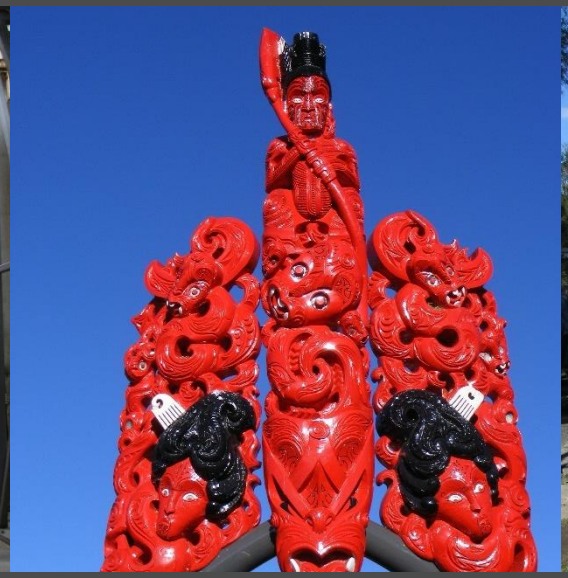
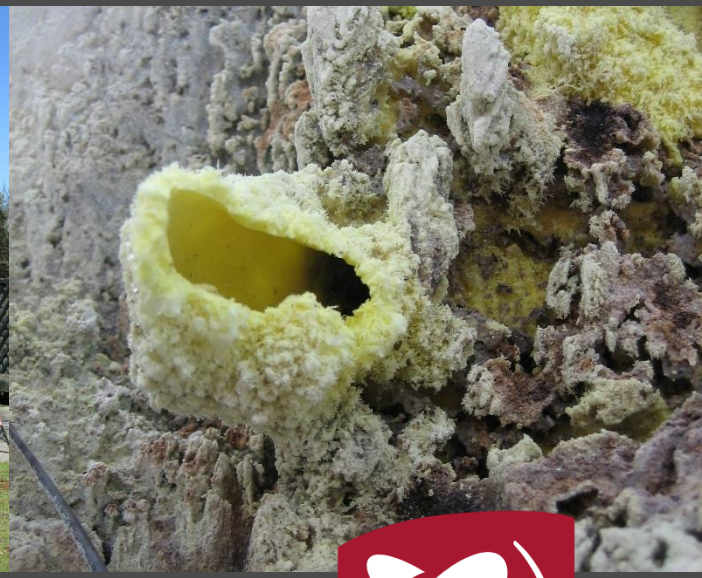
The Time is Right ….
What are you waiting for ….



27th June 2017
NZGA Seminar
Brian Carey

GNS SCIENCE
TE PŪ AO

Who am I …

- **Brian Carey**
- **GNS Science**
  - Geothermal Resource Management Specialist
- **IEA Geothermal**
  - Executive Secretary
- **You can find me here**

  info@nzgeoheat.nz

We are on a geothermal …..

Journey

Not quite like 1640 and Abel Janszoon Tasman's travels to Nieuw Zeeland

But

..... more high speed .....

Geoheat Strategy for Aotearoa NZ

- Fostering Direct Geothermal Heat Use
- It's :
  - A journey
  - A Game Changer

?

Its in our DNA

Mouse Click to view the video

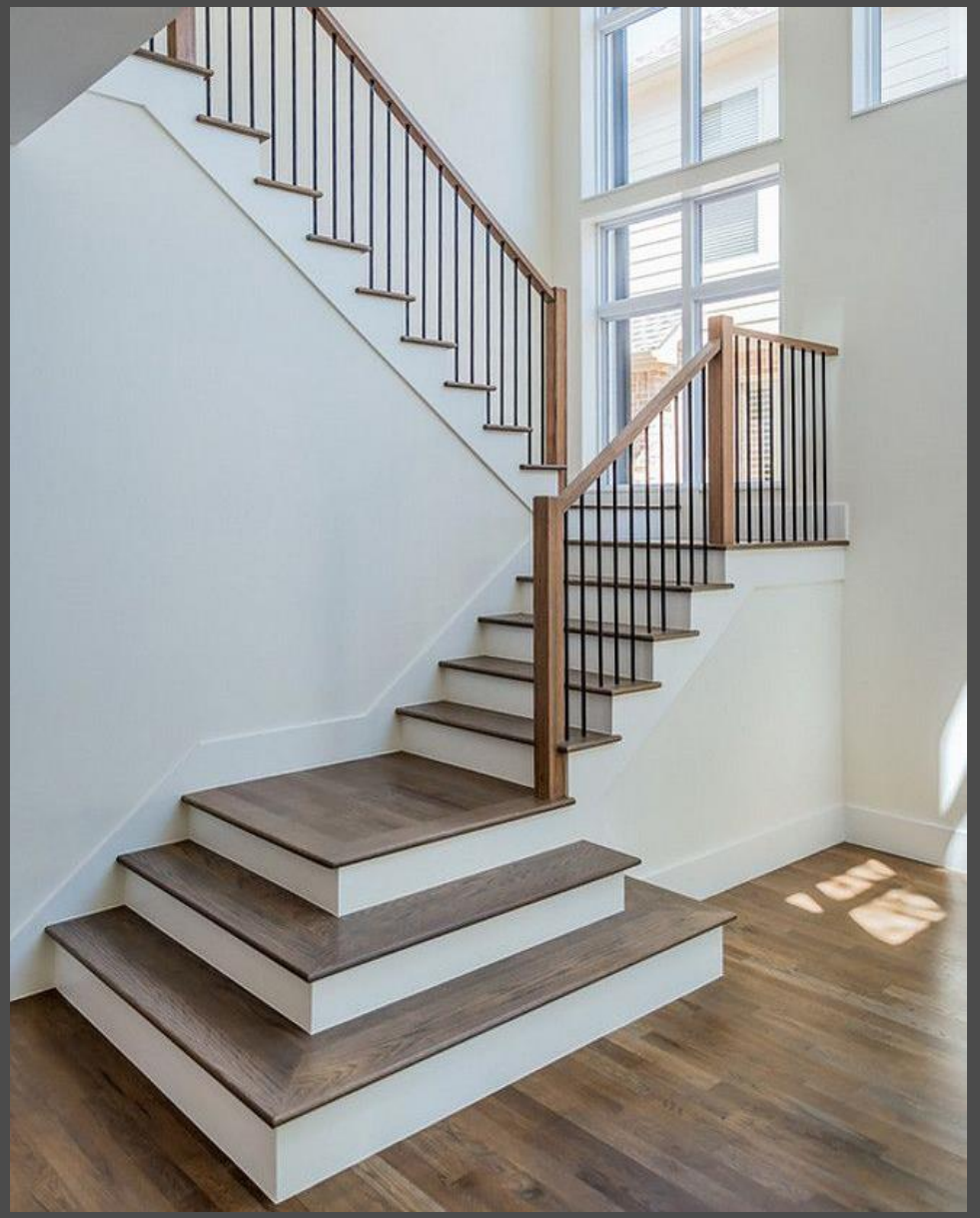
Todays Journey …..

- **NZ Energy Scene**
  - Strategies and data
  - International Energy Agency 2017 Review
- **Geoheat Strategy**
  - What started it
  - To today
  - Looking Forward
- **Launch**
- **What are you waiting for ……**

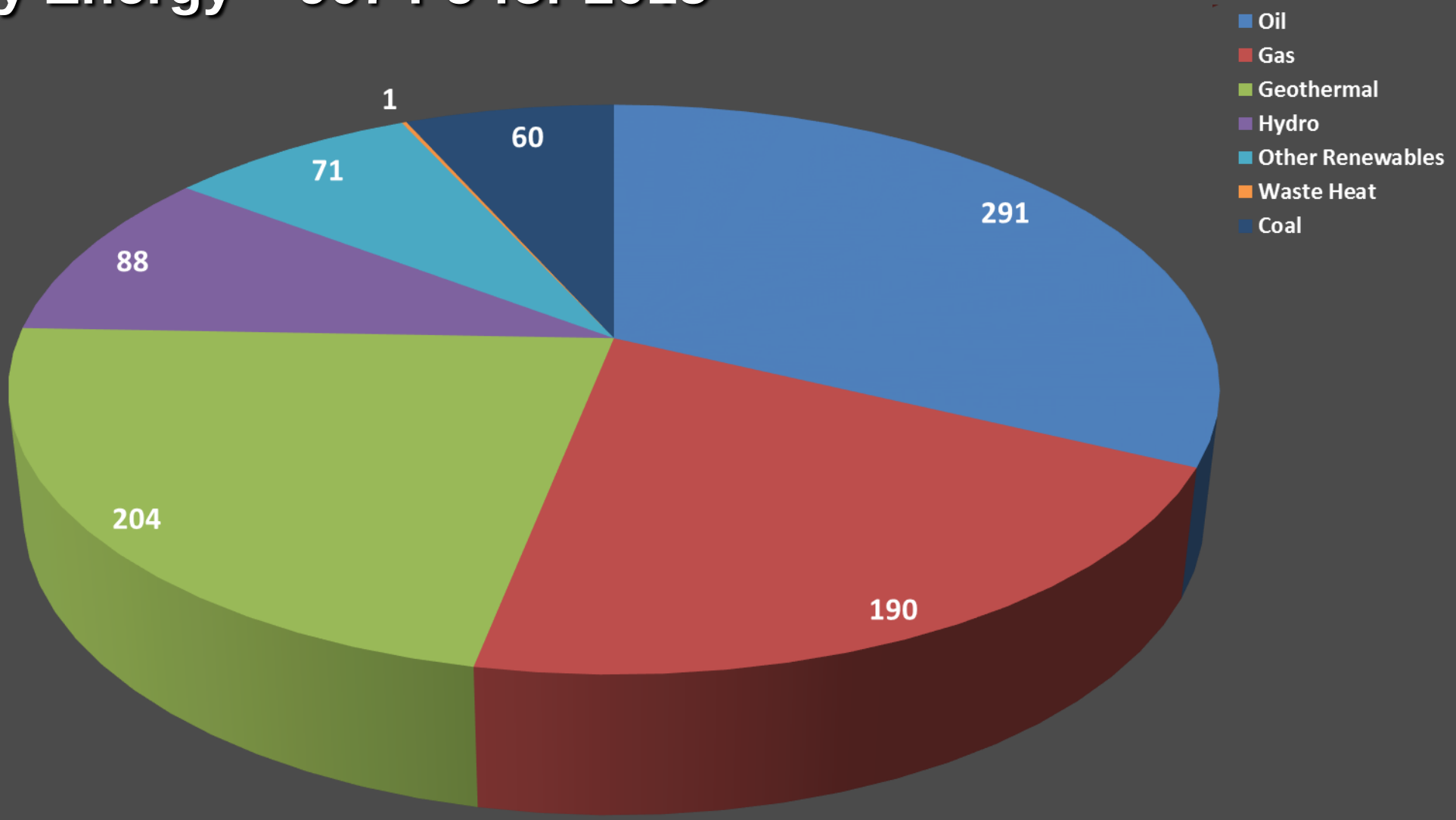
Are we going in the right direction …..

- **How does the Geoheat Strategy align**
  - Central Government Strategy
    - New Zealand Energy Strategy
    - New Zealand Energy Efficiency and Conservation Strategy
  - Regional Government Strategy and activity

Its in step

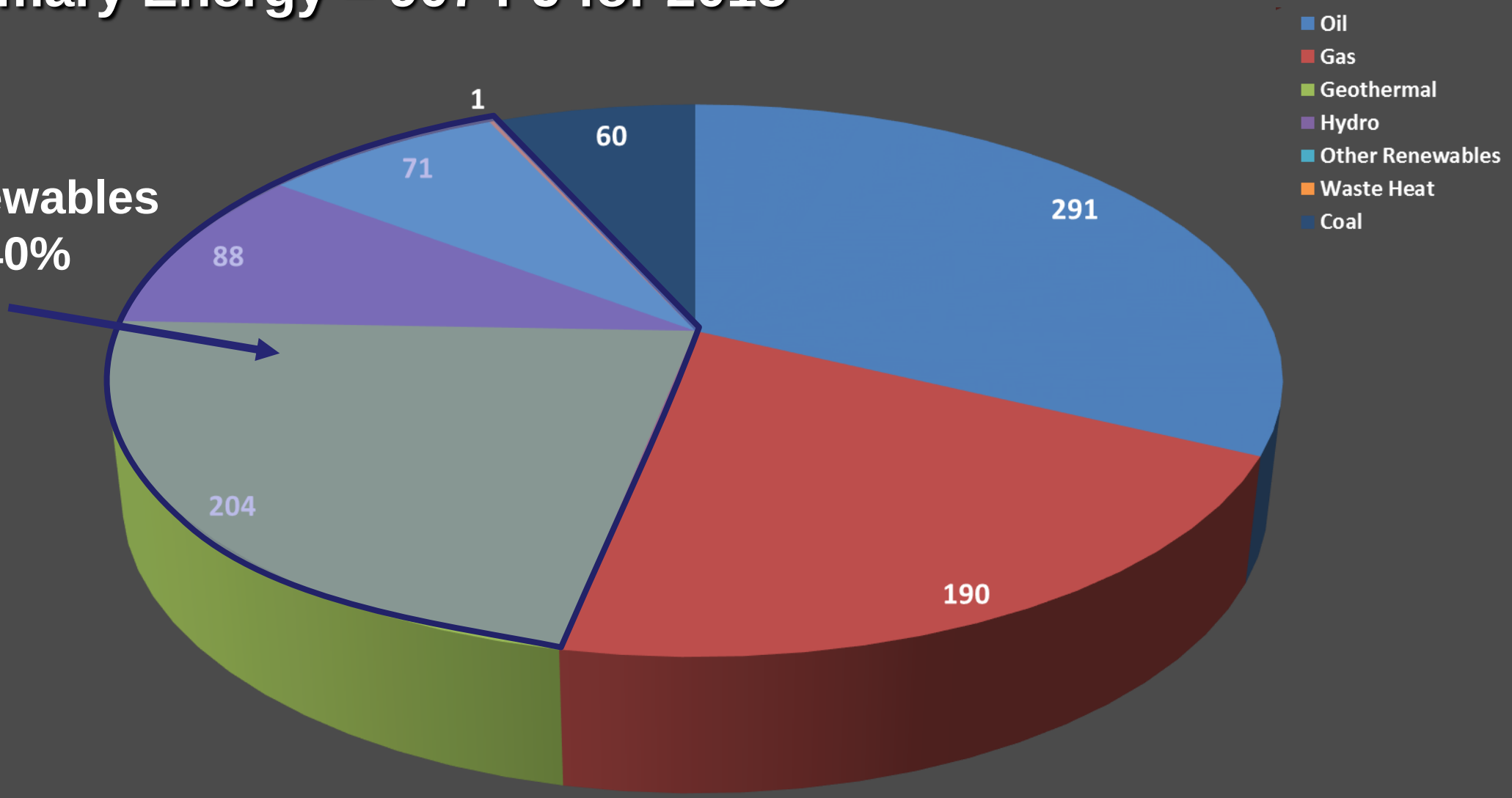


Primary Energy – 907 PJ for 2015

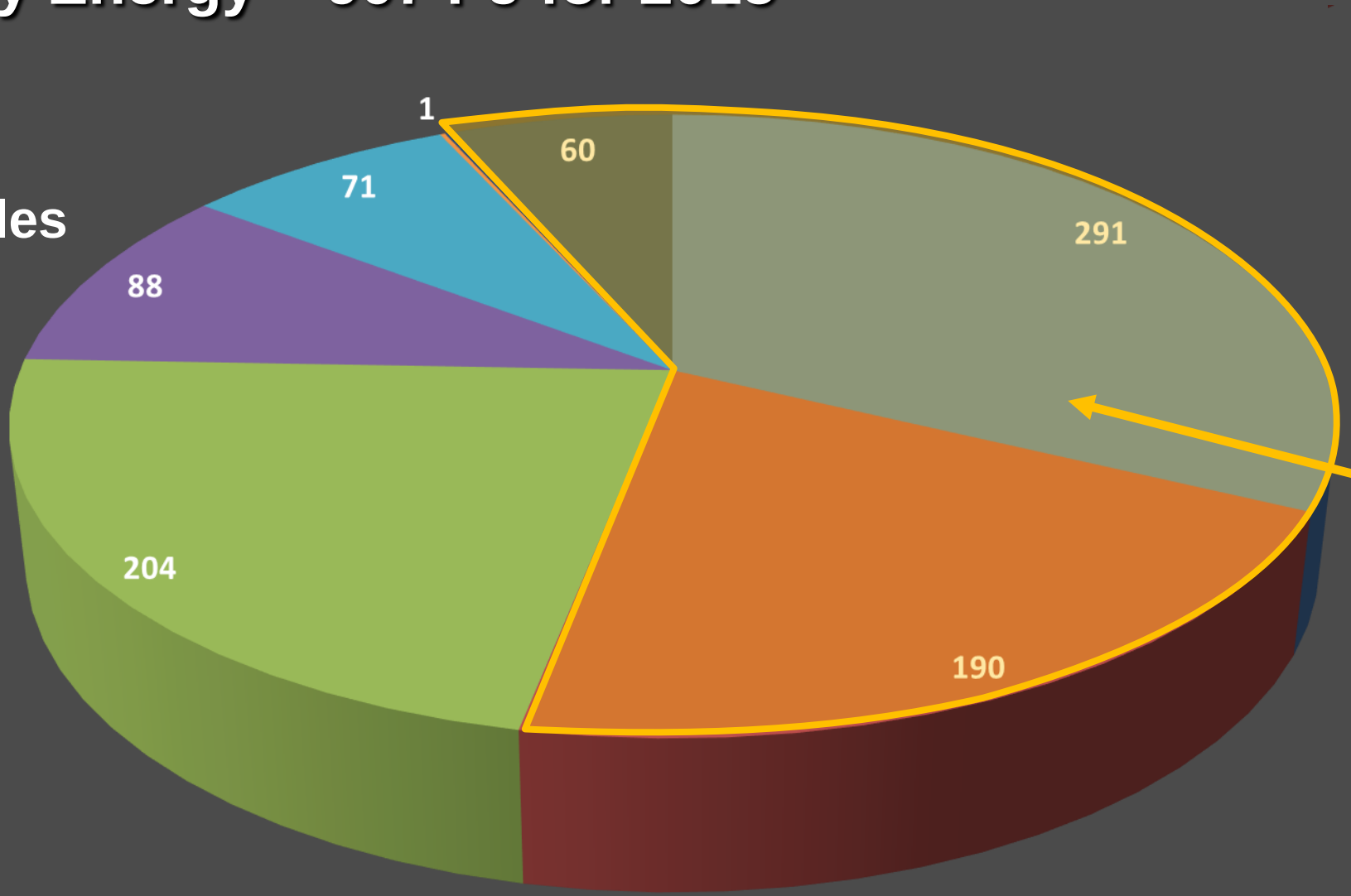


Primary Energy – 907 PJ for 2015

Renewables
40%



Primary Energy – 907 PJ for 2015



Renewables
40%

Opportunity
60%

New Zealand Energy Mix

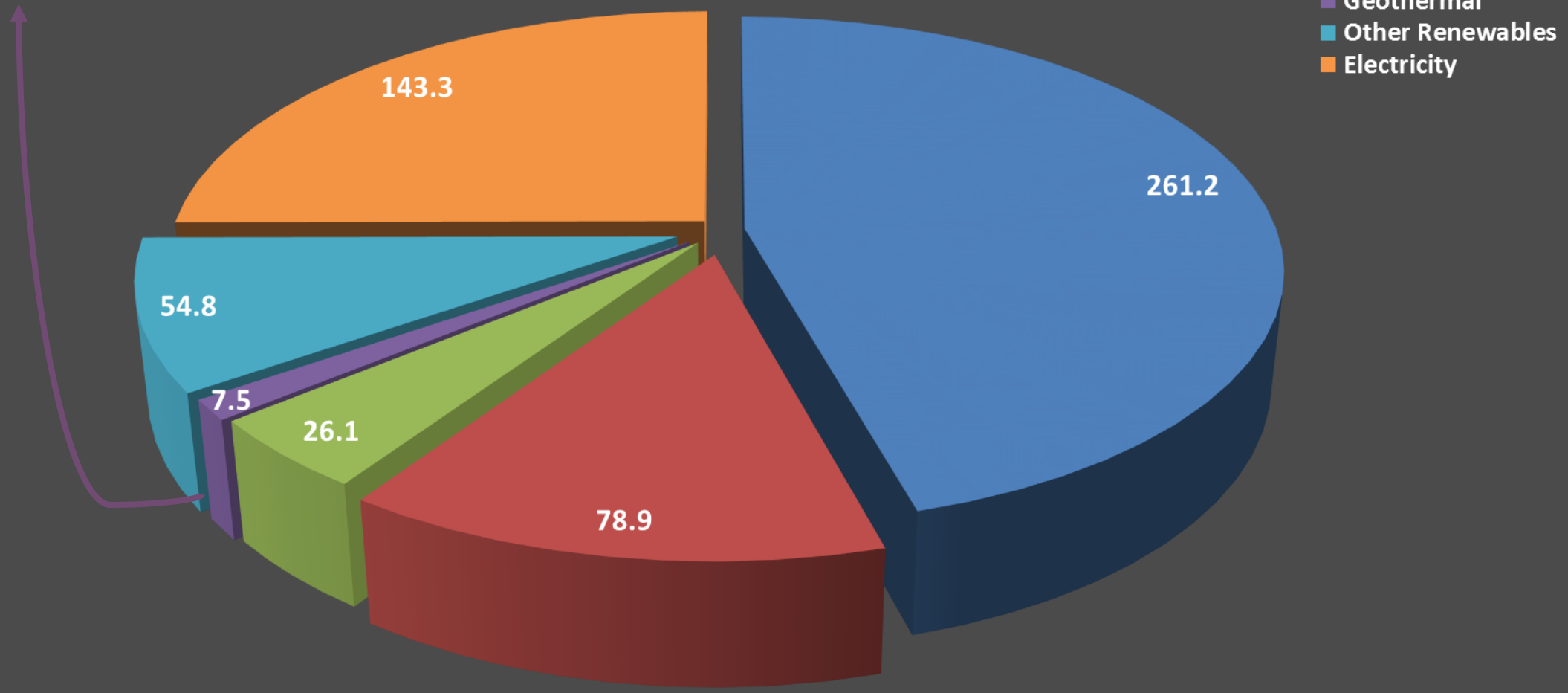
- **40% from renewable contribution**
  - Most used to produce electricity
  - The balance
    - mainly wood fuel
    - used to produce heat for industrial processes and home heating

- **The Opportunity - the 60% non renewable**

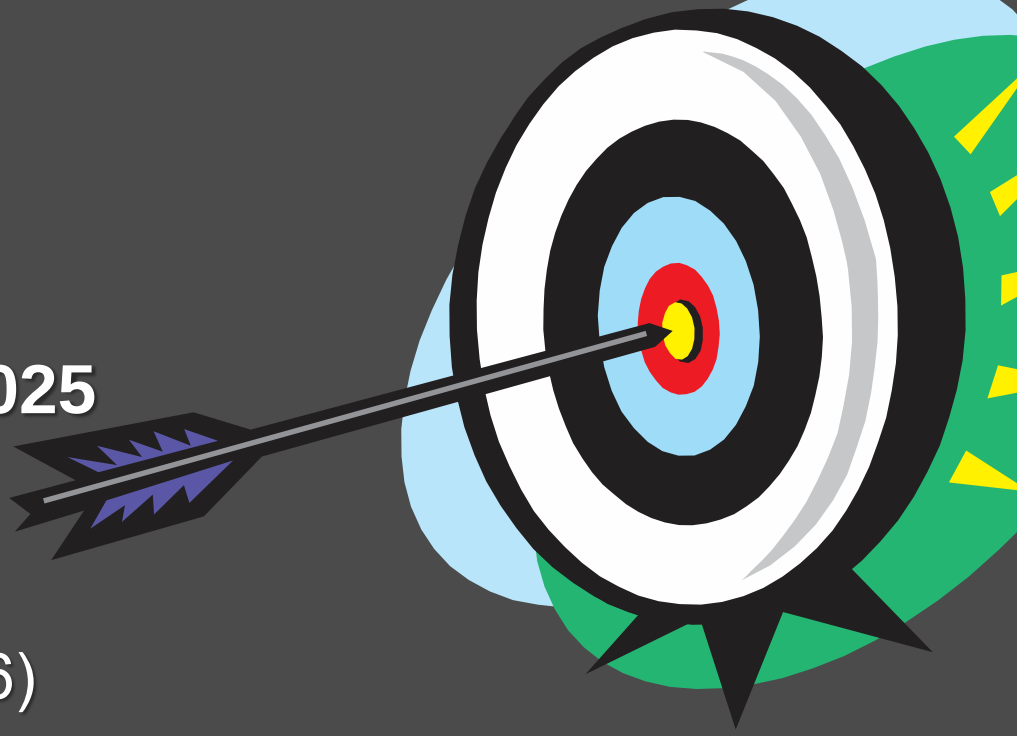
2015 Year 572 PJ Energy Consumption

Plot by energy / fuel type

≈ 8 PJ of Primary Geothermal Energy used for non electric use

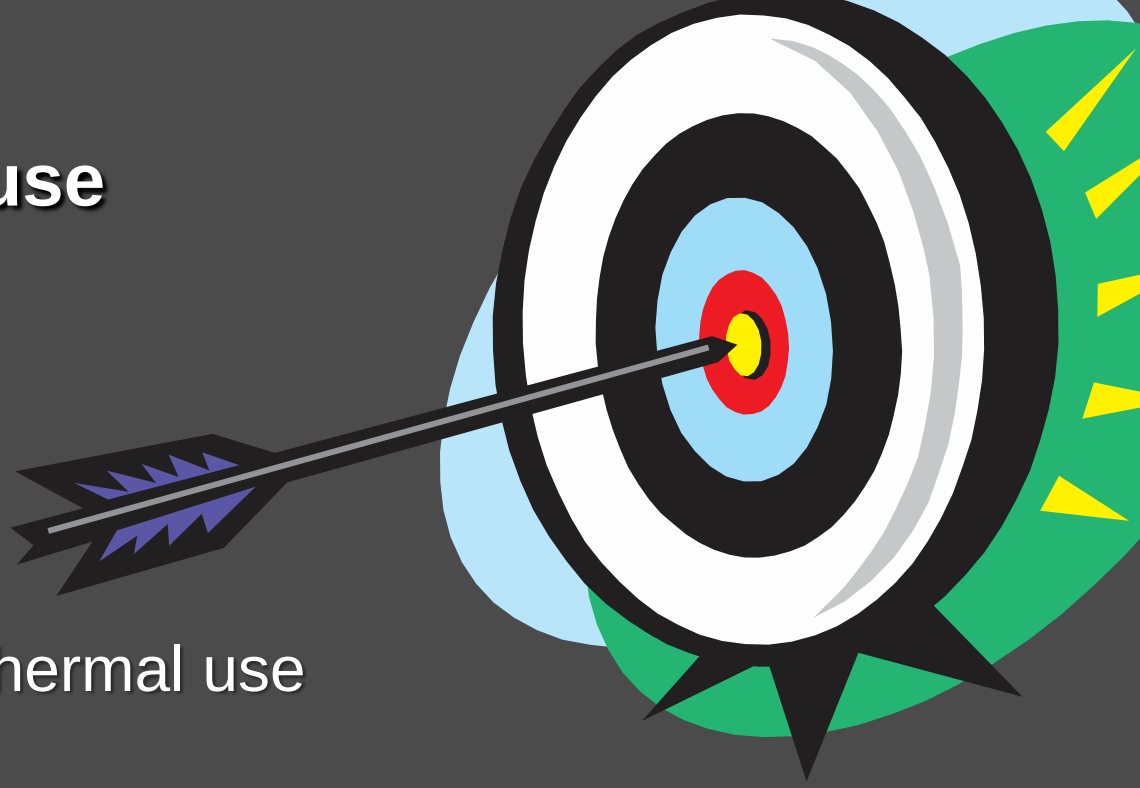


Renewables Targets



- **Electricity Target - 90% Renewable by 2025**
  - Average hydrological year
- **Sound position**
  - ≈ 80% from renewable sources (84% for 2016)
- **Geothermal cheapest non peaking electricity for next 2000 GWH**
- **90% was a stretch target when set in 2008**
- **Now a high likely hood target will be achieved**

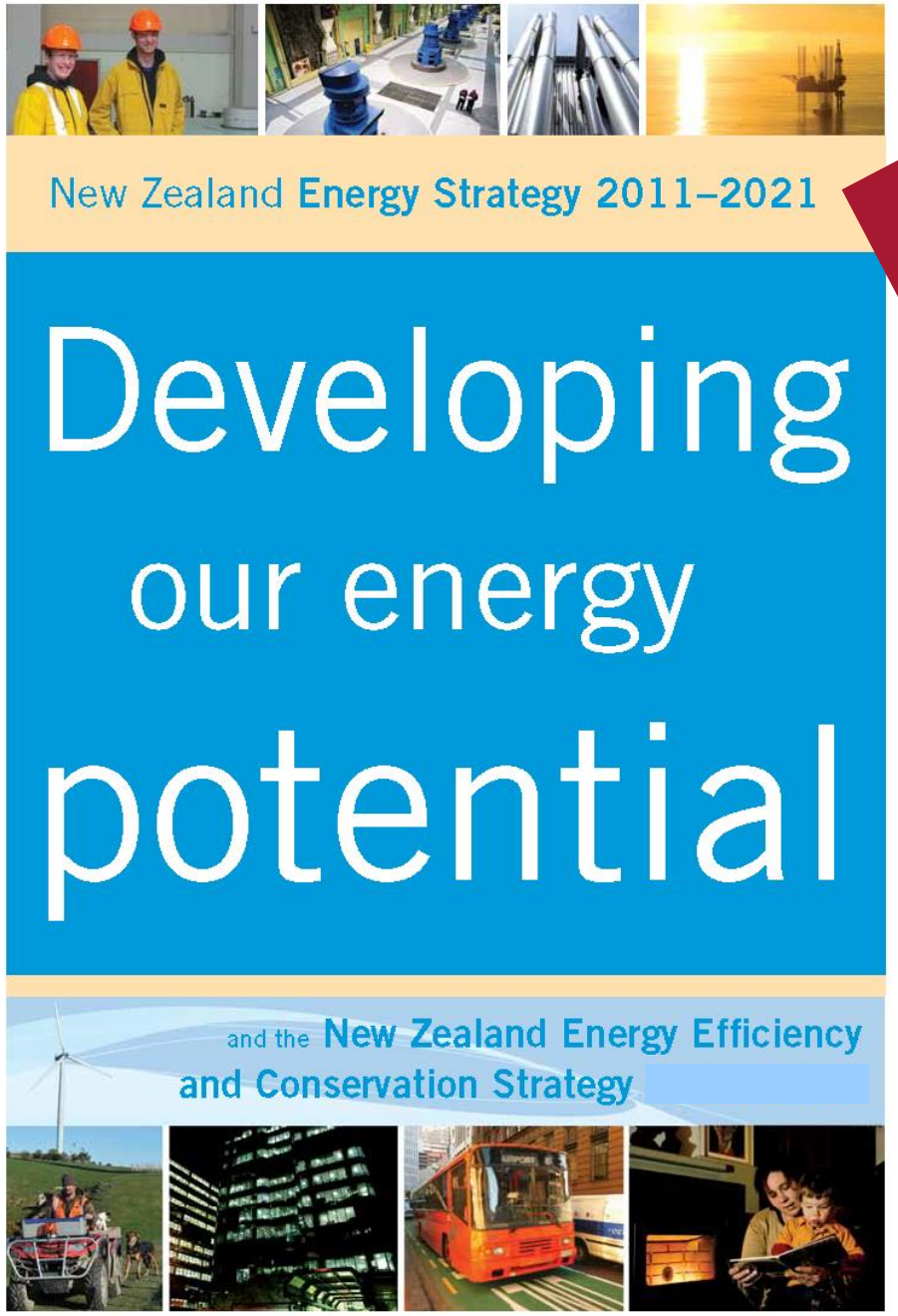
Time to shift focus to other energy use



- **To increase renewables in NZ in ….**
  - Transport
  - Heat energy
  - Great potential to grow our direct geothermal use

- **International Arena Major Energy Transformations are underway**
- **Nations are developing their own solutions**
  - and targets

NZES
2011 - 2021



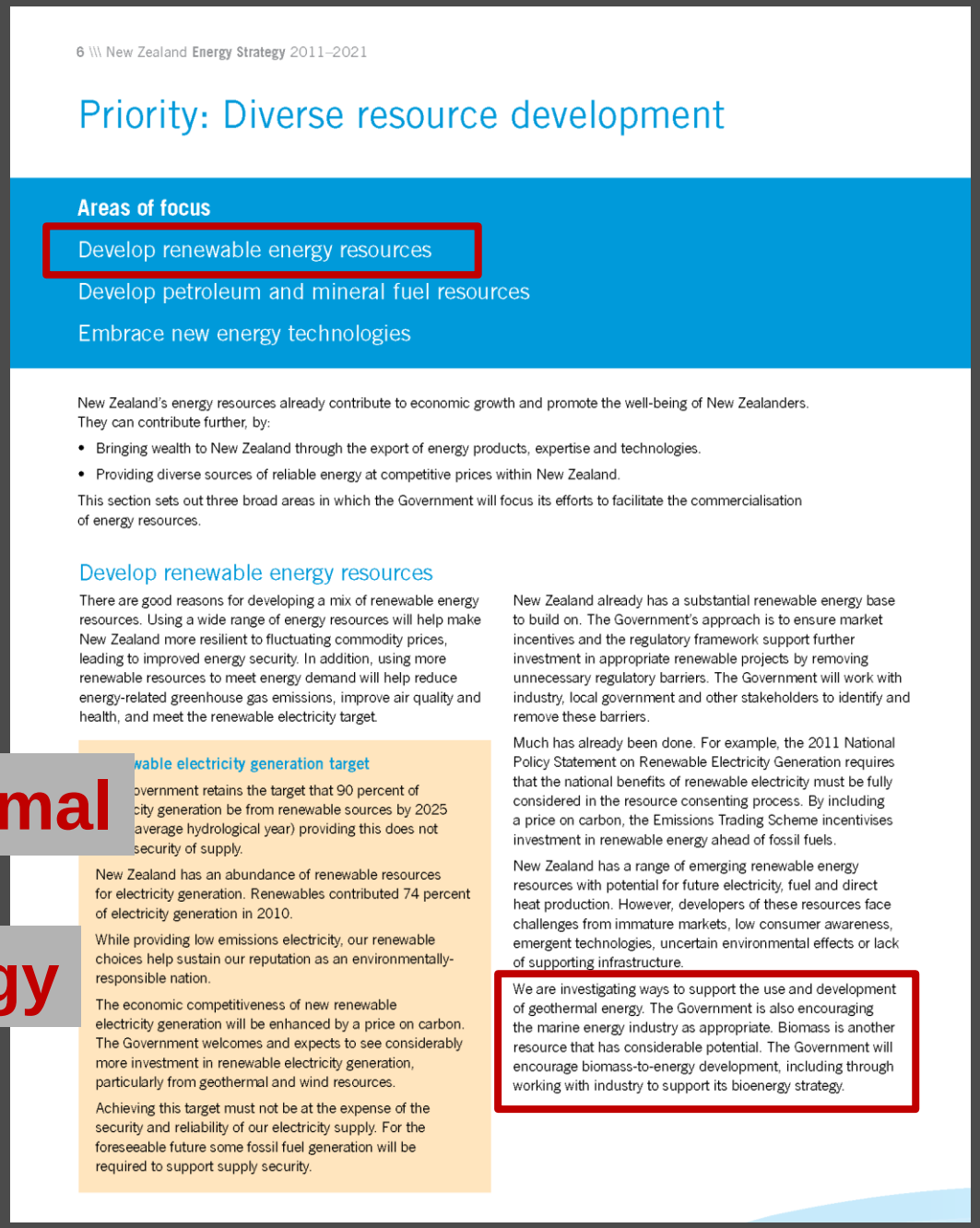
NZ Energy Strategy

- **Released in 2011**
- **Renewables important Role in NZ energy future energy supply**
- **NZ Energy Efficiency and Conservation Strategy is an integral part**
  - Under revision

NZES on Renewables

Geothermal

Strategy



Priority: Diverse resource development

Areas of focus

Develop renewable energy resources

Develop petroleum and mineral fuel resources

Embrace new energy technologies

New Zealand's energy resources already contribute to economic growth and promote the well-being of New Zealanders. They can contribute further, by:

- Bringing wealth to New Zealand through the export of energy products, expertise and technologies.
- Providing diverse sources of reliable energy at competitive prices within New Zealand.

This section sets out three broad areas in which the Government will focus its efforts to facilitate the commercialisation of energy resources.

Develop renewable energy resources

There are good reasons for developing a mix of renewable energy resources. Using a wide range of energy resources will help make New Zealand more resilient to fluctuating commodity prices, leading to improved energy security. In addition, using more renewable resources to meet energy demand will help reduce energy-related greenhouse gas emissions, improve air quality and health, and meet the renewable electricity target.

wable electricity generation target

overnment retains the target that 90 percent of city generation be from renewable sources by 2025 average hydrological year) providing this does not security of supply.

New Zealand has an abundance of renewable resources for electricity generation. Renewables contributed 74 percent of electricity generation in 2010.

While providing low emissions electricity, our renewable choices help sustain our reputation as an environmentally-responsible nation.

The economic competitiveness of new renewable electricity generation will be enhanced by a price on carbon. The Government welcomes and expects to see considerably more investment in renewable electricity generation, particularly from geothermal and wind resources.

Achieving this target must not be at the expense of the security and reliability of our electricity supply. For the foreseeable future some fossil fuel generation will be required to support supply security.

New Zealand already has a substantial renewable energy base to build on. The Government's approach is to ensure market incentives and the regulatory framework support further investment in appropriate renewable projects by removing unnecessary regulatory barriers. The Government will work with industry, local government and other stakeholders to identify and remove these barriers.

Much has already been done. For example, the 2011 National Policy Statement on Renewable Electricity Generation requires that the national benefits of renewable electricity must be fully considered in the resource consenting process. By including a price on carbon, the Emissions Trading Scheme incentivises investment in renewable energy ahead of fossil fuels.

New Zealand has a range of emerging renewable energy resources with potential for future electricity, fuel and direct heat production. However, developers of these resources face challenges from immature markets, low consumer awareness, emergent technologies, uncertain environmental effects or lack of supporting infrastructure.

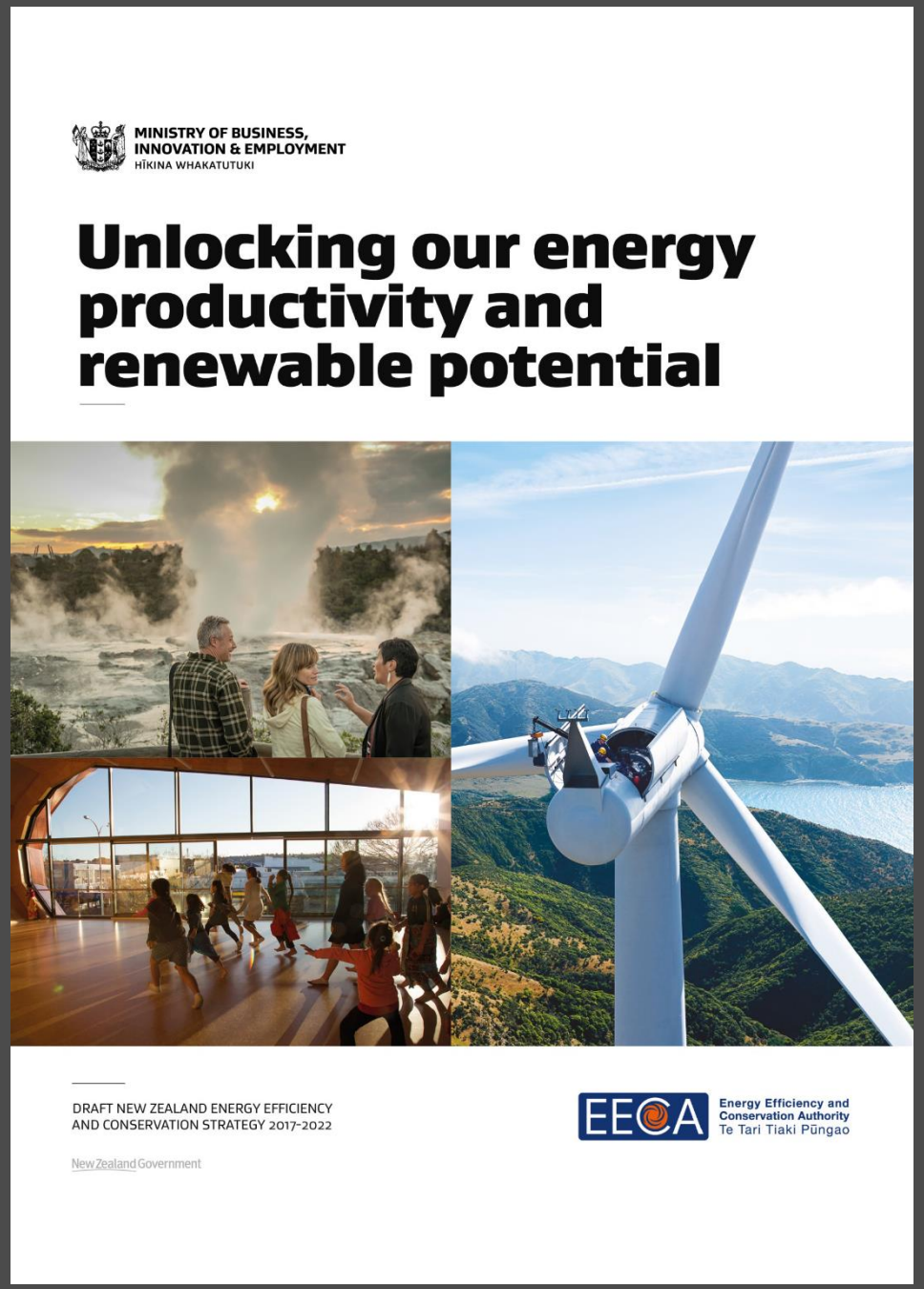
We are investigating ways to support the use and development of geothermal energy. The Government is also encouraging the marine energy industry as appropriate. Biomass is another resource that has considerable potential. The Government will encourage biomass-to-energy development, including through working with industry to support its bioenergy strategy.

Revised NZEECS - 2017 to 2022

- **In process**
- **Energy Productivity**
- **Reducing energy use from Green House Gas emitting fuels**
  - Efficiency
  - Switching to renewables

PROCESS HEAT ACTION PLAN

Revised NZEECS



Foreword - Minister of Energy and Resources

GHG

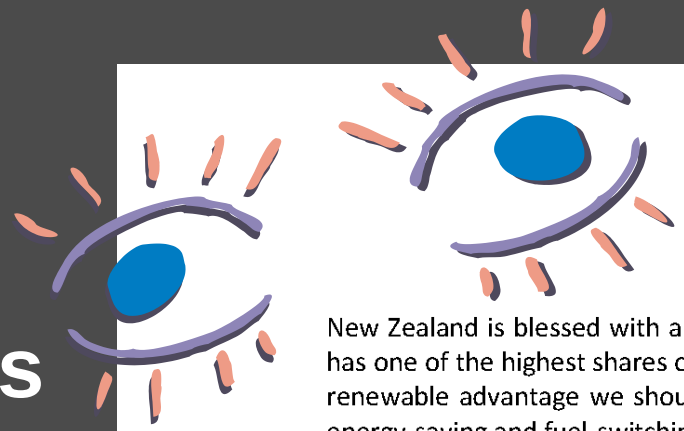
As a party to the historic Paris climate change agreement, New Zealand is committed to reducing greenhouse gas emissions. Our target is to reduce emissions to 30 per cent below 2005 levels by 2030. Businesses, individuals and the Government will need to work together to unlock our energy productivity and renewable potential to contribute to progress towards this target.

I am confident that this Strategy will help steer businesses, individuals and the Government towards taking actions that will enable our transition towards a smarter, lower-carbon and more productive economy.

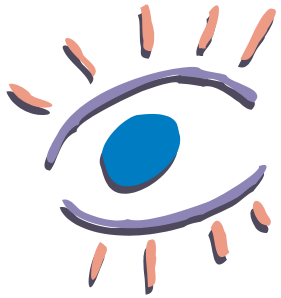
Hon Simon Bridges
Minister of Energy and Resources

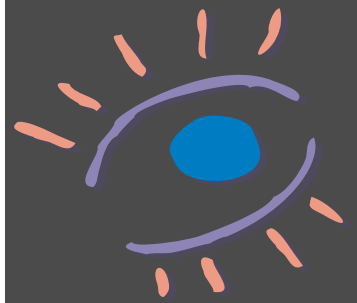
Foreword - Minister of Energy and Resources

Focus



New Zealand is blessed with an abundant supply of renewable energy resources, and already has one of the highest shares of renewable electricity generation in the world. To leverage our renewable advantage we should not only focus on renewable electricity generation but also energy-saving and fuel-switching opportunities in other sectors.





I am confident that this Strategy will help steer businesses, individuals and the Government towards taking actions that will enable our transition towards a smarter, lower-carbon and more productive economy.

Hon Simon Bridges
Minister of Energy and Resources

Foreword - Minister of Energy and Resources

Greatest Potential

Our greatest potential to reduce carbon lies in our process heat sector for industrial and commercial users, and in our transport sector; both have a much larger proportion of non-renewable energy than electricity.

I am confident that this Strategy will help steer businesses, individuals and the Government towards taking actions that will enable our transition towards a smarter, lower-carbon and more productive economy.

Hon Simon Bridges
Minister of Energy and Resources

Foreword - Minister of Energy and Resources

Critical

We need to continue to build a willingness to do things differently, and awareness that energy efficiency and increased use of our renewable advantage are critical game-changers for our environment and our economy.

Game changers

I am confident that this Strategy will help steer businesses, individuals and the Government towards taking actions that will enable our transition towards a smarter, lower-carbon and more productive economy.

Hon Simon Bridges
Minister of Energy and Resources

Foreword - Minister of Energy and Resources

New Zealand's Energy Transformation

This Strategy sets out the objectives, actions and targets for energy efficiency and renewable energy for the next five years, and will continue to support the New Zealand Energy Strategy 2011–2021.

I am confident that this Strategy will help steer businesses, individuals and the Government towards taking actions that will enable our transition towards a smarter, lower-carbon and more productive economy.

Hon Simon Bridges
Minister of Energy and Resources

Action

https://www.iea.org/countries/membercountries/newzealand/

IEA 2017 Review - 90% renewable electricity target

- A government energy policy objective
- Receives broad public support
- Target **likely to be met** from the country's very favourable renewable resources base given the attractive economics of renewables
- The government expects that the **market** should be able to **deliver** the needed **renewable** generation **capacity without financial support**

IEA 2017 - Towards Lower Green House Emissions

- New Zealand also has extensive renewable resources that could be used to produce heat in the industrial and housing markets, notably from geothermal and biomass
- There has been some development of geothermal for these purposes, but progress in developing renewable heat is slow because of competition from low-cost coal in the industry sector (for example in milk drying), and because of institutional and locational problems. Given that heat production is a significant source of energy-related CO2 emissions, these renewable options could play an important role alongside energy efficiency in their reduction.

Geoheat Strategy

- A Game Changer

Geoheat Strategy – How it started …

- **It was just an idea**
- **Became paper 95 at NZGW 2012**
  - Watt ? A GeoHeat Strategy for NZ

- **Delivered as a keynote address 20 November 2012**

Anna Morris from the Ministry for Economic Development asked

When will it be completed ?

Simple question inspired strategy development

- **Work started in earnest in 2015**
- **Scoping work - May to July**
  - Ideas developed
  - Stakeholder meetings
    - MBIE and EECA
- **Consultative / focus group workshops**
    - NZGA Generation and Industrial Use Interest Group
    - Waiariki Māori Geothermal Advisory Group
    - Bay of Connections Governance Group
- **Booth and presentation - November 2015**
  - NZ Geothermal Workshop in Taupo

A simple question ……..

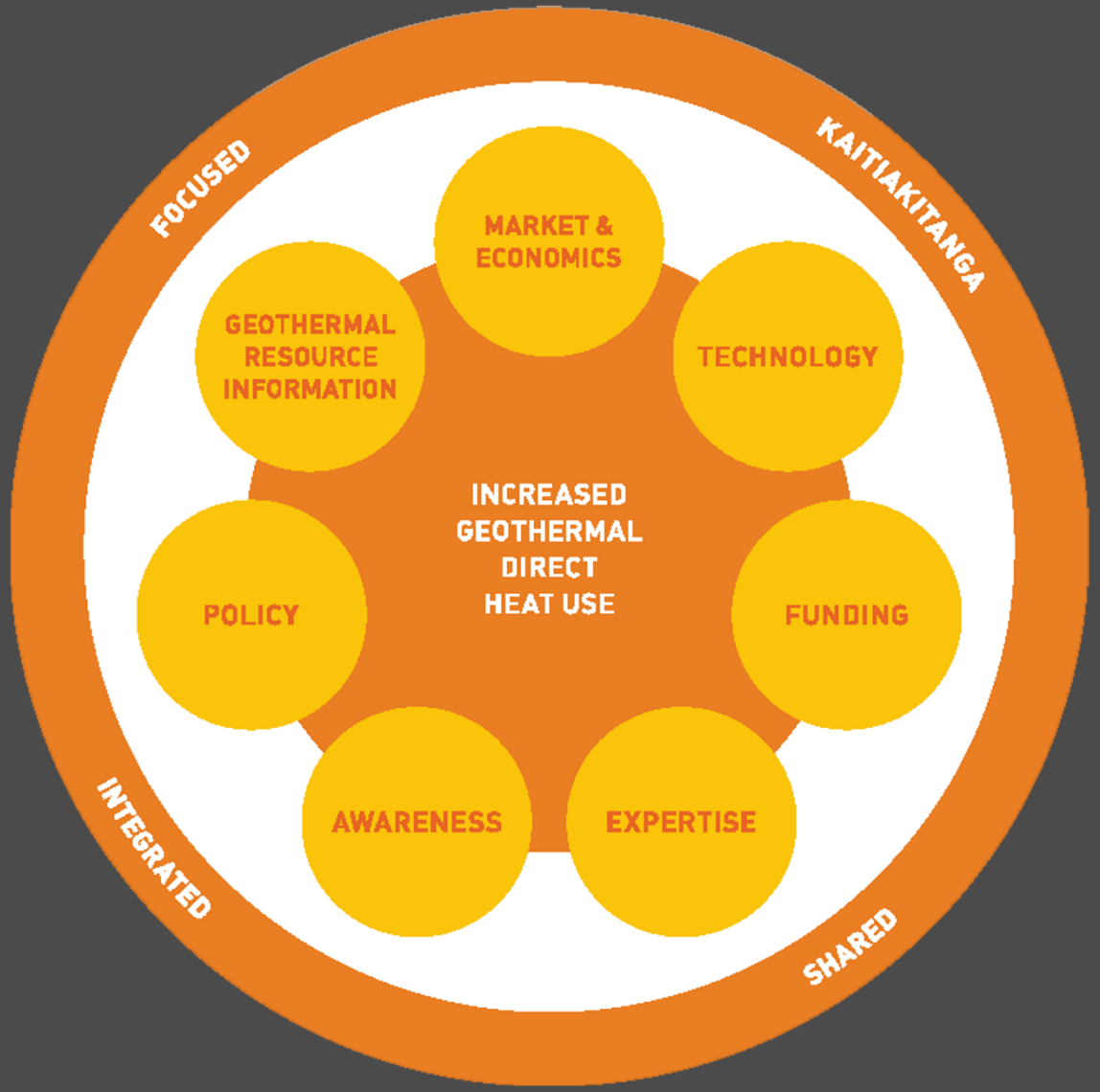
- **Drafting of the public consultation draft document**
- **NZGA ratified Host Status for the Strategy**
  - 7 March 2016 Board Meeting
- **Public Consultation – open for 2 months**
  - Document available from the NZGA web site
  - End March to end May 2016
- **Responding to comments received**
- **Paper 10 at 2016 New Zealand Geothermal Workshop**
- **Graphic Design and publishing**
  - Completed December 2016
- **On going discussions with key parties**
- **Launch today 27th June 2017**

Advocacy, Action and Influence

Document proposes activity

- **Preparation to …..**
- **Foster Direct Geothermal Heat Uptake**
  - Purposeful front footing - driving for uptake
  - Mobilising interest
  - Providing connections
  - Dismantling barriers
- **Marketing Geothermal Direct Use**
  - As a business enabler
- **Coordination**

Four Principles



Journey ….

- **integral with geothermal direct use activity occurring in the regions**
- **Initially ……**
  - Bay of Connections
  - Higher temperature industrial / commercial use
- **Strategy Sets out some next steps**
- **Then its going to be iterate to success**
  - Determined by where effort will achieve the most benefit

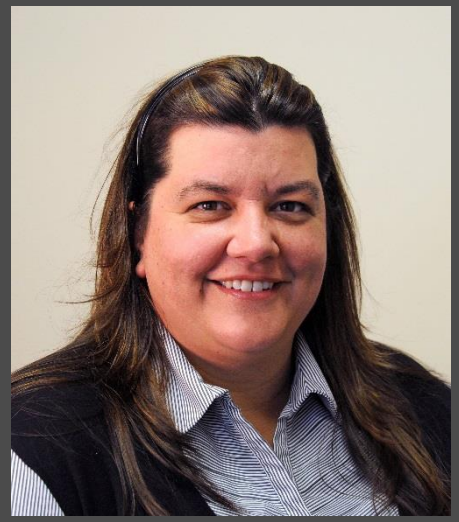
Bay of Connections

BAY OF CONNECTIONS

ONE REGION . ONE GOAL . ONE FUTURE

- **Vision**
  - Prosperity supported by sustainable sectors
- **Mission**
  - To deliver sector-based strategies and action plans that generate and encourage additional sustainable employment for the Bay of Plenty

Bay of Connections – Energy



Andrea Blair – Strategy leader
Will talk more about this

BAY OF CONNECTIONS ENERGY STRATEGY UPDATE 2016

Our **Energy.** *Our* **Advantage.** *Our* **Future.**

The Bay of Connections Energy Strategy was launched in December 2011. It covers a broad spectrum of potential energy opportunities across the wider Bay of Plenty region, including resources and supply, energy use and wealth creation.

Five years on, the Energy Strategy has been updated with a strong focus on business growth opportunities and employment, underpinned by sustainable use. The actions in this strategy are designed to achieve realistic results in the short-term, and build a platform for the longer term pursuit and realisation of the vision.

The Energy Strategy also ties in closely with the Toi Moana Bay of Plenty Regional Growth Study (RGS), with geothermal one of the nine key priority areas identified for development by the region, with the support of central government.

The Bay of Connections is the regional growth strategy for the wider Bay of Plenty region, which incorporates Eastern and Western Bay of Plenty, Rotorua and Taupō. The strategy is supported by key sector strategies and action plans for aquaculture, forestry, freight logistics, energy, Māori economic development, and sport and recreation.

VISION

Wealth and wellbeing through renewable and sustainable energy

MISSION

To create sustainable new business growth opportunities and employment

WE WILL ACHIEVE THIS BY:

- **Leadership and advocacy:** Enable and support the development of clean, green, renewable energy opportunities through advocacy, communication and collaboration
- **Investment:** develop a clear investment proposition for the wider Bay of Plenty in the context of the region's renewable energy advantages
  - ***Telling the story:*** Promote the region's renewable energy opportunities to attract significant businesses and industries to establish or expand
  - ***New energy opportunities:*** Establish ecosystems and clusters around new or existing business operations and clean, green, renewable energy opportunities
- **Support sustainable options and opportunities:** Encourage and facilitate the region's competitive advantages of renewable and sustainable energy across all energy user groups

Bay of Connections Strategies

Excellent strategy cross over and synergy

- Wrap around the Bay of Connections work
- Provide support for their activity

2030 Geoheat Strategy Targets

- Annual Direct Use Geothermal Primary Energy increase of 7.5 PJ
- 500 Jobs in the geothermal industry (or ancillary) jobs related to the first target

EXECUTIVE SUMMARY

Geothermal resources offer a key competitive advantage for New Zealand, providing a local, secure, and renewable energy source. There is substantial opportunity to grow and diversify the direct use of geothermal heat to:

- create new businesses
- convert more industries from fossil fuels to geothermal energy
- support regional economic and social development
- increase the uptake of renewable low carbon energy
- lead the world in direct geothermal energy use

New Zealand has a long history of utilising its high temperature geothermal resources, with approximately six decades of extensive large scale geothermal energy utilisation for industrial direct heat and electricity generation. However, geothermal use goes back much further, to early Māori use of geothermal springs and pools for bathing, healing, cooking, and community life.

Our recent history has seen periods of growth, static, and declining trends in geothermal heat use. The goal of this Strategy is to change this trajectory into one of continuous and sustainable growth in geothermal direct heat use.

This strategy will have been successful if, by 2030:

1. **Annual direct primary geothermal energy use has increased by 7.5 PJ in new projects in the period 2017–2030; and**
2. **Geothermal direct use business operations are employing (directly and indirectly) an additional 500 people associated with new projects in the period 2017–2030.**

To put that in perspective, a timber drying facility might use in the order of 1 PJ / annum of direct primary geothermal energy use, where a glasshouse (approx. 12 ha) might use less than 0.3 PJ / annum. So in order to reach the 7.5 PJ / annum target, the Strategy envisages the creation of four or five larger direct use projects (e.g. timber processing, large glasshouses, etc), as well as a range of smaller projects (e.g. bathing, smaller scale glass houses, etc.) over the next 10–12 years.

We propose a coordinated approach to raise awareness, secure investment, streamline policies, retain and develop expertise, adapt technologies, improve access to technical information, and share market intelligence.

Our guiding principles provide a compass for defining actions, decision-making and behaviours. The Strategy is a shared responsibility that integrates sectors, organisations and disciplines for shared benefit. Future growth is underpinned by the principle of kaitiakitanga, with a long-term, sustainable vision.

The Strategy focuses on the higher temperature Central North Island and Northland geothermal resources, but doesn't discount lower temperature resources in other regions. The Strategy excludes fostering the increase in geothermal electricity generation as this sector is already well developed, with strong industry participants and advocates in New Zealand. The Strategy will focus at the commercial and industrial scale to promote economic growth, but does not discount domestic use advancements.

To activate the Strategy, five key steps are necessary to build a foundation for successful implementation. The priority actions for 2017–18 are:

1. Establish a Geoheat Strategy Governance Group
2. Strategy Coordination
3. Establish Geoheat Strategy Action Group
4. Establish a centre for geothermal direct use advocacy and activity
5. Identify and prioritise a work plan for implementation of strategy actions

Recommended actions are also suggested. These have been developed through stakeholder consultation, and are not exhaustive. However, they seek to address the key barriers and success factors identified for increasing New Zealand's geothermal direct use, and will be further developed as the strategy advances.

New Zealand has great potential to grow our direct geothermal use. To realise our potential in this area, this Strategy seeks to coordinate activities and drive growth, to realise benefits at a national, regional and local level.

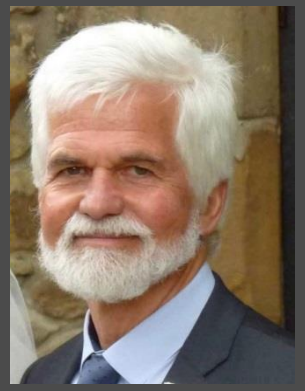
6

Action Group

- This is where you come in ……
- Provide expertise to support activity
- Voluntary
- Towards the end of the talk I will identify several areas of expertise

NZGA Geoheat Strategy Governance Group

- Provide oversight
- Coordination anchor point into NZGA
- Sounding board for high level strategy direction
- Provide wisdom and encouragement to the coordinator

Mouse Click to view the video

www.nzgeoheat.nz

Acknowledge

- **Waiariki Māori Geothermal Advisory Group**
- **New Zealand Geothermal Association**
- **GNS Science**
- **Tenon, Mercury, Contact, Prawn Park**
- **Students from:**
  - Taupo Primary School
  - Taupo-nui-a-Tia College
- **Colleagues**
  - Melissa Climo and Simon Bendall

Wow
Thank you

Geoheat Strategy for Aotearoa NZ 2017 - 2030

- **NZGA**
  - President - Andy Bloomer

www.nzgeoheat.nz

Download, Read, Get involved

Action Group Expertise …. Talk to us …

- Presenters
- Paper and article writers
- Business development expertise
- Graphic design
- Videographers
- Direct use engineering expertise

- You Want to put up funds
  - Talk to Andrea Blair

Download report using your QR card or …..

- Go to the NZGA web site - use
  Download Geoheat Strategy
- Video on youtube
  https://youtu.be/yzDhDvViPI0

That's me done …. (for today !!!)

Become a game changer

info@nzgeoheat.nz

Kia Ora