Alaska LNG Competitiveness Study

August 2016

Strategy with substance
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- The information upon which this report is based comes either from public domain sources or from our own experience, knowledge and databases. 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. We do not accept any liability for your reliance upon them.

Agenda

1. Project Overview and Scope
2. Alaska LNG Base Cost of Supply Competitiveness
3. Non Capex/Opex Options to Reduce the Cost of Alaska LNG Supply
   a. Third-party owned Tolling utility
   b. State-owned tolling utility
   c. Changes to the Fiscal Regime
4. Conclusions

Scope of Project

- **A consortium of interested parties (specifically BP, ExxonMobil and Alaska Gasline Development Corporation) has engaged Wood Mackenzie to undertake an analysis of the competitiveness of the Alaska LNG project**

- **The analysis undertaken relies on Wood Mackenzie's own internal databases and publicly available information. We have not been provided with any proprietary information by any of the companies for whom this study is being provided. The following are the areas that are addressed in this report:**

  » Establish Alaska LNG base case Cost of Supply (CoS) and define the target range for a competitive CoS for Alaska LNG

  » Identify viable options in addition to base capital cost (capex) and operating cost (opex) reduction to reduce the project's CoS

  » Consider the way forward to allow for a globally competitive LNG project in Alaska

Executive Summary

- Currently the competitiveness of the Alaska LNG project ranks poorly when compared to competing LNG projects that could supply North Asia, specifically, Japan, South Korea, China and Taiwan.

- This ranking also means that not only will the project not make sufficient returns for investors at current LNG market prices, but it may struggle to make acceptable returns even under a US$70/bbl price

- There are certain levers that could be used to improve the competitiveness of the Alaska LNG project and potentially also improve the competitiveness compared with other jurisdictions

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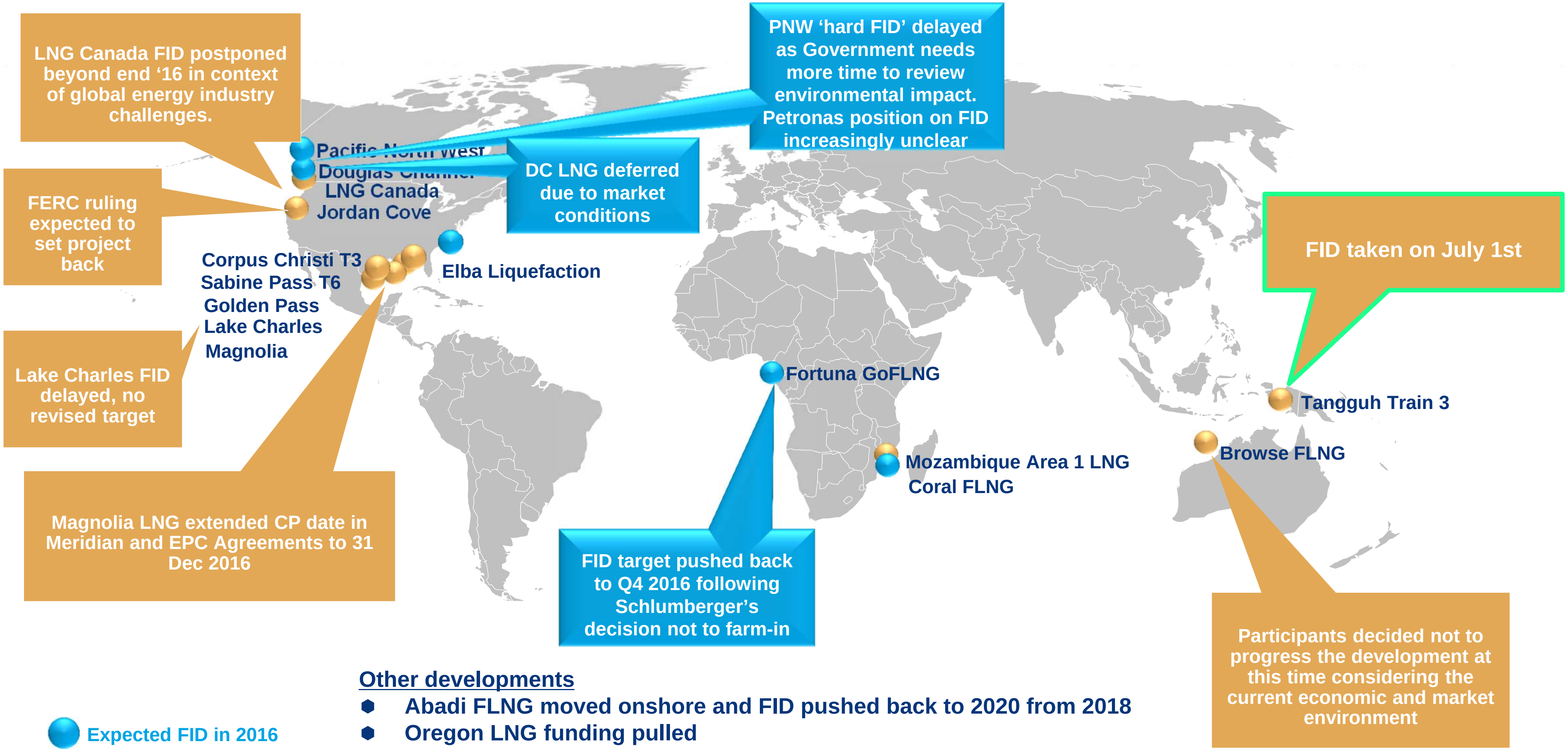
Several projects targeting 2016 FID have already pushed their timetables back

Projects where FID was envisaged by WM in 2016 (as of January 1st 2016)



Expected FID in 2016

'Wildcard' FID in 2016

<u>Other developments</u>

- Abadi FLNG moved onshore and FID pushed back to 2020 from 2018
- Oregon LNG funding pulled
- Triton LNG cancelled
- Cameroon LNG put on-hold
- Sempra indicated FID on Cameron LNG Expansion may be delayed beyond planned H1 2017 window

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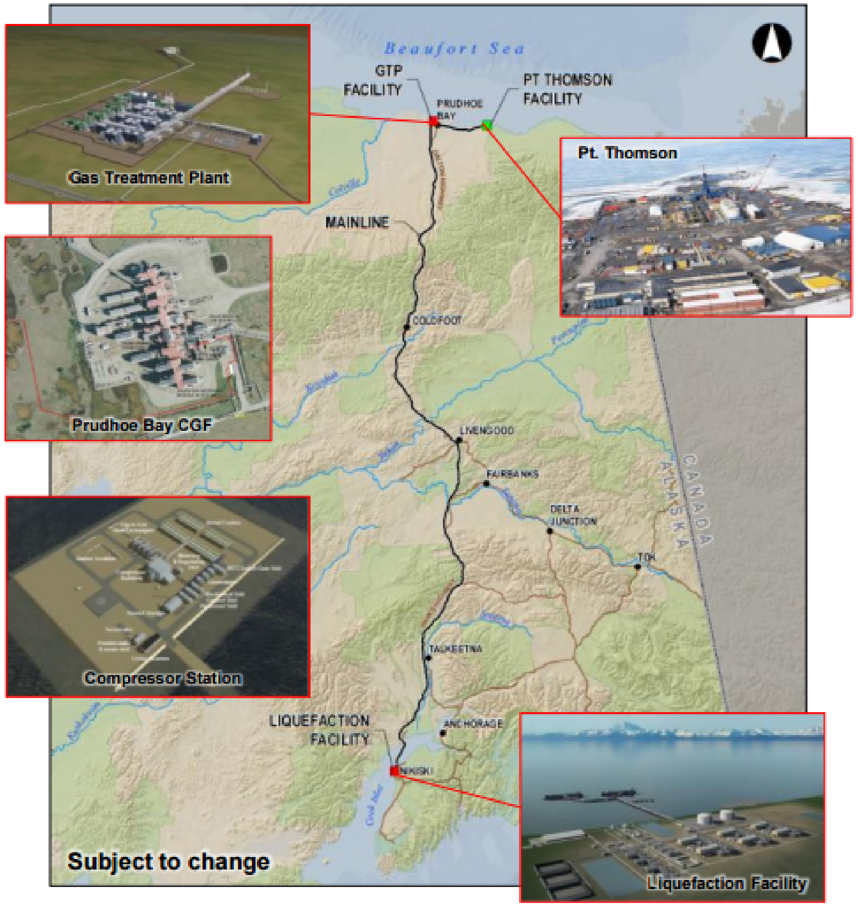
Alaska LNG – Project Overview

Alaska LNG™

An integrated liquefied natural gas export project providing access to gas for Alaskans



North Slope

Point Thomson: Deliver natural gas to GTP

Prudhoe Bay: Deliver natural gas to GTP, receive CO_2 / impurities for further handling

Gas Treatment Plant (GTP): Clean, dehydrate, chill and compress 3.5 BCFD of natural gas and deliver to pipeline

North Slope, Interior & Southcentral

Gas Pipeline: Transport 3.3 BCFD of natural gas over 800 miles to Nikiski, with at least five interconnection points for in-state gas

Southcentral

Liquefaction Facility: Create, store, and load up to 20 million tons of LNG per year (15-20 LNG cargos per month)

Alaska Gasline Development Corp bp ConocoPhillips ExxonMobil

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Approach to Analysis – Breakeven Cost of Supply

- **The basis of our analysis is to determine the breakeven delivered cost of supply for the Alaska LNG project**

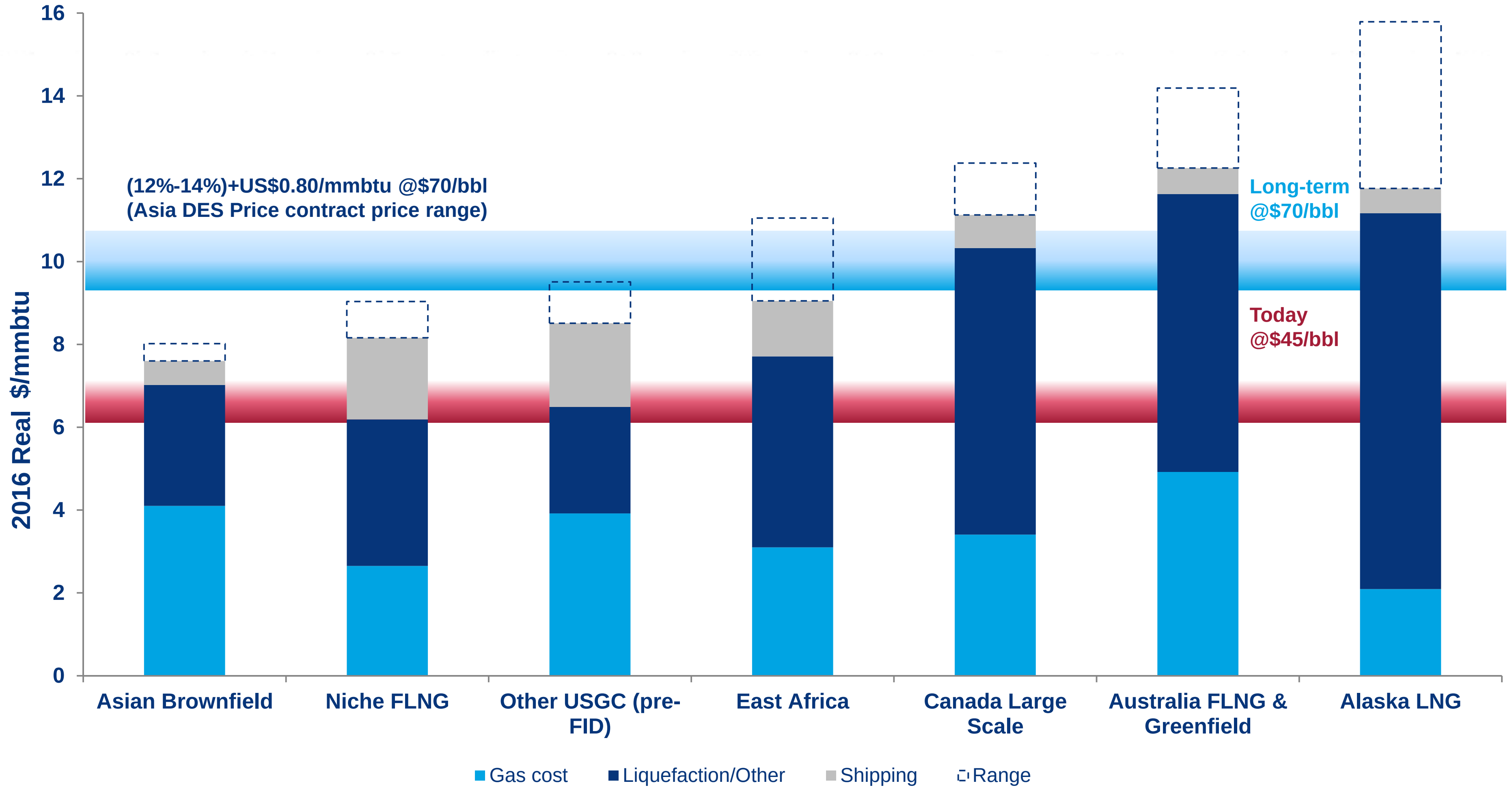
- **The analysis provides the price that would be required (in US$/mmBtu) for a project (or different elements of the project) to break even i.e. the price required for the project to generate a deemed rate of return**
  - » For the purposes of this analysis a return of 12% is used as a base case

Assumptions – Costs and Volumes

- **In line with published cost cases, two capital cost cases have been run covering transmission lines, gas treatment plant, pipeline and LNG liquefaction plant costs**
  - » Low Case US$45 billion
  - » High Case US$65 billion
- **Upstream costs are estimated by WoodMac at around US$10 billion to cover future capex for gas development at Prudhoe Bay and Point Thomson**
- **Shipping costs from Alaska to North Asia assumed at US$0.60/mmbtu**
  - » Point of reference: US Gulf Coast LNG projects' shipping to North Asia ~US$2/mmbtu
- **Upstream production 3 bcf/day**
- **Assumed losses 11%**
- **Domestic Market allocation: 300 mmcf/day**

Comparison of Breakeven cost of supply for delivery into North Asia

Estimated Delivered Breakeven Cost for pre-FID projects (to North Asia) Vs. Asian DES Price Range at $70bbl



Notes:
Breakeven costs are calculated on the basis of a 12% return
UG Gulf Coast (USGC) LT HH ~$3.41 avg real price 2019-2030; gas cost is grossed up at 15% for losses etc

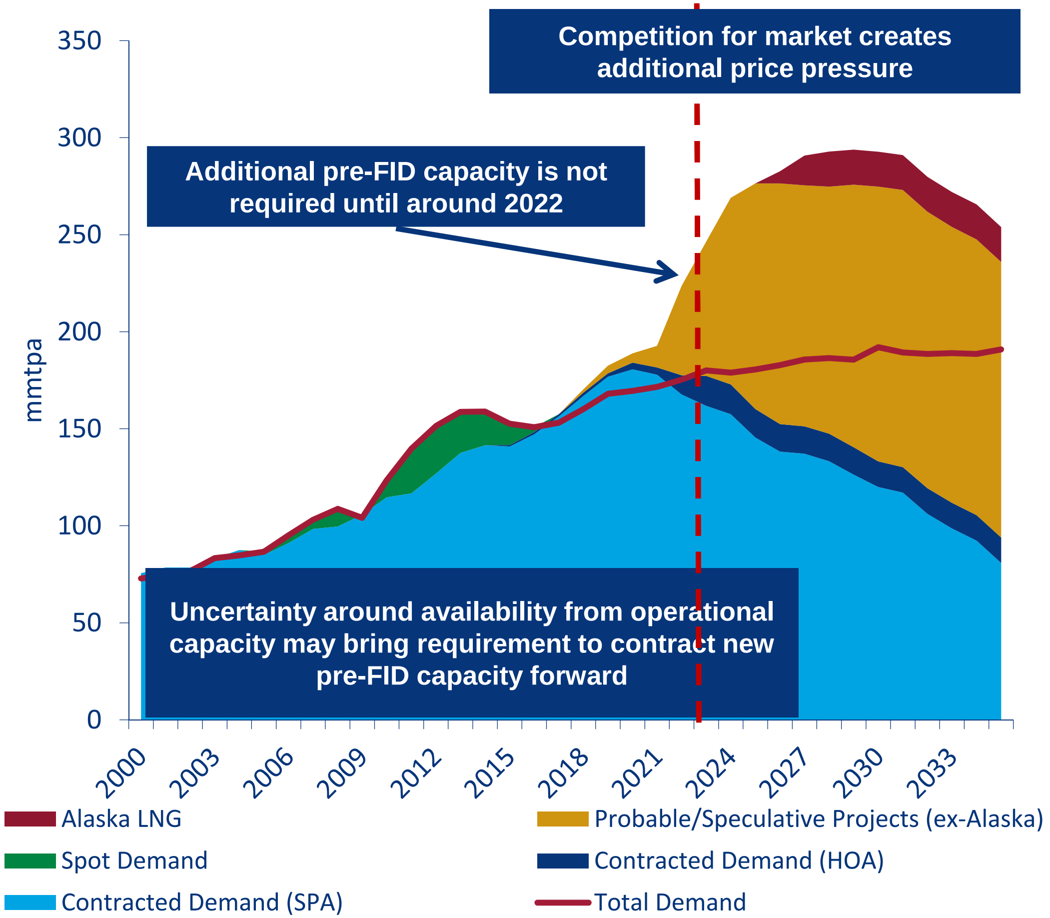
Comparison of competing projects

- **Of the peer group of projects, Alaska LNG has amongst the highest break-even cost of supply, even at the lowest capex estimate**
- **None of the listed projects break even at current oil prices of around US$45/bbl**
- **Under a long term price assumption of US$70/bbl, more would break even. However, the most economically challenged projects are:**
  - » Canada Large Scale
  - » Australia FLNG and Greenfield
  - » Alaska LNG

North Asia has a significant requirement for additional LNG, but price is not the only factor that buyers take into consideration

North Asia LNG demand vs. Contracted supply

- Maintaining a geographically diverse portfolio is important
- Contractual flexibility increasingly important
- Reliability and longevity of supply
- Significant number of competing pre-FID LNG projects plus un-contracted supplies from existing projects



Source: Wood Mackenzie

Probable and Speculative projects reflects effective capacity of pre-FID projects aimed at supplying North Asia

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Approach

- **We have considered what other options may allow a reduction in the project breakevens**
- **A reduction in costs is an option that will undoubtedly reduce breakevens and two costs cases are considered**
- **The following options are covered within this section of the report:**
  - » The effect on competitiveness by including a conventional non-recourse debt structure in a tolling plant structure
  - » Restructuring the project to increase the Alaska State's share
  - » Relief from federal or state taxes

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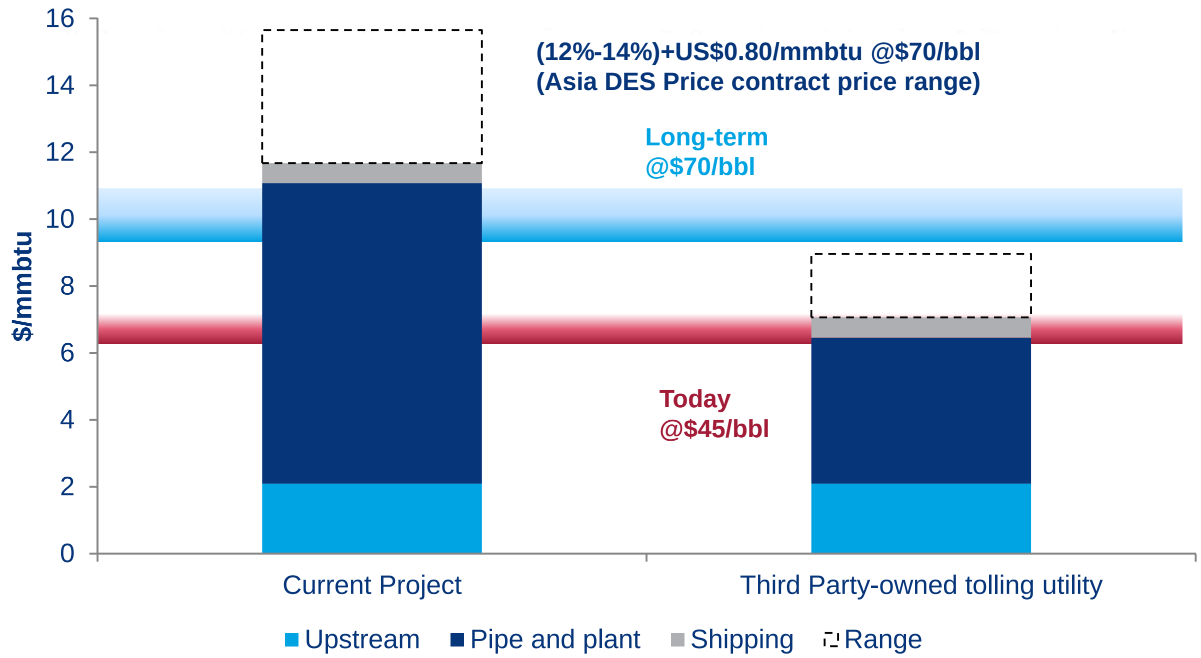
The introduction of a debt funded third party tolling structure will reduce the cost of supply

- **The debt structure assumed is:**
  - 70:30 – debt:equity
  - 15 year repayment term
  - Interest rate of Libor + 3.5%

- **A third party tolling company could require a ‘utility rate of return’ which is typically around 8%**
  - This reduced requirement for a return reduces the cost of supply



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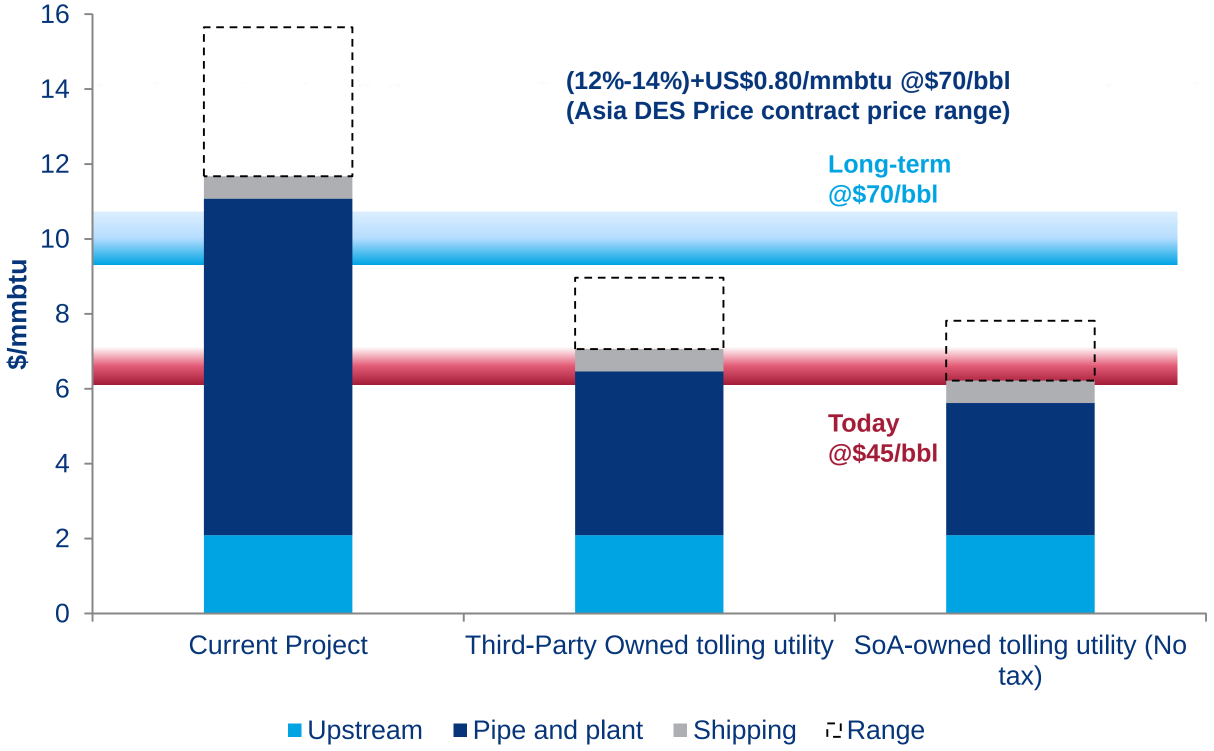
The introduction of State ownership

- In addition to a third party toller, the State of Alaska (SoA) could further reduce the cost of supply with a potential tax exemption

- SOA-ownership shown as fully tax exempt



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Changes to the Fiscal Regime

- **Targeted fiscal changes are often used around the world to encourage the development of a specific asset or a type of asset and there are many examples of this**

- **Typically relief will be granted for assets that are**
  - » high cost,
  - » found in unhospitable locations, or
  - » have low profitability under existing terms

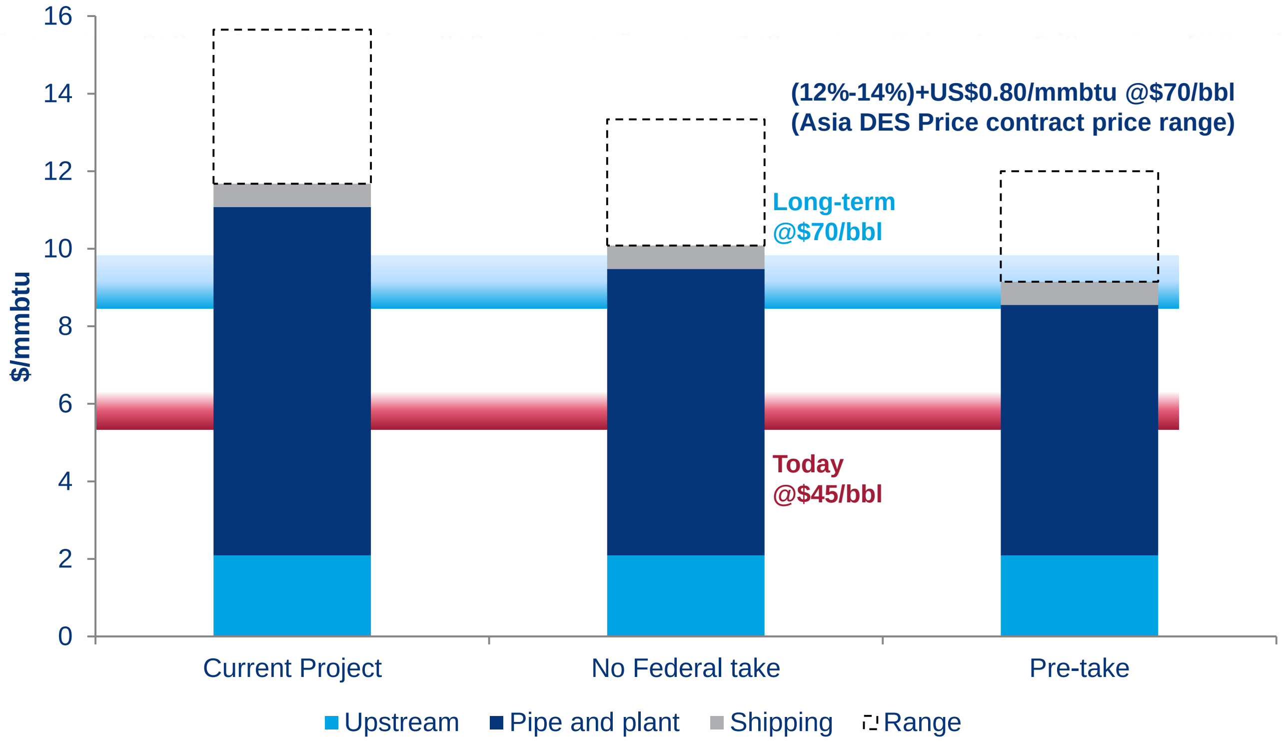
- **The Snøhvit LNG project in Norway and the Yamal LNG project in Russia are examples of LNG projects where governments have targeted fiscal reliefs to enable these projects to progress**

- **Details of the changes used, plus examples of other targeted and more broadly applied fiscal reliefs are included within the Appendix**

Impact of Federal and State fiscal change on integrated structure

- **The chart illustrates the cost of supply impact of changes to the fiscal regime on the integrated 100% equity project**

- **Even the removal of all taxes on pipeline and plants is insufficient to reduce the cost of supply below the current level of LNG prices**
  - » The pre-take case excludes all levels of government take on the plants and pipelines but includes 25% RIK/TAG



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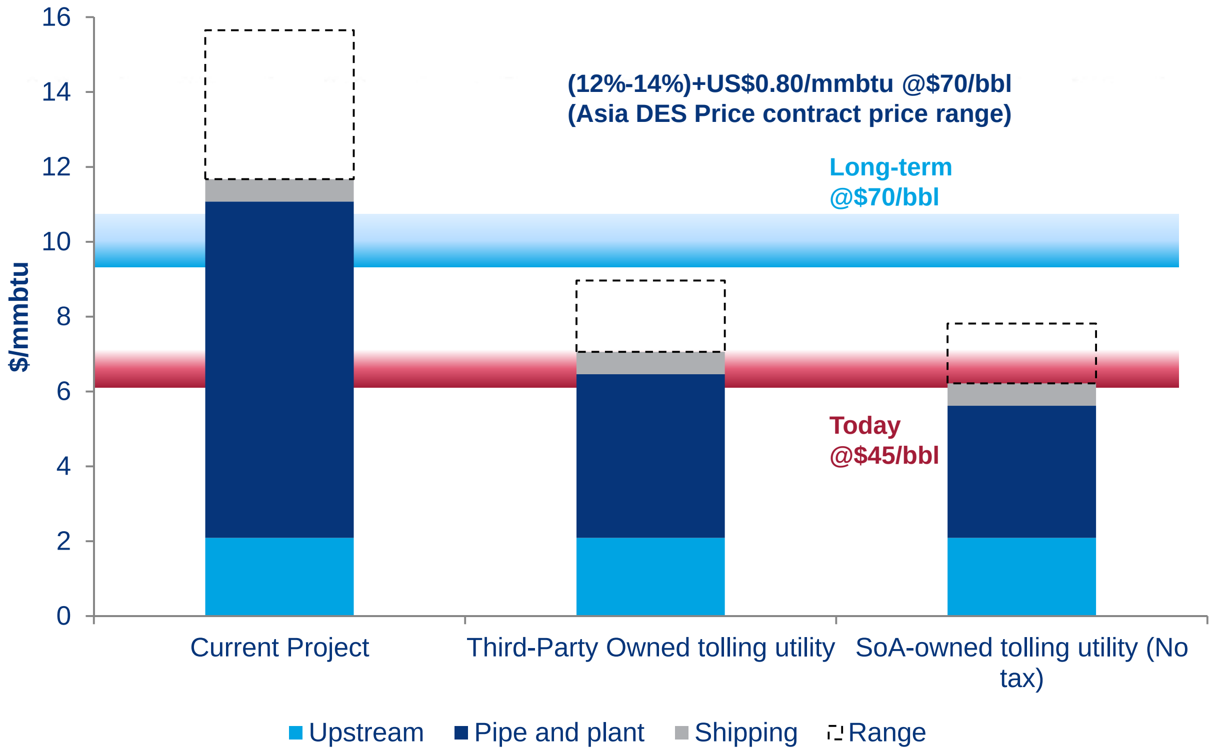
- Currently the Alaska LNG project is one of the least competitive on a cost of supply basis compared with other pre-FID LNG developments
- The State has different levers to assist in the development of the project:
  - » State support for a tolling utility-like return, debt financed project
  - » Increasing its stake beyond its current 25%
- Analysis has not accounted for benefits from:
  - » Monetization of State's gas share
  - » In-state gas supply
  - » Job creation
  - » Enabling new exploration and third-party access



Appendix

Targeted reliefs originally driven by a specific project – LNG Projects

- **Snøhvit - Norway**
  - » The project is an upstream project together with an LNG facility offshore Northern Norway. Originally the project was to be taxed as two entities: an upstream phase and a downstream phase, but the project economics were unsatisfactory.

    The terms for this project allowed faster depreciation (straight line over three years, as opposed to six years for other offshore developments) for LNG projects but would treat all of the development under the offshore taxation regime. This arrangement was enough of an incentive for the partners to agree to proceed with the project.

    However, a challenge was made on the grounds that this was an anti-competitive subsidy. This resulted in a change to the rules to amend the law covering LNG projects to give this tax incentive to projects falling within a geographically defined area in the northern part of the country.

- **Yamal LNG – Russia**
  - » The Russian government was supportive of the project and provided tax incentives to encourage the development of the project. LNG and gas condensate are exempt from Export Duty and the project has received a 12-year Mineral Extraction Tax (MET) and Property Tax holiday.
  - » These fiscal incentives have significantly helped the economics of the project, and without them its commerciality would be challenging.

General Reliefs – targeted across a broad range of assets

- **US Gulf of Mexico**
  - » Historically reliefs were given against royalty for deeper water developments
  - » For awards made in the period up to July 2007 the royalty rate for developments in over 400 metres of water was 12.5% compared to 16.67% for shallower water projects
  - » For awards made up to July 2010 royalty suspension volumes were granted generally for leases located in over 400 metres of water, with progressively higher volume reliefs granted for leases awarded in deeper water

- **Colombia**
  - » Lower royalty rates are charged for heavy oil developments (API<15^{o})
  - » Unconventional oil and gas projects have even lower royalty rates and High Price Payments do not commence until a higher price is achieved
  - » Deepwater projects have a higher threshold for the commencement of High Price Payments and will typically have a higher exempt volume threshold

Targeted reliefs originally driven by a specific project – Non LNG Examples

United Kingdom – Various

- A number of different upstream developments in the United Kingdom were provided with reliefs to encourage their development. However the nature of the relief was such that it could not be made specific to one field, rather it was structured to be available to any similar field development, although some of the conditions to qualify were very narrow
- Deepwater Gas Field Allowance –
  - In January 2010, the government announced that value allowances were to be extended to include remote deepwater gas fields in the UKCS. The qualifying criteria included a minimum water depth of 300 metres, a minimum distance of 60 kilometres to infrastructure with ullage, and more than 75% of reserves should be gas. Those fields that were 120 kilometres from relevant infrastructure would receive the maximum £800 million value allowance. This reduced to zero on a straight line basis for fields 60 kilometres from infrastructure.
- Deep New Fields West of Shetlands Allowance
  - In its March 2012 Budget, the government introduced a value allowance of £3 billion (maximum of £600 million per annum) for fields in the West of Shetlands. To qualify, fields must lie in a water depth of over 1,000 metres and hold reserves of 25 million tonnes of oil equivalent (180 mmboe) or above. The total allowance was reduced on a straight line basis from £3 billion for fields with recoverable reserves of 40 million tonnes of oil equivalent (285 mmboe) to zero for those fields with up to 55 million tonnes of oil equivalent recoverable reserves (390 mmboe). These allowances were effective for fields sanctioned after 27 March 2012.
- Large Shallow Water Gas Field Allowance
  - In July 2012, the government created a further value allowance incentive for large, shallow water gas fields sanctioned after 25 July 2012. Gas fields in water depths of less than 30 metres, with reserves between 353 and 706 bcf qualified for a £500 million value allowance. This reduced to zero for fields with reserves of 883 bcf and above. At least 95% of the recoverable reserves must be gas for the field to qualify. If two or more fields were sanctioned at the same time, the £500 million allowance will be divided between the projects based on the ratio of recoverable reserves.

Europe	+44 131 243 4400
Americas	+1 713 470 1600
Asia Pacific	+65 6518 0800
Email	contactus@woodmac.com
Website	www.woodmac.com

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