Bruce Robertson, Gas/LNG Analyst
April 2021

Institute for Energy Economics and Financial Analysis
IEEFA.org

There Are Two Elephants in the LNG Room

Emissions and Qatar Are Neglected Risk Factors in Woodside's Scarborough Project

Executive Summary

Woodside's proposed Scarborough project is a high-cost project in a world where low cost expansion projects in Qatar are bringing on gas at under half Scarborough's costs.

The Scarborough project is remote from onshore processing facilities, produces very dry gas, and is a technically difficult field to develop.

There is no carbon capture and storage proposed for Scarborough. Instead, Woodside offers a fig leaf of carbon offset projects.

All of Australia's major export LNG customers have net zero climate commitments. The U.S. and Europe are likely to introduce carbon tariffs forcing the Australian government into some form of carbon pricing.

Australia is a trading nation and cannot afford more barriers to trade.

With carbon pricing imminent in Australia, the gas industry is failing to keep investors informed as to the financial sensitivity of their businesses to carbon prices.

IEEFA calls on the Australian Stock Exchange (ASX) to enforce its continuous disclosure provisions and make the gas companies release their modelling on carbon price sensitivity.

Investors clearly are not fully informed about the financial implications of the emissions from the Scarborough gas field.

Qatar Plans Massive Expansion of Cheap LNG

Qatar, the world's biggest LNG exporter until last year, has advised it is pushing ahead with a huge expansion of capacity, taking it from 77 million tonnes a year to 110 million tonnes a year by 2025, then potentially to 126 million tonnes just two years later.[1] It is looking to develop its North Field, a field shared with Iran who has already pushed ahead with development.[2]

[1] AFR. Qatar pushing ahead with LNG expansion despite demand slump. 25 May 2020.
[2] Reuters. Iran to launch new development phases of South Pars gas field. 12 March 2019.

This 64% expansion from the world's lowest cost LNG producer will make developments in higher cost fields more problematic.

Qatar has cut prices by around 22% to secure new customers. A recent deal was struck with China's Sinopec at a "slope" or index against crude oil of just 10.19%.[3]

Qatar is a very low cost producer and can comfortably afford to cut the price of LNG. According to Wood Mackenzie:

> *"At a long-term breakeven price of just over $4 per million British thermal units, Qatar's LNG production is at the bottom of the global LNG cost curve, alongside Arctic Russian projects."*[4]

However Qatar is not only looking to price to garner new customers. It is also looking at producing lower emitting LNG via building facilities capable of capturing and storing 7 million tonnes per annum (MTPA) of emissions by 2030.[5]

In November 2020, Qatar Petroleum signed the world's first deal that details the carbon dioxide pollution of each cargo shipped to the buyer in Singapore. Qatar Petroleum plans to reduce the amount of greenhouse gases it emits from its LNG plants by 25% and upstream operations by 75% by 2030 via reducing flaring and methane leakages to 0.2%.

Scarborough Background

The remote Scarborough field was discovered in 1979. It lies in the Carnarvon Basin, 290km off the north west coast of Western Australia in 3,000 feet of water. The gas fields are estimated to hold 13.0 trillion cubic feet (Tcf) of dry gas.

Woodside proposes to develop the Scarborough gas resource through new offshore facilities connected by a 430km pipeline to the proposed expansion of the existing Pluto LNG facility on the Burrup Peninsula (Pluto Train 2). The gas would be processed at the Pluto expansion project. The distance from Scarborough to the Burrup Peninsula is 375km.[6]

According to Woodside's website, the proposal is to initially develop the Scarborough gas fields with between seven and nine high rate gas wells, tied back to a semi-submersible floating production unit (FPU) moored in 950m, close to the Scarborough field.

The Pluto Train 2 LNG brownfields expansion would have a capacity of about 5 MTPA. The expansion would also include modifications required to Pluto Train 1 for processing approximately 1.5MTPA of Scarborough gas and installation of domestic gas infrastructure to increase capacity to 225 TeraJoules (TJ) a day.

---

[3] AFR. Qatar flexes muscles with cuts to gas prices. 21 September 2020.
[4] Reuters. Qatar Petroleum signs deal for mega-LNG expansion. 9 February 2021.
[5] Bloomberg. Qatar raises carbon capture ambitions touting green credentials. 13 January 2021.
[6] Woodside. Woodside web site. April 2021.

Scarborough Ownership

The principal Scarborough gas fields are owned 73.5% by Woodside and 26.5% by BHP Billiton.

Figure 1: Ownership Breakdown of Scarborough

	Scarborough (WA-61-L)	North Scarborough (WA-62-L)	Thebe (WA-63-R)	Jupiter (WA-61-R)
Woodside (operator)	73.5%	73.5%	50%	50%
BHP Billiton Petroleum (North West Shelf) Pty Ltd	26.5%	26.5%	50%	50%

Source: Woodside website.

The ownership of Pluto is very different to the Scarborough fields. Woodside is the operator with a 90% interest and Kansai Electric and Tokyo Gas have small 5% shareholdings each in the LNG facility.

Different ownership structures between gas fields and LNG processing facilities often gives rise to conflicts as to where the profitability of a project is taken. Clearly in this case, Woodside would prefer a cheaper price for the input gas and BHP would prefer a more expensive price for the input gas to the LNG processing facility.

Scarborough Costs of Production

At an APPEA conference in May 2013, when ExxonMobil was a stakeholder in the Scarborough gas field, Exxon executive Mark Nolan was reported as saying that the Scarborough project will be "*very challenged from a cost point of view*".[7]

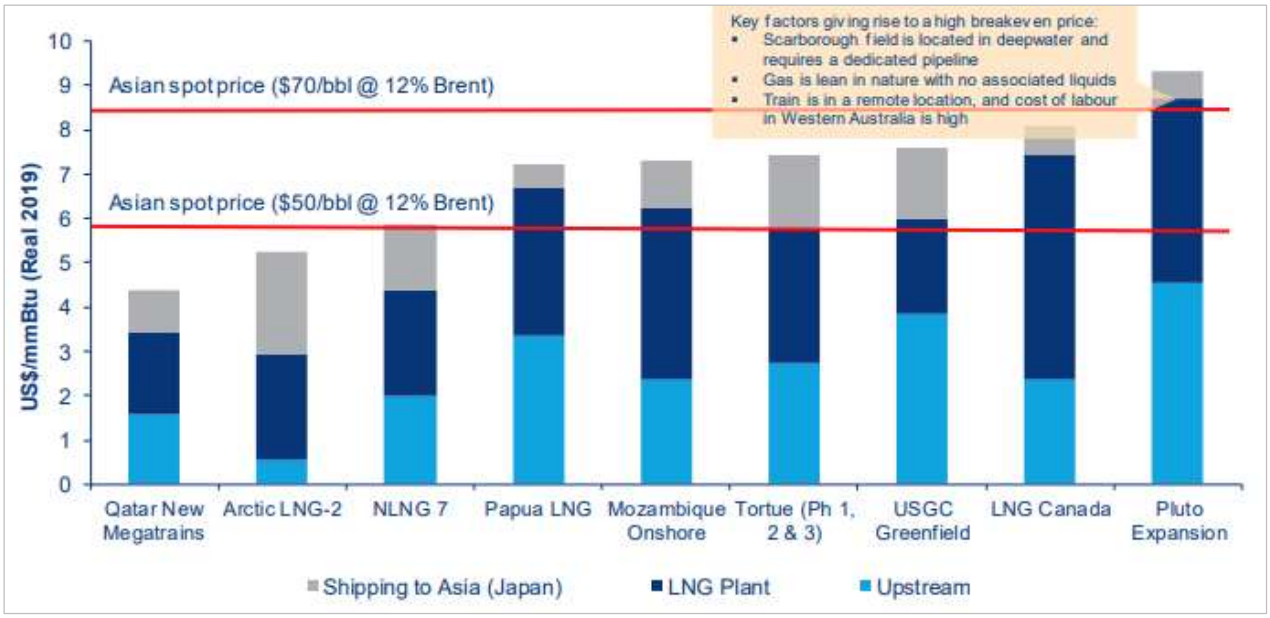
Scarborough contains very dry gas. The field is shallow and broad and will require expensive deep water horizontal drilling, according to Exxon. The absence of liquids reduces the economics of the Scarborough project.

The Pluto expansion project, utilising gas piped from Scarborough, will produce very expensive LNG at over $9 per one thousand British thermal units (MMBtu) delivered to Asia, according to a report by Wood Mackenzie dated 9 March 2020 (commissioned by APPEA) (see Figure 2). It is interesting to note that the two red lines in Figure 2 would be significantly lower if calculated today given that new contracts out of Qatar have been written at a pricing slope to Brent Crude of 10.2% thereby lowering the Asian spot price at $70/ billion barrels (bbl) to US$7.14/mmBtu from $8.40, and at $50/bbl from US$6/mmBtu to $5.20.

[7] S&P Global. Australia's Scarborough LNG project "Challenged" on costs: ExxonMobil. 27 May 2013.

The increasing competition from Qatar puts even greater pressure on the economics of the Scarborough gas field and Pluto LNG expansion.

Figure 2: Cost Stack of Select LNG Projects (DES to Asia)



Source: Wood Mackenzie. Australia Oil & Gas Industry Outlook Report. 9 March 2020.

Contracts

Woodside has struggled to secure long term contracts for its Scarborough gas expansion.

An initial agreement was struck with Uniper of Germany in late 2019.[8] In January 2021 Woodside announced an expansion of the binding 13-year sale and purchase agreement with Uniper.[9] The initial supply sought, commencing in 2021, is now for a volume of up to 1Mtpa increasing to 2Mtpa from 2026.

Woodside has been unable to attract any other customers. Given the frosty relationships that currently exist between Australia and the fastest growing LNG market - China, Australian companies have more limited customer opportunities.

Given that the Pluto expansion is for 6.5Mtpa, only 31% of the project's output is contracted. Typically, for a project to proceed, greater than 80% of volumes need to have found long term customers.

[8] Reuters. Woodside finalizes deal to supply Germany's Uniper with LNG from Scarborough. 24 December 2019.
[9] Woodside Petroleum ASX announcement. Woodside expands Long Term LNG Supply agreement. 18 January 2021.

Scarborough Emissions

Scarborough emissions consist of scope 1 emissions and processing and reservoir emissions.

Figure 3: Scarborough Scope 1 Emissions

	Annual ($MtCO_2e$)	Total expected field life ($MtCO_2e$)
Emission source		
Fuel Gas	0.41	9.88
Flaring	0.04	1.38
Fugitives	0.01	0.26
Total Scope 1	**0.47**	**11.52**

Source: Scarborough Offshore Project Proposal – NOPSEMA - Page 377.

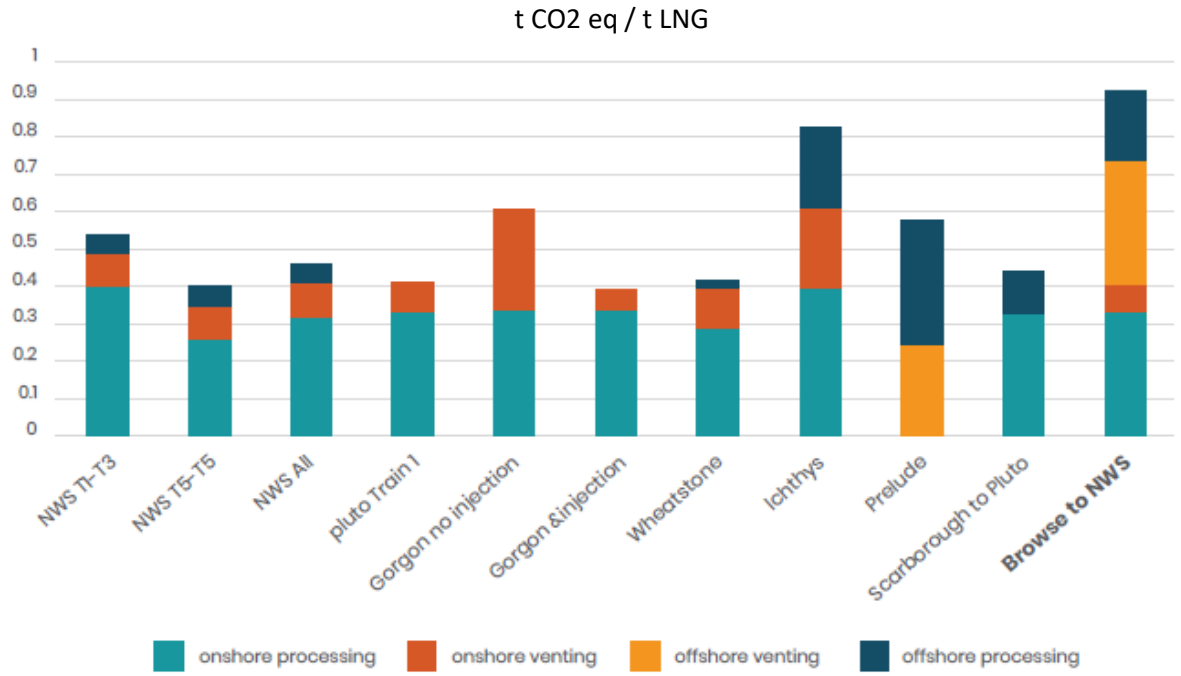
Figure 4: Forecast Scarborough Processing and Reservoir Emissions Summary

	Annual ($MtCO_2e$)	Total expected field life ($MtCO_2e$)
Onshore Processing		
Reservoir Emissions	0.02	0.55
Processing Emissions (fuel and flare)	2.82	87.42
Onshore processing Total	**2.84**	**87.97**

Source: Scarborough Offshore Project Proposal – NOPSEMA - Page 379.

Scarborough's emissions intensity is 0.415 tonnes of carbon dioxide equivalent per tonne of LNG (t CO2e / t LNG) which is unremarkable being approximately the same emissions intensity as the other north west shelf projects operated by Woodside.

Figure 5: Emissions Intensity of Woodside's Browse Basin LNG Compared With Other Western Australian LNG projects



Source: CCWA Clean State Burrup Hub report - Page 11.[10]

What is remarkable is that Woodside has *not* embarked on a carbon capture and storage project to accompany Scarborough unlike what its competition is doing at Chevron's Gorgon Project.

Woodside is acquiring carbon offsets, however these only offset a small proportion of production. In a brochure[11] on Scarborough's role in managing greenhouse gas emissions, the company claims they will acquire carbon offsets at scale. To date however, these have only delivered 840,000t of CO2 offsets for the entire company. Scarborough alone will produce 3,310,000t of CO2e per annum. Relying on carbon offsets alone to meet emissions reduction goals is a highly risky and unproven strategy given the cost and availability of offsets at large volumes is by no means certain.

Woodside's emissions reduction commitments are far less ambitious than many of their competitors and are not consistent with the Paris Agreement. Woodside's goal of reducing 'equity share' emissions to net zero by 2050 translates to a reduction of less than a third of the total carbon pollution the company is responsible for under Australian law, as the sole operator of the Pluto and North West Shelf processing

[10] Since this analysis, Woodside has significantly increased the size of the Scarborough resource and made other design changes to the project which could affect the emissions intensity of the project.
[11] Woodside. Scarborough's role in managing greenhouse gas emissions.

facilities. Woodside's emissions reduction goals also ignore the Scope 3 emissions from their gas projects.

What Are the Financial Consequences of Scarborough Emissions?

We now live in a world where globally all of Australia's major LNG trading partners including China, Japan and South Korea, plus the U.S. and Europe have net zero commitments.

Carbon tariffs will be introduced by Europe in 2023 and the U.S. has signalled that it is looking at similar mechanisms.

Carbon pricing is inevitable in Australia. The Australian government would *not* like to see foreign governments collecting a carbon tax whilst it receives no revenue.

The ASX has continuous disclosure requirements. Woodside would have modelled Scarborough under different carbon price assumptions.

Why has this modelling that materially affects the financial future of the company *not* been released to the market?

Once the carbon price sensitivity modelling is released investors can be fully informed, rather than the current situation where the financial implications of Woodside's emissions are unknown.

About IEEFA

The Institute for Energy Economics and Financial Analysis conducts research and analyses on financial and economic issues related to energy and the environment. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

About the Author

Bruce Robertson

Energy Finance Analyst – Gas/LNG Bruce Robertson has been an investment analyst, fund manager and professional investor for over 35 years. He has worked for major domestic and international institutions, including Perpetual Trustees, UBS, Nippon Life Insurance and BT. Bruce is an active participant in the national debate on energy issues in Australia and has been invited to present to a number of government enquiries into the electricity and gas industries. brobertson@ieefa.org