The unintended consequences of government intervention

November 2017

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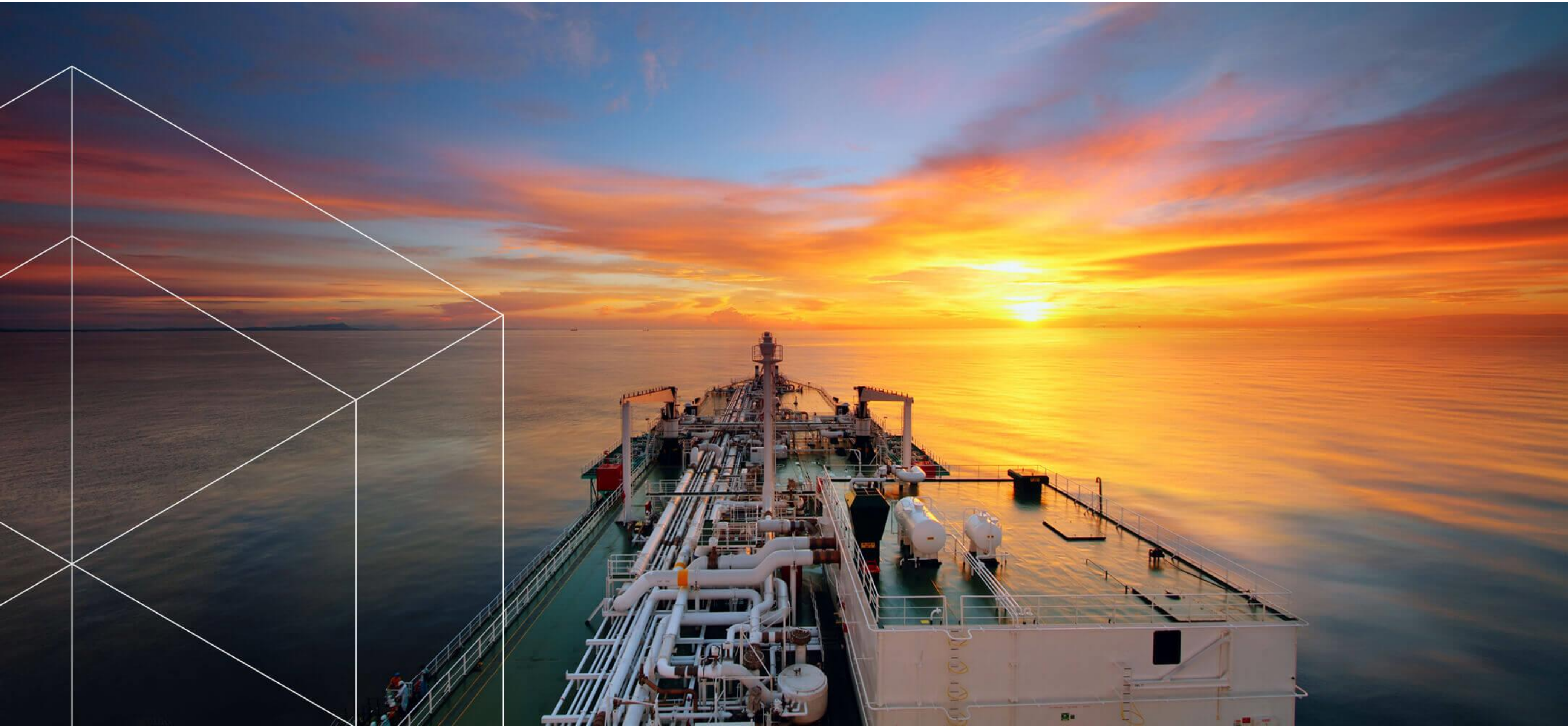


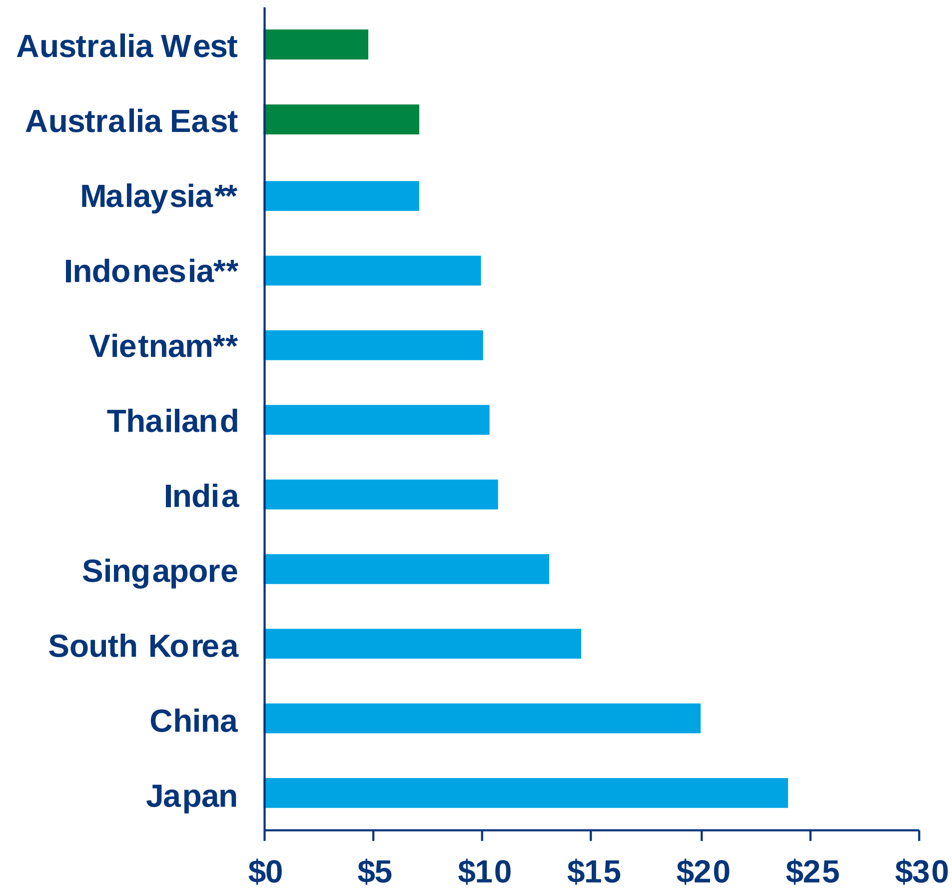
Myth Buster #1: Australians don’t pay more for gas than export customers

Comparing apples to apples – wholesale gas prices to end users

Wholesale gas prices to end users in Australia are sometimes higher than LNG prices (on the ship) due to internal transportation and retail costs and margins

End users of gas in Asia pay additional regasification, transport and retail costs, leading to costs significantly higher than for Australian end users

Indicative wholesale gas prices in Asia (2017)



Note: Many end user gas markets are opaque, and price levels vary greatly by location, seller, buyer, volume and terms. Prices herein represent what Wood Mackenzie consider indicative of marginal prices at the higher end of price ranges across various markets.

*indicative maximum price levels in US$/mmbtu. **piped gas prices, not LNG imports

Asia gas prices have changed since oil prices collapsed

Import markets have seen prices drop, but other markets like Australia have seen prices rise

Oil prices have halved from 2014 levels, and LNG prices have fallen by over two thirds from previous highs

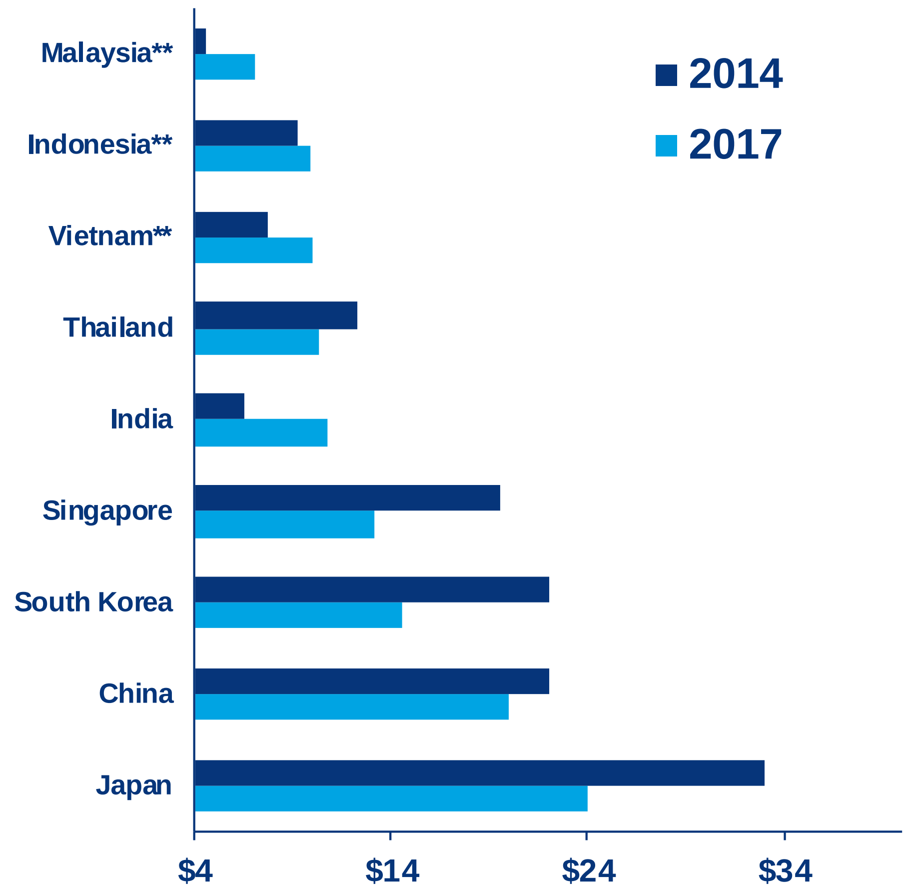
End users in most LNG import markets have seen gas prices drop as LNG prices collapsed. But these new lower prices still remain higher than Australian domestic prices

Despite a drop in oil and LNG prices, some markets have seen gas prices rise

Driven by lower cost legacy gas fields declining or changes to regulated prices to account for new cost structures and market dynamics

Australian prices have risen due to decline of lower cost legacy fields, and high cost of new supply options

Indicative wholesale gas price changes in Asia



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Hard time for Australian LNG, and east coast LNG has suffered most

Ongoing drilling economics, competition from domestic market, to curtail exports

6.4
Tcf

CSG LNG volumes at risk of being uneconomic at low prices (23% of total)

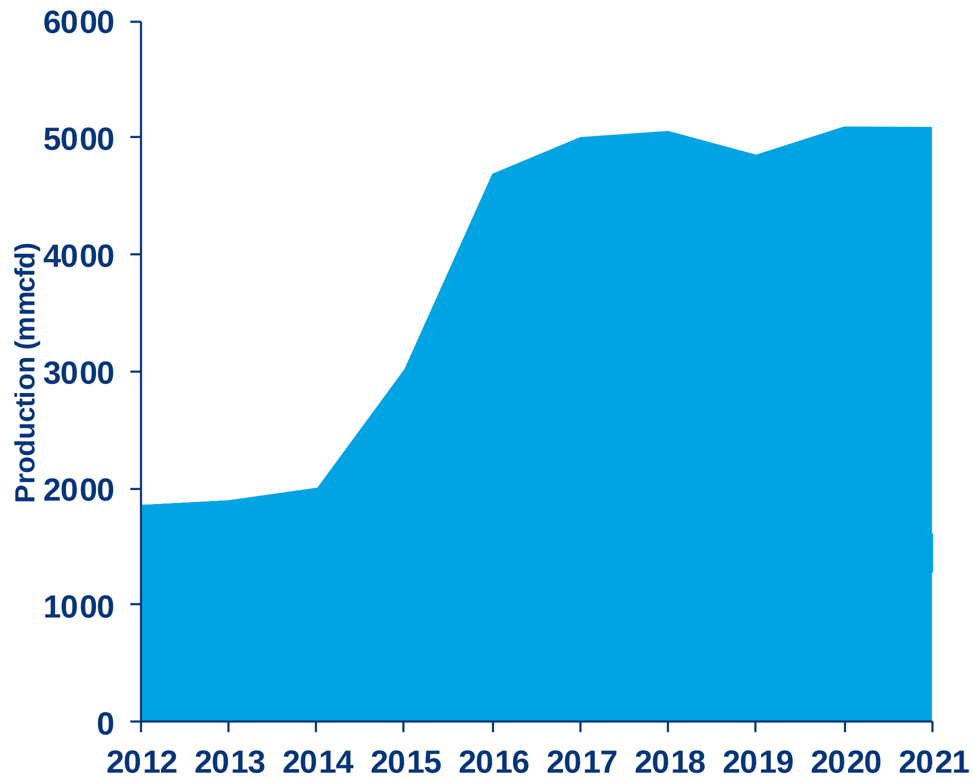
5%

Average IRR of CSG LNG projects, down from 12.5% at FID

Domestic market

to compete with LNG for molecules, especially during winter

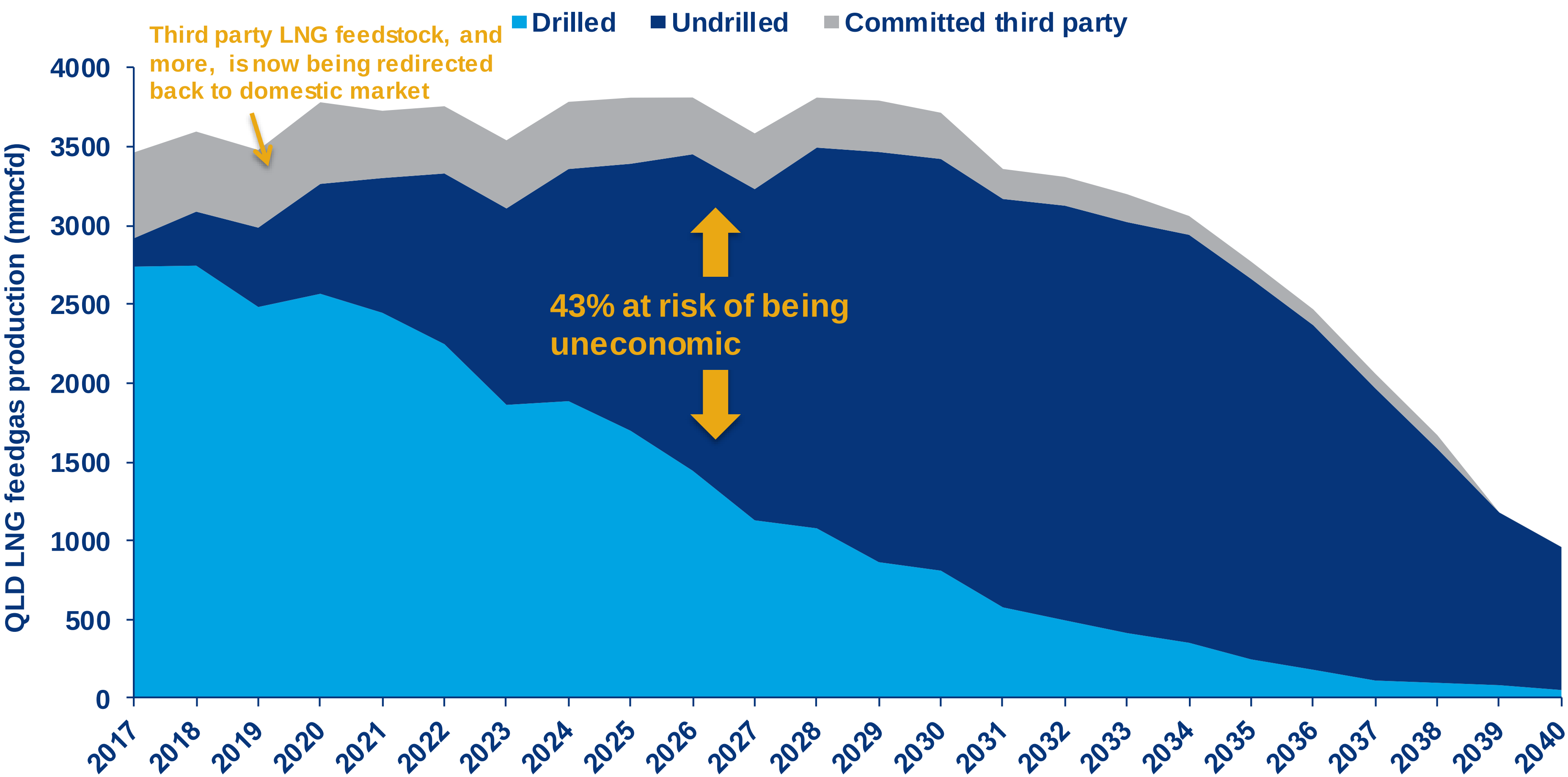
East Coast gas supply



Source: Wood Mackenzie

CSG marginal drilling costs are high

Up to 43% of yet to be drilled acreage at risk of being uneconomic around current price levels

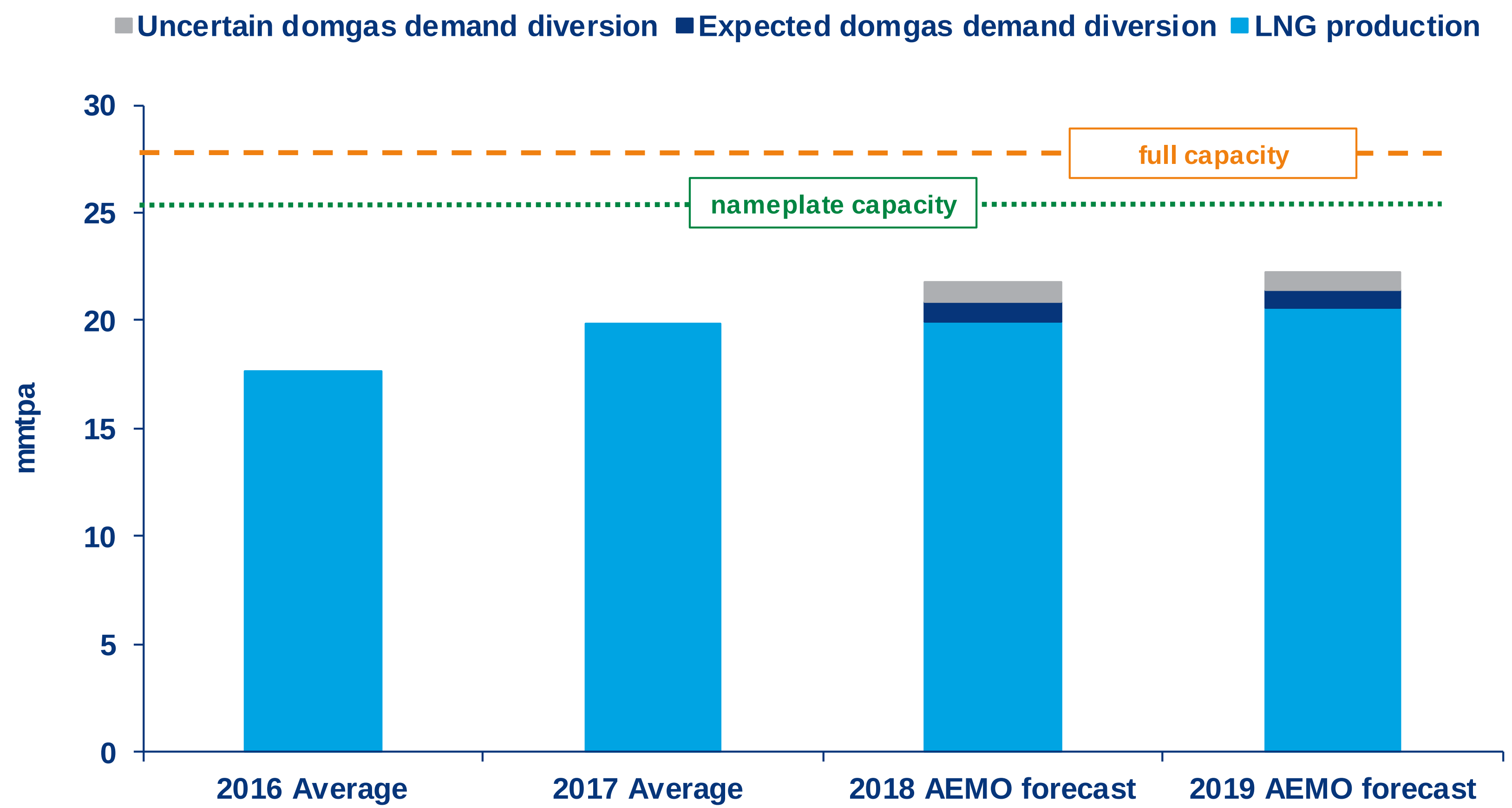


Source: Wood Mackenzie. Jan 2017. Production based on achieving nameplate output

Queensland LNG output well below capacity

First time in industry history new LNG plants deliberately run below capacity

Queensland LNG output

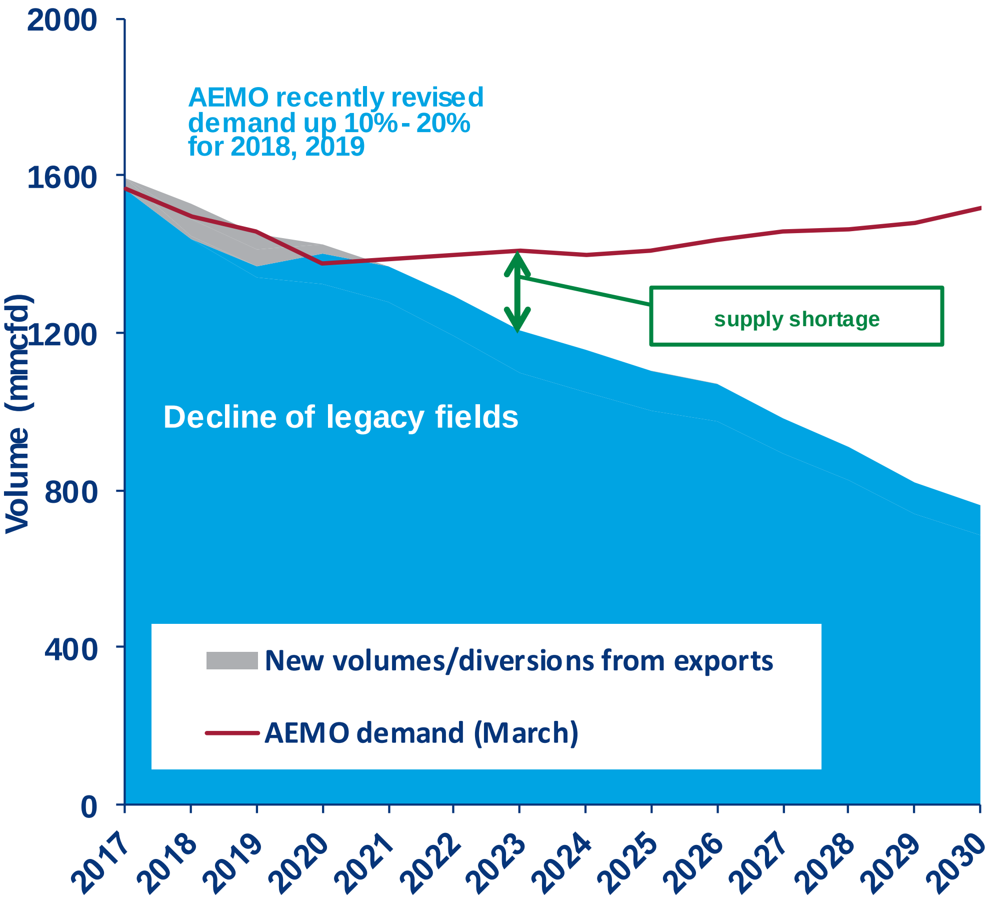


Source: Wood Mackenzie. 2017 is annualised average to September 2017. AEMO data based upon September 2017 AEMO report

Australian domestic gas crunch could further restrain LNG exports

Some gas destined for liquefaction and export will instead be diverted to domestic market

East coast domestic gas production forecast



Source: Wood Mackenzie, AEMO
NB: Assumes Santos' 30/8/17 gas swap announcement is additional volumes to the market.

Tight domestic gas supply, amidst emerging energy security crisis

The cause of tight supply and higher prices is due to decline of cheap legacy gas fields

Become major political issue: Government introduced export restrictions policy in mid 2017

LNG projects will divert feedgas to southern domestic markets, particularly during peak winter demand (southern hemisphere), reducing LNG output further

AEMO demand forecasts remain fluid, and questionable

Bold solutions being proposed

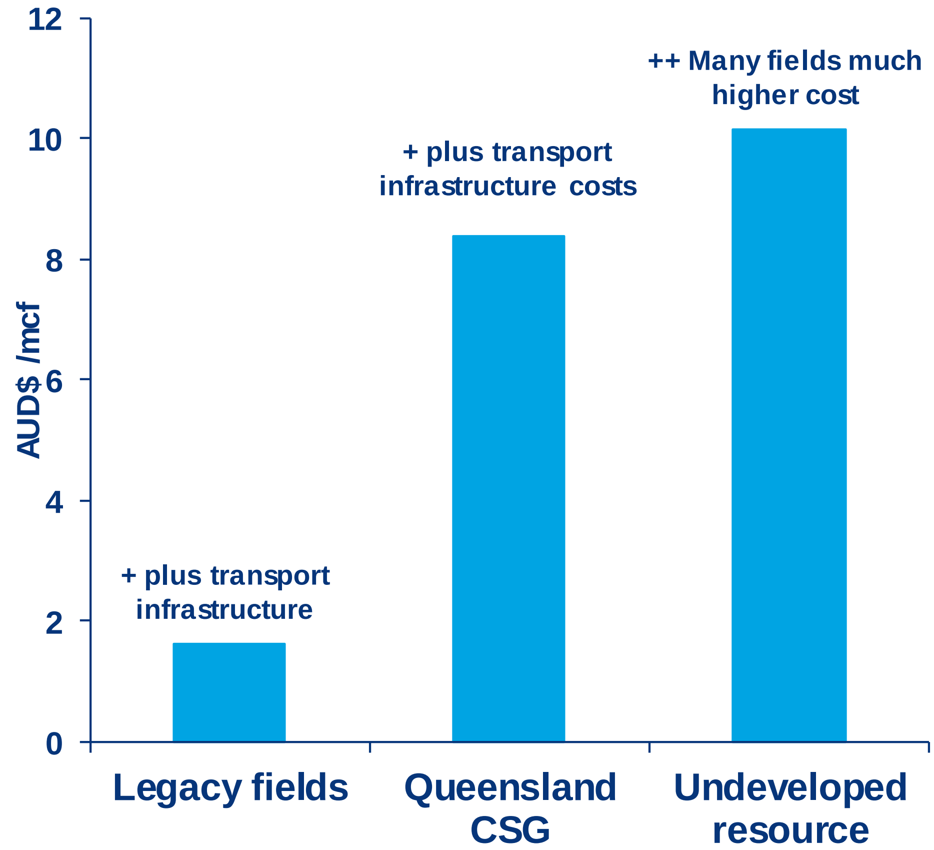
Prices go up because new gas supply is expensive

The cheap gas has finally run out

Australia's cheap legacy gas fields entering decline

Marginal domestic supply to increasingly come from CSG LNG diversions to domestic market, driven by LNG netback prices (currently lower than full lifecycle development costs)

Australian gas lifecycle breakeven costs



*12% discount rate. Average field breakeven across full lifecycle. Legacy includes Bass Strait and Cooper Basin (Note Bass strait gas is very low cost a as byproduct of oil)

ADGSM will have numerous unintended consequences

Poses immediate and longer term risks to market, tax take and economy

Increases uncertainty

The aim of the policy is unclear and changing – is it about supply security, energy prices, or avoiding industrial demand destruction?

The operation of the ADGSM is highly subjective and leaves little certainty for gas buyers or sellers to contract long term

Hampers new supply developments

Uncertainty, encouraging shorter contracts and muting of the price signal hampers new investment, particularly for large new volumes requiring new infrastructure

Invites gaming, presents a moral hazard

Annual gas contract silly season – where buyers and sellers position to influence AEMO forecasts and ministerial decisions

Its happening: ADGSM had already halted contracting as buyers held off contracts in expectation of controls.

Hits tax revenue

Export restrictions that result in lowering prices and/or reducing production will reduce government tax revenue

Queensland royalty revenue hit most, with Queenslanders partly subsidising large gas buyers in southern states

Hampers efficient planning and operations of exports – impacting corporate revenue and tax take

Increases perception of above ground risk

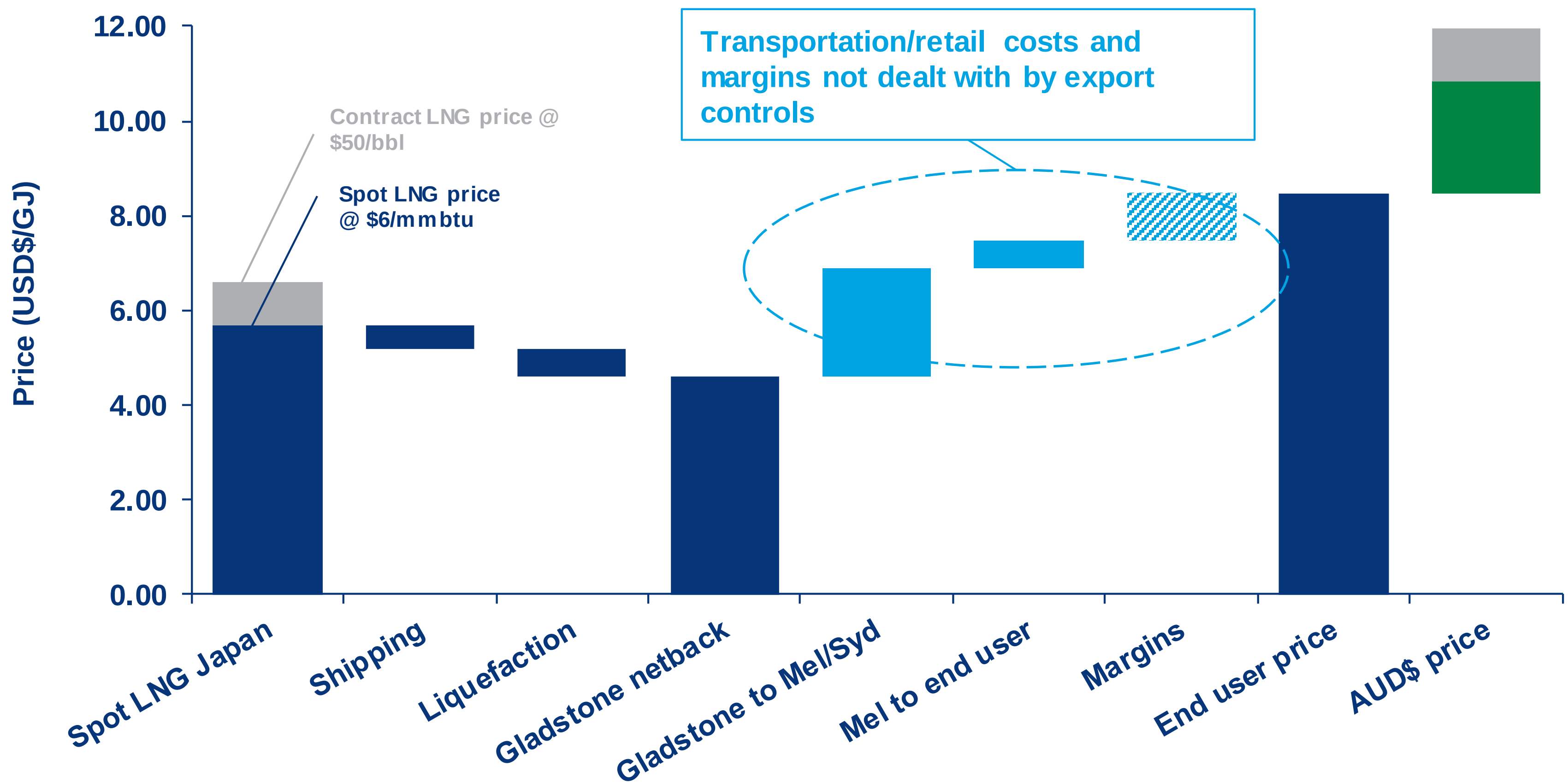
LNG contract sanctity has been broken by retrospective government intervention.

For the first time, Australia’s reputation for investment stability has been brought into question in headquarters globally

The ADGSM wont work

Prices to end users in Australia are higher than LNG netbacks due to transportation and retail costs and margins

Indicative price breakdown of marginal gas diversions to southern states



Indicative prices only. Actual prices depend upon negotiations and vary by project, transportation route, margins, sunk capacity costs, and end user.
NB Liquefaction includes plant costs and losses

Triggering ADGSM will see 'freed up gas' left in ground rather than diverted domestically

What's next? Higher gas price situation looks worse post 2020

ADGSM sets precedent, risking more interventions in the future

Domestic market to become increasingly reliant on QLD diversions as legacy fields decline

Pipelines to become congested for peak demand by early 2020s, requiring pipeline expansions, new pipelines and/or LNG imports

The road to price controls?

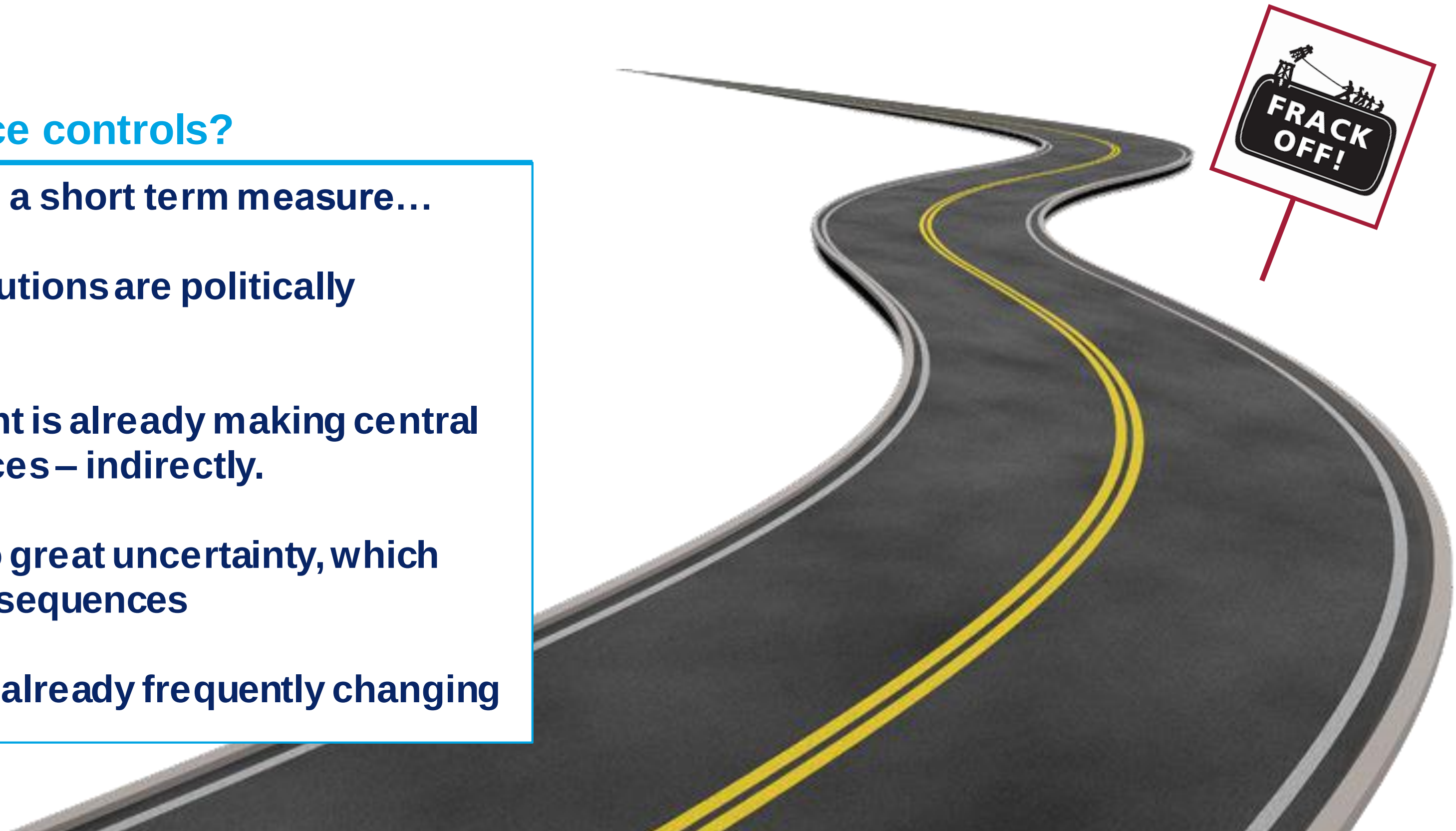
The ADSGM is supposed to be a short term measure…

… but structural long term solutions are politically intractable

Via the ADGSM the government is already making central planning decisions on gas prices – indirectly.

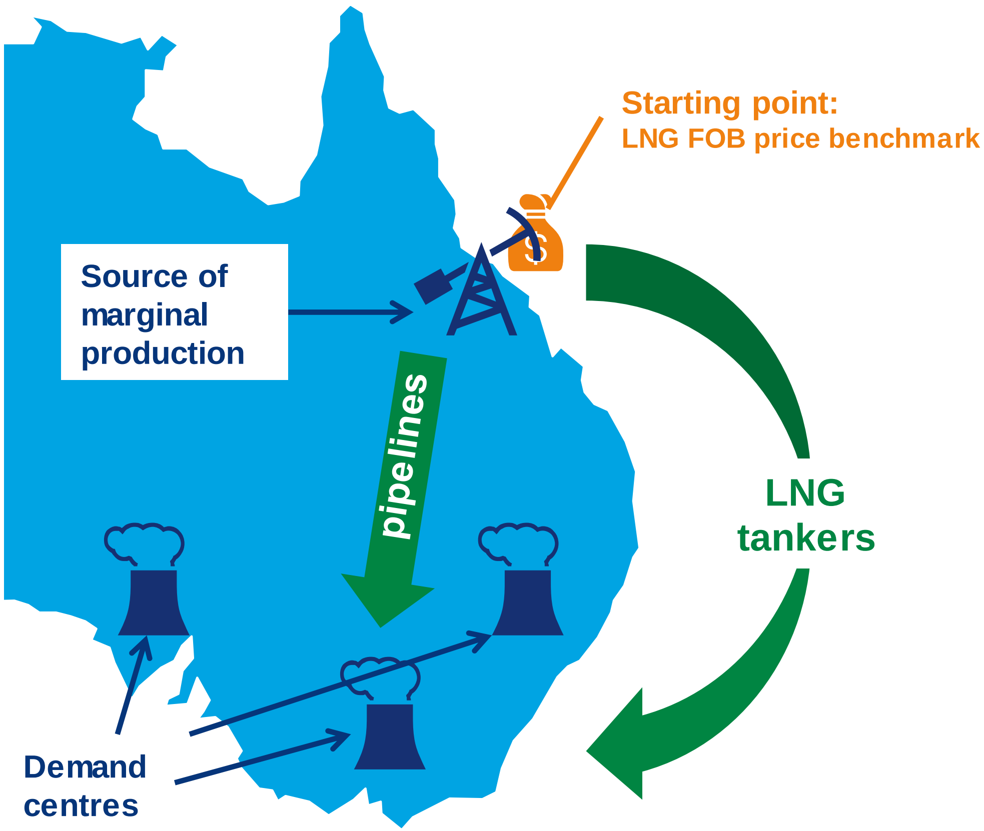
AEMO forecasts are subject to great uncertainty, which now has serious practical consequences

The targets and goalposts are already frequently changing



The next chapter for intervention: subsidies?

LNG imports an inefficient outcome, but would provide a cap on internal pipeline transport costs and margins



LNG imports an inefficient outcome. Its all about creating supply competition and storage alternatives

LNG imports are essentially an alternative competing transport mechanism to the domestic pipeline network

LNG prices still drive both domestic diversions and imports

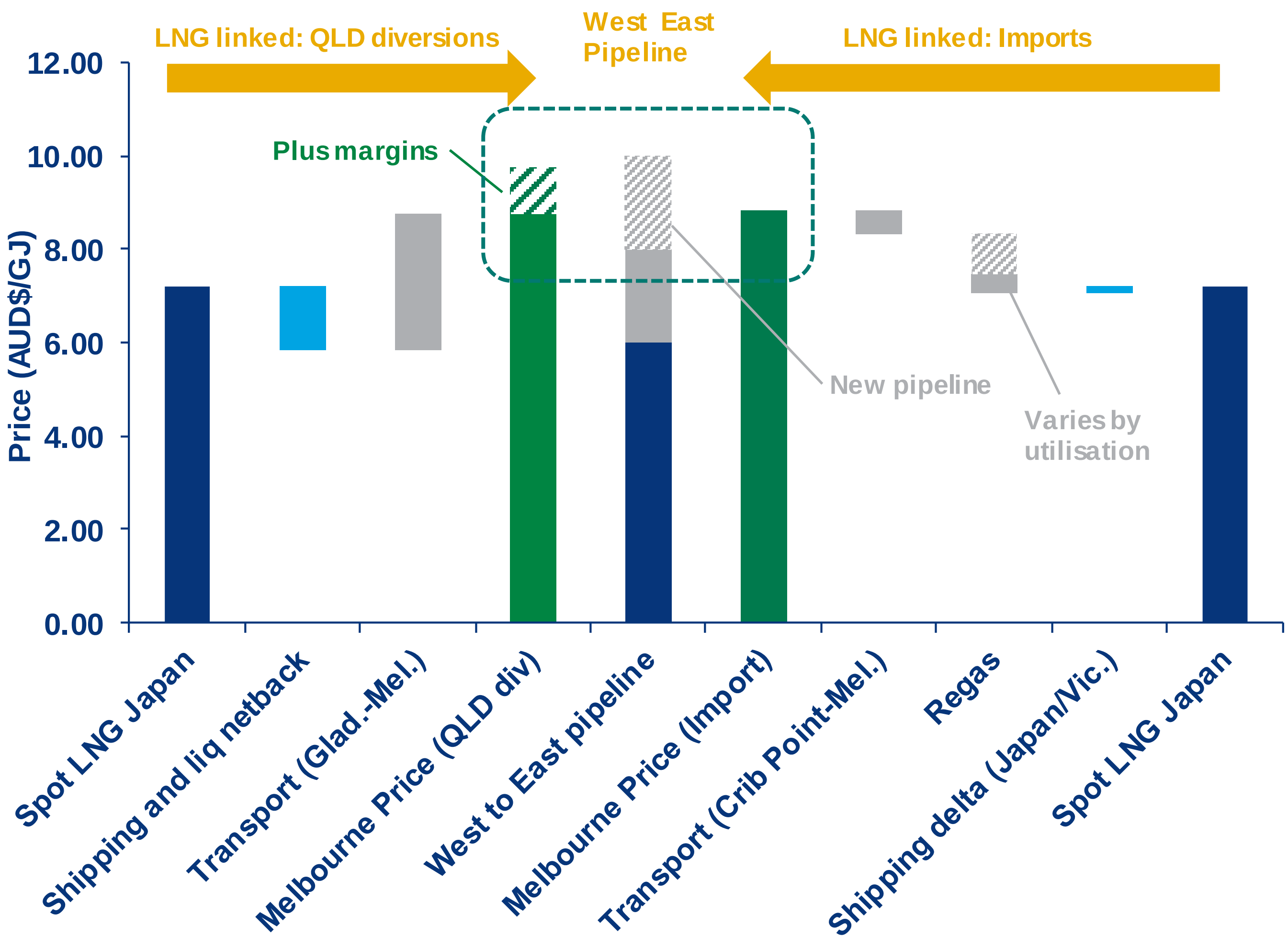
Limited and concentrated pipeline network makes internal transportation via pipeline expensive

Any LNG imported may come from QLD, but more likely to come from abroad due to cabotage rules

Bold solutions proposed, but economics for LNG imports or West East pipeline are marginal

Strategic leverage or subsidies may push projects over the line

Price breakdown of potential new gas supply to southern states



LNG imports are economically marginal compared to cost of QLD diversions

Gas buyers may pursue import terminal anyway, to provide strategic negotiating leverage with pipeline gas suppliers

End user market concentration not necessarily impacted

West East pipeline dependant on subsidies and Gorgon providing gas at lower than LNG netback pricing gas based on acceleration economics.

West coast industry may be wary of connecting into east coast, thereby becoming susceptible to capricious export controls decisions

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- Prior to Wood Mackenzie, Saul has worked with Australia's largest oil and gas company, Woodside Energy, at one of Australia's largest Venture Capital funds, M.H.Carnegie & Co, and also in corporate advisory roles in Africa. He has been an advisor on resources and economic development policy for African governments and institutions, including the United Nations Economic Commission for Africa and African Union Commission. Saul holds degrees in Law (Honours) and Chemical Engineering (Honours) from the University of Melbourne.

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