ALASKA STATE LEGISLATURE
SENATE RESOURCES STANDING COMMITTEE
April 6, 2022
3:34 p.m.

MEMBERS PRESENT

Senator Peter Micciche, Vice Chair
Senator Gary Stevens
Senator Natasha von Imhof
Senator Jesse Kiehl

MEMBERS ABSENT

Senator Joshua Revak, Chair
Senator Click Bishop
Senator Scott Kawasaki

COMMITTEE CALENDAR

ALASKA GASLINE DEVELOPMENT CORPORATION LIQUEFIED NATURAL GAS (LNG) PRESENTATION

- HEARD

SENATE BILL NO. 177
"An Act relating to microreactors."

- RESCHEDULED TO 4/8/2022

SENATE BILL NO. 228
"An Act requiring the designation of outstanding national resource water to occur only by statute; relating to the management of outstanding national resource water by the Department of Environmental Conservation; and providing for an effective date."

- SCHEDULED BUT NOT HEARD

WITNESS REGISTER

FRANK RICHARDS, PE; President
Alaska Gasline Development Corporation
Anchorage, Alaska
POSITION STATEMENT: Co-presented a PowerPoint on Alaska LNG.

NICK SZYMONIAK, Manager
Venture Development
Alaska Gasline Development Corporation
Anchorage, Alaska
POSITION STATEMENT: Co-presented a PowerPoint on Alaska LNG.

ACTION NARRATIVE

3:34:00 PM
VICE CHAIR PETER MICCICHE called the Senate Resources Standing Committee meeting to order at 3:34 p.m. Present at the call to order were Senators Stevens, Kiehl, von Imhof, and Vice Chair Micciche.

Alaska Gas Development Corporation
Liquefied Natural Gas

3:34:45 PM
VICE CHAIR MICCICHE announced the consideration of the Alaska Gasline Development Corporation Liquefied Natural Gas presentation.

3:35:49 PM
NICK SZYMONIAK, Manager, Venture Development, Alaska Gasline Development Corporation, Anchorage, Alaska, introduced himself.

3:35:51 PM
FRANK RICHARDS, PE; President, Alaska Gasline Development Corporation, Anchorage, Alaska, stated that when the AGDC enabling legislation passed the legislature, it directed AGDC to provide updates three times per year to the House and Senate Resources Committees.

3:36:16 PM
MR. RICHARDS reviewed slide 2, Alaska LNG System, consisting of a map of Alaska showing the location of the North Slope Gas Supply & Gas Treatment Plant (GTP), the Natural Gas Pipeline, and the Alaska LNG Facility, and bullet points.

[Original punctuation provided.]

North Slope Gas Supply

- 40 Trillion cubic feet (tcf) of discovered, conventional, and developed North Slope associated gas from Prudhoe Bay and Point Thomson

- This gas is stranded and can be produced at a low incremental cost

Gas Treatment Plant

- Located in Prudhoe Bay adjacent to existing gas plants
- Removes and uses/sequesters carbon dioxide (CO2) and hydrogen sulfide (H2S) from raw gas stream

Natural Gas Pipeline

- 807-mile pipeline from Prudhoe Bay to Nikiski, following TAPS and highway system
- Provides gas to Alaskans and LNG facility

Alaska LNG Facility

- 20 Million tonnes per annum (Mtpa) LNG facility located in Nikiski, near existing infrastructure and legacy Kenai LNG plant
- Converts natural gas to LNG for export to Asia

3:36:13 PM

MR. RICHARDS reminded members that the Alaska LNG Project speaks to an LNG system that has the ability to commercialize the natural gas resources found on the North Slope. He stated that this consists primarily of methane that comes from Prudhoe Bay and Point Thomson units representing about 40 trillion feet (tcf) of proven reserves, or gas produced on a daily basis. It comes up with oil and water, is captured, compressed, and pumped into the reservoir for gas cap pressurization. He highlighted that Point Thomson hydrocarbons are stripped out and the gas is repressurized and pumped into the reservoir. He indicated the state's goal was to commercialize its gas to enhance state revenues but ultimately to provide for lower-cost energy for Alaskans for Southcentral and Interior Alaska, including the Fairbanks North Star Borough. Further, those not able to tap into the pipeline would receive benefits from a revenue stream, through an In-state Energy Fund that could meet the needs of energy projects not part of the gas pipeline route.

3:38:01 PM

MR. RICHARDS stated that the 40 tcf represent the 20 million tonnes per annum (Mtpa) that could be produced at a liquefaction facility. However, to do so requires removing carbon dioxide (CO2) and hydrogen sulfide (H2S) impurities from the oil reservoirs. He indicated that would be captured in a gas treatment plant (GTP) at the Prudhoe Bay operating complex,

piped to the reservoir and reinjected. Other jurisdictions allow the CO2 to be vented, but in keeping with the environmental "green" perspective, it was always envisioned and designed to be sequestered and reinjected.

MR. RICHARDS explained that the Natural Gas Pipeline would parallel the Trans-Alaska Pipeline System (TAPS) for the first 407 miles, turn south and parallel the Alaska Railroad and Parks Highway before crossing Cook Inlet and terminating in Nikiski at the site of a new LNG facility. The facility would produce up to 20 Mtpa destined for Asian markets. He highlighted that they would have a seven to nine day shipping window so it is not effective to ship elsewhere. The legislature directed AGDC to make gas available to Alaskans so 500 million cubic feet (MCF) would be reserved to meet Alaska's energy needs at lower costs.

3:40:21 PM
MR. RICHARDS reviewed the bullet points on slide 3, Alaska LNG Status. The slide depicted a globe showing the proposed shipping route from Alaska to the Asia Pacific.

Strong Economics

- Alaska LNG has lower costs than its key competitors
- Cost of supply independently verified

Fully Permitted

- Federal government has approved construction of Alaska LNG
- Acquiring permits took significant effort and they are valuable

Environmental Benefits

- Alaska LNG will reduce global greenhouse gas emissions
- LNG will continue to be an important energy source

3:40:40 PM
MR. RICHARDS stated that the Alaska LNG project has been deemed an economic and competitive project. Wood Mackenzie, a global research and consultancy firm, provided their independent economic analysis to the legislature yesterday, and deemed the Alaska LNG project as an economic, competitive project for the Asian market.

MR. RICHARDS reviewed the permitting status and environmental benefits as shown on the bullet points. AGDC received federal permitting authorizations from the Federal Energy Regulatory Commission authorization to construct the project, and the Department of Energy's approval to sell Alaska's LNG to free-trade and non-free-trade countries. AGDC was granted the rights-of-way from the Bureau of Land Management, National Park Service and the Alaska Department of Natural Resources. The project is one of the lowest carbon-intensive projects in the world. LNG will replace coal in Asia as a power source, which could substantially reduce CO2 emissions from their power plants.

3:42:28 PM
SENATOR VON IMHOF inquired about the map on slide 3 showing an ice-free arctic.

MR. RICHARDS answered that it shows the Arctic Ocean and the Beaufort Sea but it was not ice free yet.

SENATOR VON IMHOF suggested that drawing a line between Prudhoe Bay and Scandinavia, the distance would be about the same as the Asia Pacific route. She wondered if using icebreakers would result in a much faster trip.

MR. RICHARDS replied that it would take substantial icebreakers to use that route.

3:43:44 PM
MR. RICHARDS reviewed slide 4, Strong LNG Market, including the line graph and bullet points. He noted that Gas Strategies, a natural resource consulting firm based in London, forecasts mirrored work done by BP, TotalEnergies, and other international oil companies. He directed attention to the gray area depicting the supply and the line graph projections of the future LNG demand. The two scenarios incorporate the net-zero targets that Asian countries need to reduce their CO2 emissions. The green line shows the decarbonization demand scenario Asian countries would meet by their 2050 target dates. The black line shows a partial transition to the decarbonization, and the horizontal bar shows how the Alaska LNG project fits in the demand curve. He highlighted that it represents a small amount of the demand.

[Original punctuation provided.]

LNG Market is Still Growing

- Demand growth will outpace current and planned LNG capacity

- LNG growth expected as part of energy transition as natural gas emits half the greenhouse gasses as coal

Investors and Buyers want LNG

- New LNG projects expected to be sanctioned in 2022
- Most new projects have some degree of energy transition planning

"…raising capital for these very capital-intensive [LNG] projects has not really been that much of a challenge to the industry. I think that sends a strong signal of confidence that this [LNG] is going to be around for a while." -Dan Brouillette, President of Sempra Infrastructure on NPR's Marketplace (Jan 3, 2022)

3:46:11 PM
MR. RICHARDS directed attention to a quote on the slide from Dan Brouillette, President, Sempra Infrastructure that signaled the company's confidence that LNG has growth opportunity.

3:46:57 PM
SENATOR VON IMHOF commented that some projects yield higher returns because they are less complicated. Having served on the committee for six years, she had seen AGDC's LNG presentation. She said global supply and demand appears more promising than ever, although it is still costly in Alaska. She indicated it was significant that rather than solely relying on China's funding, the Alaska LNG project would provide a mixture of public and private and domestic and international funding sources from federal government loans.

MR. RICHARDS suggested that she was referring to the federal loan guarantee program.

SENATOR VON IMHOF said borrowing is expensive. She indicated that she did not like AGDC's prior reliance on China's financing, so she found the financing changes significant.

MR. RICHARDS responded that a later slide would demonstrate the non-recourse toll model. Mr. Szymoniak would explain how this has reduced costs making the project competitive.

3:48:35 PM

VICE CHAIR MICCICHE commented that he recently attended some meetings in New York City and learned that while the largest banks are no longer lending on heavy oil, Arctic natural gas was not included in their policy statements.

3:49:35 PM
SENATOR VON IMHOF asked whether the concern was about the commodity being extracted but not about the infrastructure required to extract either commodity.

VICE CHAIR MICCICHE characterized the lending issues as anti-Arctic National Wildlife Refuge related to a single commodity: oil.

3:51:21 PM
SENATOR KIEHL stated that natural gas is an effective fuel to replace coal-fired power, the highest carbon-intensity power. Thus, bringing gas on to replace coal in the US or China can obtain a significant benefit. He surmised that was the reason banks were willing to consider participating in gas projects but not oil projects.

VICE CHAIR MICCICHE responded that when he tried to permit projects in the Lower 48 in his previous career, intervenors such as the Sierra Club were equally against natural gas projects and oil projects. He offered his view that there are levels of oil and gas production opposition, with some against everything, and others only opposed to heavy oils. He acknowledged that not all projects have the same carbon footprint.

3:53:21 PM
MR. RICHARDS reviewed the future of Asia's Energy Security.

- As a result of the war in Ukraine, the US LNG destined for Asia has been diverted to Europe.
- Europe is rapidly building new LNG import capacity to reduce its dependence on Russian gas, new LNG from the Gulf Coast will meet this future demand
- This dynamic increases the need for US supply from Alaska to meet the long-term energy security needs of Asia

MR. RICHARDS highlighted that the market would rebalance and may provide an opportunity for Alaska to meet the needs of US allies going into the future.

3:55:31 PM
MR. RICHARDS reviewed the graph and bullet points on slide 6, LNG Prices in Uncharted Territory. This slide depicted a graph showing the Japanese Korea Marker (JKM), showing the spot price in Asia, and Title Transfer Facility (TTF), which provides a Netherlands-based spot price. He pointed out that these markers were parallel until December, then diverged. The LNG spot prices were $8 in January 2021 but rose to $36 in Europe and $34 in Asia and continue to rise, which creates an opportunity for gain for those producers.

Fear of Cuts to Russian Gas Supply

- The push to shift LNG to Europe drove LNG spot prices higher
- On March 7, LNG into Europe was trading at over $70/MMBtu (over $400/bbl oil equivalent)
- Prices remain above $30/MMBtu ($170/bbl oil equivalent)
- This is driving buyers back to the long-term contracts needed to underpin Alaska LNG

3:57:31 PM
MR. RICHARDS reviewed slide 7, Focus on US LNG for Energy Security, consisting of a US map. He reviewed the status of North American LNG Export Terminals that were approved but not yet built.

[Original punctuation provided.]

US LNG Can Replace All Russia Gas to Europe

- 15 Billion cubic feet/day (Bcfd) of gas delivered from Russia to Europe

But It Will Take Time

- 3.7 Bcfd of LNG is under construction in the Gulf Coast
- Another 24.9 Bcfd is permitted for construction in the Gulf Coast
- Alaska, at 2.63 Bcfd, is the only Pacific Basin project permitted for construction that stands ready to meet the needs of Asian buyers.

3:58:25 PM
SENATOR KIEHL pointed out that Alaska was not the only country developing LNG. He wondered about the global supply outlook and the growing need in Europe or other markets.

MR. RICHARDS answered that a later slide would compare the competitiveness of the Alaska LNG project with greenfield projects coming online.

SENATOR KIEHL asked whether he could also discuss the quantity.

MR. RICHARDS answered that he could do so in general terms.

3:59:08 PM
MR. RICHARDS reviewed the Market Impact on Alaska LNG, including the record high LNG prices, the role of LNG in national security, and how using natural gas as bridge fuel has created an impact on Alaska LNG

MR. RICHARDS stated that AGDC attended CERAWeek hosted by Cambridge Energy Research Associates (CERA) in Houston, Texas, where he discussed the Gulf Coast Projects. He stated that the LNG investors and developers have had increased interest in Alaska LNG's fully-permitted project on the West Coast. He noted that the recent interest indicates that these investors have been conducting due diligence on the Alaska LNG project.

4:00:19 PM
SENATOR VON IMHOF related her understanding that natural gas is considered a bridge fuel to hydrogen. She noted that blue, green, and gray hydrogen all require separating and liquefying at extremely low temperatures, which are subsequently shipped via a pipeline. She related a scenario in which the state built a natural gas pipeline, but 10 years from now, the state wants to switch it to green hydrogen. She asked if technology was being considered regarding natural gas as a bridge fuel. She wondered if it made sense to build a pipeline that can accommodate multiple fuels.

MR. RICHARDS answered that AGDC has been considering hydrogen. He explained that it was it easier to move the methane molecules to Cook Inlet tidewater since it is ice-free water for shipping, and adjacent to the Cook Inlet Basin. He explained the process, using the methane molecule to create blue hydrogen by stripping off one of four carbon atoms, which could be sequestered into the Cook Inlet Basin. He said a readily available carrier of hydrogen is ammonia, so an existing urea ammonia plant, Agrium Ammonia Urea Plant in Kenai could be restarted to create a supply of methane. It could be expanded to produce ammonia or methanol to meet the customer's needs. Ultimately, shifting to green hydrogen, which is essentially the electrolysis of water,

would mean using a renewable energy source to break the water into its molecules. The infrastructure would be in place to pipe it to a ship to move to market or for producing energy in Alaska.

4:03:14 PM
SENATOR VON IMHOF noted the hydrogen blue energy would be located at Cook Inlet tidewater rather than at Prudhoe Bay. She surmised there was substantial natural gas in Cook Inlet, but Prudhoe Bay also has natural gas. She wondered if the state wanted to extend the life of the investment beyond 30 years if the technology exists to move ammonia or methanol in an LNG pipeline.

VICE CHAIR MICCICHE answered that cryogenic pipelines are immensely expensive to construct. He related his understanding that Mr. Richards had indicated that the gas would move from the North Slope to Cook Inlet to process it into ammonia or hydrogen. He noted that tankers could move the cryogenics at a reasonable cost but pipelines cannot.

4:05:13 PM
MR. SZYMONIAK reviewed slide 9, Wood Mackenzie Cost of Supply. He provided background information, such that in 2016, the state partnered with Conoco Phillips, Exxon, and BP to advance Alaska LNG. The group jointly hired Wood Mackenzie to do a third-party independent analysis of the project economics. In 2016, those economics for a producer-led project, producer capital and equity, using a traditional LNG business model indicated that Alaska LNG was uneconomical with the cost of supply ranging from $11 to $12. The producers turned over the project to the state and the state has continued to advance the project. The main achievement was securing major permits to construct the project, refine the capital cost and modernize the business structure. AGDC adopted a Non-Recourse Finance, which is a well-proven financing model. It has been used to finance every major pipeline other than TAPS in many generations. However, it was relatively unusual for LNG plants at that time. Since 2016, the Tolling Model has been used to finance every new LNG plant in the US. The US became the world's largest exporter of LNG in December. AGDC has spent the last year bringing this project to the point of seeking private investors. Further, AGDC has brought in a pipeline party to lead the pipeline portion of the project. AGDC decided to hire Wood Mackenzie to update their independent economic analysis of the Alaska LNG project. He reported that the Alaska LNG project is economically viable due to changes in the cost refinement and the business structure.

4:07:23 PM
MR. SZYMONIAK directed attention to the green bar on slide 10, Wood Mackenzie Cost of Supply (CoS) representing the 2016 Alaska LNG cost.

MR. SZYMONIAK said CoS is now 43 percent lower than in 2016 due to lower capex and feedgas price, and the use of a non-recourse debt funded third-party tolling structure.

MR. SZYMONIAK stated that the big difference is the oil and gas companies like to earn a high return and are willing to take on risk. The investors understand that in years of high prices, they will make more money, but it's possible that prices will be low.

4:08:00 PM
MR. SZYMONIAK reviewed slide 10, Wood Mackenzie Cost of Supply. Slide from 2022 Wood Mackenzie Alaska LNG Competitiveness Analysis.

MR. SZYMONIAK noted that pipeline companies have much lower risk and are paid for pipeline capacity, whether the product prices are high or low, or if the product is moved. Oil and gas companies built every LNG plant until 2016. In 2016, Wood Mackenzie decided to apply the pipeline business model to LNG plants, which dramatically brought down the cost of LNG plants. The buyers paid the same amount to the LNG companies regardless of the product price or if the LNG was used. This dramatically reduced the cost of liquefying the natural gas, which is shown in the first red bar. The second red bar represents the capex cost reduction to $38 billion, and the third red bar represents the reduction of feed gas costs. He noted that Wood Mackenzie had estimated the cost of gas on the North Slope would be over $2. Since then, AGDC has worked closely with the producers, including signing binding agreements with BP and Exxon and advancing discussions with Conoco Phillips. The assumption that the price of purchasing raw gas from Prudhoe Bay and Point Thomson would be $1 per metric million British thermal unit (MMBtu) is being negotiated and is not firm, and the $1 - $1.50 sensitivity analysis Wood Mackenzie used is indicative of the prices that the producers committed to in the past.

MR. SZYMONIAK highlighted that shipping costs of $.066/MMbtu were largely unchanged, resulting in LNG delivered to Asia at $6.70.

4:09:58 PM
SENATOR KIEHL stated that there is one other owner of North Slope gas, the royalty owner, who is accustomed to reviewing the market value of hydrocarbons. He asked whether this proposal would require the state to agree to roughly $1.15 per MMBtu, regardless of the market price.

MR. SZYMONIAK indicated that question has to be resolved with the state and the producers. He noted that in terms of market value, it was possible to calculate the well head price based on the LNG price. However, with independent third parties owning the entire system, they will buy natural gas from the three producers on the North Slope but not market their own LNG. That creates an arms-length transaction on the North Slope that results in a fair market price. If the three producers feel like the market price of their raw natural gas is $1 - $1.50, it establishes the market price of the value of the North Slope gas. It could potentially help streamline the valuation process for DOR.

4:11:35 PM
MR. RICHARDS commented that the state would ultimately decide whether it wants to receive its royalty in-kind or in-value.

SENATOR KIEHL suggested that the producers may have an interest in the state using the same rules they use. It would be interesting to evaluate the finances of the new proposal and determine how it impacts the treasury. On the one hand, if it is on the North Slope, there is no royalty value to the treasury, but if is sold at less than market value, Alaskans may object.

MR. RICHARDS commented that Alaskans also like to receive their natural gas at the lowest cost possible.

SENATOR KIEHL expressed his interest in ensuring that the natural gas would be available to rural Alaskans and residents in Kotzebue, Kodiak, and Ketchikan.

4:13:06 PM
VICE CHAIR MICCICHE commented that a reduced value of zero is pretty low. He said it is something that will need to be discussed as any projects move forward.

4:13:19 PM
SENATOR VON IMHOF commented that it would be good if it came to fruition because LNG could provide an excellent asset and an economic boom for this state. She pointed out that in the past

24 months the cost of labor and materials, such as steel, have gone down, but prices are going up because of supply chain issues. She expressed concern that the costs are volatile and could easily change. She wondered if AGDC could develop best and worst case cost scenarios and who is responsible for rising costs. She asked whether AGDC negotiated the property taxes for the pipeline and if they could be set aside or suspended.

MR. RICHARDS answered that Wood Mackenzie's report included a tornado chart that addressed cost overruns. He recalled that a 15 percent cost overrun would add $.70 to the cost of supply, going from $6.70 to $7.40. The outlook going forward still was $1 - $2 below the market, so there would still be an opportunity for the state. All other greenfield projects would be facing the same types of inflationary impacts.

4:15:57 PM
VICE CHAIR MICCICHE asked whether the state would have to beat the price of every producer of LNG in the world in order to be competitive.

MR. RICHARDS answered that AGDC wanted to develop an economic project as least risky as possible. The project capital costs projections include contingencies for cost overruns. It would also depend how risk would be allocated for the cost overruns. If the state wants to retain ownership it would be subject to some risk. However, Alaska does not have to beat the best price. As the Asian buyers of LNG looked for diversity and supply, they would be able to determine AGDC has a project that fits within their supply and cost goals.

VICE CHAIR MICCICHE stated that there is "X" amount of demand and the lowest cost LNG can only supply a portion of that demand. He asked if it was correct that as long as AGDC was within a profit of margin, it would have a marketable project.

MR. RICHARDS answered that was correct.

4:17:24 PM
MR. SZYMONIAK added that it was the cost of supply but it was not necessarily AGDC's selling price for its LNG. For instance, if the eventual investors taking over the project are able to sell at a higher price; that is to their advantage, the state's advantage, and potentially increasing the well head price. For instance, if the state could sell Alaska's LNG above $6.70 per MMBtu it should do so.

MR. SZYMONIAK reviewed the breakdown of the new optimized CoS of $6.70 bard chart cost shown on slide 11, Wood Mackenzie Cost of Supply. He said shipping costs of $.76 is one of the state's best advantage since shipping costs for US Gulf Coast LNG to Asia can reach $2.00. The $2.24 in liquefaction costs was comparable to liquefaction costs of other LNG plants in the US Gulf Coast using the same business model. Since Alyeska Pipeline Service Company verified and valuated the pipeline costs of $1.50, AGDC feels comfortable using them. The GTP costs of $1.16 were based on the LNG Plant and Alyeska Pipeline's business plan model. He pointed out the $1.15 cost of feed gas includes the $1 purchase price and $.15 for fuel. The new optimized cost is estimated to be US $6.7/MMBtu.

MR. RICHARDS directed attention to the three key elements shown on the lower portion of the bar graphs, the raw gas and fuel price, the GTP, and the pipeline costs of $4 represents the cost of gas to Alaskans. He emphasized that the lower cost of gas to Alaskans was beneficial.

4:19:18 PM
MR. SZYMONIAK reviewed slide 12, Wood Mackenzie Cost of Supply, which consisted of three bar chars comparing Alaska LNG, US Gulf of Mexico Low End, and US Gulf of Mexico High End. With the cost optimization and new debt structure, Alaska LNG is competitive against US Gulf Coast LNG Projects. He stated that Wood Mackenzie used US Gulf Coast for comparison because it is largely recognized that the US Gulf Coast is the marginal supplier of LNG in the world.

MR. SZYMONIAK highlighted that because the Alaska LNG MMBtu capacity charge or liquefaction charge of $2.25 falls between the $2 - $2.5 MMBtu charges for the US Gulf Coast low end and high end, it means AGDC can deliver LNG to Asia for significantly less. He offered his view that this margin is a bit wider since the price of Henry Hub has increased from $3 - $4 to over $5 - $6 today.

4:20:07 PM
MR. SZYMONIAK reviewed slide 13, Gas for Alaskans, which included a line graph showing the Alaska LNG versus historic Cook Inlet Natural Gas prices. He said that AGDC was created to supply natural gas to Alaskans. He reviewed the bullet points.

Low-Cost Gas for Alaskans

- The Alaska LNG in-state price is estimated to be between $4 - $5 per MMBtu

- Significant reduction from current prices, saving Alaskans hundreds of dollars per year

Enough Gas for Alaskans

- The pipeline is designed to supply more natural gas than the LNG plant needs
- Enough capacity for in-state demand to more than double

MR. SZYMONIAK stated that the heating bills for Anchorage, Matanuska-Susitna Valley (Mat-Su), and Kenai Peninsula residents would be reduced by half and their electrical bills would also be significantly reduced. Savings for Fairbanks residents would be even higher for those residents who could access natural gas. Currently, fuel oil is higher than $30 per MMBtu. Low-cost energy is essential but equally important is long-term energy security. New businesses and industries moving to Alaska need to know that energy costs would be consistently low for the next 50 years and any risks of Cook Inlet natural gas decline would be mitigated.

4:21:37 PM
MR. SZYMONIAK reviewed slide 14, Alaska LNG vs Competitors. Some of the LNG projects on the right side of the slide show that some competing LNG projects have a much lower cost of supply, but typically sell an oil-indexed link and Alaska can come in at a lower price. He offered his view that AGDC is competitive and has a lower cost than the margin supplier for most other LNG projects in the world.

MR. SZYMONIAK stated that most LNG is based on the cost of crude oil. A typical percentage would be 12 percent times Brent resulting in $12 gas. Sometimes it fluctuates above or below the $6.70 price. The US Gulf Coast is based on Henry Hub plus a differential for the liquefaction plus shipping.

MR. SZYMONIAK directed attention to the chart on slide 14 that was received positively by potential LNG buyers who would like to have a portion of their LNG purchase portfolio not be exposed to oil and gas pricing.

4:22:55 PM
MR. RICHARDS responded to Senator Kiehl's question about competitors. He stated that Qatar's LNG expansion would increase its liquefaction capacity to about 100 million tons per year (MTPA) of new production, which is why it has a low cost. The US

Gulf Coast production has about 220 MTPA that has been permitted but is not under construction.

4:23:26 PM
SENATOR VON IMHOF asked why most of the bar graphs on the right side of slide were higher than Alaska LNG and if it meant PNG, Western Canada, and US Gulf Coast competitors had higher construction or shipping costs.

MR. RICHARDS answered that this chart shows the LNG Cost of Supply (CoS) to Asia, which is the landed cost. He noted that some competitors have higher shipping costs, construction costs, or gas costs in the ground.

4:24:11 PM
VICE CHAIR MICCICHE commented that if geopolitical stability was also considered, it would affect two or three of these projects. Other than diversification of supply, is there a quantifiable value to LNG buyers to have the political stability of US LNG suppliers compared to the political stability of other countries, such as Mozambique.

MR. RICHARDS pointed out that Arctic LNG 2 in Russia might not move forward. He offered his belief that Asian buyers recognize the US political stability as a positive because of its reliability. He stated that the Conoco Phillips Kenai LNG plant operated for 50 years.

4:25:33 PM
MR. RICHARDS recalled Senator von Imhof's earlier comments on loan guarantees. He credited then-Senator Ted Stevens for his support that led to passage of the Alaska Natural Gas Pipeline Act. The project was to take North Slope gas and deliver it by pipeline to the US Midwest.

MR. RICHARDS stated that the bill created a federal loan guarantee for the developers of that specific project. The recent passage of the Infrastructure Investment and Jobs Act (IIJA), signed by President Biden, amended the language in the bill so the Alaska LNG project would become eligible for loan guarantees. This means the Biden administration pledges to guarantee loans with the full faith and credit of the US to pay the principal and interest on $26.3 billion of Alaska LNG debt in the event of a default. The benefits of the loan guarantees from this backstop will be a lower rate of return for financing costs ranging from 1 – 2.5 percent. Thus, the loan guarantees

could reduce the cost from potential 5 percent to either 4 percent or 2.5 percent.

MR. RICHARDS reviewed slide 15, Federal Loan Guarantee.

The full faith and credit of the United States will be pledged to pay the principal and interest on $26.3 billion of Alaska LNG debt in the event of a default.

The Infrastructure Bill includes a loan guarantee for Alaska LNG

- Principal amount of debt guaranteed up to $26.3 billion (adjusted for inflation)
- Up to 80% of the capital cost
- Term of up to 30 years
- Loan guarantee will be subject to credit terms and requirements of the loan program

Benefits of the loan guarantee

- Reduced cost of supply
- Completion risk mitigation
- Federal government support and "skin in the game"

MR. RICHARDS directed attention to the waterfall chart on the right hand side of the slide that shows the impacts on the CoS from the rate reductions. He stated that initially AGDC had identified a 20 year period for debt financing, which could be expanded to 30 years resulting in even lower costs. It could cover up to 80 percent of the capital costs. The waterfall chart shows that the project's current $6.70 base case could be lowered to a maximum of $5.59, allowing more significant margins for the developers.

4:27:42 PM
SENATOR VON IMHOF asked if the principal amount of debt guaranteed up to $26.3 billion was solely for Alaska LNG or if the funds would need to be shared with other US LNG projects.

MR. RICHARDS answered that this is for the Alaska LNG project and for the pipeline project from the North Slope of Alaska to the US Midwest. He noted that two projects are eligible for the funding, but the US Gulf Coast projects or West Coast projects were not eligible.

4:28:15 PM

SENATOR VON IMHOF asked why the Biden Administration would support this project but not Keystone.

MR. RICHARDS answered that Alaska LNG is a natural gas project and not a crude oil project. It relates to a US-producing state where the supply had been produced for 40 years. It would not necessarily require an expansion of drilling. It would allow natural gas to replace coal, so it has a green environmental benefit. It would also meet the needs of producing lower energy costs to Alaskans.

4:29:27 PM
MR. RICHARDS reviewed Property Tax Benchmarking on slide 16.

> The property taxes that Alaska LNG would pay under current statute are 10 times higher than Alaska LNG's competitors.
>
> **Most of Alaska LNG is subject to 20 mill property tax**
> - Equates to almost $800 million per year – over 10s higher than other projects
> - Equates to 10% of cost of supply
> - The LNG plant may be subject to lower property tax rate but higher municipal taxes

MR. RICHARDS referred to the chart on the right of slide 15, which shows some of the tax regimes and tax holidays that have been provided to other projects by other states, such as Texas, Louisiana or Virginia, including Payment in Lieu of Taxes (PILT) of $1 million per year, factoring in property tax abatements, or a 10-year tax holiday with depreciation. These jurisdictions recognized the economic activity associated with the projects that resulted in more jobs and other benefits to their communities so they had a willingness to provide lower tax regimes. He highlighted that the state could consider ways to make the project more economically viable such as property tax changes.

> **Property Tax Changes**
> - As contemplated in SB138 (2013), changes to property taxes are expected prior to project sanction

MR. RICHARDS noted that the bill charged the state, communities, and boroughs to consider PILT to reduce property taxes. That effort ended in 2016 with the producers, so it was never concluded, but that law provision still stands and will need consideration.

4:31:05 PM
SENATOR VON IMHOF asked if the previous numbers [on the waterfall chart on slide 15] contemplated and incorporated PILT.

MR. RICHARDS answered that it included property taxes at 20 mills, representing approximately $800 million per year, so the $6.70 CoS included the benefits of improving property tax. The tornado chart from Wood Mackenzie will show the benefits of producing the property tax, which reduces CoS by $.50 - $.60.

4:31:44 PM
MR. RICHARDS reviewed slide 17, Transition to Private Developers. He commented that AGDC advanced this project by seeking private-sector developers, not international oil companies, but utility or pipeline companies with the systems and ability to execute and operate a project. These companies would partner with the state if the state would like to retain 25 percent ownership to move this project forward. He reported that AGDC is currently negotiating with companies using the project finance model.

4:32:22 PM
MR. SZYMONIAK turned to slide 18, Project Finance. He commented that the graph on the bottom of the slide visually captures what the committee previously discussed for project financing. He related that no LNG was exported from the US when Wood Mackenzie produced its original study in 2016. The idea of using project finance had been contemplated, The Cheniere/Sabine Pass LNG project was under construction, but it was far from proven. In the last five years, this project finance model has been verified.

Non-recourse project financing under a tolling model was not widely used for LNG prior to 2016. Since, it has been used for almost all US LNG capacity.

Prior to 2016

- Virtually all LNG projects developed by oil and gas companies without true project financing
- No tolling/capacity charge included in LNG price, LNG sold indexed to oil
- No US LNG exports

After 2016

- The US LNG industry grows to nearly the largest LNG export in the world

- All LNG plants built by developers with project finance model, not oil and gas companies
- LNG prices include tolling/capacity charge

4:33:09 PM
SENATOR VON IMHOF asked whether developer-led projects were a tolling model.

MR. SZYMONIAK answered yes.

SENATOR VON IMHOF asked for a description of a tolling model.

4:33:29 PM
MR. SZYMONIAK answered that a tolling model is the pipeline business model. He explained that pipelines are built because a valuable resource located in one region needs to be moved to the location the resource is needed. He stated that to preserve the maximum amount of value for the resource producer and to minimize the costs to the buyer, the pipeline must operate as inexpensively as possible. Since capital costs represent the highest cost of moving oil or gas through a pipeline, reducing them would directly affect the total pipeline cost. The producers enter into long-term contracts to fully use the pipeline capacity. The producers take out loans based on the contracts rather than obtaining a loan based on their balance sheets. The loan ranges from about 70 - 75 percent and the remainder represents the equity that the pipeline developer invests. Although they want to turn a profit, their investors understand the low risk, so they are willing to accept a lower rate of return ranging from 10 - 12 percent, knowing that no matter what happens, the return is consistent. The tolling model was applied to LNG projects for the first time in the US Gulf Coast in the last seven years.

4:35:25 PM
SENATOR KIEHL expressed concern that it sounded very much like TransCanada's proposal under the Alaska Gasline Inducement Act (AGIA). He related that TransCanada exited. He asked for an explanation of how this happened.

4:35:50 PM
MR. SZYMONIAK answered the TransCanada model was for the pipeline. The major shift is applied through the LNG Plant and the GTP. He highlighted that no one had used the tolling model with an LNG plant at that time. LNG plants had been owned, built, and operated by oil and gas companies that sold the LNG linked to oil prices. The shift to project financing with a

capacity charge on the LNG plants represented a significant change. He related a scenario where LNG prices cratered during the pandemic. The LNG plant's customers stopped buying LNG but continued to pay their capacity charge, which allowed the LNG companies to continue to generate revenue at their LNG plants. This allowed them to continue to make money, pay their debt service, and repay their investors. He said that is why they can achieve a lower cost of capital.

4:36:56 PM
SENATOR VON IMHOF asked what happens with a capacity loan when the buyer refuses to pay. She compared not selling LNG to a car loan, where the owner wrecks the car, but must still pay the car loan.

MR. SZYMONIAK answered that it would result in a lawsuit. If the buyer breaches the contract, the lender has recourse to the buyer. The key to making this work is credit-worthy buyers pledging their credit to the entire system, which flows up to the bank. When the buyer doesn't pay the toll, the lender has recourse against the buyer instead of the infrastructure. He indicated that if the state owned 25 percent of the project, under this model, the state would earn a 10 - 12 percent return, but it would be a relatively low-risk investment.

4:38:45 PM
MR. RICHARDS reviewed slide 19, Timeline, which consisted of a chart showing the timeline for negotiating the project development agreements and the construction phase from 2024 to 2031.

MR. RICHARDS indicated that Alaska LNG would focus on securing LNG Lead parties, signing Memorandums of Understanding with AGDC, and working towards project development agreements that allow them to enter into privately-funded Front End Engineering Design (FEED). He stated that the Alaska LNG project would reach FEED in 2023, reaching a final investment decision in 2024, followed by six to seven years of construction, and the target for the first gas in 2030.

4:39:22 PM
MR. RICHARDS briefly noted slide 20, Fully Permitted Project.

Completed

- Federal Energy Regulatory Commission
- (FERC) Authorization to Construct
- All 36 Major Federal permits & authorizations

- Federal ROWs: Bureau of Land Management, National Park Service
- Alaska State Land Leases and Gas
- Treatment Plant Air Permit

Supplemental EIS

- Upstream analysis of potential environmental impacts associated with natural gas production on the North Slope
- Lifecycle analysis calculating greenhouse gas emissions from the Alaska LNG Project

4:39:44 PM
VICE CHAIR MICCICHE asked to return to slide 20. He asked for AGDC's process to attract developers to Alaska because the project has been discussed for over 40 years. He wondered what changed that would motivate developers to sign MOUs when other undeveloped projects might be more lucrative.

MR. RICHARDS acknowledged that it has not been easy. Developers around the world know about this project, but view it as a large, challenging project in Arctic conditions that will be costly to construct and require taking substantial risk.

MR. RICHARDS stated that AGDC has worked to educate developers. He said AGDC frames Alaska LNG by identifying one of the most significant project risks as the federal regulatory agencies' environmental process. It includes the public process of taking public and stakeholder comments. The process considers impacts on flora and fauna, and the project managers must work with federal agencies on mitigation measures for reasonable and economically achievable goals. He said that AGDC had completed that process, so that risk has been averted. AGDC has a supplemental environmental impact statement (EIS) undertaken by the Department of Energy in the Biden administration. While it includes risk, it is a lower risk because the environmental process provides greenhouse gas emissions analysis to ensure that enough molecules are upstream to meet the 30-year project life. He reported that the independent analysis shows the molecules are there. This greenhouse gas analysis will be released next month. It demonstrates a 54 percent reduction of CO2 compared to coal in Asia, representing 77 million tons of CO2 removed from the environment. He characterized the green component of the project as a positive one.

4:43:22 PM

MR. RICHARDS explained that the buyers want LNG to meet their needs as a transition fuel but are looking towards future hydrogen. Alaska's methane provides for both, providing immediate and future opportunities. Buyers seek a diversity of supply. The West Coast projects are LNG Canada and a small Mexico project. Everything else is shipped through the Panama Canal, which means time, cost, and delay. He highlighted that buyers view Alaska geopolitically, as part of the US, with a significant military presence, with a 50-year record of supplying LNG to Asian markets. In terms of constructing and building modularization for the major plants, Alaska had already built a pipeline in Arctic and sub-Arctic conditions, so it has the experience and infrastructure, including previously-built roads and pipeline pads. Thus, it is not the new frontier like it was for TAPS. AGDC dispels misconceptions by indicating that Alaska is part of the first world and regularly produces oil and gas reservoirs. AGDC has federal authorizations, and the state and its citizens support the Alaska LNG project advancing. It means that Alaska doesn't have stakeholder risks like other projects like Keystone or North Dakota Access experience that halts their projects.

4:45:18 PM
MR. SZYMONIAK commented that AGDC has the full support of the producers: Hilcorp, Conoco Phillips, and Exxon Mobil. He stated that AGDC meets with the producers regularly, and these companies provide strategic guidance. When AGDC brings in a developer to look at the project, the developers sign confidentiality agreements and meet with the producers. He offered his belief that having developers build relationships with the producers is critical. The Alaska LNG project requires developers to have long-term relationships with the producers. AGDC wants producers to sell gas to the project on the North Slope but does not want them to take over the project. The producers' cost of capital is too high, and it is not a priority for them in the midstream, but they have all been clear that it is a high priority for them to sell the gas.

4:46:33 PM
MR. RICHARDS reviewed slide 21, Greenhouse Gas Emissions.

> A life cycle analysis of Alaska LNG shows it reduces greenhouse gas emissions for electric power generation by more than 77 million metric tons of CO2 per year in comparison to Asian coal derived power

MR. RICHARDS stated that the chart on the right shows emissions of CO2 from an Asian coal-fired generation versus electricity produced from LNG, which would result in over 54 percent reduction in emissions from LNG. The box on the left shows that it would be equivalent to eliminating 19 coal-fired power plants or constructing 16,000 wind turbines.

4:47:31 PM
VICE CHAIR MICCICHE asked whether the calculation included the potential for sequestration or other technologies or if it is based on conventional production, shipping, and liquefaction.

MR. RICHARDS characterized it as a full life cycle analysis of Alaska LNG. He stated that it considered oil and gas production on the North Slope, the gas treatment and sequestration of the CO2 on the North Slope, the pipeline, liquefaction, shipping, and delivery to the Asian market, as well as consumption in an Asian gas-fired power plant.

4:48:27 PM
MR. RICHARDS reviewed slide 22, Alaska Hydrogen Opportunity. He stated that AGDC refers to the potential use of methane in Alaska as an Alaska hydrogen opportunity. He related that the Kenai LNG plant paved the way for LNG from Alaska to Asia 50 years ago. For many of the same reasons, clean hydrogen industry can also be created in Alaska. He reviewed the reasons shown on the slide:

[Original punctuation provided.]

> Carbon Storage and Sequestration at the Project Site at Tidewater
>
> Cycle GHG Emissions for Natural Gas vs. Coal Power
>
> Low GHG Natural Gas from Conventional Supply
>
> Short Distance to Expanding Clean Hydrogen Markets in Asia
>
> Existing Ammonia Plant well Positioned to be First Mover in Market

4:49:02 PM
MR. RICHARDS briefly reviewed slide 23, Clean Hydrogen Overview. He stated that the chart on the left shows the methane molecules composition. He explained that ammonia could be a carrier of H

atoms and meet the needs in Asia. He noted that Asia would like to spike their coal generation with ammonia, which reduces the amount of CO2 emissions coming out of the stacks.

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

MR. RICHARDS reported that Cook Inlet Basin reservoirs has 50 gigatons of CO2 sequestration. He stated that Cook Inlet Basin is world class and has the best carbon sink on the West Coast of North America. Alaska has an opportunity to capture the carbon, create hydrogen or ammonia to sequester in Alaska, and obtain the green category associated with it.

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

MR. RICHARDS said Alaska has an opportunity to capture the carbon, create hydrogen or ammonia to sequester in Alaska and obtain the green category associated with it.

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 can be exported to Asia to meet their future clean energy demands

4:50:44 PM
VICE CHAIR MICCICHE asked if the GPT was for hydrogen and if post liquefaction is for secondary carbon sequestration in Cook Inlet.

MR. RICHARDS answered that it is not currently in the design. He explained that Vice Chair Micciche was speaking about the Gas Treatment Plant (GTP) on the North Slope. The natural gas stream from Point Thomson and Prudhoe Bay goes through a process at a GTP that separates the CO2 from the methane molecules, is

captured, and pushed back into the Prudhoe Bay reservoir for sequestration.

MR. RICHARDS reviewed the liquefaction process to capture the carbon atoms from the emissions ultimately. He indicated that this technology is expensive, but new technologies are coming online and being developed, making it cost-effective to capture the flue gases and sequester them.

4:52:29 PM
SENATOR KIEHL asked about the potential to store carbon or CO2 in the Cook Inlet depleted reservoirs. He wondered how the 50 gigatons capacity relates to the throughput on the pipeline or what it would cost per unit.

MR. SZYMONIAK related his understanding that units are ammonia and hydrogen. He offered his belief that 50 gigatons are enough to sequester a large industrial clean ammonia plant in Cook Inlet. AGDC is in the early stages of putting together a team to perform a feasibility study to refine the actual sequestration relative to industrial processes for exported fuels and the cost. He indicated that AGDC is very much on the frontier. Still, they benefited from a study performed in 2011 or 2012 funded by a Lower 48 company using the Department of Natural Resources information that identified it. He stated that there was some scientific basis behind the magnitude of the site.

4:54:05 PM
MR. RICHARDS added that AGDC would produce 20 million tons of liquid natural gas annually from the GTP, and the CO2 generated in Cook Inlet would be significantly smaller. This means there would be generations of potential sequestration opportunity.

4:54:37 PM
SENATOR KIEHL commented that he would like a follow-up on the potential sequestration opportunities.

VICE CHAIR MICCICHE agreed. He offered his view that there would be a guarantee of 60 years of reasonably heavy production in Cook Inlet with a much smaller stream of CO2. He estimated that there would be 50 years of heavy production on the North Slope. He pointed out that CO2 is a fraction of what would be produced for every cubic foot of natural gas used for the project. He acknowledged that it would be an interesting calculation of what's been produced minus what will be produced in carbon sequestration.

4:55:42 PM
MR. SZYMONIAK answered that there is great carbon sequestration in the coal seams that produce natural gas.

4:55:54 PM
MR. RICHARDS reviewed slide 24, Hydrogen Feasibility Funding.

AGDC is working with partners on external funding to develop Alaska hydrogen opportunities

Potential funding sources include:

- Private North American energy companies

Infrastructure bill funding:

- $8 billion to be spent on 4+ Hydrogen Hubs

- Private Japanese energy companies
- Japanese state entities

MR. RICHARDS elaborated on AGDC's work with partners to develop Alaska hydrogen opportunities. He stated one emphasis of the Infrastructure Investment and Jobs Act (IIJA) was to examine the creation of hydrogen hubs in the US. The original bill (H.R. 3684) called for $8 billion in funding for four hydrogen hubs in geographically distinct parts of the United States. The goal of this funding is to ensure that private sector entities can develop a hydrogen-based economy to meet the energy needs in the US. From AGDC's perspective, this would also include exporting hydrogen. Currently, buyer countries are seeking hydrogen production, so AGDC has discussed potential funding for the feasibility study for hydrogen production in Cook Inlet. The potential of Asian buyers and infrastructure funding coming to Alaska could help generate or encourage hydrogen production in Cook Inlet. AGDC has been working with ammonia producers, buyer companies seeking funding from their countries, and private sector heavy industries contributing to the hydrogen project. This week, the governor introduced an infrastructure bill that included funding for AGDC to develop a hydrogen hub proposal. He characterized it as seed funding to potentially bring substantial funding from the federal government and host countries.

4:58:13 PM
MR. RICHARDS discussed slide 25, Alaska LNG and Blue Ammonia.

The size of the current LNG market can support construction of a 20 Mtpa Alaska LNG facility. This LNG facility is large enough to support construction of the Alaska Natural Gas Pipeline.

Cook Inlet Blue Ammonia demonstrates the opportunity for expanded clean energy supply from Alaska. This future proofs Alaska LNG investment and provides a path to net-zero carbon energy from Alaska.

4:58:45 PM
MR. RICHARDS summarized the current status and benefits to Alaska highlighted on slide 26, Alaska LNG.

Strong Economics

- Fully Permitted
- Environmental Benefits

Alaska Benefits

- Energy for Alaskans
- Jobs
- New Revenue

MR. RICHARDS offered his belief that the economics are showing that AGDC has a viable project that is fully permitted with environmental benefits not only for Alaskans but in the world. Alaska LNG could provide lower-cost energy for Alaskans, bringing in new jobs and revenue to the state.

4:59:10 PM
VICE CHAIR MICCICHE asked whether AGDC has performed an economic analysis to determine if the state could qualify for one of the Region Clean Hydrogen Hubs (H2Hubs) funded by the Infrastructure Investment and Jobs Act (IIJA).

4:59:47 PM
MR. RICHARDS answered that AGDC had evaluated hydrogen hubs. He stated that the language in IIJA focuses on feedstock, end-use, geographic diversity, and opportunities to create employment. The Department of Energy will be administering the H2Hub proposal and carbon capture proposal. AGDC has recently responded to a request for information by DoE to help develop the criteria for the hubs. AGDC prepared a proposal, entering key questions about diversity and supply, including Alaska's Arctic gas source that an H2Hub could export. The proposal also noted that the H2Hub project could replace the significant loss

of oil and gas jobs in Alaska and create long-term, high-wage jobs. The funding in the governor's bill was envisioned to develop a proposal, with AGDC working with private sector entities, DNR, and the University of Alaska (UAA) to develop a robust and competitive proposal for an H2Hub in Alaska. The funding would come in tranches, with the initial phase of $4 - 5 million for each H2Hub in the first year or two to prove the feedstock, end-use, and geographic diversity. Subsequently, the second tranche would provide substantial funding, billions of dollars for the hubs once the state and AGDC have a private sector project development ready to market. In closing, AGDC put forward the initial phase of funding to generate a proposal that can be successful.

5:03:13 PM
There being no further business to come before the committee, Vice Chair Micciche adjourned the Senate Resources Standing Committee meeting at 5:03 p.m.