MARTIN JENKINS

BARQUE FIELD DEVELOPMENT ECONOMIC IMPACT ASSESSMENT

Final Report

9 June 2017

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PREFACE

This report has been prepared for New Zealand Oil & Gas by Jason Leung-Wai and Tim Borren from MartinJenkins (Martin, Jenkins & Associates Limited).

MartinJenkins advises clients in the public, private and not-for-profit sectors, providing services in these areas:

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ABBREVIATIONS AND ACRONYMS

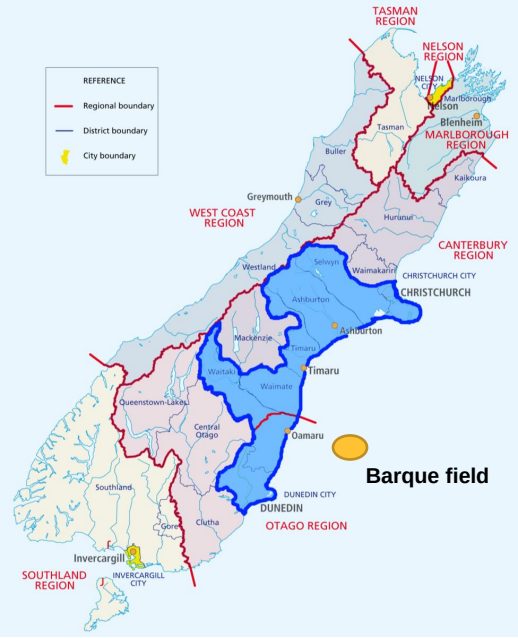
Table 1: List of abbreviations and acronyms

Abbreviation/acronym	
APR	Accounting profits royalty
AVR	Ad valorem royalty
BGA	Business growth agenda
EIA	Economic Impact Analysis
FPSO	Floating production, storage and offloading vessel
FTE	Full-time equivalent
GDP	Gross domestic product
I-O	Input-output
ktonne	Kilo tonne
Ktpa	Kilo tonnes per annum
LNG	Liquid natural gas
LPG	Liquid petroleum gas
Mmboe	Million barrel of oil equivalent
Mmstb	Million stock tank barrels
Mmtpa	Million metric tonnes per annum
NZOG	New Zealand Oil & Gas
PJ	Petajoules
Tcf	Trillion cubic feet

EXECUTIVE SUMMARY

MartinJenkins has been engaged by New Zealand Oil & Gas (NZOG), in partnership with New Zealand Trade and Enterprise and Beca, to undertake an economic impact analysis of two possible scenarios for the development of the Barque field, which is a promising undrilled exploration prospect in the Canterbury Basin east of Oamaru. The Barque field and the regional study area is shown in Figure 1.

Figure 1: Barque prospect and regional study area (shaded blue)



Situated within the Clipper permit jointly owned by NZOG and Beach Energy, the Barque prospect potentially contains more than five trillion cubic feet (Tcf) of gas and light oil – a similar size to Maui, Taranaki's largest oil and gas field. The development has the potential to generate $15 billion in GDP and $32 billion in royalties and taxes over the life of the field. It could create up to 5,700 jobs annually during the construction phase.

There are two field development options being considered, depending upon interest from partners and investors.

The base-case development scenario (offshore scenario), involving offshore production of oil for direct export, will create jobs in the local region and nationally, provide royalties to the Crown and boost export earnings.

The alternative scenario, in which natural gas is brought to shore in addition to oil and LPG production, has the potential to not only deliver the benefits mentioned above, but also transform the local and regional economy as happened in Taranaki following the Maui discovery.

This study suggests there is sufficient interest to establish a local market for natural gas in the South Island and that the economic impact of bringing gas to shore would be far greater than the base-case.

An opportunity exists for interested commercial parties and other stakeholders to work with local industry, to ensure the local region and New Zealand captures as much value as possible from the extraction and processing of its natural resource.

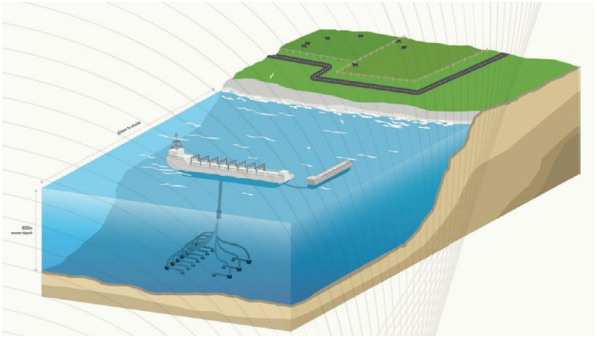
The development of the Barque field has the potential to more than double New Zealand's current oil and gas production. The gas-to-shore scenario could generate $450 million in annual GDP from operations and $700 million each year in royalties and taxes over the life of the field.

This report draws on data provided by Beca, Methanex, Coogee, Ravensdown, Fonterra and several other sector experts, to estimate the economic impact of each scenario on the regional study area and New Zealand in terms of output, GDP and employment. It also presents the likely contribution to New Zealand's export earnings and possible royalties paid. The development scenarios will have the greatest regional impact on the eastern coast of the South Island. This area comprises seven local authorities – Dunedin, Waitaki, Waimate, Timaru, Ashburton, Selwyn and Christchurch – which make up the regional study area considered in this analysis.

Currently, NZOG is in discussions with potential international partners working towards April 2018, when the joint venture must commit to drilling an exploration well, or surrender the permit. If the drilling commitment is secured, production could begin as early as 2025.

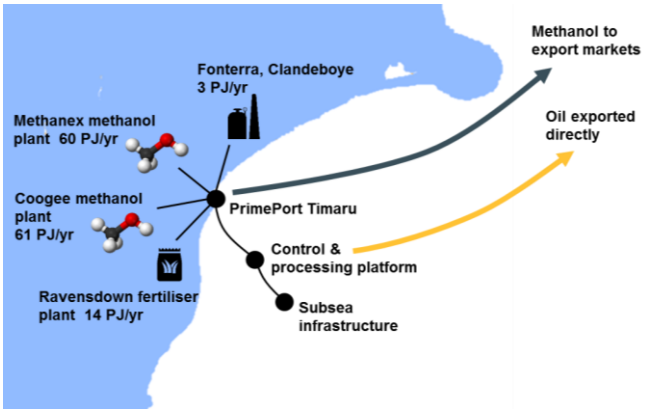
Barque field development scenarios

Scenario 1 (offshore): condensate stripping with gas recycling



- Fluid is extracted from the field via ten production wells, condensate (oil) is separated and the gas is re-injected (recycled) back into the reservoir.
- Oil is processed on an offshore vessel and exported directly to markets. Onshore activity is limited to servicing and maintenance. It is possible for the recycled gas to be extracted in the future.
- Over a 35-year period beginning in 2025, the scenario is for around 460 million barrels of oil to be extracted.

Scenario 2 (gas-to-shore): natural gas to shore with oil and LPG production



- Gas is extracted via 14 production wells and piped to shore delivering a long term, reliable gas supply for use in methanol manufacture, fertiliser/urea manufacture and industrial thermal generation. Oil and LPG is also produced. Oil will be exported, while LPG can be either exported or used domestically.
- Port is developed to service the offshore platform and provide facilities for storage and shipping of methanol.

- Two methanol plants and a fertiliser plant are commissioned based on long-term gas supply contracts. Methanol plant one (1.7 million tonnes per annum) commences in 2025; methanol plant two (1.7 million tonnes per annum) commences in 2027; fertiliser plant (650 thousand tonnes per annum) and industrial use commences in 2029.
- The scenario is based on gas production beginning in 2025. Gas production will ramp up over the first four years and will be sustained at 138 petajoules per year from 2029 until 2048, before declining through to 2070. Over the 46-year production life, around 4,733 petajoules (750 million barrels of oil equivalent) of sales gas, 340 million barrels of oil and 31 million barrels of oil equivalent of LPG are likely to be extracted.

Economic impact

The economic impacts of each scenario, estimated for the construction phase and the ongoing operations phase, are summarised in the diagrams on the following two pages.

Under the offshore scenario:

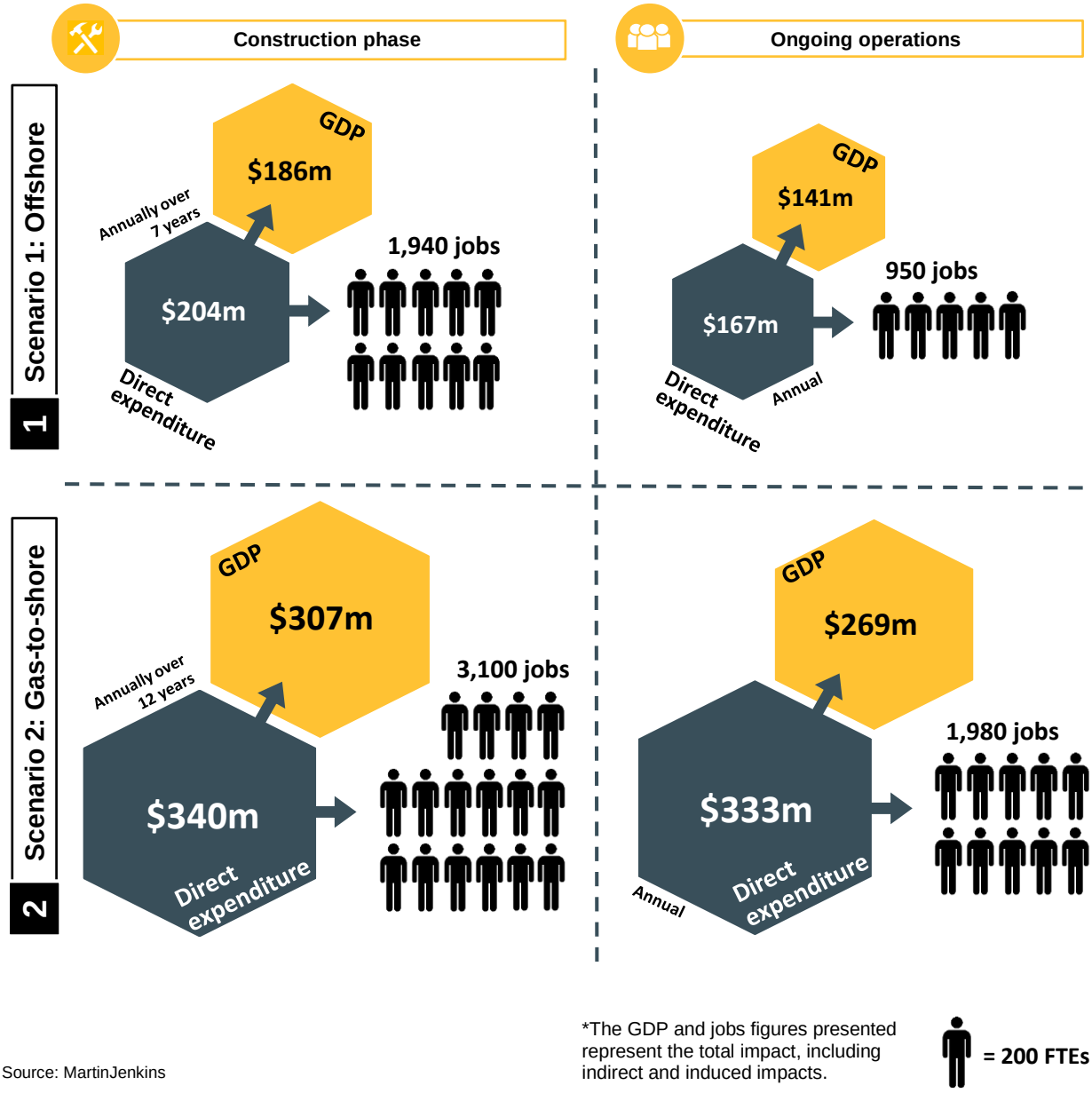
- Over the seven-year construction phase about $1.4 billion will be spent in the study region generating $1.3 billion in GDP ($186m annually) and creating over 13,500 jobs (1,940 annually). $2.3 billion will be spent in New Zealand, generating $2.6 billion in GDP ($372m annually) and creating over 25,000 jobs (3,650 annually).
- Over 20 years of ongoing operations, about $167 million will be spent each year in the study region generating $141 million in GDP and creating 950 jobs. $218 million will be spent each year in New Zealand generating $236 million in GDP and creating 1,565 jobs.

Under the gas-to-shore scenario:

- Over the 12-year construction phase about $4 billion will be spent in the study region generating $3.7 billion in GDP ($307m annually) and creating over 37,000 jobs (3,100 annually). $6.3 billion will be spent in New Zealand, generating over $7 billion in GDP ($591m annually) and creating over 68,000 jobs (5,740 annually).
- Over 20 years of ongoing operations, about $333 million will be spent each year in the study region generating $269 million in GDP and creating 1,980 jobs. $411 million will be spent each year in New Zealand generating $446 million in GDP and creating 3,220 jobs.

Based on initial screening, the two scenarios are similarly profitable for New Zealand Oil & Gas. However, the gas-to-shore scenario would create a much larger impact on the regional and national economies. Bringing gas to shore has the potential to significantly transform the South Canterbury/Otago economy, as happened in Taranaki following the Maui field discovery.

Regional economic impact

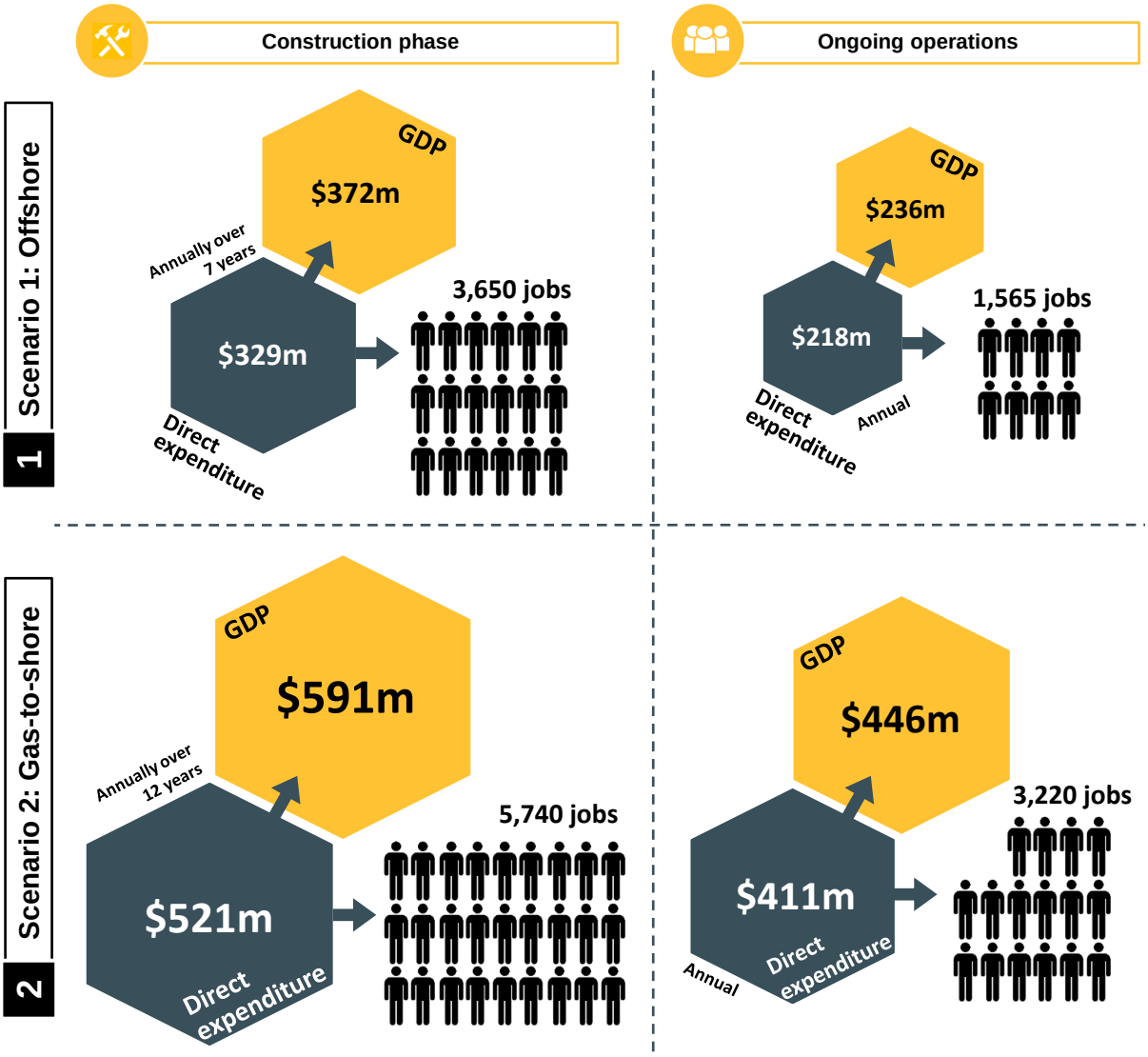


Source: MartinJenkins

*The GDP and jobs figures presented represent the total impact, including indirect and induced impacts.

= 200 FTEs

National economic impact



*The GDP and jobs figures presented represent the total impact, including indirect and induced impacts.

= 200 FTEs

Source: MartinJenkins

Table 2 provides some context around the size and significance of the Barque prospect, putting the estimated construction investment alongside other recent significant capital infrastructure projects.

Table 2: Barque development construction expenditure relative to other significant national projects

Project	Construction expenditure ($b)	Timeframe (years)
Barque, Offshore scenario	2.3	7
Barque, Gas-to-shore scenario	6.3	12
Auckland city rail link	2.8 - 3.4	6
Canterbury University rebuild/upgrade	1.1	10
Auckland city to airport light rail	1 - 1.5	
Total Christchurch earthquake rebuild	40.0	10+

Sources: MartinJenkins, NZ Treasury, Reserve Bank

The gas-to-shore scenario is a larger project than the Auckland city rail link, while the offshore scenario is larger than the Canterbury University rebuild and the Auckland city to airport light rail project.

Exports

Export values are highly dependent upon price, which is variable. Volumes can change with price, but are less variable due to production methods and supply contracts. Export volumes and values in Table 3 are calculated based on operating scenarios developed by NZOG, historic Methanex Asia contract methanol prices and historic oil prices.

Table 3: Annual export volume and value comparison

	Barque field (avg. 2025-2045)		New Zealand
	Offshore scenario	Gas-to-shore scenario	(avg. 2014-2016)
Volume			
Oil exports (mmstb)	18.1	10.9	12.7
LPG exports (mmboe)		0.3	0.5
Methanol exports (mmtpa)		3.2	2*
Value (NZ$m)			
Oil	1,814	1,095	992
LPG		16	29
Methanol		1,610	913*
Total	**1,814**	**2,720**	**1,933**

Sources: MartinJenkins, NZOG, MBIE, Statistics NZ

Notes:

*Estimated based on total NZ methanol production (assuming 99% exported) and global realised methanol price.

Barque field oil export value based on historic 15-year average oil price of NZ$100 per barrel.

Barque field LPG export value based on NZ$498 (US$350) per ktonne.

Anticipated methanol value based on Methanex's 10-year average global realised methanol price of NZ$502 (US$353) per metric tonne.

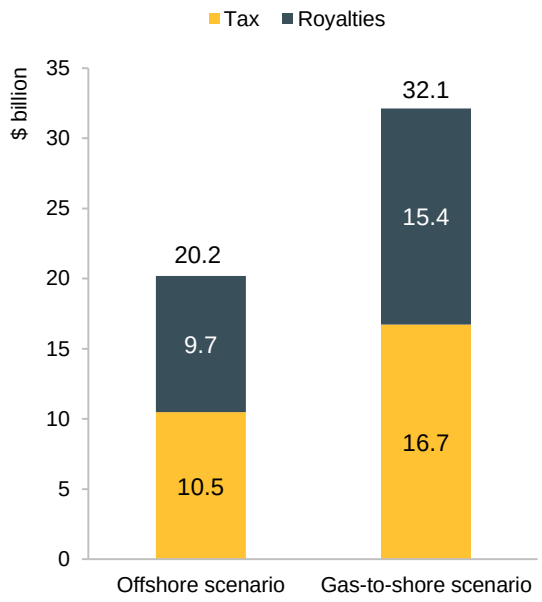
- The offshore scenario is expected to produce an average of 18.1 million barrels of oil per year between 2025 and 2045, all of which will be exported. We estimate this will generate $1.8 billion in export earnings each year.
- Under the gas-to-shore scenario, an average of 10.9 million barrels of oil, 0.3 million barrels of oil equivalent of LPG and 3.2 million tonnes of methanol are expected to be exported per year between 2025 and 2045, generating about $2.7 billion in export earnings annually. This will increase New Zealand's oil, LPG and methanol annual export earnings from about $2 billion currently to $4.7 billion. In addition, import substitution of about 550,000 tonnes of urea (fertiliser) will be worth about $220 million annually.

Export earnings would be about $1.8 billion annually under the offshore scenario, increasing to $2.7 billion under the gas-to-shore scenario.

Royalties and taxes

Royalties and taxes are difficult to estimate due to uncertainty around profitability, which is a key variable in determining both. However, NZOG's scenarios are based on expected volumes of production, expenditure and revenue to deliver a base return on investment. These scenarios underpin this analysis and have been used to estimate royalties and taxes. Note that these estimates are for NZOG activity only and do not include taxes paid for other participants in the gas-to-shore scenario. Including taxes from the methanol and fertiliser plants would provide a significant further benefit to the New Zealand public under the gas-to-shore scenario.

Figure 2: Total royalties and tax paid by NZOG over the economic life of the field



Source: NZOG

Note: The dollar values presented in this graph are nominal, so have not been adjusted for inflation, nor discounted to reflect the time value of money.

- NZOG expects to contribute $15.4 billion in royalties over the 46-year economic field life under the gas-to-shore scenario ($330 million per year average) compared with $9.7 billion over the 35-year economic field life under the offshore scenario ($270 million per year average).
- To put this into context, this is between 75 percent and 95 percent of the average annual petroleum royalties in New Zealand between 2008 and 2015 of $354 million.
- In addition to royalties, NZOG estimates it will pay $16.7 billion in corporate taxes under the gas-to-shore scenario ($360 million per year average) or $10.5 billion under the offshore scenario ($300 million per year average).

Under the gas-to-shore scenario, NZOG suggest that royalties could average around $335 million annually with a further $360 million annually in corporate tax.

This reduces to $270 million in royalties and $300 million in taxes annually under the offshore scenario.

1. INTRODUCTION

The Barque field is a promising oil and gas prospect in the Canterbury Basin off the coast of Oamaru. MartinJenkins has been engaged by New Zealand Oil & Gas (NZOG), in partnership with New Zealand Trade and Enterprise and Beca, to undertake an economic impact analysis for the development of the Barque field under two possible scenarios,

The first development scenario is a predominantly offshore operation which produces oil for direct export to overseas markets. The second possible development scenario involves piping natural gas to shore for potential use in methanol and fertiliser manufacture, industrial thermal/electricity generation, or for conversion to liquid natural gas (LNG). Oil and liquid petroleum gas (LPG) would also be produced under the second scenario.

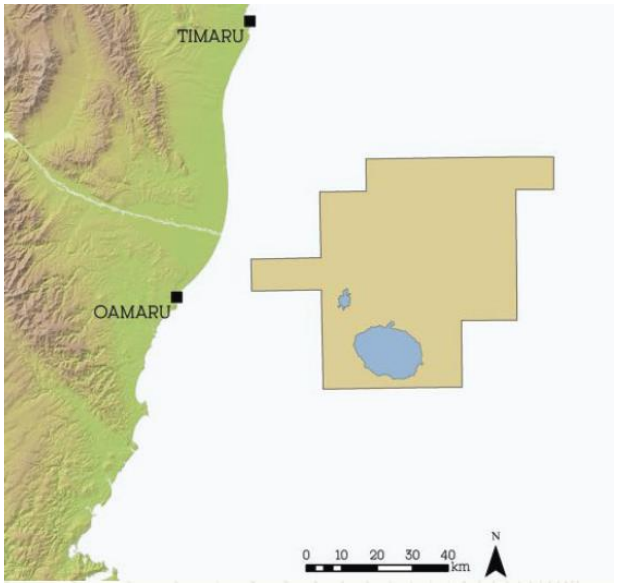
Based on initial screening, the two scenarios are similarly profitable[1] from NZOG's perspective. However, the gas-to-shore scenario would have a much larger positive impact on the regional and national economies. As there is currently no established gas market in the South Island, the gas-to-shore scenario presents opportunities to work with local industry and large manufacturers to transform the South Canterbury/Otago economy as happened in Taranaki following the Maui field discovery.

This report draws on data provided by Beca, Methanex, Coogee, Ravensdown, Fonterra and several other sector experts, to estimate the economic impact of the two field development scenarios on the region and New Zealand in terms of output, GDP and employment. It also presents the likely contribution to New Zealand's exports and the royalties generated by the developments.

Background

The Barque prospect, situated about 60 kilometres east of Oamaru, sits within the Clipper permit, which is owned by NZOG and Beach Energy (50 percent each).

Figure 3: The Barque prospect in the Clipper permit



Source: New Zealand Oil & Gas

A seismic survey, undertaken in 2014/15 suggests that it is a potentially significant field. The sub-surface geology is very promising for the extraction of gas, light oil, or a combination of both.

[1] NZOG financial modelling suggests there is five percent variation in the net present value (NPV) of each development scenario and the internal rates of return (IRR) are very similar.

Currently, NZOG is in discussions with potential international partners working towards April 2018, when the joint venture must commit to drilling an exploration well, or surrender the permit. Financial and technical capability to do so must also be proven. If the drilling commitment is secured, production could begin as early as 2025.

Method

Study area

The study area is the geographic area within which we are estimating the economic impact. We consider the economic impact at a regional and national level. The study area for the regional analysis is made up of the South Island districts of Dunedin City, Waitaki, Waimate, Timaru, Ashburton, Selwyn and Christchurch City.

Regional Input Output Multiplier Analysis

This analysis has been carried out using Regional Input-Output (I-O) Multiplier Analysis, a recognised methodology for economic impact analysis. It utilises regional and national I-O tables to calculate the overall impact of both capital and operational expenditure associated with an activity on value added in terms of gross domestic product (GDP) and employment in terms of full-time equivalent workers (FTEs). The analysis also estimates indirect and induced impacts. Regional I-O Multiplier Analysis is discussed in Appendix 1.

Activity

For each of the scenarios we have gathered information on project expenditure and timeframes from the organisations participating in the study. For each of the projects we have made a decision on how much of the activity/expenditure will occur:

- in total
- in New Zealand, and
- in the study area.

Especially in the construction phase, a large proportion of expenditure will be on imports. Similarly, more technical construction activity will likely be sourced from other areas such as Taranaki, where expertise resides.

The level of activity was based on an initial estimate by the participating organisation and our experience in other oil and gas projects. These breakdowns were also considered by industry experts to make sure that they were consistent with their understanding of those types of projects, and the capability in the regions.

The study area is not renowned for oil and gas exploration and extraction. However, it does have a relatively strong engineering sector and includes both Christchurch and Dunedin, which are the two largest service centres in the South Island.

Royalties and taxes

New Zealand's petroleum extraction royalty regime consists of the higher of either an *ad valorem* royalty (AVR) or an accounting profits royalty (APR). As such, the contribution to royalties and taxation are influenced by the exchange rate, input costs and, most significantly, global commodity prices.

As the permit holder, NZOG must pay royalties to the Crown in respect of any petroleum obtained under that permit that is sold, used in the production process, is otherwise exchanged or removed from the permit without sale, or remains unsold on the surrender, expiry or revocation of the permit. The holder of a permit must pay the higher of:

1 5 percent (AVR) of the net revenues obtained from the sale of petroleum, or

2 20 percent (APR) of the accounting profits of petroleum production.

As a New Zealand corporate, NZOG will also have to pay company tax. The maximum company income tax rate is 28 percent and taxable income is calculated after allowing for deductions against assessable income. New Zealand tax resident employees also pay tax on wages and salaries at rates up to 33 percent.

Assumptions

Timeframe

The impacts of construction activity and operational activity associated with the Barque development have been analysed for the time period 2020 to 2045, based on the assumption that a commitment to drill is made in 2018, construction begins from 2020, and oil and gas production commences in 2025. As the impact of downstream industrial gas users (the "feedstock" industry) has been included in the analysis, this time period has been defined to align with the industry standard 20-year offtake contracts for feedstock gas. As such, activity beyond the first 20 years of operation, including the impact of end-of-life decommissioning, has not been included.

Exchange rates

The analysis is based on capital and operational expenditure. To an extent, a proportion of expenditure is affected by changes in the NZ$/US$ exchange rate. We have applied an exchange rate of US$0.70 per NZ$1, which is the historic 15-year average from 2002 to 2017 (Figure 4).

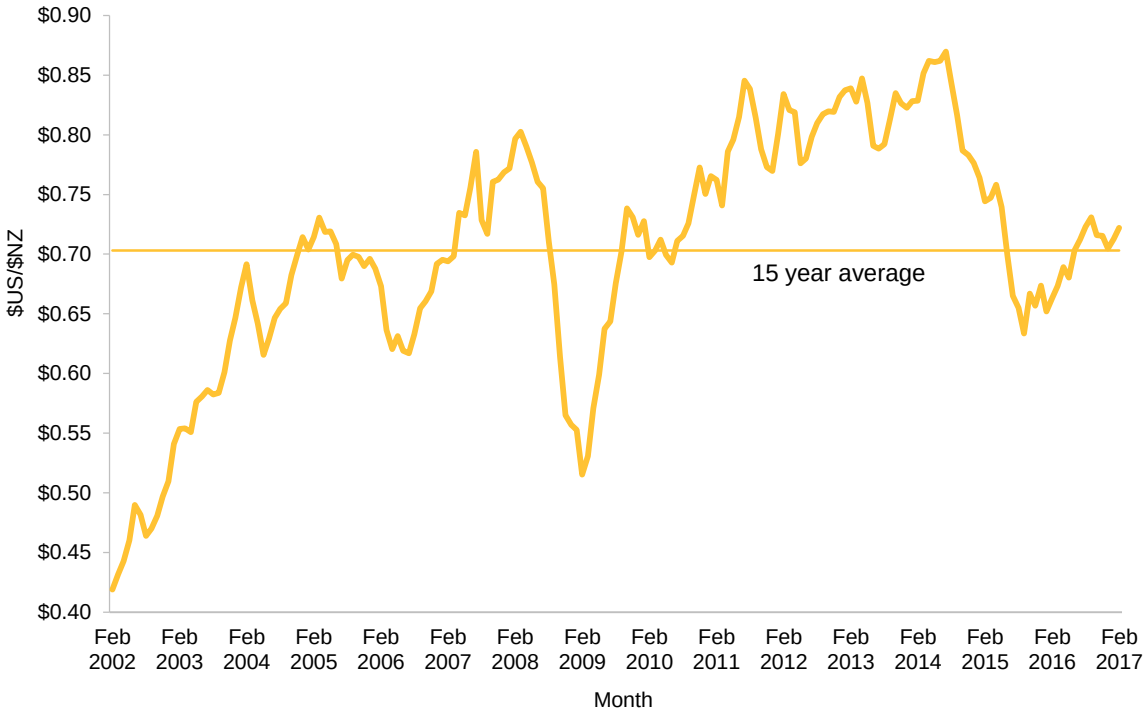
Oil price

Potential export value of oil produced by the Barque field has been calculated based on the 15-year average Brent crude oil price of NZ$100.13 (US$70.40) per barrel. This is shown in Figure 5.

Methanol price

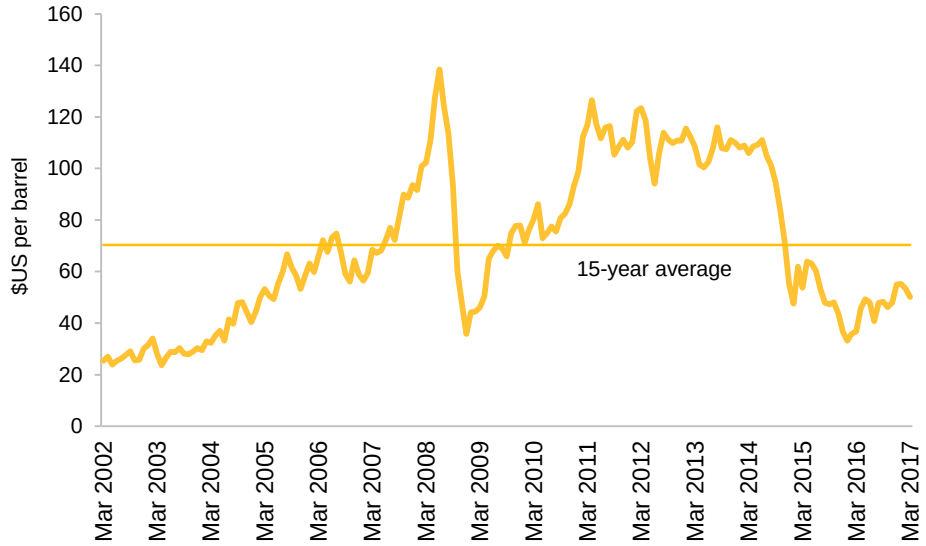
Potential export value of methanol produced using gas from the Barque field has been calculated based on Methanex's 10-year average global realised price of NZ$501.78 (US$352.80) per metric tonne (Figure 6).

Figure 4: US$/NZ$ exchange rate, 2002–2017



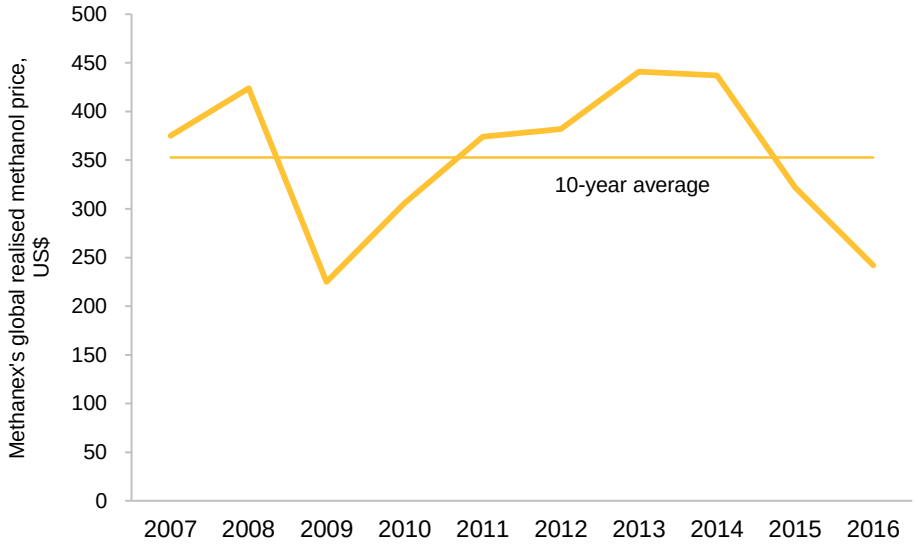
Source: Reserve Bank of New Zealand

Figure 5: Brent crude oil price, 2002-2017



Source: Quandl.com

Figure 6: Methanol price, 2007-2016 (Methanex global realised price)



Source: Methanex annual reports 2007-2016

Prices

All prices are expressed in nominal New Zealand Dollars unless otherwise noted.

Limitations

Regional I-O Multiplier Analysis limitations

Regional I-O Multiplier Analysis is a static model that does not allow for price changes resulting from activity. Further, the approach requires that economic activity applied to the model is additional to existing activity and that it does not include displaced activity from other areas of the economy.

We have attempted to ensure that we only capture additional activity through only including expenditure that occurs within the study area. Further, there is not currently an oil and gas industry or significant gas processors in the study area so displacement within the sector cannot occur. However, because of the significance of the projects, particularly during peak construction, there may well be pressure on resources, particularly labour in construction, engineering and support services. This may place upward pressure on labour costs. This could impact on industries that currently utilise that labour, resulting in either reduced or delayed activity in those industries or reduced profitability. This negative impact is not assessed in our analysis.

Accuracy of the Regional I-O Multipliers

The smaller the geographic area being assessed and the more aggregated the analysis of industries, the less accurate the model.

Our study area accounts for a relatively large portion of the South Island economy, flanked by the two main service centres - Christchurch and Dunedin. We expect most of the activity associated with the project to occur within the study area.

There is currently very limited activity in the oil and gas and gas conversion sectors in the South Island. Our approach involves assigning expenditure to industry sectors where it is likely to occur rather than channelling it through the single associated industry. This ensures that the multipliers and relationships between expenditure, GDP and output are as accurate as possible.

A second issue affecting accuracy is the quality of the regional I-O tables themselves and how they were calculated. There are no official regional I-O tables. There are several private sector providers of regional I-O tables. This analysis uses regional I-O tables supplied by Butcher Partners. Butcher Partners is a recognised supplier of regional tables that have been used in a number of economic impact analysis studies of industries and events throughout the regions of New Zealand.

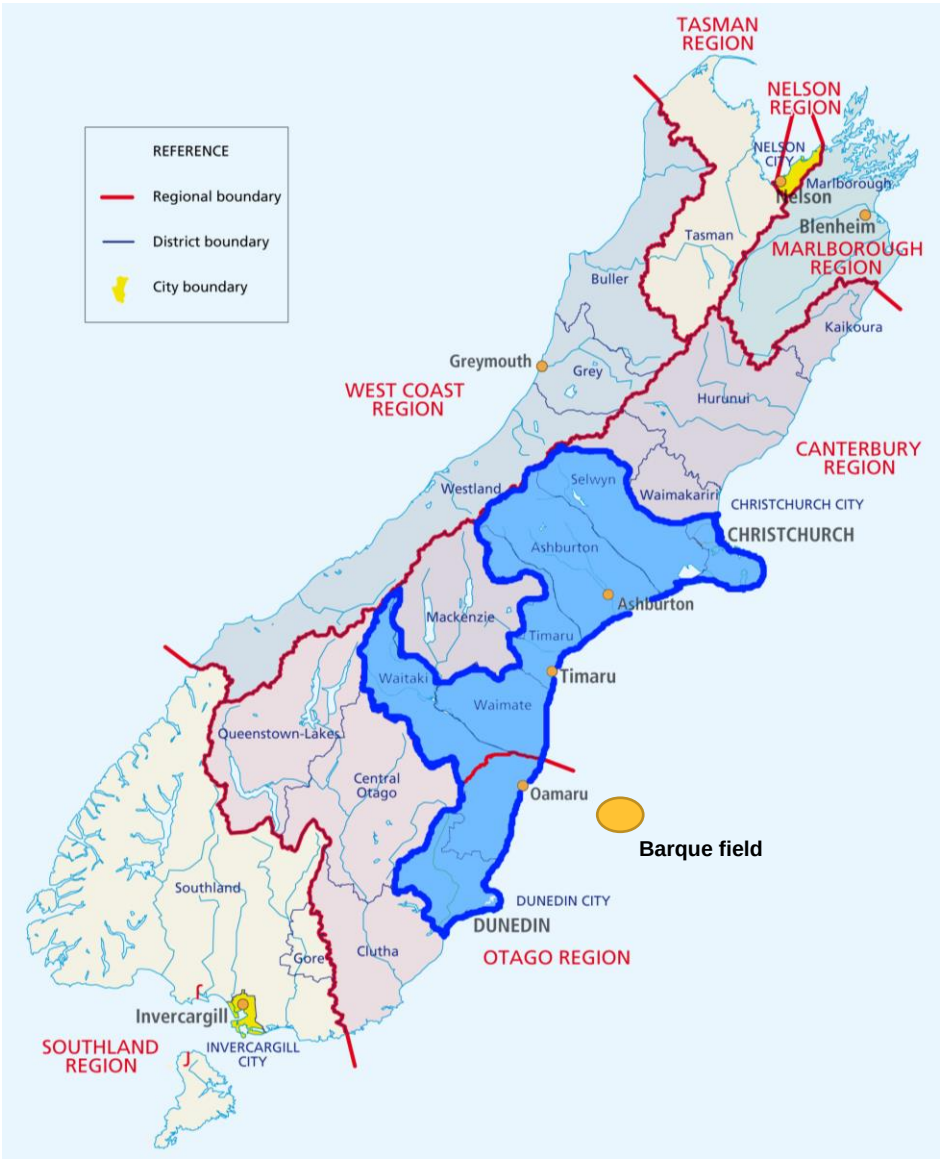
Report structure

The report is split into three sections. Section 2 defines and characterises the regional study area. Section 3 outlines the two possible scenarios for the development of the Barque field. The final section provides the results of the economic impact analysis as well as export revenue and royalties and taxes generated under each development scenario.

2. THE STUDY AREAS

The economic impact of two Barque field development scenarios has been assessed nationally and for the regional study area comprising Dunedin City, Waitaki, Waimate, Timaru, Ashburton, Selwyn and Christchurch City. This regional study area is shown in Figure 7.

Figure 7: Map of regional study area



Source: Local Government New Zealand

Christchurch and Dunedin are the main service centres in the study area, with smaller service centres in Timaru, Oamaru and Ashburton.

The total population within the study area is 668,550, with the majority of these being in Christchurch (375,000) and in Dunedin (127,000).

Table 4 and Table 5 provide three metrics of growth in the region over the last ten years – population, employment and GDP. Most districts have experienced slight growth in population over the last ten years. The exception has been the Selwyn district, which has grown relatively quickly at 4.9 percent per year. However, a large portion of this growth has been a transfer out of Christchurch City following the earthquakes.

Table 4: Study area population, 2006–2016

Area	Population 2016	%pa growth 06-16
Christchurch City	374,900	0.4%
Dunedin City	127,000	0.4%
Selwyn	56,200	4.9%
Ashburton	33,700	1.9%
Timaru	46,700	0.6%
Waimate	7,950	0.7%
Waitaki	22,100	0.7%
New Zealand	4,692,700	1.2%

Source: Statistics New Zealand

The Canterbury region's economy has seen healthy growth over the last ten years, with GDP growing at 5.3 percent per year to $33.1 billion, and employment growing faster than the New Zealand average. We note that GDP growth has been influenced by the Christchurch rebuild. A better reflection of longer term growth in the South Island economy is the Otago region, which has grown at the same rate as the national economy and in 2016 contributed $10.7 billion in GDP.

Table 5: Regional GDP and employment, 2006–2016

Region	GDP ($ million) 2016*	%pa growth 06-16	Employee count, 2016	%pa growth 07-16	Unemployment rate, % Dec 2016
Canterbury	33,108	5.3%	288,360	1.3%	3.4%
Otago	10,731	4.4%	106,870	0.8%	4.1%
Total South Island	57,537	4.9%	528,570	1.0%	3.8%
New Zealand	251,767	4.4%	2,102,340	1.0%	5.1%

Source: Statistics New Zealand – Regional GDP, Business demography statistics, Household labour force survey

Note: Employee count is a headcount of all salary and wage earners for the February reference month

*Year ended March

While unemployment is below the national average in both Canterbury and Otago, there are still a significant number of people receiving Jobseeker benefits in the study area, as shown in Table 6.

Table 6: Benefits by local authority area, December 2016

	Jobseeker	Sole Parent	Supported Living	Other Main Benefits	Total
Christchurch City	7,734	3,877	8,610	870	21,091
Dunedin City	3,656	1,249	3,091	955	8,951
Selwyn	307	227	324	31	889
Ashburton	383	305	399	19	1,106
Timaru	826	528	1,007	57	2,418
Waimate	156	83	176	8	423
Waitaki	492	230	463	13	1,198
Study area total	**13,554**	**6,499**	**14,070**	**1,953**	**36,076**

Source: Ministry of Social Development

3. FIELD DEVELOPMENT SCENARIOS

Barque field

Barque is a gas condensate prospect, located in the Canterbury Basin about 60 kilometres off the coast, east of Oamaru. Technical estimates suggest that the prospect has oil and gas of greater than 5Tcf (in-place).

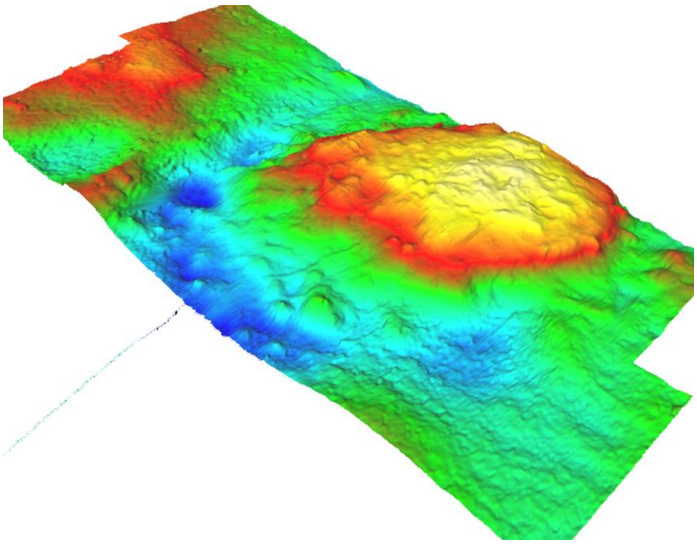
There are two main options for developing the Barque prospect:

1 condensate stripping/gas recycling scheme; offshore and liquids focused (onshore support base)

2 gas-to-shore (with condensate and/or LPG) with potential for:

- gas conversion to methanol
- gas conversion to fertiliser (urea)
- gas conversion to LNG
- gas for industrial thermal/electricity generation.

Figure 8: Barque field subsurface



Source: NZOG

Port Services

PrimePort Timaru and Port Otago (at Port Chalmers) are both possible service hubs under both development scenarios. For the scenarios assessed in this report, we have assumed PrimePort Timaru is used.

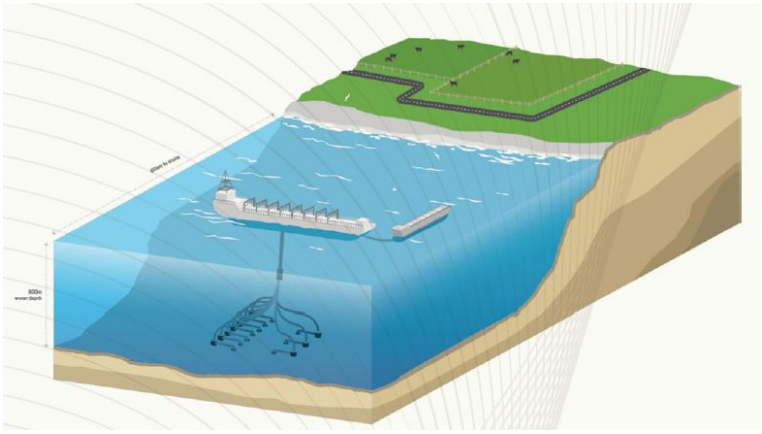
Offshore scenario

Condensate stripped and exported with gas reinjected. Offshore and liquids focused (onshore support base).

Activity

Under the offshore scenario, all processing occurs offshore. Onshore activity is limited to servicing and maintenance.

Figure 9: Offshore scenario, condensate stripping with gas recycling



Source: NZOG

Processing

Wells are drilled and fluid is extracted from the field onto a processing vessel. The condensate (oil) is separated from the fluid and the gas is re-injected (recycled) into the reservoir.

The oil is transferred from the processing vessel to oil tankers which move the oil directly to overseas markets.

It is possible for the recycled gas to be extracted again in the future. However, this has not been considered within the scenario. Likewise, LPG could be extracted from the gas, prior to re-injection, and sold separately and simultaneously to the condensate, but is not included in our analysis.

Port Services

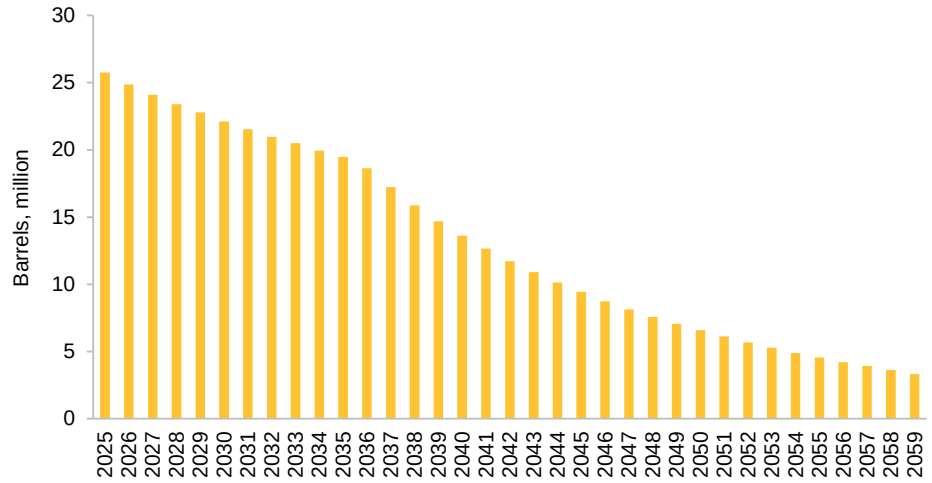
The operation will be serviced from Port Timaru, which will provide permanent berth and storage facilities for a supply ship (65 metres x 15 metres, 2,000 tonnes). This vessel will sail twice per week to service the offshore operation.

Production Profile

Production is expected to begin in 2025. Over a 35-year period, around 460 million barrels of oil are likely to be extracted.

In terms of flows, production is expected to be highest in the first year at around 25 million barrels. Production will fall over time, dropping below 5 million barrels annually from 2054. The operation will become uneconomic in 2059, when production falls below 3 million barrels. The oil production profile is shown in Figure 10.

Figure 10: Oil production profile, offshore scenario



Source: NZOG

Capital expenditure

Ten production wells and associated subsea infrastructure will be constructed to extract fluids. Condensate (oil) will be separated and processed offshore on a floating, production, storage and offloading vessel (FPSO). A dedicated berth with storage facilities will be required at the Port to service the FPSO and infrastructure.

Total capital expenditure by NZOG is expected to be $5.9 billion, of which around $2.3 billion will be spent in New Zealand. Of the $2.3 billion New Zealand spend, $1.4 billion is likely to be in the study region (Table 7). In consultation with PrimePort, $40 million capital expenditure by PrimePort has been assumed under this scenario.

Table 7: Capital expenditure, offshore scenario

$NZ m		2020	2021	2022	2023	2024	2025	2026	TOTAL
NZOG	Total	361	0	54	574	2,787	2,106	54	**5,935**
	NZ spend	175	0	28	286	827	928	28	**2,273**
	Study region spend	70	0	10	147	568	608	10	**1,412**
PrimePort	Total		0	10	14	14	2		**40**
	NZ spend		0	8	10	10	2		**30**
	Study region spend		0	2	5	5	2		**15**
Total	Total	361	0	64	588	2,801	2,108	54	**5,975**
	NZ spend	175	0	36	296	838	930	28	**2,303**
	Study region spend	70	0	12	152	573	610	10	**1,426**

Source: MartinJenkins

Operational expenditure

While production occurs offshore, the project will still require services that need to be delivered from an onshore port for the life of the operation. NZOG is expecting to incur operational expenditure of $293 million each year for the life of the project. This will include fixed costs across a number of areas including the FPSO contract, transport and logistics, onshore support, well work, fuel and business services (insurances, regulatory, marketing).

Of the $293 million annual spend, it is estimated that $218 million will be spent in New Zealand and that $167 million of the New Zealand spend will be directly in the study region (Table 8).[2]

Table 8: Ongoing operational expenditure, offshore scenario

NZ$m		Annual, 2025-2045
NZOG	Total	293
	NZ spend	218
	Study region spend	167

Source: MartinJenkins

Table 9: NZOG operational expenditure industry allocation, offshore scenario

Opex, NZ$m	Proportion of total	NZ content	Regional content
Oil and gas extraction	40%	87.2	66.7
Exploration and other mining support services	36%	78.5	60.1
Fabricated metal product manufacturing	6%	13.1	10.0
Machinery and equipment w holesaling	2%	4.4	3.3
Machinery manufacturing	4%	8.7	6.7
Road transport	4%	8.7	6.7
Scientific, architectural, and engineering services	8%	17.4	13.3
Total	100%	**218.0**	**166.9**

Source: MartinJenkins

[2] The impact of additional operational expenditure for PrimePort is captured in the model as a supplier of services to NZOG and so is not included separately.

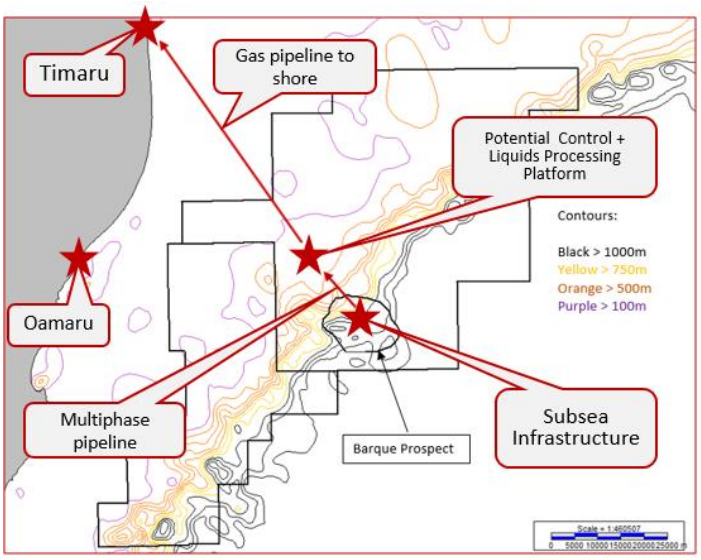
Gas-to-shore scenario

Natural gas is brought to shore and used as feedstock or as an energy source by other users. Oil produced is exported by NZOG and LPG is produced for export and the domestic market.

Activity

Under the gas-to-shore scenario, gas is extracted and piped to shore delivering a long-term, reliable gas supply for use in methanol manufacture, fertiliser/urea manufacture and industrial thermal generation. Oil and LPG are also produced.

Figure 11: Barque prospect, gas-to-shore scenario



Source: NZOG

Potential market for gas

There are numerous potential users of the natural gas produced by the Barque field. Some have existing operations in the South Island, while others have expressed interest in building plant to take advantage of a significant gas find.

In constructing this scenario, NZOG approached a number of stakeholders with potential interest in using natural gas. Methanol manufacturers Methanex and Coogee, and fertiliser manufacturer Ravensdown, suggested they would consider investing in a new plant in the South Island if a reliable, quality gas supply could be guaranteed for a minimum of 20 years. Fonterra, which has an existing dairy processing plant at Clandeboye (24 kilometres from PrimePort), expressed a similar potential interest in using natural gas for thermal generation to replace coal. Each company indicated their level of gas demand and provided details of the estimated capital expenditure required for plant construction, ongoing operational expenditure, likely direct employees and production capacity.

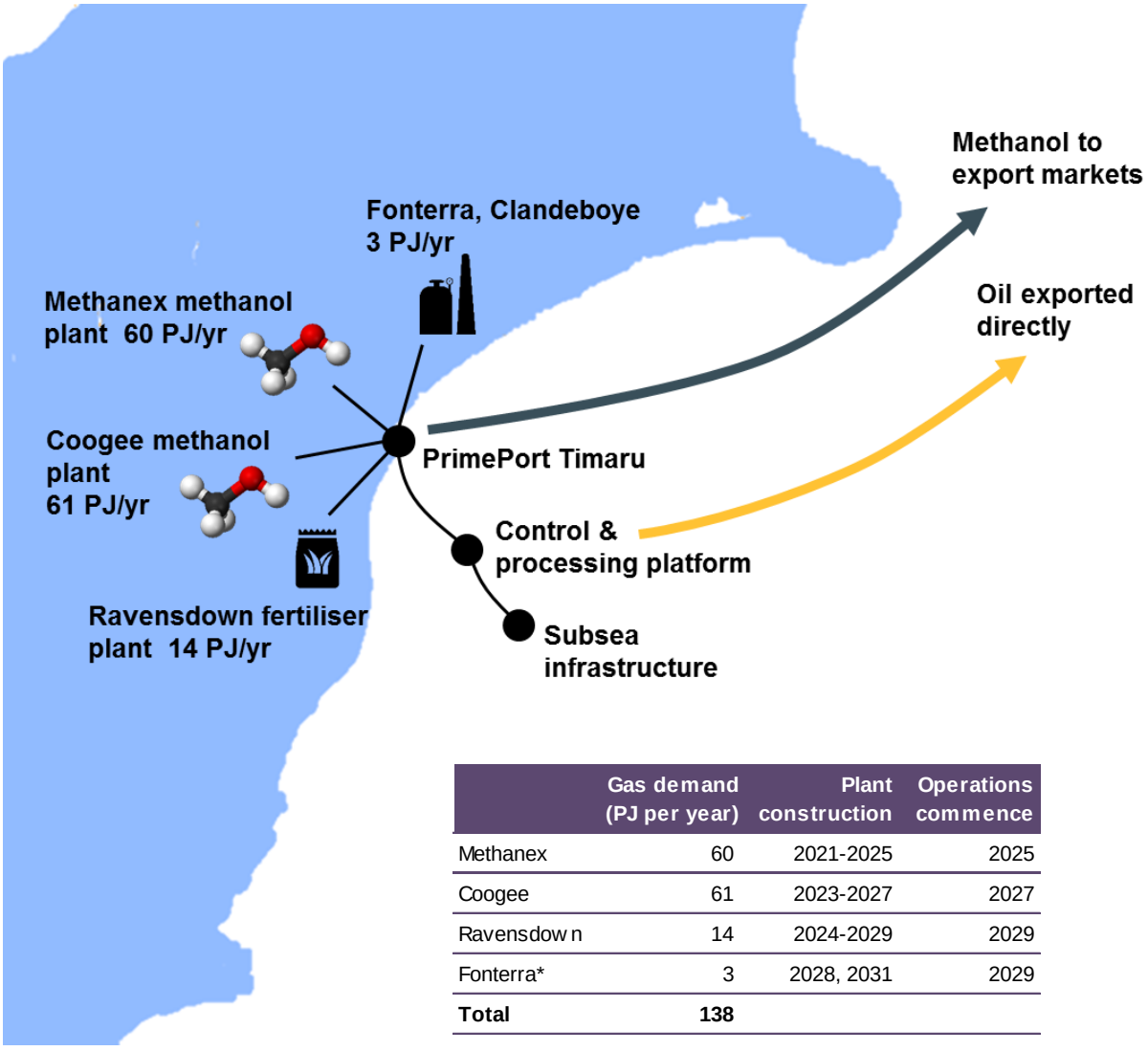
Based on the expected carbon dioxide content of the gas and the size of the field, a likely scenario would support two 1.7 million tonne/annum methanol plants as the major downstream users. Figure 12 illustrates the development scenario that the economic impact assessment is based on, and the potential level of gas demanded by each company. For this representative scenario, we have based the cost of the two methanol plants on information provided by Methanex and Coogee. However, either company (or joint venture) could build and operate both plants. In that case, some savings in

capital and operational expenditure would be realised, but this would not significantly affect the economic impacts presented in this report.[3]

We have assumed the first methanol plant is commissioned in 2025, followed by the second methanol plant commissioned in 2027, with the Ravensdown plant commencing in 2029. The scenario assumes fulfilment of 20-year offtake contracts.

It should be noted that the companies involved have not made any development commitments.

Figure 12: Gas-to-shore scenario



	Gas demand (PJ per year)	Plant construction	Operations commence
Methanex	60	2021-2025	2025
Coogee	61	2023-2027	2027
Ravensdown	14	2024-2029	2029
Fonterra*	3	2028, 2031	2029
Total	**138**		

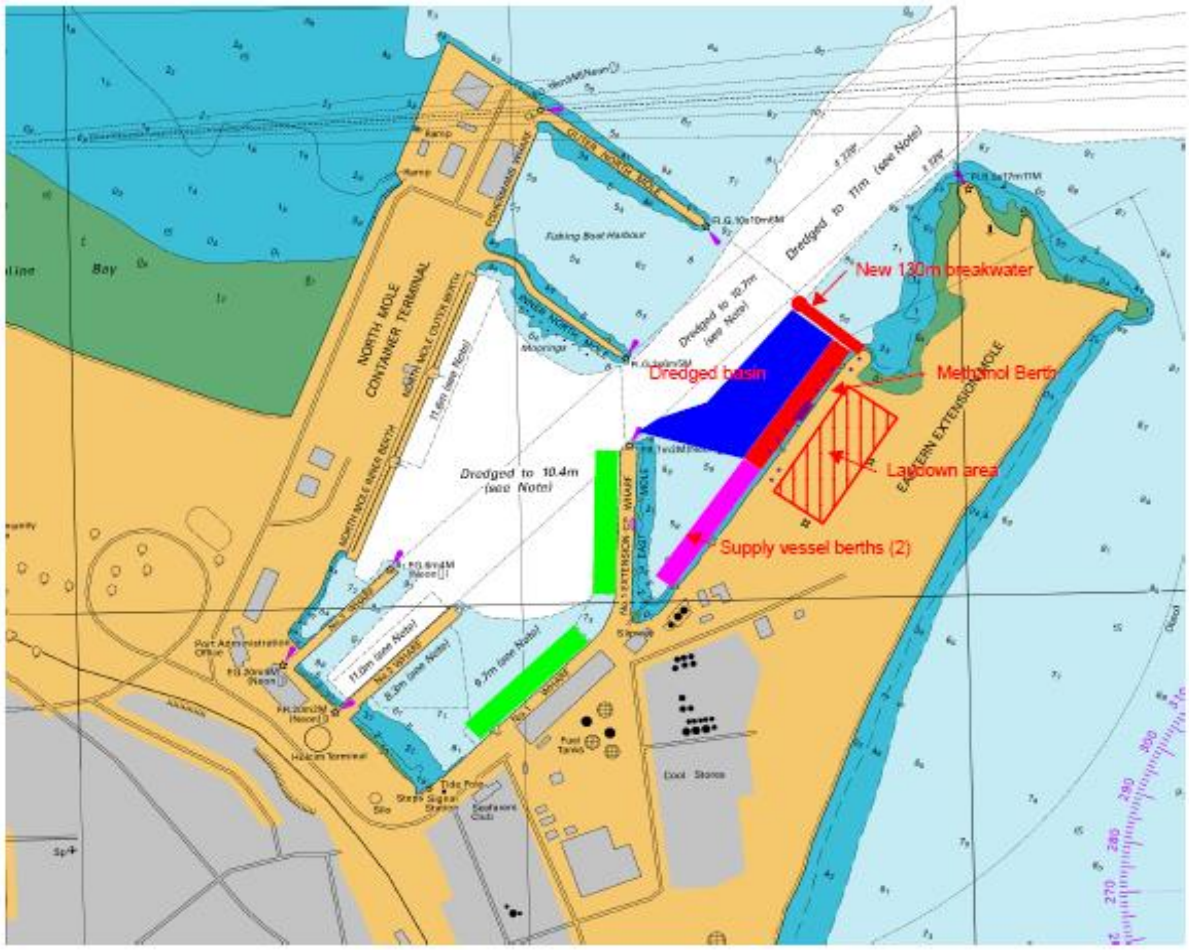
*Proposed conversions or replacement of existing coal-fired boilers to gas.

[3] We estimate the overall impacts of the gas-to-shore scenario would be reduced by about 2 percent.

Port Services

In addition to the investment required by the four companies above, significant investment will be required into port facilities to service the offshore operations and the export of methanol. In this scenario we have assumed PrimePort invests in the necessary facilities, as shown in Figure 13. It is estimated the required capital expenditure will be around $150 million, with construction activity occurring between 2021 and 2025.

Figure 13: PrimePort development, gas-to-shore scenario

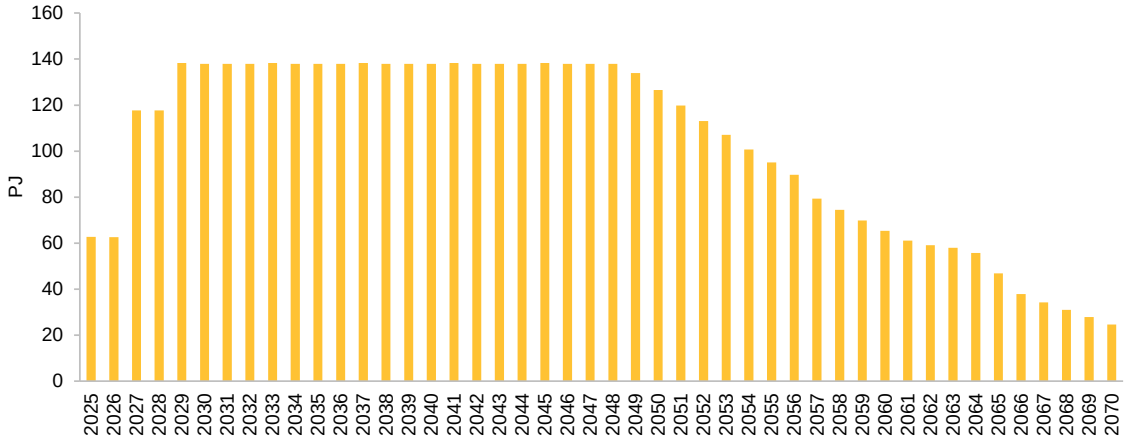


Source: Beca and PrimePort Timaru

Production Profile

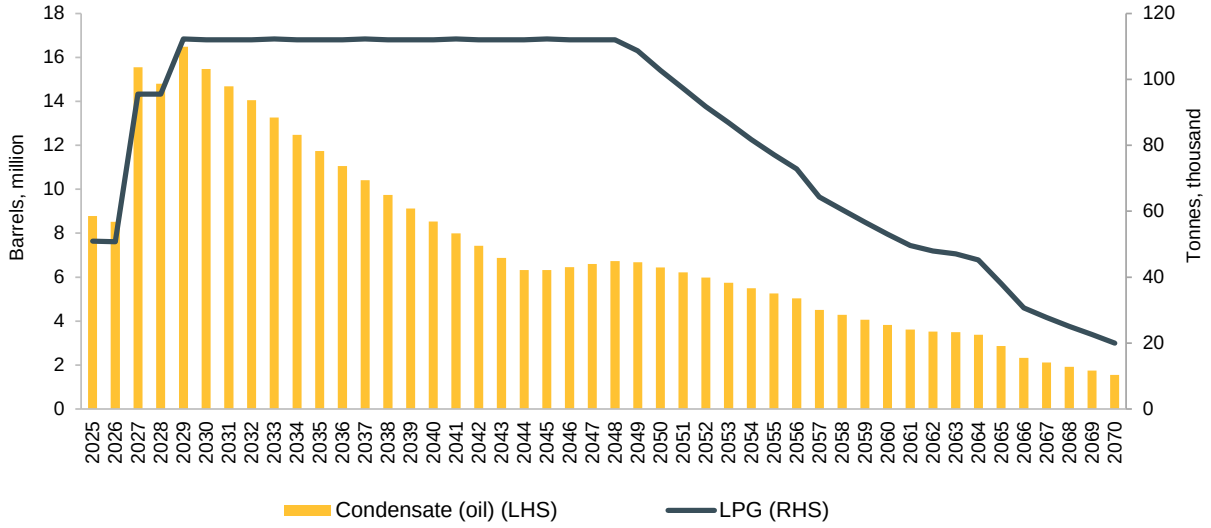
Production is expected to begin in 2025. As shown in Figure 14, gas production will ramp up over the first four years and will be sustained at 138 PJ each year from 2029 until 2048, before production output starts declining. Gas production will become uneconomic in 2070, when production falls below 25 PJ per year. Over a 46-year period, around 4,733 PJ (750 mmboe) of natural gas, 340 million barrels of oil and 31 million barrels of oil equivalent (mmboe) of LPG are likely to be extracted. LPG and oil production profiles are shown in Figure 15.

Figure 14: Natural gas production profile, gas-to-shore scenario



Source: NZOG

Figure 15: LPG and condensate production profile, gas-to-shore scenario



Source: NZOG

Construction activity

NZOG expects to begin the exploration and appraisal phase in 2020 with construction of development wells, subsea infrastructure, offshore facilities and export pipelines likely to commence in 2023. Construction of onshore facilities will take place in 2024 and 2025. Additional wells and subsea infrastructure will be built between 2029 and 2031 to come online in 2032.

Construction of port facilities and the first methanol plant will occur from 2021 to 2025. Construction of the second methanol plant will occur between 2023 and 2027, and the fertiliser plant between 2024 and 2029. Construction activity is summarised in Table 10.

Table 10: Construction activity summary, gas-to-shore scenario

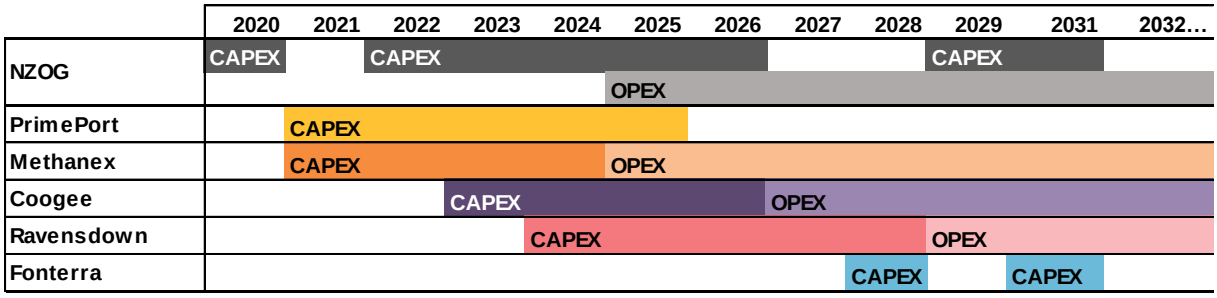
NZOG	• Ten production wells will be constructed initially with a further four wells coming online in 2032. • A control and liquids processing platform on the seafloor shelf between the production wells and the Port as shown in Figure 11. • Pipeline to transport the gas to shore where further processing plant will be constructed. • Onshore piping network to deliver gas to the various users.
PrimePort	As the existing wharfs are unlikely to be able to provide a dedicated berth for platform service vessels (65 metres x 15 metres , gross tonnage 2,000 tonnes) and the 175 metre tanker required for methanol export, we have assumed the following Port development will be required: • A new breakwater to provide protection to the loading berth. • Two new berths for platform service vessels. • Facilities for methanol export including a new berth, storage tanks, loading platform, loading arm, piping, mooring and fender dolphins. This would also need 100,000 m^3 of dredging.
Methanol plants	• Two methanol plants, each with capacity to produce around 1.7 million tonnes per year will be built in close proximity to the Port. Each will take 3-4 years to construct.
Ravensdown	• Fertiliser plant with production capacity of 650,000 tonnes per year constructed over five years.
Fonterra	• Proposed conversion or replacement of 6 existing coal-fired boilers to gas-fuelled. Assumes that one boiler is converted/replaced every three years beginning in 2028 due to life-stages of existing boilers.

Capital expenditure

Figure 16 illustrates the timing of capital expenditure and operational expenditure by each of the interested parties under the gas to shore development scenario.

Total capital expenditure by NZOG is expected to be $6 billion, of which around $2.8 billion will be spent in New Zealand, with $1.6 billion likely to be spent in the study region (Table 11). Total capital expenditure by all development participants is expected to be $12.9 billion. $6.3 billion of this is likely to be captured in New Zealand and $4.1 billion in the study region.

Figure 16: Expenditure timeline, gas-to-shore scenario



Source: MartinJenkins, based on consultation with NZOG, PrimePort, Methanex, Coogee, Fonterra and Ravensdown.

Table 11: Capital expenditure, gas-to-shore scenario

NZ$m		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	TOTAL
NZOG	Total	386	0	55	618	1,494	2,493	55	0	0	60	393	491	**6,045**
	NZ spend	187	0	29	288	642	1,129	29	0	0	31	199	250	**2,783**
	Study region spend	75	0	10	144	388	715	10	0	0	21	122	157	**1,641**
Other development participants*	Total		14	664	962	1,665	1,203	1,356	511	378	66	0	6	**6,825**
	NZ spend		7	365	524	727	621	612	339	204	66	0	4	**3,469**
	Study region spend		3	150	357	450	528	460	278	141	66	0	2	**2,435**
Total	Total	386	14	719	1,580	3,159	3,695	1,411	511	378	127	393	497	**12,870**
	NZ spend	187	7	394	811	1,370	1,750	641	339	204	98	199	253	**6,252**
	Study region spend	75	3	160	501	838	1,243	469	278	141	87	122	158	**4,076**

Source: MartinJenkins, based on data provided by NZOG and the other development participants.

*PrimePort, Methanex, Coogee, Ravensdown and Fonterra

Operational expenditure

Operational activity

NZOG, and the Methanex, Coogee and Ravensdown plants will have ongoing operational activity. Services will be provided though PrimePort (this activity is captured in the impact analysis as a supplier to NZOG and the methanol producers).

Table 12 shows the number of employees each company expects to employ directly in day-to-day operations, excluding contractors.

Table 12: People employed in plant operations

	People employed in plant operations* (FTEs)
NZOG	36
Methanex	100
Coogee	80-100
Ravensdown	52

Source: MartinJenkins, based on estimates provided directly by the organisations.

*excludes contractors

NZOG is expecting activity to include onshore and offshore operations, plant studies, transport, logistics, fuel and business services (insurances, regulatory, marketing). NZOG expect to spend $268 million each year beginning in 2025 in ongoing operational expenditure, (Table 13). We estimate that $215 million of that will be spent in New Zealand, and of that, $182 million will be in the study region. The breakdown of this expenditure by industry is shown in Table 14.[4]

Activity from Methanex, Coogee and Ravensdown will include personnel, electricity, transport, plant maintenance, other raw materials and business services. Excluding the cost of supply gas to avoid double-counting economic activity, Methanex, Coogee and Ravensdown together expect operational expenditure of around $295 million each year. Some components, such as insurance, catalysts, chemicals and specialist services will not be purchased in New Zealand. Based on a breakdown of operational expenditure received from each of the three companies, in aggregate we estimate $219 million (74 percent) will be spent in New Zealand and $169 million (57 percent) will be spent in the study area[5]. This is shown in Table 15.

From 2029 onwards, NZOG, Methanex, Coogee and Ravensdown are together expected to spend $563 million each year (excluding the cost of gas), of which $434 million is likely to be captured in New Zealand and $351 million in the study region (Table 13).

[4] Assumptions regarding the proportion of NZOG operational expenditure spent regionally and nationally are provided in Appendix 1, Table 40

[5] Refer to Appendix 1 Table 41 for the assumptions underlying this estimate.

Table 13: Ongoing operational expenditure, gas-to-shore scenario

NZ$m		Annual average 2025-2028	Annual 2029-2045
NZOG	Total	268	**268**
	NZ spend	215	**215**
	Study region spend	182	**182**
Other development participants*	Total	128	**295**
	NZ spend	95	**219**
	Study region spend	75	**169**
Total	Total	396	**563**
	NZ spend	310	**434**
	Study region spend	257	**351**

Source: MartinJenkins

*Methanex, Coogee and Ravensdown

Excludes gas cost to avoid double counting

This expenditure has been assigned to the industry where it is most likely to occur. The breakdown of expenditure into industries nationally and in the study area is shown in Table 14 and Table 15.

Table 14: NZOG operational expenditure industry allocation, gas-to-shore scenario

Opex, NZ$m	Proportion of total	NZ content	Regional content
Oil and gas extraction	40%	86.1	72.8
Exploration and other mining support services	36%	77.5	65.5
Fabricated metal product manufacturing	6%	12.9	10.9
Machinery and equipment w holesaling	2%	4.3	3.6
Machinery manufacturing	4%	8.6	7.3
Road transport	4%	8.6	7.3
Scientific, architectural, and engineering services	8%	17.2	14.6
Total	100%	**215.3**	**182.0**

Source: MartinJenkins

Table 15: Methanex, Coogee and Ravensdown aggregate operational expenditure industry allocation, gas-to-shore scenario, 2029–2045

Opex, NZ$m	NZ content	Regional content
Electricity generation and on-selling	38.0	38.0
Construction services	11.2	6.3
Electronic and electrical equipment manufacturing	11.2	6.3
Fabricated metal product manufacturing	33.6	19.0
Legal and accounting services	1.2	0.0
Machinery and equipment w holesaling	22.4	12.7
Other transport	20.4	20.4
Heavy and civil engineering construction	22.4	12.7
Scientific, architectural, and engineering services	11.2	6.3
Chemical manufacturing*	47.4	47.4
Total	**219.1**	**169.2**

Source: MartinJenkins

*Includes two sub-industries: 1) Basic chemical and basic polymer manufacturing, and 2) Fertiliser and pesticide manufacturing.

4. ECONOMIC IMPACT ANALYSIS

This section outlines the impact on the regional and national economies arising from the two development scenarios defined above. The economic impact analysis does not include the impact of company taxes and royalties collected by the government, nor the additional economic benefits to New Zealand of increased exports. These are presented separately.

Regional economic impact

The impact on the regional area comprising Dunedin City, Waitaki, Waimate, Timaru, Ashburton, Selwyn and Christchurch City is presented in this section. References to the "region" refer to this study area.

Summary

Table 16 presents the regional economic impacts of the Barque field under the two scenarios, offshore and gas-to-shore, for the construction phase and operational phase.

Table 16: Regional economic impact of Barque field development scenarios

	Construction phase			Ongoing operations		
	Direct expenditure ($m)	GDP* ($m)	Employment* (FTEs)	Direct expenditure ($m)	GDP* ($m)	Employment* (FTEs)
	Average annual[1]			Average annual		
Offshore scenario	204	186	1,936	167	141	947
Gas-to-shore scenario	340	307	3,107	333	269	1,983

Source: MartinJenkins

*Total impact including indirect and induced effects

1. Construction period: Offshore scenario (2020 – 2026), Gas-to-shore scenario (2020 – 2031)

Construction phase

Under the offshore scenario, over the seven-year construction phase, we estimate NZOG and PrimePort will spend an average of $204 million each year directly on activities and businesses based in the region. The total regional economic impact of this direct spend is expected to be $186 million in GDP and 1,940 FTE jobs each year. This includes indirect and induced impacts as the expenditure flows through the regional economy.

In comparison, over the 12-year construction phase under the gas-to-shore scenario, we estimate NZOG, PrimePort, Methanex, Coogee, Ravensdown and Fonterra will spend an average of $340

million per year directly in the region. This direct spend is expected to generate total economic impact of $307 million in GDP and 3,100 FTE jobs annually in the region.

Ongoing operations

Between 2025 and 2045, under the offshore scenario NZOG expect to spend $167 million each year on activities and businesses in the regional economy, generating $141 million in GDP and supporting 950 FTE jobs, taking into account indirect and induced impacts.

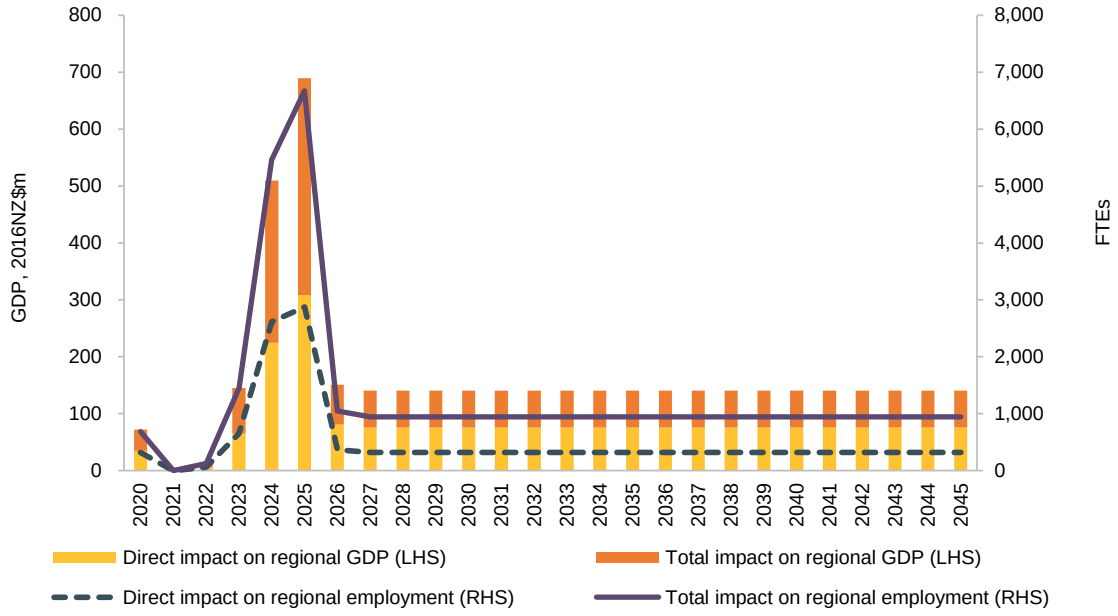
Over the same time period, under the gas-to-shore scenario, we estimate NZOG, the methanol manufacturers and Ravensdown will together spend $333 million on average each year in the regional economy on ongoing operational activity. This is expected to generate $269 million in regional GDP and 1,980 FTE jobs each year for 20 years (Table 16).

Impact of construction and operations combined, 2025–2045

Figure 17 and Figure 18 show the direct and total economic impact of each scenario in terms of GDP and jobs over the analysis timeframe. At the peak period of activity in 2025, we expect the Barque field development to directly contribute $550 million in GDP to the regional economy and directly support 5,100 FTE jobs under the gas-to-shore scenario, compared to $310 million in GDP and 2,900 FTE jobs under the offshore scenario.

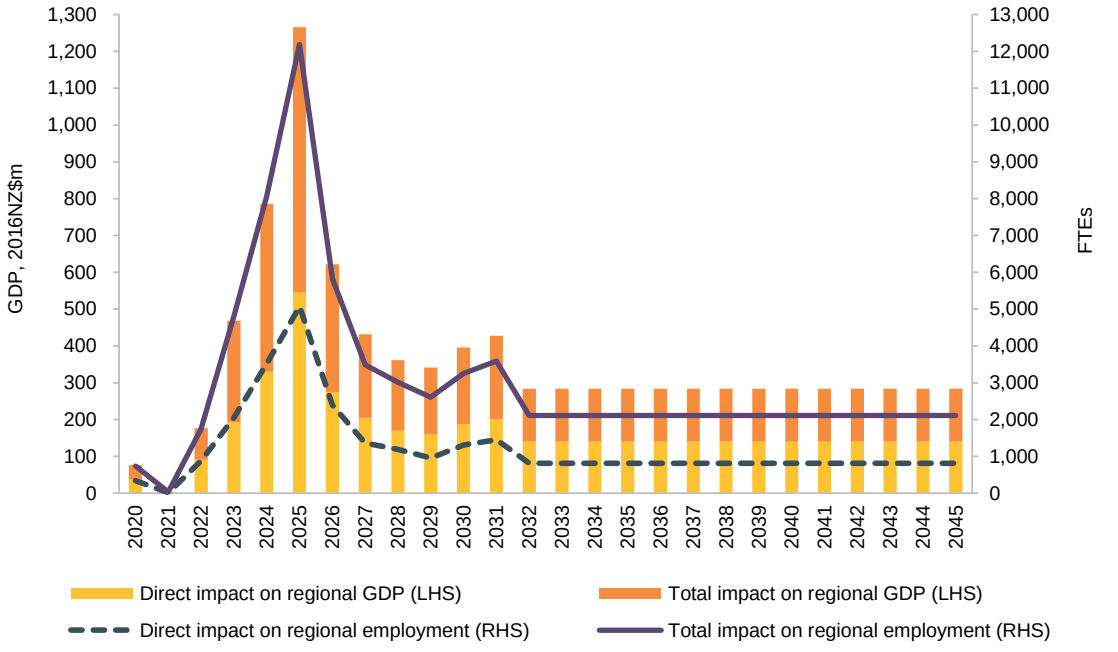
When indirect and induced impacts are taken into account, in 2025, the gas-to-shore scenario will generate about $1.27 billion in regional GDP and 12,200 FTE jobs, while the offshore scenario is estimated to generate $690 million in regional GDP and support 6,600 FTE jobs.

Figure 17: Offshore scenario: Regional economic impact from construction and operations, 2020–2045



Source: MartinJenkins

Figure 18: Gas-to-shore scenario: Regional economic impact from construction and operations, 2020–2045



Source: MartinJenkins

Construction phase

Activity (initial expenditure)

Under the offshore scenario, we expect total capital expenditure of $1.43 billion in the regional economy between 2020 and 2026, or $204 million each year on average), compared to $4.01 billion between 2020 and 2031 under the gas-to-shore scenario, or $340 million each year on average. This is shown in Table 17.

Table 17: Capital expenditure within the regional study area over the construction phase

NZ$m	Expenditure over whole construction phase		Average annual expenditure	
	Offshore scenario 2020-2026	Gas-to-shore scenario 2020-2031	Offshore scenario 2020-2026	Gas-to-shore scenario 2020-2031
NZOG	1,412	1,641	202	137
Other development participants[1]	15	2,435	2	203
Total expenditure	**1,426**	**4,076**	**204**	**340**

Source: MartinJenkins

1. For the offshore scenario this comprises PrimePort only. For the gas-to-shore scenario this includes PrimePort, Methanex, Coogee, Ravensdown and Fonterra.

GDP impact

As shown in Table 18, under the offshore scenario construction activity will directly contribute about $569 million to regional GDP ($81 million each year on average). Including indirect and induced impacts, the offshore scenario will contribute $1.30 billion in GDP to the regional economy, or $186 million each year on average.

Under the gas-to-shore scenario, construction activity is expected to directly contribute $1.55 billion to regional GDP ($129 million each year on average). Including indirect and induced impacts, the regional GDP contribution will be around $3.68 billion between 2020 and 2031, an average of $307 million each year.

Table 18: Impact of construction activity on regional GDP

NZ$m	GDP impact	Impact over whole construction phase		Average annual impact	
		Offshore scenario 2020-2026	Gas-to-shore scenario 2020-2031	Offshore scenario 2020-2026	Gas-to-shore scenario 2020-2031
NZOG	Direct	563	637	80	53
	Total[1]	1,285	1,506	184	125
Other development participants[2]	Direct	6	913	1	76
	Total[1]	14	2,178	2	182
Total activity	**Direct**	**569**	**1,550**	**81**	**129**
	Total[1]	**1,299**	**3,684**	**186**	**307**

Source: MartinJenkins

1. Includes indirect and induced impacts

2. For the offshore scenario this comprises PrimePort only. For the gas-to-shore scenario this includes PrimePort, Methanex, Coogee, Ravensdown and Fonterra.

Employment impact

Between 2020 and 2026, we estimate construction activity under the offshore scenario will support 13,550 FTE jobs in the region, including indirect and induced impacts, at an average of 1,940 FTE jobs each year (see Table 19).

Between 2020 and 2031, we expect construction activity under the gas-to-shore scenario will support 37,280 FTE jobs in the region, including indirect and induced impacts, at an average of 3,100 FTE jobs each year.

Table 19: Impact of construction activity on regional employment

FTEs	Employment impact	Jobs created over whole construction phase		Average annual jobs created	
		Offshore scenario 2020-2026	Gas-to-shore scenario 2020-2031	Offshore scenario 2020-2026	Gas-to-shore scenario 2020-2031
NZOG	Direct	6,187	6,609	884	551
	Total[1]	13,404	15,319	1,915	1,277
Other development participants[2]	Direct	64	9,428	9	786
	Total[1]	145	21,965	21	1,830
Total activity	**Direct**	**6,251**	**16,037**	**893**	**1,336**
	Total[1]	**13,549**	**37,284**	**1,936**	**3,107**

Source: MartinJenkins

1. Includes indirect and induced impacts

2. For the offshore scenario this comprises PrimePort only. For the gas-to-shore scenario this includes PrimePort, Methanex, Coogee, Ravensdown and Fonterra

Note: Estimate of direct employment includes contractors

Ongoing operations

Activity (initial expenditure)

Annual operational expenditure in the region is expected to be $167 million each year under the offshore scenario, compared with $333 million each year under the gas-to-shore scenario. This is shown in Table 20.

Table 20: Average annual operational expenditure within the regional study area, 2025–2045

NZ$m	Annual operational expenditure[1] 2025-2045	
	Offshore scenario	Gas-to-shore scenario
NZOG	167	182
Other development participants[2]	0	151
Total expenditure	**167**	**333**

Source: MartinJenkins

1. Averaged over 2025-2045

2. For the gas-to-shore scenario this includes Methanex, Coogee and Ravensdown

GDP impact

Including indirect and induced impacts, we estimate ongoing operational activity will contribute $141 million in annual GDP to the regional economy under the offshore scenario, compared with $269 million under the gas-to-shore scenario. This is shown in Table 21.

Table 21: Impact of ongoing operations on regional GDP

NZ$m	GDP impact	Annual impact of operations[1] 2025-2045	
		Offshore scenario	Gas-to-shore scenario
NZOG	**Direct**	76	83
	Total[2]	141	153
Other development participants[3]	**Direct**	0	51
	Total[2]	0	115
Total activity	**Direct**	**76**	**134**
	Total[2]	**141**	**269**

Source: MartinJenkins

1. Averaged over 2025-2045

2. Includes indirect and induced impacts

3. For the gas-to-shore scenario this includes Methanex, Coogee and Ravensdown

Employment impact

Under the offshore scenario, we expect operational activity to support around 950 FTE jobs in the study area each year, compared to 1,980 FTE jobs under the gas-to-shore scenario (including indirect and induced impacts). Employment impacts from ongoing operations is shown in Table 22.

Table 22: Impact of ongoing operations on regional employment

FTEs	Employment impact	Annual jobs created by operations[1] 2025-2045	
		Offshore scenario	Gas-to-shore scenario
NZOG	Direct	318	347
	Total[2]	947	1,032
Other development participants[3]	Direct	0	414
	Total[2]	0	950
Total activity	**Direct**	**318**	**761**
	Total[2]	**947**	**1,983**

Source: MartinJenkins

1. Averaged over 2025-2045

2. Includes indirect and induced impacts

3. For the gas-to-shore scenario this includes Methanex, Coogee and Ravensdown

Note: Estimate of direct employment includes contractors

New Zealand economic impact

The impacts on the national economy are presented in this section. These figures include the regional impacts presented above.

Summary

Table 23: National economic impact of Barque field development scenarios

	Construction phase			Ongoing operations		
	Direct expenditure ($m)	GDP* ($m)	Employment* (FTEs)	Direct expenditure ($m)	GDP* ($m)	Employment* (FTEs)
	Average annual[1]			Average annual		
Offshore scenario	329	372	3,648	218	236	1,566
Gas-to-shore scenario	521	591	5,741	411	446	3,215

Source: MartinJenkins

* Total impact including indirect and induced effects

1. Construction period: Offshore scenario (2020 - 2026), Gas-to-shore scenario (2020 - 2031)

Construction phase

Under the offshore scenario, over the seven-year construction phase, we estimate NZOG and PrimePort will spend an average of $329 million each year directly on activities and businesses based in New Zealand. The total economic impact of this direct spend is expected to be $372 million in GDP and 3,650 FTE jobs each year (Table 23). This includes indirect an induced impacts as the expenditure flows through the national economy.

In comparison, over the 12-year construction phase under the gas-to-shore scenario, we estimate NZOG, PrimePort, Methanex, Coogee, Ravensdown and Fonterra will spend an average of $521 million each year directly in New Zealand. This direct spend is expected to generate total economic impact of $591 million in GDP and 5,740 FTE jobs annually nationwide.

Ongoing operations

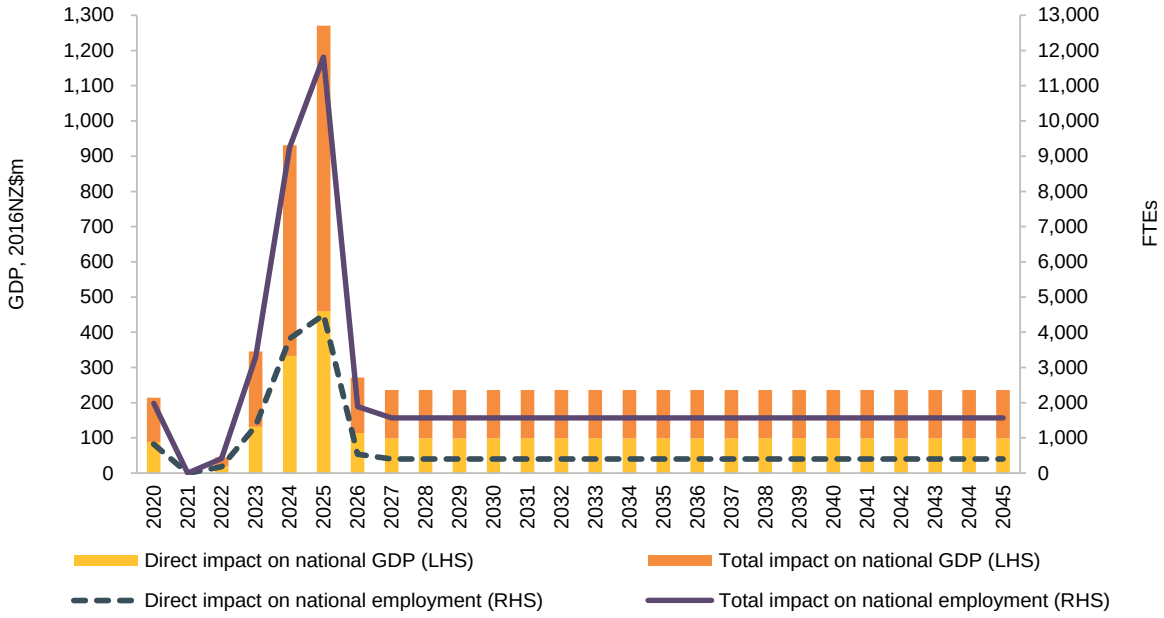
Between 2025 and 2045, under the offshore scenario NZOG expect to spend $218 million each year on activities and businesses in New Zealand, generating $236 million in GDP and supporting 1,565 FTE jobs, taking into account indirect and induced impacts.

Over the same time period, under the gas-to-shore scenario, we estimate NZOG, the methanol manufacturers and Ravensdown will together spend $411 million on average each year in New Zealand on ongoing operational activity. This is expected to generate $446 million in national GDP and 3,220 FTE jobs each year for 20 years (Table 23).

Impact of construction and operations combined, 2025–2045

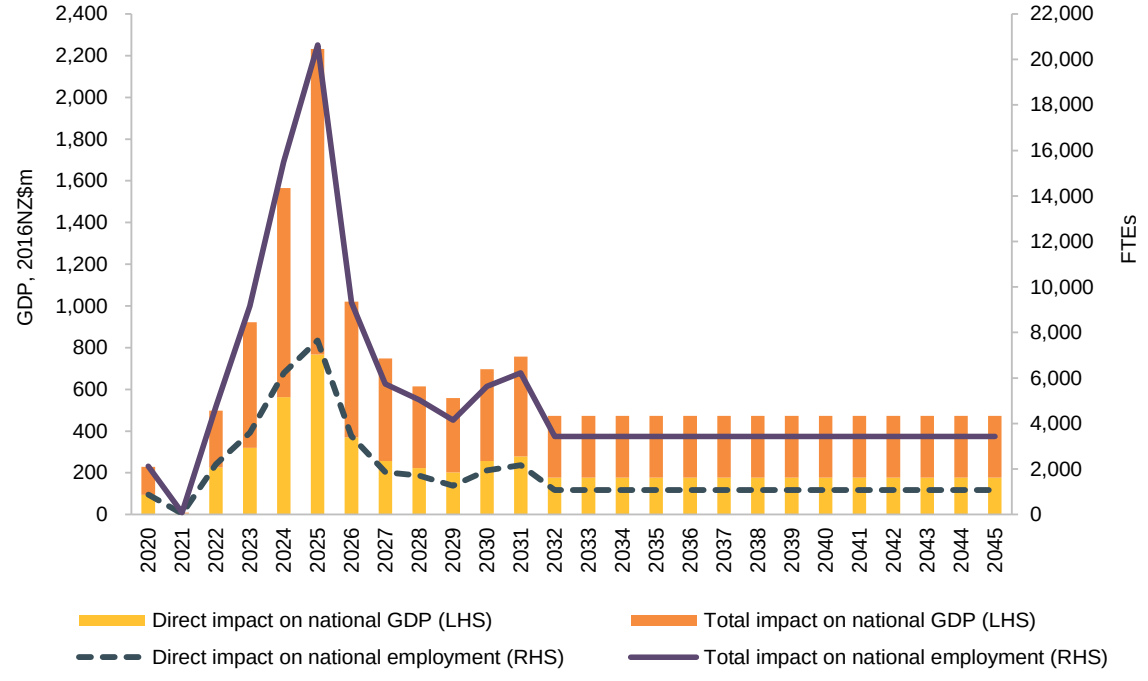
Figure 19 and Figure 20 show the direct and total economic impact of each scenario in terms of GDP and jobs over the analysis timeframe. At the peak period of activity in 2025, the Barque field development is expected to directly contribute $770 million in GDP to New Zealand's economy and directly create 7,650 FTE jobs under the gas-to-shore scenario. This compares to an estimated $460 million in GDP and 4,500 FTE jobs under the offshore scenario. When indirect and induced impacts are taken into account, in 2025, the gas-to-shore scenario will generate about $2.23 billion in national GDP and 20,600 FTE jobs, while the offshore scenario is estimated to generate $1.27 billion in GDP and support 11,800 FTE jobs nationwide.

Figure 19: Offshore scenario: National economic impact from construction and operations, 2020–2045



Source: MartinJenkins

Figure 20: Gas-to-shore scenario: National economic impact from construction and operations, 2020–2045



Source: MartinJenkins

Comparison with the Taranaki oil and gas sector

Table 24 provides a comparison of the enduring impact of operations (excluding construction activity impacts) under the offshore scenario with the impact of the whole oil and gas sector in Taranaki, as calculated in 2013 for the "Wealth Beneath our Feet – The next steps" report. The Taranaki figures presented include exploration activity as well as production activity so should not be viewed as a direct comparison, but they provide some context to the impacts calculated in this analysis, as well as an idea of the potential impact a fully developed oil and gas sector could have in the Canterbury/Otago region.

Table 24: Annual impact of ongoing operations from the offshore scenario relative to the Taranaki oil & gas sector

	Regional economic impact		National economic impact	
	Barque field development	Taranaki oil & gas sector[1]	Barque field development	Taranaki oil & gas sector[1]
Direct expenditure ($m)	167	1,509	218	1,577
GDP* ($m)	141	1,006	236	1,742
Employment* (FTEs)	947	5,941	1,566	8,481

Sources: MartinJenkins & Wealth Beneath our Feet - The next steps

1. Estimated in 2013, includes production and exploration activity

*Total impact including indirect and induced effects

Table 25 compares the enduring impact of NZOG, Methanex, Coogee and Ravensdown operations with the impact of the oil and gas sector and feedstock industry in Taranaki. Again, it is for reference only and should not be viewed as a direct comparison. The higher employment to GDP ratio in the Barque study is due to the different mix of industries that expenditure has been allocated to.

Table 25: Annual impact of ongoing operations from the gas-to-shore scenario relative to the Taranaki oil & gas sector and feedstock industry

	Regional economic impact		National economic impact	
	Barque field development[1]	Taranaki[2]	Barque field development[1]	Taranaki[2]
Direct expenditure ($m)	333	2,522	411	2,593
GDP* ($m)	269	1,574	446	2,785
Employment* (FTEs)	1,983	7,072	3,215	11,718

Sources: MartinJenkins & Wealth Beneath our Feet - The next steps

1. Average annual impact of ongoing operational expenditure (2025-2045)

2. Estimated in 2013. Includes production, exploration and activity of the feedstock industry in the region

*Total impact including indirect and induced effects

Construction phase

Activity (initial expenditure)

Under the offshore scenario, we expect total capital expenditure of $2.30 billion in New Zealand between 2020 and 2026 ($329 million each year on average), compared to $6.25 billion between 2020 and 2031 under the gas-to-shore scenario ($521 million each year on average). This is shown in Table 26.

Table 26: Capital expenditure within New Zealand over the construction phase

NZ$m	Expenditure over whole construction phase		Average annual expenditure	
	Offshore scenario 2020-2026	Gas-to-shore scenario 2020-2031	Offshore scenario 2020-2026	Gas-to-shore scenario 2020-2031
NZOG	2,273	2,783	325	232
Other development participants[1]	30	3,469	4	289
Total expenditure	2,303	6,252	329	521

Source: MartinJenkins

1. For the offshore scenario this comprises PrimePort only. For the gas-to-shore scenario this includes PrimePort, Methanex, Coogee, Ravensdown and Fonterra.

GDP impact

As shown in Table 27, under the offshore scenario construction activity will directly create about $948 million in national GDP ($135 million per year on average). Including indirect and induced impacts, the offshore scenario will contribute $2.61 billion in GDP to New Zealand's economy ($372 million each year on average).

Under the gas-to-shore scenario, construction activity is expected to directly contribute $2.51 billion to national GDP ($209 million each year on average). Including indirect and induced impacts, the contribution to New Zealand's GDP will be around $7.09 billion between 2020 and 2031 (an average of $591 million each year).

Table 27: Impact of construction activity on national GDP

NZ$m	GDP impact	Impact over whole construction phase		Average annual impact	
		Offshore scenario 2020-2026	Gas-to-shore scenario 2020-2031	Offshore scenario 2020-2026	Gas-to-shore scenario 2020-2031
NZOG	Direct	935	1,127	134	94
	Total[1]	2,570	3,158	367	263
Other development participants[2]	Direct	13	1,381	2	115
	Total[1]	35	3,933	5	328
Total activity	Direct	948	2,509	135	209
	Total[1]	2,605	7,091	372	591

Source: MartinJenkins

1. Includes indirect and induced impacts.

2. For the offshore scenario this comprises PrimePort only. For the gas-to-shore scenario this includes PrimePort, Methanex, Coogee, Ravensdown and Fonterra.

Employment impact

Between 2020 and 2026, we estimate construction activity under the offshore scenario will support 25,530 FTE jobs in New Zealand, including indirect and induced impacts, at an average of 3,650 FTE jobs each year (see Table 28).

Between 2020 and 2031, we expect construction activity under the gas-to-shore scenario will support 68,890 FTE jobs in New Zealand, including indirect and induced impacts, at an average of 5,740 FTE jobs per year.

Table 28: Impact of construction activity on national employment

FTEs	Employment impact	Jobs created over whole construction phase		Average annual jobs created	
		Offshore scenario 2020-2026	Gas-to-shore scenario 2020-2031	Offshore scenario 2020-2026	Gas-to-shore scenario 2020-2031
NZOG	Direct	10,260	12,062	1,466	1,005
	Total[1]	25,184	30,721	3,598	2,560
Other development participants[2]	Direct	144	15,113	21	1,259
	Total[1]	349	38,171	50	3,181
Total activity	Direct	10,405	27,175	1,486	2,265
	Total[1]	25,533	68,893	3,648	5,741

Source: MartinJenkins

1. Includes indirect and induced impacts.

2. For the offshore scenario this comprises PrimePort only. For the gas-to-shore scenario this includes PrimePort, Methanex, Coogee, Ravensdown and Fonterra.

Note: Estimate of direct employment includes contractors.

Ongoing operations

Activity (initial expenditure)

Annual operational expenditure in New Zealand is expected to be $218 million per year under the offshore scenario, compared with $411 million each year under the gas-to-shore scenario (Table 29).

Table 29: Average annual operational expenditure within New Zealand, 2025–2045

NZ$m	Annual operational expenditure[1] 2025-2045	
	Offshore scenario	Gas-to-shore scenario
NZOG	218	215
Other development participants[2]	0	195
Total expenditure	218	411

Source: MartinJenkins

1. Averaged over 2025–2045
2. For the gas-to-shore scenario this includes Methanex, Coogee and Ravensdown

GDP impact

Including indirect and induced impacts, we estimate ongoing operational activity will contribute $236 million in annual GDP to the national economy under the offshore scenario, compared with $446 million under the gas-to-shore scenario (Table 30).

Table 30: Impact of ongoing operations on national GDP

NZ$m	GDP impact	Annual impact of operations[1] 2025-2045	
		Offshore scenario	Gas-to-shore scenario
NZOG	Direct	99	98
	Total[2]	236	234
Other development participants[3]	Direct	0	71
	Total[2]	0	213
Total activity	Direct	99	168
	Total[2]	236	446

Source: MartinJenkins

1. Averaged over 2025–2045
2. Includes indirect and induced impacts
3. For the gas-to-shore scenario this includes Methanex, Coogee and Ravensdown

Employment impact

Under the offshore scenario, we expect operational activity to create around 1,565 jobs in New Zealand each year, compared to 3,220 jobs under the gas-to-shore scenario (including indirect and induced impacts) (Table 31).

Table 31: Impact of ongoing operations on national employment

FTEs	Employment impact	Annual jobs created by operations[1] 2025-2045	
		Offshore scenario	Gas-to-shore scenario
NZOG	Direct	401	396
	Total[2]	1,566	1,547
Other development participants[3]	Direct	0	599
	Total[2]	0	1,668
Total activity	Direct	401	995
	Total[2]	1,566	3,215

Source: MartinJenkins

1. Averaged over 2025–2045
2. Includes indirect and induced impacts
3. For the gas-to-shore scenario this includes Methanex, Coogee and Ravensdown

Note: Estimate of direct employment includes contractors

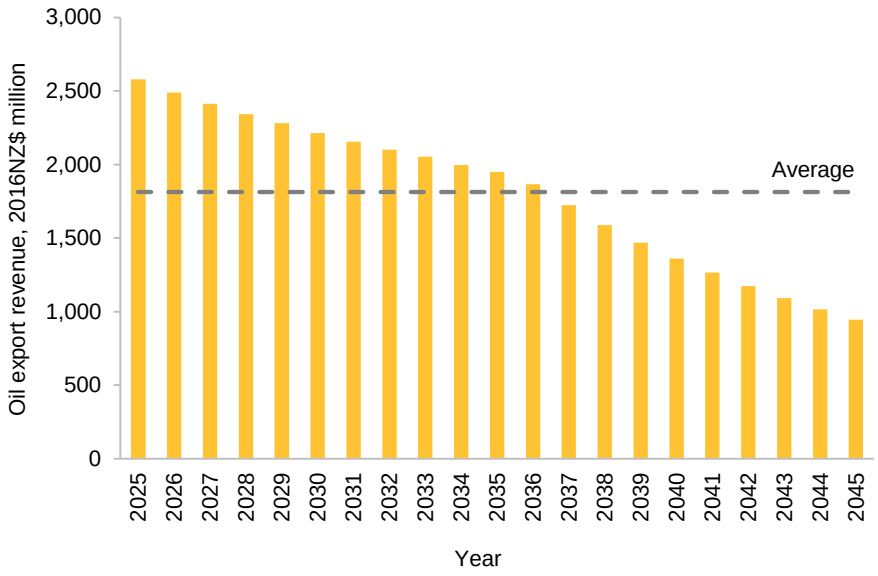
Exports

In addition to creating employment and contributing to GDP, the development of the Barque field will generate considerable export earnings, which is a key growth goal for New Zealand. The government has set a Business Growth Agenda (BGA) target of increasing exports to 40 percent of GDP by 2025.

The offshore scenario is expected to generate around $1.8 billion per year in export revenue from oil between 2025 and 2045, compared with $2.7 billion each year from oil, LPG and methanol under the gas-to-shore scenario.

Under the offshore scenario, hydrocarbons are extracted from the field and the condensate (oil) is stripped while the gas is re-injected into the reservoir. The oil is processed on an offshore floating production, storage and offloading vessel (FPSO) and exported directly to overseas markets. Based on the 15-year average Brent crude oil price of NZ$100[6] (US$70) per barrel, this is expected to generate an average of $1.8 billion each year in export revenue over the 20-year analysis timeframe, as shown in Figure 21.

Figure 21: Value of crude oil exports, offshore scenario

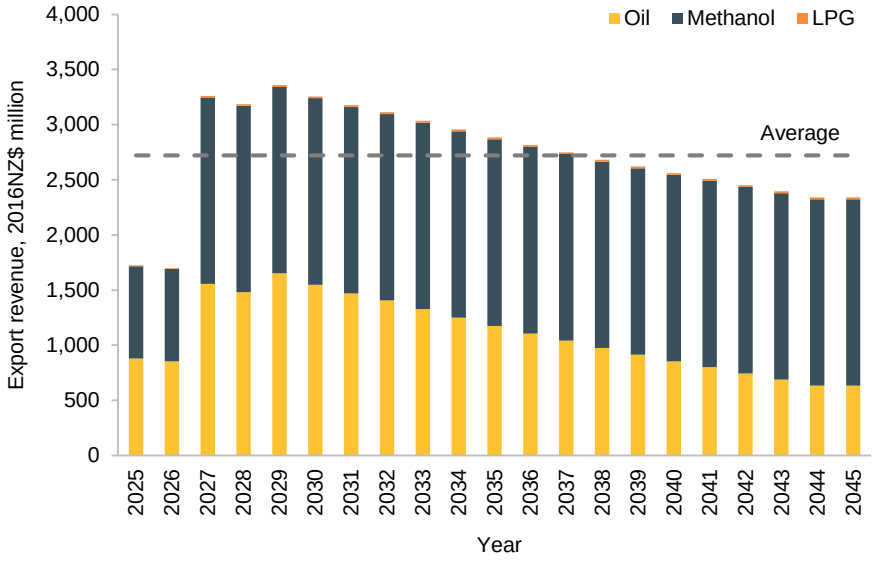


Source: MartinJenkins, NZOG

[6] Quandl.com

In the gas-to-shore scenario, methanol, oil and LPG will be produced for export. Methanex estimates the South Island demand for methanol will be about 30 kilo-metric tonnes (kMT) (less than 1 percent of the production capacity of two 1.7 mmtpa methanol plants), so 99 percent of methanol produced will likely be exported. NZOG expect to export all oil produced and about 30 percent of LPG produced. Based on the 10-year average methanol price of NZ$502[7] (US$353) per metric tonne, anticipated LPG price of NZ$498[8] (US$350) per tonne and the 15-year average oil price, we estimate the gas-to-shore scenario will generate about $2.7 billion on average each year in export revenue over the 20-year analysis timeframe (Figure 22).

Figure 22: Value of crude oil, methanol and LPG exports, gas-to-shore scenario



Source: MartinJenkins, NZOG, Methanex.

To put these figures into perspective, Table 32 shows that under the offshore scenario, the Barque field is expected to increase New Zealand's annual oil production by 150 percent and increase the country's oil export earnings by almost 200 percent, when compared with the annual average over the last 20 years. If gas is piped to shore to be used in methanol production, we estimate that New Zealand's export earnings from oil, LPG and methanol combined would increase from around $2 billion to $4.7 billion each year on average.

Figure 23 illustrates how a significant oil and gas discovery can generate a substantial step-change in export earnings, as occurred in 2007 and 2008 with the Pohokura and Tui fields coming on-line.

7 Methanex's average global realised methanol price, previous 10 years.

8 NZOG.

Table 32: Annual export volume and value comparison

	Barque field (avg. 2025-2045)		New Zealand
	Offshore scenario	Gas-to-shore scenario	(avg. 2014-2016)
Volume			
Oil exports (mmstb)	18.1	10.9	12.7
LPG exports (mmboe)		0.3	0.5
Methanol exports (mmtpa)		3.2	2*
Value (NZ$m)			
Oil	1,814	1,095	992
LPG		16	29
Methanol		1,610	913*
Total	**1,814**	**2,720**	**1,933**

Sources: MartinJenkins, NZOG, MBIE, Statistics NZ

Notes:

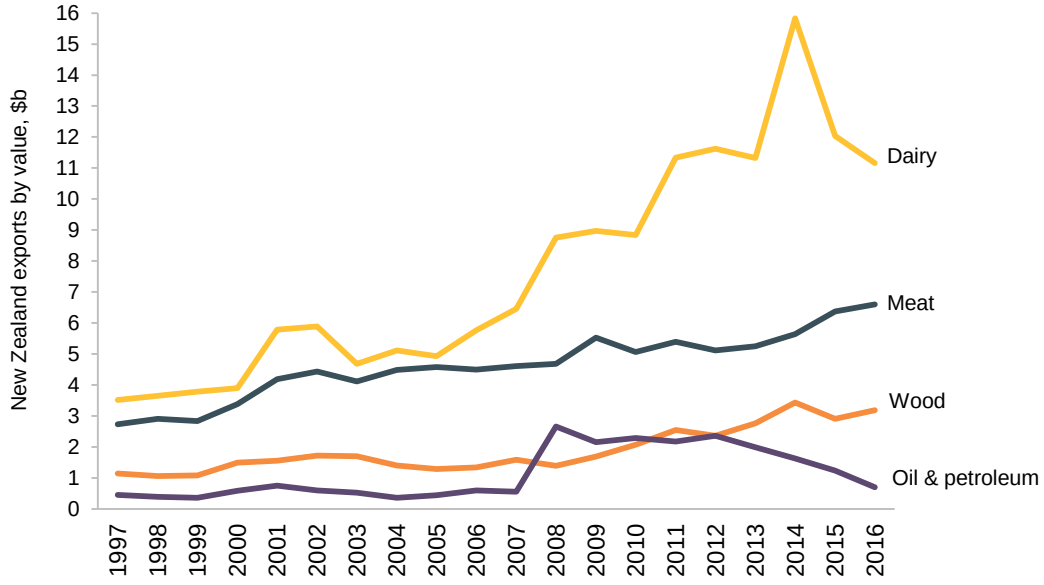
*Estimated based on total NZ methanol production (assuming 99% exported) and Methanex's global realised methanol price.

Barque field oil export value based on historic 15-year average oil price of NZ$100 (US$70) per barrel.

Barque field LPG export value based on NZ$498 (US$350) per ktonne.

Anticipated methanol value based on Methanex's 10-year average global realised methanol price of NZ$502 (US$353) per metric tonne.

Figure 23: New Zealand exports, 1997–2016



Source: Statistics New Zealand

Import substitution

In addition to export earnings outlined above, and of equal importance in reducing New Zealand's current account deficit, the production of 650,000 tonnes of fertiliser (urea) each year by a South Island plant will effectively eliminate the country's need to import significant volumes of urea, as is currently the case.

Current demand for urea in New Zealand is around 800,000 tonnes each year, of which about 550,000 tonnes are imported. Urea produced using natural gas extracted from the Barque field has the potential to make New Zealand fully self-reliant. Based on the average 15-year world urea price of NZ$395.70[9] (US$278.20) per tonne, the value of urea import substitution could be about $220 million annually.

New Zealand currently imports about 550,000 tonnes of urea (fertiliser) each year. By producing this in New Zealand instead, the import substitution value could be about $220 million annually.

[9] World Bank

Royalties and taxes

Royalties and corporate taxes generated by the Barque field development result in further benefits to the New Zealand public, over and above the impacts calculated in the EIA.

New Zealand Oil & Gas expect to contribute $20.2 billion in royalties and taxes over the 35-year economic life of the Barque field under the offshore scenario, compared with $32.1 billion over the 46-year field life if gas is brought to shore.

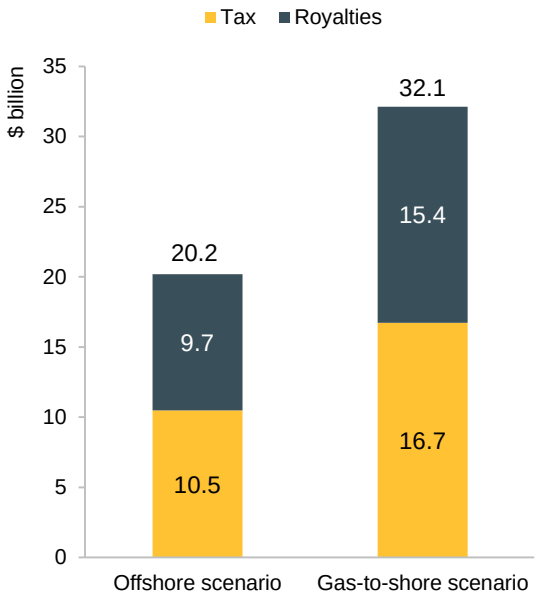
Royalties

Over the economic life of the field, NZOG expect to contribute a total of $15.4 billion to the Crown in royalties under the gas-to-shore scenario, almost 60 percent higher than under the offshore scenario (Figure 24).

Under the gas-to-shore scenario, the economic field life is 11 years longer and annual payments to the Crown, shown in Figure 25, are considerably larger, peaking at over $590 million in 2029.

The negative payments at the end of the field life reflect rebates upon decommissioning, which would occur over several years.

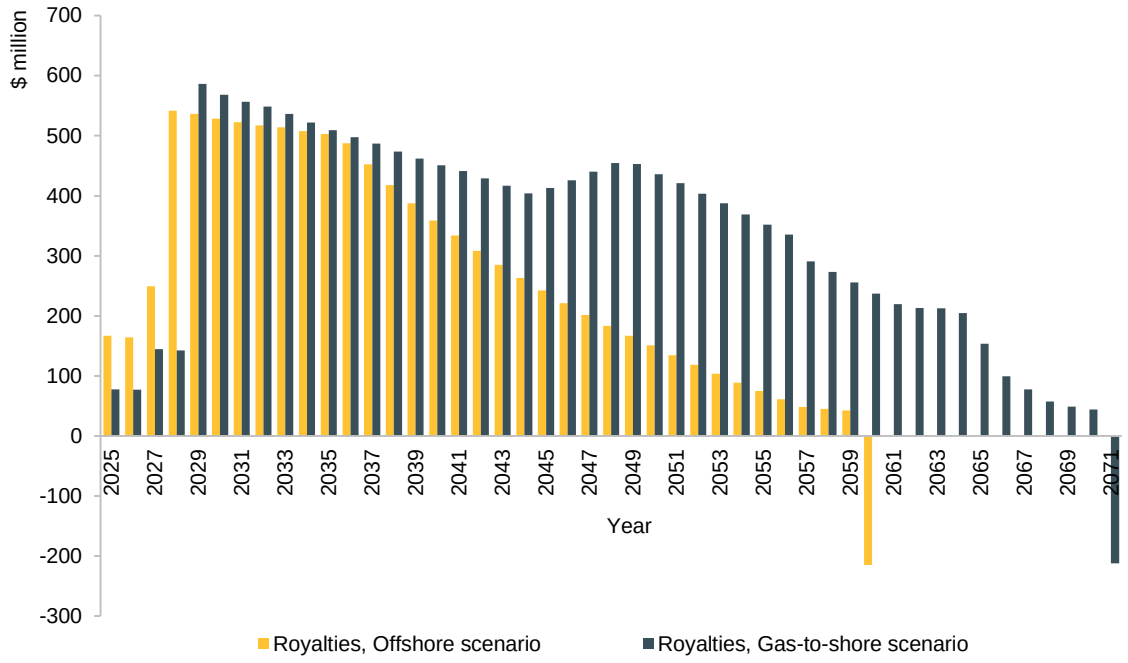
Figure 24: Total royalties and tax paid by NZOG over the economic life of the Barque field



Source: New Zealand Oil and Gas

Note: The dollar values presented in this graph are nominal, so have not been adjusted for inflation, nor discounted to reflect the time value of money.

Figure 25: Annual royalties paid by NZOG over economic life of the Barque field



Source: NZOG

Note:

The negative payments at the end of the field life reflect rebates upon decommissioning, which would occur over several years.

The dollar values presented in this graph are nominal, so have not been adjusted for inflation, nor discounted to reflect the time value of money.

Between 2008 and 2015, the Crown received an average of $354 million each year in petroleum royalties. By comparison, the Barque field is expected to generate an average of $270 million annually under the offshore scenario, and $330 million annually under the gas-to-shore scenario (Table 33). To put this into context, the New Zealand Fire Service currently costs about $380 million each year[10].

Table 33: Royalties comparison

NZ$m	Barque field		New Zealand
	Offshore Scenario 2025-2060	Gas-to-shore Scenario 2025-2071	2008-2015
Average annual petroleum royalties	270	328	354
Total petroleum royalties	9,713	15,395	2,833

Source: NZOG, New Zealand Petroleum and Minerals (pre-2008 royalties data is not made available by NZP&M)

[10] New Zealand Fire Service Annual Report 2016.

Taxes

Corporate tax paid by NZOG, Methanex, Coogee and Ravensdown is likely to be significant, but as it is based on profitability, we have not attempted to quantify the additional tax revenue generated by the new plants. However, NZOG estimates it will pay about $10.5 billion in additional company tax over the 35-year economic field life under the offshore scenario ($300 million per year on average), and $16.7 billion over the 46-year economic field life under the gas-to-shore scenario ($360 million per year on average).

APPENDIX 1: REGIONAL INPUT-OUTPUT MULTIPLIER ANALYSIS

This analysis has been carried out using Regional Input-Output (I-O) Multiplier Analysis, a recognised methodology for economic impact analysis. It utilises regional and national I-O tables to calculate the overall impact of both capital and operational expenditure associated with an activity on value added in terms of gross domestic product (GDP) and employment in terms of full-time equivalent workers (FTEs). The analysis also estimates indirect and induced impacts, which are discussed below.

The underlying logic of Regional I-O Multiplier Analysis is that enterprises create flows of expenditure (direct impacts) that generate profits and wages (value add) and employ people. These direct impacts are magnified or 'multiplied' as they flow on to the wider economy. This happens in two ways:

1 indirect impacts - the enterprise purchases materials and services from supplier firms, who in turn make further purchases from their suppliers and so forth

2 induced impacts - employees in the enterprises and in firms supplying services are paid a wage and the enterprises generate profits, which is then spent on consumption.

The total impact is then the sum of the direct, indirect and induced impacts.

Regional multipliers are used to capture the indirect and induced impacts at a regional or national level. They are also used to calculate GDP. Multipliers are derived from the I-O tables published by Statistics New Zealand and the regional (Dunedin City, Waitaki, Waimate, Timaru, Ashburton, Selwyn and Christchurch City) I-O table supplied by Butcher Partners Limited.

The size of the multiplier depends upon the degree of economic self-sufficiency. The more self-sufficient a region or nation is, the higher the multiplier is likely to be. Initial expenditure is assigned to the industry where it occurs. Each industry has a different multiplier based on the average pattern of purchases of goods and services, capital formation, profits, wages and salaries.

The analysis allows for the determination of three measures of economic activity – Gross Output, Value Added and Employment.

Gross Output is the value of production, which is built up through the national accounts as a measure of gross sales or turnover. It is essentially the initial expenditure incurred by the activity.

Value Added is the increase in output generated along the production process, which when aggregated totals GDP. Value Added is the sum of:

- compensation of employees (salaries and wages)
- income from self-employment
- depreciation
- profits and
- indirect taxes less subsidies.

Employment is generally expressed as full-time equivalents (FTEs) to allow for comparison. FTEs is the number of full-time employees and working proprietors. FTEs provide a measure of total labour demand associated with gross output for one year. For example, four full-time jobs running for three months would be shown as one FTE.

Limitations of regional I-O multiplier analysis

Price impacts, additionality and displacement

Regional I-O Multiplier Analysis is a static model that does not allow for price changes resulting from activity. Further the approach requires that economic activity applied to the model is additional to existing activity and that it does not include displaced activity from other areas of the economy.

We have attempted to ensure that we only capture additional activity through only including expenditure that occurs within the study area. Further, there isn't currently an oil and gas industry or significant gas processors in the study area so displacement within the sector cannot occur. However, because of the significance of the projects, particularly during peak construction, there may well be pressure on resources, particularly labour in construction, engineering and support services. This may place upward pressure on labour costs. This could impact on industries that currently utilise that labour, resulting in either reduced or delayed activity in those industries or reduced profitability. This negative impact is not assessed in our analysis.

Accuracy of regional models

The smaller the geographic area being assessed and the more aggregated the analysis of industries, the less accurate the model.

Our study area accounts for a relatively large portion of the South Island economy, flanked by the two main service centres - Christchurch and Dunedin. As such, we expect that there is a high likelihood that expenditure assigned to the study area will occur within it.

There is currently very limited activity in the oil and gas and gas conversion sectors in the South Island. Our approach involves assigning expenditure to industry sectors where it is likely to occur rather than channelling it through the single associated industry. This ensures that the multipliers and relationships between expenditure, GDP and employment are as accurate as possible.

A second issue affecting accuracy is the quality of the regional I-O tables themselves and how they were calculated. There are no official regional I-O tables. There are several private sector providers of regional I-O tables. This analysis uses regional I-O tables supplied by Butcher Partners. Butcher Partners is a recognised supplier of regional tables that have been used in a number of economic impact analysis studies of industries and events throughout the regions of New Zealand.

APPENDIX 2: DATA TABLES

Details of Methanex, Coogee and Ravensdown capital and operational expenditure have not been included in this Appendix as the information is commercially sensitive.

Capital expenditure breakdown

Table 34: NZOG capital expenditure industry allocation, offshore scenario

$NZ m	2020	2021	2022	2023	2024	2025	2026	% NZ content	% regional content	Total
E&A	253.3			215.3	74.4					
Scientific, architectural, and engineering services	177.3			150.7	52.1			50%	20%	
Exploration and other mining support services	76.0			64.6	22.3			40%	20%	
DEVELOPMENT WELLS				203.1	583.6	1,244.1				
Fabricated metal product manufacturing				167.2	480.6	1,024.5		40%	20%	
Heavy and civil engineering construction				23.9	68.7	146.4		90%	90%	
Scientific, architectural, and engineering services				11.9	34.3	73.2		100%	80%	
SUBSEA				47.4	142.3	284.6				
Fabricated metal product manufacturing				31.6	94.9	189.7		40%	20%	
Heavy and civil engineering construction				13.2	39.5	79.1		100%	100%	
Scientific, architectural, and engineering services				2.6	7.9	15.8		70%	30%	
OFFSHORE FACILITIES				0.0	1,878.3	469.6				
Fabricated metal product manufacturing				0.0	1,546.8	386.7		20%	15%	
Other transport				0.0	221.0	55.2		10%	10%	
Scientific, architectural, and engineering services				0.0	110.5	27.6		30%	30%	
EXPORT PIPELINES										
ONSHORE FACILITIES										
PROJECT MANAGEMENT	107.9		54.0	107.9	107.9	107.9	54.0			
Exploration and other mining support services	24.0		12.0	24.0	24.0	24.0	12.0	50%	10%	
Scientific, architectural, and engineering services	71.9		36.0	71.9	71.9	71.9	36.0	50%	20%	
Legal and accounting services	12.0		6.0	12.0	12.0	12.0	6.0	70%	20%	
TOTAL capex	**361.2**	**0.0**	**54.0**	**573.7**	**2,786.5**	**2,106.2**	**54.0**			**5,937.7**
NZ content	**175.4**	**0.0**	**28.2**	**285.6**	**827.3**	**928.2**	**28.2**			**2,272.8**
Regional content	**69.8**	**0.0**	**9.6**	**147.0**	**567.6**	**607.9**	**9.6**			**1,411.6**

Source: MartinJenkins

Table 35: NZOG capital expenditure industry allocation, gas-to-shore scenario

$NZ m	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	% NZ content	% regional content	Total
E&A	276.4			250.0	109.1						92.4	92.4			
Scientific, architectural, and engineering services	193.5			175.0	76.3						64.7	64.7	50%	20%	
Exploration and other mining support services	82.9			75.0	32.7						27.7	27.7	40%	20%	
DEVELOPMENT WELLS				143.9	403.5	773.7				44.6	222.8	295.9			
Fabricated metal product manufacturing				118.5	332.3	637.2				36.7	183.5	243.7	40%	20%	
Heavy and civil engineering construction				16.9	47.5	91.0				5.2	26.2	34.8	90%	90%	
Scientific, architectural, and engineering services				8.5	23.7	45.5				2.6	13.1	17.4	100%	80%	
SUBSEA				46.5	108.5	269.0				15.5	77.5	102.9			
Fabricated metal product manufacturing				31.0	72.3	179.3				10.3	51.6	68.6	40%	20%	
Heavy and civil engineering construction				12.9	30.1	74.7				4.3	21.5	28.6	100%	100%	
Scientific, architectural, and engineering services				2.6	6.0	14.9				0.9	4.3	5.7	70%	30%	
OFFSHORE FACILITIES				18.4	161.6	136.8									
Fabricated metal product manufacturing				15.1	133.1	112.7							20%	15%	
Other transport				2.2	19.0	16.1							10%	10%	
Scientific, architectural, and engineering services				1.1	9.5	8.0							30%	30%	
EXPORT PIPELINES				49.1	236.9	384.2									
Fabricated metal product manufacturing				33.5	161.5	261.9							20%	10%	
Heavy and civil engineering construction				11.2	53.8	87.3							30%	20%	
Scientific, architectural, and engineering services				4.5	21.5	34.9							20%	10%	
ONSHORE FACILITIES					364.9	819.2									
Fabricated metal product manufacturing					228.0	512.0							40%	20%	
Heavy and civil engineering construction					91.2	204.8							90%	75%	
Scientific, architectural, and engineering services					45.6	102.4							30%	10%	
PROJECT MANAGEMENT	109.9		55.0	109.9	109.9	109.9	55.0								
Exploration and other mining support services	24.4		12.2	24.4	24.4	24.4	12.2						50%	10%	
Scientific, architectural, and engineering services	73.3		36.6	73.3	73.3	73.3	36.6						50%	20%	
Legal and accounting services	12.2		6.1	12.2	12.2	12.2	6.1						70%	20%	
TOTAL capex	**386.3**		**55.0**	**617.7**	**1,494.3**	**2,492.8**	**55.0**			**60.1**	**392.8**	**491.3**			**6,045.0**
NZ content	**187.3**		**28.7**	**287.6**	**642.4**	**1,128.6**	**28.7**			**31.1**	**198.8**	**249.7**			**2,782.8**
Regional content	**74.8**		**9.8**	**144.0**	**388.3**	**714.7**	**9.8**			**20.8**	**122.4**	**156.5**			**1,641.0**

Source: MartinJenkins

Table 36: PrimePort capital expenditure industry allocation, offshore scenario

TOTAL CAPEX, NZ$ m	2021	2022	2023	2024	2025	% NZ content	% regional content	Total
Pre-Feasibility study & front end eng.	0.2							
Scientific, architectural, and engineering services	0.2					70%	25%	
Banking and financing; financial asset investing	0.0					100%	0%	
EPC price verification and investment decision		0.9						
Scientific, architectural, and engineering services		0.9				70%	25%	
Banking and financing; financial asset investing		0.0				100%	25%	
EIA, consultation and consenting, Finance execution		0.9						
Scientific, architectural, and engineering services		0.8				85%	50%	
Banking and financing; financial asset investing		0.0				100%	25%	
Legal and accounting services		0.0				100%	25%	
Define / major equipment tendering		8.0						
Scientific, architectural, and engineering services		7.6				80%	20%	
Legal and accounting services		0.4				50%	0%	
EPC execution, construction and start-up			14.0	14.0				
Fabricated metal product manufacturing			8.8	8.8		60%	10%	
Heavy and civil engineering construction			3.5	3.5		95%	75%	
Construction services			1.8	1.8		100%	100%	
Commercial operation					2.0			
Other transport					2.0	100%	100%	
TOTAL Capex	**0.2**	**9.8**	**14.0**	**14.0**	**2.0**			**40.0**
Total NZ content	**0.1**	**7.7**	**10.3**	**10.3**	**2.0**			**30.5**
Total regional content	**0.0**	**2.2**	**5.3**	**5.3**	**2.0**			**14.7**

Source: MartinJenkins

Table 37: PrimePort capital expenditure breakdown, gas-to-shore scenario

Offshore / OnShore	$NZ m
New Breakwater to protect loading berth	$8
New Methanol Berth (includes Loading Platform, Mooring and Fender Dolphins) and allows for dredging (100,000m3)	$40
Berths supply (assuming 200m wharf)	$30
Loading Pipeline	$2
Loading Arm	$2
Nitro system / Instrumentation / elec etc	$1
Tank Storage	
Tank Farm (2 x 15,000 tonne capacity at Port) another 2 similar tanks at the plant (based on weekly tanker loading)	$26
Ancillary	
Fire Pumps, pressure controllers Tanker compound	$8
Pipeline within site boundaries	$2
Controls room / admin	$1
	$120
Contingency 25%	$30
TOTAL Capex	**$150**

Source: MartinJenkins

Table 38: PrimePort capital expenditure industry allocation, gas-to-shore scenario

TOTAL CAPEX, NZ$ m	2021	2022	2023	2024	2025	% NZ content	% regional content	Total
Pre-Feasibility study & front end eng.								
Scientific, architectural, and engineering services	0.7					70%	25%	
Banking and financing; financial asset investing	0.0					100%	0%	
EPC price verification and investment decision								
Scientific, architectural, and engineering services		3.2				70%	25%	
Banking and financing; financial asset investing		0.2				100%	25%	
EIA, consultation and consenting, Finance execution								
Scientific, architectural, and engineering services		3.0				85%	50%	
Banking and financing; financial asset investing		0.2				100%	25%	
Legal and accounting services		0.2				100%	25%	
Define / major equipment tendering								
Scientific, architectural, and engineering services		28.5				80%	20%	
Legal and accounting services		1.5				50%	0%	
EPC execution, construction and start-up								
Fabricated metal product manufacturing			32.8	32.8		60%	10%	
Heavy and civil engineering construction			13.1	13.1		95%	75%	
Construction services			6.6	6.6		100%	100%	
Commercial operation								
Other transport					7.5	100%	100%	
TOTAL Capex	**0.8**	**36.8**	**52.5**	**52.5**	**7.5**			**150.0**
Total NZ content	**0.5**	**28.9**	**38.7**	**38.7**	**7.5**			**114.4**
Total regional content	**0.2**	**8.1**	**19.7**	**19.7**	**7.5**			**55.2**

Source: MartinJenkins

Operational expenditure breakdown

Table 39: NZOG operational expenditure in New Zealand and study region, offshore scenario assumptions

Opex	NZ content (% of total opex)	Regional content (% of NZ content)
Fixed costs		
FPSO Contract	75%	85%
Transport & Logistics	70%	75%
Domestic Onshore Support	95%	75%
Overseas Onshore Support	5%	70%
Well Work	80%	25%
Insurance	20%	0%
Regulatory, HSE, etc.	100%	10%
Variable costs		
Marketing	70%	75%
Fuel, Chemicals, etc.	90%	50%

Source: MartinJenkins

Table 40: NZOG operational expenditure in New Zealand and study region, gas-to-shore scenario assumptions

Opex	NZ content (% of total opex)	Regional content (% of NZ content)
Fixed costs		
Routine Onshore	85%	90%
Routine Offshore	70%	60%
Routine Maintenance	95%	90%
Plant Studies	75%	70%
Non-Routine Onshore	85%	90%
Non-Routine Offshore	70%	60%
Regulatory, HSE, etc.	100%	10%
SIB Capital	60%	75%
Variable costs		
Marketing	70%	75%
Transport, etc.	95%	90%

Source: MartinJenkins

Table 41: Downstream gas users operational expenditure in New Zealand and study region, gas-to-shore scenario assumptions

Opex	NZ content (% of total opex)	Regional content (% of total opex)
Salaries and other personnel costs	100%	100%
Repairs and maintenance	90%	50%
Electricity	100%	100%
Catalyst and other chemicals	0%	0%
Insurance	0%	0%
Other fixed and variable costs	100%	50%

Source: MartinJenkins

Note: The cost of gas to downstream users has not been included in the impact assessment as the activity generated producing the gas has already been taken into account in NZOG's operational expenditure.