The Abundance of Cook Inlet Alaska's Hydrogen Opportunity

ALASKA ** **GASLINE** ** DEVELOPMENT CORP.

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Alaska's Hydrogen Opportunity



H Alaska Hydrogen Opportunity

50 years ago, the modern LNG industry was created in Alaska. For many of the same reasons, the clean hydrogen industry can also be created here in Alaska.

Carbon Storage and Sequestration at the Project Site on Tidewater

Short Distance to Growing Clean Hydrogen Markets in Asia

Low GHG Natural Gas from Conventional Supply Existing Ammonia Plant well Positioned to be First Mover in Market

Clean Hydrogen

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Natural Gas



Methane hydrocarbon releases CO₂ when burned, somewhat difficult to store and transport

Hydrogen



Fuel releases no CO₂ when burned, very difficult to store and transport

Ammonia



Fuel releases no CO₂ when burned, somewhat easy to store and transport

Conversion of Natural Gas

- Natural gas can be converted into hydrogen and then into ammonia
- The existing Nutrien ammonia plant in Nikiski uses this process

CO₂ Sequestration

- The process to convert natural gas into hydrogen and ammonia produces CO₂
- If this CO₂ is captured and sequestered, the resulting "Blue Ammonia" is a clean fuel

Hydrogen vs Ammonia

- Both hydrogen and ammonia are "clean fuels" and do not emit CO₂ when burned
- Hydrogen is converted into ammonia to make storage and transportation easier
- Ammonia is included in projections of clean hydrogen demand

Alaska's Hydrogen Opportunity





Source: West Coast Regional Carbon Sequestration Partnership

Cook Inlet Advantages



Cook Inlet has been identified as having the best CO_2 sequestration potential on the Pacific Coast of North America.



Source: Alaska Geologic Carbon Sequestration Potential Estimate: Screening Saline Basins and Refining Coal Estimates



Cook Inlet Advantages

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Shipping Costs

- Alaska is one of the closest potential sources of clean fuel to Asia
- Lower shipping costs are key advantage for early clean hydrogen projects



Relative shipping costs calculated using methodology and cost estimates published in "Comparative cost assessment of sustainable energy carriers produce from natural gas accounting for boil-off gas and social cost of carbon" by Mohamad Al-Breiki, Yusuf Bicer. 2020

Proximity to Sequestration Basin

- Carbon sequestration on Pacific tidewater is advantage for exporting to Asia
- No need for long CO₂ or hydrogen/ammonia pipelines



Major North America Gas Fields

Cook Inlet Blue Ammonia

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Blue Ammonia can be developed in phases to match the growing Asian market and technology developments. Alaska can be fuel source for Asia as they transition from burning: Coal -> LNG -> Blue Ammonia



Feasibility Study & Design

- Assess the feasibility of restarting the Nutrien Kenai Ammonia plant and sequestering CO₂
- Partner with international industry
- Industry and government funding (not State)

Initial Production

- Upon sanction of the Alaska LNG pipeline, the Nutrien plant restart for export
- CO₂ is sequestered in Cook Inlet, proving out basin's potential
- First commercial supply of blue ammonia

Net-Zero Future

- Utilize additional pipeline capacity for clean energy exports (and instate demand)
- Decarbonize the full value chain to export net-zero energy from Alaska

DOE Hydrogen Hub Concept



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