

AK LNG: KEY ISSUES

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Janak Mayer, Partner › janak.mayer@enalytica.info
Nikos Tsafos, Partner › nikos.tsafos@enalytica.info

<http://enalytica.info>



JANAK MAYER
PARTNER

enalytica

JANAK.MAYER@ENALYTICA.INFO

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



NIKOS TSAFOS
PARTNER

enalytica

NIKOS.TSAFOS@ENALYTICA.INFO

Nikos Tsafos has a diverse background in the private, public and non-profit sectors. He is currently a founding partner at **enalytica**. In his 7 ½ years with PFC Energy, Nikos 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).

LNG PROJECTS EVOLVE: QC LNG (AUSTRALIA) CASE STUDY

	FEED (JULY 2008)	FID (OCTOBER 2010)	JANUARY 2014
Size	One train: 3-4 mmtpa Expandable to 12 mmtpa	Two trains 8.5 mmtpa	Two trains 8.5 mmtpa
Upstream	BG owned 9.9% of QGC and 20% of QGC's coal-bed methane in Surat Basin	All BG except CN00C 5% and Tokyo Gas 1.25% in parts of Surat Basin	Gas from AP LNG; Same as FID plus CN00C 25% in Surat and Bowen Basin
Liquefaction	T1: BG 70%, QGC 30%	T1: BG 90%, CN00C 10% T2: BG 97.5%, Tokyo Gas 2.5%	T1: BG 50%, CN00C 50% T2: BG 97.5%, Tokyo Gas 2.5% T3: CN00C option for 25%
Off-take*	BG Group: 100%	CN00C: 3.6 mmtpa* Tokyo Gas: 1.2 mmtpa* BG Group: balance	CN00C: 8.6 mmtpa* Tokyo Gas: 1.2 mmtpa* Chubu Electric: ~0.6 mmtpa*
External Financing			JBIC: 175 mn to Tokyo Gas US EX-IM: \$1.8 billion

** Off-take is supplemented by BG's global portfolio—not all LNG will come from Australia*

SOURCE: BG GROUP DATABOOK 2008—2013 EDITIONS, INDUSTRY PRESS

LNG projects evolve: case study › where are we now? › SOA options

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Project Stage	Pre-FEED		FEED		Construction						Online		
Project Milestones	Move to FEED		FID								Debottleneck / expansion		
Marketing	MOU/HOA SOA Plan		HOA/SPAs SOA Plan		SPAs for any unsold LNG								
Financing	Initial talks		Defining terms / singing loans		Possible additional financing						Refinance		
Project Structure & Ownership	Define initial structure		New partners / redefine ownership		New partners / redefine ownership						New partners possible		
Investment (Project)	\$400–\$500 mm		\$1,500–\$2,000 mm (Equity)		\$45–65 billion (Debt and equity)						O&M Met from cash flow		
Investment (SOA)	\$50–\$125 mm		\$200–\$500 mm (Equity)		\$6–\$15 billion (Debt and equity)						O&M Met from cash flow		

LNG projects evolve: case study › where are we now? › SOA options



	<u>System</u>	<u>SOA ownership percent</u>		
	Value / Kind	Upstream	GTP & Pipe	LNG
Status Quo	in value	0%	0%	0%
HOA	in kind	0%	25%	25%
MOU Option 1	in kind	0%	10% (40% x 25%)	25%
MOU Option 2	in kind	0%	0%	25%

FY 2015 PRODUCTION TAX ESTIMATE USING INCOME STATEMENT FORMAT

	Price	Barrels (Thousands)	Value (\$ million)
Avg ANS Oil Price (\$/bbl) & Daily Production	\$105.06	498	\$52.4
Annual Production			
Total		181,912	\$19,111.7
Royalty, Federal & other barrels		(23,301)	(\$2,448.0)
Taxable bbls from companies w/ tax liability		158,611	\$16,663.7
Downstream (Transportation) Costs (\$/bbl)			
ANS Marine Transporation	(\$3.46)		
TAPS Tariff	(\$6.18)		
Other	(\$0.40)		
Total Transportation Costs	(\$10.03)	158,611	(\$1,591.0)
Deductable Lease Expenditures			
Deductible Operating Expenditures	(\$17.91)		(\$2,840.3)
Deductible Capital Expenditures	(\$28.08)		(\$4,453.4)
Total Lease Expenditures	(\$45.99)	158,611	(\$7,293.7)
Production Tax			
Gross Value Reduction			(\$63.8)
Production Tax Value (PTV)	\$48.64		\$7,715.2
Base Tax (35%*PTV)			\$2,700.3
Total Tax before credits			\$2,700.3

OIL VALUE CHAIN



Oil ~\$105/bbl

Midstream costs ~\$10/bbl



Lease expenditures \$46/bbl



Production tax on ~\$49/bbl netback



SOURCE: DEPARTMENT OF REVENUE, REVENUE SOURCES BOOK, FALL 2013, P. 106

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PRICE FOR ALASKAN GAS WILL BE:



Less transparent

no readily available published price like ANS WC

Less consistent by destination

contract-by-contract differences can be large

Likely link to Japan Crude Oil Cocktail, JCC

in 2004-2013, JCC traded at \$0.22/bbl discount to ANS

Lower value vs. oil (thermal equivalency)

e.g. \$100/bbl ≠ \$100/boe of LNG

\$100/bbl = \$78-\$90/boe (13%-15% "slope")

SOURCE: DEPARTMENT OF REVENUE, REVENUE SOURCES BOOK, FALL 2013, P. 106

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MIDSTREAM COSTS WILL BE:



Order of magnitude higher

Gas is significantly more expensive to transport

Tariff not regulated by FERC

FERC will regulate permitting, not rate-setting

Tariff highly sensitive to capital structure

return on equity and /or assumed debt/equity ratio

SOURCE: DEPARTMENT OF REVENUE, REVENUE SOURCES BOOK, FALL 2013, P. 106

INDICATIVE TAX BEFORE CREDITS FOR ALASKA LNG PROJECT @ ANS

	Price	Barrels (Thousands)	Value (\$ million)
Avg LNG Price (\$/boe) & Daily Production	\$81.00	384	\$31.1
Annual Production			
Total		140,306	\$11,364.8
Royalty, Federal & other barrels		(19,643)	(\$1,591.1)
Taxable bbls from companies w/ tax liability		120,664	\$9,773.8
Downstream (Transportation) Costs (\$/boe)			
Marine Transporation	(\$6.00)		(\$724.0)
Pipeline & GTP Tariff	(\$24.18)		(\$2,917.6)
Liquefaction Tariff	(\$36.00)		(\$4,343.9)
Total Transportation Costs	(\$66.18)	120,664	(\$7,985.5)
Deductable Lease Expenditures			
Deductible Operating Expenditures	(\$3.00)		(\$362.0)
Deductible Capital Expenditures	(\$3.00)		(\$362.0)
Total Lease Expenditures	(\$6.00)	120,664	(\$724.0)
Production Tax			
Gross Value Reduction			\$0.0
Production Tax Value (PTV)	\$8.82		\$1,064.3
Base Tax (35%*PTV)			\$372.5
Total Tax before credits			\$372.5

INDICATIVE LNG CHAIN: \$100/BBL

At \$100/bbl, LNG price ~\$81/boe (13.5%)

Midstream ~\$66/boe

Upstream ~\$6/boe

Limited netback to tax (less than \$9/boe)

SOURCE: ENALYTICA ANAL OF REVENUE, REVENUE SOURCES BOOK, FALL 2013, P. 106

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IMPLICATIONS FOR STATE OF ALASKA



Fair market price critical for top line

Midstream, midstream, midstream



Upstream secondary to midstream

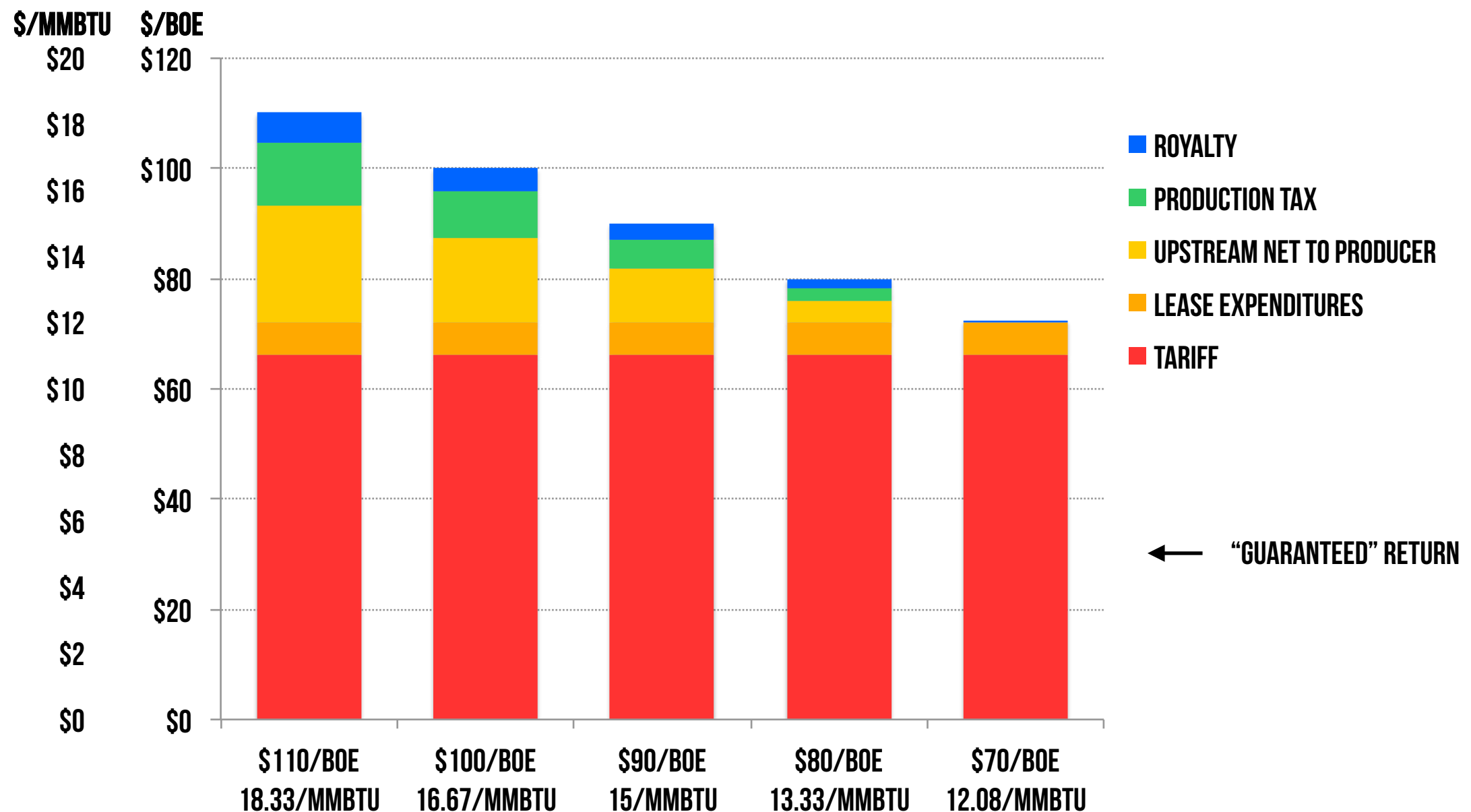


Wellhead insufficient to drive state take



RIV: UPSTREAM ABSORBS ALL THE PRICE RISK

Fixed nature of tariff in 'in value' alternative amplifies impact of price movement on state returns



Project ownership cash flows

- (+) revenue = volume x price
- (-) capital expenditures
- (-) operations and maintenance expenses
- (-) debt service (principal and interest)
- (-) tariff paid to TransCanada

Cash flows from sovereign functions

- (+) state income tax
- (+) property tax

Four cash flow scenarios

No debt and no TransCanada partnership

No TransCanada partnership but the state finances 70% of its share with debt

TransCanada is a partner and the state exercises its buyback option

TransCanada is a partner and the state does not exercise its buyback option

To understand unrestricted flows to the treasury, we can re-arrange the cash flows in a different way:

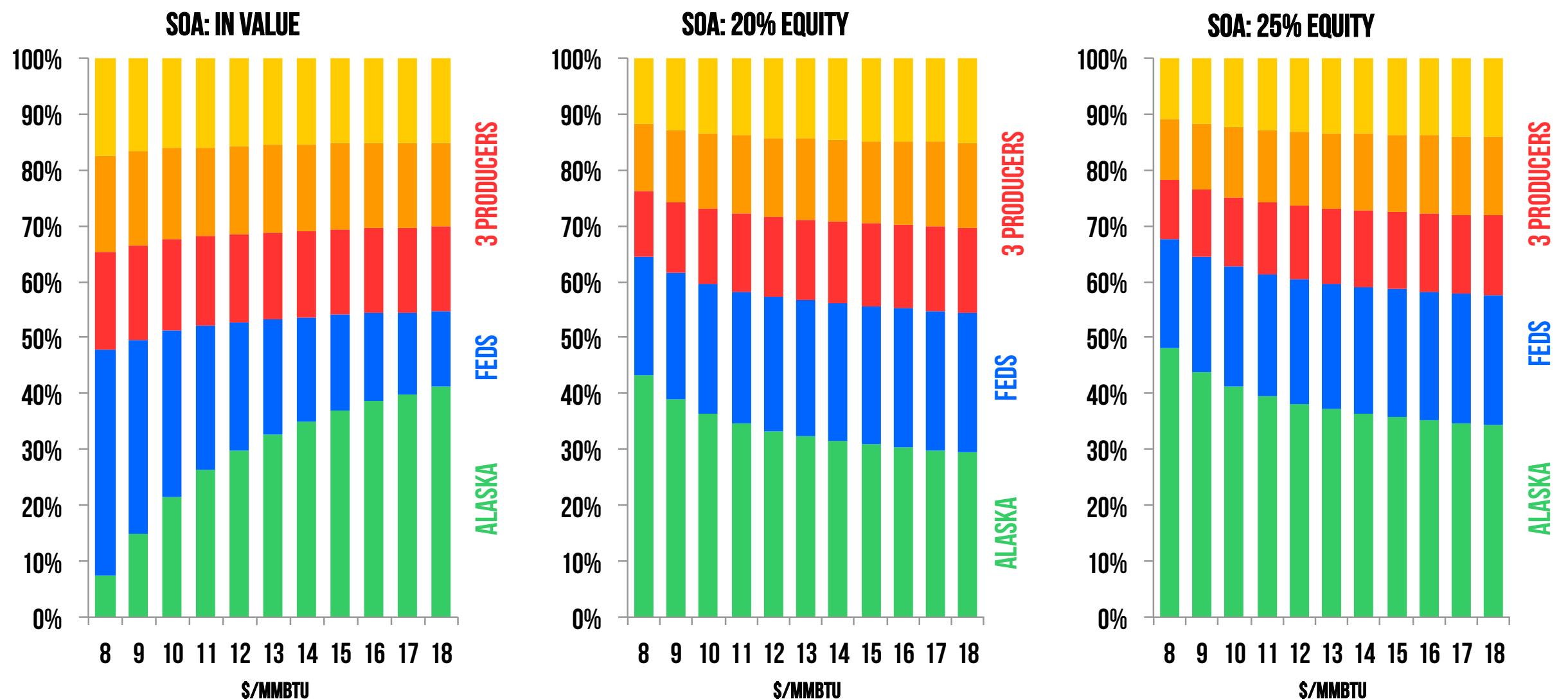
State unrestricted = total cash flows – permanent fund (25% of royalty) – property tax

SOA EQUITY LEADS TO HIGHER GOV'T TAKE ON AVERAGE

'In value' entails lowest government take, especially in low prices as cash goes to producers

Split between Fed vs. SOA split depends on both 'in value' vs. 'in kind' as well as SOA equity share

PERCENT OF CUMULATIVE CASH FLOWS OVER PROJECT LIFE

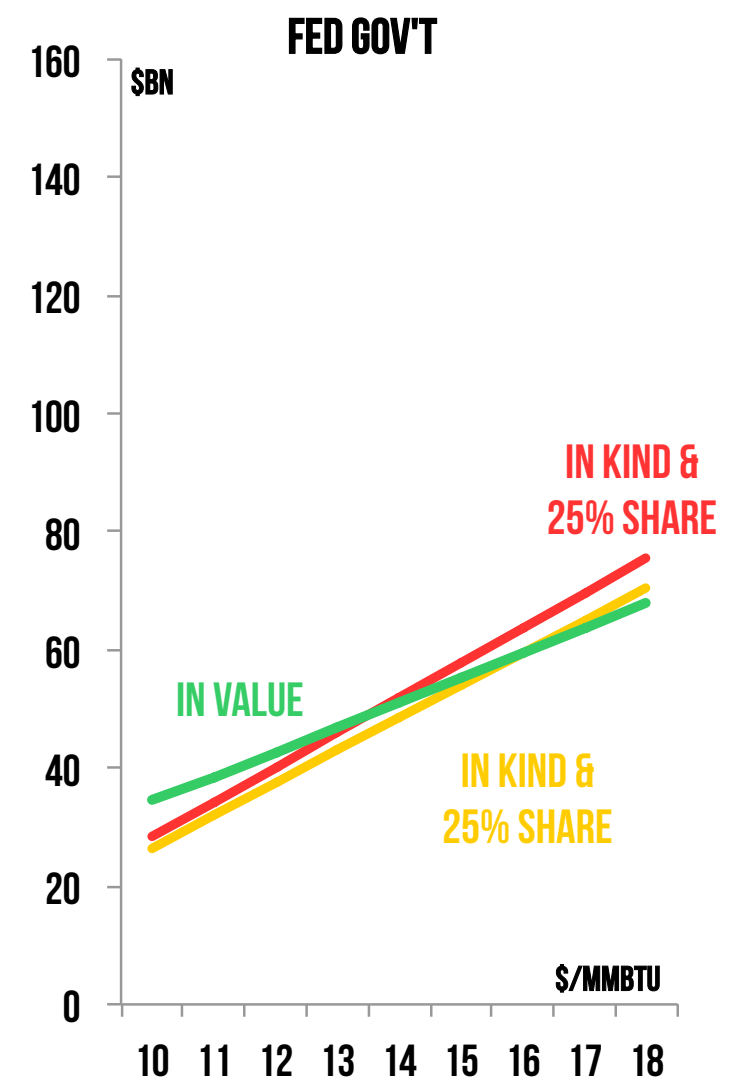
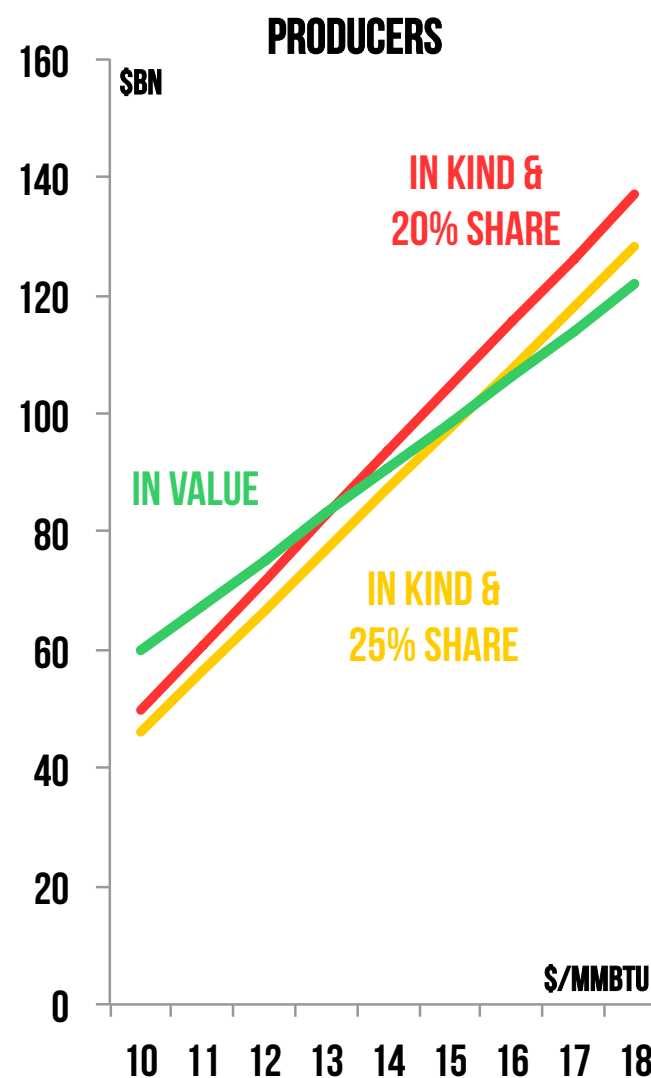
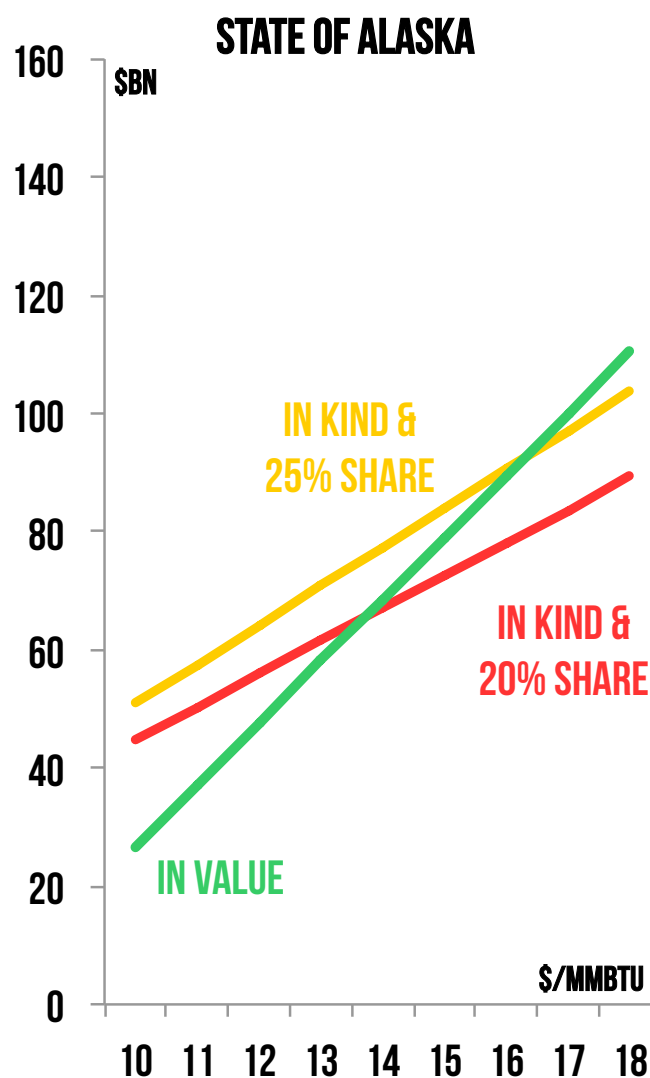


'IN KIND' W/ EQUITY OFFERS MORE DOWNSIDE PROTECTION

'In value' structure protects producers, not state, in low price environment because of tariff component

Higher SOA equity pushes up the price at which 'in value' is better than equity

CUMULATIVE CASH FLOWS OVER PROJECT LIFE



<u>System</u>		<u>SOA ownership percent</u>		
Value / Kind		Upstream	GTP & Pipe	LNG
Status Quo	in value	0%	0%	0%
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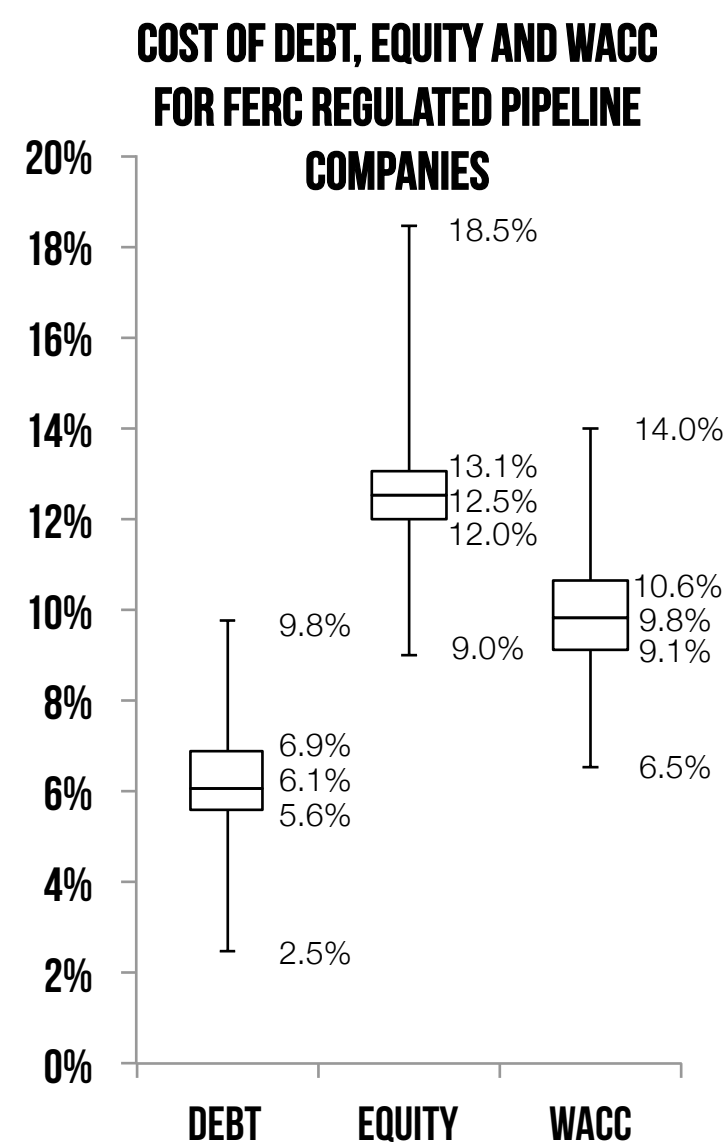
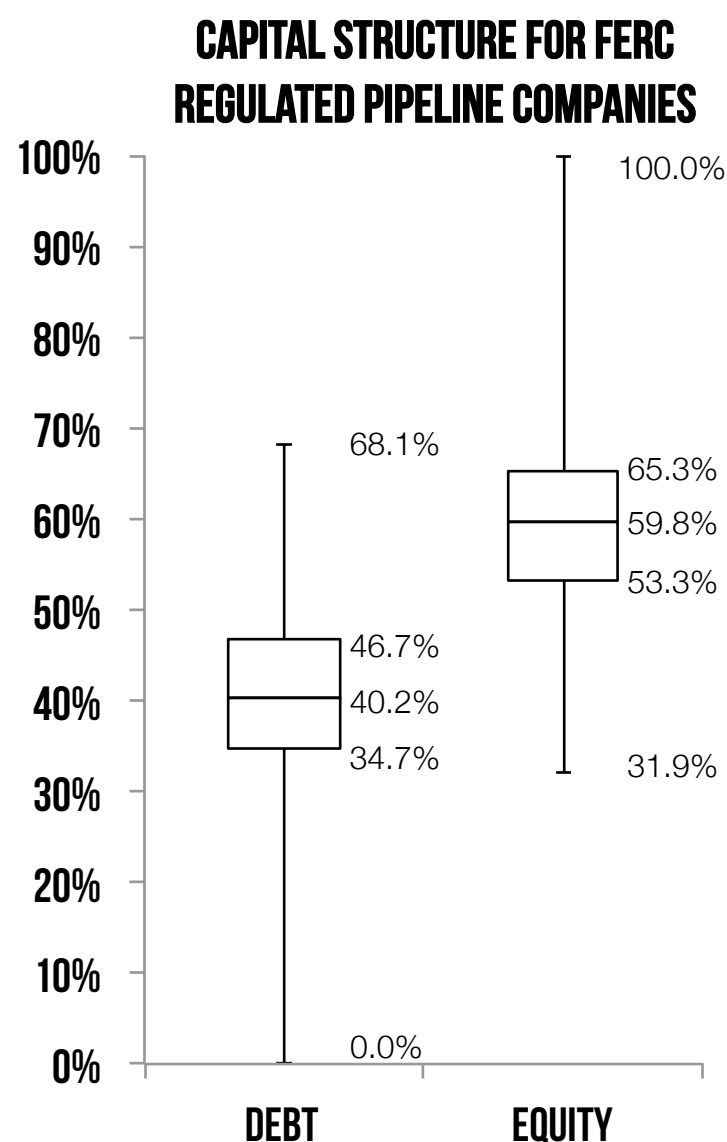


	Financial	Non-Financial
Pros	• Substantial portion of capital cost not on state balance sheet • Attractive tariff terms relative to market norms • Exit from potential AGIA liabilities	• Expansion-oriented partner to drive future expansion development • Presence at negotiation table • Execution capabilities • Continuity and momentum
Cons	• Significantly higher cost of capital than that of state • State reimburses TC in full with interest in all circumstances - even if TC decides to terminate	• State bears most risk, but gives up significant control

TRANSCANADA TARIFF OFFER WITHIN MARKET NORMS

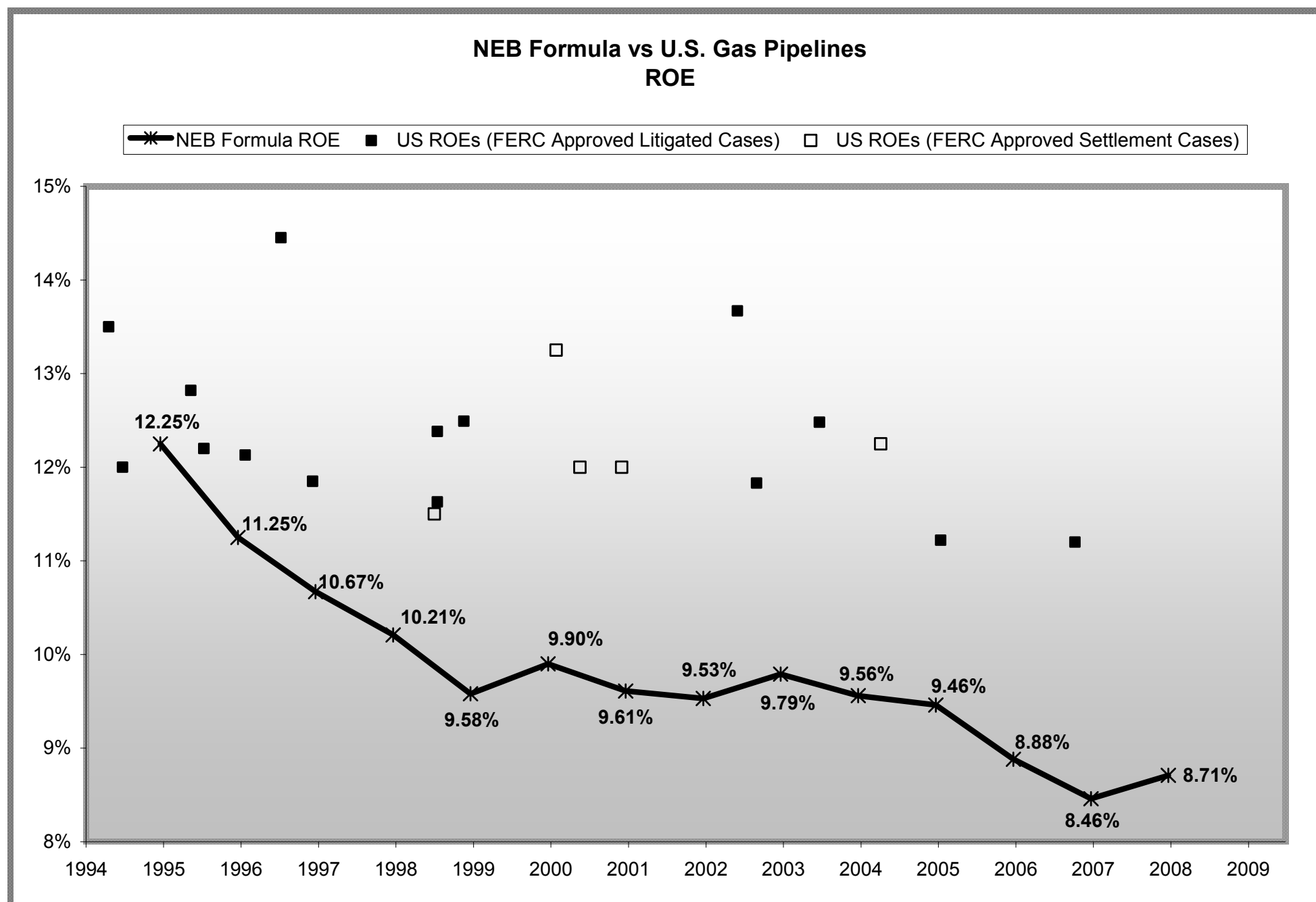
Capitalization structure (75:25 debt:equity) is more weighted toward debt than average FERC pipeline

Cost of equity (12%) and debt (5%) below average; **weighted cost of capital** (6.75%) near bottom of group



SOURCES: ENALYTICA BASED ON "FORM 2/2A - MAJOR AND NON-MAJOR NATURAL GAS PIPELINE ANNUAL REPORT," 2012

FERC ROE HISTORICALLY EXCEED NEB (CANADA) ROE

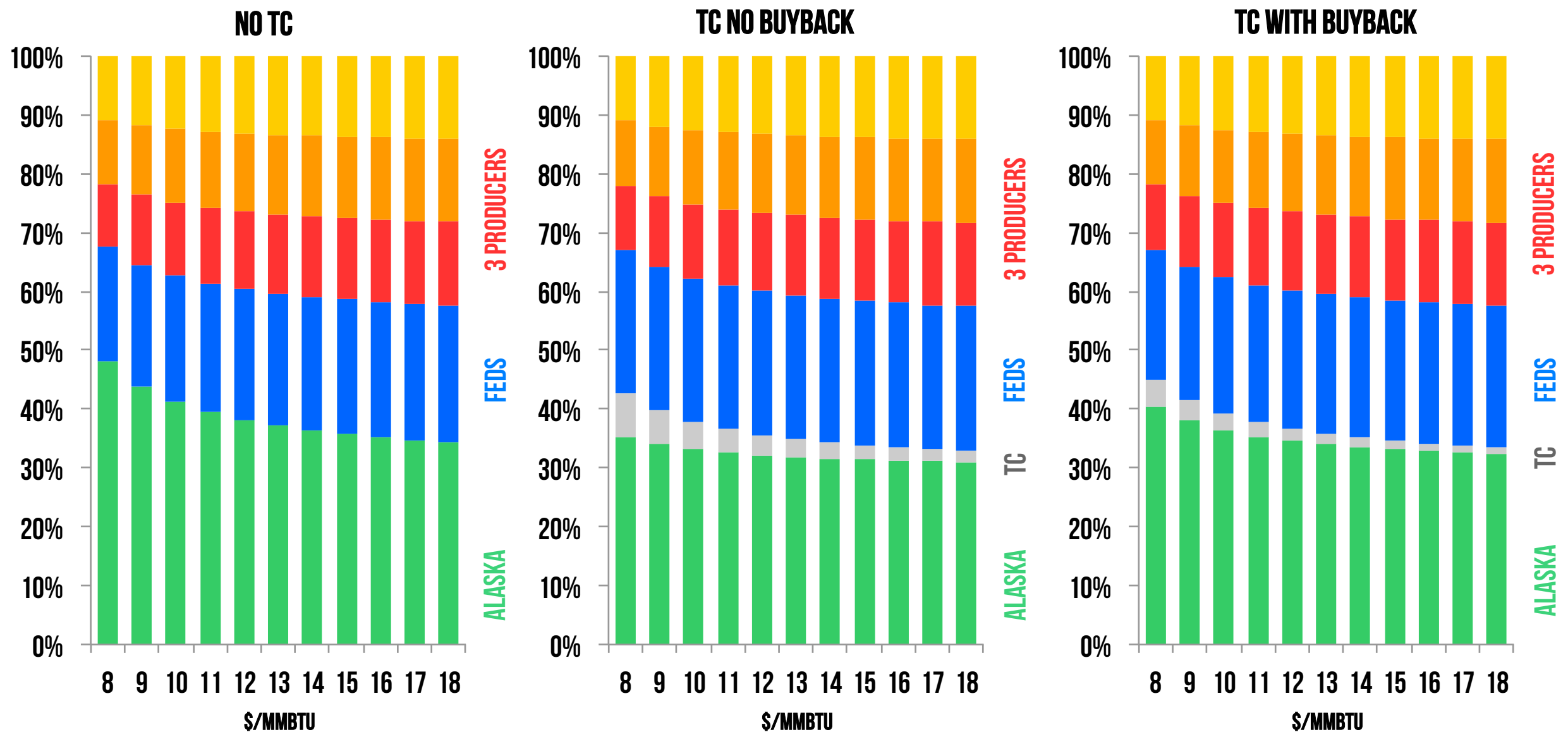


SOURCES: CANADIAN ENERGY PIPELINE ASSOCIATION (CEPA), PERSPECTIVE ON CANADIAN GAS PIPELINE ROES, FEBRUARY 2008

TC'S SHARE OF CASH IS HIGHEST AT LOW PRICES

TC's share ranges from 1% to 7%, depending on price levels and state's exercise of buyback

PERCENT OF CUMULATIVE CASH FLOWS OVER PROJECT LIFE, 25% EQUITY CASE

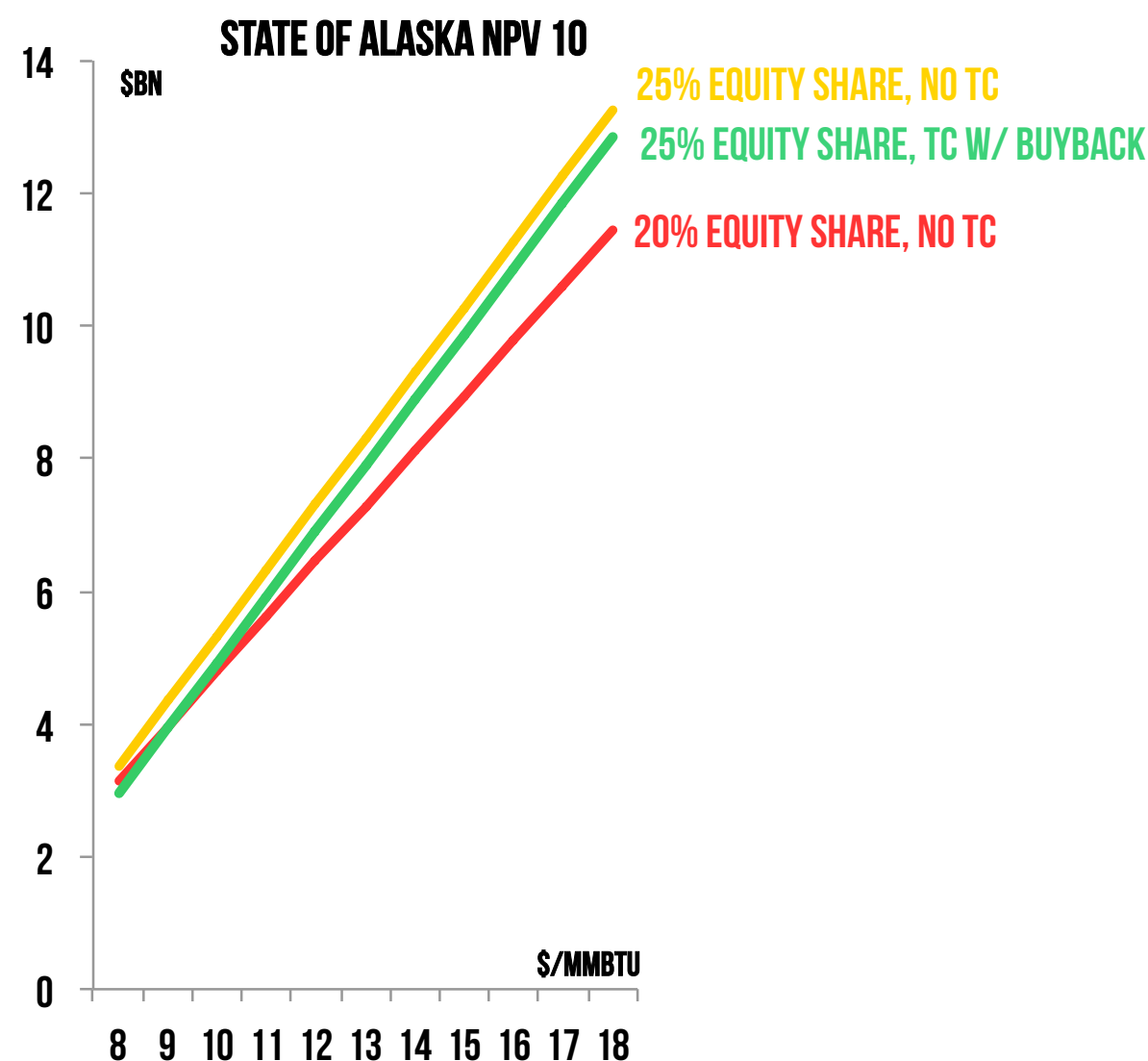
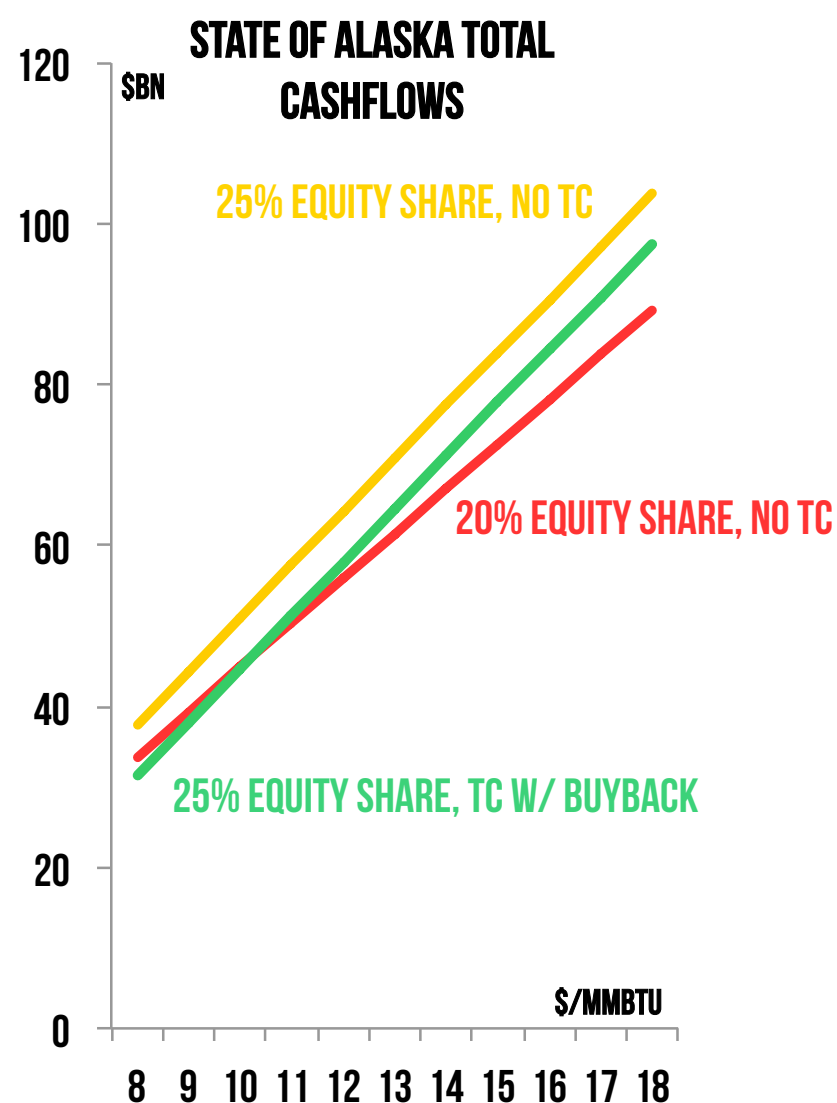


LIMITED VALUE FOREGONE UNDER TC W/ BUYBACK OPTION

Cash outlays under 25% equity share and TC w/ buyback option comparable to a 20% share without TC

Total cash flows and NPV10 are only moderately reduced compared to 25% share without TC

CUMULATIVE CASH FLOWS OVER PROJECT LIFE AND NPV TO STATE



OTHER QUESTIONS FOR THE MIDSTREAM

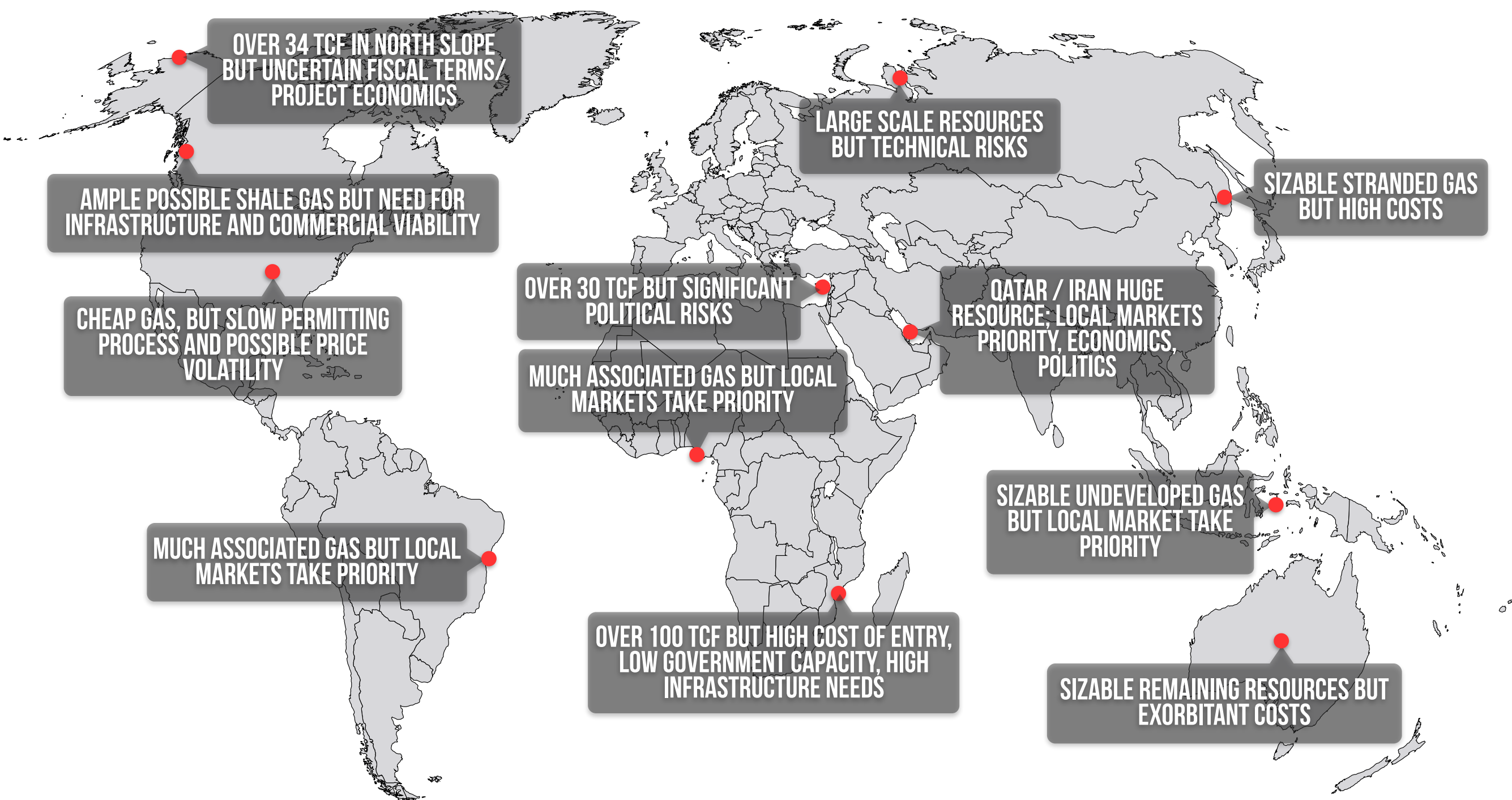
Should the state reimburse TransCanada's expenses under all scenarios; even if **the project is no-go**?

What does this imply for **risk/reward** split and appropriate locus of **control**?

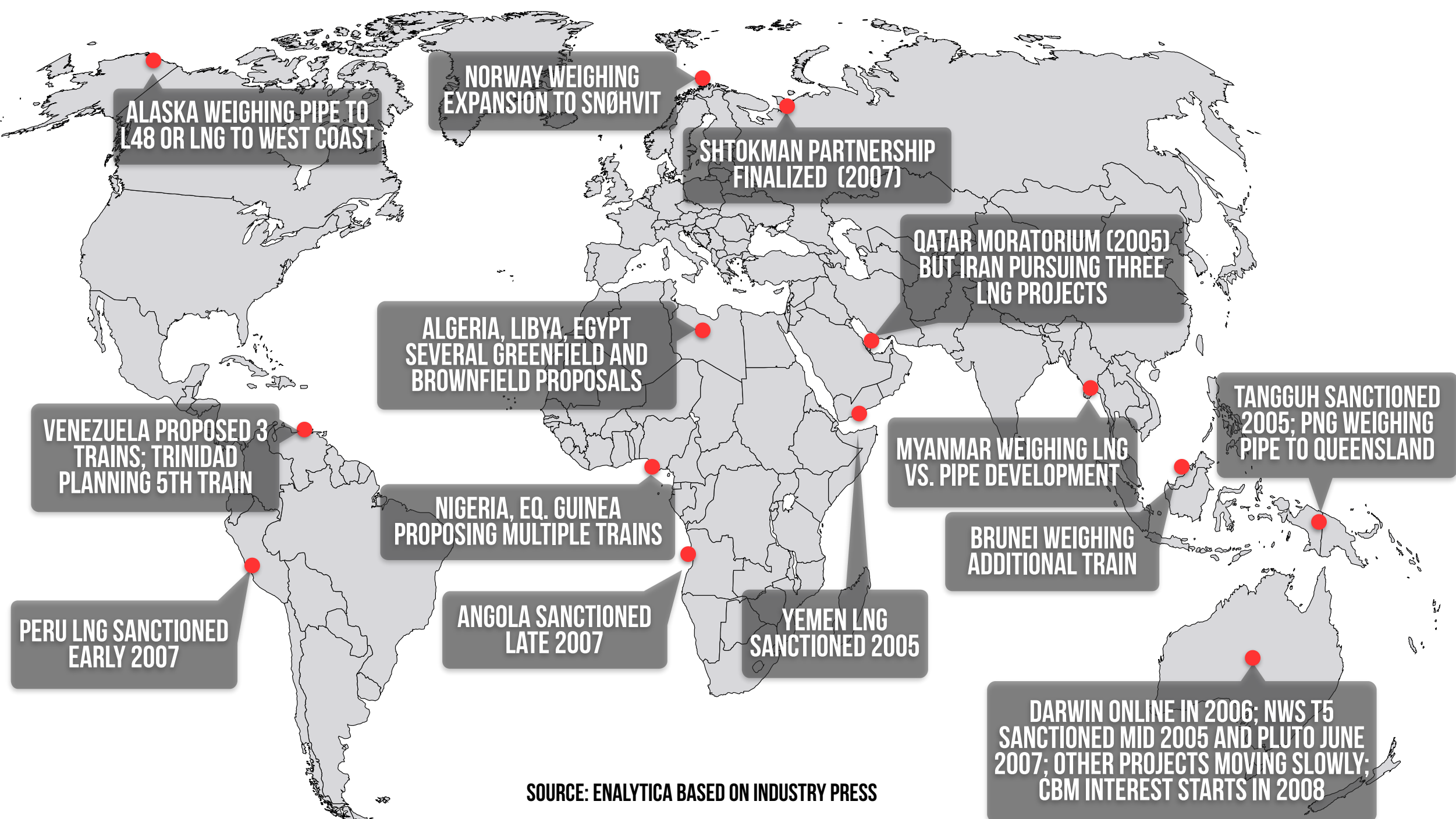
How firm is '**off ramp**' if state must offer TC participation if it continues with project within 5 years?

Should non-participants in an expansion **benefit from lower costs** if they share no risks of higher costs?

AK LNG IS COMPETING IN A WORLD WITH MANY CHOICES



BUT WE'VE BEEN HERE BEFORE IN THE MID/LATE 2000S



VARIOUS FINANCING OPTIONS OPEN TO LNG PROJECTS

Balance Sheet Finance

Project sponsors provide funds

Funds can combine debt and cash flow

Guaranteed by project sponsor (recourse)

Rate depends on sponsor's balance sheet

Easier if all parties have strong balance sheets

Project Finance

Third parties lend to project directly, not to sponsors

Sponsors put up some equity (e.g. 30%)

Guaranteed by projected revenues (non-recourse)

Rate depends on project risk

Easier to accommodate riskier sponsors

Key Questions for State of Alaska

What mix of debt and equity?

Will debt be specific to LNG project, or broader state balance sheet liability?

Will equity come from recurrent revenues, or other sources?

What role does the permanent fund play and how does this affect restricted / unrestricted revenue?

PROJECT FINANCE WELL ESTABLISHED IN LNG

IHS estimates that LNG projects raised over **\$97 billion** in third-party financing since 2000

Financing from project sponsors, export credit agencies, multilateral banks and commercial banks

Commercial loans can also secure sovereign guarantees as insurance

The Japan Bank of International Cooperation (**JBIC**) is the largest single provider of funds

Examples

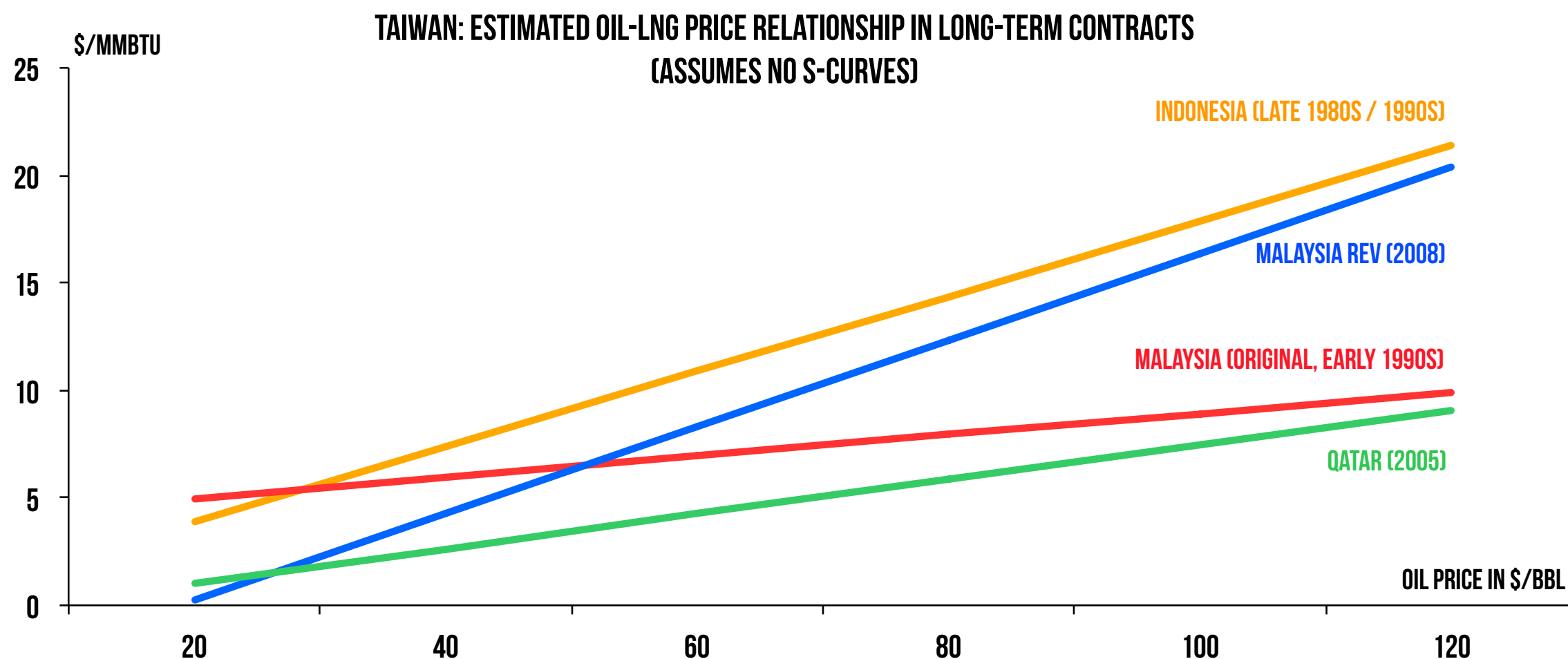
Australia Pacific LNG	\$5.8 billion	US EXIM, China EXIM, banks
Ichthys	\$20 billion	JBIC, Korea and Australia EXIM, banks, sponsors (\$4 bn)
Papua New Guinea	\$14 billion	Six ECAs and 17 banks, ExxonMobil
Peru	\$2.25 billion	IADB, US EXIM, Korea EXIM, IFC, others
Sakhalin-2	\$6.4 billion	JBIC, NEXI, banks
Tangguh	\$3.5 billion	JBIC, ADB, banks

PRICE EXPOSURE DEFINED AT CONTRACT SIGNING

Oil linkage **does not mean identical** linkage to oil (e.g. Taiwan, below); bargaining power defines linkage

New contracts do not impact existing deals (e.g. new Henry Hub-based LNG vs. existing oil-linked SPAs)

But if price is seriously out of sync with fundamentals, parties can trigger a **review clause**



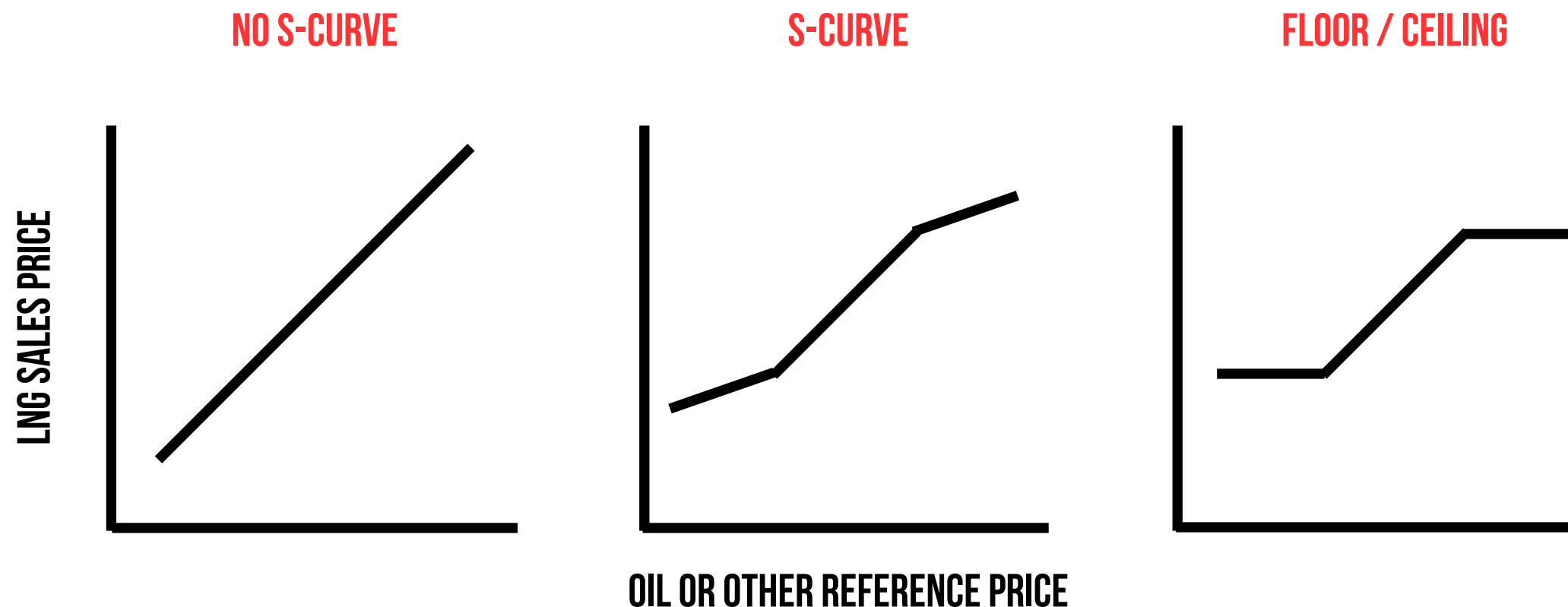
SOURCE: ENALYTICA BASED ON DATA FROM TAIWAN'S CUSTOMS ADMINISTRATION, MINISTRY OF FINANCE ([HTTP://WWW.CUSTOMS.GOV.TW/STATISTICSWEBEN/IESEARCH.ASPX](http://www.customs.gov.tw/statisticsweb/en/ieSearch.aspx))

EXPENSIVE PROJECTS CAN HEDGE AGAINST VOLATILITY

“S-curves” are clauses that **change** the relationship between oil and gas above or below thresholds

Instead of a linear link, gas prices do not rise/fall as much if oil prices rise/fall above certain thresholds

They reduce downside risk by **forgoing** some upside—they can even provide a **floor/ceiling** on prices



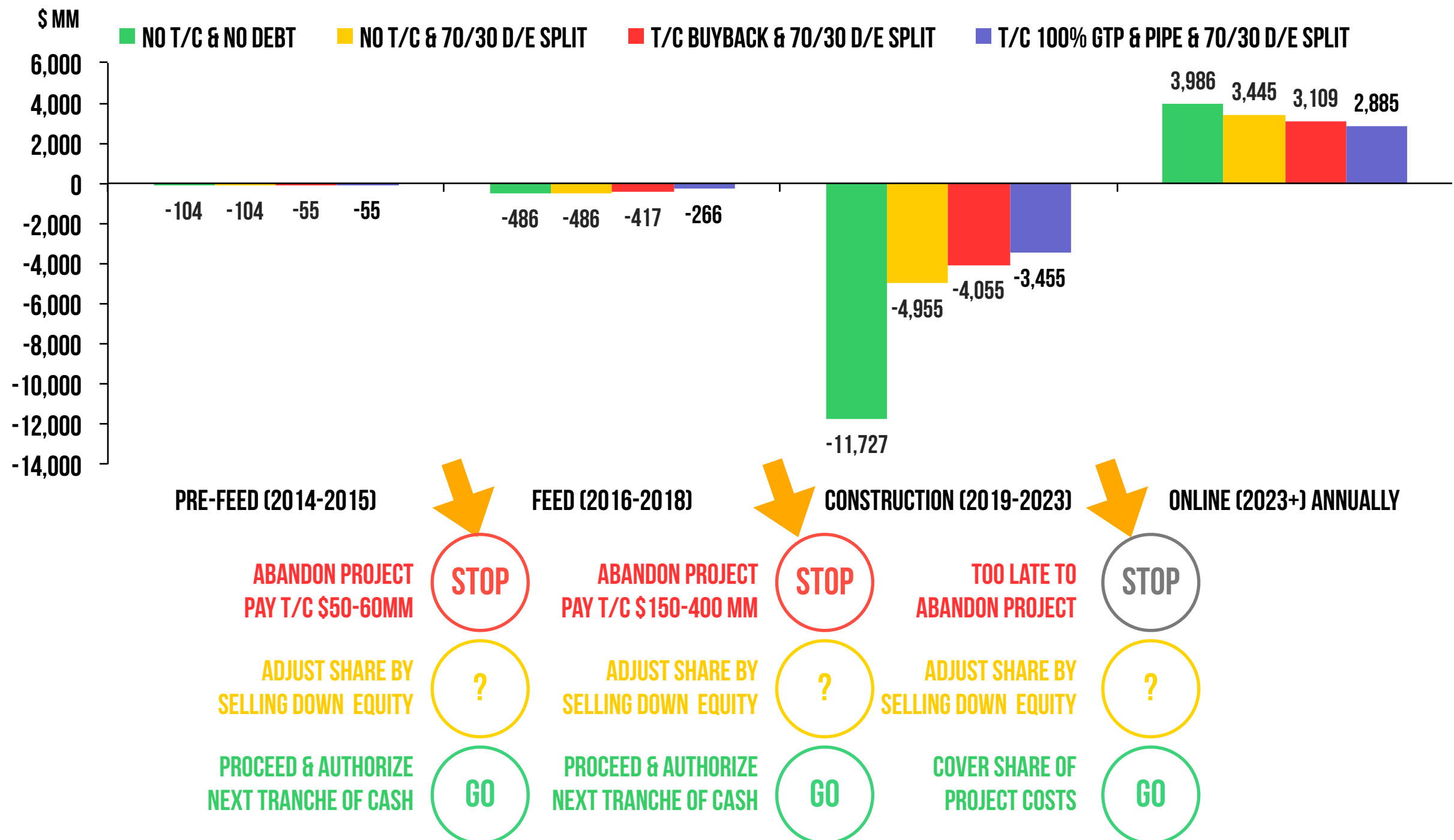
prospective suppliers › but not all supply gets built › finance options › project finance › price risk › volatility protection › cost escalation

PROJECT	SANCTIONED	TARGET DATE	ACTUAL DATE	DELAY	BUDGET BN	COST BN	% OVERRUN
Snøhvit (Norway)	Mar-02	2006	Sep-07	1.5 years	NOK39.50	NOK48.00	21.5%
Egyptian LNG T1	Sep-02	Aug-05	May-05	3 months early	\$1.1	on budget	0%
Sakhalin-2 (Russia)	May-03	2007	Mar-09	2 years	\$10.0	\$22.0	120.0%
Atlantic LNG T4 (Trinidad)	Jun-03	2005	Dec-05	on time	\$1.2	on budget	0%
Egyptian LNG T2	Jul-03	Jun-06	Sep-05	9 months early	\$0.6	on budget	0%
Equatorial Guinea	Jun-04	Late 2007	May-07	6 months early	\$1.5	on budget	0%
North West Shelf (Australia)	Jun-05	2008	Sep-08	on time	AUS\$2	AUS\$2.6	30.0%
Yemen	Aug-05	Dec-08	Nov-09	1 year	\$3.7	\$4.5	21.6%
Peru	Jan-07	mid 2010	Jun-10	on time	\$3.8	\$3.9	2.6%
Pluto	Jun-07	Early 2011	May-12	1.5 years	AUS\$11.2	AUS\$14.9	33.0%
Skikda LNG (Algeria)	Jun-07	2011	Mar-13	2 years	\$2.8	?	?
Angola	Dec-07	Early 2012	Jun-13	1.5-2 years	?	\$10.0	?
Gorgon (Australia)	Sep-09	2014	n/a	n/a	\$37.0	\$54.0	45.9%
Papua New Guinea	Dec-09	2014	n/a	n/a	\$15.0	\$19.0	26.7%
Queensland Curtis (Australia)	Nov-10	2014	n/a	n/a	\$15.0	\$20.5	36.7%
Gladstone LNG (Australia)	Jan-12	2015	n/a	n/a	\$16.0	\$18.5	15.6%

SOURCE: ENALYTICA BASED ON COMPANY PRESS RELEASES AND INDUSTRY PRESS

SOA'S CASH CALLS AND OFF-RAMPS

STATE OF ALASKA: CASH CALLS BY PHASE ASSUMING 25% EQUITY



LNG INCOME INCLUDES RESTRICTED REVENUE

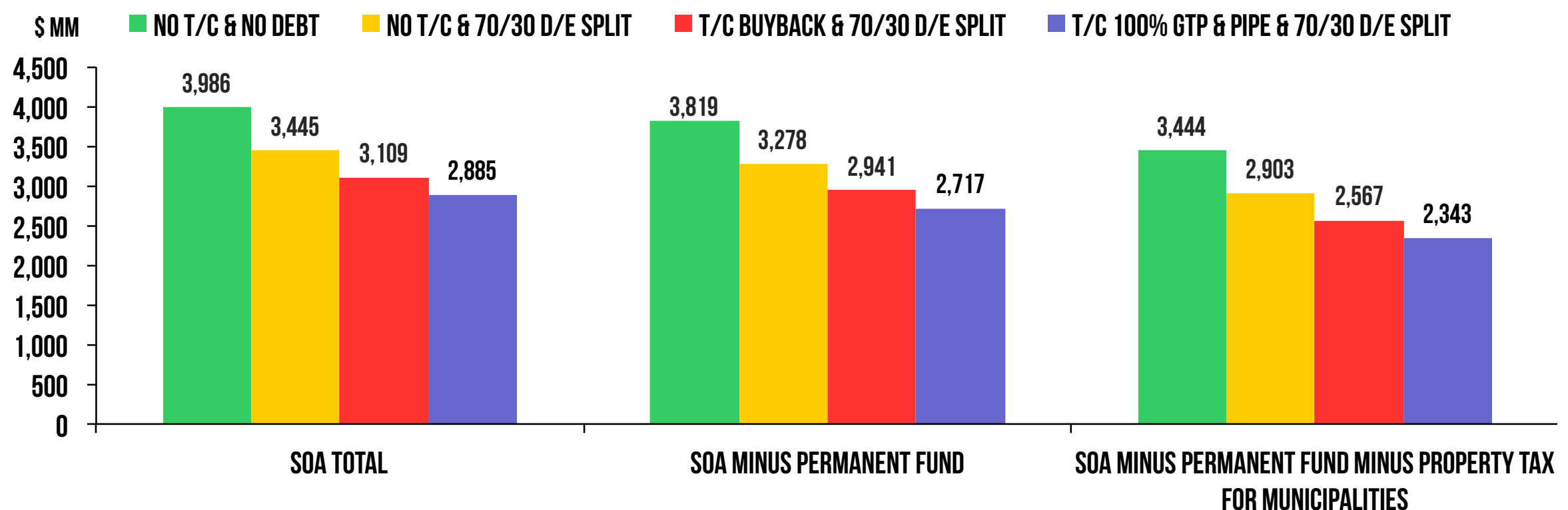
Revenue

Total income

Total income minus permanent fund (25% of royalty)

Total income minus permanent fund and property taxes allocated to municipalities

STATE OF ALASKA: BASE CASE CASH FLOWS ASSUMING 25% EQUITY



STRESS TESTING SOA'S CASH CALLS AND REVENUES

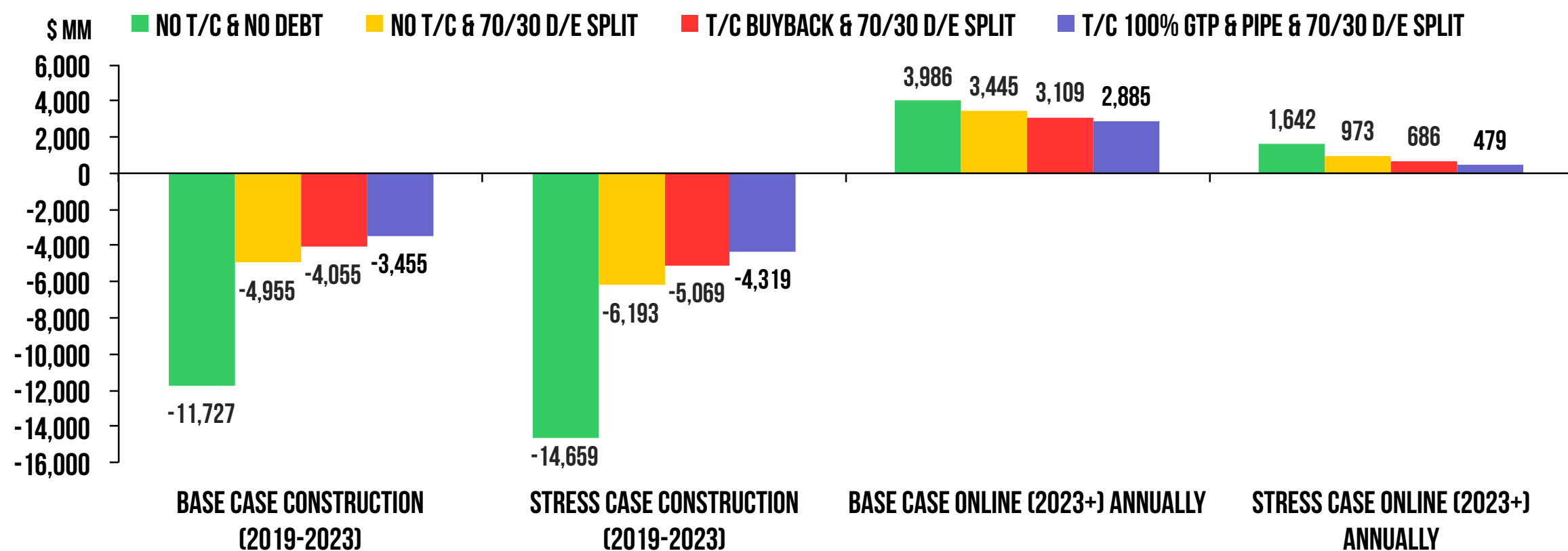
Stress Test

Project CAPEX is 25% higher

+ Sales price is \$7/mmbtu vs. \$15/mmbtu in base case

+ Average utilization (output ÷ capacity) is 80% vs. 100% in base case

STATE OF ALASKA: CASH CALLS BY PHASE ASSUMING 25% EQUITY



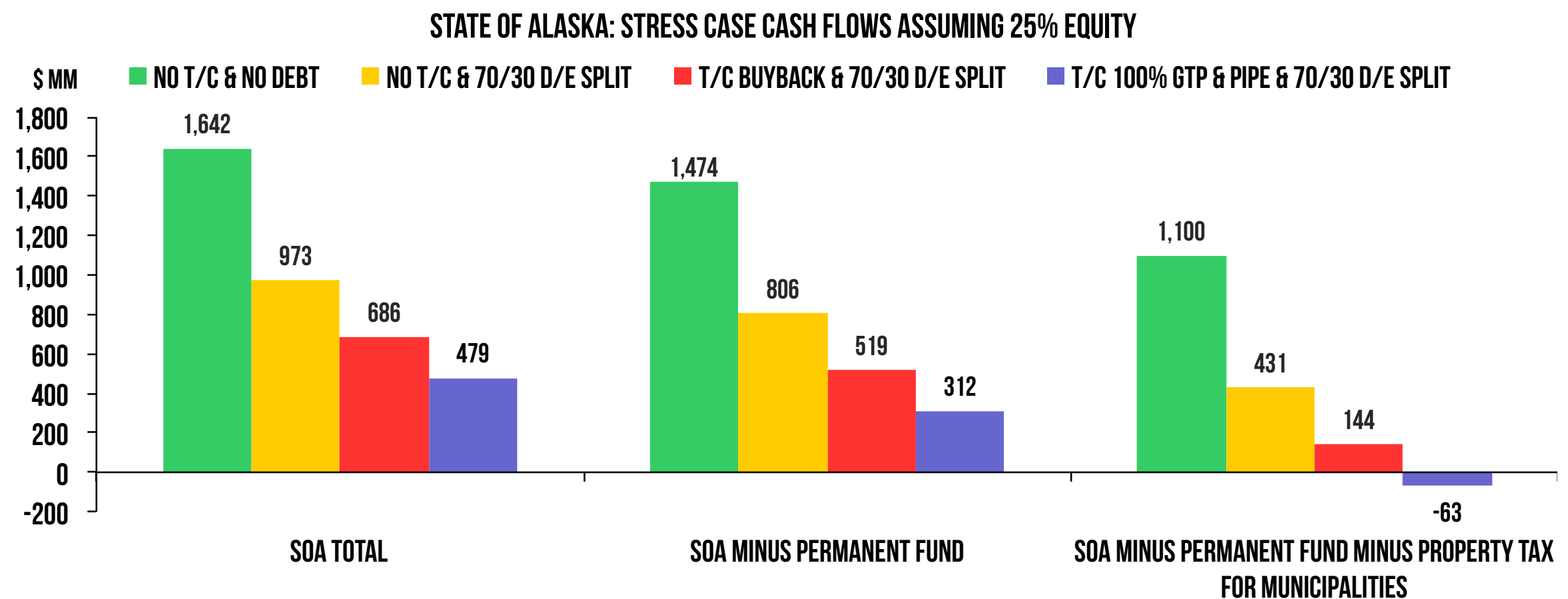
STRESS TEST: RESTRICTED VS. UNRESTRICTED REVENUES

Revenue

Total income

Total income minus permanent fund (25% of royalty)

Total income minus permanent fund and property taxes allocated to municipalities

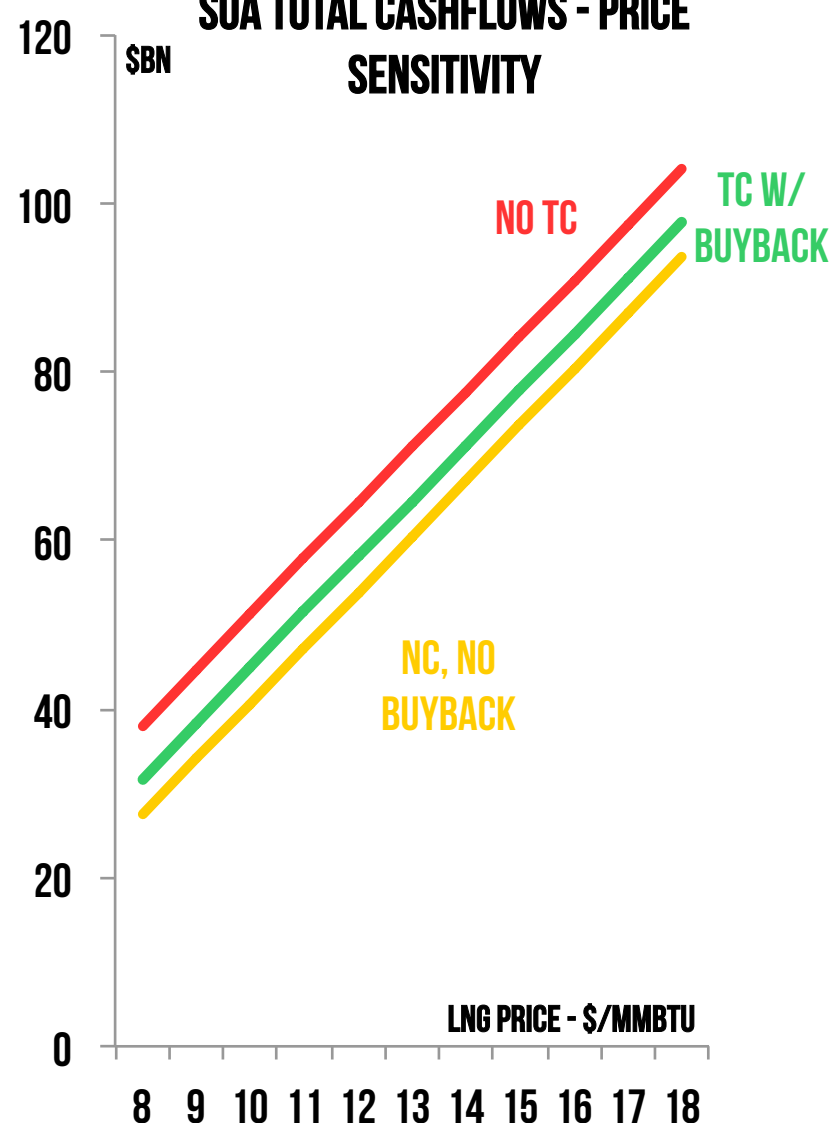


PRICE VOLATILITY IS BIGGEST RISK TO PROJECT VALUE

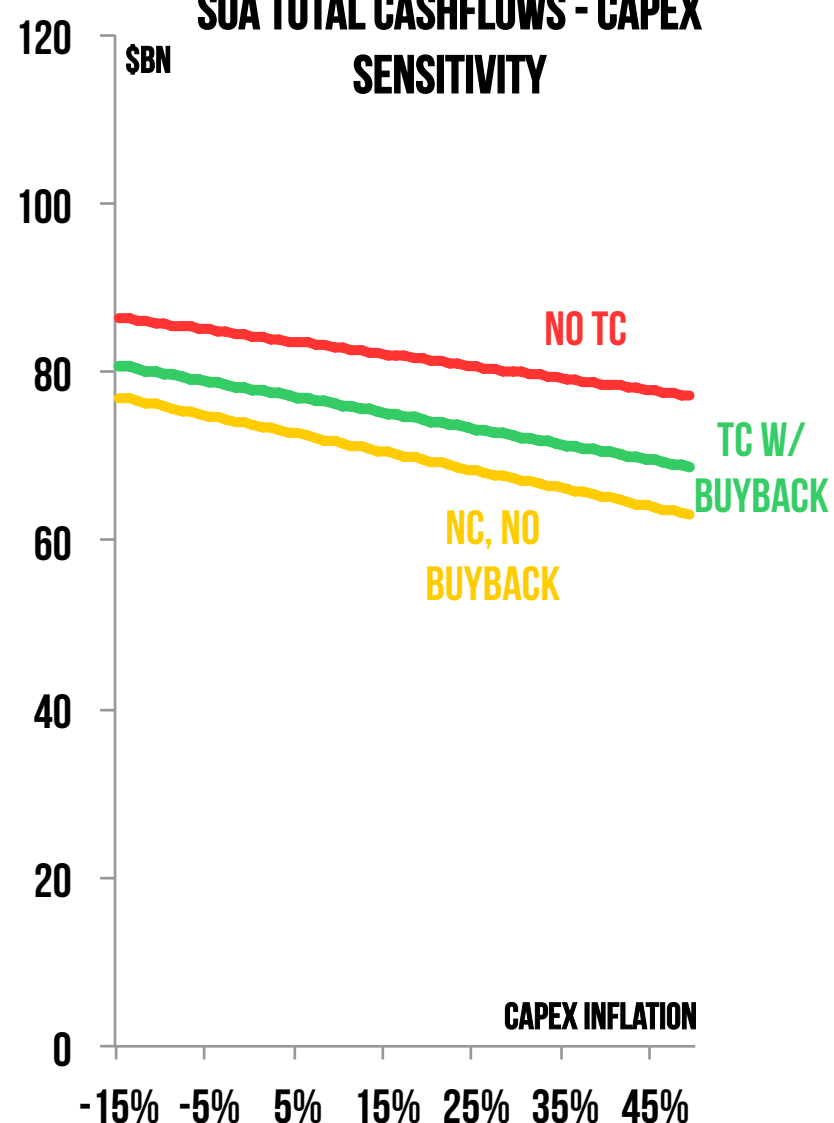
Cost overruns, lower utilization have significant, but smaller impacts

CUMULATIVE CASH FLOWS OVER PROJECT LIFE, ASSUMING 25% SHARE

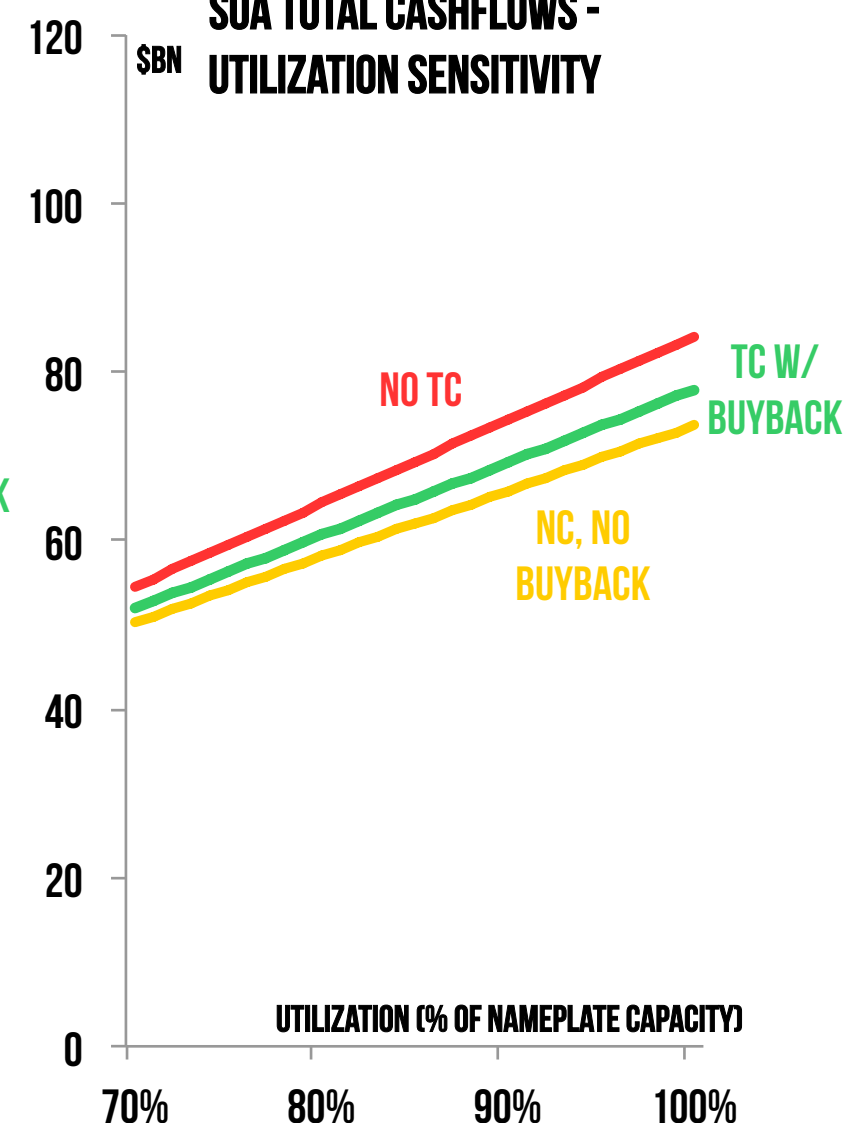
SOA TOTAL CASHFLOWS - PRICE SENSITIVITY



SOA TOTAL CASHFLOWS - CAPEX SENSITIVITY



SOA TOTAL CASHFLOWS - UTILIZATION SENSITIVITY



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