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AK LNG 101: REPORT FOR 2015 LEGISLATIVE SESSION

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Contents

AK LNG: THE BIG PICTURE

AK LNG is a major project to commercialize the substantial reserves of natural gas on Alaska's North Slope. If it comes to fruition, it will likely be one of the largest energy infrastructure investments that has ever been made. As proposed, the project consists of four major components:

- Gas production from Prudhoe Bay (~75% of the total) and Point Thompson (25%)
- A gas treatment plant (GTP) on the North Slope to remove impurities from the gas and make it ready for transport
- A large scale gas pipeline from the North Slope to Nikiski, with at least five off-take points for gas consumption within the state
- A 15-18 million ton per annum liquefaction facility at Nikiski to cool the gas and make it ready for export to global markets.

In 2014, the Parnell Administration submitted to the legislature for consideration a package that set out an overall vision for the AK LNG project structure that would see **the State of Alaska participate in AK LNG as a part-owner (25%) rather than simply as a collector of royalties and taxes**. This vision was set set out in two initial agreements with the relevant companies, a Heads of Agreement (HOA) and a Memorandum of Understanding (MOU). The Administration also submitted enabling legislation, SB 138, that provided changes to the tax code and other key areas of statute to enable this proposed structure, and that authorized the executive branch to negotiate a range of subsequent agreements that would be required to move the project to the next phase of development.

Heads of Agreement (HOA). An HOA is a "non-binding document outlining the main issues relevant to a tentative partnership agreement. Heads of agreement represents the first step on the path to a full legally binding agreement or contract, and serves as a guideline for the roles and responsibilities of the parties involved in a potential partnership before any binding documents are drawn up" (Investopedia).

The HOA setting out the AK LNG project structure was dated January 14, 2014 and included six parties: (1) The Administration of the State of Alaska; (2) The Alaska Gasline Development Corporation; (3) TransCanada Alaska Development Inc.; (4) ExxonMobil Alaska Production Inc.; (5) ConocoPhillips Alaska, Inc; (6) BP Exploration (Alaska) Inc.

The HOA envisioned a structure where the state owned 20-25% of the gas and the same share of the AK LNG infrastructure

The HOA proposed that, if satisfactory agreements could be reached, the state would take its gas entitlement from royalty and production taxes on Prudhoe Bay and Point Thomson in the form of gas instead of cash. The state would then take a corresponding ownership stake in the AK LNG project, contributing its share of the construction costs, while sharing in the revenues generated by this project. **The HOA envisioned that the state would own 20-25% of the gas and the same share of the infrastructure associated with this project**.

Memorandum of Understanding (MOU). An MOU is a "legal document outlining the terms and details of an agreement between parties, including each parties requirements and responsibilities" (Investopedia).

The MOU was signed on December 12, 2013 and is an agreement between the State of Alaska and two companies: TransCanada Alaska Company and Foothills Pipe Lines LTD (a fully owned subsidiary of TransCanada). The MOU concerns the pipeline and gas treatment plant (GTP) components of the AK LNG project, but not the LNG (liquefaction) facility.

The MOU set out a partnership with TransCanada on the state's share of the pipeline and GTP

Under the MOU, the state proposed to assign to TransCanada (TC) the 25% equity share in the GTP and pipeline provided for the state under the HOA. TC would bear the state's share of the pre-construction and construction costs for the GTP and pipeline, and the state would then pay TC a tariff to ship its own gas through these facilities. The MOU laid out the terms that would govern the transportation contract between the state and TC, including the basis on which the tariff would be set.

The MOU also proposed an option for the state to buy back 40% of its original share in the pipeline and GTP from TransCanada (up to 10%). Under the terms proposed in the MOU, the state would have until December 31, 2015 to exercise this buyback option by reimbursing TC the corresponding share of its development expenses to date with interest (for example, if TC has paid $100 million, the state would pay 40% of this amount, $40 million, plus interest).

SB 138 was the enabling legislation that provided a framework and statutory authority to implement the vision of the HOA and MOU

SB138. While the HOA laid out the vision for the overall structure and approach to the AK LNG project, and the the MOU set out the terms of TC's potential participation, SB138 was the 'enabling legislation' that provided the statutory framework and authority to take that vision and begin to implement it. Among other things, SB138 put in place:

- A **gross, rather than a net-profit-based production tax on gas,** coming into effect in 2022, with the option in certain circumstances for the tax to be paid in kind, with gas, rather than in value. SB 138 also put in place the authority for the Commissioner of the Department of Natural Resources (DNR) to modify a number

of leases, especially more complicated structures like net profit sharing or sliding scale royalty leases, to enable all leases from an AK LNG project to have a predictable, constant, gross-based royalty. The purpose of this was that, when the royalty and gross-production-tax shares of gas are combined, the state should have an entitlement to ~ 25% of the gas from the AK LNG project (the upper end of the range provided in the HOA). If satisfactory agreements on a range of fronts could be reached, the purpose was further that the state could elect to take this combined share in kind, as gas instead of cash, **providing it with ~ 25% of the total gas for the project.**

- Authorities empowering the administration to **negotiate contracts** with the companies on a wide range of areas including the off-take and balancing of gas from the producing fields, transportation and liquefaction services, and marketing of the state's LNG. These agreements would translate the broad vision of the HOA and MOU into a firm project structure.
- **A broad roadmap for how the Legislature will oversee and consent to these negotiations.** Legislators would be kept informed and have the ability to provide feedback during the negotiations through briefings held in executive session, with final contracts returning to the legislature, in public, for approval.

PROJECT TIMELINE

The project is currently in Pre-FEED, with an aim of moving to FEED in 2016

The project is currently in the pre-FEED process (Front End Engineering and Design) which involves conceptual work to define the project elements. Pre-FEED has both technical and commercial components, the process takes 1-2 years and will cost ~500 million (paid by all the project partners according to ownership share).

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Project Stage	Pre-FEED		FEED				Construction				Online		
Investment (Project)	$400–$500 mm		$1,500–$2,000 mm				$45–65 billion (Debt and equity)				Cash covers debt and other expenses		
Investment (SOA)	$50–$125 mm		$200–$500 mm (Equity)				$6–$15 billion (Debt and equity)				Cash covers debt and other expenses		

If the results of the pre-FEED are successful and all the parties are satisfied that this is a viable project that meets their commercial and strategic objectives, **the parties will then proceed to a detailed FEED study, which will further define the technical, legal and commercial aspects of this project to a great degree of procession** (blueprints, negotiations with suppliers and with buyers, preliminary agreements for finance, export permits, environment approvals, etc.). This phase could cost $1.5 to $2 billion and last 2-3 years.

At the completion of the FEED study, the parties will weigh whether to sanction the project—or take 'final investment decision' (FID) in the industry's parlance. FID is the most important milestone because it marks a "green-light" authorization for the project to start construction and for the parties to

invest more substantial amounts of capital in the project (at this point estimated between $45 and $65 billion). Construction usually lasts 4-5 years.

All parties must agree to move from one stage to the next and so each party can assess, at every point, whether the project is proceeding according to its interests.

FORTHCOMING AGREEMENTS

Under SB138, the administration has the authority to negotiate contracts of no more than 2 years' duration without requiring legislative approval. Longer-term contracts, however, must return to the legislature for approval.

The purpose of the short-term contract authority was to allow the administration to negotiate contracts necessary for the state's involvement in the current Pre-FEED stage of the project.

Under this authority, a Pre-FEED Joint Venture Agreement between the AKLNG project parties, including AGDC as the participation vehicle of the state, has been signed. Similarly, the state has signed a Precedent Agreement (PA) and an Equity Option Agreement (EOA) with TransCanada, making more concrete the terms of the state's partnership with TC. At the same time it signed an AGIA Project Abandonment and License Termination Agreement with TC, formally terminating the AGIA contract, and transitioning the relationship with TC to the new commercial one established by the MOU and made more concrete through the PA and the EOA.

These are all, however, only short-term agreements to underpin the working relationship between the parties during this time-frame. **If the project is to progress to the FEED stage in 2016, a much broader range of agreements will need to be reached, and these will need to be approved by the legislature**, ideally during a special session before the end of the year. Broadly speaking, the agreements that need to be reached can be classified in three general types: commercial, organizational and fiscal agreements.

Commercial Agreements. These focus on the contractual, commercial relationships between the AK LNG project partners and counter-parties, dealing with issues such as how gas is supplied to the project or more broadly to the state, how LNG is disposed of, and how the project is financed.

- A **Domestic Gas Supply Agreement** will need to be reached, detailing what the responsibilities of the state and the companies involved in AK LNG is with regard to supplying the domestic gas market. Some components of this may form a standalone agreement, while others may be incorporated into other agreements such as the Fiscal Agreement. For more details on key considerations for the state in negotiating a domestic gas supply agreement, please see enalytica's special report How LNG Affects Local Markets: Lessons for Alaska from Western Australia

- A **Project Gas Supply Agreement**, including details of how lifting/offtake of gas from the producing fields occurs, how different partner entitlements and supply obligations are balanced over time, and how various obligations related to gas handling are met, will need to be reached. This will be a particularly crucial agreement for the state, precisely because the state has no direct control of the upstream producing fields, but if it choses to take its tax and royalty entitlement in kind, it will incur firm commitments to counter-parties to provide them with gas or LNG. A project gas supply agreement that thoroughly deals with the wide range of possible occurrences such as outages, underproduction, and the evolution of production plans over time will be essential in order to adequately protect the state's interests.
- A **Firm Transportation Services Agreement** with TransCanada will need to be reached, if TC is to remain the entity that carries the State's share in the pipeline and GTP components of the project. The MOU and subsequent agreements with TC currently put a date of December 31, 2015 for the state to reach such an agreement with TC, and for the state to determine whether or not it wishes to exercise its equity buyback option with TC. In order to reach sound decisions on these issues, the administration and the legislature will need to have understood in detail by this point the **potential financing options**, the state has for its share of the AK LNG project, and how these compare to the implicit financing option provided by TC. It will also be necessary for the state to have made a firm decision on whether or not it intends to take its royalty and tax entitlements in kind as gas, since this will determine whether or not the state in fact has gas for TC to transport. If, at this juncture, the state were to decide to pursue the project without the involvement of TC, it would need to reimburse TC for all costs incurred to date, with interest.
- Preliminary agreements on **State of Alaska LNG Disposition** will need to be reached. While these will not be exhaustive, they will need to include a demonstration from the project partners that they have offered to purchase, dispose of or market the state's gas on "the same or substantially similar" terms to that under which they sell their own gas, since this is a requirement under SB138 for the state to take its gas in kind. It would also be wise for the State of Alaska to have undertaken extensive preliminary marketing work for its share of LNG from the project at this point, possibly including non-binding agreements with potential buyers, in order to fully understand its range of options for LNG disposition. For more details on the choices facing the state in marketing its LNG, please see the enalytica special report Marketing Alaska's Gas from AK LNG: Key Issues.

Organizational Agreements. These focus on the structure of the AK LNG project, and the nature of the relationship between the different project participants.

- A **FEED-stage JVA** will need to be reached, detailing the nature of the partnership between the different companies during the FEED stage, obligations and responsibilities of different parties, and processes for decision making,

including what decisions can be made by a majority of the partners, and which require unanimous consent from all partners.

- **Governance agreements** covering other items will need to be reached, with one of the most important issues likely to be **expansion terms** for the project. The aim here will be to put precise and binding detail around the broad principles laid out in the HOA.
- **Lease Modifications** will need to be made, as a necessary precursor to the various gas supply agreements, and to the ultimate determination of whether or not to take the state's royalty and tax entitlement in kind.

Fiscal Agreements. These focus on the fiscal terms applying to the project, both now and far into the future.

- Some form of **Fiscal Agreement** will need to be reached, detailing the fiscal terms applying to the project, and setting out avenues through with the state proposes to guarantee the stability of those terms for a sufficient duration to provide the private sector partners with sufficient confidence to commit the large amount of capital required by this project. Avenues for potential stabilization could include contractual or statutory approaches as well as mechanisms invoking the obligations flowing from the state's bonding authority. Some approaches could involve or require voter ratification and, in some cases, judicial review.
- Agreement will need to be reached on the form of **Property Tax** applying to the project. This will require extending the work done so far by the Municipal Advisory Gas Project Review Board in developing a structure for a property tax, or a payment-in-lieu of property tax that is equitable, meets the revenue requirements of the relevant municipalities, and which is stable, predictable and durable.

Many difficult, contentious agreements will need to be reached before the project can progress to FEED. For this to occur by 2016, the administration and legislature will both have a lot to do in 2015

Taken as a whole, these represent a complex web of interlocking agreements, each of which will be subject to difficult and contentious negotiations. Completion of them, however, will be required in order to reach a point where the state can satisfactorily say that proceeding with tax and royalty in kind is in Alaska's best interests. And only when such a determination has been made can a final decision on a commitment to TransCanada be made - a commitment that is currently due before the end of the 2015. Finally, only when all of these decisions have been made and agreements reached will the project be ready to move on to the Front End Engineering and Design (FEED) phase. The administration and the legislature both have a lot on their plates for 2015.

WHY MIGHT THE STATE CONSIDER INVESTING IN AK LNG?

Sovereigns invest in LNG projects in their territories in the majority of countries where LNG is produced

Many different means of state participation. Governments generate value from LNG projects in many ways. Some, like Australia, Canada and (to date) the United States act solely as taxing and permitting/regulating authorities. The majority of countries, however, have some form of ownership in the LNG ventures in their territories, and some countries such as Malaysia, Qatar and Algeria, often invest in associated facilities overseas (shipping, regasification, etc.), and take active roles in overseeing and managing LNG projects.

States that invest actively in LNG do so because they understand that gas in the ground is worth only a modest amount; only through liquefaction, shipping, sales and marketing can that gas to be sold for premium prices in markets where the demand is highest, and so those states maximize the value they receive by participating in these value-adding parts of the chain.

Because gas trades at a thermal discount to oil and because it is more expensive to transport, a purely tax-based approach would expose the State of Alaska to considerable price and cost risk

Low value at the point of production. Alaska currently generates value from its hydrocarbons through royalties and a production tax based on the 'Gross Value at the Point of Production' (the value shortly after the resource leaves the wellhead). While this system works for oil, it is more problematic for gas because gas is considerably harder and more expensive to transport.

The following table compares the Gross Value at the Point of Production for oil and gas. **For oil, the total tariff to move a barrel of North Slope oil to the US West Coast is around $10/bbl** (this includes both the Trans-Alaska Pipeline System, TAPS, and marine transportation), resulting in **gross value at the point of production of approximately $90 when the ANS West Coast price is $100.** To examine the equivalent value for gas, we start with the fact that 6 million British thermal units (mmbtus) of gas, 6 thousand cubic feet (mcf) of gas and one barrel of oil all contain approximately the same amount of energy; so 6 mmbtus or 6 mcf both equal one 'barrel of oil equivalent' (boe). Gas in Asia is generally priced based on some form of indexation to crude oil, but usually at a discount, so that when the price of Alaska North Slope (ANS) crude is $100/bbl, the price LNG in Japan under a typical contract might instead be $81/boe. Moreover, transporting a barrel-equivalent amount of LNG to Asia could easily cost as much as $66/boe, based on current cost estimates for AK LNG. Therefore, **when all costs are netted out, the remaining value at the 'point of production' is only a small fraction of the sale price of the LNG.**

INDICATIVE VALUE CHAIN IN ALASKA: OIL VS. GAS	OIL ($/BBL)	GAS ($/BOE)
RESOURCE PRICE	$100.00	$81.00
LESS: MARINE TRANSPORTATION	$3.46	$6.00
LESS: PIPELINE (& LIQUEFACTION) TARIFF	$6.58	$60.18
GROSS VALUE AT POINT OF PRODUCTION	$89.96	$14.82

More importantly, because the transportation tariff is so high and is a fixed component, **a 10-15% fall in prices or rise in costs could wipe out the wellhead value of Alaska's gas altogether. Thus, if Alaska generates value**

gas by taxing and collecting royalties based on the value at point of production, it will take a high degree of price and cost risk. If the project is within budget, and LNG prices are high, the state will do well. But if costs are higher or prices lower than anticipated, the value to the state will quickly be wiped out, because all value will be consumed by the 'midstream' transportation components of the value chain.

By investing in the project, the state avoids a repeat of the valuation disputes that plagued TAPS and provides the long-term certainty that all the partners need in order to sanction the project

Alignment. Not only do these transportation costs represent the majority of the value of the LNG, they are also likely to be very opaque. The tariffs for the liquefaction project, in particular, will be subject to minimal regulatory oversight, with much freedom for the liquefaction owners to structure the project and set a tariff as they see fit. By financing the liquefaction facility mostly through equity rather than debt, for example, the owners could potentially raise the tariff even further, costing the state billions in forgone tax and royalty revenues over time. The state has much experience with difficult disputes over tariffs for TAPS; **when tariffs consume the overwhelming majority of the barrel, as they do in LNG, the potential for dispute could become an insurmountable barrier for the project.**

For their part, the existing North Slope producers have also been burned by the disputes of the past. LNG is a business that requires long-term certainty and stability because LNG typically requires a long payback period to cover the high upfront investment. No investor will commit the amount of capital that this project requires ($45-65 billion) without knowing that the terms of the game will not change later due to disputes with the state. **Without certainty and stability, this project will not go ahead.**

The producers could achieve such stability solely through contracts with the state, but their terms would likely be unacceptable to the state. Instead, the producers can achieve stability through alignment by partnering with the state as an investor in the project. As a co-investor, **the state would generate value the same way the producers do**. When the producers do well, the state would do well. Since the state would have similar long-term commitments as the producers, **it would need stability in exactly the same way**. **The potential for disputes over items like tariffs would be eliminated, because the state would no longer face a tariff for transportation as such. Instead, the state would simply own a share of the gas, and corresponding share of the infrastructure required to move the gas to market.**

Equity protects the state better. Intuitively, one would think that if the state were to take a 25% share of the AK LNG project, it would be taking substantially more price and cost risk than if it simply took taxes and royalties from the project. One might also think that by taking 25% of the equity, it was only capturing 25% of the value of the project, while the North Slope producers captured the lion's share of the value. Both of these intuitions, however, are incorrect.

We have already shown that for gas, value at the point of production is low and variable, while the cost of transportation is high and "fixed" (in the sense of a fixed tariff). As a result, if the state is a wellhead-value taxing authority, taking its share 'in

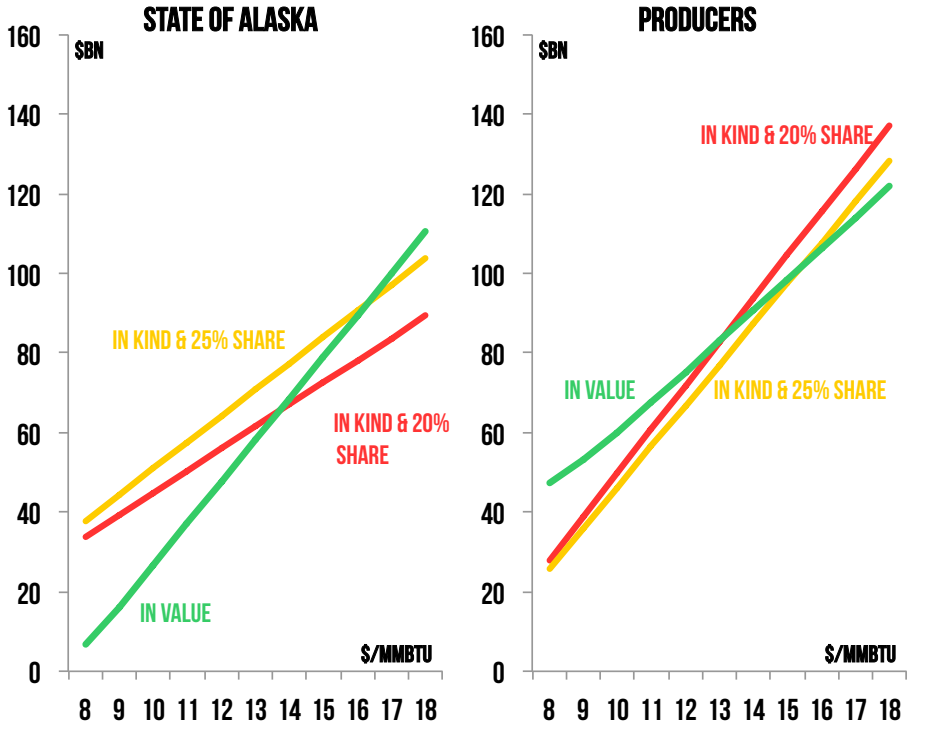
value', small movements in price or cost can wipe out value to the state altogether. The fixed midstream costs amplify the impact of price and cost movements on the state. Returns to the midstream are effectively 'guaranteed' in most circumstances, while the upstream, where the state draws its value, is the 'shock absorber' and takes up almost all of the risk. When prices fall (see table below), the midstream part still earns the same value but the gross value at the point of production shrinks.

INDICATIVE LNG VALUE CHAIN IN ALASKA	GAS ($/BOE)	GAS ($/BOE)	GAS ($/BOE)
RESOURCE PRICE	$70.00	$75.00	$81.00
LESS: MARINE TRANSPORTATION	$6.00	$6.00	$6.00
LESS: PIPELINE (& LIQUEFACTION) TARIFF	$60.18	$60.18	$60.18
GROSS VALUE AT POINT OF PRODUCTION	$3.82	$8.82	$14.82

Counterintuitively, the state is better protected on the downside by taking equity; it also takes more than 25% of the project value even though its share is only 25%

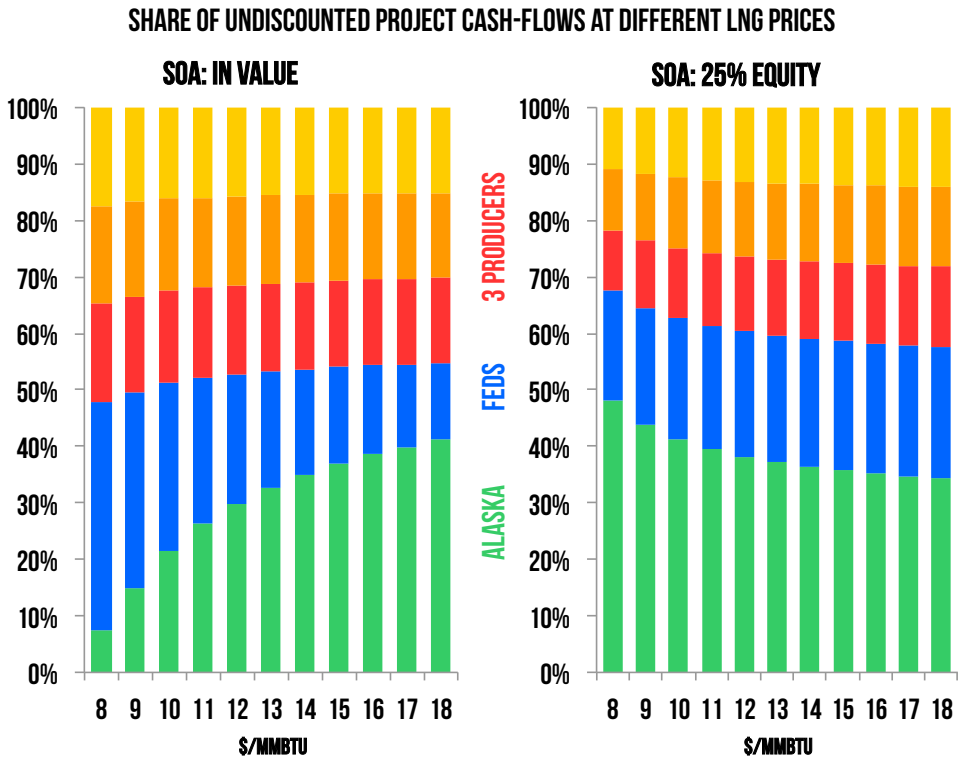
By taking a 25% share of the gas 'in kind' for the project, and 25% of the equity, the state removes this fixed component and draws value from the entire chain. **If gas prices fall, the state's return on investment would fall, but because it participates throughout the value chain, its revenues would fall less than if it were only an upstream taxing entity.** The cost of this protection is that by participating 'in kind', the state must contribute more cash up-front to project development, and in a high-price world, it will capture less of the upside than it would as an 'in value', taxing authority.

TOTAL UNDISCOUNTED PROJECT CASH-FLOWS TO STATE AND PRODUCERS AT DIFFERENT LNG PRICES



Overall, however, **the state receives a share of project value that is higher than its 25% share**. In fact, on average, across a range of gas prices, with a 25%

equity share, the state would capture a share of value roughly equivalent to that of all three of the producers combined (who own 75% of the project). The state is able to do this because of its advantages with respect to taxes. While the three producers must pay state income taxes and property taxes to the state (increasing the state's share), and must also pay federal income tax, the state does not pay these taxes other than to itself (including, within its remit, municipalities).



WHAT ROLE DOES TRANSCANADA PLAY?

Under the path proposed by the Heads of Agreement (HOA) and SB138, if satisfactory agreements on a wide range of issues can be reached, the state would acquire a 25% share of the gas for the AK LNG project by taking its tax and royalty entitlements in kind. It would also carry a corresponding 25% of the equity in the project and as an equity partner, it would be responsible for 25% of the costs of developing the $45-$65 billion project.

The Memorandum of Understanding (MOU) and subsequent agreements signed by the state have provided for TransCanada to carry the state's 25% share in the gas treatment plant (GTP) and pipeline throughout the pre-FEED stage. As a result, throughout this stage, TC is covering the costs associated with the state's 25% share in these project components. If, prior to moving to FEED, the state were to sign a Firm Transportation Services Agreement with TC, TC would then hold the state's 25% share in these components throughout FEED, construction and for the first 25 years of production. TC would be reimbursed for bearing these costs by charging the state a tariff for the transportation of the state's gas.

Under the MOU and the Equity Option Agreement (EOA) signed by the state, prior to FEED the state has the option to 'buyback' up to 40% of its original share in the pipeline and GTP from TC by repaying the corresponding share of TC's development expenses to date with interest.

Prior to FEED, the state could also decide not to sign an FTSA with TransCanada. Were this to occur, the state would then need to repay all of TC's expenses to date with interest, and would need to cover its full share of costs for the FEED and construction phases, or find a different partner.

STATE OWNERSHIP

	UPSTREAM	GTP & PIPE	LNG
WITHOUT TC	0%	25%	25%
TC & BUYBACK	0%	10%	25%
TC & NO BUYBACK	0%	0%	25%

If the state is capital constrained, divesting part of its share in the GTP and pipeline make more sense than reducing its ownership of the liquefaction plant

Concentrating state share in liquefaction. Key to the approach entailed under the MOU is a distinction between the pipeline and GTP components of the project, and the liquefaction plant. There are a number of reasons why such a distinction might make sense.

Of all of the components in the project, the liquefaction plant will be the most expensive (likely constituting around half of the total project cost), the least subject to regulatory oversight, and the least transparent to non-participants. As a result, the **liquefaction plant presents the greatest potential source of lost value to**

the state if it does not participate in that component of the project. By contrast, regulated, cost-of-service tariff-setting principles are well established for pipelines in the United States, and it is possible to set a transparent tariff for a pipeline that provides a set return to a third-party pipeline company.

If the state proceeds with equity participation in AK LNG, it will generate the greatest possible value in most circumstances through the greatest possible share of the overall project. The overall share the state can take, however, is constrained by two factors: by the size that the producers are willing to agree to (if the state share is too large, there will be insufficient value for the producers to find the project attractive); and by the state's ability to finance its share of the construction costs.

Given such constraints it may make sense for the state to reduce its exposure to lower-yielding project components in order to carry the largest possible share in the higher-yielding components that lies within its financial capacity. **So long as an attractive tariff can be established for the pipeline and GTP, reducing the state's exposure to these components, and maximizing its participation in the liquefaction facility may make sense if the state is capital-constrained.**

In this regard, from a purely financial perspective, the impact of TC's involvement may be seen as being akin to a loan; it reduces the capital investment in the project required of the state, and the state pays back the 'loan' through a fixed payment in the form of a tariff. Also like a loan, it increases some of the state's exposure to risk by adding a fixed claim on the project cash-flows that must be met before the state receives its share. Compared to other forms of debt, TC's involvement is a relatively expensive form of financing, with a weighted average cost of capital (WACC) that is significantly above the state's own cost of debt. However, since there will likely be limits on the amount of debt that the state is able to carry for the project, the ability of TC to shoulder some of the burden may still be attractive. This may particularly be the case because of other benefits TC's involvement in the project can offer.

A third-party pipeline company increases the odds that the infrastructure can be expanded to include new gas discoveries for delivery to Alaskans as well as international markets

Expansion benefits of a third-party participant. The existing producers have a clear and demonstrated execution capability to undertake the pipeline and GTP components of AK LNG alone. However, since the potential North Slope gas resource base is likely much larger than just existing reserves at Point Thomson and Prudhoe Bay, the question of how future expansions of the AK LNG project are handled will also be critical. The interests of the state may well differ in this regard from the interests of the existing major North Slope producers.

The producers will ultimately generate income from AK LNG by selling gas that they own into premium export markets. They have no compelling interest in ensuring the ability of other North Slope resource holders to monetize their own gas by expanding the AK LNG facilities. While they might support an expansion that reduced their own unit costs, they are unlikely to devote significant management time or resources to such a project. An expansion that did not reduce their costs is not one they would have any incentive to pursue.

This is particularly a problem for the pipeline, as opposed to the liquefaction plant. While there are issues to resolve in pursuing an expansion of the liquefaction plant (e.g. how to pay for shared costs), in general, expansion of a liquefaction plant is straightforward: with enough gas, a company can add another train with its own ownership and structure. By contrast, all the gas will be transported through the same pipeline, making the question of the participants' interest in expansion critical.

It will thus be essential to have a strong, pro-expansion partner in pipeline component of the project. If the state were to carry its own interest in the GTP and pipeline, it could play this role itself. However, this may place a significant burden on the state that it is not best positioned to carry. If the state does not wish to be the primary driving force behind future expansions to the GTP and pipeline, or does not believe it has the capabilities to play such a role, there may be a significant benefit to the involvement in the project of an experienced third-party pipeline company. Unlike the producers, such companies make their money from moving gas, not selling it and so they have an overwhelming interest in expansions.

The tariff agreed for the pipeline appears competitive, but must ultimately be compared to the state's other options for financing; any increased costs must be justified by other benefits the partnership brings

Tariff for pipeline. The tariff structure proposed under the MOU appears to be solidly competitive when compared to tariffs for interstate pipelines regulated by the Federal Energy Regulatory Commission (FERC). **In particular, the ratio of debt to equity proposed for the project (75:25 for the initial project, and 70:30 for subsequent expansions) serves to create a competitive rate-setting WACC for the initial project of below 7%.** This places some financing risk on TC, and appears to be a component of the proposed terms that should be attractive to the state. The 'rate tracker' component of the MOU however, also places some risk on the state; if the 30-year Treasury rate rises significantly between now and the time of Final Investment Decision (FID), the rate-setting WACC will correspondingly increase. It is also important to note that under the terms of the MOU, the 'rate tracker' would apply any increase in the 30-year Treasury rate not just to the cost of debt, which is logical, but also to the cost of equity, which may be less warranted. Ultimately, the attractiveness of the tariff must be assessed by comparison to the state's other potential options for financing. Any increase in costs compared to other options must be justified by other benefits the partnership brings, if the state is ultimately to sign an FTSA with TC.

GLOSSARY

Acronyms:

AGIA - Alaska Gasline Inducement Act

FEED - Front End Engineering Design

FERC - Federal Energy Regulatory Commission

FID - Final Investment Decision

GTP - Gas Treatment Plant

HOA - Heads of Agreement

LNG - Liquified Natural Gas

MOU - Memorandum of Understanding

pre-FEED - pre-Front End Engineering Design

WACC - weighted average cost of capital

Units and conversions:

abbreviation	unit	relevant conversions
bbl **boe**	barrel (oil) barrel of oil equivalent	1bbl = 1 boe = 6000 cubic feet (6 mcf)
$/bbl	dollars per barrel (oil)	$6/bbl = $1/mcf ≈ $1/mmbtu
btu **mmbtu**	British thermal unit million British thermal units	$1/mmbtu ≈ $1/mcf (varies based on heat content of gas)
mmcf/d	million cubic feet per day	1,000 mmcf/d = 7.8 mmtpa = 10.3 bcm/yr
bcf **tcf**	billion cubic feet trillion cubic feet	1 tcf = 28.32 bcm = 20.67 million metric tons LNG
bcf/d	billion cubic feet per day	1 bcf/d = 7.8 mmtpa = 10.3 bcm/yr
bcm	billion cubic meters	1bcm/yr = 0.73 mmtpa = 96.7 mmcf/d
mmtpa	million metric tons per annum (LNG)	1mmtpa = 1.37 bcm = 48.37 bcf/y = 132 mmcf/d
mmtoe	million metric tons of oil equivalent	1 mmtoe = 1.11 bcm = 39.2 bcf = 107.4 mmcf/d

ABOUT US

Janak Mayer. Before co-founding enalytica, Janak led the Upstream Analytics team at PFC Energy, focusing on fiscal terms analysis and project economic and financial evaluation, data management and data visualization.

Janak has modeled upstream fiscal terms in all of the world's major hydrocarbon regions, and has built economic and financial models to value prospective acquisition targets and develop strategic portfolio options for a wide range of international and national oil company clients. He has advised Alaska State Legislature for multiple years on reform of oil and gas taxation, providing many hours of expert testimony to Alaska's Senate and House Finance and Resources Committees.

Prior to his work as an energy consultant, Janak advised major minerals industry clients on a range of controversial environmental and social risk issues, from uranium mining through to human rights and climate change. He has advised bankers at Citigroup and policy-makers at the US Treasury Department on the management and mitigation of environmental and social impacts in major projects around the world, and has undertaken macroeconomic research with senior development economists at the World Bank and the Peterson Institute for International Economics.

Janak holds a BA with first-class honors from the University of Adelaide, Australia and an MA with distinction in international relations and economics from the Johns Hopkins School of Advanced International Studies (SAIS).

Nikos Tsafos. Nikos Tsafos has a diverse background in the private, public and non-profit sectors. He is currently a founding partner at enalytica. He previously spent 7 ½ years at PFC Energy, where he advised the world's largest oil and gas companies on some of their most complex and challenging projects; he also played a pivotal role in turning the firm into one of the top natural gas consultancies in the world, with responsibilities that included product design, business development, consulting oversight and research direction.

Prior to PFC Energy, Nikos was at the Center for Strategic and International Studies (CSIS) in Washington, DC where he covered political, economic, and military issues in the Gulf, focused on oil wealth, regime stability and foreign affairs. Before CSIS, he was in the Greek Air Force, and prior to his military service, Nikos worked on channeling investment from Greek ship-owners to Chinese shipyards.

Nikos has also written extensively on the domestic and international dimensions of the Greek debt crisis. His blog (Greek Default Watch) was listed as one of "Europe's Top Economic Blogs" by the Social Europe Journal, and his book "Beyond Debt: The Greek Crisis in Context" was published in March 2013.

Nikos holds a BA with distinction in international relations and economics from Boston University and an MA with distinction in international relations from the Johns Hopkins School of Advanced International Studies (SAIS).

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