Economic viability assessment and economic value of Alaska LNG project - Phase 1

Final

January 27th, 2025

Agenda

Monday 27th January 2025

01	Introductions	5 minutes
02	Executive Summary	15 minutes
03	Questions	5 minutes

Contents

Project Background

Wood Mackenzie has worked extensively as an independent consultant on Alaska's energy issues since 2016 to provide an economic analysis of the viability of the cost of supply (CoS) for Alaska LNG (also referred to as AK LNG). Most recently in 2021/22, Alaska Gasline Development Corporation (AGDC) engaged Wood Mackenzie for an updated analysis that included calculating a new base CoS, identifying opportunities to optimize the CoS, a competitive analysis and providing our long-term projections.

Since the last study, AGDC has proposed a phased approach to developing Alaska LNG. Phase 1 involves developing the gas pipeline from the North Slope to Southcentral and Interior Alaska markets. As part of Phase 1, ADGC has engaged Wood Mackenzie for **an independent economic analysis of the proposed gas pipeline** and an **economic benefit analysis** for the state of Alaska.

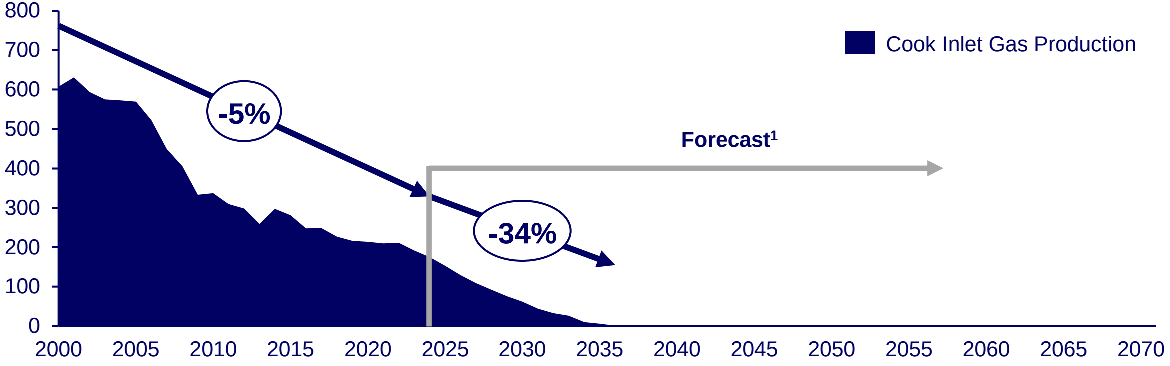
The information on which this independent report is based has either come from our experience, knowledge and database or it has been supplied to us by AGDC. The opinions expressed in this report are those of Wood Mackenzie. They have been arrived at following careful consideration and enquiry, but we do not guarantee their fairness, completeness, or accuracy. The opinions, as of this date, are subject to change. Please note that for this engagement, we have adjusted our standard base case to reflect disclosed asset-specific information.

This Report is structured across 5 sections:

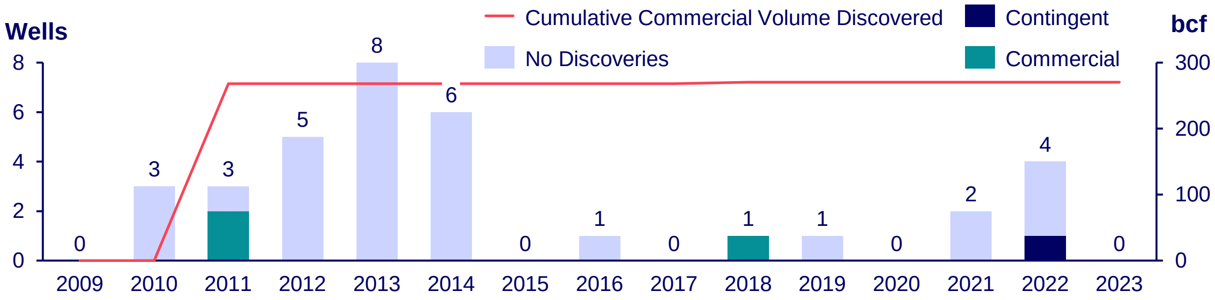
- Southcentral and Interior Alaska market overview
- Delivered cost of piped gas and scenario analysis
- Analysis of LNG imports as an alternative
- Economic impact of Alaska LNG Phase 1
- Final takeaways and conclusions

Gas supply has been dwindling, and despite exploration efforts by operators, no new volumes have been discovered in Cook Inlet to replenish the reserves

Cook Inlet gas production
mmcfd



Exploration activity in the Cook Inlet basin



Source: Wood Mackenzie

1. Compounded Annual Decline Rate is 34% driven by production reaching 0 in 2037.

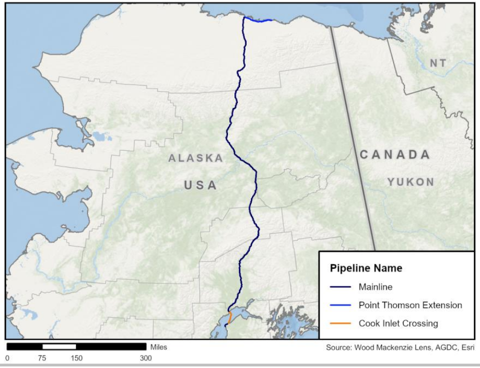
- Cook Inlet production is expected to be depleted by the mid-2030s
- Exploration success in the Cook inlet has been limited:
  - **34 exploration wells** drilled in the last 15 years
  - **9% success rate** with only three commercial discoveries
  - **270 bcf** of reserves discovered in the last 15 years

With Cook Inlet gas production recovery proving to be a challenge, two main alternatives to addressing the forecast supply gap are a new gas pipeline and LNG imports

Gas supply alternatives for Southcentral and Interior Alaska market

1. Natural gas supply via pipeline

In Phase 1, a 765-mile, 42-inch diameter mainline pipeline will connect the Southcentral Alaska region with the northern fields, providing a secure and affordable gas supply. In the beginning, the pipeline will supply local and industrial consumption, then expand to provide feed gas for export into LNG markets.

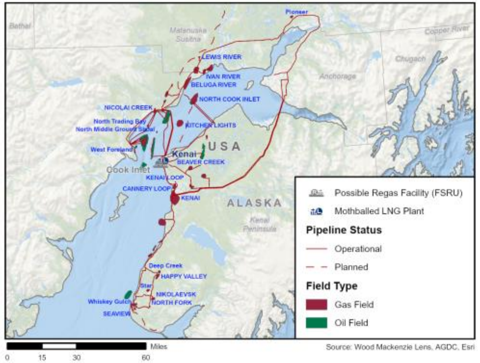


Key stats

- Total capex: From US$10.8 billion to US$14.9 billion for max capacity
- Time to first gas: 2031
- Capacity: 3.3 bcfd at max
- Ability to expand to cover incremental investment in subsequent LNG phases

2. LNG imports[1]

Gas imports via LNG require regas and further downstream infrastructure, including an FSRU dock to take the imported gas and potentially inland storage for operations optimization across yearly seasonality.



Key stats

- Total capex: TBD
- Time to first gas: 3 - 4 years post FID[2]
- Capacity: 400 to 450 mmcfd fit for current demand without increased industrial activity
- Expected utilization: 40 – 45%

Source: AGDC, Wood Mackenzie

1. Map location of the FSRU is illustrative since planned location is pending definition based on receiving port; 2. Excelarate Energy announced in Aug ’24 a target commercial start date for LNG imports via FSRU for 2028, suggesting its plans to take FID during 2024, though location of the required dock and overall status of the project is not clear as of writing of this report

Four scenarios were developed and analyzed to account for: existing gas demand (baseload), potential new demand brought by gas availability, and the construction of a 20 mtpa LNG facility

Scenario	Description	Components	Average gas demand (mmcfd, 2031-2071)
Scenario 1: Baseload	This includes the Current State demand for gas in Southcentral and Interior Alaska. Plus, additional demand from Fairbanks substitution of oil/wood as gas becomes available to avoid EPA's nonattainment area designation and finally, the ramp-up from the Nikiski Refinery	Current state (Southcentral + Interior) + Fairbanks + Nikiski Refinery	~190
Scenario 2: WM Case	Baseload plus additional gas demand based on historical gas demand for the industrial sector and population growth forecasts. We estimate Industrial demand will reach 48 mmcfd (32 mmcfd additional to 16 mmcfd from the Nikiski Refinery[1]).	Baseload + Additional Industrial Activity	~220
Scenario 3: Additional Industrial demand	This considers the maximum upside from industrial demand based on high-consuming facilities starting operations. This incremental gas demand could come from restarting a previously operating fertilizer plant, a new ammonia plant (brownfield or greenfield) or new data centers.	WM Case + High-consuming industrial plant	~320
Scenario 4: Alaska LNG	The 20 mtpa LNG Facility (Alaska LNG) will require an additional 2,844 mmcfd at full capacity[2]. This demand was added to the WM Case and assumed to come online in 2032 with one 6.7 mtpa train and two more in 2033 and 2034, respectively.	WM Case + Alaska LNG[3]	~2,930

Source: Wood Mackenzie 1. In 2001 industrial demand reached 185 mmcfd with industrial activity and population at 632,716. Even though population is expected to peak in 2033, WM expects enough demographic base to support increased demand back to historic levels via additional uses of natural gas 2. Feedgas estimation considers 7.11% Liquefaction Loss, 1.56% Transport Loss, and 52,000,000 mmbtu/mt and 1,090 Btu/scf conversions. 3. Additional average demand is 2,705 for the 40 years due to phased kick-off of one train per year.

Costs in the first three scenarios account for minimum compression capacity but with Alaska LNG, the cost for compression and a segment to cross Cook Inlet is also considered

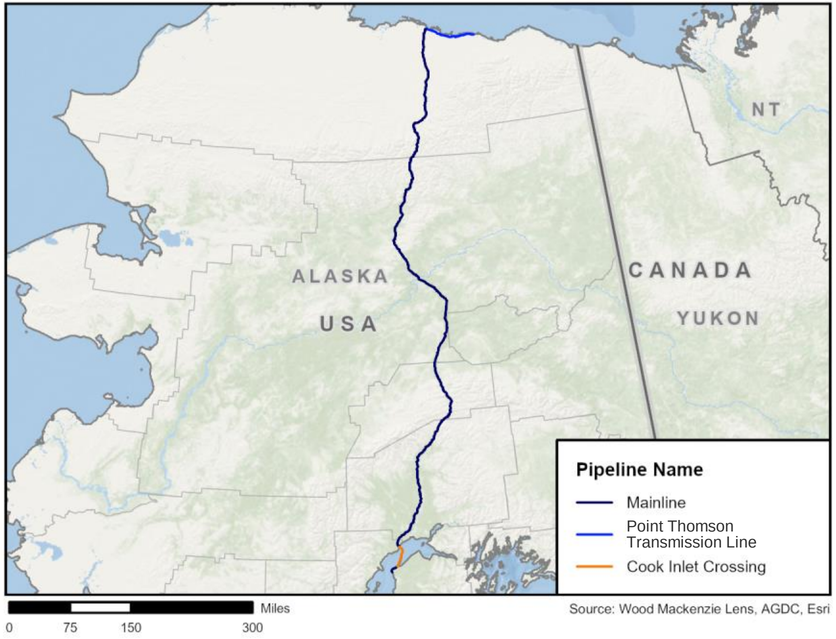
Alaska LNG Pipeline capex by scenario

Real 2024 US$ million

Capex / Scenarios (2024 US$ million)		Baseload	WM Case	Additional Industrial demand	Alaska LNG
Phase 1 mainline[1]	$10,769	✓	✓	✓	✓
Compression	$2,485				✓
Cook Inlet + Additional Section	$1,131				✓
Point Thompson Expansion	$564				N.A.[2]
Total Amount	**$14,950**	**$10,769**	**$10,769**	**$10,769**	**$14,385**

- In-state gas demand is burden only by Phase 1 Capex
- Additional cost is considered only for LNG volumes coming online

Alaska LNG Pipeline Scope

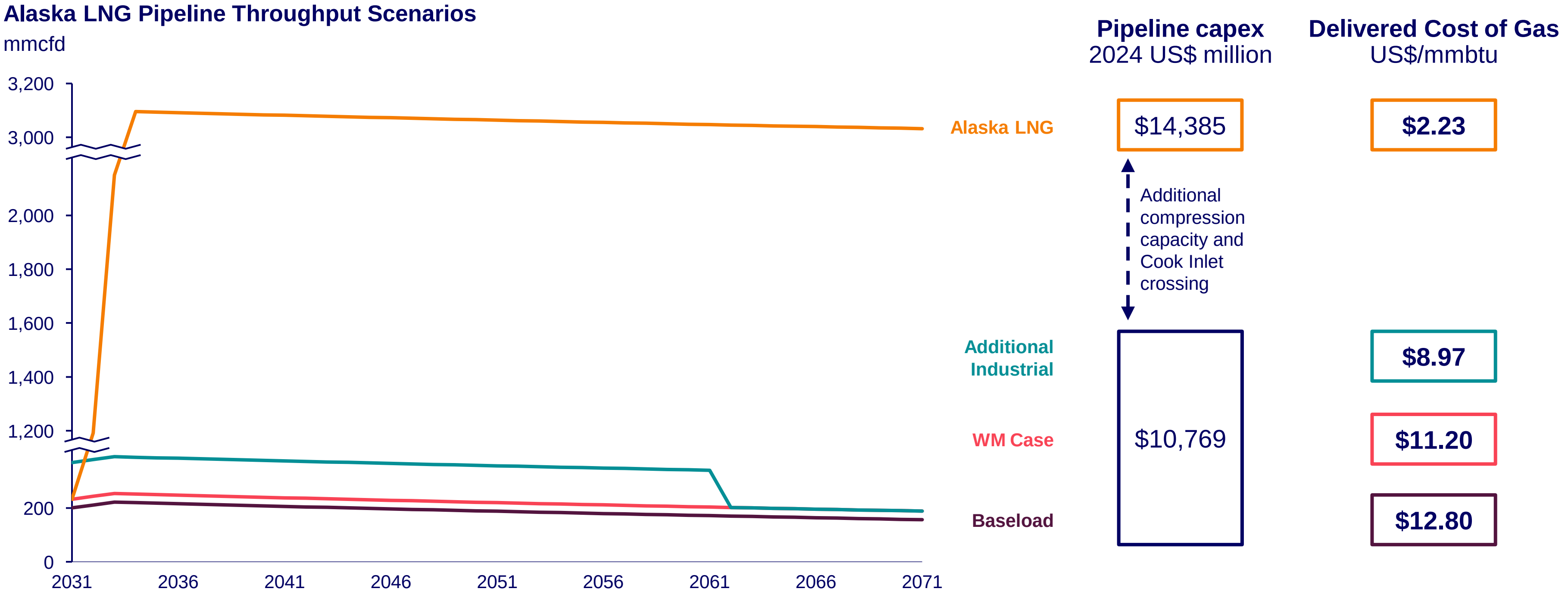


Source: Wood Mackenzie Lens, AGDC, Esri

Source: Wood Mackenzie with information from AGDC

1. Considers 20% Contingency and US$50 million of Property Taxes
2. Alaska LNG Scenario does not consider the Point Thompson Expansion cost. In order not to affect the rest of the shippers it must be considered as part of the purchase gas cost for the LNG facility only.

The scenario analysis shows an asymmetrical impact on the delivered cost of gas from a change in demand accruing to the consumers' benefit



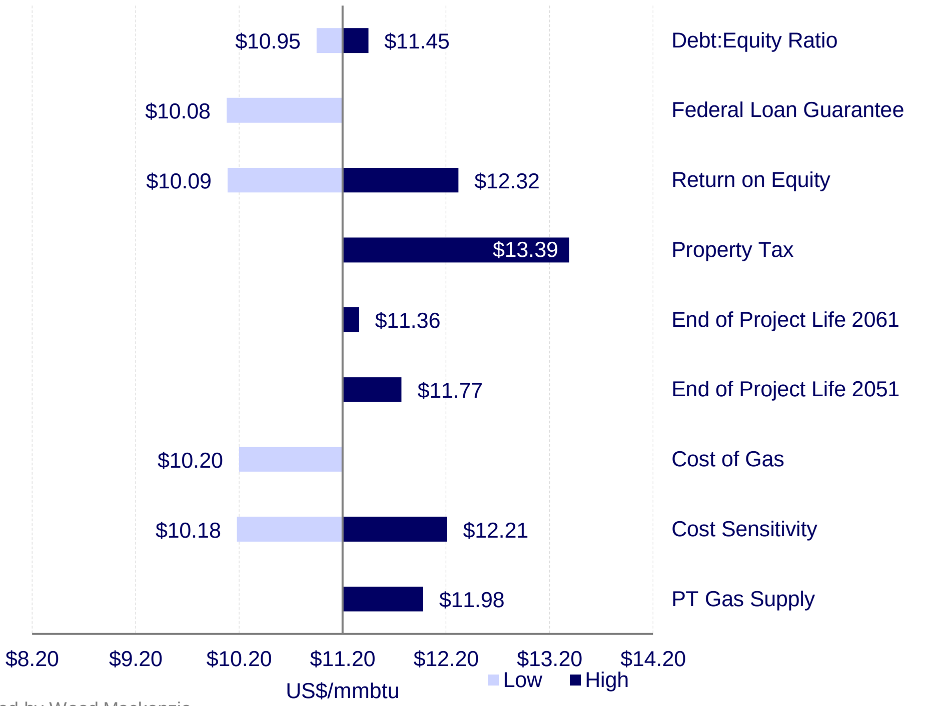
Source: Wood Mackenzie

Additional sensitivities showed that securing a Federal Loan Guarantee and reducing Property Tax have the most impact on the cost of gas

Assumptions	Low	Base	High
Leverage – Debt : Equity Ratio	80:20	75:25	70:30
Federal Loan Guarantee	5.00%	6.25%	-
Return on Equity	7.5%	10.0%	12.5%
Property Tax	-	0.2%	2.0%
End of Project Life in 30 years	-	2071	2061
End of Project Life in 20 years	-	2071	2051
Cost of gas	$0/mmbtu	$1/mmbtu	
Capex Sensitivity	-10%	$10.8 Bn	+10%
Alternative supply at Point Thomson: Increased Capex and Gas Price[1]		$10.8 Bn & $1/mmbtu	+564M & +US$ 0.25/mmbtu

Delivered Cost of Gas – Sensitivity analysis on the WM Case Scenario

Real 2024 US$/mmbtu



Source: Wood Mackenzie; 1. The assumed gas price of US$ 1.25/mmbtu was provided by AGDC and not verified by Wood Mackenzie

The LNG import cost analysis considers four main components (LNG cost, shipping, and regasification) across the value chain, each with a potential range of results

LNG import cost components

1 LNG Cost

- Multiple alternatives exist for securing supply of LNG (i.e. acquiring the molecule), ranging from spot market purchases, long-term supply and purchase agreements (SPA), or taking a tolling position partnering with an LNG developer
- Each alternative provides exposure to its own set of market risks and requires different levels of investment and management

2 Shipping

- LNG being a global commodity provides multiple geographical alternatives that require shipping cost considerations
- Alaska's access to the Pacific means geographical focus in Pacific facing projects, ideally as close as possible (e.g. West Canada projects), though other limitations arise, such as availability of supply or possible ship sizes

3 Regasification

- LNG requires to be re-gasified (transformed back to natural gas) to be consumed
- Regasification costs depends upon configuration of the processing facility e.g.: Land vs. FSRU[1], overall size, storage requirements, levels of utilization, etc.

4 On shore gas reception

- There are potential infrastructure requirements depending on specific circumstances such as costs to access the gas network and/or requirement to have a dock that meets the needs to bring the gas in-land in the case of an FSRU

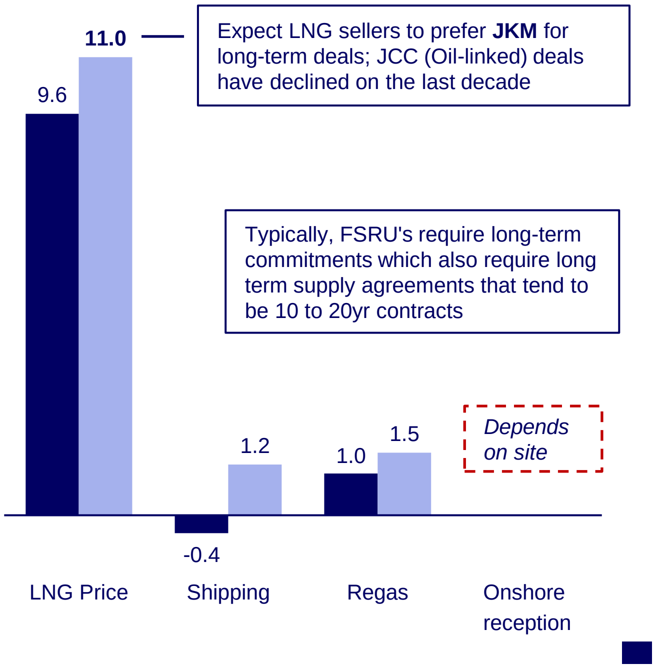
Range of Cost estimated for LNG Imports

Source: Wood Mackenzie; 1. Floating Storage Regasification Unit

LNG imports estimated at ~US$10.2-13.7/mmbtu plus onshore costs downstream of regas, within range of the delivered cost via pipeline

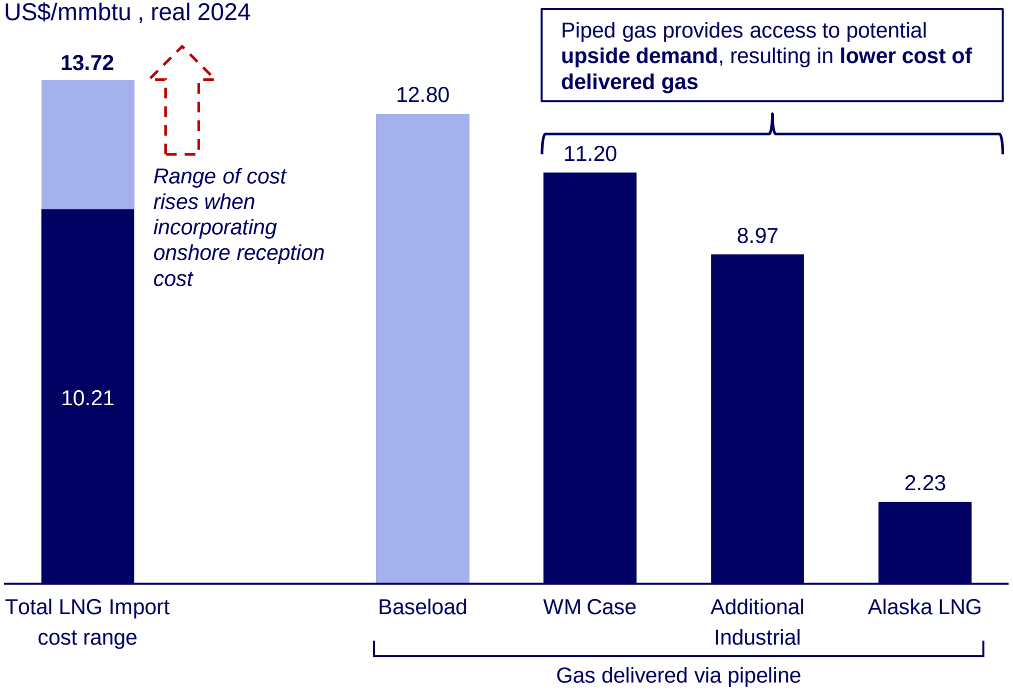
LNG Import cost range per value chain component[1]

US$/mmbtu, real 2024



LNG Import cost (without onshore investment) vs Gas delivered via pipeline

US$/mmbtu , real 2024



Source: Wood Mackenzie

1. Considers LNG Price average for the 2031 – 2050 Period, Shipping and Regas costs maintained constant in real terms

Wood Mackenzie

The approach to assess the socio-economics benefits of Alaska LNG Phase 1 considers four components

Components Considered to Assess Socio-Economic Benefits

1 Assess standalone capex by project components:

- Total **Capital Expenditure** for **Construction**
- Analyze spend directly impacting Alaska
  - Direct impact from increased labor, land, and rights of way activity related to the project
- Additional implied benefit of access to incremental demand and higher probability of AK LNG

2 Assess socio-economic benefits for the lifetime of the project

- Lifetime **operational expenditure** (mostly in-state spend)
- **Government tax** for gas monetization, pipeline operations, and others
- **Direct job creation** by project components
  - Construction phase
  - Operations phase

3 Assess Indirect and Induced benefits

- Benchmark and select input-output **multipliers** for **indirect** and **induced** benefits
- **Quantify Indirect & Induced** impact on **Alaska Gross Value Added (GVA)[1] and jobs**

4 Assess potential for savings with access to low-cost gas supply & other benefits

- Identify expected total state **gas consumption**
- Compare resulting **cost of gas** under base case scenario to alternatives (LNG Imports)
- Project potential for **savings** across the target operating period (2031–2071)
- Include other benefits, such as Fairbanks gas adoption

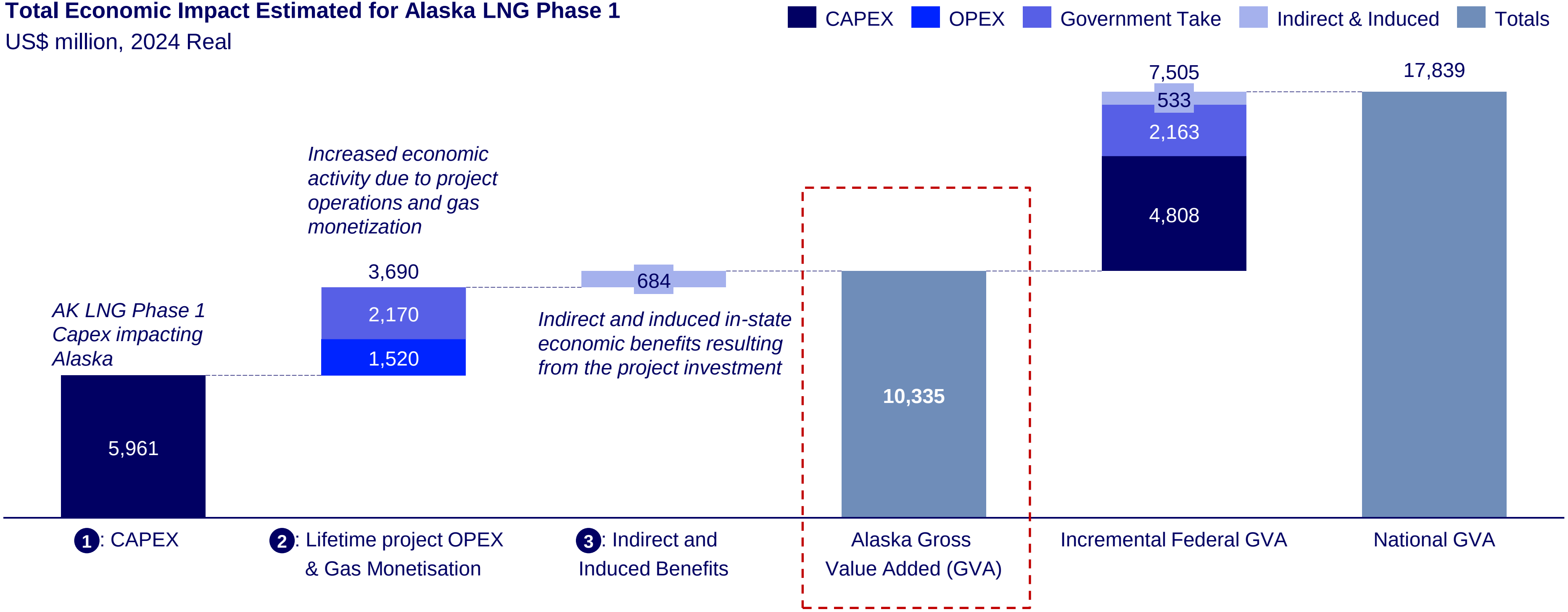
Alaska LNG Phase 1 development: Socio-economic benefits reflected in GVA, jobs and potential savings

Source: Wood Mackenzie; 1.GVA refers to the lifetime impact on Alaska's GDP

Wood Mackenzie

Gross Value Added for Alaska LNG Phase 1 is estimated at ~US$10.3 billion, with ~US$ 9.6 billion of direct economic impact from the Project's investment and operations in-state expenditure

Total Economic Impact Estimated for Alaska LNG Phase 1
US$ million, 2024 Real



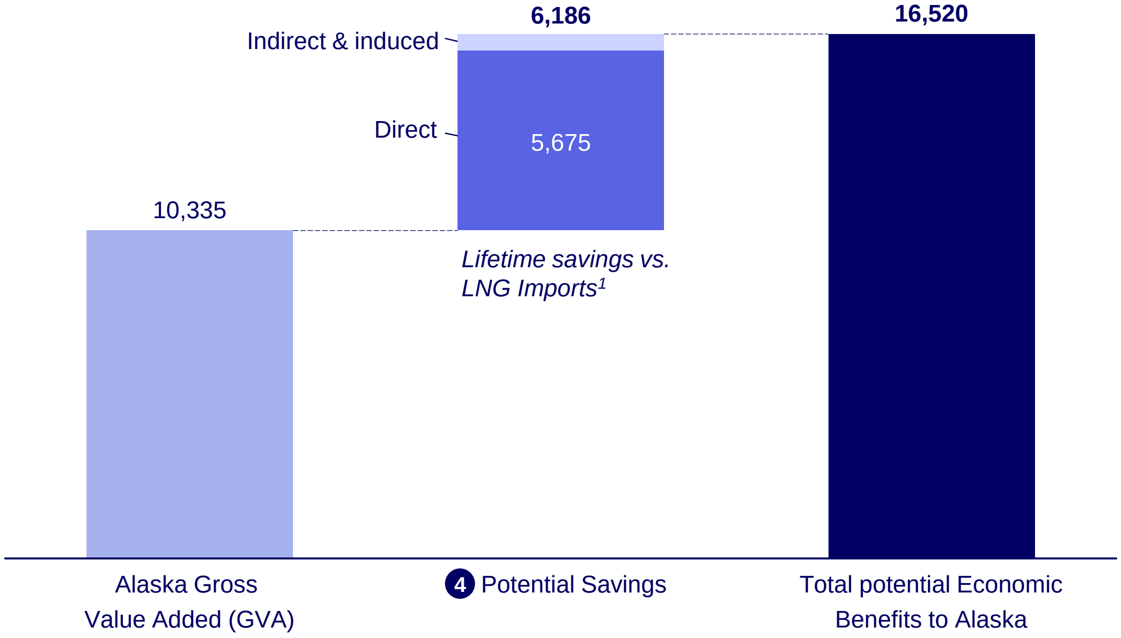
Source: Wood Mackenzie, AGDC, the Perryman Group; 1. Considers WM Case Scenario and high-end cost of LNG imports

With potential implied savings (compared to LNG imports) economic benefits to the state add up to ~US$ 16.6 Bn

- Gas via pipeline has additional economic benefits over the long term:
  - Lifetime **savings** from the **baseload** supplied via Pipeline, compared to LNG add up to **~US$ 5.7 billion**
  - Savings going back into the economy would also generate indirect and induced impact
  - The pipeline provides potential upside for gas demand and industrial activity
  - Overall potential impact to the state of Alaska is estimated at ~ **US$16.5 billion** or 2.8x in-state capex

Total Economic Impact Estimated for Alaska LNG Phase 1

US$ million, 2024 Real



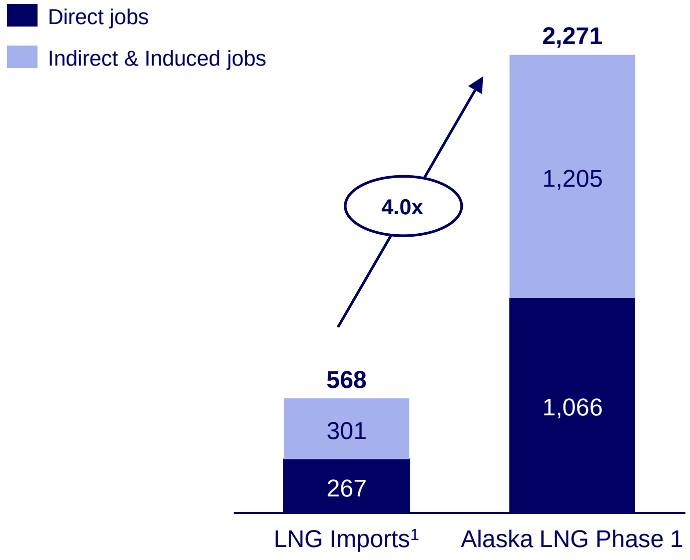
Source: Wood Mackenzie, AGDC, the Perryman Group; 1. Considers WM Case Scenario, high-end cost of LNG imports and grossed up with the construction economic multiplier (as proxy)

The impact in jobs created from Alaska LNG Phase 1 is 4x larger than the LNG imports alternative mainly due to a larger in-State construction scope

Economic Impact Comparison – LNG Imports vs Alaska LNG Phase 1

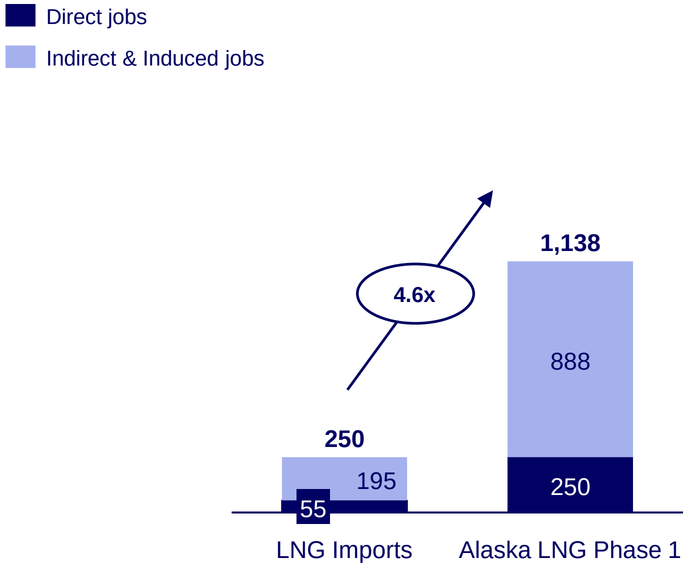
Average jobs per year - Direct, indirect, and induced

Construction Phase



Duration	3 years	5 years

Operations Phase



Duration	40 years

Source: Wood Mackenzie and AGDC. 1. Refer to appendix for key assumptions

The substitution of wood/oil for gas in Fairbanks for its energy needs offers a range of benefits: cleaner air, lower emissions, removal from EPA’s nonattainment designation, etc.

Cleaner air

- Local emissions from wood stoves and burning distillate oil contribute to particulate pollution
- With access to gas, a cleaner alternative becomes available to improve air quality

EPA’s nonattainment designation

- A portion of the Fairbanks North Star Borough, including the City of Fairbanks, was designated as a PM$^{2.5}$ Nonattainment Area in December 2009.
- By removing the designation, administrative expenses are reduced as the implementation plans to attain and maintain air pollutant emissions are no longer required.

Health

- Air pollution has direct consequences in public health
- By reducing air pollution, public health expenses may also decrease

Potential access to grants and investment

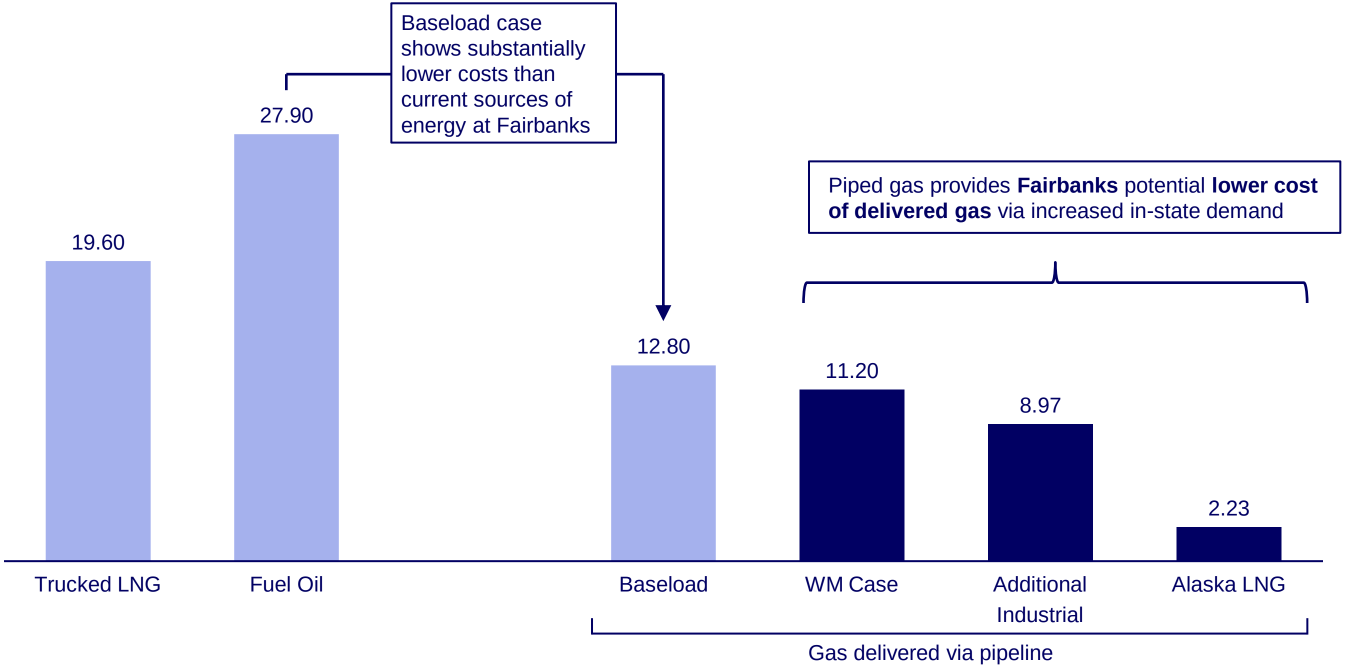
- EPA’s nonattainment designation may limit private and/or public investment in the region

Source: Wood Mackenzie and Alaska Department of Environmental Conservation

Additionally, energy costs at Fairbanks could potentially drop when switching from fuel oil and trucked LNG to natural gas via pipeline

Fairbanks energy cost comparison – Trucked LNG and Fuel Oil vs Gas delivered via pipeline

US$/mmbtu, real 2024



Source: Wood Mackenzie; Prices of trucked LNG and Fuel Oil at Fairbanks are lower end of cost range extracted from Interior Gas Utility (IGU) update published March 2023

Gas supply via pipeline provides over ~US$10 Bn of positive economic impact, 2 - 4x more jobs, and access to lower delivered costs vs LNG imports, though it requires higher capex

- **Cook Inlet gas supply has declined**, and despite exploration efforts by operators, **no new volumes** have been **discovered**
- Lack of reliable and affordable gas supply drove **decline in demand**, however going forward **supply** is expected to **drop faster** creating a **demand gap of ~2.3 tcf** (to 2071) projected to begin by the end of this decade
- With Cook Inlet gas production proving to be challenging, there are **two main alternatives** to address the forecasted **supply & demand gap**:

	Natural Gas Supply via Pipeline	LNG Imports
	A 765 mile (Phase 1), 42-inch diameter pipeline connecting the Southcentral Alaska region with the North Slope fields	Gas imports via LNG, for which regas and further downstream infrastructure is required
	▪ Cost of delivered gas in the **US$2.23 – $12.8/mmbtu**	▪ Cost of delivered gas in the **US$10.2 – $13.7/mmbtu (plus onshore costs)**
	▪ Direct, indirect and induced GVA**: ~US$ 10.3 Bn** ▪ **2,271 jobs**[1] created during construction and **1,138 in operations**	▪ Lower capex & lower direct, indirect and induced GVA **~US$0.6 – 1.4 Bn** ▪ **568 jobs**[1] during **construction** and **250** in **operations**
	▪ Time to first gas 2031[3]	▪ 3-4 Years post FID[2], though no major permit applications have been submitted. Permitting and/or required buildout could delay first gas
	▪ Provides access to **upside demand** with additional industrial and economic benefits to the state ▪ **Reducing emissions** and **removal from EPA's nonattainment** in **Fairbanks** via substitution of oil & wood as primary energy source	▪ Focused supply for the Southcentral region ▪ No Fairbanks or additional industrial demand ▪ Exposure to higher price volatility for energy needs
	▪ Higher **likelihood** of **full Alaska LNG Project**	

Source: Wood Mackenzie; 1. Direct, indirect and induced jobs, average per year of each period; 2. First gas for LNG imports is dependent on receiving all required permits, and Wood Mackenzie is uncertain about the status of those. Additionally, as of March 2024, Enstar's (local gas distributor) earliest estimation of first gas is 2029. 3. The AGDC has indicated that the pipeline has all major permits in place

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