


# OUR FUTURE FROM ENERGY

**WORLD CLASS ENERGY**

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

BAY OF PLENTY ENERGY STRATEGY

*A product of the Bay of Connections Economic Strategy*




# ACTION PLAN SUMMARY

THE BAY OF PLENTY ENERGY STRATEGY IS AIMED AT INCREASING THE WEALTH AND WELLBEING OF THOSE WHO LIVE IN THE BAY OF PLENTY REGION AND BEYOND.

## AN ACTION PLAN FOR A PROSPEROUS FUTURE

Energy is an enabler for business and residential living, so needs to be an appropriately priced, reliable, sustainable input that will support the efficiency of other industries and act as an attractor for the region.

The region is rich in energy resources, which through innovation and wise investment can lead to new employment, healthy homes and attract additional people to the region. The region can be a leader in clean, smart and responsible energy – leading ideas and leading innovation.

The Strategy is aimed at creating a foundation for individuals and business in identifying and successfully pursuing opportunities available from the region's sustainable resources. As a region we can show that we are open to renewable energy ideas and not just looking at the obvious and traditional solar, wind, geothermal prospects. The Strategy will assist us to be first movers, and concentrate on the possibilities – some of which we haven't even explored yet.

As we move from the petroleum era we need to look at new sources of energy, which we are fortunate the region has in abundance. We need to remember that we are actually part of the environment and if we harm the environment, we harm ourselves and our economy. So, having a renewable and responsible focus on energy is important – for the wealth and wellbeing of the environment, the people and the region.

The key to this Strategy is the Action Plan. To achieve the vision of 'wealth and wellbeing via energy' the Bay of Plenty needs to take this Strategy, own it, and act upon it – together.

The Strategy and Action Plan are not exclusive to the Bay of Plenty. There are other key partners who are essential to its development and implementation – such as our neighbours Taupō and Waikato.

An essential aspect of the Action Plan is that we work in partnership with national agencies and initiatives, and work closely with local and central government, industry associations and other bodies. The theme of Bay of Connections is just that: building regional, national, international, and business connections. That theme also runs through this Strategy. We need to be internationally connected at all times, and connect investors with the opportunity.

The Action Plan falls into four major areas – Resources, Supply, Use, and Growth. These are the fundamental areas that will make critical contributions to the region's improved wealth and wellbeing. It is all about creating the right environment for the commercial entities – both existing and new – to succeed.

The Action Plan is not the end point. It is iterative – there will be some actions that the Bay of Plenty Energy Action Group put to one side, and there will be other actions that are added. It is intended to be a framework to build on the existing strengths of the industry, and help guide future action, engagement, and achievement.

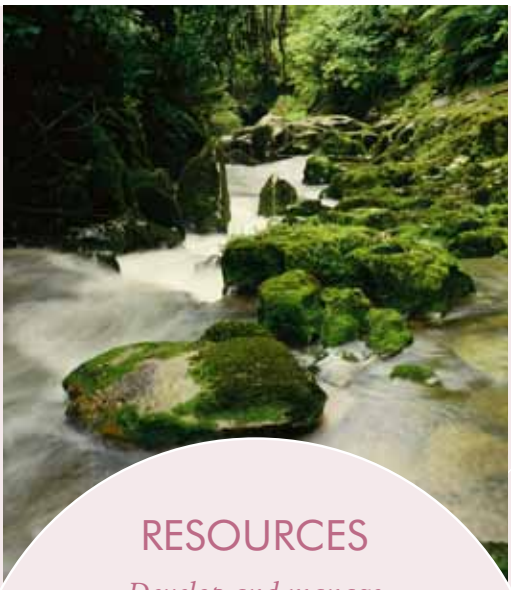
A key item in the Action Plan is to create the Bay of Plenty Energy Action Group. The main purpose of this group is to provide leadership – by driving and owning initiatives that will contribute to the goal of the Strategy.

The Group will be vital to ensuring this Strategy is put into action. It will be important for the members to take a regional and generic industry overview when implementing the Action Plan. The members will be those who can influence and directly contribute to the areas of Resources, Supply, Use, and Growth. It will establish simple terms of reference, will prioritise the items in the Action Plan, and will put timeframes on those actions – within the next two to five years. The Group will refresh the Strategy on a regular basis, to ensure that actions remain relevant and targeted to the areas of maximum benefit for the industry and the region.

## GROWTH

*Investment and partnerships*

Building a unique Bay of Plenty brand and profile around a renewable energy industry will give us a point of difference at a national and international level. Partnerships and connections – domestic and international – are key to growing the industry, along with investment promotion and facilitation.



## RESOURCES

*Develop and manage*

There is a huge amount of potential in our resources – natural, financial and people. We need to further develop capacity and capability as we grow our renewable energy industry. This will include better understanding of the availability and use of our natural resources, technical capability, research and development, and technology commercialisation.

THE ACTION PLAN FALLS INTO FOUR MAJOR ENERGY FOCUS AREAS – RESOURCES, SUPPLY, USE, AND GROWTH. THESE ARE THE FUNDAMENTAL AREAS THAT WILL MAKE CRITICAL CONTRIBUTIONS TO THE REGION'S INCREASED WEALTH AND WELLBEING.

## USE

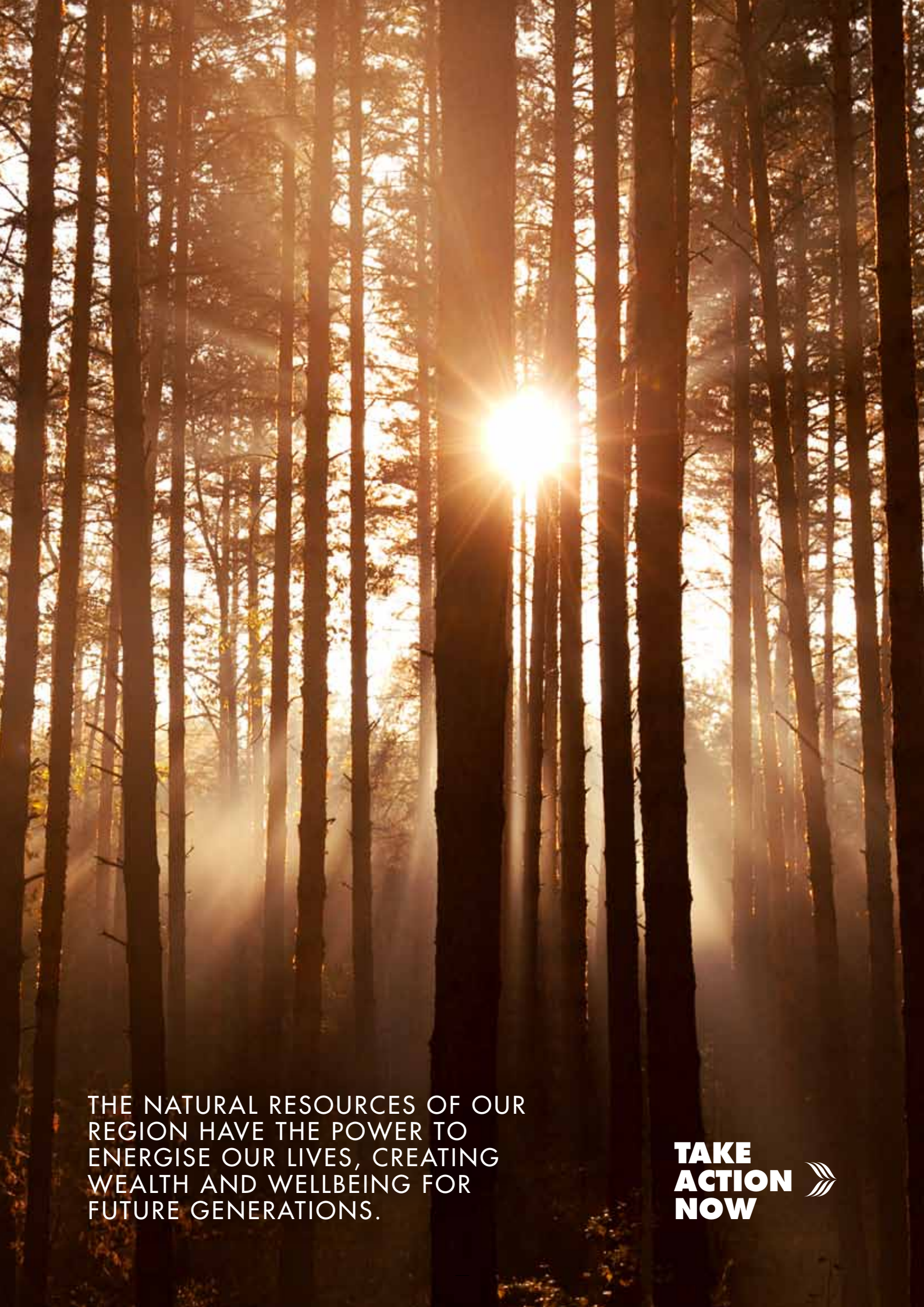
*Wise and efficient*

It is imperative that we have a region where use of energy is wise and efficient at the domestic, commercial, and industrial levels. Better use of readily available renewable resources, coupled with an energy education conservation programme, should be encouraged – to promote sustainable environmental outcomes.

## SUPPLY

*Secure and affordable*

The supporting physical and regulatory frameworks are essential for unleashing the region's potential and the success of this Strategy. This will involve smart integration and delivery, world class infrastructure, production of alternative transport fuels, and efficient regulations.


THE NATURAL RESOURCES OF OUR REGION HAVE THE POWER TO ENERGISE OUR LIVES, CREATING WEALTH AND WELLBEING FOR FUTURE GENERATIONS.
TAKE ACTION NOW

# BAY OF PLENTY ENERGY STRATEGY

LOOKING AHEAD

# WHAT ARE THE OPPORTUNITIES FROM ENERGY?

The aim is to discover new approaches and technologies to further increase our efficiency in clean energy production and use. We want to be first movers, looking at new possibilities that push the boundaries – many of which haven't even been conceived yet.

By taking an open-minded approach, coupled with our significant resources, the Bay of Plenty is in the perfect position to take full advantage of the shift towards cleaner and more responsible energy.



*"Energy has been fundamentally important to humanity's progress throughout history as it is today. This is one of the reasons action on climate change is controversial – because energy supply and availability is so critically integrated into our lives and our economy. That's why recognizing the enormous amount of clean and safe energy we have available to us is such an important mental shift. We think we live in scarcity and as a result often act from a place of fear. The truth is very different. We live on an abundant planet and our future progress is now only constrained by our thinking."*

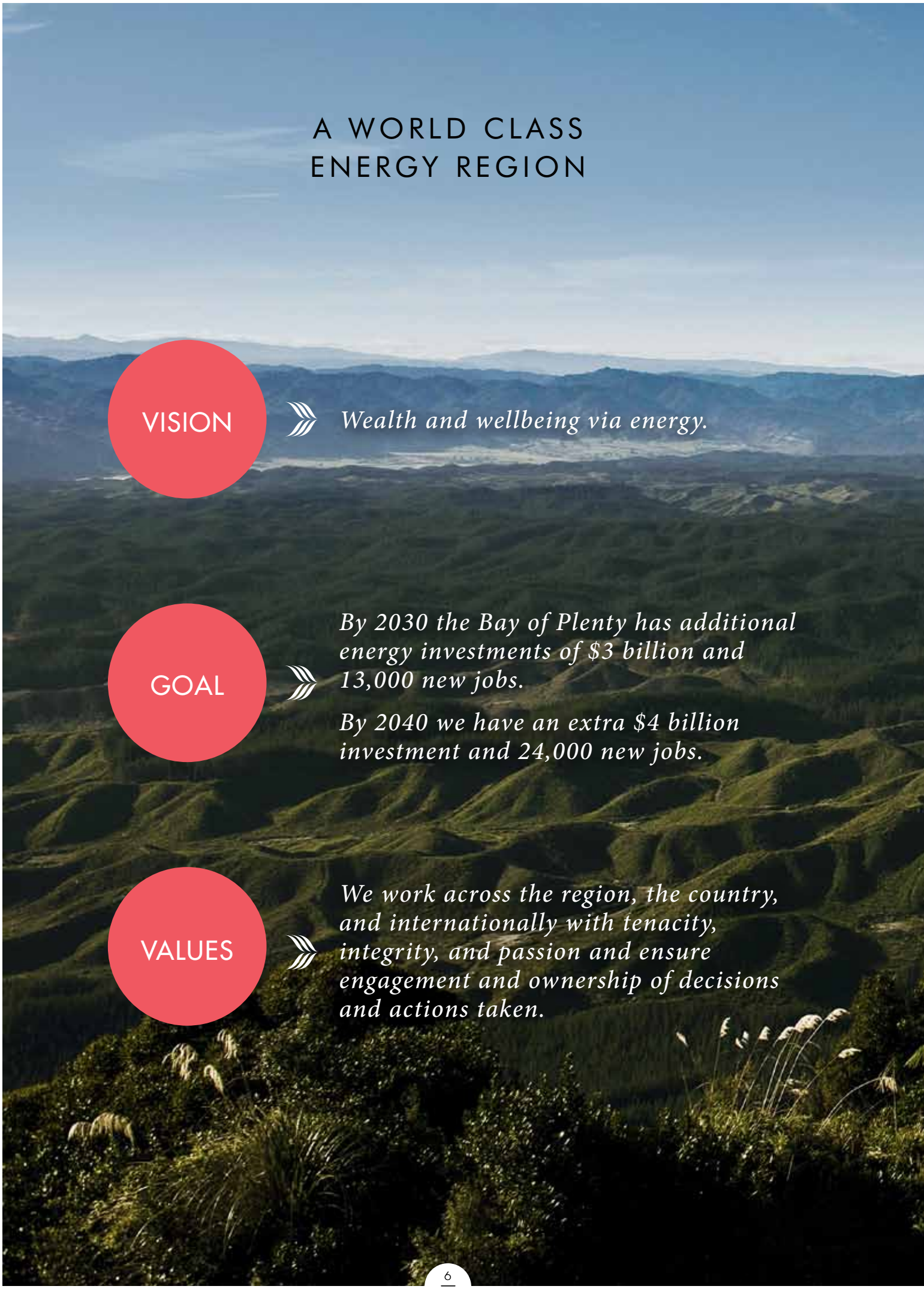
– PAUL GIILDING. THE GREAT DISRUPTION, 2010.

*"…as the world inevitably starts to put a price on carbon pollution, conserve energy and look for non-oil transport fuels, it will be nations that embrace a clean, low carbon economy that will economically prosper through booming clean technology exports and increased low carbon foreign investment. And the nation with the largest natural advantage to capture these economic opportunities in the developed world is New Zealand."*

*"New Zealand has been dealt with the unique natural endowment of ample carbon-neutral, baseload energy supplies that gives them the near exclusive opportunity of forging and leading the new clean economy of the future. With New Zealand's natural endowment, wealth, innovation, business-friendliness and vision, coupled with its proximity to the emerging powerhouse in Asia, the investment in clean technology is not just an environmental strategy, it is an economic growth strategy."*

– DR BEN MCNEIL, NEW ZEALAND'S ECONOMIC OPPORTUNITY IN THE EMERGING CLEAN INDUSTRIAL REVOLUTION.





# A WORLD CLASS ENERGY REGION

## VISION

*Wealth and wellbeing via energy.*

## GOAL

*By 2030 the Bay of Plenty has additional energy investments of $3 billion and 13,000 new jobs.*

*By 2040 we have an extra $4 billion investment and 24,000 new jobs.*

## VALUES

*We work across the region, the country, and internationally with tenacity, integrity, and passion and ensure engagement and ownership of decisions and actions taken.*

# The **STRATEGY**

# OUR REGION

RESOURCE RICH IN:

## SUNSHINE AND RAIN

- Creating opportunities for solar and hydro energy
- Significant potential for solar thermal (hot water) applications
- Some opportunities for small to medium sized hydro generation

## GEOTHERMAL

- Numerous underdeveloped geothermal resources
- Heat resources essentially under every part of the region
- Underutilised opportunities for direct heat use and downstream applications
- Extensive experience and capabilities for developing and supporting international geothermal electricity generation
- World-leadership in industrial direct heat use at Kawerau
- Taupō has the largest range of direct and cascade heat use applications in New Zealand – including timber drying, horticulture, food manufacturing, aquaculture tourism and space heating
- Opportunities for heating hotels, motels and recreation facilities

## FOREST RESOURCES

- Extensive forestry plantations from which added value products (including engineered wood products, biofuels, biochemicals and biomaterials) can be obtained
- 20% of the wood from extensive forestry plantations is currently wasted residue either at harvest or during processing
- Much of the wood produced exported as low value log and chip
- International investors are now eyeing our forest resources as feedstock for the production of advanced biofuels and the extraction of biochemicals

## PEOPLE

- Two well established trades training providers
- Scion, an international centre of wood-energy and wood processing research
- GNS Science based in Taupō, an international centre of geothermal excellence
- International geothermal expertise
- National energy efficiency provider expertise (Energy Options)

# ENERGY RELATED STRENGTHS

- Industry – Kawerau: the world's largest industrial geothermal heat site, and Taupō: the largest range of geothermal applications
- Existing hydro and geothermal electricity generation
- Tourism, and particularly health and spa-related tourism
- Forest harvesting, collection, chipping and transport of wood chip
- Land available for new energy crops
- International quality engineering support capability

# ATTRACTIVE REGULATORY ENVIRONMENT

- As New Zealand's fastest growing region, business needs reliable energy supply
- A clear resource management policy framework is provided to enable the development and use of the region's resources

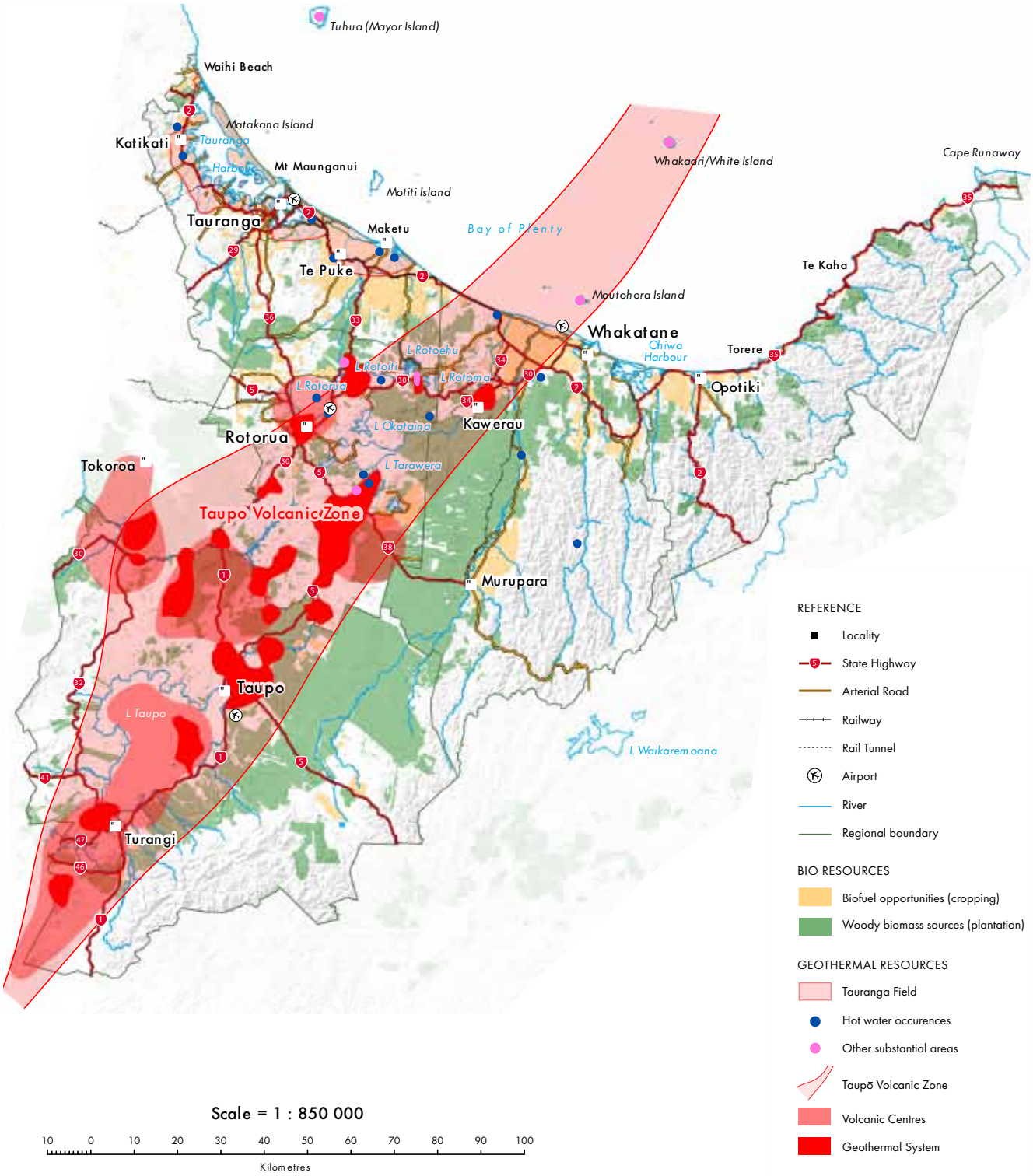
Opportunities include heat and electricity generation and use, biomass available for production of biofuels and extraction of associated biochemicals, geothermal heating for hot house food production and aquaculture, and Rotorua and Taupō's latent potential to become yet again an international geothermal health spa location.

The Bay of Plenty has a strong infrastructure framework which supports current and future development of the region's energy resources.

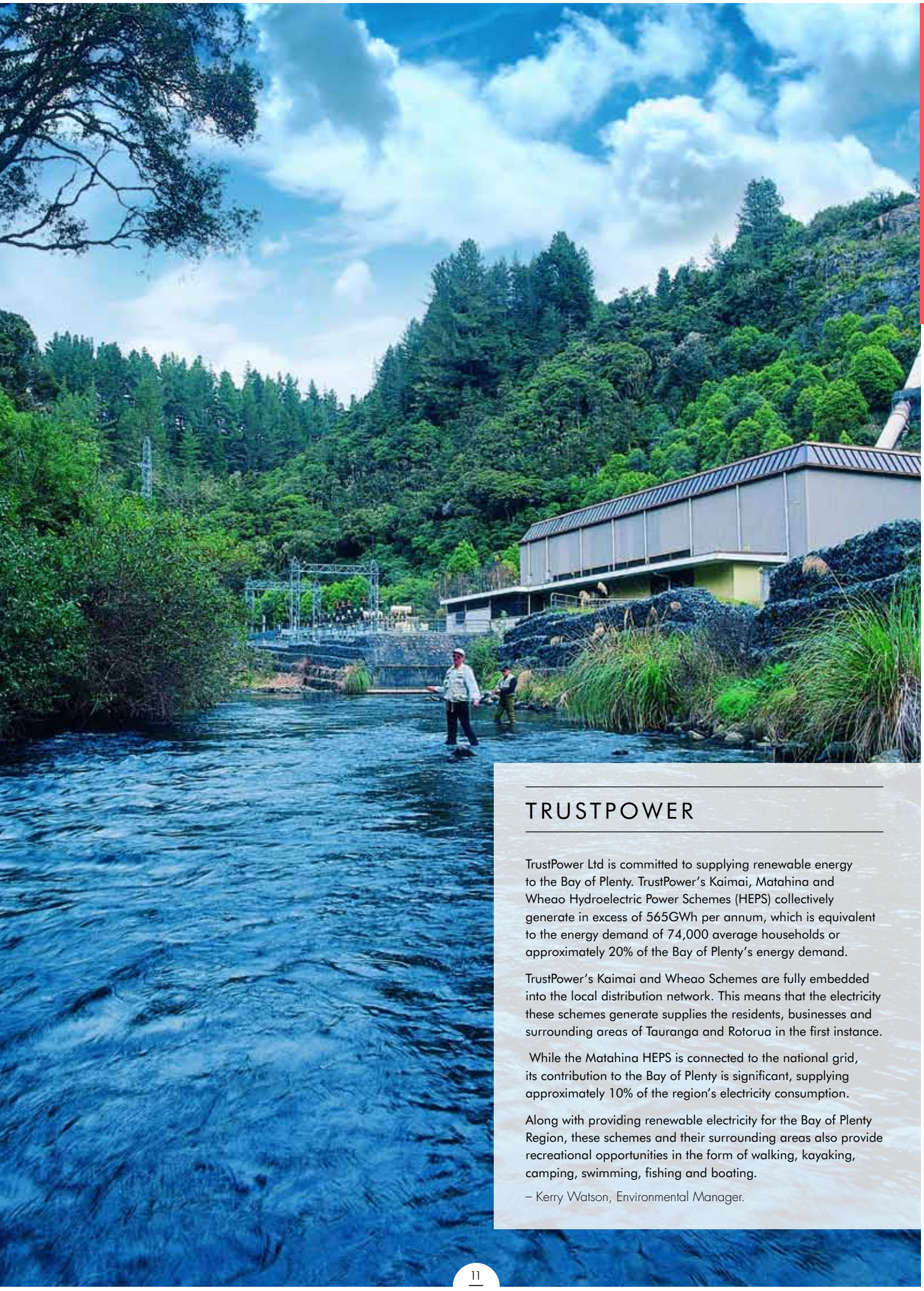
## NORSKE SKOG TASMAN

We've got one of the very best carbon footprints for a paper manufacturing site in the world. The fibre we use is from the residues of a renewable plantation forest, and by using geothermal steam and geothermal electricity to process the residues we are unique in the world. I haven't come across a better place to do business than here. Kawerau has it all.

– Peter McCarty, Mill Manager




*SOURCE: © Bay of Plenty Regional Council, 2011. © Sourced from Land Information New Zealand data. CROWN COPYRIGHT RESESRVED*
*NOTE: Taupō is part of the Bay of Connections through close working relationships with the Bay of Plenty region and shared economic resources - in particular Energy, Forestry, Tourism and Logistics.*



## TRUSTPOWER

TrustPower Ltd is committed to supplying renewable energy to the Bay of Plenty. TrustPower's Kaimai, Matahina and Wheao Hydroelectric Power Schemes (HEPS) collectively generate in excess of 565GWh per annum, which is equivalent to the energy demand of 74,000 average households or approximately 20% of the Bay of Plenty's energy demand.

TrustPower's Kaimai and Wheao Schemes are fully embedded into the local distribution network. This means that the electricity these schemes generate supplies the residents, businesses and surrounding areas of Tauranga and Rotorua in the first instance.

While the Matahina HEPS is connected to the national grid, its contribution to the Bay of Plenty is significant, supplying approximately 10% of the region's electricity consumption.

Along with providing renewable electricity for the Bay of Plenty Region, these schemes and their surrounding areas also provide recreational opportunities in the form of walking, kayaking, camping, swimming, fishing and boating.

– Kerry Watson, Environmental Manager.

# SCION

Scion – a Crown Research Institute based in Rotorua – is working with New Zealand's forestry, wood processing and other biomaterial sectors to create economic value with beneficial environmental and social outcomes. The organisation's Statement of Core Purpose explicitly supports Scion's role to "increase renewable energy production and energy security by growing New Zealand's ability to produce sustainable bioenergy and liquid biofuel products". Examples of low carbon renewable energy opportunities include:

- Scion's Lignocellulosic Biofuels Initiative optimises thermomechanical/enzymatic technologies to process woody biomass into liquid biofuels. Scion's mechanical pulping pilot plant (pictured) is the only one of its type in the Southern Hemisphere and is core to this work. The LBI process can recover more than 70% of fermentable wood sugars without damaging valuable lignin co-products.
- Scion's Waste 2 Gold programme is processing municipal and industrial organic wastes to eliminate landfilling and recover value. Its Terax™ hydrothermal deconstruction technology (currently at pilot scale through a Rotorua District Council partnership) reduces waste volumes by >95% and recovers heat and chemical by-products for production of biofuels, bioplastics and fertilisers.
- Scion's torrefaction research is seeking to generate a high energy density, stable pelletised solid biofuel from wood residues that can replace coal or gas in thermal power stations and boilers.

– Trevor Stuthridge, General Manager Sustainable Design

# THE POINT OF THIS STRATEGY

Quite simply, the point of this Strategy is to achieve economic growth and wellbeing via energy, which is supported by world class leadership in efficient and effective energy-use practices and energy conservation. The Strategy covers all aspects of energy sourcing, supply and use in the region including that related to transport, business and residential homes. It is about using the energy for current wealth and wellbeing while conserving and maintaining sustainable energy availability for future generations.

We are also cognisant of the National Energy Strategy, and will ensure we fit and adapt it to the region's characteristics.

To capitalise our energy resources we also need to have a change in thinking to energy, not just electricity. This Strategy puts a greater focus on wealth creation through thinking energy in the wider sense and it encourages a collective approach to developing our resources.

Demand for energy and its cost are increasing. To promote economic growth and community wellbeing, our region needs secure, sustainable and reliable supplies of energy at affordable prices, along with initiatives to attract investors.

Energy development and management presents an opportunity to contribute substantially to the Bay of Plenty economy. Making sure we get the most value from our energy and having a strong renewable energy profile will give us a competitive advantage – nationally and internationally.

The region has a real comparative advantage (nationally and globally) in energy resources - geothermal, biomass and solar. The Strategy is to assist us to use this advantage to generate growth and wellbeing:

- Energy is an enabler of other industries (enabler focus) – through the Strategy we will encourage further development of existing comparative advantage areas (geothermal, bioenergy, solar) and ensure that the infrastructure/regulation is in place to generate cheaper, more sustainable energy sources that will improve the productivity of existing businesses and attract new businesses.
- Energy as a business (energy sector focus) – the Strategy will support and encourage businesses to:
  a) generate affordable/renewable energy and sell it, and
  b) develop energy based solutions/products they can sell globally.
- Energy for wellbeing (consumer focus) – the Strategy will encourage efficient and effective energy use practices and energy conservation. Behaviour changes will reduce expenditure and improve the health of our people and our environment.

## FACILITATING INVESTMENT

The Strategy has a number of actions aimed at ensuring that the region is the place to invest. This requires that the market for energy is as open and competitive as possible within this region. The Strategy aims to facilitate this type of environment on a number of levels from planning and regulation that enables renewable energy development, consenting processes that are efficient and quick, facilitation of industrial connections and contacts and the development of linkages with the rest of the country and the world to promote this region as the place for investment in sustainable energy.

## SELLING THE REGION

A key component of the Action Plan is around selling the region. The region's richness in natural resources – which attracts many to live in the region – needs to be proclaimed loud and wide as it sets the positive reason for why the region is so rich.

The key messages for the region are:

**ENHANCE** the value of the Bay of Plenty's renewable resource advantages
- sustainable management and protection of our biomass, hydro and geothermal resources
- adoption and adaption of appropriate technologies to convert biomass, geothermal and solar resources to high quality energy outputs

**OPTIMISE** the Bay of Plenty's energy footprint
- ensure security of supply for electricity, heating and transportation fuels within the region
- encourage energy efficiency for the community and industry

**MAXIMISE** economic growth opportunities from renewable energy production within the Bay of Plenty
- support investment in renewable energy applications and distribution infrastructure
- identify key opportunities for renewable energy exports to domestic and international markets

**ENCOURAGE** the social benefits of renewable energy production in the Bay of Plenty
- grow skills and employment opportunities
- nurture an innovation-culture driven by an emerging renewable energy sector
- the enhancement and optimisation of current renewable energy infrastructure

## THIS STRATEGY IS:

- Focused on economic growth and wellbeing
- Bay-wide, and beyond
- Developed within a wider context for energy
- Market led
- Globally focussed
- Encouraging strategic alliances
- Aimed at extracting more value from energy in a sustainable manner
- Aimed at increasing the region's profitability and competitiveness
- Aimed at helping to increase employment, income levels and living standards across the Bay
- Aligned with other Bay of Connections strategies, as well as the Bay of Plenty Regional Policy Statement, the New Zealand Energy Strategy, the New Zealand Energy Efficiency and Conservation Strategy and Government climate change priorities.

# WHY FOCUS ON ENERGY?

## UNDERSTANDING THE OPPORTUNITIES

Over the next 15-50 years our region could attract more than $4 billion in sustainable energy-related developments including:

- Extensive geothermal direct heat supply to industry
- Geothermal electricity generation
- Plus Te Mihi (166MW) and Nga Tamariki (110MW) are currently under construction and Tauhara 2 (250MW) is consented
- New hydro and wind generation
- Transport biofuel manufacture from forest resources including forest harvest residues, and potentially fuel crops (up to $1b in investment)
- Stimulating demand for new bio-products arising from use of the biomass and geothermal resources
- Enhanced tourist related activities based on geothermal resources
- Warm and healthy low energy homes and commercial buildings based on solar space and water heating initiatives or on geothermal heat pumps
- Increased use of wood-based fuels for industrial, institution and residential heating
- Investment in energy efficiency
- Investment in health/wellbeing projects such as home insulation
- In the longer-term significant solar electricity generation.

The opportunities would be based on using the region's abundant sustainable resources, potentially leading to:

- Generating more than 10% of New Zealand's electricity demand (becoming a net exporter)
- Producing more than 10% of New Zealand's liquid transport fuels (ethanol and biodiesel)
- Significant growth in energy-intensive processing industries and tourism activities using direct use of geothermal energy
- Major reductions in carbon emissions.

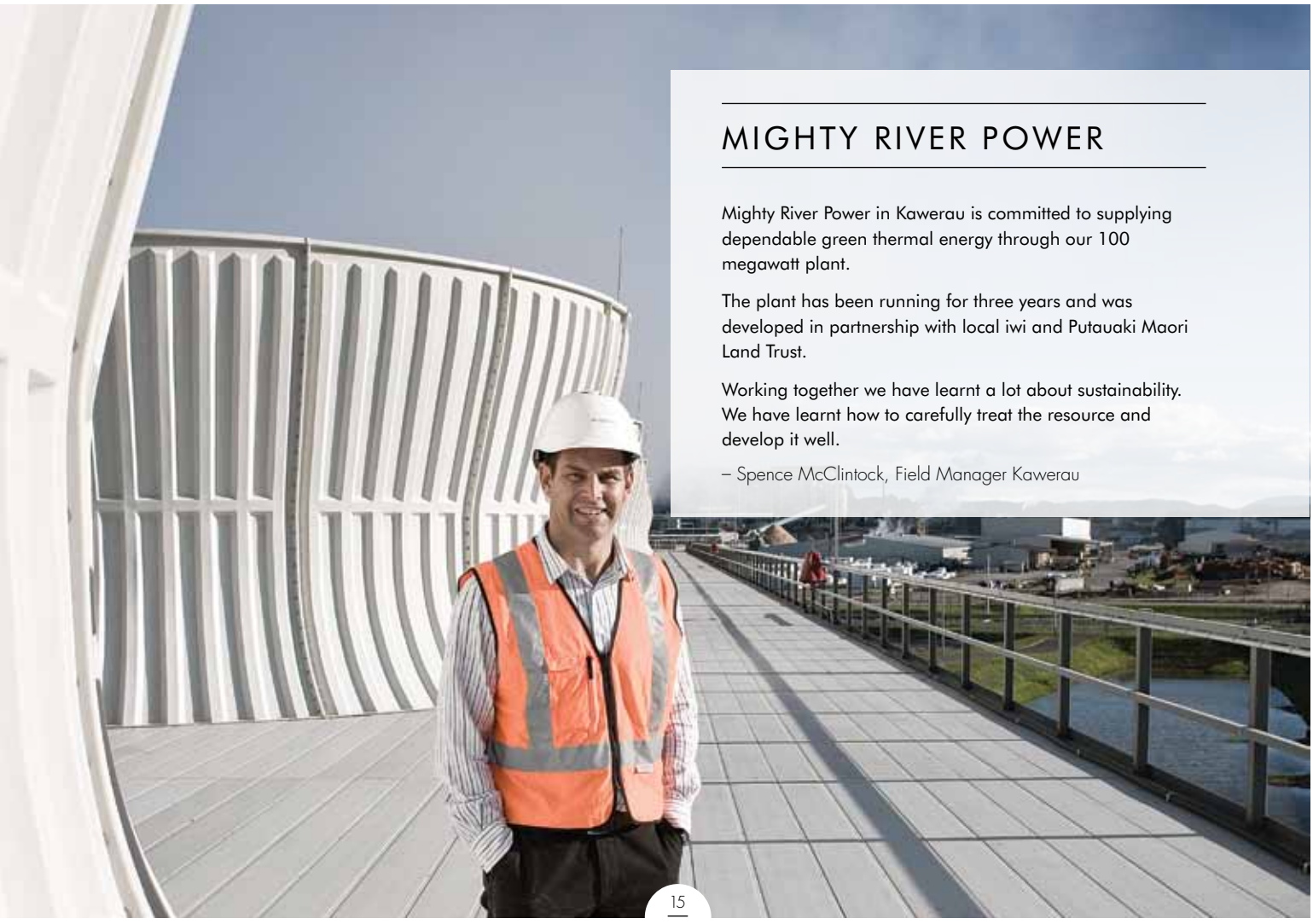
### Existing Electricity Generation

| Name | Location | Field | Operator | Generation Type | Capacity (MW) | Annual Generation (average GWh) | Commissioned |
|---|---|---|---|---|---|---|---|
| KAIMAI HEPS | Lloyd Mandeno | Tauranga | TrustPower | Hydro | 15.6 | 70 | 1976 |
| | Lower Mangapapa | Tauranga | TrustPower | Hydro | 6 | 17 | 1976 |
| | Ruahihi | Tauranga | TrustPower | Hydro | 20 | 76 | 1981 |
| | Kaimai 5 | Tauranga | TrustPower | Hydro | 0.35 | 2 | 1982 |
| KAWERAU (BOPE) | Kawerau, Bay of Plenty | Kawerau | Bay of Plenty Energy | Geothermal | 6.3 | 35 | 1989, 1993 |
| KAWERAU (KA24) | Kawerau, Bay of Plenty | Kawerau | | Geothermal | 8.3 | 70 | 2008 |
| KAWERAU (MRP) | Kawerau, Bay of Plenty | Kawerau | Mighty River Power | Geothermal | 100 | 800 | 2008 |
| MATAHINA HEPS | Matahina | Whakatane | TrustPower | Hydro | 80 | 290 | 1967 |
| MOKAI | Northwest of Taupō | Mokai | Mighty River Power | Geothermal | 112 | 900 | 2000 |
| NGA AWA PURUA | North of Taupō | Rotokawa | Mighty River Power | Geothermal | 140 | 1100 | 2010 |
| OHAAKI | Between Rotorua and Taupō | Ohaaki | Contact Energy | Geothermal | 70 | 400 | 1989 |
| POIHIPI | North of Taupō | Wairakie | Contact Energy | Geothermal | 55 | 350 | 1997 |
| ROTOKAWA | North of Taupō | Rotokawa | Mighty River Power | Geothermal | 33 | 210 | 1997 |
| TE HUKA | North of Taupō | Tauhara | Contact Energy | Geothermal | 23 | | 2010 |
| WAIRAKEI | North of Taupō | Wairakei | Contact Energy | Geothermal | 161 | 1310 | 1958, 2005 |
| WHEAO/FLAXY | Wheao/Flaxy | Near Rotorua | TrustPower | Hydro | 24 | 115 | 1982 |

[1]*The Bay of Connections commissioned a Technical Report (available at www.bayofconnections.com) which informs this Energy Strategy.*

## THE OPPORTUNITIES WILL BE SUPPORTED BY:

1. A secure investment environment that is underpinned by certainty within regulatory policy.
2. Providing impetus for economic development through supporting a secure energy supply capability, with reliable and affordable pricing, which in turn supports growth in energy intensive industries, such as wood processing.
3. Investigation and promotion of new products that can be manufactured in the region from its natural resources.
4. Attracting energy-reliant investment into the region, from national and international sources.
5. Enhancing the quality and quantity of the regional workforce by creating opportunities across a wide range of energy-related trades and professions, and for research and development clusters.
6. Developing a strong base of skill infrastructure for the energy potential to be fully realised.
7. Developing specific expertise in new energy production technologies.
8. Ensuring that the energy strategy is consistent across the region and integrated with other regional initiatives including that of forestry, freight logistics, waste management, and the resource management planning framework.
9. Showcasing highly efficient use of energy – including the building and associated industries to research and use improved designs.
10. Enhancing the Bay of Plenty's national and international attractiveness through the use of low carbon and renewable energy sources. Supporting achievement of the New Zealand Energy Strategy target of 90 per cent renewable electricity by 2025 and supporting national and international climate targets.
11. Raising health levels of the regional community via Warm and Healthy Homes programme.
12. Assisting behavioural changes to energy use, and working together to get the best outcomes.
13. Ensuring that there is a sound understanding of the export value chain with respect to products from bioenergy and geothermal activities.
14. Assisting land and resource developers to integrate developments into local communities and taking care of the environment.
15. Integrating stakeholder interests to form a powerful and united regional force, speaking with one voice.
16. Ensuring environmental responsibility, with policies and practices that assist development of the resource based opportunities in an environmentally responsible manner. The most significant geothermal features are managed by Department of Conservation. This strategy recognises that conservation work.
17. Encouraging integration between land use and energy to achieve greater efficiencies.
18. Developing and protecting energy corridors to accommodate future capacity requirements.



## MIGHTY RIVER POWER

Mighty River Power in Kawerau is committed to supplying dependable green thermal energy through our 100 megawatt plant.

The plant has been running for three years and was developed in partnership with local iwi and Putauaki Maori Land Trust.

Working together we have learnt a lot about sustainability. We have learnt how to carefully treat the resource and develop it well.

– Spence McClintock, Field Manager Kawerau

# A BIT OF BACKGROUND

BAY OF CONNECTIONS AND THE ENERGY STRATEGY.

Bay of Connections is the region's economic development strategy. At the end of 2008 Bay of Connections was launched by the Bay of Connections Governance Group. The Governance Group is made up of three business leaders, three representatives from each of the economic development agencies, a local government representative, and two Māori business representatives.

Bay of Connections identifies 13 key areas of focus for the region's growth and development opportunities. It is a combination of emerging and existing industries. Energy is one of those key areas, so this Strategy forms part of the wider development initiative under Bay of Connections.

## STRATEGY DEVELOPMENT AND IMPLEMENTATION

This Strategy has been developed in partnership with leaders in the industry and supporting agencies. Work began in 2009.

In 2010 the Energy Advisory Group was set up. Because this Strategy forms part of the Bay of Connections, the Energy Advisory Group mandate comes from the Bay of Connections Governance Group. It has a strong commercial and regional focus, as well as including members from Wellington, Auckland and Taupō. The purpose of the group has been to provide expert advice and guidance during the Strategy development.

Two regional forums were held in July 2009 and June 2011. The purpose was to ensure stakeholder input and ownership of this Strategy. The forums were well attended by industry leaders, research and science providers, iwi, training and education providers, and local and central government from across the Bay of Plenty, and various parts of New Zealand.

The background report for this Strategy was completed in 2009 by Brian Cox, East Harbour Energy. It can be accessed at www.bayofconnections.com under the Energy section.

After the forum in 2009 it was decided to postpone completing the Strategy, and to wait until we were ready to develop the Forestry Industry Strategy and the Freight Logistics Strategy. The reason being that the degree of overlap between these three strategies meant it made sense to develop them in tandem.

Since the beginning of the 2011 calendar year all three strategies have been in development. There is some common membership across all three advisory groups to ensure the links between these industries are picked up.

As this Strategy is implemented over time, more stakeholders will become involved. An essential success factor of this Strategy and the Action Plan will be for the region to maintain close links with key players and implementation agencies – including those of central government and those based in the Bay and other regions. A collaborative approach is vital to our success.

## LINK TO OTHER STRATEGIES AND REGIONAL ACTIVITIES

The Energy Strategy has been developed with linkages to other regional strategies and activities including forestry, freight logistics, and the Regional Policy Statement.

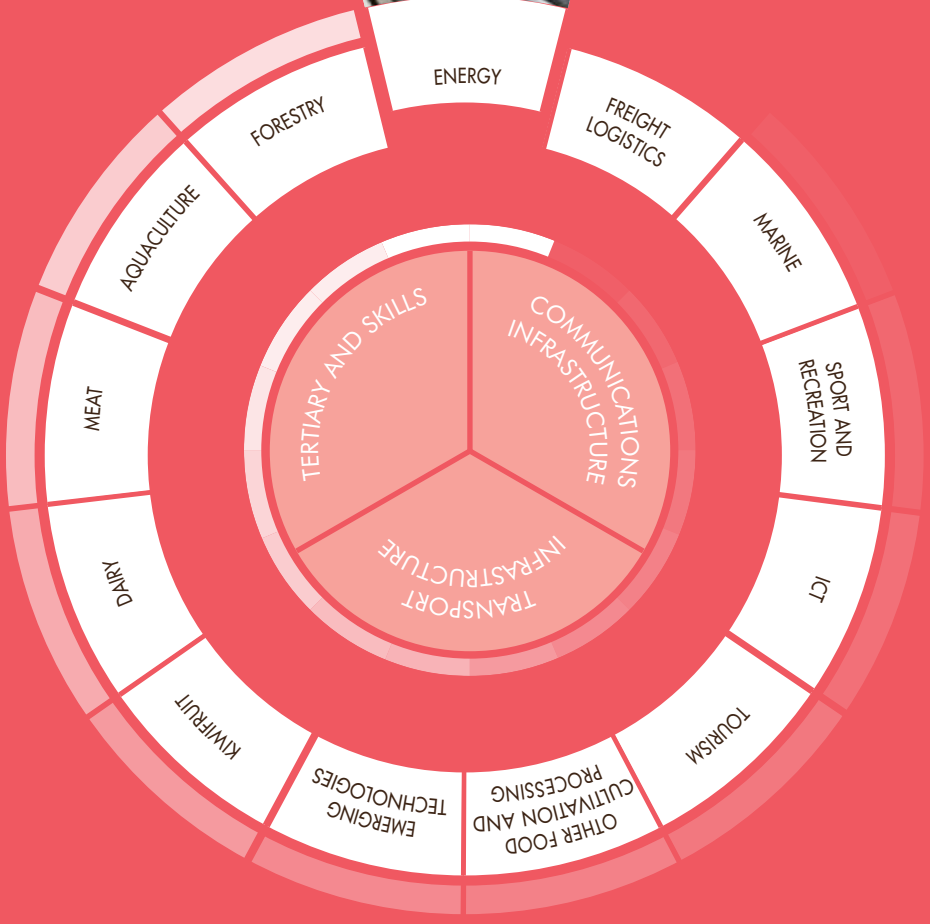
The Energy Strategy cannot be treated separately from these strategies and activities as energy is so intricately linked as an enabler for so many aspects of regional activity.

### SOLAR POTENTIAL

FACT

The solar energy potential of The Bay of Plenty region is one of the largest in the country.

# KEY AREAS OF FOCUS




## MANY OF THE BAY OF CONNECTIONS FOCUS AREAS ARE INTRINSICALLY LINKED TO THE SUCCESS OF THE ENERGY STRATEGY.

As we further develop the various strategies and action plans, they will all be linked to varying degrees. This integrated approach will ensure we get the best results across all industries the Bay of Connections is involved with.

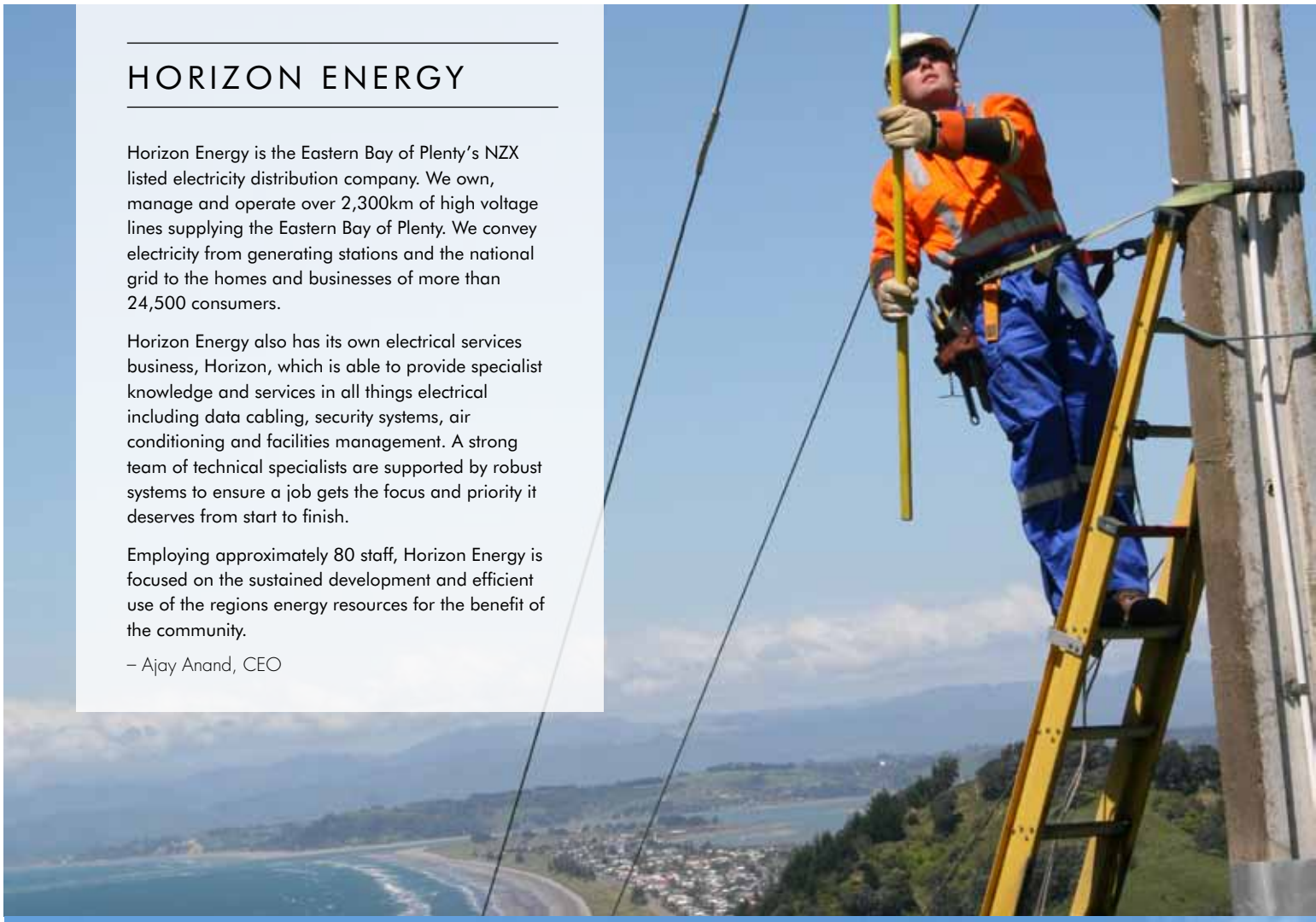
# HORIZON ENERGY

Horizon Energy is the Eastern Bay of Plenty's NZX listed electricity distribution company. We own, manage and operate over 2,300km of high voltage lines supplying the Eastern Bay of Plenty. We convey electricity from generating stations and the national grid to the homes and businesses of more than 24,500 consumers.

Horizon Energy also has its own electrical services business, Horizon, which is able to provide specialist knowledge and services in all things electrical including data cabling, security systems, air conditioning and facilities management. A strong team of technical specialists are supported by robust systems to ensure a job gets the focus and priority it deserves from start to finish.

Employing approximately 80 staff, Horizon Energy is focused on the sustained development and efficient use of the regions energy resources for the benefit of the community.

– Ajay Anand, CEO



# ENERGY OPTIONS

SUSTAINABILITY, ENERGY, COMMUNITY

Energy Options is a community owned, sustainable energy solutions business originating out of Whakatane. With values of: environmental care, community concern, employment creation and compassion for the vulnerable – the business has been remarkably successful, gaining nationwide recognition for its commitment to the principles of sustainability and in 2009, entering New Zealand's 50 fastest growing companies.

Energy Options has a passion first and foremost for good advice. This passion is applied by the business to domestic, community and small business customers and is followed with a range of sustainable energy solutions. With close to 100 staff, Energy Options has become a sizeable business advancing the ethos of: energy conservation, energy efficiency, renewable energy and energy self-sufficiency.

– Nik Gregg, CEO

# *The* **SITUATION**

# VALUE-ADDED ENERGY

## BAY OF PLENTY VALUE-ADDED ENERGY

The region is a net importer of electricity. As regional demand increases, smart use of different types of energy will be key to ensuring we get the best from each of our energy sources, in other words, contributions to secure supply, low cost and highly efficient use will add value to the Bay of Plenty economy. Energy self-sufficiency in the Bay will provide greater security of energy supply, supporting our energy intensive industries.

Renewable energy will be increasingly important as a selling point to support access to international markets.

### CURRENT ENERGY USE

Processing primary produce requires the greatest energy use, with wood processing being the most energy intensive.

| Sector | End Use | % Sector | % of total regional energy use | TJ |
|---|---|---|---|---|
| COMMUNITY | Residential | 83.9 | 8.8 | 4168 |
| | Municipal | 16.1 | 1.7 | 802 |
| | Total | 100 | 10.5 | 4970 |
| AGRICULTURE | Motive Power, Mobile | 33.0% | 0.9% | 443 |
| | Transport, Land | 28.7% | 0.8% | 386 |
| | Pumping | 12.0% | 0.3% | 161 |
| | Total | 73.7% | 2.0% | 990 |
| COMMERCE | Transport, Land | 24.5% | 0.9% | 431 |
| | Low Temperature Heat (<100 C), Space Heating | 20.3% | 0.8% | 356 |
| | Refrigeration | 18.7% | 0.7% | 329 |
| | Total | 63.5% | 2.4% | 1,116 |
| INDUSTRY | Intermediate Heat (100-300 C), Process Requirements | 81.7% | 46.8% | 22,124 |
| | Motive Power, Stationary | 5.9% | 3.4% | 1,587 |
| | Motive Power, Mobile | 2.5% | 1.4% | 669 |
| | Total | 90.1% | 51.6% | 24,380 |
| TRANSPORT AND STORAGE | Transport, Land | 78.4% | 9.1% | 4283 |
| | Transport, Sea | 11.1% | 1.3% | 609 |
| | Transport, Air | 7.8% | 0.9% | 428 |
| | Total | 97.3% | 11.3% | 5320 |

NOTE: Data sourced from the Energy End Use Database, Energy Efficiency and Conservation Authority. The data for Table 5 was collected in July 2009 and the components making up the sector may be grouped differently from the earlier values obtained in the table. The total end energy use for New Zealand is 544.44 PJ.

### FUTURE DEMAND FOR INDUSTRIAL/COMMERCIAL ENERGY

Energy demand from industrial and commercial activities will increase – and often the quality of the energy required increases as well. This drives industrial and commercial users to look at how they can ensure their reliability of supply of energy.

### ENERGY FOR TRANSPORT

Various authorities expect national transport energy use to remain at current levels, and possibly decline until 2016. Then an increase is expected. Over the next two decades the transport industry is expected to change its energy sources. This is expected to reduce demand on liquid fossil hydrocarbon (petrol/diesel) and increase demand on:

- Liquid biofuels (ethanol and bio diesel blends)
- Electricity generation, due to an expected increased in the use of electric vehicles.

FACT

## POWER TO THE PEOPLE

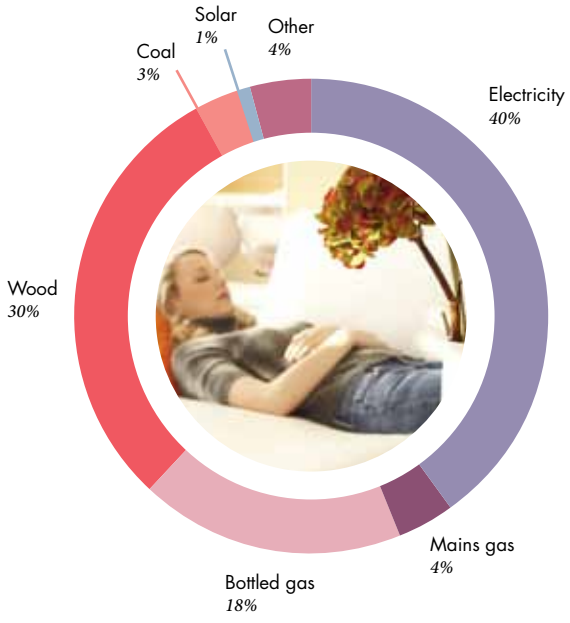
The Kawerau Power Station meets approximately one third of residential and industrial demand in the region and provides cost certainty to local industry.



### ENERGY FOR DOMESTIC USE AND WELLBEING

Home owners' demand for insulation, alternative energy sources (eg., solar and ground source geothermal) and good building designs to save energy costs is growing. This is countered by houses with a bigger energy demand. Opportunities exist to improve energy supply eg., solar hot water, and efficient use in domestic applications. There are opportunities to improve the use of energy by encouraging changes in behaviour around energy. Warm and healthy homes improve community wellbeing.

Bay of Plenty Home Heating Sources




*Current regional domestic heating sources.*

### COMMUNITY WELLBEING

How communities address energy matters can have a significant effect on their wellbeing. Energy is often other people's business until it is not available. Social and health impacts are usually the strongest on the poor.

Energy based initiatives create jobs. This can be enhanced when the initiatives are financially or psychologically owned by the people.

Investment in energy initiatives often have public good benefits which do not accrue to the investor. In such cases there is a role for the community to work with the investor so both the investment returns and the public good benefits are achieved.

Economic growth through attracting people to the warmth from solar energy is already a major reason for people moving to the Bay of Plenty. This wellbeing can be enhanced by the inclusion of good solar design in new buildings and installation of solar water heating systems in new houses, both of which are cost effective, already proven and readily available to building owners.

Greater use of renewable energy and modern energy use technologies provides an opportunity for members of the community to take greater responsibility for their own energy future.

### ENERGY IS AN EXPORT SECTOR

Energy is able to be exported from the region in the form of added value bio-products or utilised hydro and geothermal energy. Clean technology innovation derived from biomass and geo-energy resources is in demand internationally. A high class port and airport links to world markets make the Bay of Plenty region well positioned to be an export driver for New Zealand.

### ADDITIONAL VALUE TO FOREST AND LAND OWNERS

This Strategy provides an opportunity for the exploration of new products from wood including biofuels, biochemicals and bioproducts. These will be co-products with conventional wood products but provide additional revenue streams for forest and land owners.

Land owners will also have the opportunity to investigate and eventually plant energy crops providing co-products for current horticulture and agriculture activities.

### ENERGY AND CLIMATE CHANGE

The effects of climate change are of concern to New Zealanders and the implementation of this Strategy will allow the region to take action to mitigate against adverse effects. This Strategy will assist with increased national use of renewable energy in heat, electricity and transport applications.

## USE OF ENERGY BY ENERGY TYPE

### ELECTRICITY DEMAND

The Bay of Plenty's long run electricity demand is predicted to grow at around 1.64 percent annually over the next decade from 602MW in 2011 to 698MW by 2021. This is slightly lower than the national average of 1.8 percent annually based on business as usual – in other words, no endeavour to attract high energy use industries to the region. Recent patterns of demand since the 2008 economic crisis have been slower than previous long term predictions.

If new biorefineries were attracted to the region to process biomass into transport fuel or biochemicals then there would be an increased demand for electricity. However, with such investments it can be expected that on-site electricity generation would be installed to meet the demand.

### Projected Bay of Plenty electricity demand


*SOURCE: Transpower Annual Planning Report 2011*

### ENERGY DEMAND MANAGEMENT AND EFFICIENT USE

Improvements in the way energy is used can have a significant effect on maintaining a demand/supply balance. Contracting for non use or time of use shifting can also be an effective mechanism for ensuring reliability of energy supply.

### ELECTRICITY SUPPLY (GENERATION)

Electricity generation capacity within the region is around 400MW and is mainly made up of geothermal and hydro generation. The remaining electricity demand is met by electricity imported from other regions. A new hydro and geothermal electricity generation plant is under investigation and is expected to be installed throughout the next decade. Some of the geothermal plant will be for the supply of heat as well as for the generation of electricity.

The region's location within the Taupō Volcanic Zone makes the Bay of Plenty one of the two main regions in New Zealand with significant geothermal resource suitable for the use of conventional electricity generation technology.

### ENERGY FROM NATURAL GAS

Natural gas is currently used for generation of electricity at Edgcumbe (10MW), but most gas in the region is used for the production of heat. There is an extensive piped-gas distribution network that supplies natural gas throughout the region. There is also an ongoing demand for bottled liquefied petroleum gas (LPG), distributed to businesses and homes throughout the region.

### ENERGY FROM BIOFUELS

Biomass is used extensively throughout the region for the production of heat. This is from wood and dairy processing residues. And a small amount is now being extracted from forests as harvest residues.

### HEAT FROM GEOTHERMAL

Geothermal heat is used in a number of direct use applications throughout the region. These range from small domestic heating through to the heating of hotels and motels to the heating of the pulp and paper plant at Kawerau, which is the world's largest geothermal direct heat application. Taupō has the largest range of direct and cascade heat use applications in New Zealand.

### GEOTHERMAL ENERGY

Geothermal energy can produce heat for electricity production or other heating applications. The objective is to maximise the use of the region's geothermal resources, on a sustainable basis, to create regional economic growth, employment and wellbeing. Initiatives include:

- Building on Rotorua and Taupō's success, history and reputation to establish the region as a tourist destination based on high value geothermal health spas
- Development of direct-heating and cascade heating applications, promoting this as a regional opportunity
- Development of a regional approach for use of the region's shallow geothermal prospects
- Protecting the region's geothermal electricity generation and fostering increased development of the region's potential resources
- A regional focus on the development of food production initiatives using geothermal heat
- A regional focus on the development of timber drying using geothermal heat, taking advantage of the co-location of geothermal energy and forestry resources
- Promoting research into the benefits from the co-location of geothermal energy and forestry resource processing.

### BIOMASS TO ENERGY

Biomass can be used to make two energy fuels; wood fuel for heat production, and liquid biofuels for transport fuel. These can provide forest owners with additional revenue streams from forest residues that are currently wasted, and higher value from the wood produced.

In addition to the benefits to forest owners, the uptake of biomass as an energy source will enhance local employment opportunities, improve regional energy security of supply, reduce the region's contribution of greenhouse gas emissions to the atmosphere, and contribute to the improvement of air quality. These benefits can be enhanced by:

- Developing strategies to maximise the value of the region's forestry resources
- Developing extraction processes for residues as a valuable fuel
- Maximising the use of biomass for production of transport fuel and heat
- Fostering the development of wood and residues to transport fuel technologies – establishing Rotorua as the national centre for research on production of transport fuel from lignocellulose
- Developing a fuel cropping strategy.

### BIOMASS TO BIOCHEMICALS AND BIOMATERIALS

The deconstruction of wood for the production of engineered wood products or biofuels also leads to the production of other co-products in the form of chemicals, or fibre for use as plastic substitutes. Such activities are often most efficiently bolted on to existing pulp mill or wood processing facilities as biorefineries. Over the next decade bio-based products will start replacing petroleum based products. The region has the opportunity to lead New Zealand into a bio-based economy to replace the current petroleum economy.

FACT

## OPPORTUNITIES IN BIOFUELS

Plantation forests grow up to three times faster in New Zealand than the same trees would in other environments.

# POWERSMART SOLAR

Powersmart Solar is an award winning solar power integrator based in Mount Maunganui. The company has been recognised for superior customer service, system design, project management, and a commitment to sustainable business practices. Powersmart Solar has received several awards for quality projects, been finalists in several award categories for outstanding business performance, and voted New Zealand National Sustainable Business of the Year.

Powersmart Solar currently develops solar power projects throughout New Zealand, Australia, and the Pacific Islands. Notably we are currently developing the world's first project to totally solar power a nation in the Pacific Islands. Solar power is quickly becoming a mainstream electricity source and Powersmart Solar is at the forefront of its development.

– Michael Bassett-Smith, Director

# *The* **OPPORTUNITY**

# RESOURCES/ SUPPLY/USE/ GROWTH

## RESOURCES

*Develop and manage*

RESOURCES

**Natural capital**

The Bay of Plenty has a potential competitive advantage in geothermal, solar, biomass and small amounts of hydro.

Importantly they are renewable resources with lower carbon dioxide emissions than coal and gas, making them fuels that fit in with the Government's 90 percent renewable direction. The use of renewable energy resources results in a range of benefits including contributing towards security of electricity supply, and mitigating effects on the environment.

The region's strength in renewable energy resources complements and reinforces national energy supply.

**Geothermal**

Geothermal resources are used for heating, industrial processing, electricity generation, bathing, spa and medical treatments, tourism and horticulture. The use and development of geothermal energy for electricity is expected to play a significant role in increasing the proportion of renewable electricity in New Zealand and maintaining security of supply.

Traditional use has extracted heat by also extracting geothermal fluid. New techniques allow for extracting heat without extracting fluid, through the use of down–hole heat exchangers and ground source heat pumps.

Geothermal energy can be used as a direct heat source by industry as happens in Kawerau and Taupō. Other opportunities around geothermal include:

- Hot fluid - establish a Rotorua and Taupō Geothermal Health Spa Cluster - build on Rotorua and Taupo's success and reputation as tourist destinations
- Geothermal electricity generation plant and steam-field equipment construction, operation and maintenance
- Create specialist research centres around geothermal heat extraction for emerging energy technologies and applications
- Greater cascade use, especially for food production and processing. There are significant opportunities in direct use of geothermal for heat over a wide range of temperatures right down to ground source heat pumps using ground temperatures at around 15°C.

**Solar**

The sun is already a major reason people are attracted to the region. This will continue to be a significant economic driver for the region. There is significant potential for the development of solar thermal energy in the region. Possible opportunities for solar include:

- Solar water heating for domestic and commercial scale applications
- Over the long term, distributed generation on a community linked basis could be a viable option. Establish a watching task force in this area, with social initiative mandates
- Passive solar design principles in the built environment.

**Biomass**

Biomass involves converting crops or crop residue to heat or liquid fuel. Internationally there is significant work underway on how biomaterials, biochemicals and advanced biofuels can be extracted from biomass. While still at the pilot stage the region is well positioned to attract the building of a commercial plant based on the resources of the region.

The combustion of biomass has low greenhouse gas emissions compared to fossil fuels which mean the relative cost of such fuels for heating will improve as the Emissions Trading Scheme increases the price of fossil fuels. Sustainable and renewable bio-energy also has the advantage that it can be stored and deployed easily, and it can be sourced from what would otherwise be waste material, such as forest residues.

Rotorua could be established as the national centre for research on production of transport fuel from lignocellulose. With advances in bio-energy, there are opportunities to provide forest owners with additional revenue from residues that are currently being wasted.

**Waste**

Utilisation of wasted municipal organic refuse and research and development around technologies for better use of such materials an energy source. There are also significant opportunities around industrial waste. The mind-set change is to consider waste as a resource.

### TECHNICAL CAPABILITY

With the development of natural resources comes a demand for competent tradespeople who can implement the designs and run the machinery.

A skilled and engaged workforce is vital for the success of the energy sector. With emerging energy technologies, there is an inevitable demand for tradespeople, equipment suppliers, and professionals.

On the supply-side, education and training offerings should be aligned with and informed by industry needs. Relevant and valued education and training is an integral part of a well-functioning, responsive labour market. Increasing the quality and quantity of the labour force in the Bay is a key goal.

There are a range of opportunities that arise from education and training:

- Develop training programmes to establish the Bay of Plenty as a Centre of Excellence in energy use
- Create a hub for providing expert energy-related advice. And this could open advisory, auditing and a range of technological employment opportunities
- Create energy-focused schools, technology, education and demonstration centres
- Improve the relevance to industry of education and training offerings and raising the number and nature of employment opportunities for students
- Create an education and career pathway for students in energy
- Lift the level of public knowledge and understanding of energy efficiency, and energy conservation
- Promote partnerships across and between providers to develop a centre of industry excellence

### RESEARCH AND DEVELOPMENT

Research and development has a special significance for the Bay. While considerable time and resources have been dedicated to researching biofuels – particularly wood based ones – further research and development is needed to fully crack the technological threshold around feasibility, and to develop the industry.

Improved partnerships and relationships between science providers, industry, tertiary education institutes, government and Iwi will assist in this area as we develop world-leading levels of innovation. The research and development must be commercially-driven activity, translating to employment and income gains.

### TECHNOLOGY COMMERCIALISATION

Greater use of the region's natural resources for wealth and wellbeing will be achieved using existing and evolving technologies. There are many technological ideas around energy which are thought of in the region yet never go anywhere because of funding or capability constraints. An attitude of fostering innovation and commercialising these ideas would flow through to how energy is used throughout the region. It can also be used to unleash the wealth of opportunities within the region from our natural resources.

The development of the region's natural resources will require the sourcing of new technologies and often the adaptation of conventional technologies to new uses. This is an area where the region can build on its depth of knowledge and academic expertise to foster a culture of commercialisation.

The region has the capability through Scion, GNS, geothermal businesses such as Mighty River Power, training providers and research centres for technology transfer from international contacts to local applications.

## LEADING RESEARCH

Scion, who are based in the Bay of Plenty, are an international centre of plantation forestry biomass production, wood-energy, biochemicals and biomaterials research.

FACT

# SUPPLY

*Secure and affordable*

To create sustainable economic growth and wellbeing from energy requires businesses that can lead in economic, social and environmental practices. The contribution energy makes to competitive business is through:

1. Secure supply
2. Lower energy input costs
3. Marketability of the energy source

Similarly residential demand for a reliable supply of energy at an affordable price is an important component of community wellbeing.

## ENABLING REGULATORY REGIME

The regulatory regime for energy and biomaterials is influenced by the Resource Management Act decision making, and central and local government policy direction. The New Zealand Energy Strategy and New Zealand Energy Efficiency and Conservation Strategy set the strategic direction for energy use and supply with the primary goal to make the most of New Zealand's energy potential through environmentally responsible development.

The Government's target is that 90 percent of New Zealand's electricity will be generated from renewable sources, and an additional 9.5 PJ of energy from bioenergy and direct use geothermal by 2025. These objectives will be assisted by the National Policy Statement for Renewable Electricity Generation in the region, which would be given effect to in district and regional plans. Within this context, there is a significant opportunity for the region to ensure the regulatory environment assists the economic growth of the region through its regional policy statement and through regional and district plans.

The benefits of having an enabling regulatory regime for energy:

- Increasing confidence to invest in energy, leading to industry growth and development
- Minimising costs to implement energy efficiency initiatives
- Enhancing the levels of innovation and experimentation, leading to higher value-added and returns
- Improving security of supply and reducing greenhouse gas emissions.

## SECURE ELECTRICITY SUPPLY

Secure supply means there are predictable and sustainable supplies and costs of electricity. This allows businesses to operate with certainty and to accurately budget, and minimise business interruption.

Secure supply also means there is certainty for the community that this supply will be sustainable and will be secure for future generations. Having a secure electricity supply is essential for both businesses and the community.

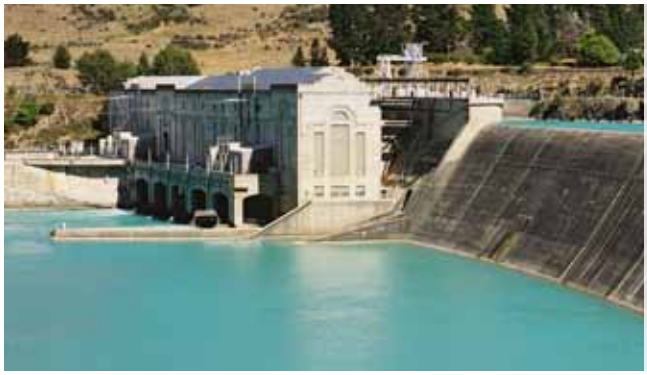
Grid strength to ensure that the necessary investment occurs not only in core group but also in local area networks. At the moment, for example, Ōpōtiki has a constrained supply should the proposed aquaculture project development proceed.

Future opportunities exist around establishing the skills, expertise, knowledge and cluster synergies in the Bay of Plenty based around renewable energy and distributed energy solutions.

## INFRASTRUCTURE

The supply of energy through electricity transmission lines and gas pipelines requires good infrastructure. Identifying the need and ensuring appropriate response requires a close working relationship between energy suppliers and the community. This also applies to the distribution of products derived from the use of energy. An attraction of investment to the region is the proximity of a high class port, roading and airport infrastructure.

Growth and development increase the demand for energy. Consideration needs to be given to the identification of energy corridors to accommodate future capacity requirements and to protect these corridors from being constrained by development.



## RENEWED THOUGHT...

FACT

According to a United Nations report, renewable energy sources could outpace fossil fuels in the next 20 years.

# USE

*Wise and efficient*

## THE COST OF ENERGY

Energy is a substantial cost input into a business or home.

Future opportunities lie in securing contracts with suppliers, minimising costs of production and distribution and getting those gains passed on to:

- Support for community
- Acknowledgement of sustainability
- Structures that support the most vulnerable first.

We also need to establish supply structures that enable access to all, while advancing respect for and conservation of, energy through behaviour change and energy efficiency that is rewarded. Technology can be used to improve the cost of energy and efficiency of use.

**Domestic opportunities include:**

- Warm and healthy home initiatives that assist home owners through better access to existing government programmes and incentives
- Promote the use of solar energy for heating house space, water and cooling
- Encourage the use of new energy-efficient building designs and materials
- Encourage business engagement in the servicing of domestic energy services
- Consider finance packages to support renewable energy engagement
- Invest in community networks to investigate and establish sustainable energy supply alternatives
- Community vehicle charging services
- Community engagement to the point of business innovation.

**Industrial opportunities**

- Plant design, construction, maintenance, and retrofitting
- Motor efficiency – especially pumps.

## EFFICIENCY

Improving the efficient use of energy is often more cost effective than the sourcing of additional energy supply. So it is important to develop an energy efficiency culture in the region. Potential future opportunities in this area include:

- Employment opportunities in energy use technology and services: design of energy efficient buildings and materials, supply of materials, installation, maintenance, retrofit, energy audit and advice, and training people in the preceding skill sets
- Promotion of the region as an information hub on efficient use of energy and on energy conservation
- Establishing the Swedish concept of having model communities that demonstrate desired energy behaviours
- Establishing energy technology demonstration centres in association with Waiariki and Bay of Plenty Institutes
- Supporting an 'energy professionals cluster' through seminars and up-skilling programmes and demonstrations
- Encouraging uptake of best practice amongst the mainstream market, and assist uptake of best practice for the low income
- Establishing energy efficiency and conservation as a culture not just as an objective.

# GROWTH

*Investment and partnerships*

## PARTNERSHIPS AND INTEGRATION

Partnerships play a crucial role in the successful development and implementation of the Strategy. The importance of collaboration and connections cannot be overstated. Strong partnerships will result in better outcomes. Relationships with key agencies such as Energy Efficiency and Conservation Authority, Ministry of Agriculture and Forestry, New Zealand Trade and Enterprise, Scion, and the Ministry of Science and Innovation are essential.

The establishment of the Energy Action Group will be essential in providing the leadership and lobbying capability at the regional and national level. Information sharing across all key partners will also be a key success factor of the Action Plan.

## EXPORT AND INTERNATIONAL CONNECTIONS

The region is well placed to export the products of its initiatives for economic development from use of its natural resources. This can also be coupled with export of the expertise that accompanies the developments. Many of the technologies are based around clean technology which is an export opportunity in itself.

There are a range of future opportunities for investment promotion and facilitation through:

- Clean technology
- Products based on clean energy
- Development of a new and proactive industry around renewable energy
- World leading energy use behaviour change and the social, environmental and economic benefits from this
- The establishment of long lasting community enterprise based around renewable energy initiatives – to the long term benefit of the community
- Innovation from mass adoption and broad based engagement
- Employment in both renewable energy services and downstream supply chain opportunities
- Establishment of world leading intellectual capital based around bio-mass, geothermal, solar combinations.

## INVESTMENT PROMOTION, FACILITATION, AND SELLING THE REGION

The region has an abundance of economic growth opportunities coupled with the wellbeing of the community. Selling these attributes is necessary if the opportunities are to be realised.

We must create a clear pitch for the region – a clear story and a compelling offering, put together in a strong way. The region has to be its own champion and carry out more aggressive marketing.

The branding – the Bay of Plenty is the **green window** for New Zealand as an entry point for international opportunities and investors – the equivalent of a Silicon Valley, and having an industry ecosystem based around biofuels, biochemicals and biomaterials. Being internationally recognised as the renewable energy region for New Zealand will support this brand.

Selling the region begins domestically - household engagement on a personal level will result in pride, leadership and positive social trends. Stronger communities in Bay of Plenty through engagement can lead to better sustainable energy management and ownership.

It is also important we exhibit national leadership in positive social impacts through the health, social and environmental benefits derived from distributed generation and renewable energy engagement.

THE ACTION PLAN FALLS INTO FOUR KEY AREAS – RESOURCES, SUPPLY, USE, AND GROWTH.

THESE ARE THE FUNDAMENTAL AREAS THAT WILL MAKE CRITICAL CONTRIBUTIONS TO THE DEVELOPMENT OF THE ENERGY INDUSTRY IN THE REGION.

# *The* **ACTION PLAN**

IT WILL BE THE ROLE OF THE ENERGY ACTION GROUP TO PRIORITISE THE ITEMS IN THE ACTION PLAN AND PUT TIMEFRAMES ON THOSE ACTIONS – WITHIN THE NEXT TWO TO FIVE YEARS. IT WILL ALSO REFRESH THE STRATEGY ON A REGULAR BASIS, TO ENSURE THAT ACTIONS REMAIN RELEVANT AND TARGETED TO THE AREAS OF MAXIMUM BENEFIT FOR THE INDUSTRY AND THE REGION.


THERE IS A HUGE AMOUNT OF POTENTIAL TO UNLOCK FROM OUR RESOURCES – NATURAL, FINANCIAL AND PEOPLE. WE NEED TO FURTHER DEVELOP CAPACITY AND CAPABILITY AS WE GROW OUR RENEWABLE ENERGY INDUSTRY. THIS WILL INCLUDE BETTER UNDERSTANDING AND USE OF OUR NATURAL RESOURCES, TECHNICAL CAPABILITY, RESEARCH AND DEVELOPMENT, AND TECHNOLOGY COMMERCIALISATION.

| BROAD AREA | OUTCOMES | ACTIONS | WHEN | WHO |
|---|---|---|---|---|
| Natural capital | Understand the existing energy projects. | Stocktake and audit of current and potential projects across the region.<br>Understand what others are doing and how the Energy strategy can link in. | | Energy Action Group, Bioenergy Association of New Zealand, New Zealand Geothermal Association, Energy Efficiency and Conservation Authority. |
| Technical capability | Integration with regional Forestry and Wood Processing, and Freight Logistics groups. | Determine the areas of commonality between the action plans of the strategies. | | Energy Action Group. |
| | Develop regional skills base. | Develop work experience/ internship for year 12 students.<br>Provide a PhD scholarship, or three $5,000 scholarships, eg., to an industry expert, a scientist, and an emerging leader.<br>Develop and promote renewable energy diploma for tertiary students. | | Energy Action Group. |
| | Engage with Crown research institutes, tertiary institutions innovators, and industry training organisations (ITOs). | Use regional research and development working group to make contact and develop partnerships. | | Scion, GNS, Energy Action Group. |

| BROAD AREA | OUTCOMES | ACTIONS | WHEN | WHO |
|---|---|---|---|---|
| Technical capability | Explore the feasibility of a Centre of Excellence of international reach and range. | Work with industry to establish centres or Centre of Excellence in designated fields.<br>Use regional research and development working group to make contact and develop a Centre of Excellence structure. | | Scion, GNS, New Zealand Clean Energy Centre. |
| | Industry-ready work force - education and training. | Identify education and training needs required to deliver a skilled work force to satisfy the labour needs of this Strategy.<br>Facilitate a working group of statutory organisations (eg., Ministry of Social Development, Work and Income New Zealand and New Zealand Trade & Enterprise), regional council and educational institutes including Waiariki, Awanuiarangi and Kawerau Enterprise Agency.<br>Convene a working group of representatives from industry, providers (and ITOs) and iwi who could be responsible for driving progress around education and training. | | Waiariki Institute of Technology, Bay of Plenty Polytechnic. |
| | Renewable Energy Ambassador into schools for years 11 onwards. | Investigate the Enviro-Schools model to get learnings from that programme. Learn from what Rotorua's Energy Champion did and did not achieve. | | Ministry of Education, Scion, Bay of Plenty Regional Council, Energy Action Group. |
| Research and development | Establish regional research and development action plan. | Establish working groups of those interested in regional research and development capabilities and actions.<br>Identify existing research that is relevant to the region and use as a basis for a gaps analysis and action plan. | | Scion, GNS, Energy Efficiency and Conservation Authority, Foundation of Māori Authorities, Poutama Trust. |
| | Collaborate (regionally and internationally) with others to leverage off their experience and lessons learned. | Prepare a brochure outlining the research and development capabilities and opportunities of the region for sending to international parties.<br>Establish and maintain links with offshore universities. | | Scion, GNS. |
| | Active participation in national research and development initiatives. | Secure membership onto key research and development groups. | | Energy Action Group. |

| BROAD AREA | OUTCOMES | ACTIONS | WHEN | WHO |
|---|---|---|---|---|
| Research and development | Establish the region as a Centre of Excellence for waste to energy technology development in New Zealand. | Carry out an analysis to identify waste to energy opportunities in the region.<br>Establish a waste to energy action group.<br>Facilitate PPP and JVs with Councils to make it work. | | Bioenergy Association of New Zealand, and Scion. |
| Technology commercialisation | Develop opportunity hubs. | Sell/promote the interconnectedness and select smart locations.<br>- Waipa<br>- Kawerau<br>- Taupo | | Rotorua District Council, Kawerau District Council, Taupō District Council, economic development agencies. |
| | Link with national commercialisation project. | Understand what technology and innovation exists and what could be applied and commercialised. | | New Zealand Trade & Enterprise. |
| | Assess potential for tidal power in Tauranga Harbour. | Link with research programme with Bay of Plenty Coastal Chair. | | New Zealand Clean Energy Centre, Energy Action Group. |
| | Identify technology commercialisation needs. | Use IP from Scion and other Crown research institutes and market it into commercial business propositions. | | Scion, GNS, Bioenergy Association of NZ, New Zealand Geothermal Association. |
| | Future technologies. | Work with research agencies to promote emerging technologies relevant to the resources of the region to investors and energy users. | | Scion, GNS, Bioenergy Association of NZ, New Zealand Geothermal Association. |
| | Assistance for project commercialisation. | Establish a commercialisation mentoring capability with regional and national experts in energy commercialisation. | | New Zealand Trade & Enterprise, Energy Efficiency and Conservation Authority. |

# SUPPLY

*Secure and affordable*

THE SUPPORTING PHYSICAL AND REGULATORY FRAMEWORKS ARE ESSENTIAL TO THE INDUSTRY AND THE SUCCESS OF THIS STRATEGY. THIS WILL INVOLVE SMART INTEGRATION AND DELIVERY, WORLD CLASS INFRASTRUCTURE, PRODUCTION OF ALTERNATIVE TRANSPORT FUELS, AND EFFICIENT REGULATIONS.

| BROAD AREA | OUTCOMES | ACTIONS | WHEN | WHO |
|---|---|---|---|---|
| Regulations | Advocate timely, efficient and comprehensive consent processes. | Hold a one-day forum on consenting matters. Focus on best practice for AEE preparation and consenting. | | Bay of Plenty Regional Council. |
| | Advocate for removal of regulatory barriers to commercialisation/ opportunities - eg., access to grid. | Understand the resource dynamics of a geothermal field and sustainable use.<br>Promote understanding of regulatory requirements.<br>Identify smart integration and delivery. | | New Zealand Geothermal Association, Energy Efficiency and Conservation Authority. |
| | | Promote good environmental practice during development of energy resources and subsequent operations. | | Bay of Plenty Regional Council. |
| | Promote the removal of conflicts between regional and local government, and work between regions. | Talk with companies currently seeking consents and those who have gained consents to help remove any inconsistencies. | | New Zealand Geothermal Association, Bioenergy Association of New Zealand, energy companies. |
| | Energy intensive clusters. | Identify existing and potential energy/ industry precincts within the Bay of Plenty region, including Kawerau. | | Rotorua District Council, Kawerau District Council, Taupō District Council, economic development agencies. |
| Energy supply | District heating opportunities taken into homes. | Establish programme of activities taking geothermal technology into homes. | | New Zealand Geothermal Association. |

| BROAD AREA | OUTCOMES | ACTIONS | WHEN | WHO |
|---|---|---|---|---|
| Energy supply | Secure electricity supply. | Investigate and analyse regional electricity security and capacity of supply for both short and long term growth needs. This will involve analysis of current and future electricity requirements and growth forecasts to determine the level of supply required into the future. | | Energy Action Group. |
| Infrastructure | Better rail and logistics to decrease costs of fuel. | Evaluate the current road and rail infrastructure from an energy perspective and identify areas where energy costs can be reduced. | | Energy Efficiency and Conservation Authority. |
| | Unconstrained electricity supply routes exist for export/import distribution. | Explore programmes that enable local area supply networks.<br>Facilitate good communication channels between Transpower, electricity network owners, and generators and users to ensure timely upgrades by holding an annual meeting of the parties.<br>Using the initial scoping analysis, initiate feasibility studies to highlight where LAN's supplying electricity or direct heat to urban areas are commercially viable. | | Energy Action Group. |
| Embedded energy supply | 100% self-sufficient and 100% renewable. | Commission a project to evaluate the social, economic and financial benefits of the region becoming 100% self-sufficient in energy. | | Horizon Energy, Bay of Plenty Electricity, electricity generators and retailers. |
| | Research regional/ local actions to move self-sufficiency forward. | Explore how effective low voltage distributed generation smart grids can be used in region within constraints of national grid and legislation. | | Horizon Energy, Bay of Plenty Electricity, electricity generators and retailers. |
| | Explore the opportunities that different uses of resources might have for the region. | Explore the opportunities around distributed electricity generation and heat supply. | | New Zealand Clean Energy Centre, Horizon Energy, Bay of Plenty Electricity, electricity generators and retailers. |
| | Identify areas where embedded energy activity can be used. | In areas where direct relationships are possible, ensure environment is conducive to attracting investment.<br>Targeted marketing to attract heavy energy users to designated areas.<br>Facilitate relationships between investors, land owners, generators etc. | | Horizon Energy, Bay of Plenty Electricity. |

| BROAD AREA | OUTCOMES | ACTIONS | WHEN | WHO |
|---|---|---|---|---|
| Transport fuels | Position the region as a major contributor to alternative transport fuels. | Facilitate bio fuels production in the region and promote a drop in capability to service stations within the region to lower costs, educate users and increase demand. | | Bioenergy Association of New Zealand |


IT IS IMPERATIVE THAT WE HAVE A REGION WHERE USE OF ENERGY IS WISE AND EFFICIENT AT THE DOMESTIC, COMMERCIAL, AND INDUSTRIAL LEVELS. BETTER USE OF SOLAR SHOULD BE ENCOURAGED AND PROMOTED, AS WELL AS ENSURING ENVIRONMENTAL OUTCOMES ARE FAVOURABLE.

| BROAD AREA | OUTCOMES | ACTIONS | WHEN | WHO |
|---|---|---|---|---|
| Domestic, commercial, industrial | Knowledge base. | Identify current energy use and where gains can be made. | | Energy Action Group. |
| Domestic | Information for consumers to make informed decisions. | Collate existing information for:<br>- Domestic<br>- Commercial<br>- Industrial<br>Make information relevant to Bay of Plenty.<br>Publish material on www.bayofconnections.com | | Energy Options, Energy Efficiency and Conservation Authority. |
| Domestic and commercial | Encourage the use of energy efficient systems and behaviours. | Establish programme of information dissemination to residential and commercial users on the benefits of using energy efficiently:<br>- Link to branding.<br>- Have a domestic 'hero' to promote energy-saving light bulbs, solar, etc.<br>- Source funding for the campaign.<br>- Have a 12mth follow-up plan.<br>- Implement monthly community communications. | | Energy Action Group, and Energy Efficiency and Conservation Authority. |

| BROAD AREA | OUTCOMES | ACTIONS | WHEN | WHO |
|---|---|---|---|---|
| Industrial | Symbiosis / integrated use, and cascade use. | Identify opportunities for integrated energy use. | | Rotorua District Council, Kawerau District Council, Taupō District Council, economic development agencies. |
| Domestic, commercial, industrial | Extend direct use of geothermal energy for heating. | Investigate Rotorua district heating opportunities.<br>Assist homeowners improve efficiency of on-site wells.<br>Encourage residential clusters of geothermal use.<br>Assist commercial heat users utilising geothermal for their heating for:<br>- Accommodation<br>- Tourism<br>- Commercial buildings.<br>Facilitate Rotorua being an international health spa location.<br>Facilitate use of geothermal heat for glasshouse heating.<br>Increased use of low enthalpy technologies for households.<br>Geothermal for kiln drying (Kawerau), horticulture (Mokai), heating (Tuaropaki), supply (Taumara North). Use the expertise of the existing operations to assist with others.<br>Horticulture / aquaculture next to geothermal. Use variety of species/ crops of high export value. | | Rotorua District Council, New Zealand Geothermal Association, New Zealand Clean Energy Centre, Energy Efficiency and Conservation Authority, and GNS. |
| Industrial | Gather group of knowledgeable individuals quarterly and provide some management/admin/ networking support. | Create a dragon's den type gathering of key members of local industry to give opportunity for sharing of knowledge and technical advances focussed on energy efficiency. Also entrepreneurs and proven (potentially on small scale) inventions to develop new technologies in seed operations in industry. | | Sustainable Business Network, local technology developers. |
| Domestic, commercial, industrial | Ongoing engagement with Energy Efficiency and Conservation Authority on energy conservation and energy efficiency. | Work with Energy Efficiency and Conservation Authority to establish specific action programmes. | | Energy Action Group. |
| Solar energy | Solar hot water. | Establish a regional solar hot water programme. | | Energy Options. |

| BROAD AREA | OUTCOMES | ACTIONS | WHEN | WHO |
|---|---|---|---|---|
| Solar energy | Solar electric. | Encourage commercial uptake.<br>Strategies on how to address affordability to low income/ fixed income.<br>Advocate for cheaper availability to average households to invest in solar panels – such as dropping regulatory fees. | | Energy Options. |
| Environmental outcomes | Improved environmental outcomes. | Identify actual and potential adverse environmental effects resulting from energy generation, use and renewable energy activities.<br>Prepare Environmental Guidelines that can be used by developers in conjunction with actions identified in the Investment Action Table. | | Bay of Plenty Regional Council. |


BUILDING UNIQUE BAY OF PLENTY BRAND AND PROFILE AROUND A RENEWABLE ENERGY INDUSTRY WILL GIVE US A POINT OF DIFFERENCE AT A NATIONAL AND INTERNATIONAL LEVEL. PARTNERSHIPS AND CONNECTIONS – DOMESTIC AND INTERNATIONAL – ARE KEY TO GROWING THE INDUSTRY, ALONG WITH INVESTMENT PROMOTION AND FACILITATION.

| BROAD AREA | OUTCOMES | ACTIONS | WHEN | WHO |
|---|---|---|---|---|
| Partnerships and integration | Build and maintain relationships with government and other national organisations – such as Energy Efficiency and Conservation Authority, Ministry for Economic Development, New Zealand Geothermal Association, Bioenergy Association of New Zealand. | Host a meeting with Government and other organisations once a year to report progress on actions, and showcase Energy in the region. | | Energy Action Group. |
| | Enhance relationships between intra-regional groups, such as Taranaki and Taupō. | Host a meeting of intraregional groups once a year for sharing of ideas and establishing areas of collaboration. | | Energy Action Group. |

| BROAD AREA | OUTCOMES | ACTIONS | WHEN | WHO |
|---|---|---|---|---|
| International connections | Sell the brand. | Develop relationships with potential investors, and those who can assist.<br>Develop marketing and PR programmes.<br>Prepare segment specific marketing collateral and/or investment prospectuses. | | Energy Action Group. |
| | Promote the Bay of Plenty as an investment destination. | Use the Kawerau and Taupō promotional projects of 2011 as a model.<br>Work collaboratively as a region to ensure we present one face to investors. | | Energy Action Group. |
| | Strategic offshore alliances with those who have similar ideas, challenges and aspirations. | Identify an offshore investment person who can be encouraged to work with the region to learn from each other. Maintain the partnership around renewability, science, research and development, technology commercialisation, best practice benchmarking, cultural opportunities, etc.<br>Develop relationships with offshore investor/commercial organisations. | | New Zealand Trade & Enterprise. |
| | Establish fund to source domestic and offshore funding. | Identify 10-15 global investors who could respond to our strategy and invest. | | Energy Action Group. |
| Investment facilitation | Export. | Support organisations entering new and existing export markets. | | Energy Action Group. |
| Investment promotion | Develop a brand and a profile for the region to:<br>• encourage investment in opportunities identified in the scoping analysis above and<br>• ensure community buy-in to development projects. | Promote and support industry development through the profile.<br>Collate existing information on energy opportunities into a brochure for potential investors, energy users and business.<br>Develop brand values and key statements to ensure consistency of message across all communications.<br>Provide investors with our story and a reason to invest.<br>Identify the cultural component as part of the regional profiling.<br>Make the brand unique and a compelling reason to invest in the Bay of Plenty – through ease of investment, the culture, the resources, and willingness of the people in the region to work collaboratively. | | Energy Action Group. |
| | Showcase energy projects – success breeds success. | Create a visual portfolio/showcase of resources – what's happening, what's available. Such as the Kawerau Industrial Symbiosis project.<br>Publish non-commercially sensitive material relating to the use of energy in the region on www.bayofconnections.com | | Energy Action Group, Bioenergy Association of New Zealand, New Zealand Geothermal Association, Energy Efficiency and Conservation Authority, economic development agencies. |

| BROAD AREA | OUTCOMES | ACTIONS | WHEN | WHO |
|---|---|---|---|---|
| Investment promotion | Ensure a managed pipeline of opportunity. | Provide a balanced portfolio for investors to work with, and ensure the process is seamless and integrated.<br>Hold regular investment workshops. | | Energy Action Group. |
| | Establish an Energy Ambassador to champion and help promote the region's profile, networks, and activities. | Use the ambassador to empower clusters, working groups and interested parties to develop action plans and take action directly. | | Energy Action Group. |
| Investment facilitation | Minimal barriers to development. | Market, advocate, and facilitate to ensure barriers are minimised. | | Energy Action Group. |
| | Regional prospectus for potential investors. | Develop the co-investment opportunity. List of options – eg., geothermal and its capacity, solar options such as refitting homes in conjunction with Energy Efficiency and Conservation Authority. | | Energy Action Group. |
| | Toolkit for investment. | Develop toolkit to promote a joined-up approach to engagement. Include information on geothermal, GIS tools, decision tree, the regional people to work with, and the entry points. | | Energy Action Group. |
| | Create a carbon trading centre in the region. | Establish a working group to establish a regional carbon trading consortia for aggregating a number of small parties. | | New Zealand Clean Energy Centre, and Ministry for Economic Development. |
| | Establish pan-iwi resource management collective. | Identify landowners and incorporated trusts that have authority to commit. Develop a regional register.<br>Identify Māori investment potential, opportunities and appetite for investment.<br>Stocktake on the extent of capability.<br>Identify where the influence for growth in the region is. Find a best practice case study. | | Energy Action Group, Foundation of Māori Authorities, Poutama Trust, New Zealand Trade & Enterprise. |
| | Assess and assist potential for iwi to fund investment. | Hold an investment Forum for Māori to better identify individual landowning Māori groups, trusts, and hapū.<br>Hold workshops in relevant areas to assist landowners identify opportunities. | | Energy Action Group, Foundation of Māori Authorities, Poutama Trust, New Zealand Trade & Enterprise. |

### FUNDING

The funding of the actions outlined in this Strategy will be critical to activities happening. Funding will need to come from a variety of public and private sources. The region has experience in attracting investors, working with industry clusters and assisting relevant parities to obtain funding from government programmes. The success of attracting funding is to demonstrate need, value, and capability.

### MONITORING AND REVIEW

A strategy needs to be continuously monitored and reviewed to ensure its relevance. The Energy Advisory Group will establish monitoring processes and annual review and reporting so that the Strategy and Action Plan remains relevant.

# WE ACKNOWLEDGE

THIS STRATEGY IS THE PRODUCT OF INPUT AND ENERGY FROM A RANGE OF INDIVIDUALS AND GROUPS. THE KEY CONTRIBUTIONS MADE TO THIS STRATEGY ARE GRATEFULLY ACKNOWLEDGED.

This Strategy is the product of input and energy from a range of individuals and groups. The key contributions made to this strategy are gratefully acknowledged.

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|---|---|
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# GLOSSARY AND ENDNOTES

## JOULE

The **joule** is a derived unit of energy or work in the International System of Units. It is equal to the energy expended (or work done) in applying a force of one newton through a distance of one metre (1 newton metre or N·m), or in passing an electric current of one ampere through a resistance of one ohm for one second. One joule can also be defined as:

The work required to produce one watt of power for one second, or one "watt second" (W·s) (compare kilowatt hour). This relationship can be used to define the watt.

## WATT

The **watt** is a derived unit of power in the International System of Units (SI). The unit measures the rate of energy conversion. It is defined as one joule per second.

## MEGAWATT

A megawatt is a unit for measuring power that is equivalent to one million watts (equivalent to one joule per second).

A MW of energy is the quantity produced at a moment of  time. It is the capacity. It becomes a MWh if that MW is used for 1 hour.

A house on average in NZ uses 7630kWh per year. 1 MW = 1000kW. There are 8760 hours in a year. That means that 1MW being generated for a year can cover 1148 houses.

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