GAS INDUSTRY COMPANY LIMITED

NZ Gas Story - what to do with a new discovery

Venture Taranaki 'Lunch & Learn'

3 September 2015

What we'll cover…

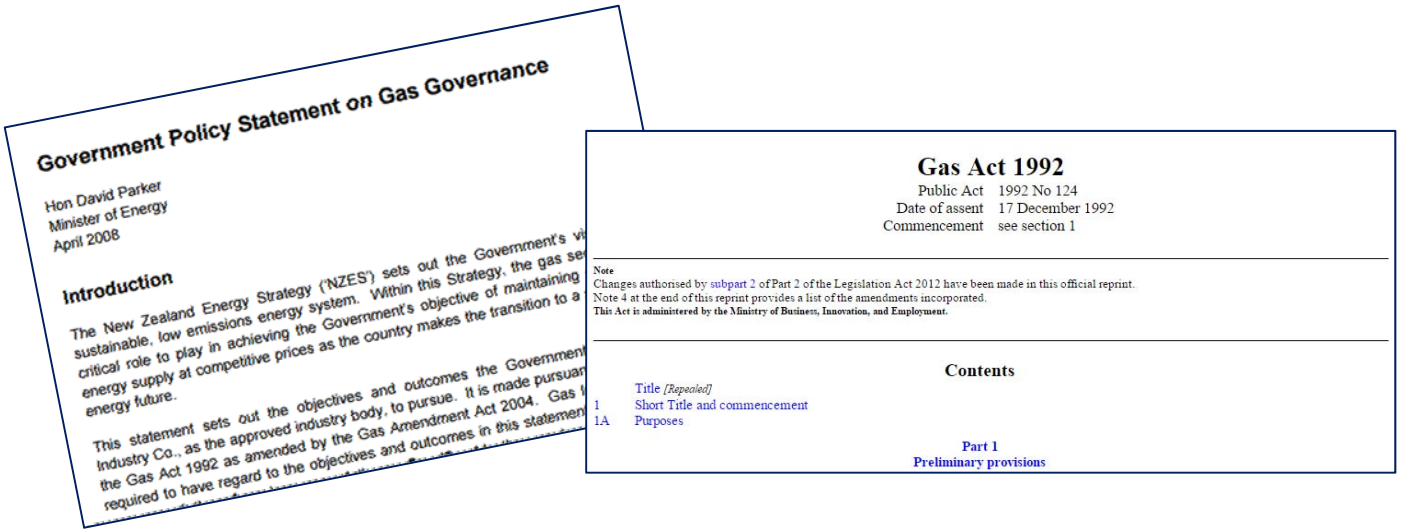
- Gas Industry Co (GIC) – who we are, what we do and why
- Gas contribution to New Zealand's energy supply
- Telling the New Zealand gas story
- The opportunities and challenges of a significant new gas discovery
- Issues and prospects for the industry's future

GIC - who are we

- Formed in 2004 as the industry body under the Gas Act 1992
- The co-regulator providing – link between industry and Government under the unique co-regulatory governance of downstream gas sector
- Owned by the industry with 11 shareholders
  - Contact, Genesis, Greymouth, Methanex, MRP, NZOG, Nova, OMV, Powerco, Shell, Vector
- Board of 7 Directors – four independent; industry-associated (CEOs of Contact, NZOG, Powerco)

Gas Industry Co's principal objective is to develop governance arrangements that…

'*Ensure that gas is delivered to existing and new customers in a safe, efficient, reliable, fair and environmentally sustainable manner…*'



Government Policy Statement on Gas Governance

Hon David Parker
Minister of Energy
April 2008

Introduction

The New Zealand Energy Strategy ('NZES') sets out the Government's vi
sustainable, low emissions energy system. Within this Strategy, the gas se
critical role to play in achieving the Government's objective of maintaining
energy supply at competitive prices as the country makes the transition to a
energy future.

This statement sets out the objectives and outcomes the Government
Industry Co., as the approved industry body, to pursue. It is made pursuan
the Gas Act 1992 as amended by the Gas Amendment Act 2004. Gas
required to have regard to the objectives and outcomes in this statemen

Gas Act 1992

Public Act 1992 No 124
Date of assent 17 December 1992
Commencement see section 1

Note
Changes authorised by subpart 2 of Part 2 of the Legislation Act 2012 have been made in this official reprint.
Note 4 at the end of this reprint provides a list of the amendments incorporated.
This Act is administered by the Ministry of Business, Innovation, and Employment.

Contents

Title *[Repealed]*
1 Short Title and commencement
1A Purposes

Part 1
Preliminary provisions

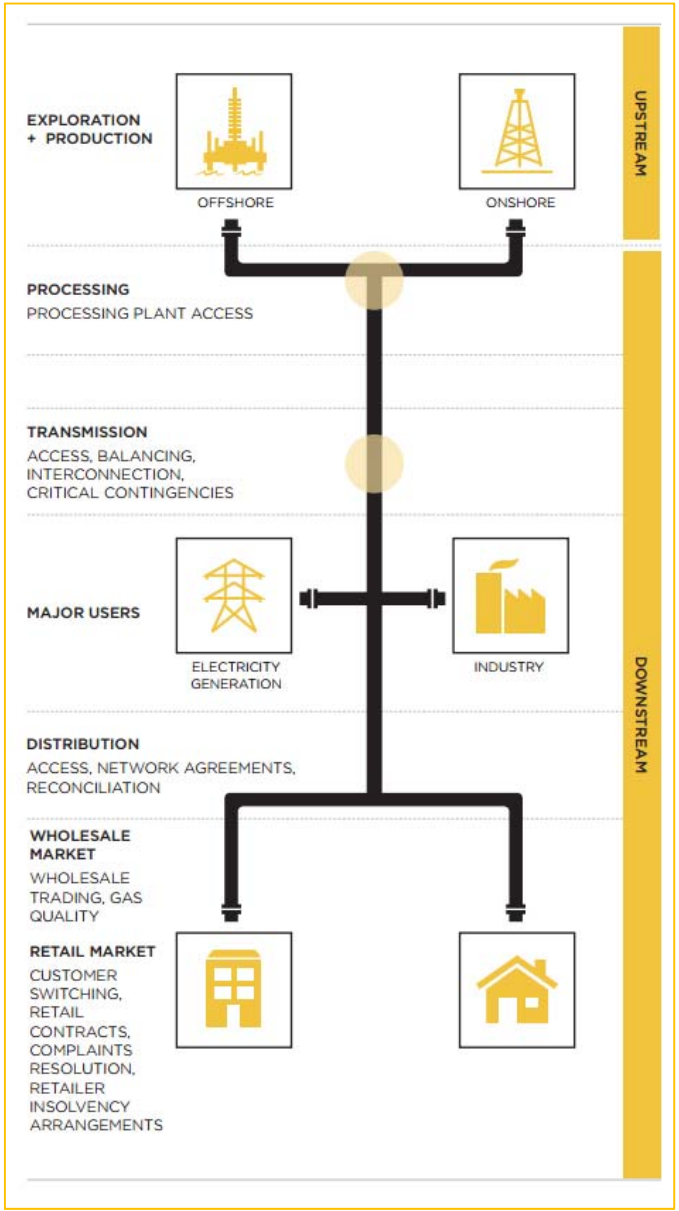
Other Gas Industry Co objectives

- *providing access to essential infrastructure and competitive market arrangements*
- *minimising barriers to competition*
- *maintaining/enhancing incentives for investment in gas processing, transmission and distribution*
- *subjecting delivered gas costs and prices to sustained downward pressure*
- *ensuring security of supply risks are properly and efficiently managed by all parties*
- *ensuring energy and other resources used to deliver gas to consumers are used efficiently*

So, what do we do

- Develop downstream arrangements, including regulations, to improve
  - the operation of the gas markets
  - access to infrastructure
  - consumer outcomes

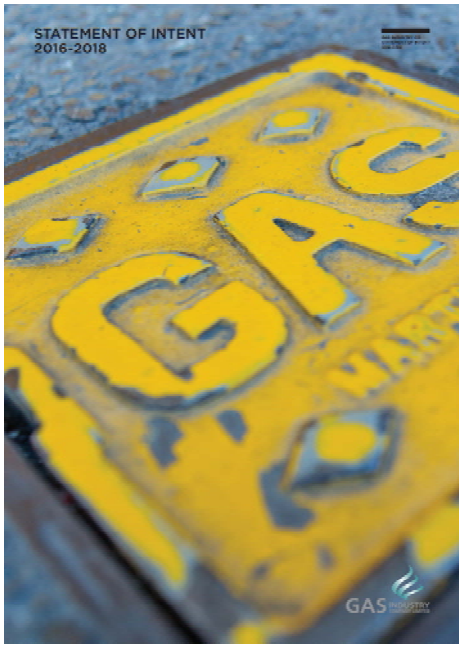
- Existing governance arrangements
  - customer switching
  - downstream reconciliation
  - critical contingency management
  - compliance
  - distribution contracts scheme
  - retail contracts scheme



Gas Industry Co's strategy…

'*Optimising the contribution of gas to New Zealand…*'

Strategic objectives frame our Work Programme…

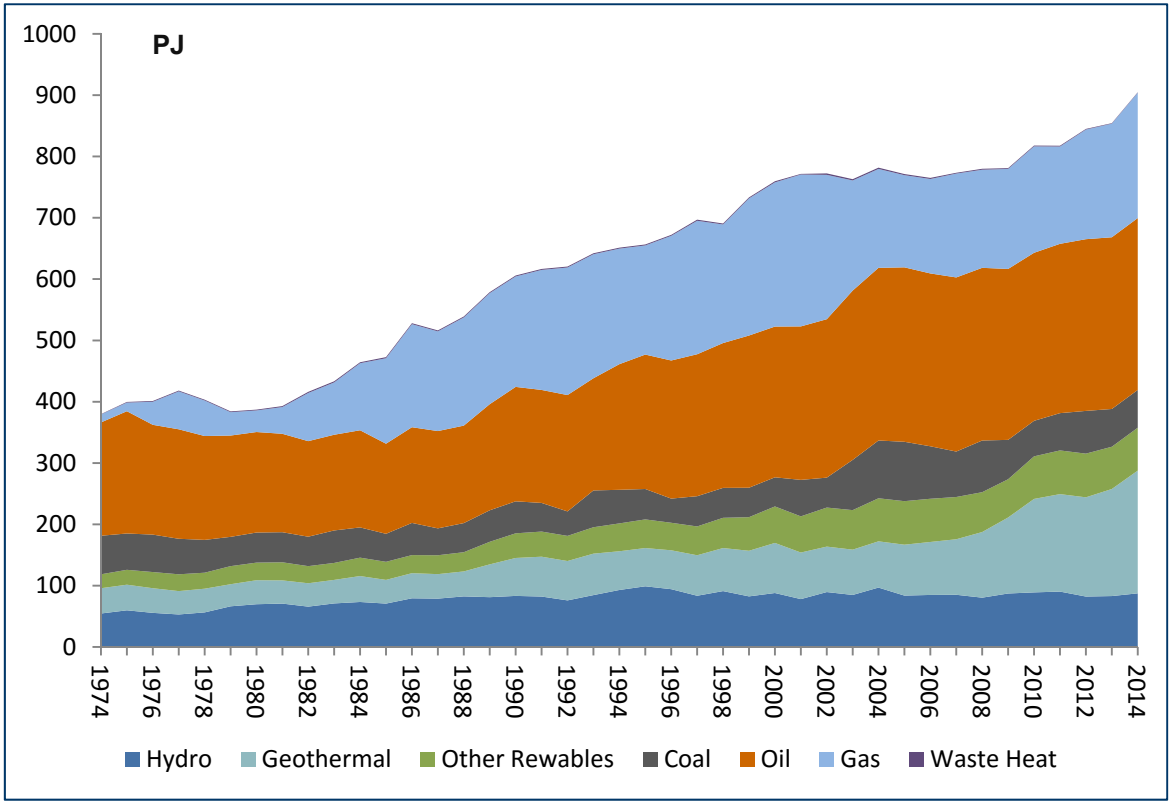


- *Facilitating efficient use of, and investment in, gas infrastructure*
- *Promoting efficient, competitive and confident gas markets*
- *Building and communicating the New Zealand Gas Story*
- *Delivering effectively on our accountabilities*

A quick look at the contribution of gas to NZ…

It has grown enormously since the first gas flowed from Kapuni 45 years ago…

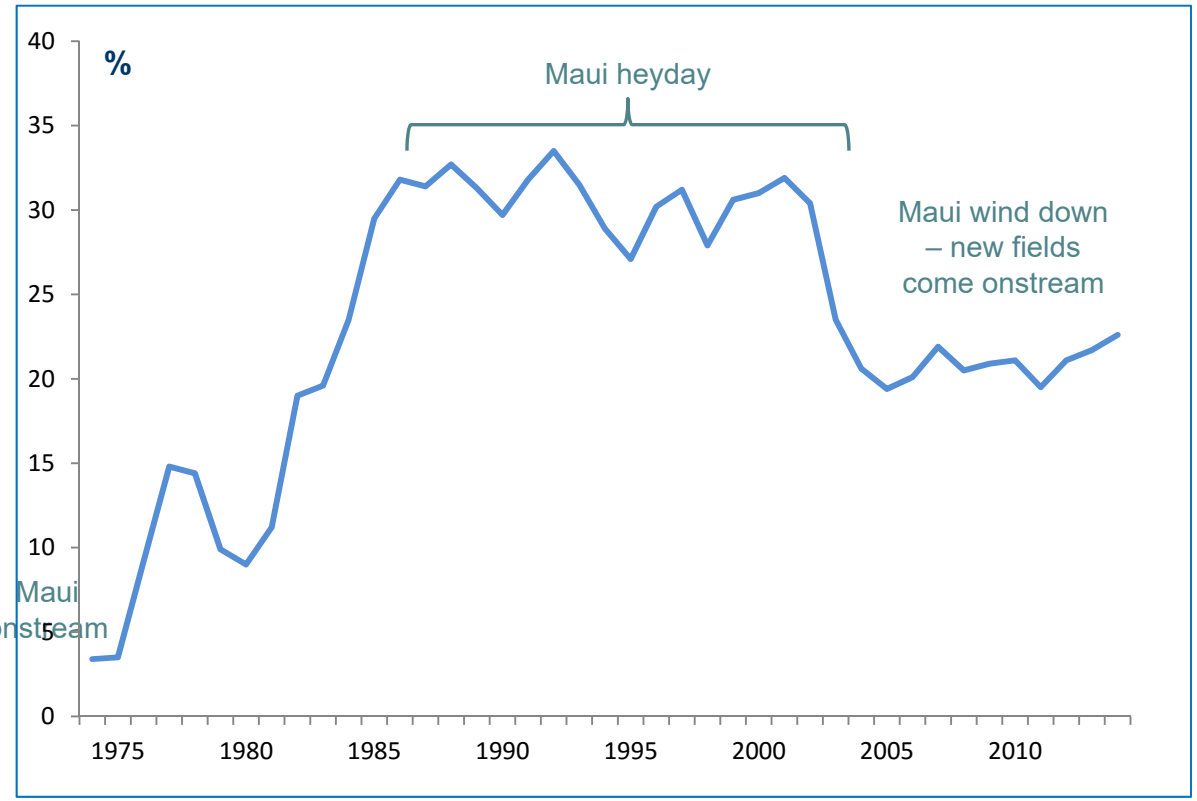
Primary Energy Composition 1974-2014



Source: 2015 Energy in New Zealand

Over the past 25 years, gas has accounted for 20-33% of primary energy

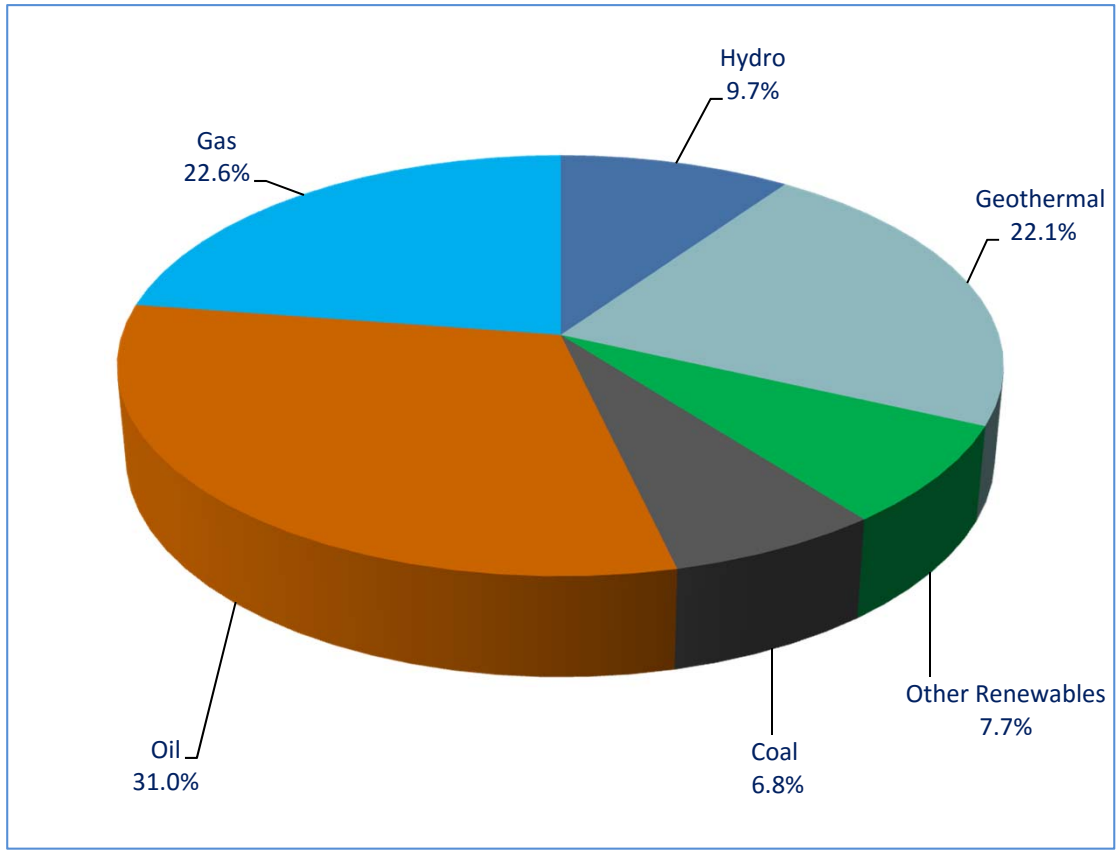
Gas Contribution to Primary Energy Supply 1974-2014



Source: 2015 Energy in New Zealand

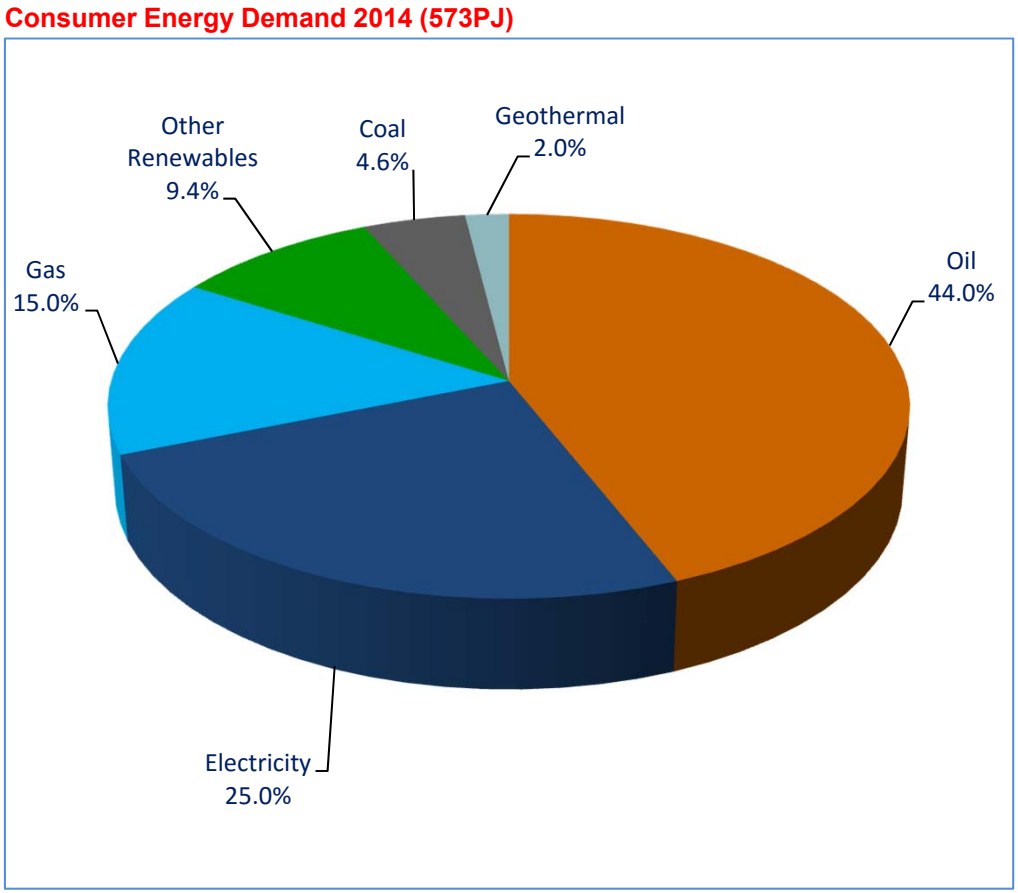
Today gas provides over 22% of primary energy

Primary Energy Supply 2014 (905PJ)



Source: 2015 Energy in New Zealand

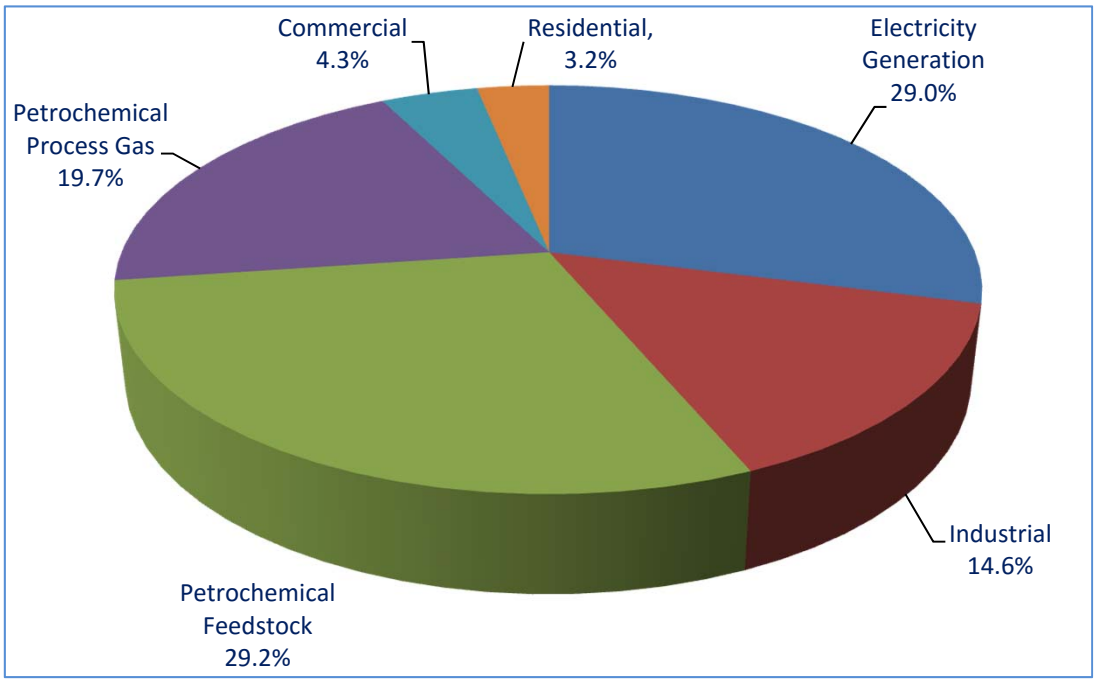
…and 15% of consumer energy



Source: 2015 Energy in New Zealand

78% of gas is used as a transition energy for electricity/petrochemicals; 249,000 households use just 3.2%

Consumer Gas Use 2014 (203PJ)



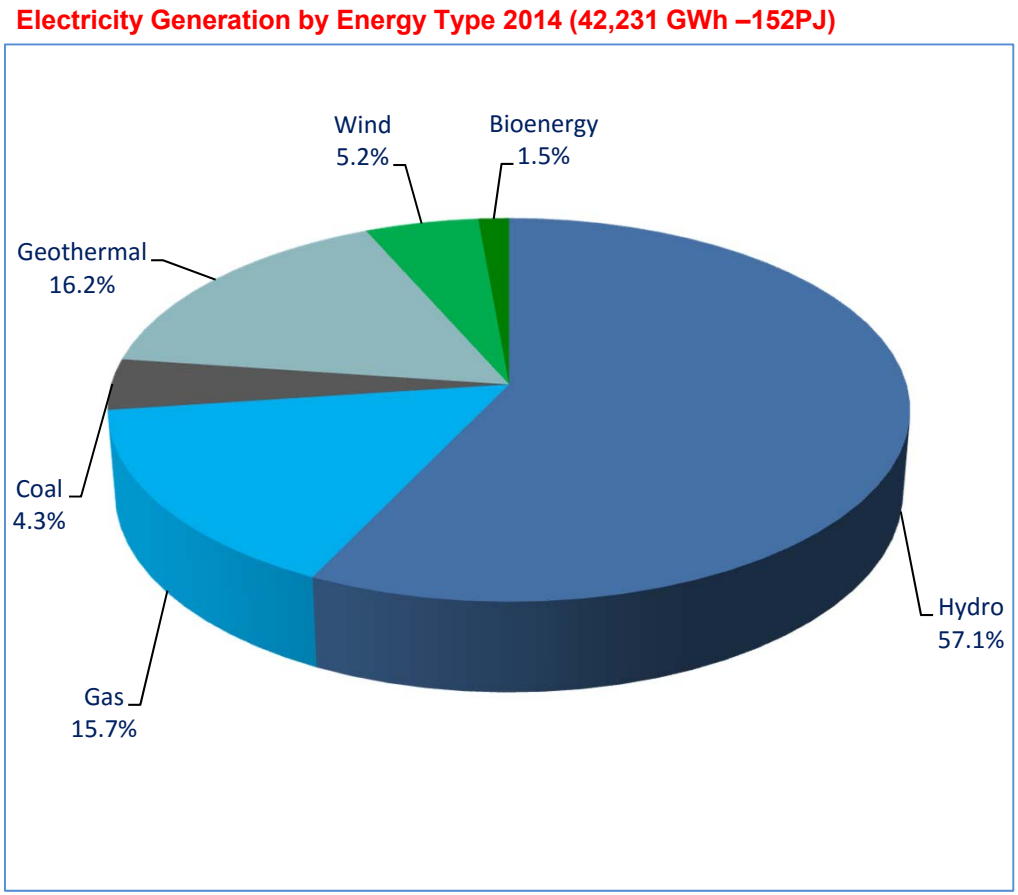
Source: 2015 Energy in New Zealand
Petrochemical usage accounts for 48.9% of total

Large users represent less than 1% of gas consumers, but 90% of consumption

In Victoria, residential use is over a third of total consumption

In densely populated UK, most gas is used in the residential and commercial sectors

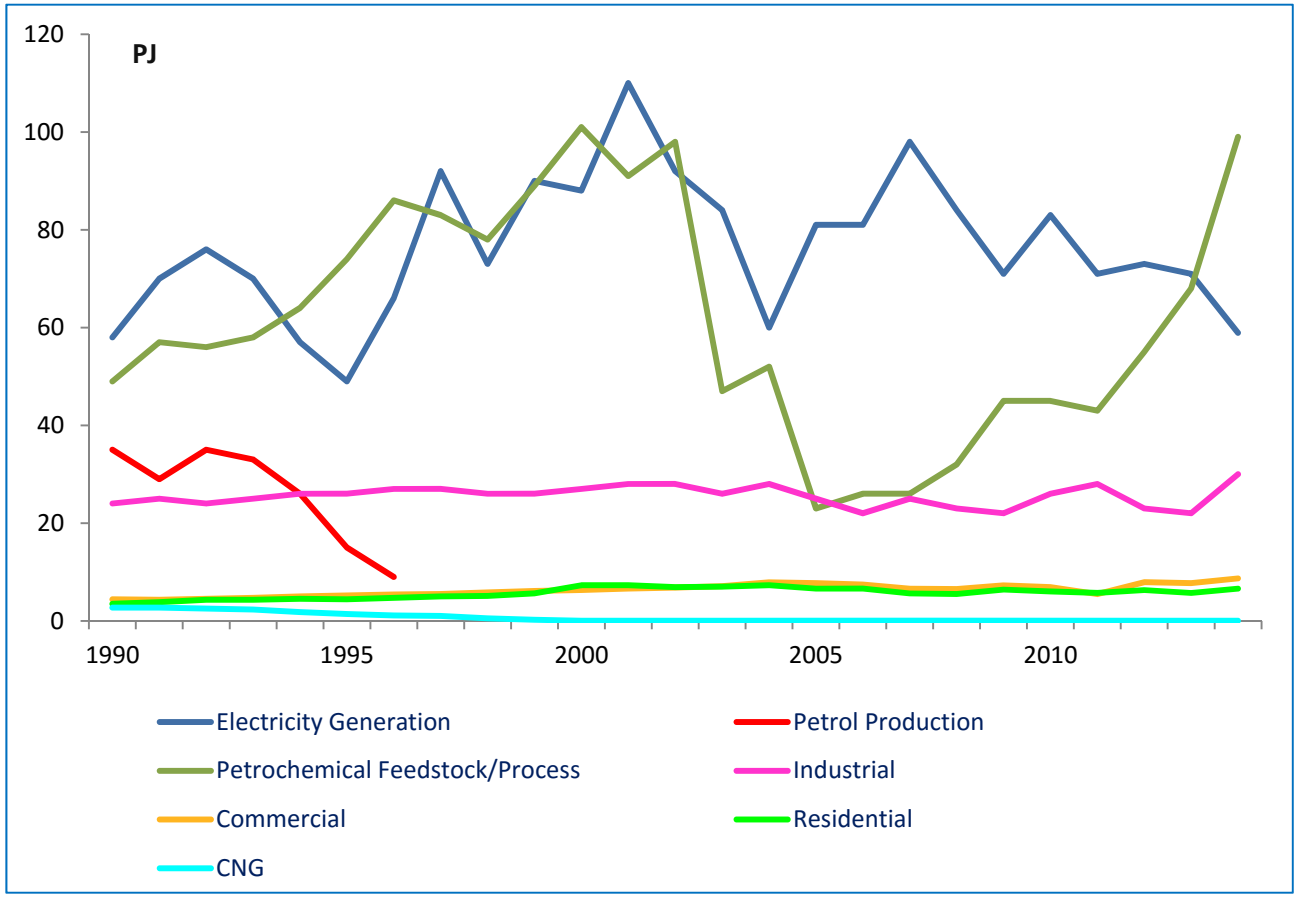
Gas generates 16% of New Zealand's electricity



Source: 2015 Energy in New Zealand

But gas use trends in NZ are changing over time

Gas Use by Consumer Group 1990-2014

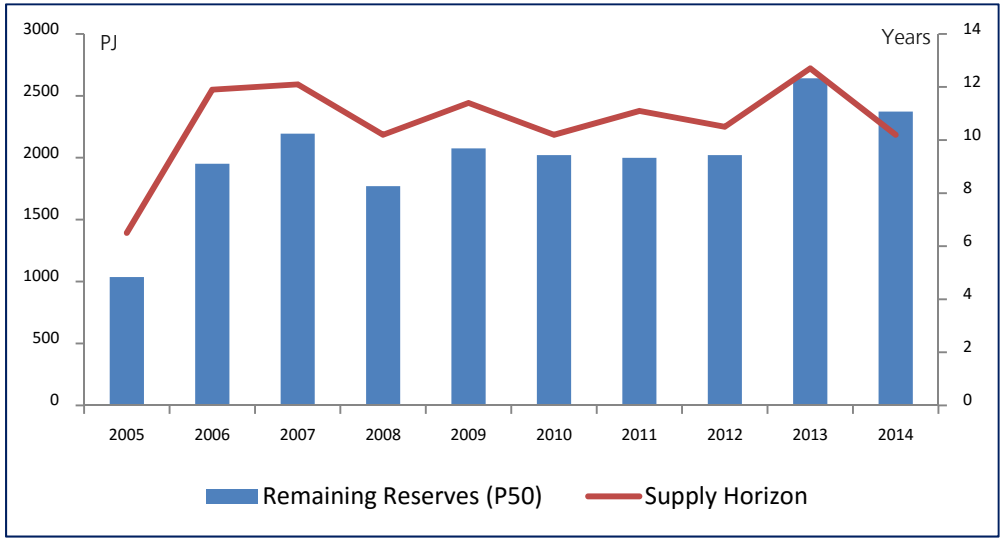


Source: 2015 Energy in New Zealand

Reserves are relatively stable…

- Since 2005, remaining gas reserves have ranged between 1,036PJ (2005) to 2,642PJ (2013)
- Current gas reserves = 2,373PJ
- Reserves/production ratio to 2012 consistently in 10-12 year horizon, recovering from a low of around 6 years in 2005
- The supply horizon rose to 13 years in 2013
- Current supply horizon = 10 years
- Gas reinjection increased from 11PJ to 17PJ in 2014 (mainly Pohokura)
- Unconventional gas reserves are not firm enough to be included in New Zealand's formal gas reserves position

Remaining P50 Reserves/Supply Horizon 2005-2014



Source: 2015 Energy in New Zealand
Supply Horizon = annual reserves/gross production ratio. Gross production (233PJ) includes gas flared, gas injected, gas used for operational purposes, losses, and LPG extraction

The gas market is well served…

- Multiple retailers (11 brands)
- High level of consumer switching
- Existing infrastructure sufficient until next step change (big jump in demand, major new find)

Globally, gas is having a renaissance

- Shale and coal seam gas bonanza changing international gas markets
- Gas will play greater role in the future global energy mix
- IEA predicts 70% increase in world electricity demand by 2035 – underpinned by doubling of gas-fired generation
- Mounting worries about energy supply security and nuclear power safety
- Larger markets adopting technology that is changing the nature of direct gas use
  - LNG traditionally for transporting bulk natural gas between markets, but now used directly within markets – transport (road, rail sea), remote industrial sites to replace diesel

But gas is part of the world environmental and climate change debate

- Concerns over shale/CSG production techniques (fracking) and the continued use of fossil fuels in any form

- Low Carbon Auckland Plan

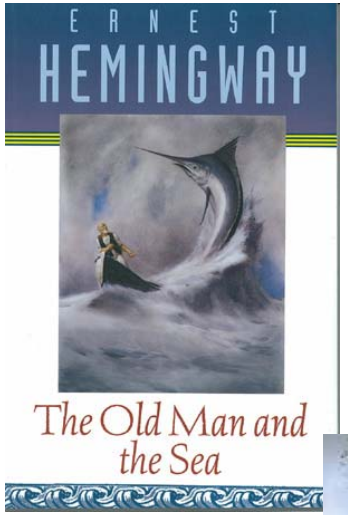
… on the flip side

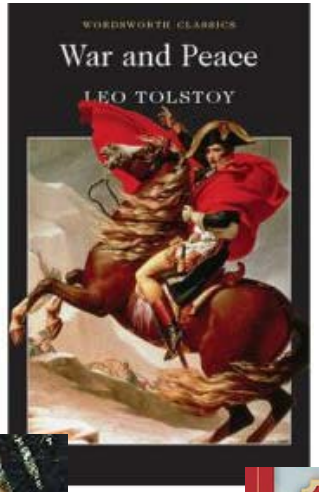
- Internationally, gas has an important role in environmental sustainability:
  - cleanest burning among fossil fuels
  - for many countries it is a bridge to a greener economy by replacing more harmful energy forms (coal, oil)

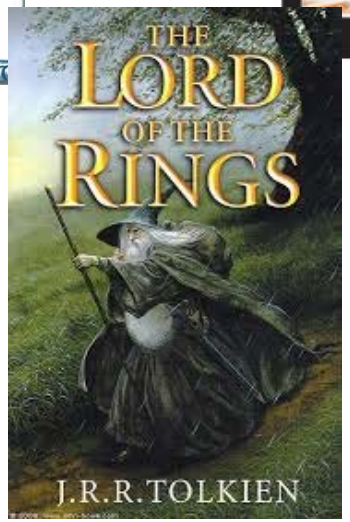
- Direct gas use and efficient technologies can lower energy emissions

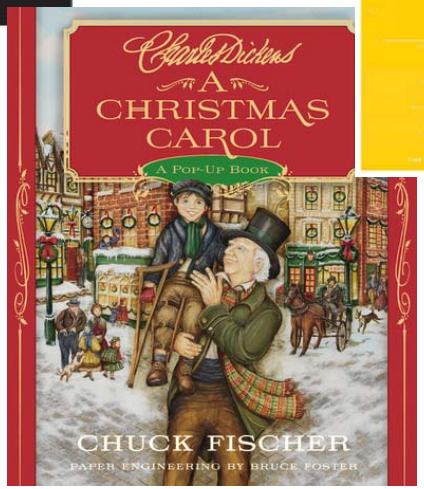
Overall, it's a good story – maybe not among the classics...

But still worth telling…



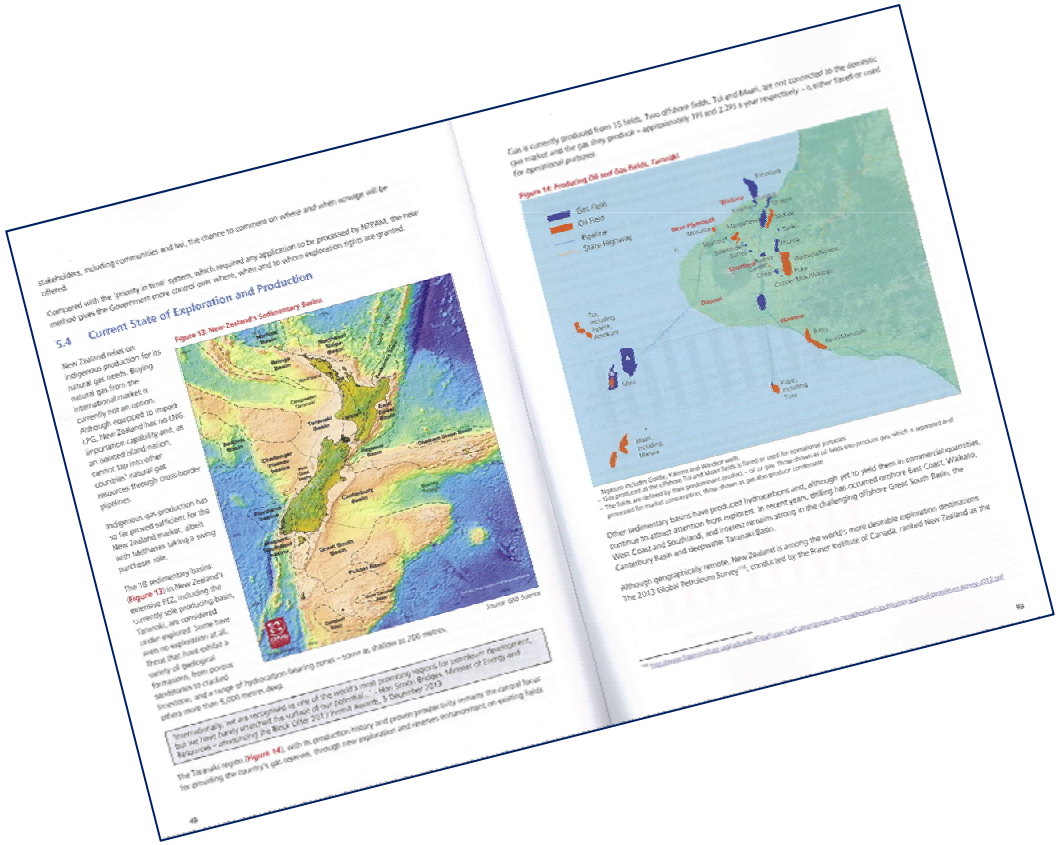






Telling the New Zealand Gas Story through a range of channels…

The New Zealand Gas Story publication...

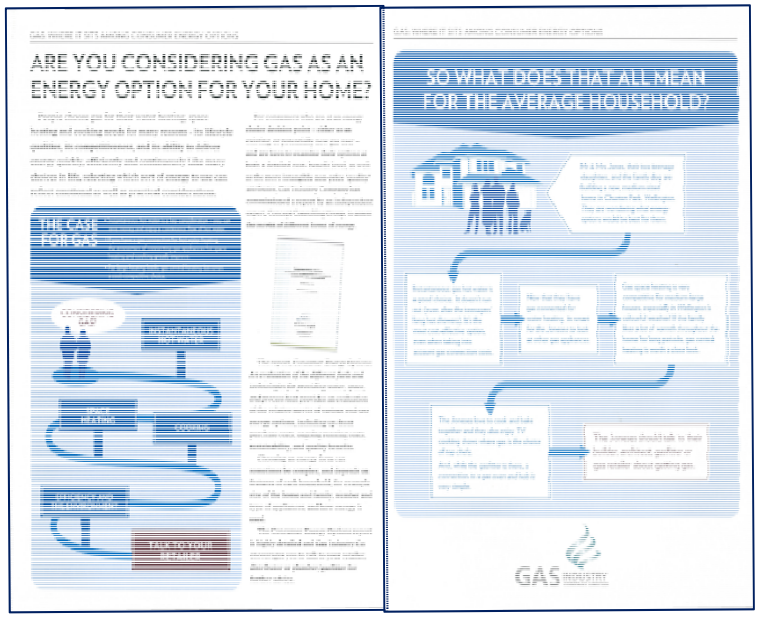


- Authoritative information source for industry and public stakeholders
- Comprehensive end-to-end account of New Zealand's gas industry:
  - historic development
  - policy/regulatory framework
  - structure and players
  - sector breakdown
  - pricing
  - safety
  - environmental sustainability
- Assessment of the industry's state and performance

Energy Options…

Evaluates different fuels and technologies for water, space and process heat, with a focus on the competitive market positioning of gas

- Instant gas hot water most cost-effective even if the home doesn't have an existing gas connection
- Gas best option for new industrial boilers



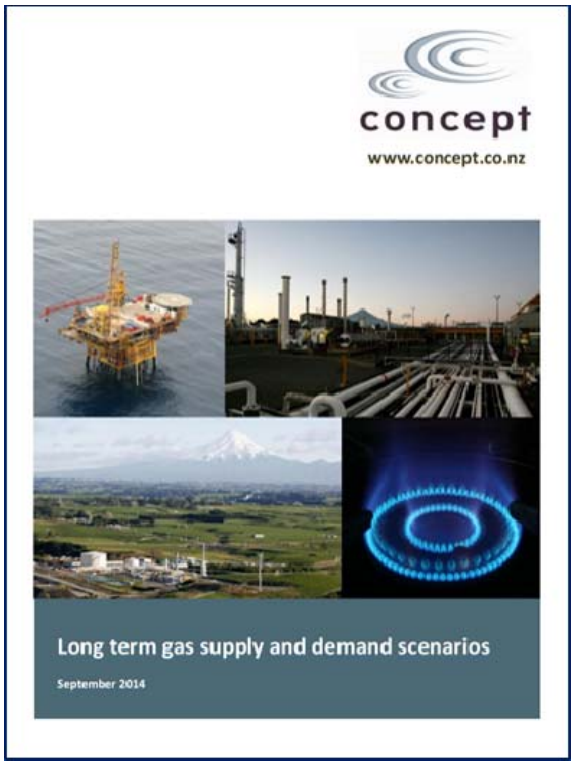
- Space heating options vary depending on house size, insulation, and preferences. Gas competitive with heat pumps if already a connection for water heating
- The carbon footprint of gas-fired space and water heating is less than some electric heating options and similar to high efficiency electric heat pumps

Gas supply & demand…

Updates 2012 study of supply/demand scenarios to 2027

Gas discoveries are sporadic and all have different characteristics. Three scenarios reflect possible futures for New Zealand…

- **Plentiful supply** – where the discovery exceeds the market's ability to absorb it
  - lower prices
  - new petrochemical or other demand increases
- **Moderate supply** – where the discovery closely matches demand over time
  - upstream replaces 200PJ used each year
  - existing methanol plants act to balance demand with supply
  - prices influenced by economics of producing methanol in New Zealand
- **Tight supply** – where insufficient gas is found to meet demand
  - methanol plant demand declines to match supply, or ceases
  - reduced consumption by other large users – electricity generation, urea, industrial process heat
- **What's likely?** – New Zealand will cycle between these scenarios, rather than move to just one. Market will find equilibrium



Commercialisation options...

Two reports on the opportunities and challenges presented by a major new gas discovery:

Report 1: Woodward Partners (John Kidd)

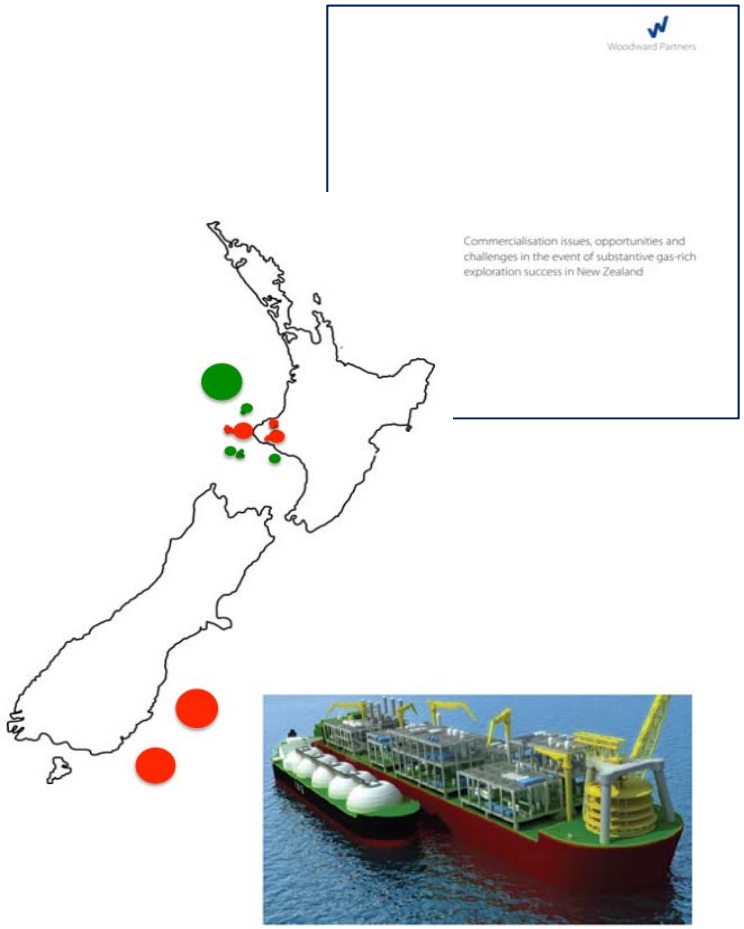
Written at a time of unprecedented exploration activity – high level view of challenges and opportunities associated with a significant new gas find

Report 2: Concept Consulting (Simon Coates)

More detailed assessment of what New Zealand might actually do with such a find

Report 1 – how exploration success might unfold

- North and South Islands are different worlds
- South Island a blank slate
  - no natural gas
  - no infrastructure
  - transformational market development opportunities
- North Island market is mature
  - infrastructure well established, highly reliable
  - substantial recent demand growth attributable to one player (Methanex)
  - but market concentration, reduced demand.
- Possible LNG exports vs overall benefits to NZ. Floating production technologies may mean gas won't land in NZ
- LNG carries price shock risk through move to export price parity



Report 2 – demand options for new gas discoveries

- New gas discoveries may exceed the current domestic market to absorb them
- But there are options for growing the market to absorb surplus production
- Feasibility depends on a variety of external factors
  - world energy prices
  - currency exchange rates

Option – LNG export

- LNG exports for discoveries 3,000-4,000PJ and over
- LNG sale into Asia is potentially one of the most valuable options for a large new gas discovery in New Zealand, even allowing for processing and shipping costs
- Lower shipping costs to Asia compared with, eg US Gulf Coast
- Higher liquefaction costs in New Zealand offset by floating liquefaction developments

Option - petrochemicals

- Methanol, ammonia/urea manufacture for fields not large enough to warrant LNG development
- These are mature technologies with products sold into well-developed international markets
- New Zealand still importing some of its urea requirements

Option- transport fuel

- Emerging technologies for natural gas use as heavy duty haulage transport fuel potentially offer lower fuel prices
- ‘micro’ production technologies enabling pipeline gas to produce LNG and establish refuelling bases
- Scale of likely New Zealand demand insufficient to underwrite a new gas discovery on its own
- Fuel blend possibilities –eg: methanol/traditional fuels

Duel diesel/LNG powered train - USA

LNG-powered truck

Shell LNG refuelling station - Canada

Option – electricity generation

- Electricity generation historically important to commercialising gas finds
- Opportunities for developing new baseload gas-fired generation are constrained by electricity demand growth and rising competitiveness/use of renewables – particularly geothermal and wind
- Gas is the most competitive energy for peaking generation, but the quantities of gas involved are relatively small
- Continuing developments in electricity generation fuel mix

Nova Energy – McKee Power Station

Option – retail market

- Direct gas use in the residential, commercial and industrial sectors is a steady, but relatively small demand source
- Most significant opportunities to switch to gas in the North Island have already been taken up
- In the South Island, any find not justifying LNG export could displace existing coal applications – but challenges include scale limitations and pipeline development costs

Fonterra Dairy factory - Whareroa

Report 2 conclusions…

'Taken together, these options mean there should be a ready source of demand for significant New Zealand gas discoveries…'

'As such, New Zealand should not be disadvantaged for exploration investment relative to other locations around the world which are distant from the core oil and gas markets of the US, Europe and Asia.'

Overall - there are some head winds for the NZ Gas Story …

- Gas in strong competition with electricity and other fuels
- Gas networks affected by new distributed generation
- Energy demand is flat
- Dealing with the carbon challenge
- Big new gas find is proving elusive
- Oil price downturn affecting investment

but the gas sector remains in good health…

- Gas still making a major contribution to the New Zealand economy and energy mix
- It is providing consumers with a competitive energy choice
- Its role is changing, but it is still a good story
- New Zealand is still an attractive exploration destination.
- Homes will be found for new gas

All publications and other information is available on our website
www.gasindustry.co.nz

We are holding a more detailed Gas Story Roadshow presentation and will be back in New Plymouth in the next month or so. We'll let you know the details ….