MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

AIDE MEMOIRE

New Zealand Oil and Gas Sector: Key Facts

Date:	10 April 2018	**Priority:**	High
Security classification:	Sensitive	**Tracking number:**	2878 17-18

Information for Minister

Hon Dr Megan Woods
Minister of Energy and Resources

Contact for telephone discussion (if required)

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The following departments/agencies have been consulted

Minister's office to complete:

☐ Approved
☐ Noted
☐ Seen
☐ See Minister's Notes
☐ Declined
☐ Needs change
☐ Overtaken by Events
☐ Withdrawn

Comments

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Purpose

To provide you with key facts in respect of the New Zealand oil and gas sector.

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Dr David Darby
Manager, Commercial Analysis and Investment
Building, Resources and Markets, MBIE
10 / 04 / 18

Key Facts – Oil and Gas Sector	
Production (2016)	• Oil production: 12.5 million barrels (11 million barrels for export). • Natural gas production: 213 petajoules (PJ).
Estimated Proven and Probable Petroleum Reserves (2016)	• 78 million barrels of oil. • The reserve-to-production ratio as of 1 January 2018 is less than ten years of annual demand.
Royalties and Energy Resource Levys (ERLs)	• $170 million (2017). • Over $1.3 billion dollars between 2013 and 2017.
New Zealand GDP contributions[1]	• 2013 estimate of petroleum industry contribution is approximately $1.7 billion. • This estimate increases to $2.8 billion when value-add products (e.g. methanol; fertiliser) are included.
Taranaki GDP contribution	• In 2013, contribution from the petroleum industry estimated to be approximately $1 billion (12 per cent of Taranaki's GDP for that year). • In 2016, GDP per capita was $71,297 (highest in New Zealand) reflecting the high skilled jobs relating to the oil and gas industry.
Numbers employed[2] **(FTEs) (2014)**	**Taranaki:** • Direct: 3,936 FTEs. • Direct, Indirect and Induced: 5,941 FTEs. **New Zealand:** • Direct: 4,653 FTEs. • Direct, Indirect and Induced: 8,481 FTEs.
Producing Fields	27 producing petroleum fields, all located in Taranaki. Pohokura field (New Zealand's largest) supplies 36 per cent of New Zealand's natural gas. Other major fields: Kupe, Maui, Maari, Turangi, Tui, Kowhai, Kapuni and Mangahewa.
Decommissioning	MBIE expects four major offshore fields to be decommissioned before 2046. These are the Pohokura, Maui, Maari and Tui fields.
Permit Durations	• Active exploration permits range from 10 to 26 years in duration. Permits issued through the current petroleum programme regulations are granted for up to 15 years. • Active mining permits range in duration from 25 to 50 years. Duration of permits currently issued are set at the discretion of the Minister of Energy and Resources (normally issued for the commercial life of the field) but cannot exceed 40 years. Extensions of duration can be sought after the initial term has expired.

[1] Statistics New Zealand only reports data for aggregate mining and petroleum sector (estimated).
[2] Taken from a 2014 study conducted by Martin Jenkins. Due to the oil and gas downturn since 2014 these numbers are likely to be an overestimate compared to current figures (but are the most recent available).

Oil and Gas Sector Overview

1. In 2016, New Zealand produced approximately 12.5 million barrels of oil, 11 million barrels of which was exported[3]. The majority of the oil produced in New Zealand is exported to Australia (where it fetches a premium price). Low quality cheaper crude oil is imported for domestic consumption.

2. Approximately 213PJ of gas was produced for the domestic market in 2016, which equates to about 23 per cent of New Zealand's energy supply[4]. All of the natural gas produced is consumed domestically for petrochemicals (50.1 per cent), electricity generation (26.5 per cent), industrial users (12.8 per cent), and commercial and residential users (7.7 per cent).

3. This briefing provides an update to our 14 March 2018 briefing to the Prime Minister (2518 17-18 refers).

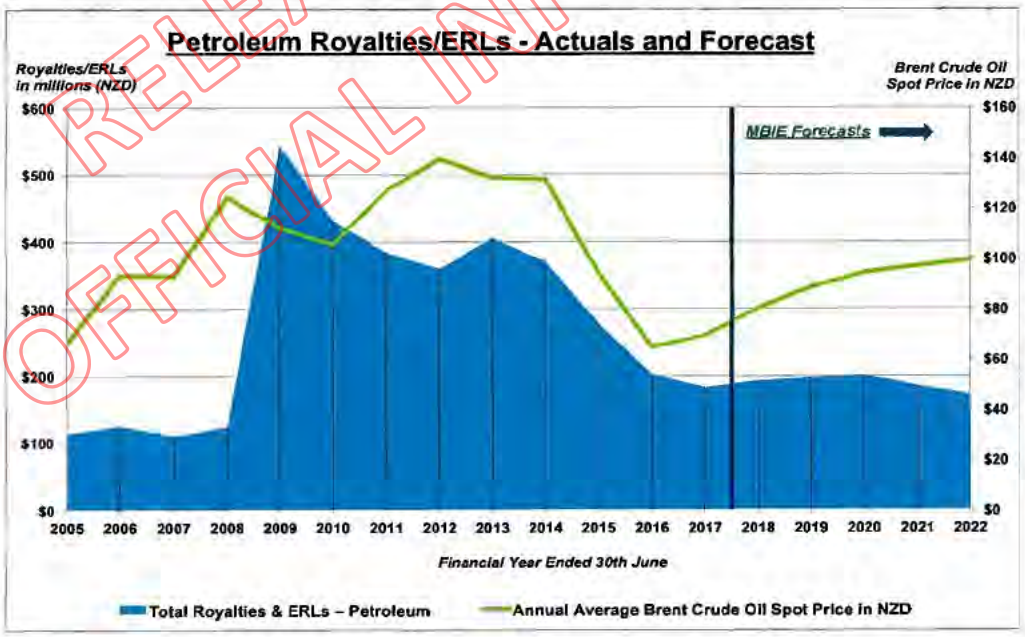
Economic and Fiscal Contribution of Oil and Gas Sector to New Zealand

Direct fiscal benefits to the Crown

4. The Crown receives direct benefit from the petroleum sector through royalties[5] and the Energy Resource Levy (ERLs) paid to the Crown, and taxes (including company taxes).

5. While royalties have been declining in recent years alongside the fall in the international price of crude oil and declines in domestic production, the petroleum sector still provided over $170 million in the way of royalties and ERLs in the 2017 fiscal year. The level of royalties and ERLs derived by the Crown in any given year reflects a number of factors, including the level of production and the oil price.

6. Between 2013 and 2017 the petroleum sector paid over $1.3 billion in royalties and ERLs. A summary of petroleum royalties and ERLs (and future forecasts) over time is shown below.



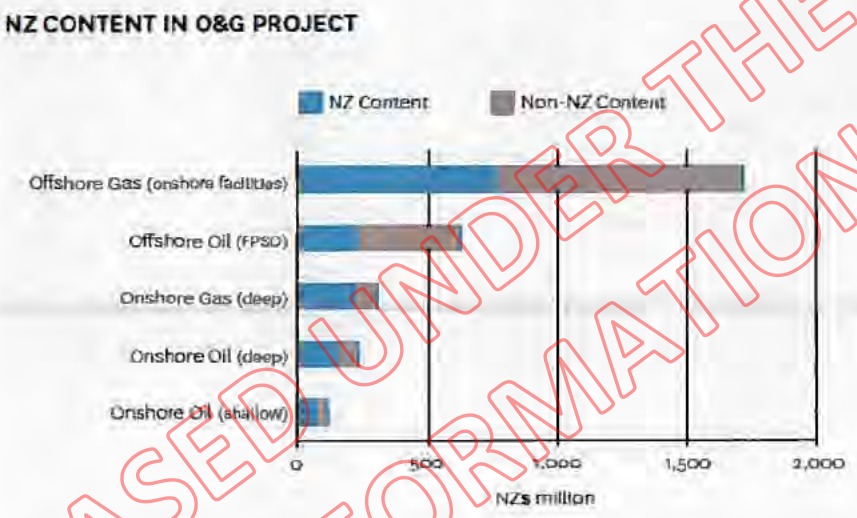
[3] 2016 figures are the latest available. Production data is reported for the previous year at the end of March.
[4] Including non-electricity uses of natural gas.
[5] Royalty rates on petroleum fields differ substantially. For permits issued under the Crown Minerals Act 1991 the royalty rates that are applied are a hybrid of a 5 per cent revenue-based royalty and a 20 per cent profits-based royalty, whichever is higher. As royalties are deductible for tax purposes the effective Crown take is approximately 42 per cent.

7. The amount of corporate taxation is not precisely known due to taxpayer confidentiality and the difficulty in disaggregating the data.

Employment

8. Based on a 2014 survey undertaken by Martin Jenkins on behalf of Venture Taranaki, the oil and gas industry directly employed 4,653 full time employees nationwide. Of these, 236 full time employees worked directly for exploration and production companies. Most jobs in the oil and gas sector are in the engineering or specialist/technical services sectors.

9. In terms of total expenditure, offshore oil and gas activities involve significantly greater costs than onshore activities. MBIE is unable to undertake independent modelling of these costs in the time provided. However, Venture Taranaki provided the following information in 2014 based on discussions with oil and gas industry participants[6].



Source: Martin Jenkins, Venture Taranaki, The Wealth Beneath our Feet: The Next Steps

Contribution of Oil and Gas Sector to Gross Domestic Product[7]

10. Based on reported data from Statistics New Zealand, in 2015/16 combined petroleum and minerals extraction accounted for 1.0 per cent of GDP, or $2.4 billion[8].

11. The total contribution to GDP of the oil and gas sector in 2013 was modelled at $1.7 billion. This increased to $2.8 billion when other activities are factored in[9]. The Taranaki region benefits disproportionately from this economic contribution.

Potential economic impacts of an oil and gas discovery

12. In June 2017, Martin Jenkins released an economic impact assessment of the Barque Field Development[10], which modelled two development scenarios that could occur if the field is

[6] With the fall in oil prices since mid-2014, there has been a fall in activity levels and it is likely that there will be fewer jobs in the sector today than was estimated by Martin Jenkins. This is typical of the cyclical nature of the industry, with job levels likely to rise should there be a rise in oil prices in the future.
[7] As with employment estimates, the contribution of the oil and gas sector to GDP is likely to have fallen since mid-2014 following the fall in oil prices and consequent fall in activity levels.
[8] Statistics New Zealand only reports GDP figures for the combined mining and petroleum sector, which makes estimating GDP contributions alone from oil and gas challenging.
[9] For example, added-value manufacturing that uses gas as a feedstock such as Methanex (methanol), Ballance Agri-nutrients (fertiliser), AICA New Zealand (glue) and Contact Energy's combined and peaker plants (electricity).

drilled and a commercial discovery made. In one development scenario, the field would contribute NZD$141 million to GDP annually and 950 jobs on an ongoing basis, while in the other it would contribute NZD$269 million to GDP annually and 1,980 jobs on an ongoing basis.

13. The operator of the permit, New Zealand Oil and Gas (NZOG) estimates this field may be two or three times the size of the Maui field. NZOG estimates that drilling has a 20 per cent chance of success (i.e. one in five wells drilled would be expected to be successful, which is high for the sector).

14. In 2013 MBIE modelled a range of scenarios of oil and gas development on the East Coast of the North Island[11]. Under a "small-scale" scenario, the gross national disposable income of the East Coast region would grow NZD$160 million and 199 jobs would be created. This increased to NZD$1.4 billion and 1,163 jobs in a "large-scale" scenario.

Reserves

15. There are twenty-seven oil and gas fields in Taranaki currently producing oil and gas, all of which are located either onshore or offshore in Taranaki. Of the fields recently developed, Pohokura is the field with the largest volume of reserve remaining, currently estimated at 1,476PJ. Pohokura alone provides 38 per cent of New Zealand's annual gross gas production. Other major producing fields include Kupe, Maui, Maari, Turangi, Tui, Kowhai, Kapuni and Mangahewa.

16. As at 1 January 2017, the estimated 2P[12] reserves of oil are 78 million barrels, and remaining gas reserves are estimated at 2020PJ. A key issue for New Zealand's security of supply is that this represents an estimated ten years of reserve for natural gas, at the current annual consumption rate (although demand is increasing – driven by industrial users).

17. Based on permit holders' annual summary reports for 2018, it appears as if there will be a significant decline in gas reserves as of 1 January 2018[13]. This is primarily due to a 19.5 per cent reduction of reserves at the Pohokura field which is New Zealand's largest producing field. This is in turn based on updated reservoir models for Pohokura which indicate greater water levels than previously modelled.

18. New Zealand remains totally reliant on domestic gas supply as it does not have the infrastructure for the import of Liquefied Natural Gas (LNG) from overseas. Domestic gas demand has been increasing in recent years (largely driven by industrial users in the chemical manufacturing space).

19. Even with rising demand, estimated gas reserves have kept pace and remained between 10 and 14 years of annual demand since 2003. Importantly, however, reserve additions have largely been provided by ongoing development at existing producing fields rather than through the discovery of any new fields. There has been no new discovery of note since the Turangi field was discovered in 2005. Preliminary estimates of reserve levels for 1 January 2018 indicate that the reserve to production ratio has fallen below 10 years for the first time since 2003.

[10] Martin Jenkins, *Barque Field Development Economic Impact Assessment: Final Report*, 9 June 2017, available at: https://www.nzoc.com/dmsdocument/333.
[11] Ministry of Business, Innovation & Employment, *East Coast Oil and Gas Development Study*, March 2013, available at: http://www.mbie.govt.nz/info-services/sectors-industries/natural-resources/oil-and-gas/petroleum-expert-reports/east-coast-oil-and-gas-development-study/East-Coast-oil-gas-development-study-report.pdf.
[12] 2P refers to the proven (90 per cent chance of being recovered) and probable reserves (at least 50 per cent chance of being successfully recovered).
[13] These numbers have yet to be audited with permit holders and are still preliminary at this stage.

Several of the Taranaki fields are approaching end-of-life

20. Fields such as Maui and Kapuni are 50 to 60 years old and continue to produce today. However, these fields are nearing the end of 'primary production' (production provided from the natural flow of a reservoir). Both the companies and government agencies involved are considering the decommissioning of these fields, however, it is possible companies will attempt to employ additional drilling, seismic surveying and technology to maximise the production of petroleum and extend the fields' lives.

21. The Tui field is also nearing the end of its productive life, with decommissioning expected to commence in two years. New owners, Tamarind New Zealand Pty Limited, are investigating extending the life of that oil field through additional drilling.

22. Shell has reported a 19.5 per cent downgrade in reserves estimates at the Pohokura field as of 1 January 2018. Pohokura is New Zealand's largest producing field. This has reduced the amount of gas reserves to fewer than ten years of annual demand. This is the first time that this has occurred since the Maui reserve write down in 2002/03.

Demand-side users of Natural Gas

23. Major users of gas account for 92.3 per cent of the gas consumed in New Zealand, with other commercial and residential consumers only consuming 7.7 per cent of the natural gas supply in 2016. Total net production of gas in New Zealand in 2016 was 190.79PJ. Total net demand in New Zealand in 2016 was 189.43PJ and for 2017 this was 190.77PJ. We have used 2016 figures as these were consistently available.

24. As there is no gas transmission network in the South Island, all of these consumers are based in the North Island.

Major Petrochemical and Industrial Gas Users

25. Most of the natural gas demand in New Zealand is used for petrochemical feedstock and petrochemical process purposes, representing 50.1 per cent of demand in 2016. Major Industrial consumers primarily use natural gas as a feedstock for the manufacturing of products (e.g. urea) or for industrial high heat applications (e.g. steel manufacturing), and represented 14.8 per cent of demand in 2016.

26. In total, the industrial and petrochemical sectors consumed 125.5PJ of gas, corresponding to 77.5 per cent of the total gas demand in 2016. The major demand side industrial and petrochemical users of New Zealand's natural gas supply are set out in the following table:

Major Industrial Users	Demand (2016)	Demand (percentage of total supply)	Description
Methanex New Zealand	77.8PJ	41 per cent	Methanex New Zealand Limited (Methanex) is the single largest source of demand for natural gas. It is the macro demand-side balancing agent. Methanex uses natural gas for both feedstock and high process heat requirements. Methanol is primarily exported for Asian markets.
Dairy Sector (primarily Fonterra)	9.4PJ	5.0 per cent	Primarily used by Fonterra (dairy processing). Natural gas is used for process heat applications e.g. pasteurisation of milk.
Ballance Agri-nutrients	6.181PJ	3.23 per cent	Natural gas is used for Ammonia/Urea production. These products are used in the agriculture sector to improve soils and pasture quality.
Pulp and Paper sector	Pulp and Paper used approximately: • For paper products: 3.86PJ • For logging: 1.67PJ	2.9 per cent	The major firms are Oji Fibre Solutions and Tasman Pulp and paper. Natural gas is primarily used for process heat applications e.g. firing boilers to timber treatment or paper drying.
Refining New Zealand	2.975PJ	1.9 per cent	Used for industrial high heat applications in the refining of crude oil into petrochemical products.
New Zealand Steel Ltd	1.744PJ	0.9 per cent	Steel production from titanomagnetite ironsands. Used for high heat applications and hydrogen production.

Electricity Generation

27. Electricity generation represents another major user group of natural gas in New Zealand, consuming approximately 51PJ of natural gas, or 26.5 per cent of the natural gas supply. In 2016, 12.8 per cent of total electricity generation was from gas-fired electricity generation. Gas generation in New Zealand is at a 35 year low but still has an important role in managing 'peaking demand' (particularly in winter months) and providing generation capacity when hydro reserves are low.

28. Note that Nova Energy is currently constructing a new 100MW gas-fired plant in Taranaki. Nova Energy also holds resource consents for a proposed Otorohanga gas-fired station, up to 120MW capacity.

29. Major Firms:

- Contact Energy (Taranaki Combined Cycle, and Stratford Peaker Plant)
- Genesis Energy (Huntly, including e3p combined cycle plant)
- Nova Energy (McKee Peaker Plant).