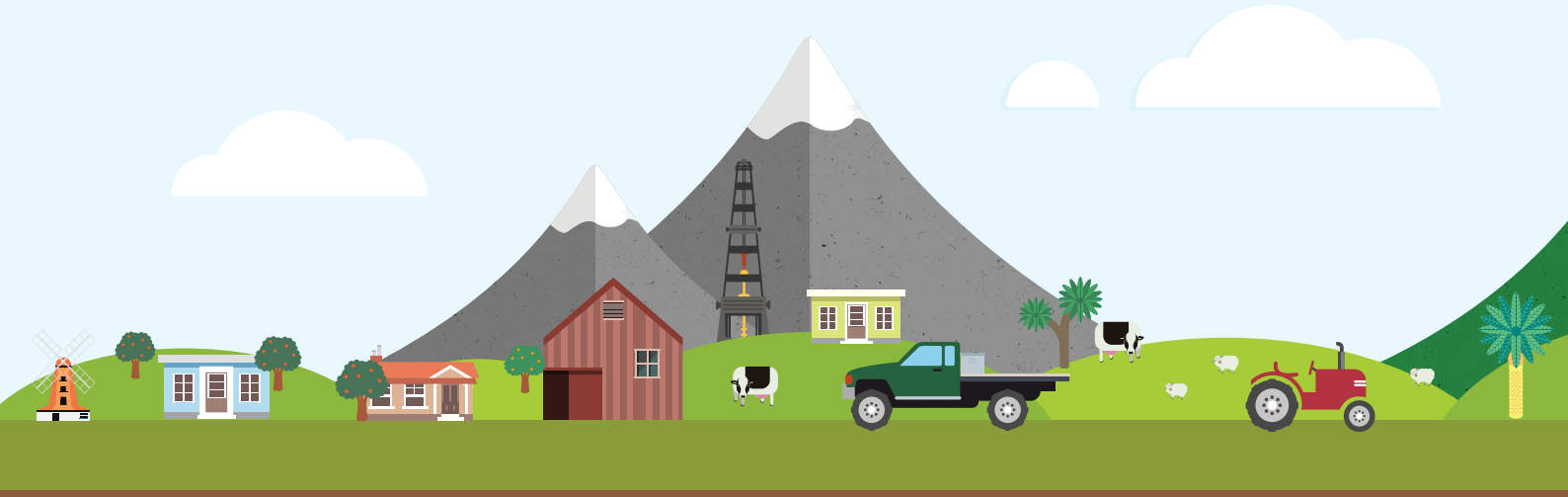
PEPANZ
PETROLEUM EXPLORATION & PRODUCTION ASSOCIATION OF NEW ZEALAND

A CHANGING ROLE

THE FUTURE OF OIL AND GAS IN A LOWER CARBON WORLD



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EXECUTIVE SUMMARY

Oil and gas have a crucial role to play in both the transition to a lower-carbon society, and as a long-term part of that world.

- In the future oil and gas will have much less of an impact on the environment as emissions are reduced, captured and offset.
- Forecasts show oil and gas will still make up around half of the world's energy needs by 2040, but will be used in different ways.
- The world's population will reach nine billion people by 2040 and will be wealthier and increasingly urbanised. We will need more energy from all sources to support this major increase in living standards.
- Electric vehicles and lower-emitting fuels will increasingly replace oil for transportation in motor vehicles, while natural gas will increasingly replace coal for industrial use and power generation.
- The net emissions generated by oil and gas can be reduced through:
  - » Substituting coal with natural gas (which has less than half the greenhouse gas emissions)
  - » Pricing carbon through the Emissions Trading Scheme (ETS)
  - » Using carbon capture and storage technology which may allow near zero emissions from the use of oil and gas
  - » Offsetting emissions through planting trees
- Oil and gas have a wide range of non-combustible uses that will continue to be important, such as medical and cosmetic products, plastics, building materials and clothing.
- It is not just possible, but essential for oil and gas to co-exist in a net zero emissions world. They bring enormous benefits to people's lives by providing affordable, reliable and sustainable energy.
- PEPANZ has a 'Net Zero Emissions Committee' to ensure the New Zealand petroleum sector is proactively involved in these efforts to reduce net emissions. Our industry is determined to be part of the solution, and this publication is a summary of our vision.

INTRODUCTION – WHAT FUTURE FOR OIL AND GAS?

The future of the oil and gas sector in New Zealand has never been more topical than in 2018.

In April 2018 the Government announced that no new offshore petroleum exploration permits would be granted, and that the future of onshore Taranaki permits beyond 2020 will be reviewed.

The new Government has also set ambitious goals of reaching net-zero emissions by 2050 and having 100% renewable electricity (in a normal hydrological year) by 2035.

Globally, the Paris agreement has set a goal of keeping the global temperature rise to under two degrees by 2100. Prime Minister Jacinda Ardern has stated "the world accepts our future isn't fossil fuels".[1]

With the rise of electric vehicles as well, surely oil and gas are on the way out – in the long term at least?

Perhaps surprisingly to some people, the answer is clearly 'no'. As we outline in this publication, nearly every energy forecast for the future shows a major and ongoing role for oil and gas.

It will be a different role – less oil will be used for road transport, for example – but they will still be very important for electricity generation, transport and process heating as well as manufacturing everyday products.

Oil and gas can not only help with the transition, but will also co-exist in a lower carbon world.

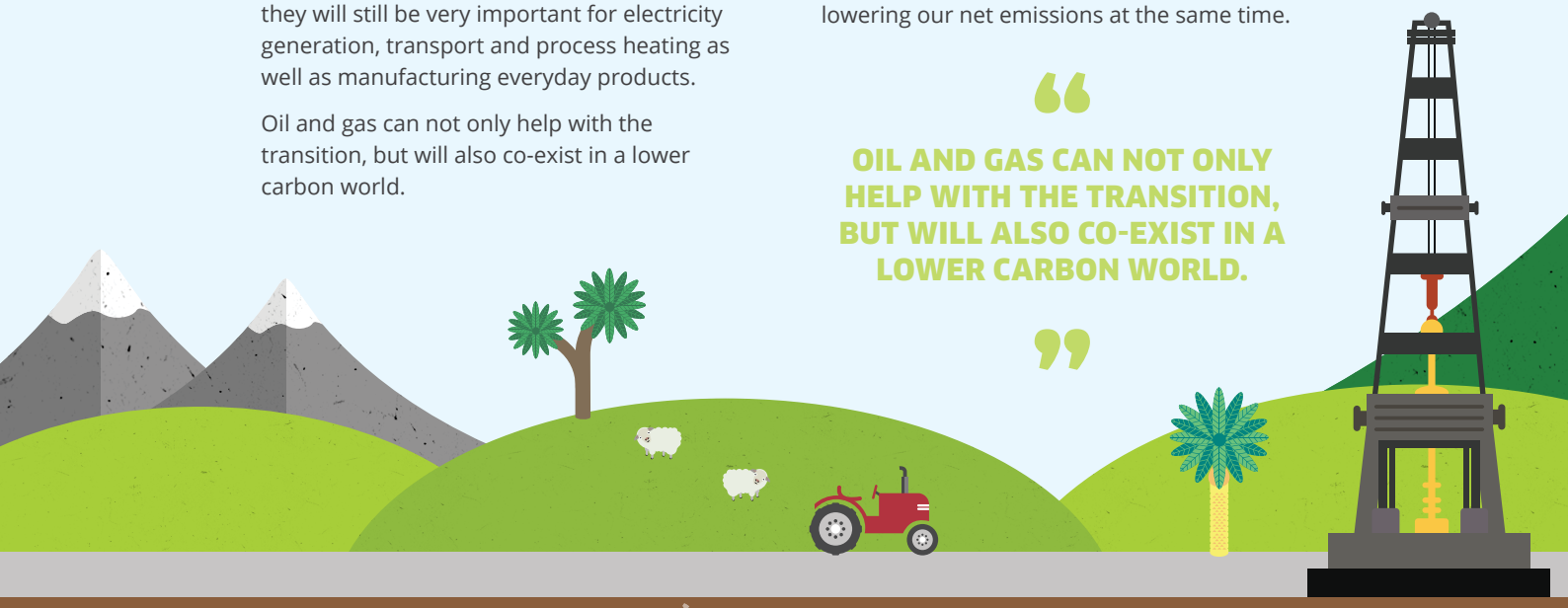
This is especially true for natural gas which is already helping reduce emissions around the world by replacing coal in power generation. It will be a major support and complement to the growth of renewable energy.

Carbon capture and storage, planting more trees and improving energy efficiency are just some of the ways this can happen while reducing our net emissions and meeting the ambitious goals of the Paris Agreement. Increasing use of electric vehicles and renewable energy sources, and being smarter with the way we use energy will also play an important part.

This publication sets out how and why we can continue to enjoy the benefits of fast, affordable, reliable and effective energy to power our lives, while reducing our overall environmental footprint for the benefit of future generations. Our industry is a crucial part of the solution to this fundamental challenge of the 21st century.

Part One looks briefly at how we use oil and gas today, and how this is expected to change in the coming decades. Part two looks at ways we can continue to use oil and gas while lowering our net emissions at the same time.

"OIL AND GAS CAN NOT ONLY HELP WITH THE TRANSITION, BUT WILL ALSO CO-EXIST IN A LOWER CARBON WORLD."



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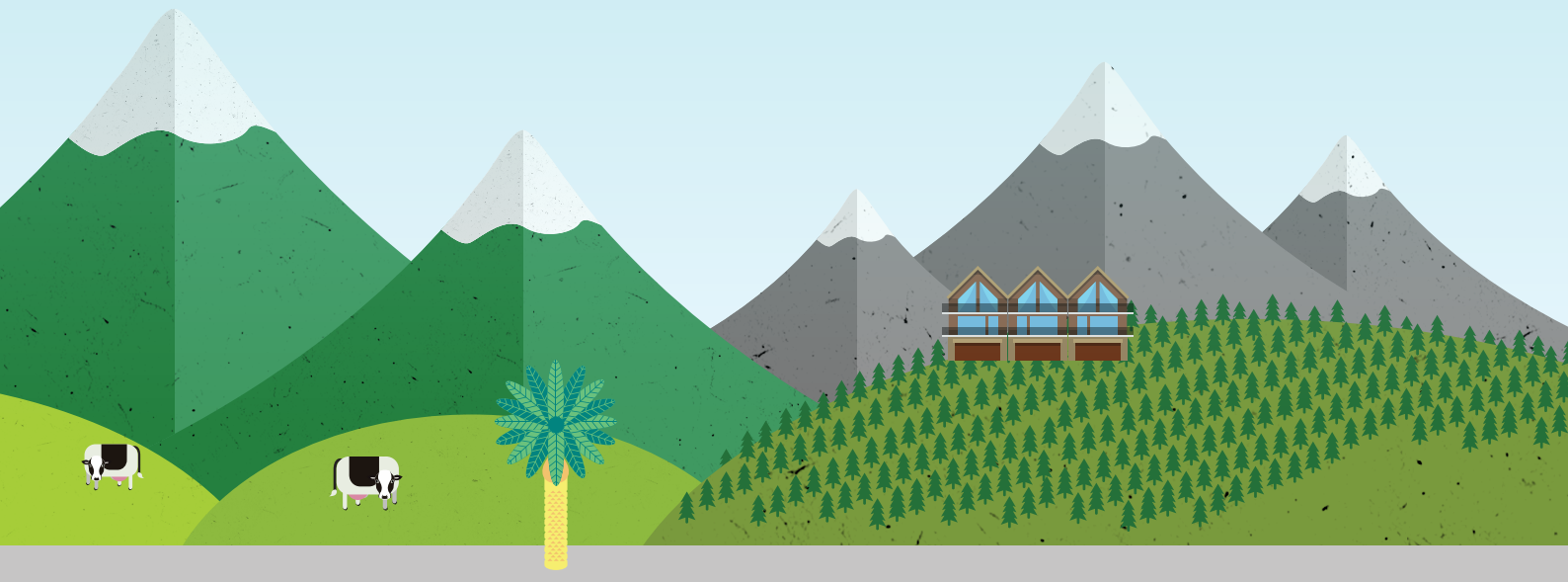
PART ONE

THE FUTURE FOR OIL AND GAS



WHAT DO WE USE OIL AND GAS FOR NOW?

Energy underpins three of the most basic necessities for human survival: food, clothing and shelter.

Right now, oil and gas provide **60%** of New Zealand's total energy[2] and over **50%** of the world's total energy.[3] It is difficult to overstate their importance to our way of life and the economic and social benefits they bring.

Natural gas provide homes, businesses, schools and hospitals with instantaneous energy, providing heat, electricity and continuous hot water.

Oil helps power much of our transport network, including air, rail, road and sea travel, upon which society and the economy rely upon.

Importantly, oil is not just petrol for cars. In fact, only around 50% of oil is used for road transport.

The rest is used for aviation, shipping, and industrial use. Around 16% of produced oil is used in everyday non-combustible products like medical and cosmetic products, plastics and clothing.[4]

New Zealand produces all of its natural gas domestically which provides just over 20% of our total energy, including around 14% of our electricity supply.[5]

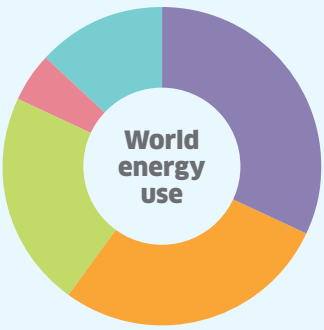
Uses of natural gas include:

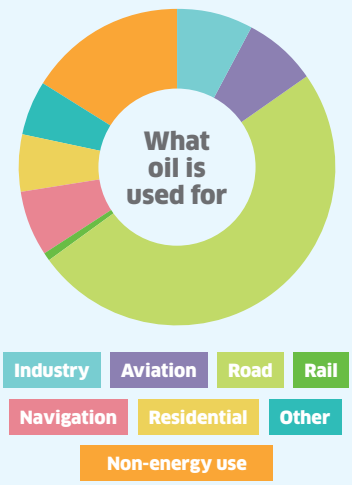
- Making petrochemicals like methanol (a clear liquid chemical with a range of uses) which is exported, and urea fertiliser;
- Electricity supply;
- Industrial heat processing (dairy, meat, timber, steel, food processing, petroleum refining); and
- Use by 400,000 households, small businesses, schools, hospitals etc.[6]

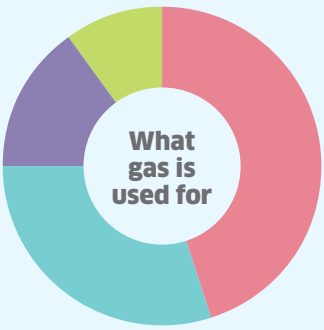
Many of these industries would not exist in New Zealand without a ready supply of natural gas.

Oil and gas also deliver major economic benefits to New Zealand, contributing around $2.5 billion per year to the economy and responsible for the employment of up to 11,000 people at peak times.

On average the Government receives around $500 million per year in royalties and taxes from the sector. To put in context, this is the equivalent of the 2018 pay settlement for nurses, or it could cover the cost of Wellington's new Children's Hospital ten times over.







*See pages 20 – 21 for references

GLOBAL ENERGY DEMAND IS BOOMING

The world population is expected to reach 9 billion by 2040[7] and become increasingly wealthy and urbanised.

This will drive global energy demand which is forecast to increase 30% over this period – the equivalent of adding another China and India to today's global demand.[8]

The number of people currently with no access to electricity (1.1 billion) is also expected to fall as global standards of living improve, and large numbers of people move into the middle class and consume more energy as a result.[9] In China, the average household will consume nearly twice as much electricity in 2040 as it does now.[10]

Around three billion people still use wood, coal or animal dung to cook and heat their homes which has a major impact on human health and the environment.[11] Around four million people every year die from poor air quality, and the expense and effort of gathering fuel for many is substantial.

Increased use of natural gas therefore has potential to deliver enormous economic, social and environmental benefits.

Renewable energy sources are growing quickly and becoming cheaper, and are forecast to provide 40% of this increased global demand.[12] This is a significant and positive growth, but still leaves a whopping 60% of new global energy demand to be met.

This means we will need more energy from *all* low-carbon sources – including both renewables as well as efficiently produced oil and gas.

*Oil and gas are still expected to supply **half** of the world's energy needs by 2040 – around the same proportion as now.*[13]

This is the finding of the International Energy Agency (IEA) in all three of their projected scenarios.

The global future for oil and gas

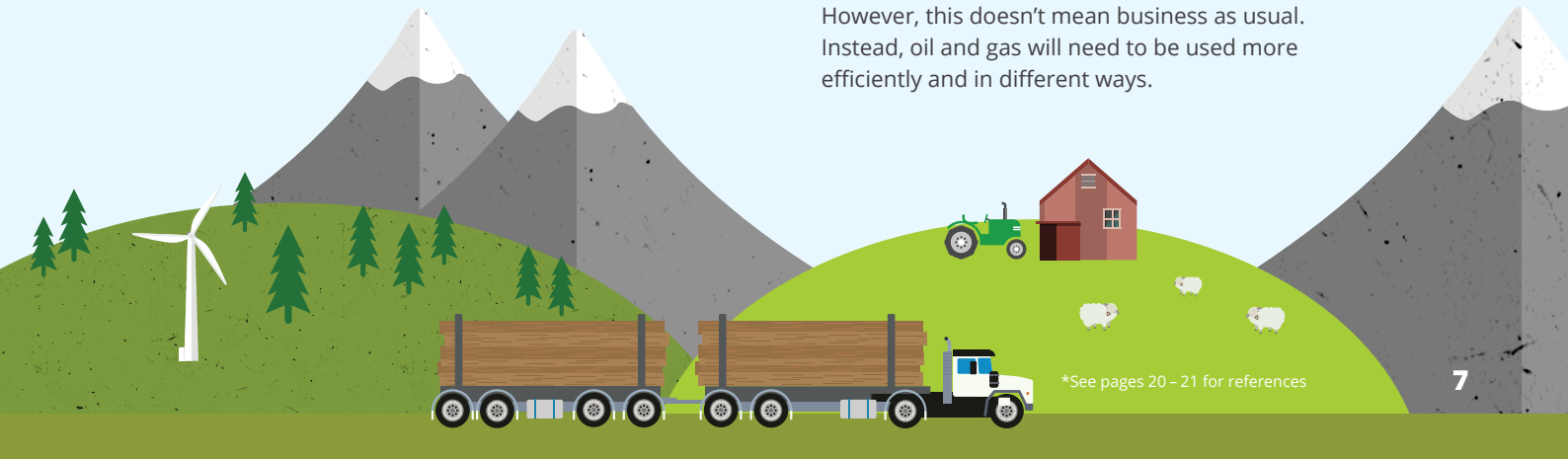
Global natural gas usage is expected to grow **45% by 2040**, providing a quarter of the world's energy according to the IEA's 'New Policies' scenario.[14] It will increasingly be used for power generation to displace coal and potentially for shipping, trucks and buses in the form of LNG.

Projections show demand for oil will be slower and potentially even decrease with the rise of electric cars, but it will continue to be **the world's biggest source of energy**.[15]

While electric vehicles will become more common for domestic use, other uses of oil (such as petrochemicals, heavy transport, aviation, 3D printing and building materials) will continue to drive demand.

The appeal of natural gas is no surprise. As well as being affordable, accessible and practical, it has less than half the emissions of coal which is still widely used around the world.

However, this doesn't mean business as usual. Instead, oil and gas will need to be used more efficiently and in different ways.



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NEW ZEALAND'S ENERGY FUTURE – NO MORE FOSSIL FUELS?

The New Zealand Government has set an ambitious goal of reaching net-zero emissions by 2050. Carbon budgets will be set by an independent Climate Change Commission which will set interim targets to eventually reach this goal.[16]

Alongside this, the Government is aiming to achieve 100% renewable electricity generation by 2035 with the important caveat of "in a normal hydrological year".[17] This means that gas and coal will play a smaller, but still crucial role in providing back-up supply during times of peak demand.

Electric vehicles could make up 40% of our vehicle fleet by 2040, according to some forecasts.[18]

All of these factors mean our domestic use of oil is unlikely to grow strongly.

At the same time though, while petrol consumption may decline, both oil and gas are still very likely to play a major role in meeting our energy needs in the following ways:

- Heavy transport e.g. trucks
- Shipping
- Air travel
- Heating for homes, businesses and community facilities
- Industrial use – especially for heat, such as milk processing
- As a 'feedstock' for conversion into another product such as plastics, bitumen, fertiliser and methanol. Most of these products are not burnt and therefore create no emissions, apart from in their manufacture.

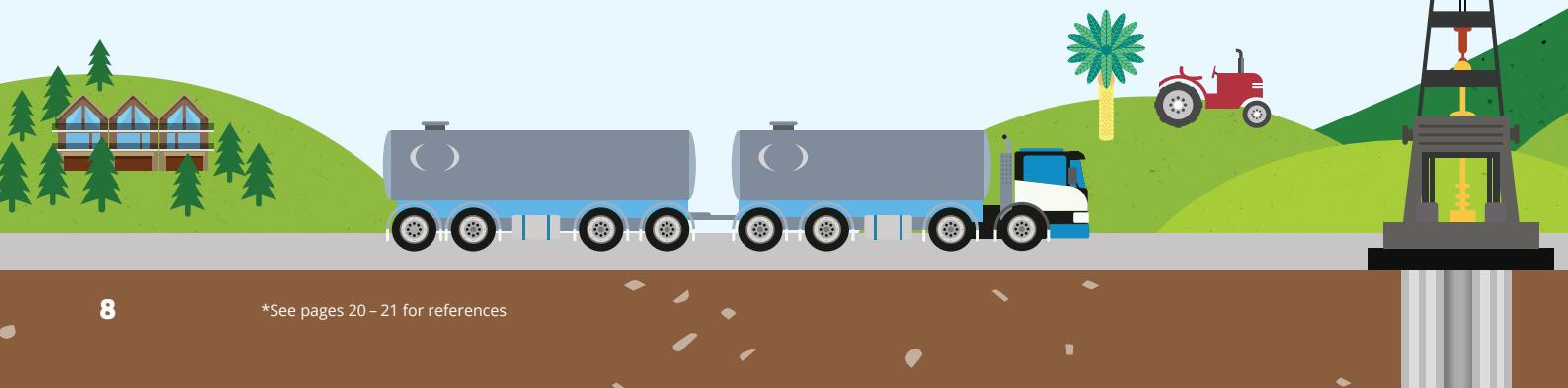
How realistic would it be for New Zealand to move 100% away from all use of fossil fuels? A recent study by Concept Consulting Group found:

> **"If New Zealand wishes to completely transition away from petrol/diesel for transport, and coal for industrial process heat, and gas for process-space-and-water heating, the amount of new renewable generation required would be very large – approximately doubling the annual electricity demand."[19]**

Without some radical development of new technology, trying to double our electricity supply would be an impossible ask in terms of practicality and affordability.

It could mean doubling the 17 current wind farms and building a range of new dams and hydro power stations throughout the country. Just gaining resource consent to build these new sources would be extremely challenging.

Even then, the report notes *"the use of electricity for some of the very high-temperature industrial process requirements is not considered feasible."*



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WHAT HAPPENS WHEN WE RUN OUT OF NATURAL GAS?

New Zealand has just over 10 years of known natural gas reserves left and the prospect of new finds have been reduced by the Government's decision to end the granting of new offshore exploration permits.

If our gas supplies run out then New Zealand will need to import gas from overseas[20] and/or develop renewable energy at an unfeasible rate. Either outcome is likely to be more expensive for consumers.

New investments may be forced into using coal. This would be a poor outcome for the environment given that coal has twice the greenhouse gas emissions of natural gas.

Imported LNG is another likely replacement, most likely from Australia and the USA. Both countries are preparing to increase their production and export of this fuel to meet global demand and shortfalls in renewable energy.

Electrification to replace natural gas would be another alternative. However, a recent study estimated this would require a 35% increase in electricity generation.[19] As noted previously, this would be very challenging and expensive.

Overall the report concludes that displacing existing uses of gas is one of the least economic ways of decarbonising the economy.[19]

> **"IF OUR GAS SUPPLIES RUN OUT THEN NEW ZEALAND WILL NEED TO IMPORT GAS FROM OVERSEAS AND/OR DEVELOP RENEWABLE ENERGY AT AN UNFEASIBLE RATE."**

*See pages 20 – 21 for references

WHAT HAPPENS IF WE STOP OIL PRODUCTION IN NEW ZEALAND?

Put simply, the relatively small gap left by New Zealand production of oil would quickly and easily be filled by global supply.

This means the environmental impact of ending New Zealand's oil exploration and production would be minimal, but the economic impact would be significant given it generates around $1.5 billion a year in exports.

Nearly all of the oil produced in New Zealand is exported overseas and becomes part of the global market.[21]

To give a sense of scale, New Zealand produces 15 million barrels of oil per year, while Saudi Arabia produces 10 million barrels per *day*.[22] This means our annual supply is around 0.4% of Saudi Arabia's.

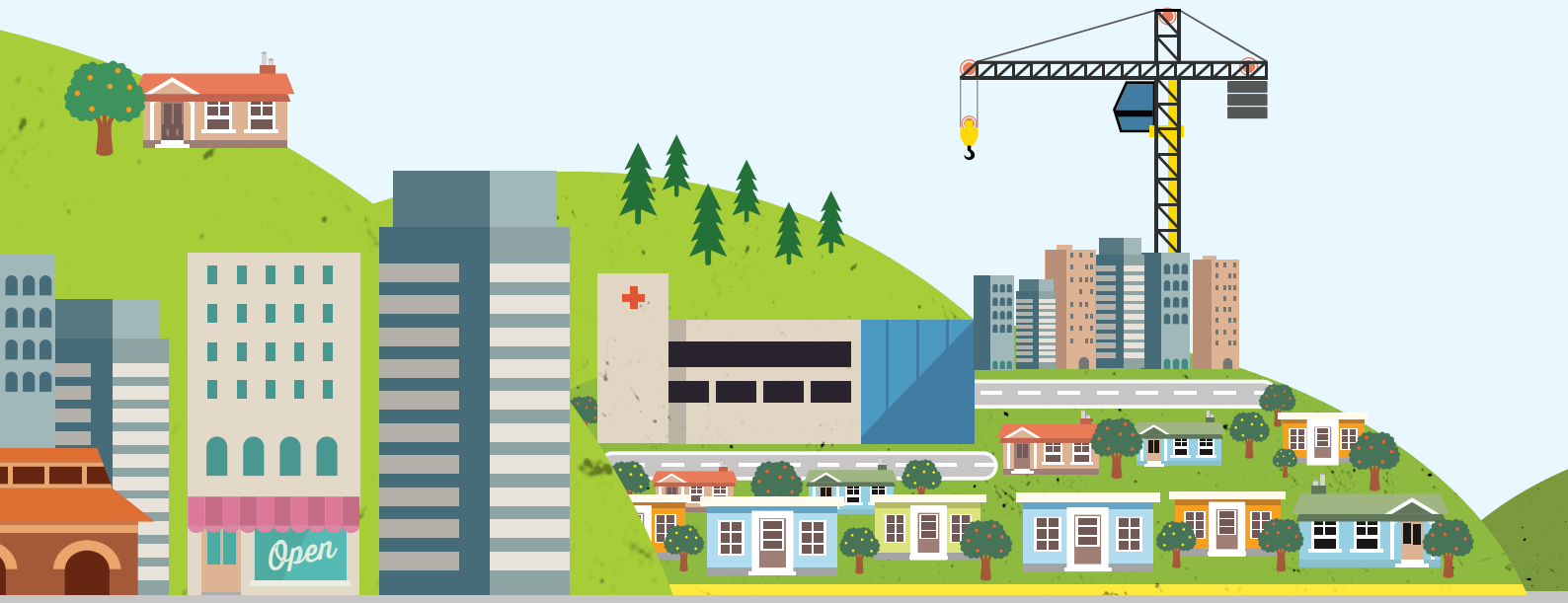
Importantly, not all oil is the same. New Zealand oil requires less energy to extract than foreign sources, such as Venezuelan bitumen, Canadian tar sands, or heavy crudes from Saudi Arabia.

It is also light and sweet which means it requires less refining than heavy oils and less treatment for sulphur removal.

In many cases these foreign producers also have lower health and safety and environmental standards than New Zealand, and less stringent employment and human rights records.

This is the issue of 'carbon leakage' that arises if New Zealand stops production and every other global producer does not do the same. Production is then likely to shift to higher-emitting producers, meaning a rise in overall global emissions.

This reinforces a fundamental principle of the Paris Agreement that climate change is a global issue requiring coordinated global engagement and action.



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PART TWO

HOW TO REDUCE EMISSIONS WHILE STILL USING OIL AND GAS

HOW TO REDUCE EMISSIONS WHILE STILL USING OIL AND GAS

As outlined in Part One, oil and gas will remain a fundamental part of our lives for the foreseeable future – albeit in different, more efficient and sustainable ways.

One of the great challenges of the 21st century is how to deliver this energy while reducing net emissions at the same time. It is a challenge the oil and gas industry is up for.

Net emissions are what drives climate change, and it is essential as a society and an industry we reduce them.

This is a major focus for our industry and it should be the consistent and clear goal of Government policy around the world.

It's important to stress here the difference between 'net' and 'total' emissions. Clearly there will never be zero *total* emissions, as long as there is human and industrial activity of any kind. But emissions can be minimised, and importantly, *offset* with other efforts like planting more trees which absorb carbon dioxide.

This section looks at the different ways our industry, Governments and society can reduce net emissions – both in New Zealand and around the world. This creates a 'win-win' scenario where we can still enjoy the benefits of fast, affordable, and effective energy to power our lives, while reducing our overall environmental footprint.

However, it is important to note that there is no one silver bullet here. No single option will be enough on its own, and we will need a range of different tools used together.

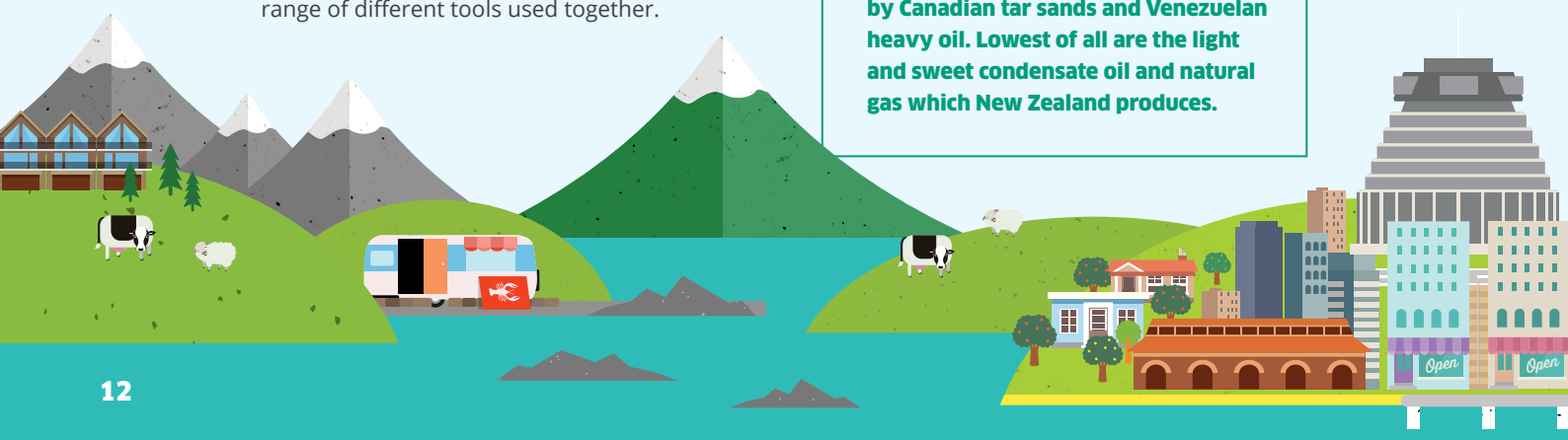
Oil and gas will still play a fundamental role in our lives in 2040 and beyond. The challenge is not to replace them, but to reduce our impact on the environment by lowering our net emissions.

What about concerns we can't afford to burn half of known fossil fuel reserves?

Renewable energy sources alone cannot meet global demand (as outlined in Part One) so we will need a mix of energy sources. Even in the Paris Agreement two-degree scenario, more oil and natural gas will be required and gas is the best in terms of emissions which can be reduced, captured and offset (as outlined in Part Two).

Importantly, not all fossil fuels are the same. Most of these reserves are coal which has twice the emissions of natural gas. This is exactly why we need to prioritise the reserves with the lowest emissions using policy tools like the ETS.

Some sources also require more energy to extract and process. The most carbon intensive fuel is coal, followed by Canadian tar sands and Venezuelan heavy oil. Lowest of all are the light and sweet condensate oil and natural gas which New Zealand produces.



NATURAL GAS AS A TRANSITION FUEL

Natural gas has half the emissions of coal, which currently provides 28% of the world's energy and 45% of global carbon dioxide emissions.[23] Coal is clearly the single biggest contributor to man-made climate change.

Switching from coal to natural gas, especially for electricity generation, is one of the fastest, lowest cost and most secure routes to significantly reduce emissions for many countries.

This switch is a major reason why carbon dioxide emissions in the US have fallen 14% since 2005,[24] and the UK's emissions have fallen to their lowest level since the 19th century – 36% below 1990 levels.[25]

There is great potential for other countries to follow suit and make similar gains. In China, for example, around 66% of electricity generation still comes from coal and they continue to build new coal-fired power plants.[26]

Somewhat ironically, while the US has pulled out of international environmental treaties like the Paris Agreement, they would have been the only country to meet their targets thanks to using more natural gas.

Here in New Zealand coal is responsible for 7% of our greenhouse gas emissions and is still widely used for industrial heating processes such as in milk plants and timber processing.[27] Switching these processes to gas could therefore lead to a major reduction in New Zealand's emissions.

Natural gas is already being used as transport fuel, particularly for heavy transport including trucks and buses. Methanol produced from natural gas is also seen as a very promising fuel for modern shipping.

This is why the export of Liquified Natural Gas (LNG) is growing fast around the world. In Australia, Chevron has invested $62 billion into the Gorgon development off the coast of Western Australia which will produce and export LNG directly to Asia.

The US is also gearing up to become a major exporter of LNG, and is expected to be the world's largest by the mid-2020s.

The IEA is clear that:

> **"Gas needs to be seen as part of the solution to local and global environmental problems", while also acknowledging the need to "reassure not just policy-makers, but also an occasionally sceptical public, that gas can have a rightful place in the future of global energy."[28]**

Clearly natural gas is not just a 'transition fuel', but a 'destination fuel' as well.

Developing and exporting our own natural gas reserves to replace coal could be one of the biggest contributions New Zealand ever makes to global emissions reductions.

Natural gas will also play a crucial role in supporting renewable energy sources like solar and wind. The sun doesn't always shine and the wind doesn't always blow, so a back-up is essential

*See pages 20 – 21 for references

PRICING EMISSIONS THROUGH THE EMISSIONS TRADING SCHEME (ETS)

Putting a price on emissions is the simplest and most effective policy tool for reducing net emissions because the more you emit, the more you pay. As long as the price is clearly signalled, it provides transparency and certainty to consumers and industry.

New Zealand's ETS creates a direct financial incentive for businesses to invest in technologies and practices that reduce emissions. It also encourages forest planting which helps absorb emissions.

For this reason, it is the Government's principal policy response to climate change and one supported by PEPANZ. We think it should be consistently applied and include all sectors, including agriculture. At present just over half of New Zealand's greenhouse gas emissions are covered by the ETS.[29]

If there is adequate global action, carbon pricing means that over time the most efficient energy sources will be developed. Higher emitting sources like coal will become less economic, while lower emitting sources like natural gas will be more likely to be developed.

It's also important that the ETS evolves in line with similar schemes in other countries so we avoid the problem of 'carbon leakage', whereby production shifts to different jurisdictions with the same (or higher) level of emissions.

NON-COMBUSTIBLE USES OF OIL AND GAS

Around 16% of oil produced is not burned. Instead, it is used to make thousands of everyday products that release no emissions.

In total, around 14 million barrels of oil per day go towards non-energy uses. Nearly every product in our daily life contains petroleum in some way, including medical and cosmetic products, building materials, plastics, and clothing. In many cases there is no affordable or practical alternative.

Natural gas is also an important feedstock for hydrogen fuel which produces near zero emissions.

Car bodies | **Mobile phones** | **Cosmetics** | **Eyeglasses** | **Appliance components**

OFFSETTING THROUGH TREE PLANTING

Trees act as a carbon 'sink', absorbing emissions and reducing the greenhouse gases entering the atmosphere.

Forests already offset 30% of New Zealand's emissions,[30] which is a major reason why the Government has set a goal of planting one billion trees over the next 10 years.

The Productivity Commission's report into a low emissions economy predicts that forestry land will have to increase by between 1.3 million and 2.8 million hectares, mostly from sheep and beef farms. This is between five and 10 per cent of New Zealand's total landmass, which could be the equivalent size of the entire Waikato region.

To encourage this, it recommends providing more certainty around the ETS and a more active approach from the Government towards afforestation on government-controlled land.

However, at some point beyond 2050 carbon sequestration will reach a limit as economically viable land for new forests is used up.

*See pages 20 – 21 for references

USING TECHNOLOGY TO CAPTURE AND/OR PROCESS EMISSIONS

Current and developing technologies make it possible for fossil fuels to be burned while limiting the release of greenhouse gas emissions.

Carbon capture and storage (CCS) is the process of capturing carbon emissions from large sources such as power plants and storing them where they cannot escape into the atmosphere, usually deep underground in geological formations.

Large scale CCS is a reality today and can remove as much as 90% of carbon dioxide from major projects.

One of the earliest examples is Equinor's Sleipner CCS Project in Norway, which has captured almost 17 million tonnes of carbon dioxide from an offshore natural gas production facility and permanently stored them in a sandstone formation deep under the seabed.[31] This is roughly equivalent to 20% of New Zealand's annual greenhouse gas emissions.

Another emerging technology is the 'Allam Cycle' process which can potentially capture all of the carbon dioxide generated. A prototype $160 million plant is now in production testing near Houston in the USA.[32] GNS Science in New Zealand has also carried out research into New Zealand's CO_2 storage potential.[33]

Closer to home, $2 billion is being invested into this technology at the Gorgon Project – the world's largest natural gas development in Western Australia. Once complete it will include the world's largest CO_2 injection plant able to store up to four million tons of CO_2 per year, estimated at 40% of total Gorgon Project emissions.[34]

According to IPIECA (the global oil and gas industry association for environmental and social issues):

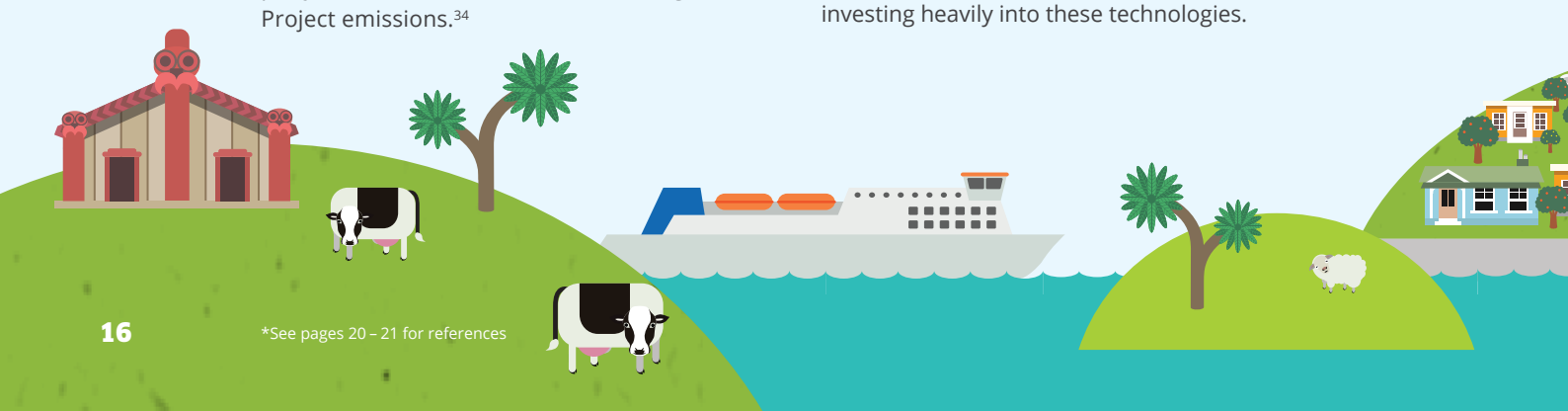
> **"Without large-scale commercial development of this technology, realising a low-emissions pathway will be much more difficult and costly."[35]**

The Intergovernmental Panel on Climate Change (IPCC) also attaches much importance to CCS, estimating it could make up to 55% of the total carbon mitigation efforts until the year 2100.[36]

CCS opportunities have been identified in New Zealand. While it's currently uncertain how much of a role this technology could play here, PEPANZ recommends the Government introduce a comprehensive regulatory framework so that it can be deployed in future.[19] This is also a recommendation of the Productivity Commission in their Low-emissions economy report.

CCS is not an easy process. Some of the challenges include the cost, regulatory and policy uncertainty, and the practicality of finding the right large-scale storage sites required.

However, over time, these challenges can and will be addressed as the oil and gas industry is investing heavily into these technologies.



*See pages 20 – 21 for references

REDUCING THE EMISSIONS FROM OIL AND GAS PRODUCTION

While most of the emissions related to oil and gas come from their end use, the impacts from production are not insignificant.

It is estimated the oil and gas industry emits about 8% of global greenhouse gas emissions through processes like flaring, venting and leaks (although in New Zealand the figure is less than 2%).[37]

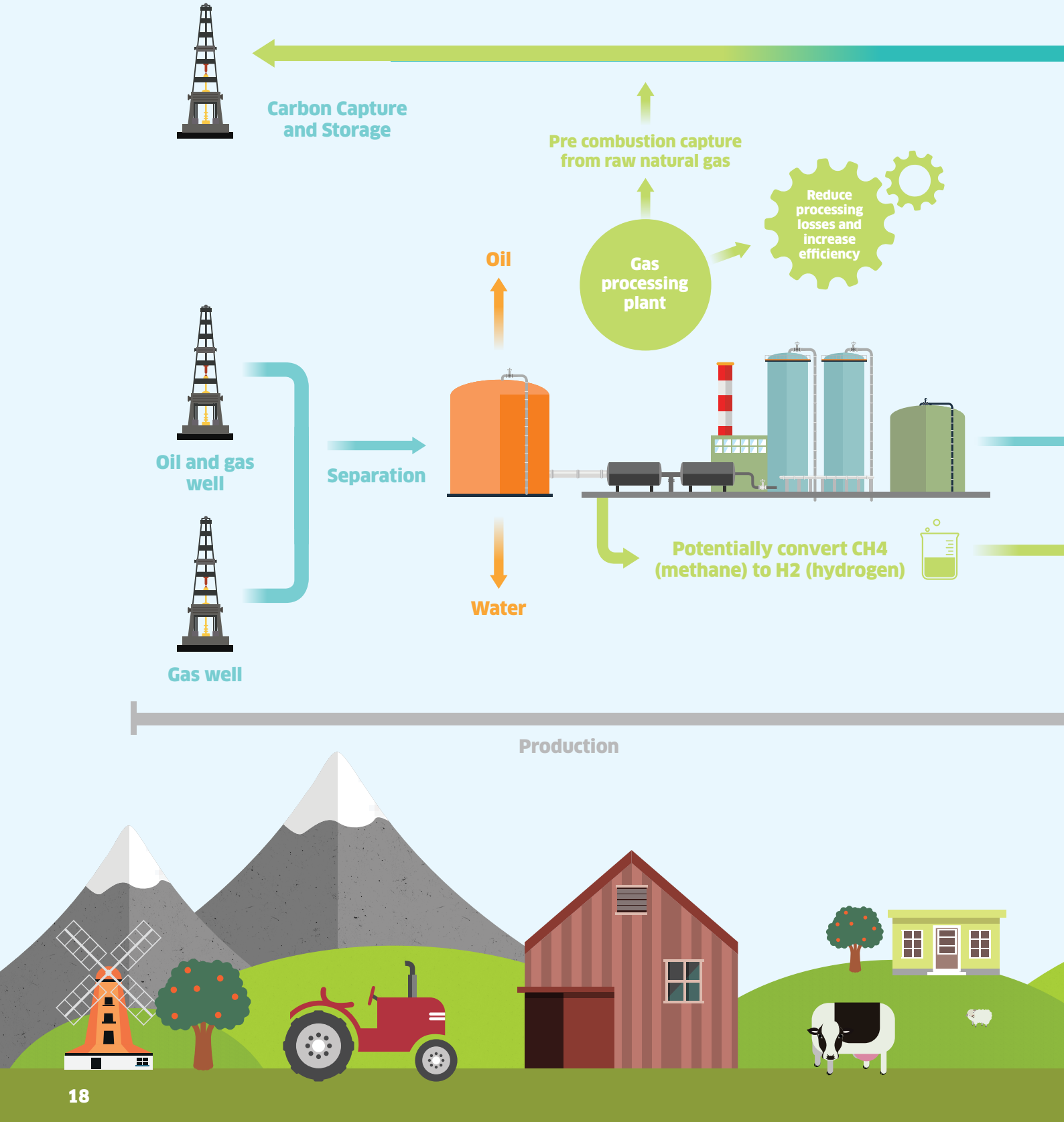
This is particularly true for fugitive methane emissions which are potent, but short lived. For this reason there is debate over whether reducing methane emissions should be as high priority as carbon dioxide emissions, given their rapid decay.[38] However, the IEA notes:

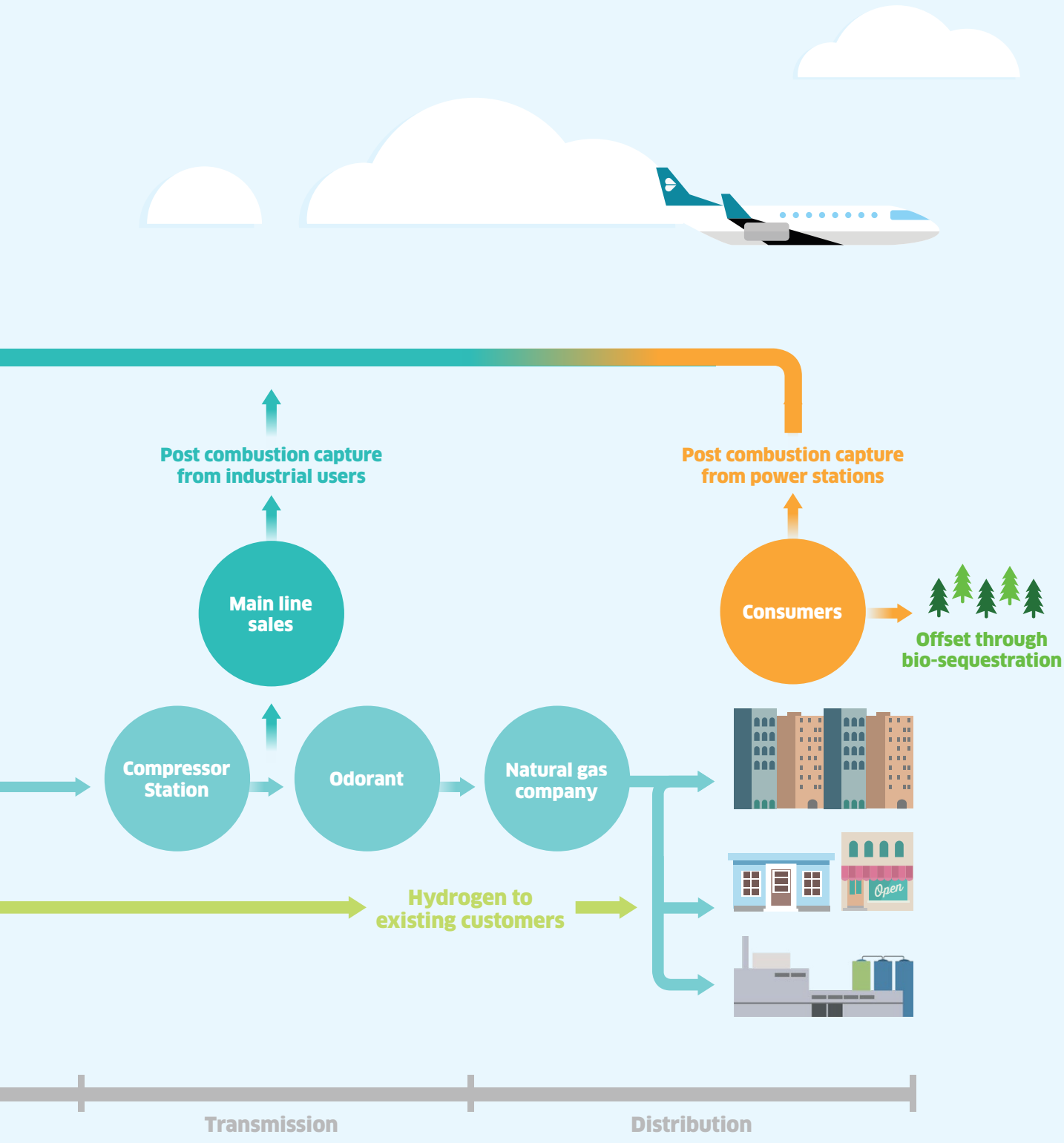
> **"The uncertainty in oil and gas methane emissions levels is high, but enough is known to conclude that these emissions cannot be ignored and that they represent a clear risk to the environmental credentials of natural gas."[39]**

The industry is acutely aware of this, and voluntary and regulatory efforts are increasing to tackle this challenge both here in New Zealand and globally. Progress is being made; for example, flaring (the burning of excess gases) by the industry worldwide has reduced by 20% between 2005 and 2012.[40]

*See pages 20 – 21 for references

Ways the oil and gas industry is reducing emissions through the production process




Post combustion capture from industrial users
Post combustion capture from power stations
Main line sales
Consumers
Offset through bio-sequestration
Compressor Station
Odorant
Natural gas company
Hydrogen to existing customers
Open
Transmission
Distribution


PUBLIC HALL

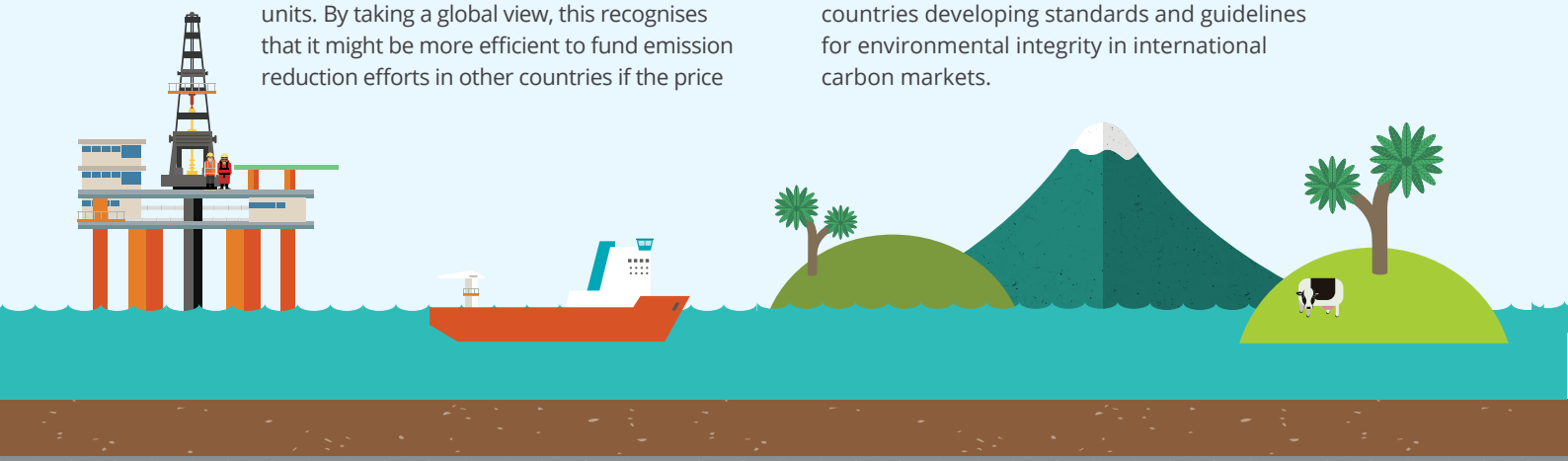
INTERNATIONAL COOPERATION ON REDUCING EMISSIONS

Taking both a global and a local view on emissions is crucial. By producing and exporting natural gas from New Zealand we might increase our domestic emissions, but at the same time reduce the world's total net emissions which would be a net positive result.

To this end, Article 6 of the Paris Agreement allows for bilateral and regional cooperation which means we can secure international carbon mitigation credits for this process.

New Zealand could also supplement domestic climate change action by purchasing high integrity international emission reduction units. By taking a global view, this recognises that it might be more efficient to fund emission reduction efforts in other countries if the price of carbon is very high in New Zealand. This would be a better outcome for both the global environment and our local economy.

A challenge will be ensuring the environmental integrity of this trading system. New Zealand currently leads the Ministerial Declaration on Carbon Markets – a group of countries developing standards and guidelines for environmental integrity in international carbon markets.



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14. Ibid – excerpt 'Outlook for Natural Gas'. The New Policies Scenario describes where existing policies and announced intentions might lead the energy system, in the anticipation that this will inform decisionmakers as they seek to improve on this outcome

15. Ibid page xiv. Under the more ambitious 'Sustainable Development' scenario, natural gas would become the world's largest source of energy by 2040.

16. Note that the detail, in terms of the gases and sectors that this applies to, is currently under consideration by the Government.

17. New Zealand Labour Party 2017 Energy Policy

18. https://www.stuff.co.nz/motoring/news/99859535/our-supercharged-future-electric-vehicles-to-make-up-40-per-cent-of-fleet-by-2040

19. Concept Consulting Group "*Electricity generation implications of large-scale fuel-switching from gas to electricity*" 20 April 2018

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CONCLUSION

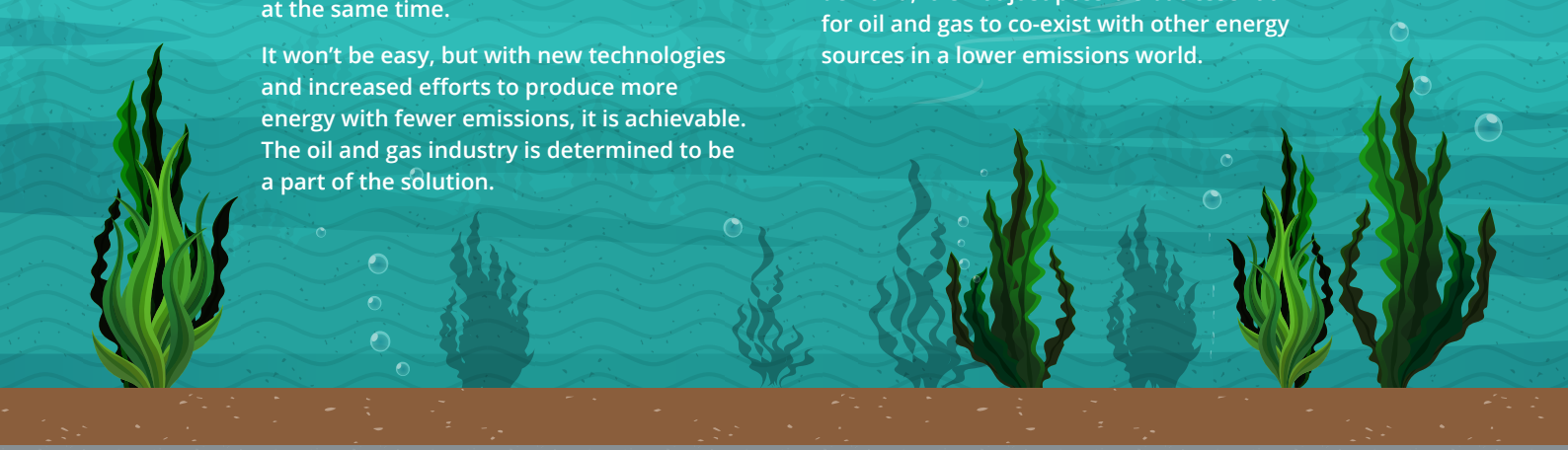
The future energy mix for New Zealand and the world needs to be smarter, cleaner and more efficient. It needs to meet what is known as the energy 'trilemma' – providing energy security, equity, and environmental sustainability.

Oil and gas will clearly be a key part of meeting this great challenge, providing enough energy for people to live better lives while reducing our environmental footprint at the same time.

It won't be easy, but with new technologies and increased efforts to produce more energy with fewer emissions, it is achievable. The oil and gas industry is determined to be a part of the solution.

This is a good news story given the enormous benefits oil and gas bring to our lives.

Given massively increasing global energy demand, it is not just possible but essential for oil and gas to co-exist with other energy sources in a lower emissions world.



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35. IPIECA *Exploring low emissions pathways: Advancing the Paris Puzzle* 2016

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38. Ministry for the Environment's "Our Climate: Your Say" discussion document on the Zero Carbon Bill, available at www.mfe.govt.nz

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40. IPIECA *Exploring low emissions pathways: Advancing the Paris Puzzle* 2016 page 10

PEPANZ – WHO WE ARE

PEPANZ is the industry association of the upstream oil and gas sector.

Established in 1972, PEPANZ works with local and central government to ensure New Zealand's regulatory and commercial framework promotes quality investment, and that the return from the country's oil and gas resources is maximised for industry, government and the community.

PEPANZ works to increase community and government understanding of the industry by publishing information about the sector's activities and economic importance to the nation.

As representatives of New Zealand's oil and gas industry, PEPANZ also provides its members with strong representation and advocacy, leadership for industry wide issues, while engaging openly and honestly with New Zealanders.

PEPANZ members currently account for an estimated 95 percent of New Zealand's petroleum production. We also represent more than 40 associate member companies that provide a range of goods and services to the industry.

PEPANZ believes that developing New Zealand's oil and gas sector can enrich New Zealand's future – the future of member companies, communities and the economic future of New Zealand's regions as part of a net-zero emissions economy.

PEPANZ Priorities

Advocate

Fair, transparent and workable regulatory environment

- Policies needed to responsibly advance the sector are understood and advanced
- Specific issues resolved (e.g. Decomissioning regulations, EEZ regulations and guidance to Maritime Transport Rules)
- Sensible district plans
- Evidence-based, consistent, fair and stable policy settings for marine use and protection
- Economically and environmentally reasonable and rational framework for emissions reduction
- Effective relationships with key stakeholders

Engage

Trusted by New Zealanders

- Regarded as an authorative and reasonable voice in the debate about the future of energy and the environment
- Increase public knowledge, favourability and trust in the sector
- Promote evidence-based discussions about the sector and its role in providing energy and reducing emissions
- Effective relationships with key stakeholders

Support

Valued by Members

- Increased networking opportunities for Members
- Responsible and responsive to Members
- Relevant and regular communication with Members
- Outstanding conference
- More guidelines developed
- Effective relationships with Members

OUR BOARD

PEPANZ is governed by a Board that is elected annually from our membership base. The Board meets quarterly, and sets the strategy for the organisation as well as monitoring the delivery of our Business Plan.

Joanna Breare

Chair
Todd Energy

David Coull

Deputy Chairman
Bell Gully

Gabriel Selischi

Representing Large Producers
OMV

Mat Quinn

Representing Large Producers
Beach Energy

Max Murray

Representing Medium Producers
TAG Oil

Andrew Jefferies

Representing Medium Producers
New Zealand Oil & Gas

Nathan Palmer

Representing Large Explorers
Chevron

Jason Peacock

Representing Small Producers / Small Exporters AWE

Nick Jackson

Representing Associate Members
Elemental Group

OUR STAFF

Meet our team of professionals

Cameron Madgwick

Chief Executive

Cameron is the Chief Executive of PEPANZ, a role he took up in September 2014. Cameron's interest in the oil and gas industry started at an early age. Growing up in Taranaki he saw first-hand how a strong and robust oil and gas industry can truly benefit a community – both their financial and social well-being.

With the knowledge he has gained as Chair of the Community Law Centres o Aotearoa, his background as a lawyer and the work he has done in various community engagement roles, Cameron is committed to ensuring New Zealanders have access to factual, honest and transparent information about the oil and gas industry, and strongly believes that growing the industry is vital to ensuring our energy security and strengthening our regional economies in a responsible and environmentally friendly manner.

Joshua O'Rourke

Policy Manager

Josh leads PEPANZ's policy programme, working with members and other stakeholders to promote policies that are fair and reasonable for the oil and gas sector.

Josh has a strong public policy background and understanding of the key regulatory matters relevant to the oil and gas sector. Previously Josh worked on petroleum policy at the Ministry for the Environment, the Environmental Protection Authority, and at the Ministry of Business, Innovation and Employment.

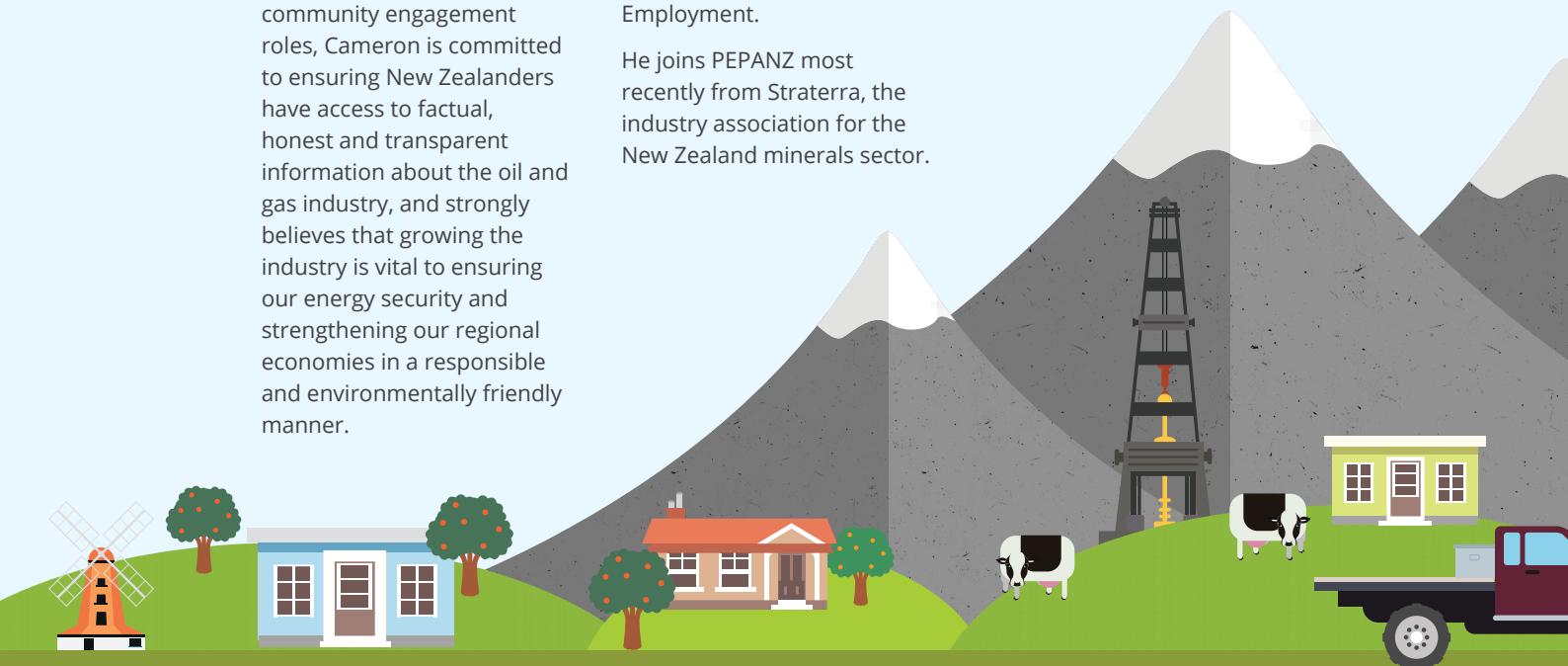
He joins PEPANZ most recently from Straterra, the industry association for the New Zealand minerals sector.

Phil Rennie

Communications Manager

Phil leads PEPANZ's communications work, helping engage with and tell the story of the industry to stakeholders, the public and media. He is the first point of contact for any media enquiries.

Before joining PEPANZ, Phil worked as a Press Secretary to a Government Minister for eight years and has also worked in communications roles for professional membership bodies in New Zealand and overseas.



Carolyn Clark

Office and Events Manager

Carolyn is involved in the execution of all PEPANZ events, and takes the lead role in managing the annual New Zealand Petroleum Conference. She also ensures the smooth running of our Wellington office.

Carolyn brings with her a wide range of relevant experience. She has ensured the successful execution of many events, having worked in hospitality over a number of years, as well as having been a successful business manager.

She also brings with her nine years' industry experience, having worked at BP Oil NZ – based in Wellington, the central North Island and Auckland.

INTRODUCING...

NEW ZEALAND'S ENERGY MIX

PEPANZ is proud to present www.energymix.co.nz, a website providing accessible and easy to understand information on New Zealand's oil and gas sector right to the home computers and smartphones of New Zealanders.

The website provides honest and transparent information about the industry, including the challenge of ever increasing demands for energy, the future role of oil and gas given the need to respond to a changing climate, and the economic benefits our industry can deliver to the country.

www.energymix.co.nz

OUR MEMBERS

We are proud to both represent and advocate on behalf of our 68 Members, who through their activities are helping grow the New Zealand economy and secure New Zealand's long-term energy security.

Our membership is made up of a wide range of companies in the oil and gas sector – from some of the world's largest multinationals, right through to local companies who provide a range of essential services. Together, our membership is responsible for an estimated 95 percent of New Zealand's petroleum production and this scale allows us to advocate successfully on their behalf.

Large Producers

Lattice Energy

OMV

Shell

TODD ENERGY

Medium Producers

THE EXPLORERS NEW ZEALAND OIL & GAS

TAG Oil

TAMARIND

Large Explorers

Chevron

Statoil

Small Producers/Small Explorers

AWE

BEACH ENERGY

WestSide

Field Operations Servicer Providers

HALLIBURTON

KINETIC

OSD

Schlumberger

WEBSTER DRILLING

Shell

WorleyParsons resources & energy

Non-field Service Providers

BELL GULLY

btw company
surveyors . planners . engineers . land & g·i·s services

CHAPMAN TRIPP

beca
amec

Deloitte.

Elemental Group

ERM

BUDDLE FINDLAY

PortTaranaki
the west gate

pwc

MARSH

LogiCamms

KensingtonSwan
LAWYERS

KPMG

senate shj

SGS

Simpson Grierson

SLR
global environmental solutions

MinterEllison RuddWatts
LAWYERS

AECOM

GovettQuilliam
THE LAWYERS

WITT
WESTERN INSTITUTE OF TECHNOLOGY AT TARANAKI

BRG
Communications · Public Affairs

LANDPRO

GreenwoodRoche

Russell McVeagh

anderson lloyd.

THOMPSON+CLARK

Others

SPINDLETOP
LEGAL & COMMERCIAL SOLUTIONS

totum

appea
the voice of australia's oil and gas industry

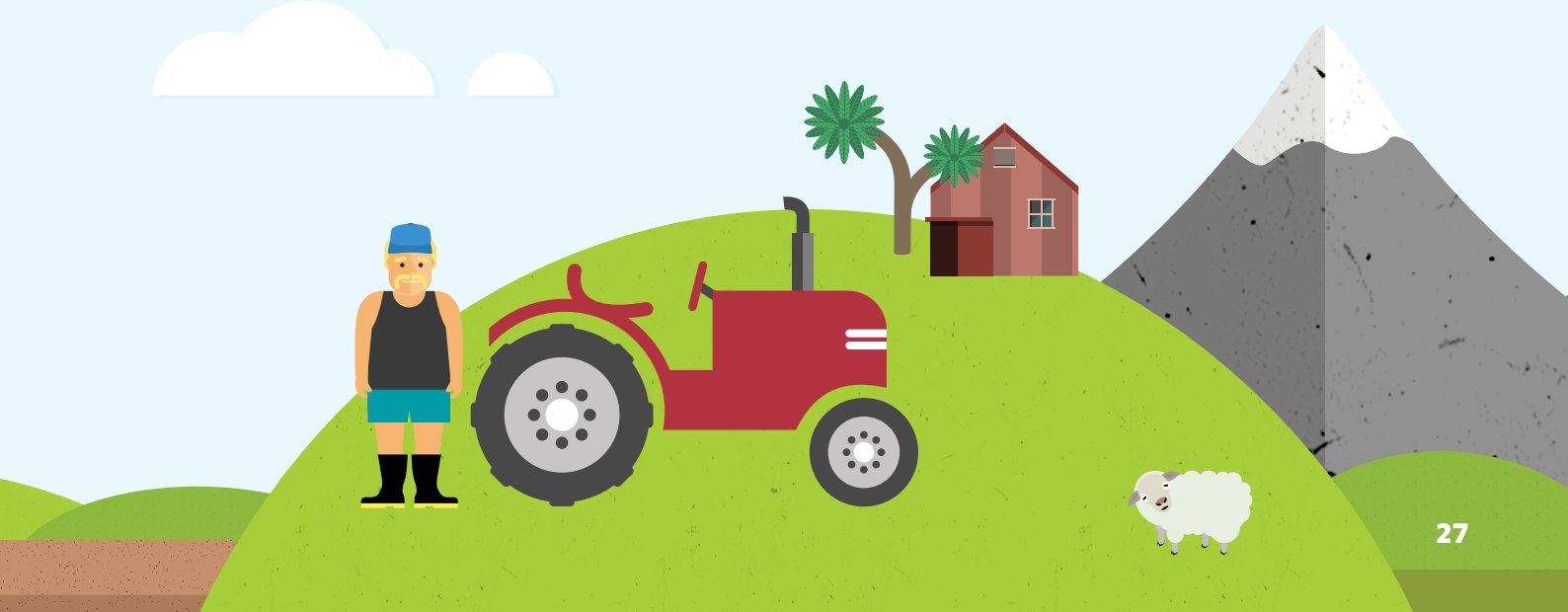
hale & twomey

Longbay
Petroleum Associates Ltd.

Dr. Peter Kamp

Star Offshore Services

Safe Work Solutions



PEPANZ

PETROLEUM EXPLORATION & PRODUCTION
ASSOCIATION OF NEW ZEALAND