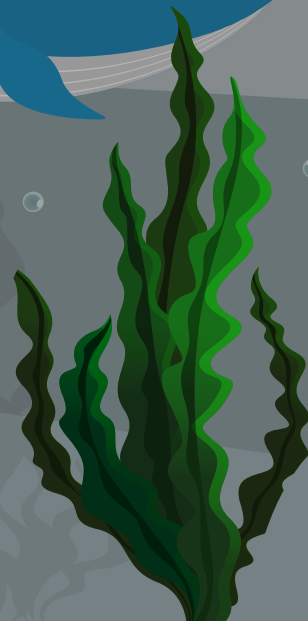
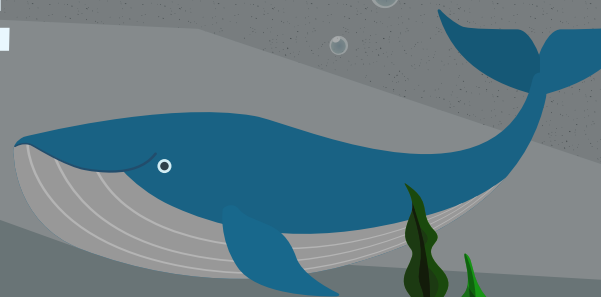




ASKING THE BURNING QUESTIONS

July 2020



INTRODUCTION

Energy is vital to our lives. It powers every aspect of our economy and society, and yet it is easy to take for granted until it isn't available anymore.

Our homes, schools, hospitals and businesses need energy that is affordable, reliable and sustainable. This has never been more important as New Zealand rebuilds from the COVID-19 crisis.

This goal should have broad political support from across the spectrum. However, New Zealand's ability to achieve this is now at serious risk.

This briefing outlines the changes for the oil and natural gas industry in recent years that have reshaped the world we now operate in. What are the major challenges and opportunities, and critical questions for policy makers ahead of this year's election?

We see three main urgent questions:

- 1. What happens if our natural gas supply continues to decline?**
- 2. What would this mean for our emission goals?**
- 3. Do we have the right policy settings?**

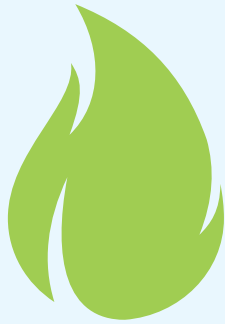
Our aim is not to offer any specific answers or policy suggestions at this stage; instead, the purpose is to identify the challenges and urgent questions that New Zealand must address.¹

OUR MEMBERS

PEPANZ is proud to represent and advocate on behalf of our nearly 50 members, who through their activities are helping grow the New Zealand economy and secure New Zealand's long-term energy security.



THE ROLE OF OIL AND GAS IN NEW ZEALAND²



400,000

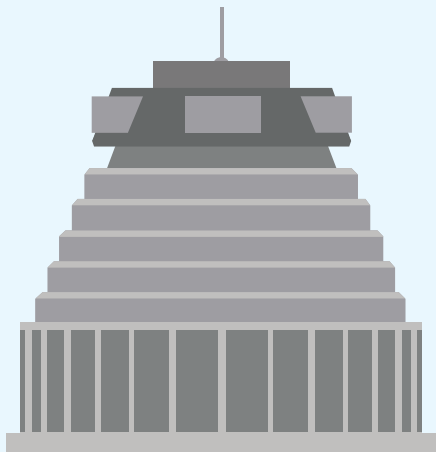
HOUSEHOLDS, BUSINESSES (E.G. RESTAURANTS), SCHOOLS AND HOSPITALS USE NATURAL GAS OR LPG



OUR INDUSTRY
CREATES
11,000
JOBS

NATURAL GAS PROVIDES
OF OUR TOTAL ENERGY

21%



ROYALTIES AND TAXES FROM OIL AND GAS HAVE EARNED THE GOVERNMENT **\$650m PER YEAR** ON AVERAGE OVER THE LAST DECADE

NATURAL GAS PROVIDES AROUND

12%
OF OUR
ELECTRICITY
SUPPLY



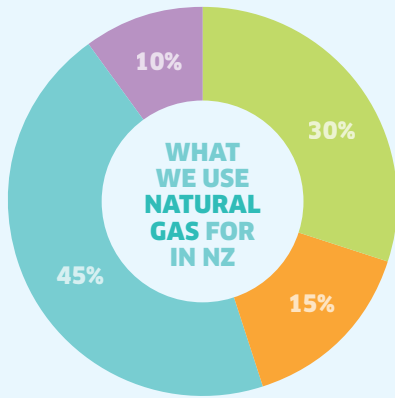
OIL EXPORTS ARE WORTH AROUND **\$750m PER YEAR**

AROUND 95% OF OIL WE PRODUCE IS EXPORTED



AROUND 11 YEARS OF NATURAL GAS SUPPLIES LEFT






- Electricity
- Major industries
- Petrochemicals and fertiliser
- Household and commercial use

**NATURAL GAS
KEEPS ELECTRICITY
PRICES DOWN
BY SUPPORTING
RENEWABLE SOURCES**



**NUMEROUS USES
FOR OIL AND GAS
DON'T INVOLVE BURNING
E.G. PLASTICS, CLOTHING, MEDICINES
AND ELECTRICAL GOODS**

**GLOBAL
DEMAND
FOR NATURAL GAS
EXPECTED TO GROW**

 **45%
BY 2040**

**MAJOR EXPORT
INDUSTRIES
RELY ON
NATURAL GAS
INCLUDING**
 FOOD PRODUCTION 🍔
 DAIRY PLANTS 🥛
 MEAT WORKS 🥩
 TIMBER PROCESSING 🌲
 BUILDING MATERIALS 🏠

**NATURAL GAS HAS
HALF THE
EMISSIONS
OF COAL**



**OIL AND GAS
WORKERS EARN
TWICE
THE NATIONAL
AVERAGE SALARY**



A CHANGED CONTEXT FOR THE OIL AND GAS SECTOR

By 2030 New Zealand's production of natural gas is forecast to be 60% lower than today.³ This means that without new exploration and development, or commercial alternatives, we face a serious energy shortfall.

In effect, we are now in a closed system with rapidly shrinking natural gas reserves and rapidly shrinking opportunities to replace them.

Bringing new supplies to market is now much more difficult given the Government's 2018 decision to end new exploration permits beyond onshore Taranaki.

Existing exploration permits granted before 2018 are still valid but many of these have been surrendered. There is now approximately 71,000 square kilometres of offshore area subject to a petroleum exploration permit but this is rapidly shrinking.

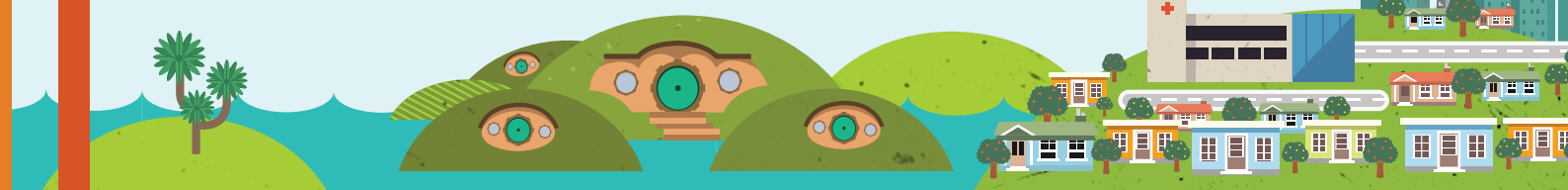
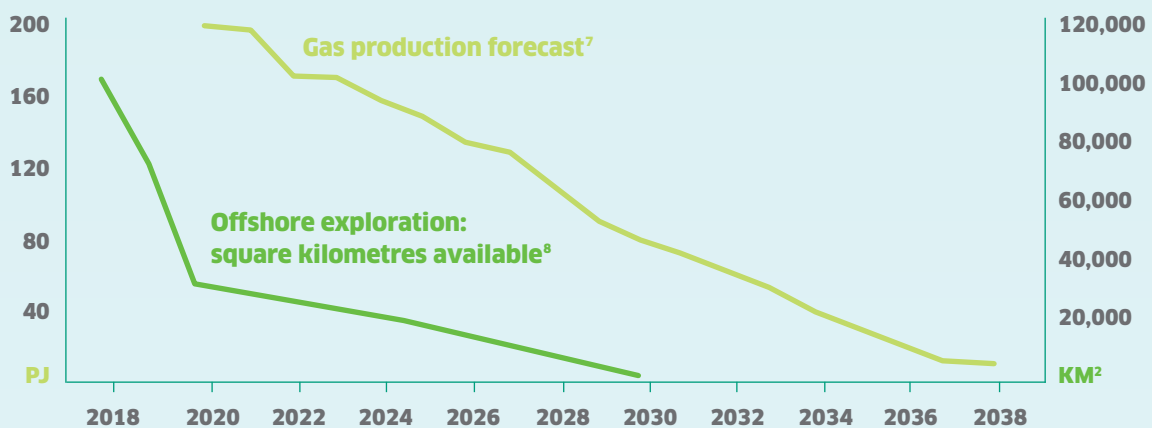
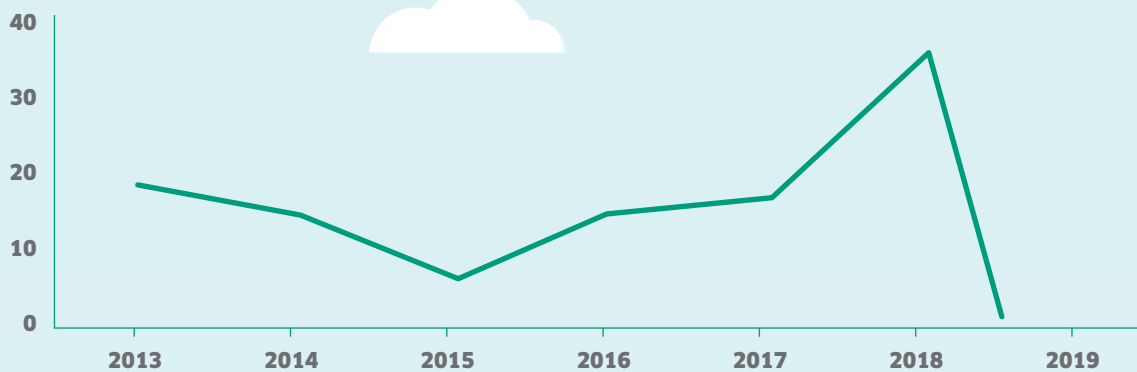
Over half of today's acreage will be relinquished by November 2021 and 100% by 2030.⁴

Interest in New Zealand as an exploration destination was building by 2018 with record interest in that year's Block Offer. However, since 2018 all non-producing explorers have left New Zealand, including major companies Anadarko, Equinor and Chevron. OMV has largely completed its exploration efforts with just the one potential success in the Taranaki Basin at the Toutouwai prospect.

There is now just one further scheduled new exploration campaign outside Taranaki with Beach Energy tentatively scheduled to drill the Wherry prospect off the coast of South Canterbury.

On the positive side there is redevelopment work on existing fields underway with the most notable example being OMV's \$500 million programme to extend the life of the aging Maui field.⁵ There is also likely to be continued supply from onshore gas fields such as Mangahewa, Kapuni, and Turangi.

Block offer nominations⁶



1. WHAT HAPPENS IF OUR NATURAL GAS SUPPLY CONTINUES TO DECLINE?

Could we use renewables instead?

Some of the key challenges include:

- **Cost:** While the development of new technology means the cost of renewable energy is falling, it is still not economic to meet all our energy needs. If it was, then it would be doing so already. The cost of building new infrastructure is particularly expensive.
- **Reliability:** The sun doesn't always shine, the wind doesn't always blow and the rain doesn't always fall at the right times, which limits how much renewable electricity we can generate.
- **Storage:** Storing electricity generated from renewable sources to use later in the form of batteries is often highlighted as a solution to these challenges, but it remains hugely expensive and impractical.
- **Practicality:** There are many uses of oil and natural gas for which alternative energy sources – such as electricity – are not physically possible or prohibitively expensive. This includes aircraft fuel, the production of certain petrochemicals, and for many industrial heat processes requiring very high temperatures.⁹

What would a shrinking gas supply mean for electricity prices?

Natural gas helps keep the cost of electricity down for businesses and households. Although it only provides around 12% of electricity supply, it provides a crucial back-up to intermittent renewable sources at the flick of a switch.

The Interim Climate Change Committee (ICCC) warned against ending the role of natural gas as a back-up electricity generator too quickly, estimating that it could see a 14% increase in retail electricity prices for households, 29% for commercial and 39% for industrial users.¹⁰

What would a shrinking gas supply mean for industrial users?

Around 60% of natural gas produced in New Zealand is used by the industrial sector, creating much-needed jobs and exports. If we cannot find affordable energy sources to fill this gap then energy costs will inevitably increase, causing serious damage to the economy.

Major users include dairy, meat, timber, steel, food processing and fertiliser production who require high temperatures to create their products.

The recent decision to close the Tiwai Point aluminium smelter shows how vulnerable businesses are to energy costs and the devastating impact this can have on jobs and livelihoods.

What would declining gas supply mean for households?

Natural gas and LPG are used by around 400,000 homes, businesses, hospitals, schools, and community facilities (such as libraries, swimming pools etc) for heating, cooking and hot water. What will the impacts be if locally produced natural gas is no longer available, or prohibitively expensive?

Could imported LNG fill the gap? Should it?

Recent modelling by the BusinessNZ Energy Council highlighted two potential future energy scenarios for New Zealand, with one envisaging the importing of LNG from overseas from the 2030s onwards as the rising cost of gas makes this economic. Is this a desirable outcome, and if not, what should we do now to avoid this?



2. WHAT DOES A DECLINING GAS SUPPLY MEAN FOR OUR EMISSION GOALS?

Are we likely to use more coal instead of natural gas?

The temporary outage at the Pohokura natural gas field in 2019 showed that without natural gas, the most likely replacement fuel is coal with twice the emissions. Domestic shortages of natural gas, hydro power and coal have led to Genesis Energy and New Zealand Steel importing a million tonnes of coal in recent years. This has meant higher emissions, as well as higher energy and electricity costs.¹¹

What impact would higher electricity prices have on emissions?

Electrifying transport and industrial heat is a key way of lowering emissions but this won't be possible without affordable and reliable electricity. As outlined earlier, the ICCC has warned that removing natural gas would hinder decarbonisation efforts by making electricity much more expensive.

As summarised by Simon Coates of Concept Consulting, *"Lower cost electricity facilitates the far bigger prize of decarbonising process heat and decarbonising transport."*¹²

What impact will it have on global emissions if major gas users leave New Zealand?

Without a reliable long-term supply of natural gas, major industrial users could relocate to other countries with less strict rules around emissions (known as 'carbon leakage'). This would be a lose-lose scenario for New Zealand's economy and for global emissions.

What role should/could natural gas play in hydrogen generation?

New Zealand (and other nations) are interested in the potential of hydrogen as a zero-emissions future energy source. Around 95% of global hydrogen is made from natural gas and a recent study estimates it is three times cheaper to produce this way than through using electricity.¹³ However, to be done with almost zero emissions requires carbon capture and storage (CCS).

WHAT IF METHANEX LEFT NEW ZEALAND?

Another factor which could – perhaps counterintuitively – shorten the life of natural gas production in New Zealand is if methanol producer Methanex exits New Zealand.

Given they consume around 45% of domestic natural gas and provide a strong buying market for producers to sell into, their exit would make further exploration and development less economic. This would mean New Zealand's available gas supply declines even faster, and production would most likely shift to China where coal is used instead of gas. This would cause a substantial increase in global emissions.¹⁴



3. DO WE HAVE THE RIGHT POLICY SETTINGS?

In the absence of new exploration permits, are the permit application and change-of-condition settings right?

The current rules around exploration permits are based on a competitive allocation, with deadlines to 'drill or drop' before permits are required to be relinquished. This made sense when we had regular opportunities for new exploration, but now requires reassessment.

Is the decommissioning regime fit for purpose, given many fields are approaching the end of their natural lifespan?

The Government is currently working on new rules around decommissioning oil and gas fields when they reach the end of their productive lives. These are major operations requiring substantial investment.

It is important that operators take responsibility for this work, and at the same time any requirements on operators must be practical and workable.

What are the best tools to manage greenhouse gas emissions?

The Emissions Trading Scheme (ETS) is the Government's key policy tool for reducing emissions and is a demand-focussed approach. Various studies (including the joint 2018 Nobel Prize winner for economics) have shown that emissions pricing is the most cost-effective way of reducing emissions.¹⁵

If we are going to use alternative policies in addition to the ETS, how effective will they be in reducing emissions – and at what cost?

Do we have the right regulatory settings to allow new innovation?

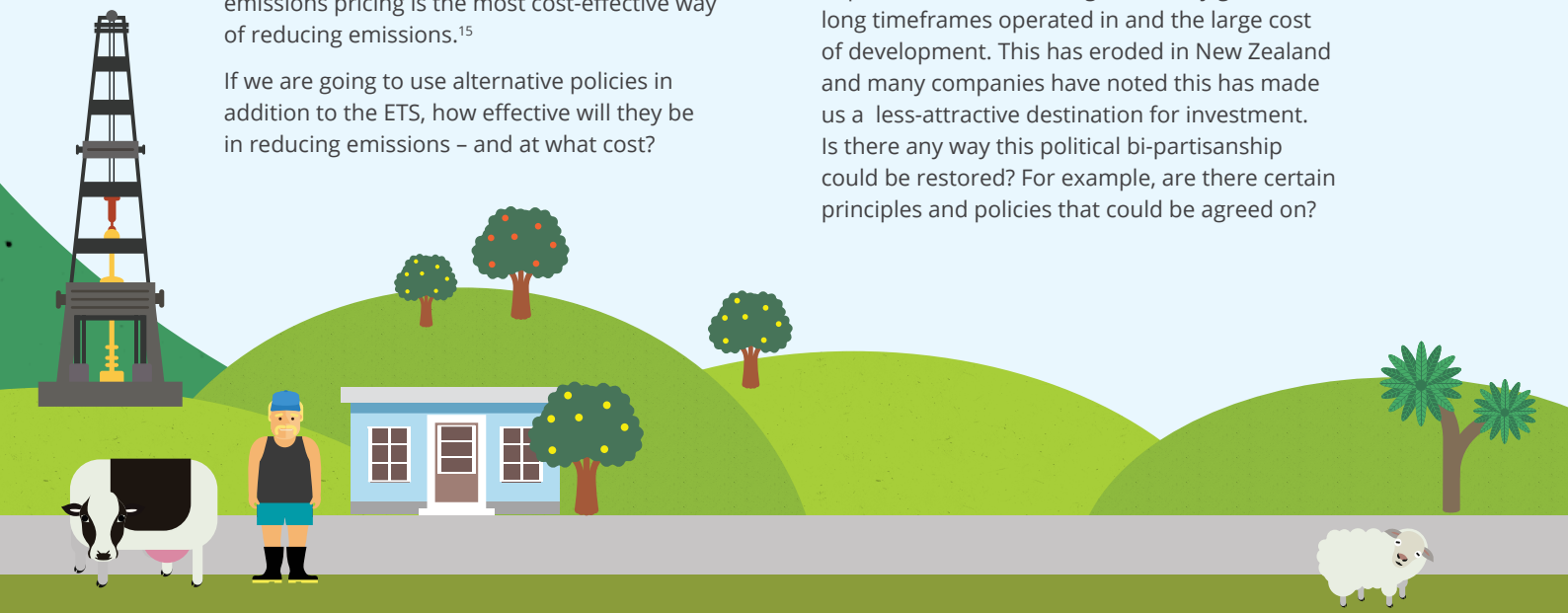
New technology is constantly being developed to help lower emissions in both the production and use of oil and natural gas. One example is CCS which involves capturing carbon dioxide emissions from large sources (such as power plants) and storing them where they cannot escape into the atmosphere, usually deep underground in geological formations. This technology is a reality around the world. While it is not forbidden by law in New Zealand, there is also no specific enabling regulatory regime for CCS. Is this lack of a framework a barrier to investment?

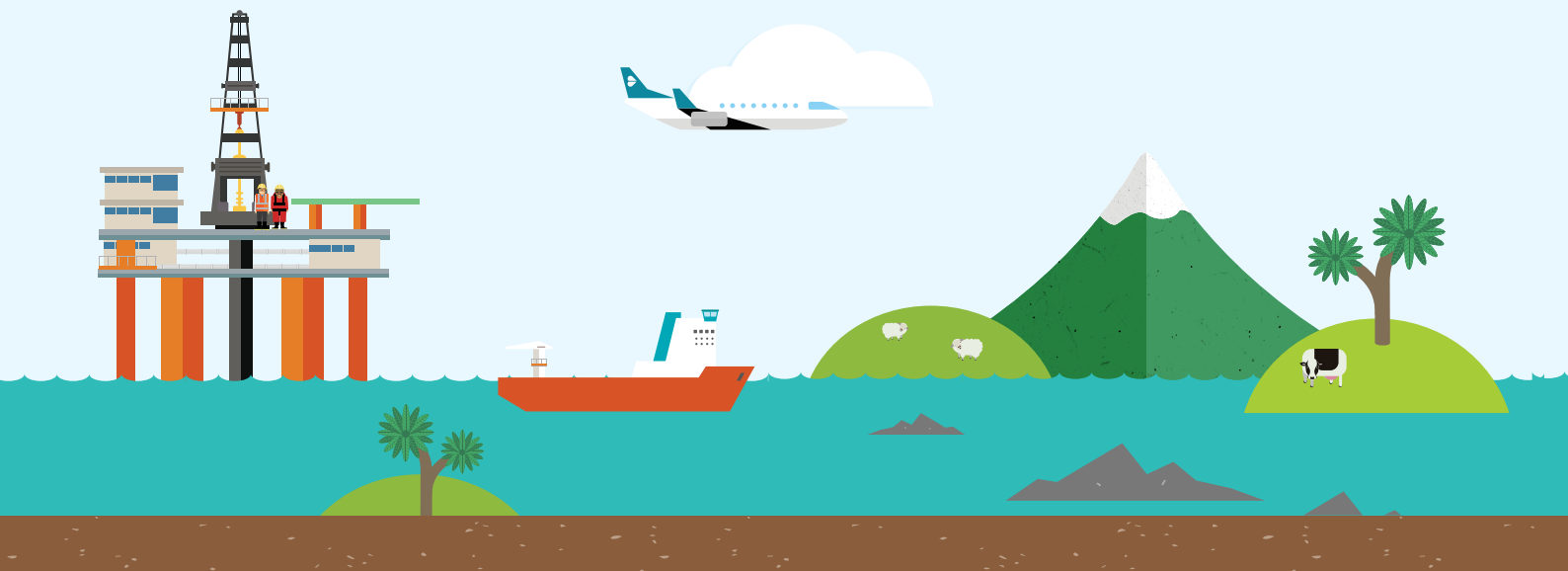
Do we have the right skills and people available?

The oil and gas industry by nature is cyclical. While the oil price is currently low and future exploration is unclear, the industry will still need skilled people to maintain an ecosystem for the wider energy sector. However the workforce is aging and there are always attractive overseas opportunities on offer. Could the lack of human capital impact our energy security, and what can be done to avoid this?

Is it possible to rebuild political bi-partisanship?

For many decades there has been relative political consensus on the benefits of a strong domestic oil and gas industry. Regulatory predictably is very important for the oil and gas industry given the long timeframes operated in and the large cost of development. This has eroded in New Zealand and many companies have noted this has made us a less-attractive destination for investment. Is there any way this political bi-partisanship could be restored? For example, are there certain principles and policies that could be agreed on?





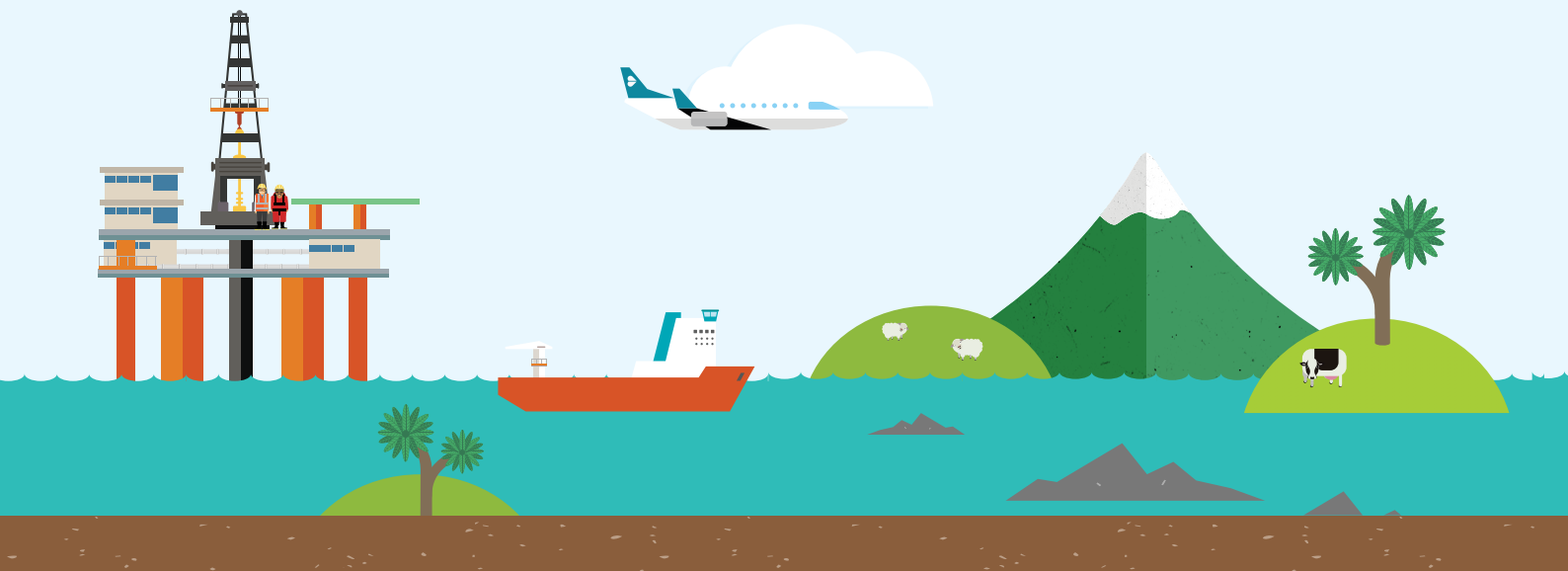
REFERENCES

1. After the 2020 election PEPANZ will publish a briefing to the incoming Minister of Energy and Resources with proposed policies and solutions to these challenges.

2. Infographic references:

- 400,000 users: The New Zealand Gas Story – published by the Gas Industry Company Limited (<https://www.gasindustry.co.nz/about-the-industry/nz-gas-story/document/5806>)
- 11,000 jobs: Venture Taranaki *The Wealth Beneath Our Feet* (2015) <https://www.martinjenkins.co.nz/assets/Home/The-wealth-beneath-our-feet-next-steps.pdf>
- 21% of our total energy: Energy in New Zealand (2019), Ministry of Business, Innovation and Employment
- Royalties and taxes averaging \$650m: New Zealand Petroleum and Minerals website <https://www.nzpam.govt.nz/our-industry/nz-minerals/minerals-data/industry-statistics/>, and Parliamentary Commissioner for the Environment: <https://www.pce.parliament.nz/media/197019/report-restricting-the-production-of-fossil-fuels-in-aotearoa-new-zealand.pdf>
- 12% electricity supply: Energy in New Zealand (2019), Ministry of Business, Innovation and Employment
- Oil exports value: Statistics New Zealand trade dashboard: https://statisticsnz.shinyapps.io/trade_dashboard/
- 95% of oil exported: Energy in New Zealand (2019), Ministry of Business, Innovation and Employment
- 11 years of natural gas supply: Ministry of Business, Innovation and Employment
- Petroleum reserves data, based on the average of the last four years of domestic natural gas usage www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/petroleum-reserves-data/
- What we use natural gas for: The New Zealand Gas Story – published by the Gas Industry Company Limited (www.gasindustry.co.nz/about-the-industry/nz-gas-story/document/5806)
- Natural gas keeps electricity prices down: the Interim Climate Change Committee (ICCC) report “Accelerated Electrification” www.iccc.mfe.govt.nz/what-we-do/energy/electricity-inquiry-final-report/
- Global demand for natural gas: World Energy Outlook 2019, International Energy Agency (IEA).
- Twice the average salary: New Zealand Petroleum and Minerals <https://www.nzpam.govt.nz/our-industry/value-benefits/>

3. Petroleum reserves data from the Ministry of Business, Innovation and Employment: www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/petroleum-reserves-data/



REFERENCES

4. Ministry of Business, Innovation and Employment discussion document: Review of the Crown Minerals Act 1991 www.mbie.govt.nz/dmsdocument/7320-discussion-document-review-of-the-crown-minerals-act-1991
5. See <https://www.stuff.co.nz/business/119766921/omvs-maui-redevelopment-to-extend-gas-fields-life>
6. Ministry of Business, Innovation and Employment briefing "Block Offer 2018 – Stages 1-3 Block Selection and Justification", 14 June 2017 and www.stuff.co.nz/business/104974545/oil-industry-claims-before-ban-interest-in-exploring-in-nz-was-the-highest-in-years
7. Gas production forecast - Ministry of Business, Innovation and Employment
Petroleum reserves data <https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/petroleum-reserves-data/>
8. Offshore exploration kilometres available: Ministry of Business, Innovation and Employment discussion document: Review of the Crown Minerals Act 1991 www.mbie.govt.nz/dmsdocument/7320-discussion-document-review-of-the-crown-minerals-act-1991
9. See for example Concept Consulting's "Electricity generation implications of large-scale fuel-switching from gas to electricity" www.gasnz.org.nz/uploads/Implications-of-gas-to-electric-switching-v03.pdf and Ministry of Business, Innovation and Employment technical paper "Process Heat in New Zealand: Opportunities and barriers to lowering emissions." www.mbie.govt.nz/have-your-say/process-heat-in-new-zealand-opportunities-and-barriers-to-lowering-emissions/
10. Interim Climate Change Committee (ICCC) report "Accelerated Electrification" <https://www.iccc.mfe.govt.nz/what-we-do/energy/electricity-inquiry-final-report/>
11. Presentation by John Kidd to the Gas NZ Industry Forum, October 2019: www.gasnz.org.nz/uploads/images/GasIndustryForum/1.%20John%20Kidd%20Enerlytica%20Challenges%20and%20opportunities%20for%20Gas.pdf
12. See <https://www.newsroom.co.nz/@environment/2019/03/06/475094/govt-open-to-advice-on-100-renewable-target-shaw>
13. Hydrogen in New Zealand – Report 1 Summary, Concept Consulting (January 2019): http://www.concept.co.nz/uploads/2/5/5/4/25542442/h2_report1_summary_v4.pdf
14. See for example: <https://www.interest.co.nz/news/94853/methanex-signs-agreements-gas-suppliers-so-it-can-keep-producing-methanol-nz-until-least>
15. See for example <https://www.newscientist.com/article/2181795-economics-nobel-prize-given-for-putting-a-price-tag-on-climate-change/>