H2HUB APPLICATION COVER PAGE

Project Title: Alaska Hydrogen Hub			
Exchange Control Number: 2779-1519		Geographic Region: Alaska	
Prime Applicant: Alaska Gasline Development Corporation			
Sub-Recipients/ Project Partners:	Agrium U.S., Inc., Alaska CCUS Consortium		
H2Hub Program/ Project Manager:	Brad H. Chastain, CPG	Email: Phone:	bchastain@agdc.us 907-330-6344
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Confidentiality Statement: Non-Confidential			
H_2 Production Capacity:	610 to 1,565 *(metric tons H_2/day)*	Total Period of Performance:	12 *(yrs)*
Total H2Hub DOE Funding Request:	850 *($M USD)*	Total H2Hub Non-Federal Cost Share:	3,750 *($M USD)*

For each category, please select all that apply:

Energy Feedstock:
- ☐ Renewables: _____
- ☐ Nuclear
- ☒ Fossil fuels
- ☐ Other:

_____

End-uses:
- ☒ Electric power generation
- ☒ Industrial (e.g., ammonia, steel, synthetic fuel production)
- ☒ Residential or commercial heating
- ☒ Transportation
- ☐ Other:

_____

Production Technologies:
- ☐ Electrolysis
- ☒ Thermal conversion (e.g., reforming, gasification, pyrolysis)
- ☐ Other:

_____

Connective Infrastructure:
- ☐ H_2 pipelines
- ☒ H_2 carriers
- ☐ Underground H_2 storage
- ☐ Aboveground H_2 storage
- ☐ H_2 fueling stations
- ☒ Other:

Existing natural gas pipelines, carbon capture and sequestration facility

The following concept paper has been organized to respond to the Concept Paper Requirements found in Section IV.C.i of FOA No.: DE-FOA-0002779.

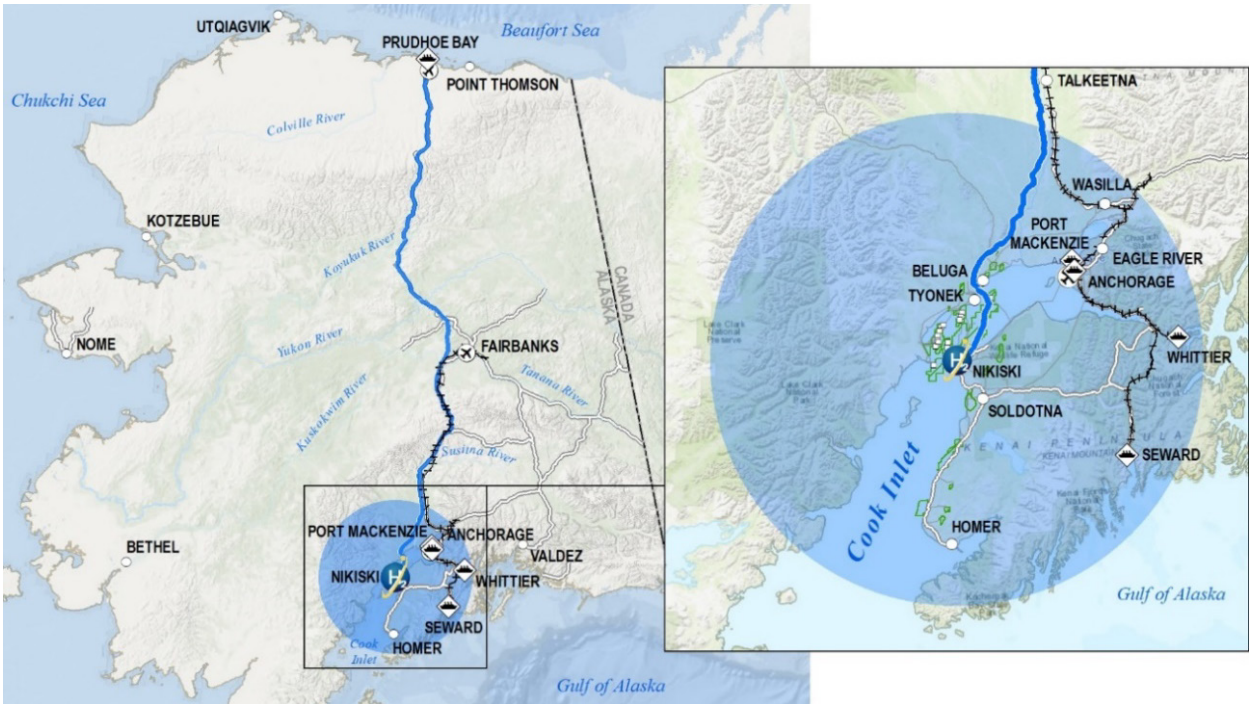
1. ALASKA HYDROGEN HUB DESCRIPTION

1.1. Proposed Integrated Alaska H2Hub

The Alaska H2Hub provides an efficient, short-term path to creating an impactful hydrogen hub located on the United States (U.S.) West Coast in Southcentral Alaska (Figure 1). The hub utilizes abundant local energy resources and leverages and repurposes existing energy infrastructure. The Alaska H2Hub concept, as shown in Figure 2, will initially generate commercial-scale, low-carbon intensity hydrogen to be used in Alaska, the Western U.S. including Hawaii, and exported to Asia markets. Hydrogen demand in Asian markets is rapidly outstripping supply during the transition to the emerging hydrogen economy, and where high levels of harmful emissions from coal-fired plants in Asia have a direct and detrimental environmental effect on Alaska and the Western U.S.

In addition to the strategic importance of providing a commercial-scale hydrogen supply based on the U.S. West Coast, the Alaska H2Hub will facilitate in-state hydrogen ecosystem use and production growth via existing infrastructure and unmatched Alaska renewable energy resources within the central hub area that is currently in the early stages of development. The Alaska H2Hub will provide the baseload supply for launching commercial-scale adoption of hydrogen throughout the Pacific Rim, resulting in significant reductions of greenhouse gas (GHG) emissions in the U.S. and the North Pacific region.

Figure 1. Alaska H2Hub Location Map

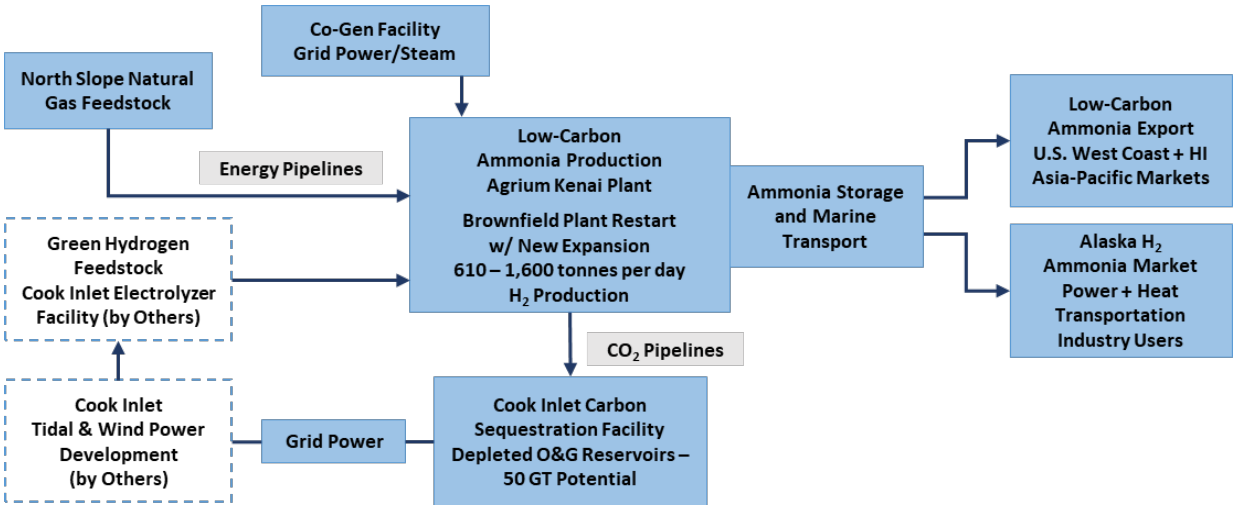


The primary Alaska H2Hub hydrogen production will be liquid ammonia (NH_3). Initial production will be through the potential restart of the existing Kenai Plant. A phased restart of both idled ammonia units will yield 3,500 tonnes per day of liquid ammonia, which equates to 610 tonnes per day of hydrogen. Carbon capture and sequestration will ultimately gather and sequester approximately 4,300 tonnes per day of carbon dioxide (CO_2). Annual expected production is 1.26

million tonnes of ammonia consisting of 221,000 tonnes of hydrogen. Possible future expansion plans under an economic and sustainable commercial business case include installation of a new autothermal reforming (ATR) plant, additional ammonia storage capacity, and expansion of the existing marine terminal to service larger cargo tankers. This expansion could more than double daily ammonia production to 8,900 tonnes per day (1,600 tonnes per day of hydrogen) and total annual production of 3.25 million tonnes (571,000 tonnes of hydrogen).

Incremental ammonia production from new greenfield ammonia facilities will be connected to Alaska H2Hub infrastructure and marketing/distribution network as they are developed by the private sector, including the advancement of supporting renewable energy projects (Figure 2).

Figure 2. Alaska H2Hub Concept



The establishment of the Alaska H2Hub infrastructure and hydrogen market is expected to enable additional hydrogen production for both in-state and export users. These products will include methanol and synthetic fuels for Alaska air and marine transportation hubs.

Hydrogen Ammonia Production at World Class Scale – Ammonia is currently the preferred carrier of hydrogen for emerging markets due to its advantages of conventional liquid storage and transportation at atmospheric pressure. Restarting the idled existing ammonia production facility (Kenai Plant), owned by Agrium U.S., Inc., a subsidiary of Nutrien Ltd. (Agrium U.S.), will result in a phased production restart capacity of 3,500 tonnes per day of low-carbon intensity liquid ammonia (610 tonnes per day hydrogen), with additional ramp-up expansion possible that could more than double total facility ammonia production. The Kenai Plant includes significant ammonia storage capacity and a marine terminal and has a long operational history of safely producing and delivering ammonia for U.S. West Coast domestic and Asia-Pacific markets.

Public-Private Partnership – The Alaska Gasline Development Corporation (AGDC) is a State of Alaska public corporation that has partnered with world-class private team members, including Agrium U.S. and the Alaska Carbon Capture, Utilization and Storage (CCUS) Consortium, that have successful track records developing, marketing, and operating similar scale ammonia and energy projects and facilities across the world. AGDC will act as the prime recipient/consortium representative for an unincorporated consortium of organizations that will comprise the

proposed Alaska H2Hub. AGDC fully meets the eligibility requirements for this role under Section III.A.i.4 of the Funding Opportunity Announcement (FOA). In the event the Alaska H2Hub proceeds to a full application, AGDC will form a new operational subsidiary that will have the sole mission of developing the Alaska H2Hub in collaboration with our identified team organizations. The public-private partnership will result in an operable venture with a consolidated governance structure that enables collaborative leverage of each member's strengths. Access to necessary hub facilities and equipment will be provided by hub members.

Long-term Feedstock Resource on Alaska's North Slope – Largest North American Proven Natural Gas Resources in Production – The North Slope of Alaska has the largest untapped natural gas resources in North America and will supply the Alaska H2Hub via the Alaska LNG Project pipeline. Recent U.S. Department of Energy (DOE) analyses of North Slope gas resources at two of the multiple existing units (Prudhoe Bay Unit and Point Thomson Unit) determined there is more than enough gas available to supply the Alaska LNG Project through its 30-year operational life.[1] This supply will provide long-term, stable methane feedstock critical for the sustainable and competitive production of hydrogen in Alaska. The Alaska H2Hub is distinctive in that it will have sustainable economics at the time of initial hydrogen production.

Cook Inlet Basin Carbon Sequestration – The Alaska H2Hub will generate low-carbon intensity hydrogen through the local sequestration of processed CO_2. The historic oil and gas producing Cook Inlet Basin in Southcentral Alaska has been estimated by geologists to have more than 50 gigatons (GT) of carbon sequestration potential[2] based on prolific geologic conditions (saline aquifers and coal beds) and numerous depleted oil and gas reservoirs located near the Kenai Plant and other industrial CO_2 point sources. The Alaska H2Hub will be the catalyst for an economic and sustainable hydrogen production complex, eventually transitioning to carbon-free hydrogen underpinned by Alaska's vast renewable resources.

Achieves DOE Clean Hydrogen Production Standards – North Slope natural gas feedstock via the Alaska LNG Project can be produced and transported via pipeline at a lower GHG intensity than other U.S. natural gas producing basins. Refurbishing and restarting ammonia production at the Kenai Plant with carbon capture and sequestration will significantly reduce CO_2 and GHG emissions from historic operating emissions levels. Ramping up expansion with a planned new ATR plant has the potential to further reduce emissions by approximately 60% and result in a lifecycle GHG emissions intensity of less than 4 kilograms CO_2 equivalents per kilogram of hydrogen, as the Alaska H2Hub matures. The development of the Alaska H2Hub Cook Inlet CO_2 sequestration facility will also establish a market for other carbon capture opportunities from existing oil and gas production facilities, refineries, and industrial natural gas power and heating operations.

Incorporates Multimodal Transportation Infrastructure within Alaska and to Domestic West Coast and Asian Markets – Hub facilities include an existing ammonia plant located in the

[1] DOE/EIS-0512-S1: Supplemental Environmental Impact Statement Alaska LNG Project (2022).

[2] Shellenbaum, D.P., and Clough, J.G. 2010. Alaska Geologic Carbon Sequestration Potential Estimates: Screening Saline Basins and Refining Coal Estimates: California Energy Commission Public Interest Energy Research.

Southcentral Alaska region with access to existing large-scale gas supply and delivery infrastructure, connected power production and transmission networks serving the largest Alaska population centers, military installations, and industrial users, and Alaska multimodal transportation infrastructure. The Alaska H2Hub is strategically located in close proximity to high-demand and developing hydrogen markets in North America, Hawaii, and Asia via existing marine transportation systems.

Unlimited Potential to Grow the Hub with Renewables for Future Hydrogen – Cook Inlet is estimated to hold upwards of 18 gigawatts (GW) of tidal power,[3] which is approximately 35% of the nation's total tidal resources. For demand-side comparison, Southcentral Alaska power needs are a mere 0.6 GW. Resource capacity significantly exceeds local demand. Additionally, offshore wind capacity within Cook Inlet is estimated at 184 GW, with an energy potential of 742 terawatt-hours per year.[4] Additional studies that further quantify Cook Inlet's offshore wind, tidal, and geothermal resources are currently underway. Onshore utility-scale wind and solar project expansions continue, spurred in part by a newly drafted State of Alaska Renewable Portfolio Standard (RPS) aiming to achieve an 80% renewable energy portfolio mix for Alaska's Railbelt utilities by 2040. The Railbelt utilities are the connected electrical utility grid generally found along the Alaska Railroad from Southcentral Alaska to Interior Alaska. The renewable power findings by the National Renewable Energy Laboratory (NREL), corroborated by recent investments in new development and expansion of existing renewable power production, catalyzed by Alaska's RPS and goals for decarbonizing the Railbelt utility grid, validate the transition of Alaska to a supplier of renewable domestic clean energy with excess supply to support a carbon-free hydrogen future.

Once the Alaska H2Hub hydrogen supply chain is re-established with ammonia production, there is significant potential for the development of hydrogen for ammonia production feedstock via electrolysis from new facilities powered by renewable energy projects developed as part of State of Alaska and Railbelt utilities' initiative to diversify grid power. Hydrogen will also serve as feedstock for developing power-to-liquid applications for Alaska's transportation industries including aviation and marine global hubs and the in-state railroad system. Additionally, there is an immediate opportunity for hydrogen blending into the existing Southcentral Alaska natural gas distribution network serving regional electric power generation and natural gas heating for large population centers in the Municipality of Anchorage, the Matanuska-Susitna and Kenai Peninsula boroughs, and Joint Base Elmendorf-Richardson.

Hydrogen produced in the Alaska H2Hub region could also be stored in portable tanks that can be barged to remote Alaska Native communities to supplement and replace expensive primary high-emissions diesel power and heat generation for their micro-grid energy systems. This effort

[3] National Renewable Energy Laboratory. 2021. Cook Inlet Tidal Energy Resource Characterization Effort. NREL/FS-5700-79933. https://www.nrel.gov/docs/fy21osti/79933.pdf.

[4] Doubrawa, P., Scott, G., Musial, W., Kilcher, L., Draxl, C., and Lantz, E. 2017. Offshore Wind Energy Resource Assessment for Alaska. Golden, CO: National Renewable Energy Laboratory. NREL/TP-5000-70553. https://www.nrel.gov/docs/fy18osti/70553.pdf.

will dovetail with the DOE Office of Clean Energy Demonstrations' $1B initiative[5] to facilitate energy improvements in rural or remote areas to decarbonize the nearly 200 energy islanded communities in rural Alaska.

There are currently a multitude of large, private sector-led renewable energy projects in development in Alaska. One example of Alaska H2Hub potential leverage is Tidal Energy Corp (TEC) and their tidal energy and hydrogen initiative to evaluate opportunities for ecosystem growth beyond the initial Alaska H2Hub. TEC is developing the Turnagain Arm Tidal Electricity Generation Project, a 137-square-mile tidal energy site with 30-foot tides situated between Anchorage, Alaska, and the Kenai Peninsula. TEC has received Pre-Application approval from the Federal Energy Regulatory Commission (FERC) (Project P-15109) for the exclusive rights to develop the site for an 8-year period. The site is ideally situated between the Chugach Electric Association and Homer Electric Association grids, and 38 miles from the Kenai Plant. TEC has identified the following scope and schedule from the Final Investment Decision (FID) for a commercialized tidal power development associated with the Alaska H2Hub.

- Resource Assessment and Feasibility Analysis (24 months) – TEC is partnering with several National Labs for preliminary site work, as well as applying for an Alaska Energy Authority grant. This work is expected to be completed by Fall 2024, with regulatory requirements, permitting, pre-engineering, secured federal funding, and private sector financing completed alongside these tasks.
- Tidal Energy Pilot 5-Megawatt (MW) Project (18 months) – Install a 5-MW tidal stream generator facility within the Turnagain Arm Tidal Energy Generation boundary. The project will have an energy storage (modular pressurized tanks/battery/other) component to keep power flowing during slack tides and be designed to scale after testing and observation into a commercial tidal project. This phase would include installation of a 5-MW low-temperature electrolysis/polymer electrolyte membrane electrolysis unit powered by the Tidal Energy Pilot unit. Includes hydrogen storage, compression, and other components to prepare the hydrogen for shipping to off taker(s).
- Tidal Energy Powered Hydrogen 50-MW Commercial Site (18-36 months) – Increase pilot scale from the Tidal Energy Pilot project by an order of magnitude to add 50 MW and an associated tidal energy powered Hydrogen Pilot Project. Additional electrolyzer capacity will be located in close proximity to ammonia production facilities in Nikiski to use the hydrogen as feedstock. Further expansion of the facilities in the 3- to- 5-year timeframe could scale up to a 500-MW commercial-scale project with a direct connection to the Alaska Railbelt grid.

1.1.1. Key H2Hub Production

Kenai Plant – Nikiski, Alaska is an industrial area in Southcentral Alaska with 60 years of activity. Nikiski is the center of onshore and offshore oil and gas support services in Cook Inlet, and has existing facilities associated with refining, liquefied natural gas export, and fertilizer

[5] DE-FOA-0002841: Request for Information Energy Improvements in Rural or Remote Areas, 2022.

manufacturing. Although historically developed, the Nikiski area has ample land for new industrial projects.

The Kenai Plant is located on 130 acres in Nikiski, owned by Agrium U.S. Thirty percent of the property is currently vacant, allowing for future plant expansions and increasingly lower carbon intensity hydrogen inputs. The main complex consists of two anhydrous ammonia plants. The plant also contains its own power and steam plants, a docking terminal for loading cargo ships, and significant maintenance and support facilities. Liquid ammonia is stored on site in interconnected 30,000-ton and 50,000-ton storage tanks. Prior to shut down in 2007, the plant was supplied with natural gas for use both as feedstock for anhydrous ammonia, and for utility power and steam generation via pipelines from various onshore and offshore Cook Inlet oil and gas fields. Since shutdown, the Kenai Plant has been maintained for potential restart.

The Kenai Plant benefits from excellent transportation logistics (Figure 3). Essentially, all products produced at the Kenai Plant are transported via ship or barge. The terminal is located in water 40 feet deep at mean lower low water and can accommodate ships 650 feet in length or 50,000 deadweight tons.

Figure 3. Kenai Plant & Terminal

1.1.2. H2Hub Feedstock

The Alaska H2Hub will be located at tidewater in Upper Cook Inlet and near extensive oil and gas infrastructure. Natural gas production in Cook Inlet is significantly depleted and cannot support the Alaska H2Hub. Feedstock natural gas will be supplied from Alaska North Slope natural gas via the Alaska LNG Project pipeline. The North Slope natural gas is already developed and has been produced and reinjected in the reservoir for more than 40 years. North Slope natural gas is a conventional resource and can be produced with minimal drilling at a fraction of the CO_2 emissions of shale gas from the Lower 48 states. The Alaska LNG Project is being developed separately and is anchored for 30 years by 40+ trillion cubic feet of discovered, conventional, and developed North Slope-associated gas from Prudhoe Bay and Point Thomson. Natural gas will be transported from the North Slope to the Nikiski liquefaction facility through an 807-mile pipeline with 3.3 billion cubic feet per day (Bcfd) capacity that includes interconnections to existing natural gas distribution pipeline networks in the Anchorage and Kenai areas. The Kenai interconnection location is near the Kenai Plant and will be tied into the existing gas distribution system that provides feedstock gas to the plant. The Kenai Plant requires 150 million standard

cubic feet per day (MMscfd) for initial ammonia production and could increase up to 375 MMscfd for the expansion of Alaska H2Hub production.

1.1.3. H2Hub Connective Infrastructure

The Alaska H2Hub is located within the existing Southcentral Alaska natural gas production and distribution pipeline networks that serve the majority of Alaska's population centers, commercial businesses, and transportation industry. This natural gas distribution network will be connected to the Alaska LNG Project pipeline to access North Slope gas resources and will enable the transport of long-term and reliable natural gas feedstock for ammonia production. The gas utility pipelines serving existing natural gas power generation and heating could also be used for future hydrogen blending. The Alaska H2Hub will include a transmission pipeline(s) from the CO_2 source at the Kenai Plant to one or more of the two target CO_2 sequestration fields in Cook Inlet, including the Middle Ground Shoal Field and the Kenai Gas Field. Several legacy pipelines are located throughout the Nikiski area and associated with the two target CO_2 sequestration fields. Existing roadways and utility easements in the Nikiski area also provide opportunity for new buried transmission pipeline routes.

The scope of Phase 1 of the project will include initial screening to determine availability and feasibility of legacy pipelines for use in CO_2 transmission, pipeline specification, new pipeline routing and alignment, and landowner and right-of-way (ROW) review.

Alaska's grid power is provided through interconnected utilities that operate the Railbelt grid system that serve communities from the Kenai Peninsula to Fairbanks, Alaska. The Alaska H2Hub ammonia and carbon sequestration facilities are located within the Railbelt utility system, which will enable it to connect to grid power. The Railbelt utilities are currently developing implementation plans to increase the diversity of the renewable power grid mix by developing wind, geothermal, and tidal power projects and expanded hydropower capabilities. The development of the Alaska H2Hub will augment the development of renewable projects and infrastructure for producing ammonia feedstock and expand electrification of hub facility heat and power.

The Alaska H2Hub is situated with ready access to the existing Southcentral Alaska marine, air, rail, and highway transportation systems that include the Port of Alaska, Ted Stevens Anchorage International Airport, the Alaska Railroad, and all major Alaska highways.

Cook Inlet CO_2 Sequestration Facility – In a 2010 study,[2] the Alaska Department of Natural Resources identified that the Cook Inlet Basin has the highest CO_2 storage potential in Alaska with an estimated 50 GT in depleted reservoirs, saline aquifers, and coal beds. More recent studies on Cook Inlet CO_2 sequestration have been conducted by the University of Alaska, Anchorage and the University of Texas, Austin and corroborate enormous Cook Inlet storage potential.[6, 7]

[6] Pantaleone, S., and Bhattacharya, S., 2021, Hydrologic and Geomechanical Characterization of the Deep Sedimentary Rocks and Basement for Safe Carbon Sequestration in the Cook Inlet Basin, Alaska. International Journal of Greenhouse Gas Control. https://doi.org/10.1016/j.ijggc.2020.103243.

[7] Pantaleone, S., and Bhattacharya, S., 2020, Potential for Carbon Sequestration in the Hemlock Formation of the Cook Inlet Basin, Alaska, AAPG. Environmental Geosciences. https://doi.org/10.1306/eg.10221919011.

Several offshore and onshore fields relatively close to Nikiski have depleted reservoirs. These fields have potential for large-scale CO_2 sequestration within the Sterling, Tyonek, and Hemlock Formations that underlie the Cook Inlet Basin. In consultation with the primary researcher who has most recently conducted Cook Inlet CO_2 sequestration studies, it is anticipated that any one of these fields at a minimum has adequate capacity and could feasibly sequester the required CO_2 volumes from 30 years of hydrogen production from the existing ammonia Kenai Plant. The preliminary sequestration facility target area is the Kenai Gas Field based on the on-going assessment of existing oil and gas reservoir and geologic data. That field, which is located within 20 miles of the Kenai Plant, has existing infrastructure ROWs for CO_2 pipeline routing. Based on a review of depleted sandstone reservoir capacity, this field is expected to have adequate CO_2 sequestration capacity for the Alaska H2Hub production. If required during future hub growth, additional sequestration capacity is anticipated to be available in two to four other depleted oil and gas fields located within a 30-mile radius of Nikiski, which share the same geologic formations and have similar sequestration capacities.

The scope of the Alaska H2Hub will include a surface compression facility and the downhole infrastructure required to sequester CO_2 through injection into suitable formations at the target CO_2 sequestration field. The scope will include evaluation of reservoir porosity and permeability, review of seismic data and structural analysis, well evaluation, review and analysis of existing reservoir production models, development of storage capacity estimates, simulation of CO_2 plumes to refine storage capacity estimates and quantify uncertainty, and development of a field verification testing program for recommended field(s).

1.1.4. H2Hub End Use

Ammonia Market Study – A 2022 market study of the North America and Asia-Pacific ammonia market was conducted for AGDC by Emergen Research in support of the development of the Alaska H2Hub. Production of ammonia is needed to meet the growing demand as a decarbonized energy source, both for its hydrogen content and as a fuel itself. Ammonia demand is increasing in the North American and Asia-Pacific markets mainly due to a worldwide shift to use cleaner low- or zero-carbon fuels and decreased carbon emissions. The North America and Asia-Pacific ammonia market is expected to grow at a Compound Annual Growth Rate over 6% in terms of market volume from 9,657 kilotons in 2022 to 15,237 kilotons in 2030. Additional factors driving ammonia demand include expanding chemical industries, rising vehicle demand using alternative fuels, government initiatives to shift toward clean energy sources, and increasing investment in research and development of cleaner energy alternatives.

Ammonia Applications and Users – Ammonia as a low-carbon fuel has a wide range of industrial applications, including transportation, power generation and industrial uses in steel, cement, and fertilizer production. As noted above, ammonia demand is expected to increase substantially over the coming decades. By 2030, the price of hydrogen and ammonia for use as chemical feedstock is predicted to be equivalent to the price of fossil fuel, which will drive the demand for ammonia in the coming years. Using ammonia and associated hydrogen for power and heating will facilitate transition away from high-emissions coal-fired plants in Asia.

Domestic Market (AK, HI, Pacific U.S.) – The Kenai Plant has long-standing and traditional ammonia market destinations on the U.S. West Coast that could be reengaged for the export of low-carbon ammonia to meet rising demand. Additionally, AGDC has had preliminary discussions with Hawaii hydrogen energy groups regarding direct shipments of Alaska ammonia to provide feedstock required to expand their hydrogen energy sector.

Alaska applications for ammonia hydrogen include industrial power and heating (including existing coal-fired plant blending), transportation users via Port of Alaska, and power-to-liquid aviation fuels at the Ted Stevens Anchorage International Airport.

1.1.5. How the H2Hub will Advance Hydrogen Production and Consumption Infrastructure in the U.S.

The Alaska H2Hub's strategic geographic location, long-term hydrogen feedstock, early market production, and existing hydrogen production infrastructure are ideally suited to advance U.S. hydrogen production and domestic and global consumption for the following reasons.

Ammonia Demand will Drive Increased Hydrogen Production and Consumption – North American ammonia demand is expected to grow significantly in the next 10 years due to the increasing shift toward zero-carbon through decarbonization, and rapid expansion of various applications including transportation and power generation, and the growing need for fertilizers to increase food production and security. The U.S. is expected to remain one of the fastest growing markets for the production and consumption of ammonia globally. Rising demand for low-carbon fuel for industrial applications is expected to drive growth in the U.S. ammonia market.

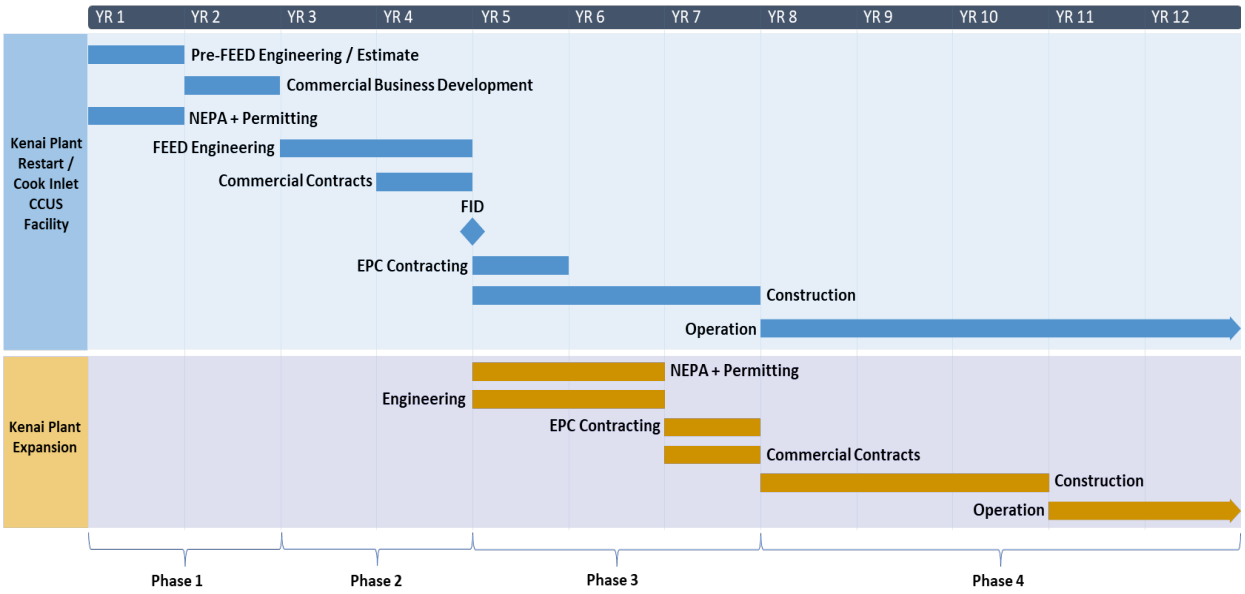
Favorable Long-term Liquid Ammonia Commodity Pricing will Drive Hydrogen Infrastructure Development Investment to Enable Sustainable Hydrogen Production – In June 2020, U.S. ammonia prices dipped to 226.50 USD per tonne before rising to 432.50 USD per tonne in February 2021. Ammonia prices jumped 34% to 580 USD per tonne in March 2021. Prices have continuously risen since then, reaching over 1,022 USD per tonne in October 2021, the highest level since 2008. Ammonia prices are often linked with natural gas prices. However, natural gas accounted for only 15% of the increase in its price in October. Long-term sales predictions show ammonia pricing staying around 1,000 USD per tonne through 2024, settling to approximately 600 USD per tonne by 2027.

Alaska Renewable Energy Resource Development will Enable Hub Expansion for Hydrogen Production and Consumption in Alaska and Domestic Export as Ammonia Hydrogen – Alaska has enormous wind, tidal, and geothermal renewable energy resources, which are currently in the early stages of development and can be accelerated with the re-establishment of the hydrogen market and State of Alaska energy diversification and security initiatives. The Alaska H2Hub operations will result in hydrogen production infrastructure and a market that will advance hydrogen production and consumption in Alaska, and other U.S. Western states.

1.2. H2Hub Preliminary Development Plan and Timeline

The Alaska H2Hub will be developed using a stage gate approach consistent with the DOE FOA, as outlined below for the Alaska H2Hub Phases 1 – 4 (Figure 4).

Figure 4. Alaska H2Hub Timeline



Phase 1 – Detailed Project Planning (Year 1-2) – Priority engineering and design activities will focus on upgrades and refurbishment of the two existing steam methane reformers at the Kenai Plant and supporting utility functions. This includes new reformers, retrofit reformer CO_2 capture systems, and new CO_2 compression facilities for offsite carbon sequestration. The objective is to complete pre-FEED-level design to enable preparation of a Class 4 cost estimate and Level 2 execution schedule in 12 months.

The Cook Inlet CO_2 sequestration facility and pipeline feasibility study and conceptual design will be completed to allow for site selection and initiation of the long lead permitting activities including required subsurface testing and modeling. Pipeline routing alternatives will be developed to allow for selection of preferred routing to initiate the required ROW acquisition and permitting activities. The overall objective for the timing of carbon sequestration facility actions is to have a completed conceptual design, Class 4 cost estimate, and Level 1 schedule that will enable preliminary cost modeling for facility operation rates and fees in 18 months.

Business development activities include establishment of an AGDC operating subsidiary that includes partner teaming agreements, governance structure, and funding mechanisms consistent with the DOE FOA requirements. Natural gas feedstock offtake agreements and letters of commitment, required for the initial restart production volumes, will be developed and executed. Marketing efforts will focus on re-establishing the Kenai Plant customer supply chain and engagement with the Agrium U.S. existing and targeted expansion customer base.

The initial phase of the Alaska H2Hub will also include development of program planning and execution elements including major permitting and National Environmental Policy Act (NEPA) assessments, development of the program management/project execution plan, and a risk management plan. It will also advance the conceptual business and financing plans, and initiate stakeholder engagement, building on the stakeholder engagement work already completed for the Alaska LNG Project.

Phase 2 – Project Development, Permitting, and Financing (Year 3-4) – Engineering and design activities for the Kenai Plant restart will advance to the FEED-level detailed design stage and enable preparation of a Class 3 cost estimate and Level 4 execution schedule, and initiate engineering, procurement, and construction (EPC) planning and procurement activities to facilitate a FID. This phase is targeted for completion within a 2-year timeframe. Pre-FEED activities will be started for the Kenai Plant expansion, which will include a new ATR plant, increasing ammonia storage, and expanding marine terminal dock facilities.

Engineering and design activities for the Cook Inlet CO_2 sequestration facility and pipeline will be advanced in the same timeframe to the detailed design stage to enable preparation of a Class 3 cost estimate and Level 4 execution schedule, and initiate EPC planning and procurement activities for FID will be initiated. Business development activities will include securing feedstock and customer offtake agreements, confirming project financing, and commitments for project labor and community engagements. The permit acquisition plan and completion of the NEPA process will include planning milestones and alignment with construction execution critical path requirements.

Phase 3 – Installation, Integration, and Construction (Year 5-7) – Pending FID and DOE funding authorizations, EPC contracts will be executed for construction of the Kenai Plant restart upgrades and Cook Inlet CO_2 sequestration facility and pipeline. Engineering and design activities will be progressed to FEED level for the Kenai Plant expansion. Business development and marketing activities will be matured to operational status for planning offtake shipments.

Phase 4 – Ramp-Up and Sustained Operations (Year 8-12) – Operation of the Kenai Plant restart and Cook Inlet CO_2 sequestration facility and pipeline will commence. Advanced engineering and design activities through detailed design and EPC planning will take place for the Kenai Plant expansion to facilitate FID and commencement of construction to achieve ramp up and sustain operations. Renewable feedstock ammonia production will be incorporated as future renewable energy electrolysis projects come online.

1.2.1. Impact of Proposed Project on Hydrogen Production and Consumption

Initial Large Quantity Production to Market – Average production is expected to be 3,500 tonnes per day of low-carbon intensity ammonia, equating to 610 tonnes per day of hydrogen. Annual expected production will be 1.26 million tonnes of ammonia, consisting of 221,000 tonnes of hydrogen.

Existing Market and Supply Chain – The Kenai Plant has a long-standing and developed supply chain connected to existing markets in North America and Asia to provide ammonia for consumption by a wide range of users.

Ramp Up Expansion and Market Lift-off – Future expansion plans will increase daily ammonia production to 8,900 tonnes per day (1,600 tonnes of hydrogen per day) and total annual production of 3.25 million tonnes (571,000 tonnes of hydrogen), nearly 6% of the DOE 2030 hydrogen production goal of 10 million tonnes per year.

Reduced Lifecycle GHG Emissions – Development of the carbon sequestration facility within the Alaska H2Hub and completion of the plant expansion using ATR will reduce the lifecycle GHG

emissions for Alaska ammonia production by approximately 60% and enable attainment of the DOE's proposed clean hydrogen production standard.

1.2.2. Key Risks and Challenges

The Alaska H2Hub concept was developed to mitigate key risks in feedstock supply, large-scale production capabilities, and the user market. Accordingly, the hub is founded on a proven long-term, world-scale, feedstock source in Alaska North Slope natural gas, and an existing ammonia production facility with an established market of customers and users. The key risks and challenges for that foundation is the timing and delivery of gas via the Alaska LNG Project, completion of FEED and a FID-level cost estimate, and NEPA/permitting acquisition.

AGDC is currently working with existing and potential partners to progress commercial agreements needed to proceed to final design, FID, and construction of the Alaska LNG Project. The evaluation of environmental impacts required under NEPA has been completed, and all major permits and authorizations required for construction have been obtained.

Nutrien is currently completing a preliminary engineering study for the restart of the Kenai Plant, which is necessary to determine the basis of design and program plan to address major cost, schedule, and supply chain challenges and risks. The Kenai Plant has maintained its operating permits, include critical air permits, to reduce permitting risks with plant restart.

1.3. Meeting FOA Objectives and Impact of DOE Funding on the Project

As described in Section 1.2.1 above, the Alaska H2Hub clearly meets objectives of the FOA and intended DOE funding impacts. Key items are summarized below:

- Alaska H2Hub will be capable of producing impactful, commercial-scale quantities of low-carbon intensity hydrogen that exceed the FOA rate of at least 50-100 tonnes per day.
- Long-term and sustainable feedstock combined with utilization of an existing and proven ammonia production facility operated by world-class private sector partners with an established market and end users will provide the backbone for long-term financial and operational viability.
- Development of the Alaska H2Hub hydrogen supply chain will drive the development of hydrogen for future ammonia production feedstock via electrolysis from new facilities powered by renewable energy projects; these projects are being developed as part of the State of Alaska and Railbelt utilities' initiative to diversify the grid power that would facilitate Alaska market lift-off.
- The Alaska H2Hub can meet the DOE's proposed clean hydrogen production standard and deliver significant community benefits (as described in Section 2).

2. COMMUNITY BENEFITS

The Alaska H2Hub is founded on re-establishing the Alaska ammonia production industry, that historically served as a critical driver in Southcentral Alaska's economy for over 40 years, with new clean hydrogen capabilities. The Alaska H2Hub area is ideally located to provide significant engagement and energy and economic benefits to several Disadvantaged Communities (DACs) in rural Alaska, as well as Alaska Native and tribal communities within the hub area.

Demonstrated History in Labor Engagement and Workforce Development of Quality Jobs – The Kenai Plant established a labor union workforce for operating the plant and a long history of community and training organization engagement that resulted in development of a highly qualified workforce to fill quality, higher wage jobs.

Demonstrated Significant Alaska Native and Tribes Engagement and Partnering – The Alaska H2Hub ammonia production and carbon sequestration facilities are located within the Kenaitze and Salamatof Tribal Alaska Native Village Statistical Areas (ANVSAs). AGDC has an existing relationship with Salamatof Native Association, an Alaska Native Village Corporation, and has engaged them as a key stakeholder in the hub development. AGDC has successfully engagement with Alaska tribal entities and Alaska Native Regional and Village Corporations across the State of Alaska.

The Kenai Plant has a long history of recruiting, hiring, and developing Alaska Native and tribal personnel for quality jobs, as well as engagement with and support of Alaska Native organizations. The Alaska CCUS Consortium includes one of Alaska's major Alaska Native Corporations, as well as other corporate members who have a track record of supporting Alaska Natives.

Alaska's Exceptional Track Record on Responsible Environmental & Natural Resource Stewardship – Alaska resource development projects are subject to some of the most stringent environmental and resource management requirements in the world. Accordingly, project developments in Alaska model responsible environmental and resource stewardship and provide significant benefits to communities in terms of mitigated impacts, economic opportunities, and sustainable resource management.

2.1. Community and Labor Engagement

AGDC has maintained a fully developed and performing Stakeholder Engagement Program since 2013, which was instrumental in the development of the Alaska LNG Project and encompasses the Alaska H2Hub area. The program includes the following:

- A Stakeholder Engagement Management Database, which to date, includes active engagement tracking and management of more than 2,100 stakeholders, including 555 community members, 69 communities/NGOs and 152 local governing entities and agencies, 263 Alaska Native and tribal entities and organizations, 39 labor and trade groups, 276 industry and utilities representatives, 148 landowners, and 474 state and federal agencies and legislative representatives.
- AGDC has received 13 unique resolutions of support from communities across Alaska.
- Community engagement outreach tools include face-to-face meetings, public workshops, website and social media platform tools, and contracting solicitations.
- A 10-year track record of documented successful engagement on energy infrastructure projects from concept selection, permitting, engineering, and construction execution planning phases.

AGDC has been working with multiple labor organizations since 2017, has established a framework of critical labor acquisition objectives, as stated in the Alaska Department of Labor's

"Alaskans First" initiative to maximize opportunities for increasing the quantity and quality of skilled Alaska labor resources. This resulted in a 2018 Memorandum of Agreement for building and trade councils to provide the framework for future binding Project Labor Agreement contracts with AGDC's EPC Contractors.

In addition, Agrium's Kenai Plant has a 30-year history of meaningful and successful engagement of the community and labor organizations. The following are a few representative examples of their efforts and results:

- The Kenai Plant's hourly workforce was represented through the Oil Chemical and Atomic Workers Union (OCAW Local 1-369) since 1990. OCAW transitioned to Paper, Allied-Industrial, Chemical and Energy Workers Union (PACE Local 8-0369) in 2000. In 2005, PACE transitioned to United Steelworkers (USW Local 8-0369). Ninety-five percent of the represented employees were active union members, which included approximately 175 full-time employees/residents of the Kenai Peninsula.
- Kenai Plant employees participated in numerous community service organizations that support United Way campaigns, Chamber of Commerce functions, Boys and Girls Clubs, the Kenai Peninsula Food Bank, the Alaska Wounded Warriors program, and numerous young women and men's athletic teams, programs, and events. The facility was recognized by the State of Alaska as Exporter of the Year repeatedly over the past 50 years.
- The Kenai Plant leaders initiated and sponsored the Caring for the Kenai Environmental Stewardship program, an environmental awareness program that offered annual competitive scholarships to Kenai Peninsula high school seniors. Agrium supported this competition in its entirety. The program received national recognition from the White House in the late 90s.

2.2. Investment in American Workforce

AGDC will leverage the recent collaboration with the Alaska Department of Labor on the development and deployment of a focused workforce development program to support the Alaska LNG Project. The program was formed to support the estimated 12,000 direct jobs created during construction and the 1,000 long-term operations jobs once commissioned. Another 6,000 new long-term jobs are expected as a result of the indirect economic impact. The Alaska LNG workforce program recognized the need to combat Alaska's high unemployment rates by training Alaskans in preparation for future employment opportunities. Construction and operation of the Alaska H2Hub will similarly provide a foundation for the future prosperity of our state.

Likewise, the Kenai Plant will continue to actively support and promote industry training programs, as it did during previous operations. For example, the Kenai Plant advocated hiring interns from within various courses at Kenai Peninsula Community College (KPCC) and hiring employees from within the Instrumentation Tech and Petro Tech programs, (of which the Kenai Plant helped to establish). KPCC continues to utilize the Kenai Plant as an avenue for 'hands-on' training demonstrations for students in various programs.

2.3. Advancing Diversity, Equity, Inclusion, and Accessibility

AGDC's existing human relations, stakeholder engagement, and external affairs program are built around principals that foster a welcoming and inclusive environment, support all groups of

people, including those underrepresented in science, technology, engineering, and mathematics, advance equity, and encourage the inclusion of individuals from these groups in all phases of AGDC's larger statewide programs.

The Kenai Plant made a concerted effort to advance diversity, equity, inclusion, and accessibility. This effort included hiring full-time staff from local Alaska tribal groups and other minority status individuals within the operations, maintenance, and administrative staff; hired and provided advancement for women to key operations roles; and hired nearly 30 veterans for full-time Kenai Plant operations jobs.

2.4. Contributing to the Justice40 Initiative Goal

AGDC and their team members have implemented large-scale and successful programs and project development plans for community and stakeholder engagement and meaningful participation. AGDC's commercialization of stranded, low-carbon intensity, North Slope natural gas will provide Alaska communities with cleaner energy and economic opportunities. The footprint of the AGDC development statewide program encompasses many of the DOE's identified DACs in Alaska, including large areas of tribal ANVSA lands and Alaska Native Regional and Village corporations. The Alaska H2Hub further meets AGDC's clean energy and economic opportunity objectives by facilitating the transition to a cleaner hydrogen energy that can be deployed in remote villages to replace diesel-powered electricity and heating. The associated hydrogen infrastructure will provide social and economic benefits.

The Alaska H2Hub low-carbon intensity ammonia production and carbon sequestration facilities are located within the Kenaitze and Salamatof Tribal ANVSAs. The larger Alaska H2Hub area that will deliver climate and clean energy benefits encompasses five additional ANVSAs tribal DACs, as shown in Table 1. Additionally, Table 1 summarizes AGDC's long-standing engagement activities in their project development programs.

Table 1. AGDC Engagement with Alaska Tribal DACs

DACs	Organizations	Number of Engagements
Chickaloon ANVSA (6290R)	Chickaloon Moose Creek Native Association, Inc. Chickaloon Native Village Chickaloon Village Traditional Council	45 since 2015
Eklutna ANVSA (6450R)	Eklutna, Inc. Eklutna Native Corporation Eklutna Tribe Native Village of Eklutna	28 since 2014
Kenaitze ANVSA (6720R)	Kenaitze Indian Tribe	43 since 2014
Knik ANVSA (6785R)	Knik Tribal Council Knik Tribe	70 since 2014
Ninilchik ANVSA (7080R)	Ninilchik Native Association Ninilchik Traditional Council Ninilchik Tribal Council	28 since 2015
Salamatof ANVSA (7400R)	Salamatof Native Association, Inc.	49 since 2015
Tyonek ANVSA (7655R)	Native Village of Tyonek Tyonek Alaska Group, Inc. Tyonek Native Corporation	87 since 2014

3. PROJECT TEAM DESCRIPTION

3.1. H2Hub Project Team Organization and Roles

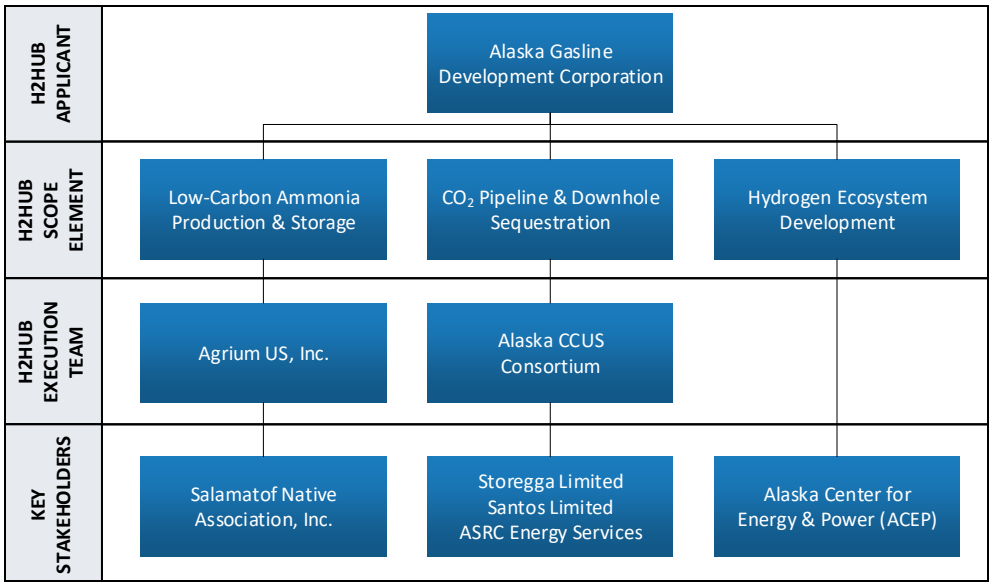
The Alaska H2Hub is being developed as a public-private joint infrastructure project using a consortium approach of public and private sector team members.

3.1.1. H2Hub Team Organizational Structure and Governance

Alaska Gasline Development Corporation – AGDC is the FOA applicant and was created by the Alaska State Legislature, as codified in Alaska Statutes, Title 31, Chapter 25. AGDC is an independent instrumentality of the State of Alaska, incorporated in the State of Alaska, and is governed by an independent Board of Directors appointed by the Governor of Alaska. AGDC has broad statutory authority to develop business and work directly in partnership with private companies. AGDC has a unique ability to work across the State of Alaska and the Pacific Rim. Additionally, the corporation has the power to form operational subsidiaries to pursue infrastructure development in accordance with its statutory mission. As the prime recipient/ consortium representative for the unincorporated consortium of organizations that will comprise the proposed Alaska H2Hub, AGDC will form a new operational subsidiary to develop the Alaska H2Hub under a teaming agreement with the identified team members. This operational subsidiary will be incorporated in the State of Alaska, will be an extension of AGDC, and will meet the FOA eligibility requirements.

AGDC proposes a simplified governance structure, whereby AGDC functions as the integrator of the Alaska H2Hub and administers DOE grant funding in accordance with the minimum 50% private sector cost sharing. AGDC intends for each primary team member to have a defined scope of work within the Alaska H2Hub and expend their own funds directly at 50% or greater of total cost under an agreed-upon budget and schedule. AGDC will be responsible for documenting private sector cost matching to DOE and accounting for appropriate DOE grant allocation fully meeting the DOE program requirements. A possible Alaska H2Hub organization structure includes anticipated applicant and team member roles, as shown in Figure 5.

Figure 5. Alaska H2Hub Organization Structure



Following the Concept Paper stage of the procurement process, and in the event AGDC proceeds with submittal of a Full Application, AGDC and Alaska H2Hub team members will enter negotiations for a definitive Alaska H2Hub Teaming Agreement (articles of collaboration) that will define the commercial terms to fully execute the Alaska H2Hub, as defined in the Full Application. The intent is to execute the Teaming Agreement prior to submission of the Full Application.

The Teaming Agreement will bring the individual consortium members together and will include the consortium's management structure, method of making payments to consortium members, means of ensuring and overseeing members' efforts on the Alaska H2Hub, provisions for team member direct cost sharing expenditures, and provisions for ownership and rights in any intellectual property developed previously or under the agreement. General and Administrative costs associated with the operation of AGDC's subsidiary corporation will be defined in the Teaming Agreement. If it is determined the consortium includes foreign members, AGDC will submit a separate explicit written waiver request in the Full Application for each foreign member.

Agrium U.S., Inc. – Nutrien via their subsidiary company, Agrium U.S., owns and operates the Kenai Plant and site property and will be a key teaming partner in the Alaska H2Hub. Nutrien is a world-class company that produces and distributes more than 27 million tonnes of potash, nitrogen, and phosphate products for agricultural, industrial, and feedstock customers worldwide. They are the third-largest nitrogen producer in the world, with more than 7 million tonnes of gross ammonia capacity and the ability to produce more than 11 million tonnes of total nitrogen products in the U.S., Canada, Trinidad, and Argentina.

3.1.2. Cook Inlet CO_2 Sequestration Facility

Alaska CCUS Consortium – The CCUS Consortium has been identified as a key private sector team that will play a central role in Cook Inlet ammonia generation at commercial scale. The Alaska CCUS Consortium companies include ASRC Energy Services, LLC (AES), Oil Search (Alaska), LLC—a subsidiary of Santos Limited (Santos), and Storegga.

AES is a wholly owned subsidiary of Arctic Slope Regional Corporation, the largest of Alaska's 13 Native Regional Corporations. AES is comprised of several business units offering services for all phases of oil and gas project development, engineering, and design. Recently, AES has been involved in several federal grants seeking innovative solutions for operations in the Arctic. This includes serving as the lead facilitator for design, engineering, permitting, drilling, and operations in DOE's National Energy Technology Laboratory research and development project to investigate the resource potential of methane gas hydrates in the Prudhoe Bay Unit on the Alaska North Slope. AES also has existing oil and gas commercial operations within the Alaska H2Hub area and operates the Rig Tenders Marine Terminal in Cook Inlet.

Santos is an international oil and gas exploration and production company. Santos is the operator of the Pikka Unit and is currently developing the $2.6B Pikka Phase 1 oil project located on the Alaska North Slope. Consistent with Santos' goal of achieving net-zero (scope 1 and 2 emissions, equity share) by 2040, Santos has committed to delivering Pikka Phase 1 as a net-zero oil project (scope 1 and 2, equity share). Santos has entered into Memorandums of Understanding with Alaska Native Corporations to deliver carbon offset projects, including a Strategic Alliance with AES, on leading technology development for carbon solutions in the Arctic.

Storegga was established in 2019 as an independent champion for the development of carbon reduction and removal technologies. Storegga is the lead developer of the Acorn carbon sequestration project in Northeast Scotland, in partnership with Shell, Harbour Energy, and North Sea Midstream Partners. In 2022, Storegga established a U.S. presence and is currently working with AES and Santos on carbon capture and sequestration development projects in Alaska.

Salamatof Native Association, Inc. (SNAI) – SNAI is an Alaska Native Village Corporation with more than 200 shareholders. SNAI has corporate offices and is headquartered in Kenai, Alaska. Their mission is to preserve and protect its culture and heritage and promote pride by enriching and educating its youth for the future. Teya Development, LLC (Teya), a wholly owned by SNAI, is a Small Business Administration (SBA) 8(a)-certified Alaska Native Village Corporation, and is an SBA Small Disadvantaged Business. As a leader in the federal contracting market, Teya has the manpower, experience, resources, line of credit, and bonding capability to ensure the successful completion of multiple projects simultaneously with minimal risk. Teya currently has 860 employees nationwide, with revenues of more than $100M.

3.1.3. H2Hub and Hydrogen Ecosystem Development

Alaska Center for Energy & Development (ACEP) – Established in 2007, ACEP is a statewide, university-led, applied research program based at the University of Alaska, Fairbanks. They are dedicated to applied energy research related to community- and industry-scale power generation, transmission, heating, and transportation fuels. ACEP is focused on lowering the cost of energy throughout Alaska and developing economic opportunities for the state, its residents, and its industries.

ACEP provides leadership in developing energy systems for islanded, non-integrated electric grids and their associated oil-based heating systems. ACEP prioritizes work in areas where Alaska has specific needs or where Alaska has a strategic advantage due to resource availability, unique circumstances, or location. They focus on the integration of solutions and maintain extensive relationships with communities, utilities, and energy project stakeholders across Alaska and have the reputation as an objective, technically capable, and respectful partner. ACEP currently leads the state-wide Alaska Hydrogen Energy Working Group, a group of diverse stakeholders focused on the hydrogen energy future of Alaska.

3.2. Project Team Experience

AGDC and Nutrien: Proven Track Records in World-Class Energy Project Development – AGDC has been the lead party in the development, engineering, permitting, and construction planning for two world-class energy infrastructure projects in Alaska, as outlined below. AGDC's unique public sector charter and broad statutory authority enable it to develop projects and work directly in partnership with private companies to deliver large integrated projects.

- Alaska LNG Project – $38B integrated project that includes a 4-Bcfd gas treatment plant in Prudhoe Bay, an 807-mile mainline pipeline with 3.3 Bcfd capacity to transport North Slope natural gas to Nikiski, and a 20-million metric ton per annum liquefaction facility and marine terminal in Nikiski for export of LNG to Asia-Pacific customers. The project has completed detailed Pre-FEED engineering and NEPA environmental impact statement activities and has all major federal permits and approvals in place, including a FERC Section 3 authorization to

construct and a DOE LNG export license. The project is poised to proceed to final engineering and construction phases.

- Alaska Stand Alone Pipeline Project – $10B integrated project consisting of a North Slope gas conditioning facility, 727-mile 36-inch pipeline, and offtake lateral pipelines in Fairbanks and Anchorage for in-state natural gas consumption of approximately 500 MMscfd. The project was developed to deliver natural gas from the North Slope to Fairbanks and Southcentral Alaska, to provide affordable, long-term energy to as many communities as practicable. AGDC was the lead party and project sponsor responsible for executing a $360M program to complete the design, NEPA/permitting process, and EPC procurement and planning.

Nutrien realized annual revenue in excess of $27B on $50B of assets, and deployed sustaining and investment capital expenditure programs totaling $1.8B in 2021. In July 2021, Nutrien announced they have teamed up with the DOE and other partners to explore flexible zero-carbon ammonia production, helping to facilitate the global transition to low-carbon fertilizers.

In May 2022, Nutrien announced that it is evaluating Geismar, Louisiana as the site to build a world-class clean ammonia facility. Building on the company's expertise in low-carbon ammonia production, ammonia will be manufactured using innovative technology to achieve at least a 90% reduction in CO_2 emissions. The project will proceed to the FEED phase, with FID expected to follow in 2023. If approved, construction of the approximately $2B facility will begin in 2024, with full production expected by 2027.

3.3. Project Team Working Relationship History

AGDC has been working collaboratively with Nutrien and their Kenai Plant for the past 2 years on several technical and commercial development initiatives involving natural gas feedstock, plant restart alternatives, and joint carbon reduction concepts. These efforts include the private sector-led Cook Inlet Blue Ammonia Feasibility Study, currently underway. AGDC has worked with ACEP and Alaska CCUS Consortium parties since 2021 on Alaska hydrogen development and joint carbon capture and sequestration opportunities.