PURE ADVANTAGE

GREEN GROWTH
FOR GREATER WEALTH

NEW ZEALAND'S POSITION IN THE GREEN RACE

MAY 2012

PREFACE by Rob Morrison

Pure Advantage was formed in the belief that enhancing New Zealand's natural environment will improve our competitive positioning in the global shift to green growth. This represents a huge opportunity to increase prosperity for all New Zealanders.

Pure Advantage believes New Zealand needs to build wealth as a country. We cannot distribute wealth without generating it first, and it is a country's wealth that determines its long-term ability to invest. This investment is critically needed in New Zealand for education, healthcare, the environment and infrastructure, in order to reverse the long-term decline in our wealth relative to other countries.

For years now much of the debate around the green economy has centered on global warming and climate change. Despite the 17 United Nations Climate Change Conferences held since 1995, the annual global rate of CO_2 emissions has actually accelerated from around 1% per annum in the 1990s to 3% per annum since 2000.

Although no country is immune to the effects of global warming, domestic political implications have so far hindered global action. Future generations will be forced to deal with the consequences of inactivity from today's governments. For many countries, especially developing ones, despite their potential vulnerability to global warming and climate change, the issues of energy security, population growth, environmental degradation and resource scarcity are more relevant and require urgent attention.

The efforts to meet these challenges have been grouped under the title of green growth or low carbon and more sustainable economic activity. The commercial prospects associated with green growth are huge. The Stern Review stated "Markets for low-carbon energy products are likely to be worth at least US$500 billion per year by 2050". An Innovas report commissioned by the UK government in 2009 put the value of the green growth economy at NZ$6 trillion.

No country in the world promotes its clean, green image as much as New Zealand, or is as reliant on its clean, green image for its exports and tourism. So in the green growth race, and it is a race, New Zealand should be out in front, leading, but we are not. There are a number of reasons why this is the case, not least of which is the view that New Zealand can have its cake and eat it too. Despite our steadfast promotion of New Zealand's clean, green image, we continue to lag behind a number of countries in environmental indices and we continue to look for economic solutions from extractive industries such as coal and oil. We do this in spite of the significant opportunities available from the global shift to green growth and the fact that we have considerable competitive advantages to access these markets.

With the integration of the global economy through ease of capital flows, people and ideas, backed by technological innovation, there are many new markets and new methods of accessing them. The opportunities available globally are not limited to green growth. But for New Zealand with an existing clean, green brand and skills and experience in low energy intensity food production, sustainable forestry and fisheries, water and waste management and low carbon electricity generation, the appeal of green growth is obvious.

New Zealand urgently needs to improve its own environmental record to protect the clean, green image that benefits the sale of much of what New Zealand produces and exports. This is especially true if we want to attract the capital, people and ideas that this economy needs to be competitive on the global stage. By harnessing either new or existing technologies and skills developed to improve the sustainability of our production processes, energy efficiency and resource usage, we can give ourselves the ability to maximise the returns from the possibilities available globally from green growth.

For New Zealand it is likely that the best prospects are in the rapidly developing economies of Asia and not with our traditional trading partners, Australia, the US and the UK. Two thirds of the global green stimulus, post the global financial crisis, was committed in Asia. Countries like Japan, Korea, Taiwan and Singapore are investing in green growth. To reduce reliance on fossil fuels and imported resources, these countries are investing heavily in alternative energy and energy efficiency, as well as waste and water management to meet their own challenges and to participate in the global green growth economy.

The best examples of countries benefiting from green growth, are those where the public and private sectors have identified and invested in their unique opportunities generally. Investment in education, research and the workforce is crucial, as is long-term bipartisan government policy.

In the UK, Denmark, California and Singapore, government regulations for energy efficiency and low carbon targets have resulted in significant innovations and investment by the private sector, leading to material job creation and export growth in the green growth sector.

There is, however, very little coordinated planning in New Zealand around what green growth represents and what it could potentially mean for New Zealand. We need clear strategic thinking on how to enhance our integration into the global green growth economy, along with better planning around how we organise our own resources, in order to take advantage of the opportunities available.

We need to do this to generate a better outcome for all New Zealanders.

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ACKNOWLEDGEMENTS

This report builds on the efforts of many individuals and organisations who have undertaken green growth research, policy development and commercial endeavours.

Their work contributes to a rapidly growing understanding of the benefits of green growth and the methodology for its implementation.

Pure Advantage acknowledges and thanks those who provided direct input and assistance in the preparation of this document.

We also acknowledge the support of the many businesses, NGOs, charitable groups and other organisations that support the Pure Advantage mandate for change.

Pure Advantage wishes to acknowledge the commitment, input and support of two of its founding members who passed away in 2012.

SIR PAUL CALLAGHAN

The late Sir Paul Callaghan was a world-leading scientist in the fields of nanotechnology and magnetic resonance and held the position of Alan MacDiarmid Professor of Physical Sciences, School of Chemical and Physical Sciences, Victoria University of Wellington. Sir Paul was past president of both the Academy Council of the Royal Society of New Zealand and the International Society of Magnetic Resonance.

Sir Paul's work put himself and New Zealand on the international stage and his mantelpiece featured an array of honours for his endeavours. He was awarded the Rutherford Medal, NZ's highest scientific honour, in 2005. He was appointed a Principal Companion of the New Zealand Order of Merit in 2006. In 2007 Sir Paul was recognised with a KEA World Class New Zealand Award and the Sir Peter Blake Medal. He was knighted in 2009 and in 2011 was named Kiwibank New Zealander of the Year.

LLOYD MORRISON

The late Lloyd Morrison was a staunch supporter of Pure Advantage. He was the founder and Executive Chairman of H.R.L Morrison & Co, a specialist infrastructure business. Lloyd was a director of Infratil, Auckland International Airport and Fisher Funds, and Chairman of Snapper. As a long-term supporter of the arts, music in particular, he established the HRL Morrison Music Trust in 1995 to support New Zealand musicians and composers, with special emphasis on the production and marketing of recordings on the Trust Records label. Lloyd was also a partner in New Zealand music publisher Promethean Editions. Lloyd was made a companion of the New Zealand Order of Merit (CNZM) for services to business in 2009. He was also named "Business Leader of the Year" by the New Zealand Herald in 2006 as well as being awarded by Wellington Businesses Gold Awards with a lifetime achievement award, and also named Visionary Leader by Deloitte/Management magazine in 2011.

ABOUT PURE ADVANTAGE

Pure Advantage is a not-for-profit entity comprised of business leaders who are passionate about ensuring that New Zealand becomes a greener, wealthier nation. Our aim is to articulate the green growth vision, provide a credible business case and deliver an ambitious green growth strategy for New Zealand. In doing so, we aim to enlist leaders from businesses, communities, iwi and government.

We strongly believe that the private sector, in partnership with government, can drive a new green direction for New Zealand's economy. Pure Advantage is focused on galvanising industry but we also recognise the role of government.

Underpinning our strategy going forward is the need for robust economic research that demonstrates the scale of the challenges and opportunities that we face.

Join us in improving the economy, environment and living standards of all New Zealanders.

www.pureadvantage.org

PURE ADVANTAGE FOUNDING MEMBERS:

- Sir Paul Callaghan
- Sir George Fistonich
- Rob Fyfe
- Chris Liddell
- Phillip Mills
- Jeremy Moon
- Lloyd Morrison
- Rob Morrison (Chairman)
- Geoff Ross
- Justine Smyth
- Mark Solomon
- Sir Stephen Tindall
- Joan Withers

PURE ADVANTAGE

GREEN GROWTH
FOR GREATER WEALTH

EXECUTIVE SUMMARY

This report is a call to action for leaders seeking a role in shaping New Zealand's green growth future. In order to engage corporates, industry groups, academics, iwi and government, we look at some of the opportunities for New Zealand offered by the emergence of a green growth economy. In doing so, we also acknowledge some of the shortcomings of New Zealand's current environmental and economic performance. Green growth represents a once-in-a-generation opportunity for New Zealand to develop its economy for the better.

Green growth is the aggregated economic benefit that comes from minimising waste and the inefficient use of energy, reducing pollution and greenhouse gas emissions, enhancing natural resources and biodiversity. It is an economic progression driven by a series of interrelated and unprecedented global commercial imperatives, including the geopolitical drive for domestic energy security, exploding population growth, changing social demographics, mounting climate obligations, rapid decarbonisation of economies towards renewable energy and initiatives to conserve natural resources, particularly water. Rather than a burden, green growth is an economic pathway to sustainable wealth.

Global green growth is potentially worth NZ$6 trillion a year. To date much of the green debate in New Zealand has focused on the downside: costs and enforced obligations. Pure Advantage has been formed to focus on the economic upside of being green and to catalyse the implementation of green growth economic strategies in New Zealand. We believe that enhancing New Zealand's environment represents a huge opportunity for New Zealand to improve our international competitive position.

Pure Advantage is a not-for-profit entity comprised of business leaders who are passionate about ensuring that New Zealand becomes a greener, wealthier nation. Our aim is to articulate the vision, provide the intellectual rigour and industry horsepower to develop and deliver an ambitious green growth strategy for New Zealand. In doing so, we aim to enlist leaders from businesses, communities, iwi and government.

Pure Advantage recognises that creating a major change in New Zealand's economic strategy and direction is going to require robust analysis coupled with strong leadership. This report is the first step in a process moving from assessing the global context of green growth towards identifying New Zealand's macro-economic opportunities, and finally developing a business case and strategy for taking advantage of these opportunities. Bringing these elements together with the necessary stakeholders will help to accelerate change.

While New Zealand's international branding relies heavily on portraying our environment and economy as 100% Pure, we're failing our own branding test across a range of key environmental metrics. New Zealand has slipped from 1st to 14th on the Yale University's Environmental Performance Index. Our water quality causes 18,000 - 34,000 cases of waterborne disease each year, our per capita carbon emissions are the fifth worst in the Organisation for Economic Co-operation and Development (OECD), and our housing stock is among the coldest and least efficient in the OECD. Perhaps most concerning is that New Zealand's native biodiversity is coming under increasing strain as 77% of New Zealand's threatened species look set to decline. Factors such as these add to the increasing scrutiny of brand integrity by both global consumers and the international media. This puts New Zealand's export earnings at risk.

To make matters worse, all this is happening as we continue to slide down the OECD economic performance tables and our quality of life is deteriorating. Successive governments have failed to make the long-term strategic decisions needed to address our economic slide, at the same time missing the opportunity to keep New Zealand clean and green. As a result, New Zealand was ranked 23rd in the world in the World Economic Forum's 2010 Global Competitiveness Index; the index specifically noted New Zealand's lack of innovation, productivity and poor quality infrastructure. Furthermore, the OECD now ranks New Zealand 22nd out of its 30 members for Gross Domestic Product (GDP) per capita. New Zealand hasn't ranked in the top 20 of the OECD's productivity table in over 20 years. New Zealand's economy needs strong leadership to embrace the high-value green economy and lift it out of its economic malaise.

New Zealand isn't unique in facing these challenges: many other countries are grappling with climate obligations, poor environmental performance and increasing competition for resources. Many OECD countries are, however, already demonstrating the link between green growth policies and strong economic performance. Countries all over the world are investing in green development to help their economies' transition to a more robust, sustainable and environmentally benign platform. As part of the US Government's US$787 billion (NZ$1 trillion) stimulus package, US$83 billion (NZ$105 billion) was dedicated towards green economy spending. South Korea devoted 80% of its US$38 billion stimulus package to green growth initiatives. There are lessons from the private sector too. From Israel's water drip technology to the UK's world-leading housing retrofit programmes through to Finland's innovative use of wood for biomass, there are endless examples of green growth driving new economic growth.

While it must be acknowledged that some government initiatives are underway, New Zealand has a long way to go to catch up.

It is not all bad news, however. We have an ample endowment of natural resources and there are huge financial gains to be made in improving New Zealand's domestic performance in a number of areas. There are NZ$4 billion of energy efficiency savings to be found in the New Zealand economy over the next 10 years alone. We can reduce our reliance on imported oil and save money in the process and, by leveraging our green capability in agriculture and renewables, we can add value to our exports. Bioenergy, smart grid, aquaculture, biofuel, water management and many other green growth options represent billions in potential savings and new revenue.

Addressing our shortcomings offers great opportunities to drive the economy and improve New Zealanders' quality of life. Green can mean jobs, innovation, productivity and a higher quality of life. Leadership from both the private sector and government is essential in helping New Zealand get ahead, but we have to get the green growth formula right.

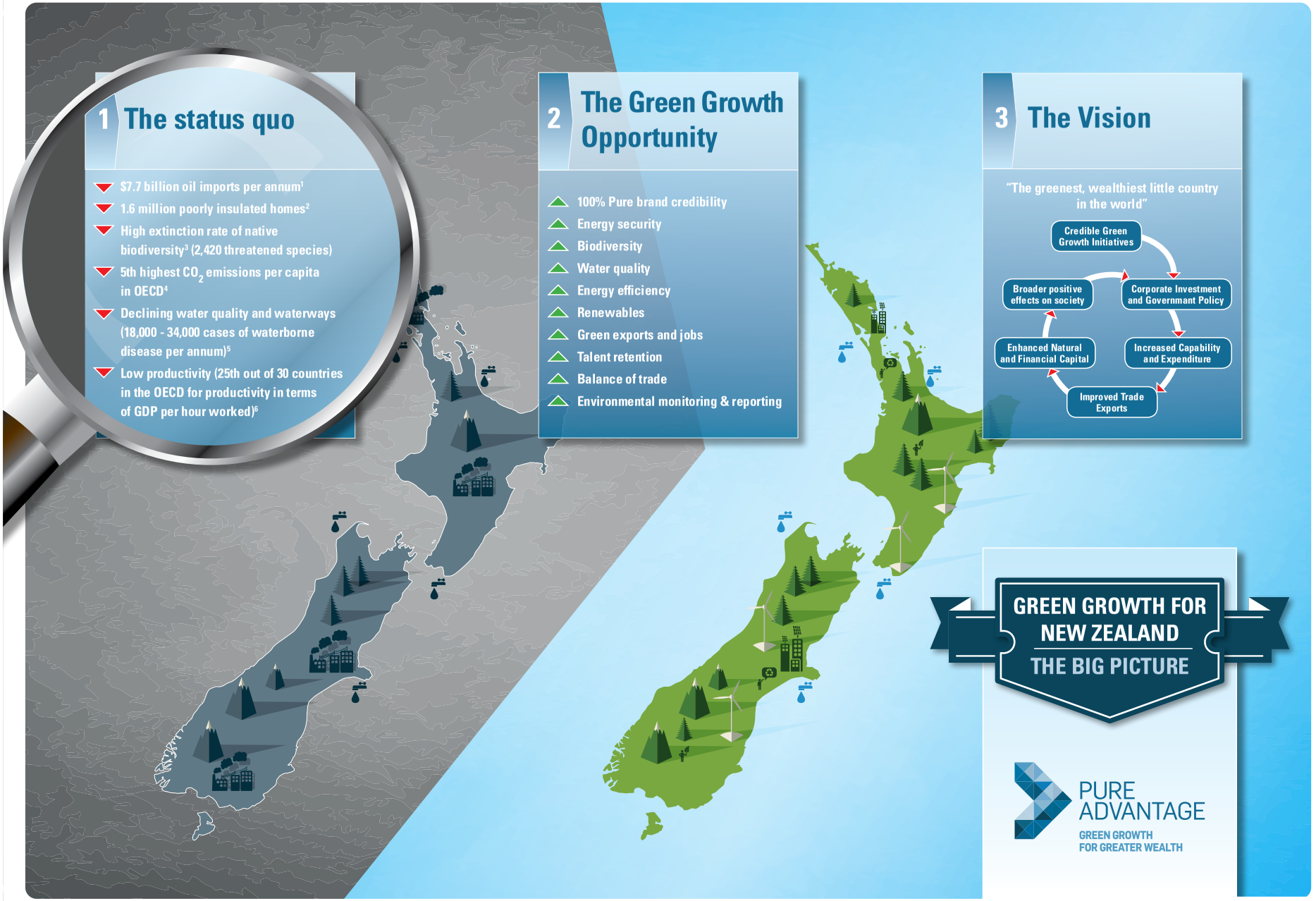
What is ultimately required is a partnership between government and industry. Government's role is to create the right set of policies and the right regulatory environment for green growth opportunities. The role of industry is to give effect to these opportunities. It seems increasingly evident, however, that bipartisan political agreement for creating green growth is unlikely to arise of its own accord in New Zealand any time soon. New Zealand's political leadership has successively failed to make the distinction between greening our current dirty industries, and creating new forms of high-value growth in a green economy. ***Rather than limit ourselves to mitigating the damage of our current fossil fuel-based economy, we should also be using green as a new source of growth.***

Given the political conditions, Pure Advantage proposes that, in the first instance, corporates need to step up to provide the necessary leadership to get things moving. Assuming business can demonstrate this leadership and a willingness to invest, we believe that the people of New Zealand, and as a result government, will follow.

Understanding the need to provide a credible and robust business case for green growth, New Zealand's Position in the Green Race has been prepared by Pure Advantage as an opener for the next stage of detail: a macro-economic review of New Zealand's green growth opportunities, set to be released in the third quarter of 2012. The macro-economic review is being prepared by internationally respected London-based economists, Vivid Economics, in conjunction with the University of Auckland Business School, and will provide an assessment of New Zealand's high-value green growth opportunities.

In the coming months Pure Advantage will be working with corporate leaders to further develop our green growth strategy for New Zealand.

Together we can help build New Zealand's advantage – our Pure Advantage.


1 The status quo
$7.7 billion oil imports per annum[1]
1.6 million poorly insulated homes[2]
High extinction rate of native biodiversity[3] (2,420 threatened species)
5th highest CO_2 emissions per capita in OECD[4]
Declining water quality and waterways (18,000 - 34,000 cases of waterborne disease per annum)[5]
Low productivity (25th out of 30 countries in the OECD for productivity in terms of GDP per hour worked)[6]
2 The Green Growth Opportunity
100% Pure brand credibility
Energy security
Biodiversity
Water quality
Energy efficiency
Renewables
Green exports and jobs
Talent retention
Balance of trade
Environmental monitoring & reporting
3 The Vision
"The greenest, wealthiest little country in the world"
Credible Green Growth Initiatives
Corporate Investment and Government Policy
Increased Capability and Expenditure
Improved Trade Exports
Enhanced Natural and Financial Capital
Broader positive effects on society
GREEN GROWTH FOR NEW ZEALAND
THE BIG PICTURE
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THE RISE AND RISE OF THE GREEN ECONOMY

SECTION ONE:

WHAT IS 'GREEN GROWTH'?

The OECD and United Nations Environment Programme (UNEP) define green growth as that which promotes economic growth while reducing pollution and greenhouse gas emissions, minimising waste and inefficient use of natural resources and maintaining biodiversity. Green growth improves health outcomes for the population and strengthens energy security by reducing dependence on imported fossil fuels. This change requires shifts, both in public funding and in private capital brought about via carefully targeted public funding, accompanied by the right policies to elicit private financing.

DRIVERS

Green growth is a global economic revolution driven by a series of interrelated global mega-trends, including:

- rapid decarbonisation of economies towards renewable energy, stemming from concerns about ongoing energy security as a result of geopolitical instability and oil price volatility
- population growth and changes in population demographics, leading to consequent downstream pressure on water resources, waste, food and energy systems
- international climate obligations which have led to development of new economic and policy tools which take into account environmental externalities and natural capital
- environmental toxicity, pollution and spiralling biodiversity loss, which in some cases is restricting economic growth and exacerbating health concerns
- the upside economic benefits of clean technologies and a corporate shift towards tackling inefficiency as a source of profit rather than cost

As the world economy struggles back from Global Financial Crisis (GFC), few policy makers believe that we can return to pre-crisis models of growth. The GFC has provided the world's governments with an opportunity to change the way that we associate economic growth with the environment, and strategic-thinking, forward-looking countries have vowed to respond to the challenge. Green growth means finding practical and flexible approaches to the environmental dimensions of economic growth and using these solutions to enhance our standard of living.

In addition, forward-looking governments and businesses are searching for ways to benefit from emerging climate change obligations. Rather than fight the changes, governments and industry leaders are getting ahead through innovation and investment in the cleantech sector. Green growth strategies need to be designed on the basis of each country's unique strengths and opportunities. Businesses and governments throughout the world are providing examples of how to successfully turn the new constraints listed above into opportunities.

The emerging clean economy produces jobs that are better paid, more export orientated and more resilient to economic downturns. In the US, for example, a 2011 report by the Brookings Institution noted that, on a per job basis, businesses in the clean economy generate roughly twice the export value of a typical job (US$20,000 vs. US$10,000), and that median wages in the clean economy were 13% higher than in the regular economy. In addition, while jobs in the non-green economy were shed during the recent financial crisis, job growth in the clean economy remained strong.[7]

During the GFC, most leading OECD countries included significant clean economy investment as part of economic stimulus packages. The New Zealand Government's 2009 package missed this opportunity and instead focused largely on infrastructure investment, with little emphasis on enabling green economic growth.[8] In contrast, the Obama Administration's US$787 billion (NZ$1 trillion) economic stimulus plan allocated US$83 billion (NZ$105 billion) to clean technology spending and tax breaks for cleantech firms.

New Zealand needs a clear bipartisan agreement on New Zealand's long-term policy direction, to align areas of absolute or relative competitive advantage and drive investment in green opportunities.

For New Zealand to compete in the green race, several factors need to come together. The experience of European countries, including Denmark, shows that the free market alone is insufficient to change an entire country's economic direction. There needs to be a government strategy to drive a switch from a carbon-based economy to a low-carbon economy. Once such a blueprint is created, government, business and social groups need to agree on implementation. This sort of partnership is Pure Advantage's vision. It will not start on its own.

The green growth potential for the private sector is huge. Despite the GFC, the international market for clean tech is booming. A report commissioned by the UK Government in early 2009 estimated the value of the global market for clean tech at £3 trillion (NZ$6.1 trillion) in 2008. As the international community continues to grapple with the issue of climate change, this figure is expected to grow to £4.3 trillion (NZ$8.8 trillion) by 2015.[9] The International Energy Agency's (IEA) World Energy Outlook for 2011 estimates US$17 trillion (NZ$21 trillion) of new energy investment will be required worldwide by 2035, with renewable energy subsidies likely to grow to US$250 billion (NZ$317 billion) per year.[10]

Low-carbon and environmental goods and services (LCEGS) are not the only markets to experience growth. Cleantech investment is the fastest growing venture capital investment sector in the US, exploding from a base of US$231 million (NZ$293 million) in 2003 to US$4.1 billion (NZ$5.2 billion) in 2008.[11] The cleantech venture capital market share in Europe increased from 1.6% in 2001 to 4.4% in 2007.[12]

Cleantech firms continue to generate buzz from investors and market analysts. US electric car manufacturer Tesla, the first US car manufacturer to list on the US stock exchange since Ford in 1956, opened on the NASDAQ in 2010 with a strong initial showing. This reflects the market's faith in the future of clean technologies.

WHAT CAN NEW ZEALAND GAIN FROM GREEN GROWTH?

- Greater production efficiency (reduced input costs and externalities)
- Increased income from trade/tourism (competitiveness, value, market share)
- Enhanced economic strength and resilience (a more diverse economy, high-value/knowledge-based exports and industries; a better trade balance)
- Enhanced property and company values (premiums)
- Increased foreign direct investment flows
- Higher employment/skill levels
- Greater energy and national security
- Reduced/avoided costs of importing fossil fuels
- Reduced/avoided costs of maintaining and expanding fossil fuel-based infrastructure
- The experience, skills and intellectual property to leverage international markets and the ability to utilise our clean, green brand
- Access to one of the fastest growing sectors of the global economy

THE NEW ZEALAND CONTEXT: WHY GREEN GROWTH MAKES SENSE

New Zealand claims several key advantages in the pursuit of green growth:

- An abundance of energy generation sources (geothermal, hydro and wind)
- World-leading knowledge and experience of certain technologies, such as geothermal, that other countries continue to struggle to adopt
- World-leading 'first world' knowledge of agriculture and forestry
- A well-educated population led by innovative and practical thinkers
- The developed world's first free trade agreement (FTA) with China
- An attractive operational base for multinationals, thanks to political stability, business-friendly regulation and potential energy security from renewable sources
- We have an established clean, green brand

SETTING A PATH FORWARD: THE AIMS OF THIS REPORT

Green growth promises a revolution in how we structure our economy and society in much the same way the internet changed the industrial economy. New Zealand needs to be bold and forward looking, with decisive leadership from the private sector and a robust government policy framework. This is our opportunity to emerge from Australia's shadow, not by following that country's carbon intensive industries but by breaking ahead in the pursuit of a green economy.

This document aims to:

1. Provide an honest appraisal of New Zealand's environmental performance across a range of parameters and compare New Zealand's green policy aspirations with those of other nations.
2. Broadly define green growth and examine its potential benefits to New Zealand's economy and environment.
3. Explain a process for developing a green growth recipe for NZ and a strategy for delivering it.

This document is not a manifesto nor is it an exhaustive review of environmental and economic performance data. It does not provide a complete green growth strategy for New Zealand. It does, however, highlight important trends, specific environmental and economic challenges, areas of additional focus, and explains in broad terms Pure Advantage's evolving strategy for catalysing action.

A THIRD INDUSTRIAL REVOLUTION? GREEN GROWTH GLOBALLY

SECTION TWO:

New Zealand isn't alone in facing challenges posed by the need to change to a low-carbon economy. A diverse range of countries from across the OECD provides insight into how New Zealand can harness the 'green wave'. The experience of each country is unique but united by forward-looking business and political leadership and the active pursuit of economic and environmental wellbeing. From Israel's water drip technology to the UK's world-leading retrofitting to Finland's innovative use of wood for biomass, this section provides examples of how political and business leadership can harness a country's unique individual strengths to bring it ahead in the global green economy. There is much for New Zealand to learn.

"A transformative economic change now has to occur. Delay will be damned expensive"

Dr. Achim Steiner, Director, UN Climate Change Programme

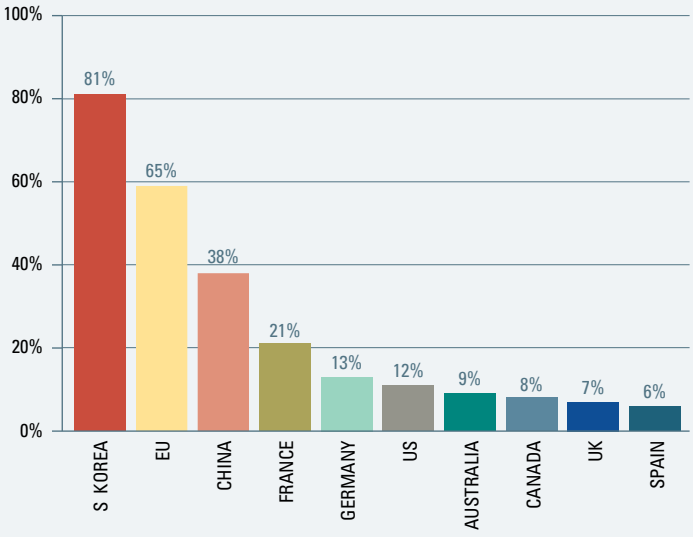
KOREA

Korea's carbon emissions almost doubled between 1990 and 2005, the highest such growth rate in the OECD. In response, its government released a Clean/Green Growth declaration in 2005 and made this the national vision in 2008.

Korea's US$38 billion (NZ$48 billion) fiscal stimulus package, part of its 2009-2013 five-year plan, devoted 80% of its budget to green initiatives designed to spur new economic growth and strengthen Korea's already highly developed manufacturing sector.[13]

This spending, almost 2% of GDP is expected to generate additional economic output of US$162.7 billion (NZ$207 billion) and over 1.6 million new jobs.

Figure 1: GREEN SPENDING AS A % OF TOTAL STIMULUS



Source: *Building a Green Recovery*, HSBC, 2009, p.2.

UNITED KINGDOM

The United Kingdom's Climate Change Act 2008 obliges energy suppliers to meet ambitious household carbon savings targets to improve home energy efficiency. This, coupled with the 2020 Zero Energy building target policy, is generating high levels of innovation and export growth in the building technology sector. The UK's green growth efforts are led by a strong building insulation sector, which now accounts for 3.3% (£12.8 billion or NZ$26 billion) of a £390 billion (NZ$800 billion) global market. Figure 2 illustrates the UK Government's plans for a carbon zero economy by 2050.

The UK's progress in retrofitting poorly insulated homes is of particular interest. A quarter of total UK carbon emissions come from energy used in household heating.[14] About 91% of homes could benefit substantially from improvements in energy efficiency and 70% will still be inhabited in the year 2050.[15]

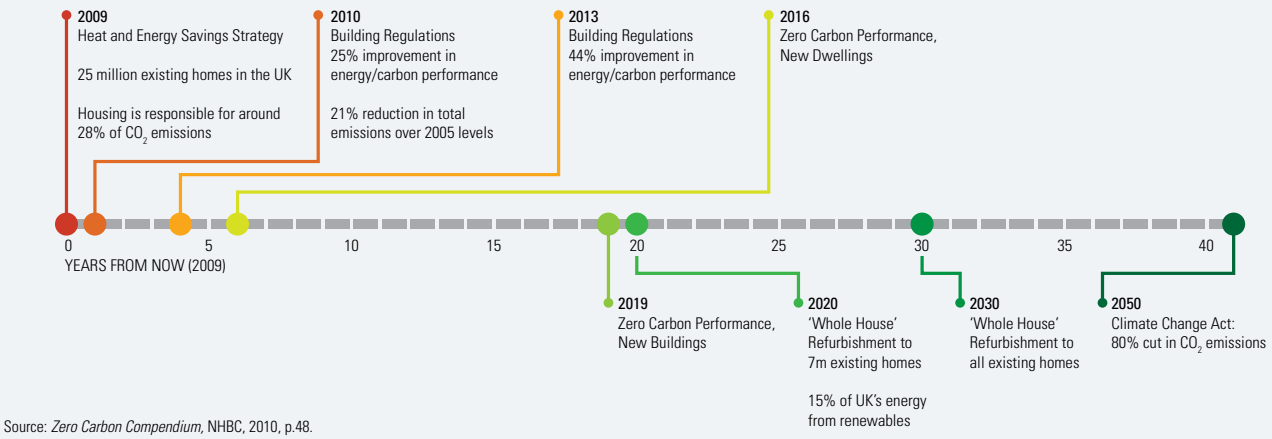
The UK's Green Deal policy framework, facilitated through local councils and public private partnerships (PPPs), addresses the issues implicit in these statistics. The Green Deal helps households, businesses and community spaces improve their energy efficiency and overcome the otherwise restrictive up-front costs of retrofitting. It operates on the premise that savings will always exceed the cost of work and allows energy suppliers to recoup retrofitting costs via monthly energy bills. The largest such 'Green Deal' in the UK, a £250 million (NZ$513 million) Birmingham City Council initiative, aims to retrofit 25,000 homes and 1,000 businesses over the next five years.[16] This is expected to create 270 new jobs, cut emissions by 3,750 tonnes per year and slash the power bills of thousands of households and hundreds of businesses.

Table 1: EMPLOYMENT IN THE LOW CARBON AND ENVIRONMENTAL GOODS AND SERVICES (LCEGS) SECTOR 2007/8

SECTOR	TOTAL EMPLOYED	% TOTAL	SPECIALIST EMPLOYED	% TOTAL
ENVIRONMENTAL	192,000	22	93,000	21
RENEWABLE	257,000	29	147,100	33
EMERGING LOW CARBON	432,300	49	205,300	46
TOTAL	881,300	100	445,400	100

Source: *Low Carbon and Environmental Goods and Services: An Industry Analysis,* Innovas, 2009, p.6.

Figure 2: CURRENT ZERO CARBON TIMELINE, 2009 - 2050



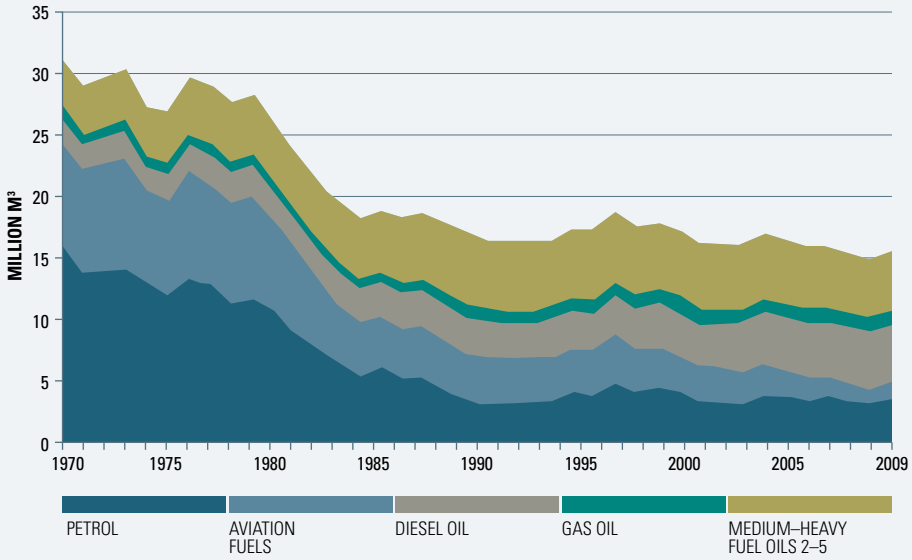
Source: *Zero Carbon Compendium,* NHBC, 2010, p.48.

SWEDEN

Sweden's long-term national energy policy states the Swedish energy system, as far as possible, must be based on domestic and renewable energy sources with minimal harm to the environment. It is certainly making progress. In 1970, 77% of Sweden's energy came from oil; that figure is now 31%, following considered and extensive investment in renewable energy sources. Figure 3 illustrates the decrease in oil usage. In contrast, oil remains New Zealand's biggest source of fuel for our total energy needs. Sweden produced 44.4% of its energy from renewable sources in 2008 and plans to increase that figure to 49% by 2020, largely due to significant investment in wind and hydro generation along its coastlines.

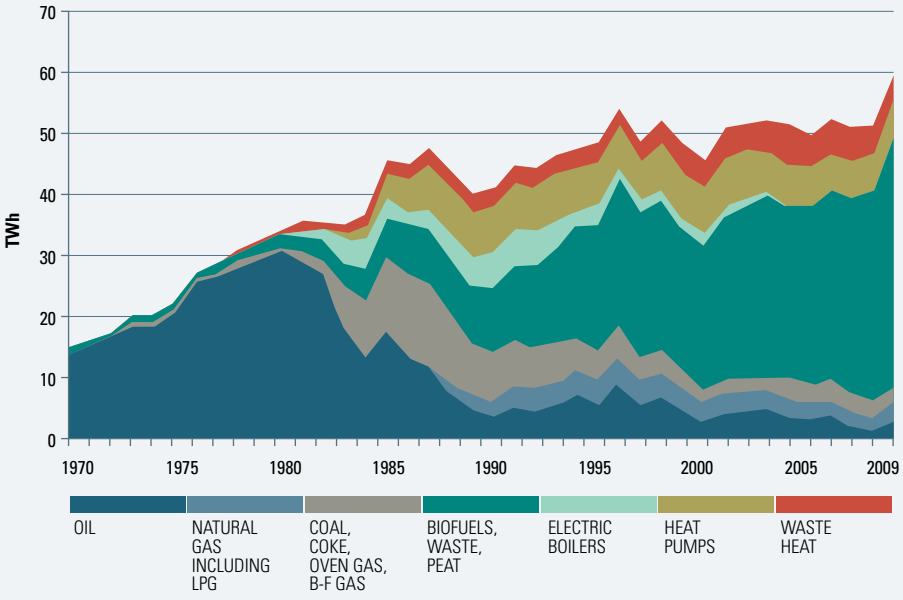
Sweden also strongly promotes innovative biofuel programmes. Sweden, which has more forest per capita than any other country in the European Union (EU), has the ability to provide a steady supply of potential biomass for energy consumption. There is strong government support for increasing the amount of production forestry stock used for energy and the Swedish government also encourages technological innovation in this area. While increasing its planting capacity, Sweden carried out a US$5.6 million (NZ$7.1 million) upgrade of its second generation ethanol pilot plant (able to use cellulose as a raw material in large scale biofuel production). Another key area of growth is the expansion of district heating initiatives (cogeneration and the use of industrial and utility heat waste for domestic needs). Wood-based pellets are replacing oil-based home heating, and, as Figure 4 demonstrates, fewer than 8% of Swedish homes are now heated by oil.[17]

Figure 3: USE OF OIL PRODUCTS IN SWEDEN, INCLUDING INTERNATIONAL TRANSPORT, 1970 - 2009



Source: *Energy in Sweden - Fact and Figures 2011*, Swedish Energy Agency, 2011.

Figure 4: ENERGY SOURCES OF DOMESTIC HEATING, 1970 - 2009



Source: *Energy in Sweden - Fact and Figures 2011*, Swedish Energy Agency, 2011.

In 2007, Sweden ranked second highest in the OECD for investment in research and development (R&D), at over 3.5% of GDP. As significant investment in the clean energy sector continues, this emphasis on R&D is helping to create several key knowledge industries. These include special cultivars bred for short-rotation forestry cycles, specialised planting and harvesting machinery, and advanced combustion technology.

Sweden recognises the benefits of introducing targets for industry. In 1992, Sweden introduced a charge on nitrogen oxide emissions (NOx) from large stationary combustion plants. Since then, Sweden has become a testing ground and 'hothouse' for new NOx-lean technologies. This has enabled Sweden to halve its NOx emission intensity - a substantial and technologically significant reduction. One report suggests Sweden's NOx charge led to a world-leading 24.3 patent applications between 1970 and 2006.[18] Of these, 47% were filed for inventions in combustion technology and 53% for inventions in post-combustion technology.

Sweden's clean-tech sector features only a few large companies. Figures 5 and 6 demonstrate that the rest are small and medium sized enterprises (SMEs).[19] About 3,500 clean technology companies generate US$14 billion (NZ$19 billion) in revenue from exports, a quarter of overall sales and a figure that increased by 75% over the last five years. The government is earmarking US$590 million (NZ$750 million) for environmental projects over the next two years to further boost the industry, including US$180 million (NZ$229 million) to further commercialise green technology.

Figure 5: INDUSTRY STRUCTURE - BIOENERGY

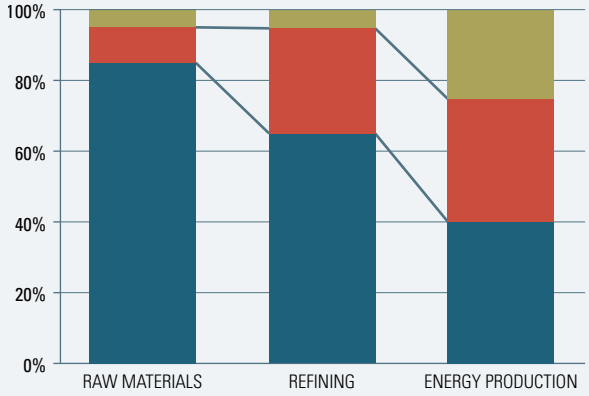
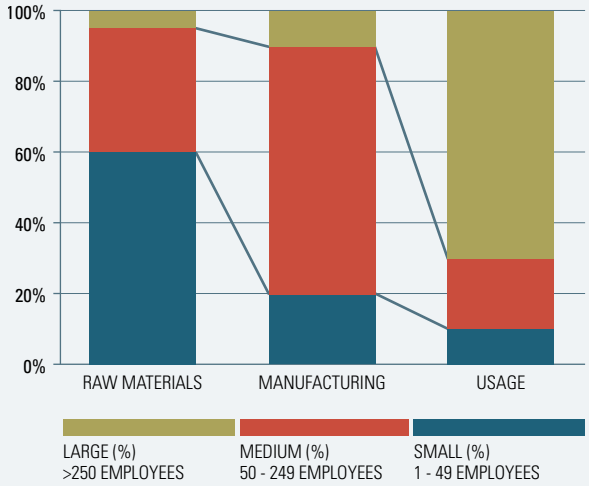
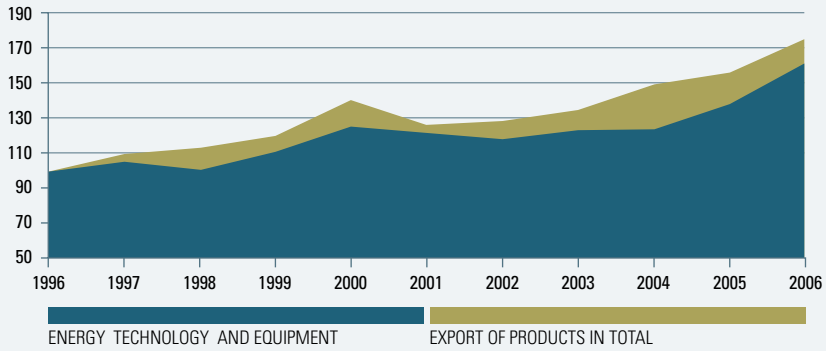


Figure 6: INDUSTRY STRUCTURE - BIOFUELS



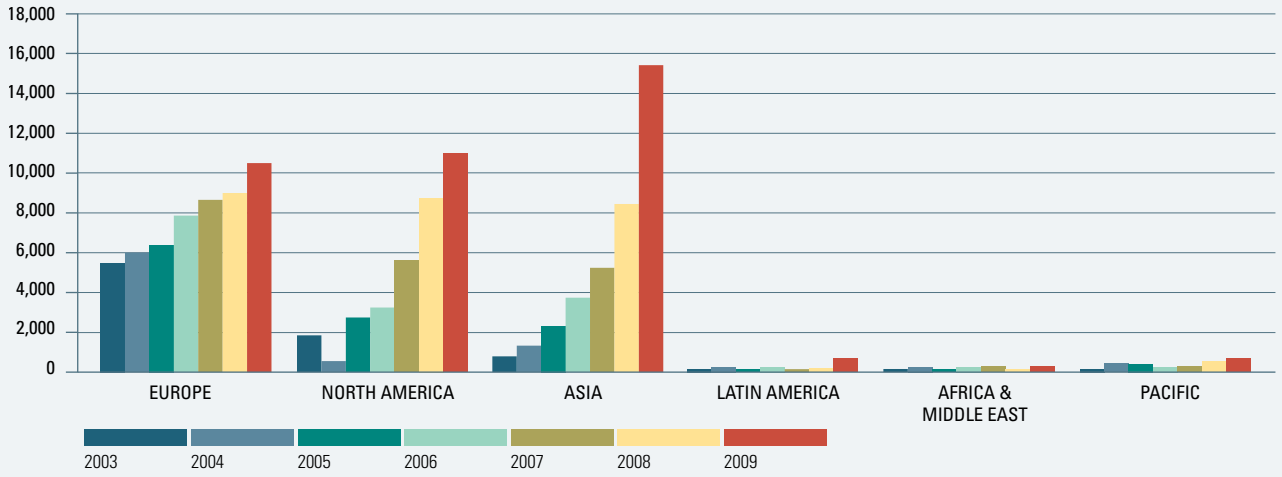
Source: *A Mapping of Swedish Bioenergy,* Invest Sweden, 2007, p.8, p.14.

Figure 7: SWEDISH EXPORTS OF ENERGY TECHNOLOGY PRODUCTS AND TOTAL EXPORTS Index 1996=100



Source: *Energy Technology Industry - A Business in Growth,* Nordic Energy Research, 2007, p.11.

Figure 8: GLOBALLY INSTALLED WIND CAPACITY 2003-2009



Source: *A Global Wind Report: Annual Market Update 2010,* Global Wind Energy Council, 2010, p.14.

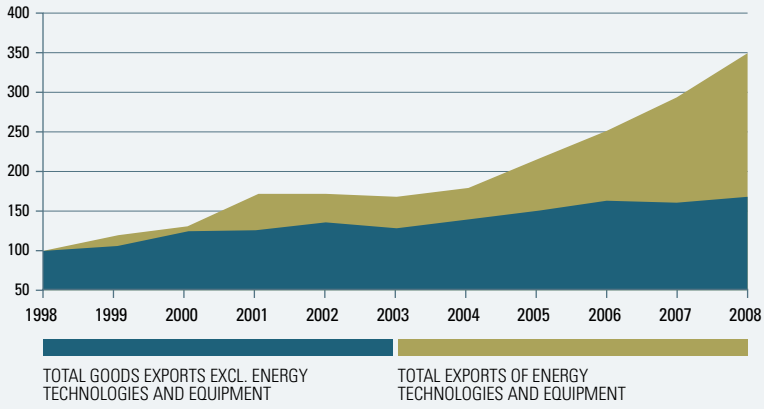
DENMARK

Denmark's renowned 'Wind Valley' is an established green cluster where manufacturers, suppliers, research and educational institutions combine expertise, innovation and advanced technology in an industry that employs about 20,000 people. Financial support for prototyping and early testing, available since the early 1980s, together with the introduction of feed-in tariffs, has stimulated the emergence of an early domestic market for wind energy. As a result, Danish companies now make up 40% of the world market for wind turbines, with combined turnover of over €US$3 billion (NZ$4.8 billion). Denmark is one of a number of European countries investing heavily in wind energy. Figure 8 shows the development of wind technology around the world.[20]

Danish wind turbine manufacturer Vestas is the world's dominant offshore wind manufacturer, with a 20% market share. DONG Energy (one of Denmark's leading companies), component manufacturers, such as LM Glasfiber, and offshore installation contractors, such as A2SEA, create a powerful export market.

Denmark's export of energy technology and equipment has more than tripled since 1989, as is shown in Figure 9.[21] Two thirds of its green energy technologies come from the wind turbine sector. Energy exports accounted for 11% of total Danish exports, or DKK64 billion (NZ$14 billion) in 2008. This places Denmark at the top of GDP-weighted world rankings for clean energy exports.

Figure 9: DANISH EXPORTS OF ENERGY TECHNOLOGY PRODUCTS AND TOTAL EXPORTS Index 1996=100

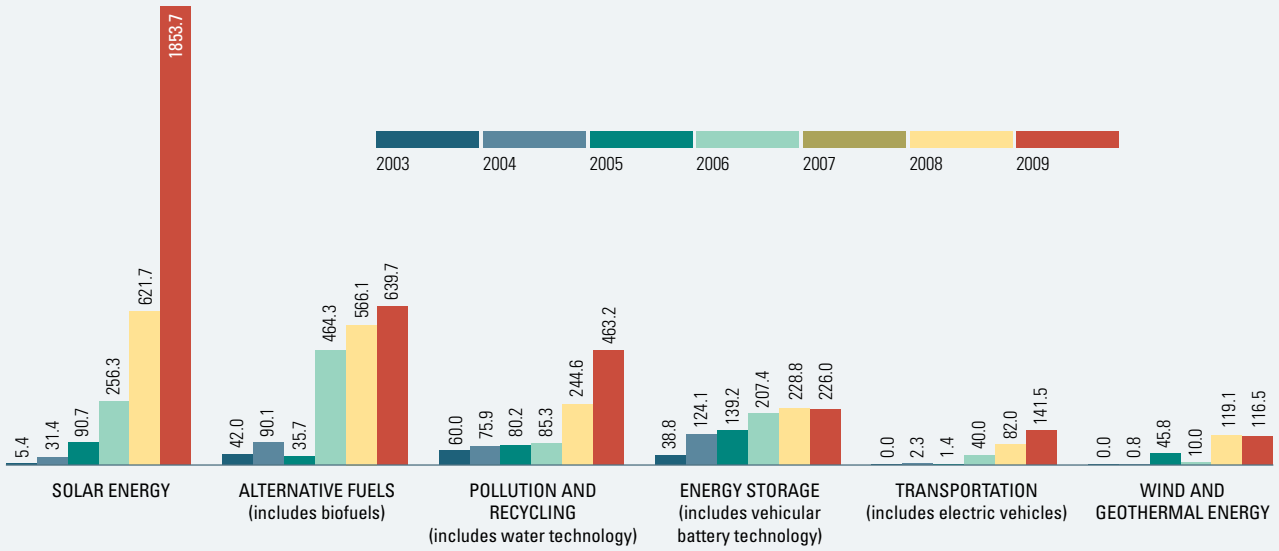


Source: *Energy Technology Industry - A Business in Growth,* Nordic Energy Research, 2007, p.12.

FINLAND

Finland, a world leader in the production of wood products, boasts a strong biomass-fuelled energy generation sector driven largely by strategic targets. The local forestry industry derives 73% of its energy from wood-based fuels, and biomass cogeneration systems account for almost 80% of industrial heating, 74% of domestic heating and 29% of national electricity. Finland's National Climate Strategy Energy (2004) set out to double the annual use of forest chips to five million cubic meters (36 petajoules or PJ) of chips for domestic consumption. This is of particular interest to New Zealand, as our strong forestry sector means we have potential to emulate this type of biomass generation.

Figure 10: TOP CLEANTECH SUB-SECTOR INVESTMENTS ($ IN MILLIONS)



Source: *Cleantech Drives Through Stormy 2008*, PricewaterhouseCoopers, 2009, p.2.

AUSTRALIA

Australia's established and substantial low carbon goods and services sector is currently growing at 4% per year. The Australian clean energy sector is active in developing opportunities, with collaborative research agreements with German R&D leaders, and clean energy investment and installation partnerships with Korea and China.

The Australian Government's Clean Energy Future package, due to be passed later this year, will provide AU$100 billion (NZ$128 billion) dollars for clean energy over coming decades, including about AU$10 billion (NZ$13 billion) to be distributed through the new Clean Energy Finance Corporation.

In addition, Australia has identified a global opportunity for its water industry and set up WaterAUSTRALIA to promote its international competitiveness in that area.

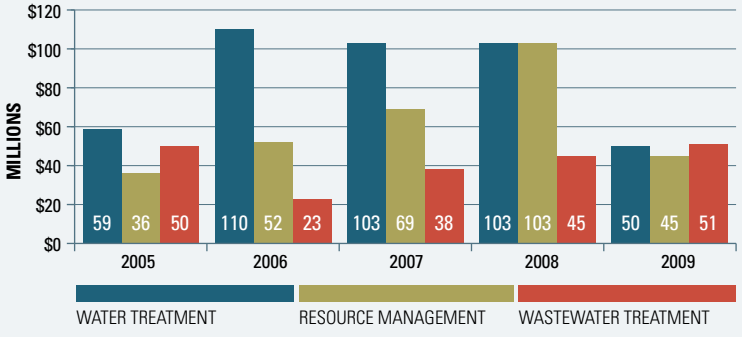
SINGAPORE

In April 2009, the government of Singapore invested more than US$692 million (NZ$880 million) in a five year 'green plan'. It is anticipated this blueprint will help build a clear and concise national strategy to address current energy challenges. Singapore is an established hub for water management expertise in the Asia-Pacific region, and has an R&D presence in the water sector characterised by strong international collaboration with leading water research institutions and companies.[22] Singapore aims to secure 3% of the global water market, which would increase the GDP contribution of its water sector from US$300 million (NZ$380 million) in 2003 to US$1.1 billion (NZ$1.4 billion) by 2015.[23]

ISRAEL

Israel's water technology sector reaps the benefits of strong government policy and fiscal incentives. The Israeli government, drawing on that country's knowledge of water scarcity and conservation, established Israel NEWTech, a unit focused on commercialising Israeli clean technologies for water. The unit fosters R&D which includes providing beta sites throughout Israel for testing new water and energy saving solutions. The export future of this area is bright. International water scarcity creates strong demand for technology designed to optimise water use. More than 200 of the over 400 water companies in Israel are already exporting their technology, worth a total US$3 billion (NZ$3.8 billion) in 2009. This technology includes drip irrigation (more than 80% of irrigation production equipment in Israel is exported), water reuse, recycling, reclamation technology, desalination, water security and monitoring.

Figure 11: GLOBAL INVESTMENT IN WATER TECHNOLOGY[28]



Source: *The State of Water Innovation,* Cleantech, 2010, p.5.

‘100% PURE’ REALITY CHECK: GREEN PERFORMANCE IN NEW ZEALAND

SECTION THREE:

INTRODUCTION

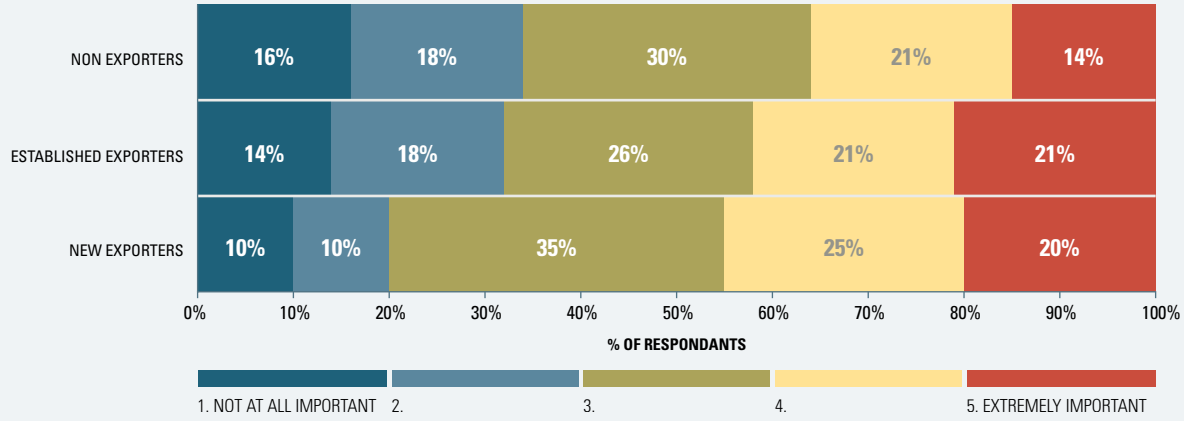
The 100% Pure brand is an important part of bolstering international belief that New Zealand is, in fact, “clean and green”.[24] This brand is now coming under significant scrutiny, particularly in the areas of New Zealand’s environmental performance in the areas of water quality and our rate of biodiversity loss.

New Zealand’s success as an exporter of resource-based goods and services depends on environmental integrity. Our exports rely on the quality of our environmental output and policies.[25] The influence of this brand is twofold. First, it helps New Zealand’s dairy sector, worth 17% of New Zealand’s GDP. Second, it helps attract millions of tourists a year who have a combined annual economic value of more than NZ$20 billion. About two thirds of international visitors surveyed felt that New Zealand’s natural environment exceeded their expectations.

It is therefore clear there is a lot riding on our clean, green reputation. Consumer expectations in our major markets with regard to sustainability, quality, health and safety of food products and tourism experiences are increasing rapidly.[26] Studies show a 5% drop in reputation and consequent drop in demand for primary products and international tourism would cost the economy more than 22,000 jobs, an annual direct loss of NZ$455 million in primary product sales and a NZ$155 million loss in international tourism sales.[27]

Here, we take an objective look at some of New Zealand’s environmental indicators, ranging from New Zealand’s water quality to the quality of its transport mix and housing efficiency. We will then examine some of the economic challenges New Zealand faces.

Figure 12: BEING CLEAN AND GREEN IS VITAL FOR EXPORTERS



A 2008 survey of 778 New Zealand businesses highlighted that, for 80% of new exporters, and nearly 70% of existing exporters, being clean and green is “vital”[28]. This indicates a capitalisation on New Zealand’s clean, green brand.

Source: *Clever Companies Insight 2008*, PricewaterhouseCoopers, 2008, p.36.

OBJECTIVE INTERNATIONAL MEASURES

New Zealand ranked first out of the 146 countries in Yale University's 2006 Environmental Performance Index (EPI).[29] The index ranks countries on the quality of their environmental policies, as originally outlined in the UN Millennium Development Goals. Since then, we have slipped from 7th in 2008 to a poor 14th in 2012, bypassed by developing countries such as Slovakia and Costa Rica (see Table 2).[30]

These rankings will come as a shock to those in New Zealand who believe our country prides itself on its clean, green image.

Two OECD reports (2007 and 2010) present specific challenges to New Zealand's image. The reports show declining environmental performance across a range of metrics including water, energy, emissions, land use and environmental monitoring.

As these figures demonstrate, New Zealand is neither well positioned to be in the vanguard of the global green economy nor to seize green growth opportunities as they arise; nor are we achieving the bare minimum to justify the traditional competitive advantage upon which our 100% Pure New Zealand brand rests. Current government initiatives are not sufficient to drive the necessary progression of New Zealand's domestic economy and infrastructure.

Our reliance on our environment for branding, export base and sense of identity means there are colossal risks and substantial costs if we continue with business as usual. If we continue to lock ourselves into a high-carbon economy, we risk fossil fuel dependency and the further devaluation of the New Zealand brand. The alternative: a bold green growth strategy to unlock significant economic opportunities and other benefits for New Zealanders. We will now take a more specific and micro level look at New Zealand's environmental performance.

Table 2: 2012 ENVIRONMENTAL PERFORMANCE INDEX

RANK	COUNTRY	SCORE
1	SWITZERLAND	76.69
2	LATVIA	70.37
3	NORWAY	69.92
4	LUXEMBOURG	69.20
5	COSTA RICA	69.03
6	FRANCE	69.00
7	AUSTRIA	68.92
8	ITALY	68.90
9	UNITED KINGDOM	68.82
9	SWEDEN	68.82
11	GERMANY	66.91
12	SLOVAKIA	66.62
13	ICELAND	66.28
14	NEW ZEALAND	66.05
15	ALBANIA	65.85

Source: *The Environmental Performance Index*, Yale University, 2012.

WATER QUALITY & ALLOCATION

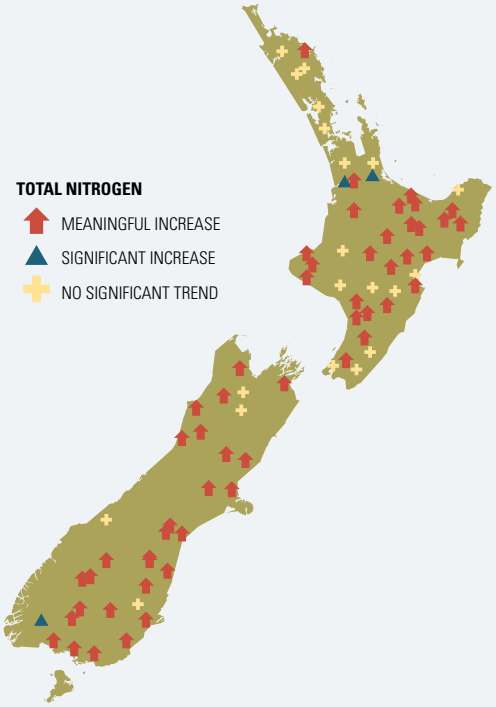
While New Zealand's freshwater quality is good overall, quality and availability are deteriorating and vary between and within catchments. The Yale University Water Quality Index ranks New Zealand 43rd out of 132 countries with a score of 40.3 out of 100 for ecosystem vitality for freshwater. Despite successive work programmes reporting back to the government with options on how to resolve New Zealand's water challenges, including the Land and Water Forum (2010), New Zealand maintains a top ten position for nitrate levels in water among OECD countries. This can largely be attributed to agricultural intensification, especially in the dairy industry.

The majority of New Zealand's population (70%) receives good quality drinking water yet we suffer from an estimated 18,000-34,000 cases of waterborne disease each year.[31] In addition, many areas have already reached freshwater extraction limits. Figure 13 demonstrates the countrywide increase in nitrogen in our waterways since the late 1980s.[32] The 2006 OECD average for total weekly allocation of water used for irrigation is 43%. In contrast, New Zealand's irrigation allocation is 77%. This has rapidly increased in recent years, as demonstrated by Figure 14.[33] This relatively high rate is driven by large scale land use conversion from sheep farming to dairy farming and a steady increase in horticulture and viticulture.

Water scarcity, in the absence of water pricing, is an increasing problem for certain dairy intensive regions. These regions are becoming more vulnerable to drought due to their increased irrigation loads, and this is only expected to get worse. Climate change is expected to increase the frequency and severity of droughts in New Zealand. This is of special concern for a country that relies so heavily on agricultural produce. NIWA studies show low rainfall reduces the efficiency of our agricultural production, and estimate that the 2007 and 2008 droughts cost the country NZ$500 million and NZ$1 billion respectively. Due to New Zealand's heavy reliance on hydroelectricity, the economy suffers disproportionately during drought periods. Mighty River Power attributed its substantially reduced earnings in 2009-2010 in part to drought. Its underlying earnings fell 34% to NZ$139.6 million compared with the previous year.

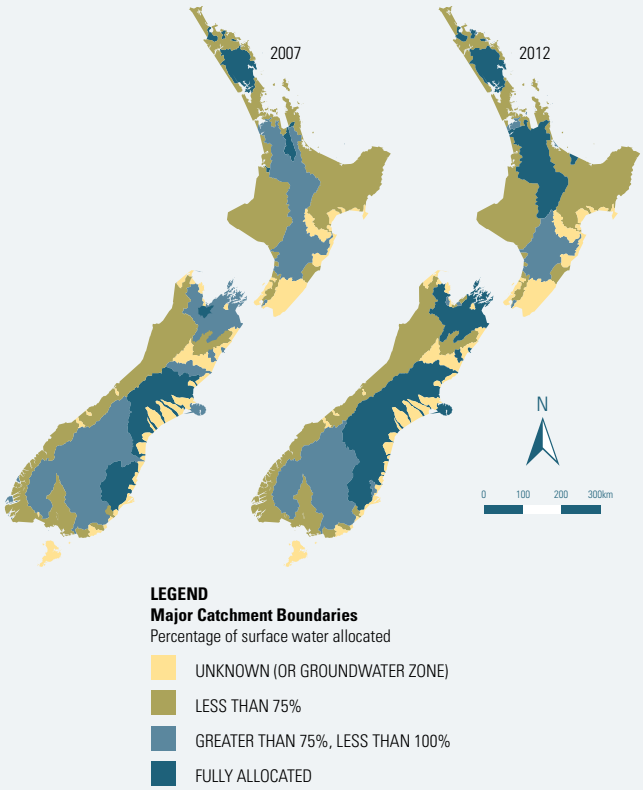
Despite some work to mitigate these challenges, few viable solutions are in sight for water stressed regions. Successive governments have failed to implement a comprehensive framework for water quality in New Zealand waterways. A comprehensive framework would allow regional councils to establish targets for nutrient flows in their respective catchment areas. This is a very important factor in areas where pastoral farming systems are the main source of nitrate pollution.[34] This could also form the basis of a market for nutrient trading.

Figure 13: TRENDS IN TOTAL NITROGEN 1989-2007



Source: *Our Rivers: Trends in Water Quality,* Ministry for the Environment, 2009, p.2.

Figure 14: CHANGES TO SURFACE WATER ALLOCATIONS 2007-2012



Source: *A Best Use Solution For New Zealand's Water Problems,* New Zealand Business Council for Sustainable Development, 2008, p.4.

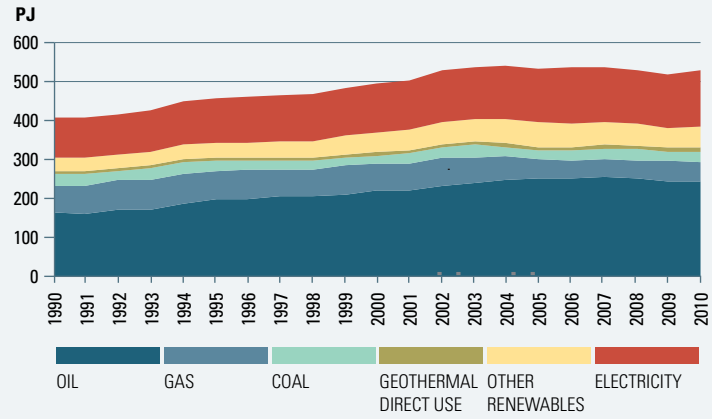
NEW ZEALAND'S ENERGY MIX

About 60% of New Zealand's total energy supply comes from fossil fuels, such as coal, oil and gas, of which New Zealand imports 40% of its energy, mostly in the form of oil (see Figure 15).[35]

New Zealand's goal is for 90% of its electricity generation to come from renewable energy sources by 2025 yet the proportion of our energy derived from renewable sources is declining.[36] In 1975, renewable energy accounted for 90% of electricity generation in New Zealand. By 2010, despite recent gains, this figure was down to 76%. In fact, the electricity sector displays one of the largest increases in emissions since 1990, mainly due to an increase in fossil fuel use.[37] Despite this, no new hydro generation plants have been built in New Zealand for 20 years.

Successive government indifference hasn't helped. New Zealand's 2007 Energy Strategy and 2011 Energy Strategy both lacked detailed road maps as to how we will meet our 90% target. Businesses and industries will need clear priorities and firm targets in order to meet that goal. This becomes starker when placed in the context of our imports and exports. In the year to June 2011, New Zealand spent NZ$7 billion on imported petroleum products. In the same period we exported NZ$1.3 billion less for all our combined meat and livestock products. Relying on sustainable energy sources offers significant energy security and efficiency gains.

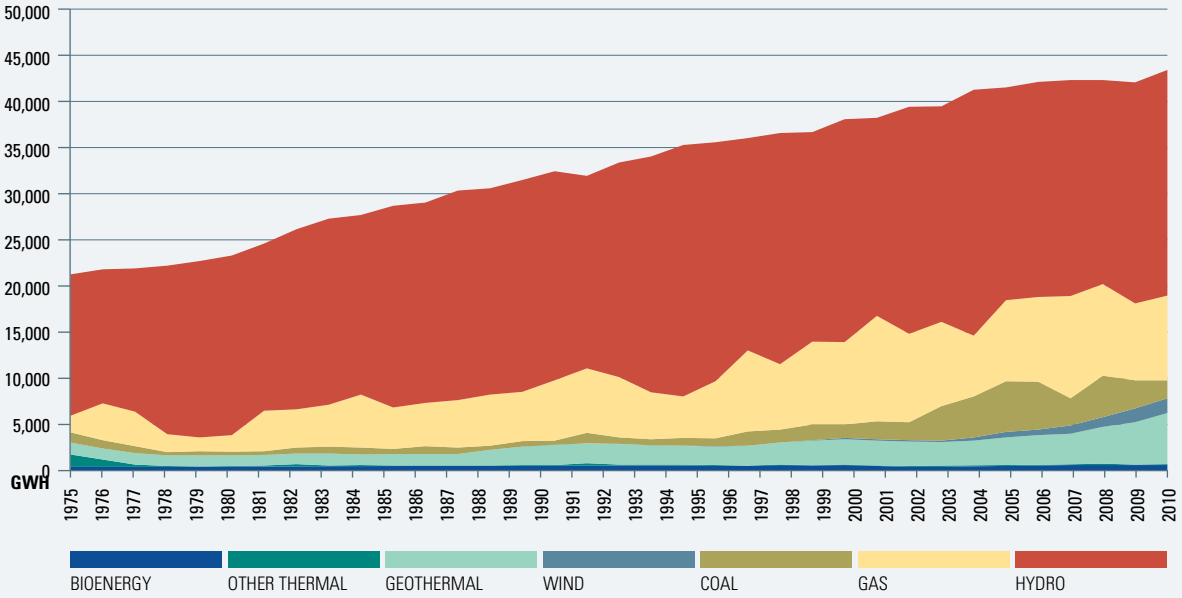
Figure 15: TOTAL CONSUMER ENERGY



Source: *The New Zealand Energy Data File,* Ministry of Economic Development, 2011, p.12.

Our fossil fuel addiction means New Zealanders face increasingly high energy costs and also contributes to significant environmental damage. Being 100% Pure means choosing how we structure the base of our economy. If we are to truly keep that status, we will have to make a significant move away from fossil fuels and towards sustainable, affordable renewable energy.

Figure 16: ANNUAL ELECTRICITY GENERATION BY FUEL TYPE



Source: *The New Zealand Energy Data File,* Ministry of Economic Development, 2011, p.99.

EMISSIONS

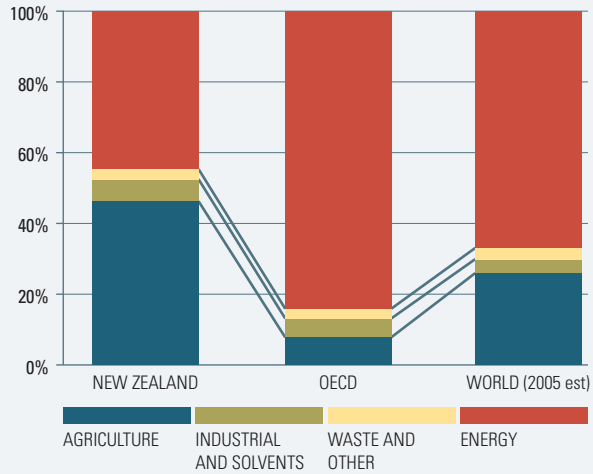
New Zealand's emissions are the fifth highest per capita in the OECD after Australia, Luxembourg, the US and Canada. Our emissions have increased 23% since 1990; most other countries in the OECD managed to reduce per capita emissions. New Zealand will overtake the US in terms of per capita emissions in fewer than eight years.[38]

New Zealand faces a unique challenge within the OECD with its relatively high agricultural emissions (see Figure 17).[39] New Zealand's agricultural emissions have grown 1% per year since 1990, and are expected to continue growing at this rate in at least the medium term. New Zealand is in theory the first country in the world to include agriculture in an emissions trading scheme, however the timing of the agriculture sector's entry into the Emissions Trading Scheme (ETS) remains uncertain.

Farmed livestock accounts for 95% of the methane emissions in New Zealand's greenhouse gas (GHG) profile. The livestock emissions of Australia, the UK and Ireland are at least as large as New Zealand's but they constitute a much smaller percentage of total emissions. Reducing methane will be critical to reducing New Zealand's emissions.

Our unique emissions profile makes for costly mitigation. An exceptionally high proportion of our electricity generation is already derived from renewable sources (mainly hydro) and no technology to significantly reduce methane from ruminant animals currently exists. However, with increased innovation driven by green growth, New Zealand may be able to become a world leader in such technology.

Figure 17: SOURCES OF GREENHOUSE GAS EMISSIONS, 2009, % CO_2e



Source: *NZ Ahead,* The New Zealand Institute, 2011, p.90.

TRANSPORT ENERGY EFFICIENCY

New Zealand boasts the world's third highest rate of car ownership. To make matters worse, our transport sector is inefficient and highly carbon intensive, consuming 45% of New Zealand's total consumer energy. Between 1990 and 2006, total transport emissions increased by a shocking 64%. About 40% of carbon dioxide emissions come from road transport, equivalent to about 20% of New Zealand's total greenhouse gas emissions.

New Zealand lags far behind other OECD countries in policies and measures to improve the energy efficiency and emissions reduction of the national transport fleet.[40] Two of the biggest problems are low fuel excise taxes (and low use of road charging to capture external costs more fully) and inadequate public transport infrastructure.[41] Targets such as dropping the average carbon intensity of the light vehicle fleet to 170 grams CO_2 per kilometre by 2015 (saving 175 PJ of transport energy by 2025) are yet to find a place in government policies. Implementation of the ETS is yet to have a significant impact on transport behaviour.

New Zealanders' high car ownership rates are reflected in their low user rates of public transport – one of the lowest in the world, with only 2.5% of trips made by public transport. In contrast, 70% of commuters in Curitiba, Brazil, use the Bus Rapid Transit (BRT). This system contributes to 30% less fuel use per capita in Curitiba than in eight other Brazilian cities of its size. Unfortunately, and rather controversially, public transport infrastructure funding in New Zealand will be cut from an already low 1.8% of the current land transport budget to 0.7% by 2021.[42]

HOUSING ENERGY EFFICIENCY

New Zealand's housing stock is notoriously difficult to heat due to poor insulation and the very rare use of double-glazing. Our housing efficiency equates to where the Scandinavians were in the 1960s.[43]

New Zealand's energy efficiency improved at a rate of 0.7% per annum from 1995 to 2007, a rate similar to other OECD economies. At the same time, New Zealand is one of the least energy efficient countries in the OECD when comparing economic output to electricity consumption.[44]

The Government makes no clear statement in the Energy Efficiency and Conservation section of New Zealand's Energy Strategy about its desired policy priorities with regard to saving petajoules, reducing greenhouse gas emissions, increasing energy security, improving health outcomes in the residential sector and achieving other social benefits. Programmes designed and implemented to secure energy efficiency are, consequently, often ill-suited to achieving their stated objectives.[45]

The New Zealand Building Code review led to more energy efficient housing regulations. New houses now consume 30% less energy than houses built to the old code. However, New Zealand is well behind the passivhaus or zero carbon standards adopted by other countries (see table 3).

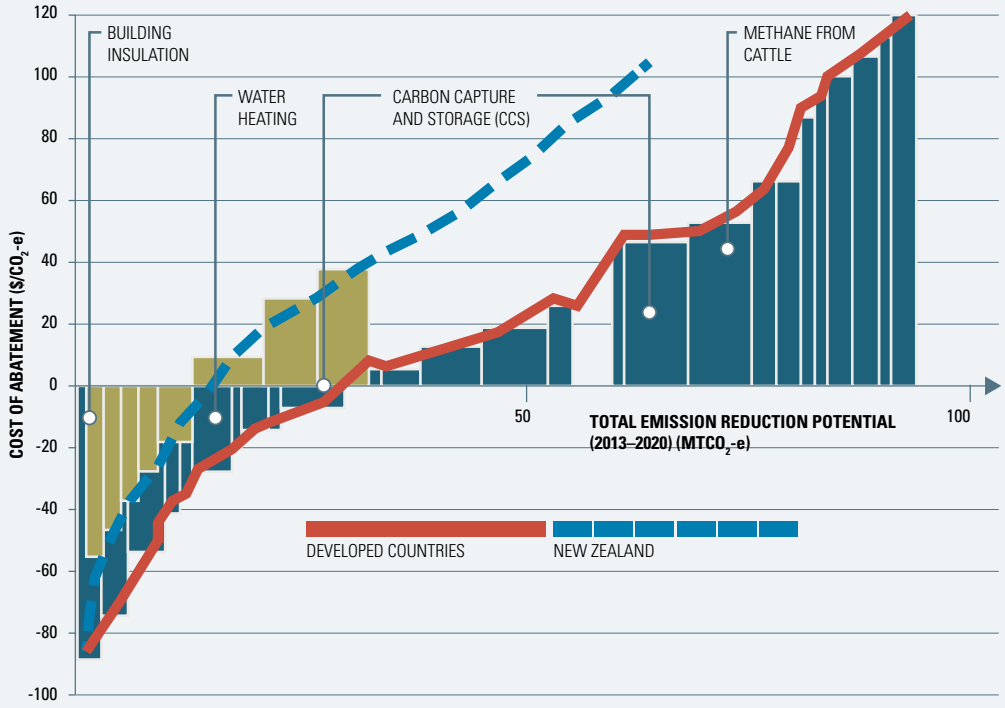
Table 3: INTERNATIONAL HOUSING ENERGY EFFICIENCY STANDARDS

COUNTRY	MANDATORY STANDARD	TIMELINE
Sweden, many German cities	Passivhaus	Current
UK	Zero Carbon Housing	2016
France	Energy Plus House	2020
US	ZEB	Demonstration Communities Built

New Zealand has about 1.6 million poorly insulated homes, all of which need to be reinsulated.[46] The UK's per capita investment in programmes that retrofit poor quality housing stock is far higher than that in New Zealand. While the existing funding mechanism in New Zealand led to some public private co-funding partnerships to help retrofit houses, it is undermined by short term funding, which means businesses and the industry as a whole are unable to make the required long-term commitments.[47]

Investing in the insulation of New Zealand's homes comes with a number of benefits that go beyond just energy efficiency: it will also improve people's health and quality of life. As has been demonstrated in the UK, investing heavily in home insulation can also create thousands of jobs for semi-skilled New Zealanders.

Figure 18: INDICATIVE ABATEMENT COSTS



Source: *A Conceptual Framework to Assist Decision Making on International Climate Change Policy,* The Treasury, 2007, p.15.

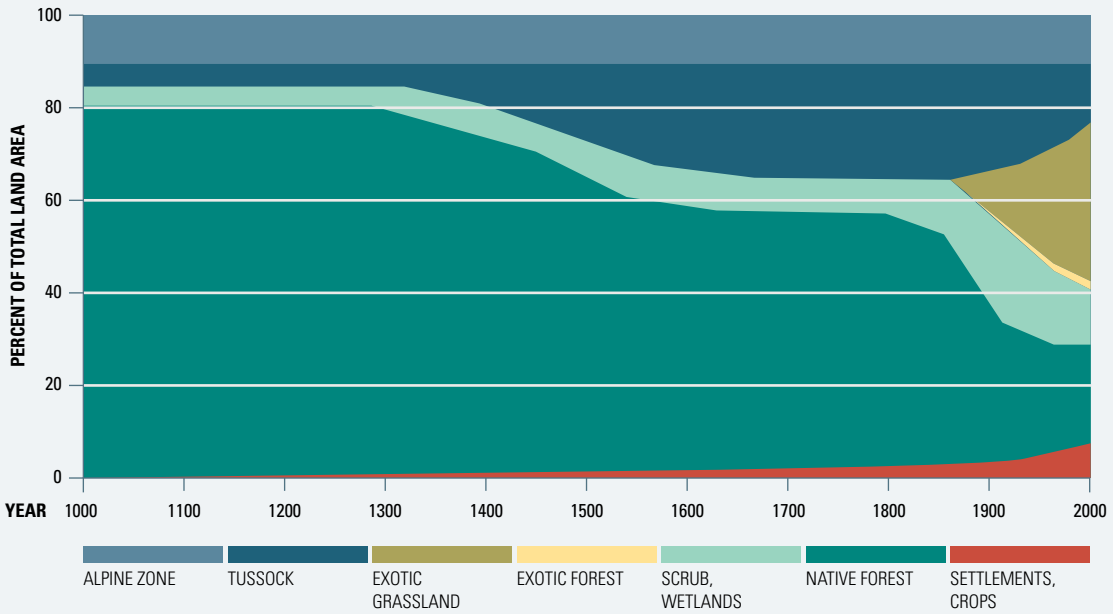
LAND USE

The percentage of New Zealand land in protected areas is one of the highest among countries in the OECD. We are considered a leader in the management of parks and protected areas. Mining is off limits on 40% of the conservation estate listed in Schedule 4 of the Crown Minerals Act. A recent Government proposal to extract minerals from Schedule 4 land prompted strong public opposition.

New Zealand's landscape, however, is undergoing extensive changes and we're paying the cost in the form of higher carbon emissions. Recent land use changes, in response to booming dairy prices, affect the amount of water available for irrigation. In addition, erosion, nutrient leaching, and loss of biodiversity are all associated with changes in land use. Total water allocated for extraction increased by 50% between 1999 and 2006, mainly for farming irrigation. As a result, consented irrigated land in New Zealand increased by 52%.

In addition, New Zealand forestry is characterised by low levels of new planting.

Figure 19: LAND USE CHANGE OVER THE LAST 1000 YEARS



Source: *The State of New Zealand's Environment: The State of Our Land,* Ministry for the Environment, 1997, p.28.

ENVIRONMENTAL MONITORING

The Parliamentary Commissioner for the Environment's (PCE) 2010 report[48] on environmental monitoring found New Zealand lacks reliable and independent 'state of the environment' reporting.[49] New Zealand is the only country in the OECD not to have a legislated process for regular national environmental reporting. Disparate data and indicators on the state of the environment from different stakeholders at local and national level prevent policy becoming more focused on results.

The concluding chapter to the Environment for New Zealand 2007 report provides telling insight into New Zealand's environmental reporting standards.[50] The final report omitted this part of the last chapter. The draft chapter later became publicly available in the interests of transparency. It states:

It is the very aspects of New Zealand's environment that underpin our economic wealth through tourism and primary production – our iconic flora and fauna, our stunning wilderness areas and our rural landscapes – which are particularly vulnerable to increasing pressures. This is perhaps the critical area where New Zealand differs from other developed countries: other countries do not rely so heavily on the preservation of their natural environment for their economic wellbeing.

Addressing New Zealand's environmental challenges, as we understand them, will require implementing proper systems and intelligence. As the rest of the world feels the impacts of climate change, New Zealand will feel the impact of global scrutiny on how resources are managed.[51]

BIODIVERSITY

In February 2000, the New Zealand Government launched the New Zealand Biodiversity Strategy (NZBS)with the intent, over the next 20 years, of halting the decline of New Zealand's indigenous biodiversity. [52] To assist the plan, government put together a NZ$187 million five year package, with funding divided into 43 programmes. At the end of this five year plan, 35% of programmes recorded significant progress and a further 23% recorded moderate progress. Despite these gains, 77% of New Zealand's threatened species still lack targeted recovery work and will most likely continue to decline in numbers due to a lack of resources needed to support protection measures.[53] As there is no overall biodiversity monitoring system, it is very hard to monitor and evaluate the overall achievement across all public and private land in New Zealand.

If New Zealand wishes to protect its native wildlife, there needs to be explicit direction from both the government and the private sector.

NEW ZEALAND'S ECONOMY

NEW ZEALAND'S ECONOMIC PERFORMANCE

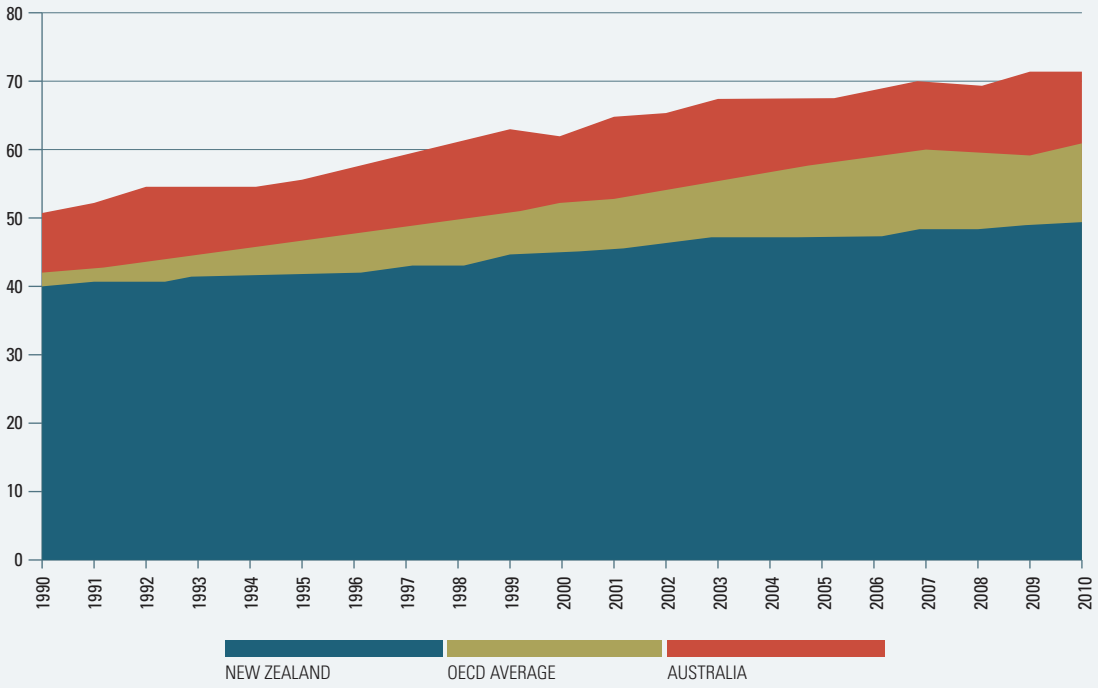
"The real risk for New Zealand as it emerges from recession is that it reverts to the mediocre economic performance that has marked much of its recent past, we want to do better than just muddle through... By muddling through, I mean an economy that grows a bit here and there, which stops and starts…"

Bill English, Minister of Finance, 2009[54]

Much of New Zealand's recent political discourse revolves around the goals of achieving economic prosperity and global competitiveness.[55] This is proving a huge challenge. New Zealand, with its poorly performing economy, is currently not well placed to gain competitive advantages in future global markets nor do we currently have the flexibility to respond quickly to changing consumer demand. This section contrasts New Zealand's economic performance with those of highly ranked green growth countries, providing insight into where New Zealand might move forward. New Zealand ranked 25th in the World Economic Forum's 2012 Global Competitiveness Index, with New Zealand's GDP per capita, lack of innovation, productivity and infrastructure quality all of particular concern. This section aims to assess New Zealand's performance in four key metrics: GDP, productivity, innovation and infrastructure.

New Zealand's drift down the OECD rankings for GDP per capita can't be ignored. New Zealand, below the OECD's average income levels for the last two decades, is now ranked 22nd out of 30 countries – 20% below the OECD average and about 35% below Australia (see Figure 20).

Figure 20: REAL GDP PER HOUR WORKED, 1990 - 2010, NZ$



Source: *NZ Ahead,* The New Zealand Institute, 2011, p.54.

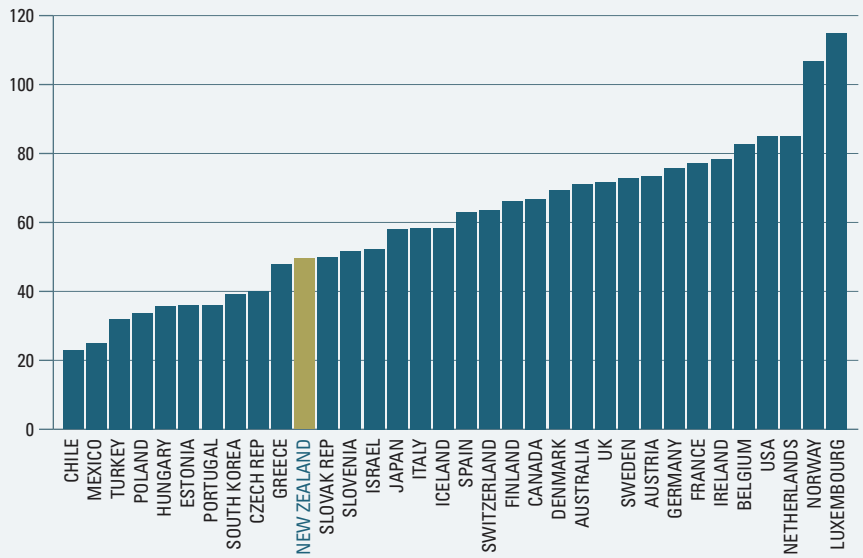
New Zealanders often talk of 'catching up with Australia'. Some commentators suggest New Zealand needs a different target. Denmark achieved US$23 billion (NZ$29 billion) in green exports in the last 15 years, largely thanks to the ability of Denmark's political parties to reach a cross-party agreement to build a green growth economy. The parties were helped by constructive partnerships with academia, and industry and business groups. New Zealand can learn from this type of agreement as we work to lift our per capita GDP.

New Zealand's productivity also continues to lag behind much of the rest of the OECD. New Zealand has not achieved a rank higher than 20 in the OECD's annual productivity rankings since 1990. Figure 21 shows New Zealand's GDP per hour worked to be below the OECD average.[56] New Zealand's productivity could benefit from value-added green growth industry.

Innovation directly lifts competitiveness and productivity and provides higher profits by increasing the value of goods and services. Patenting, a common measure of innovation, provides insight into New Zealand's innovation performance. Japan leads the way in clean energy technology patents with 4672 patents filed between 1988 and 2007. The US and Germany filed about 2500, and New Zealand just 13.[57] Many other developed nations choose to prioritise patent applications for clean energy inventions, cutting down on application waiting times and helping them 'get ahead' in the green race.[58]

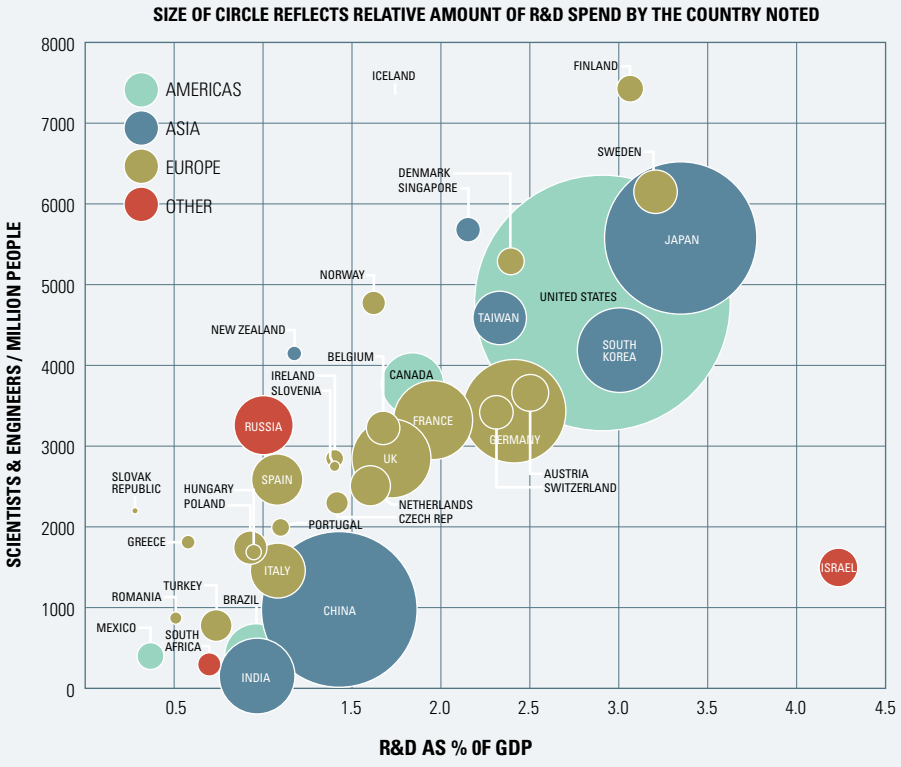
Finally, New Zealand will have to improve the quality of its infrastructure if it is to fully embrace the coming green industrial revolution. New Zealand is currently ranked 37th in the world for infrastructure adequacy,with transport stock quality and energy importation marked as key areas for improvement.[59] Finland and Denmark, previously mentioned as examples of green growth leaders, both rank in the top ten.

Figure 21: REAL GDP PER HOUR WORKED IN THE OECD, 2010, NZ$



Source: *NZ Ahead,* The New Zealand Institute, 2011, p.55.

Figure 22: WORLD OF R&D 2010



Source: The Netherlands' Ministry of Economic Affairs, Agriculture and Innovation.

PLAYING TO NEW ZEALAND'S STRENGTHS

SECTION FOUR:

Having assessed New Zealand's environmental and economic credentials, we can now offer examples of how New Zealand might build on the established benefits of (relatively) healthy environmental performance to make green growth a natural direction for future development.[61] A green growth future creates significant benefits: the countries that reduce the carbon dependency of their economies most quickly and develop carbon-friendly technologies will be the most prosperous in the 21st century. This section suggests where New Zealand's natural strengths lie and where investment in green growth would be most beneficial.

As section two of this report demonstrates, stronger economies (such as Sweden, Denmark, and the UK) are actively engaged in growing green economies and demonstrate that a mix of government, business and social engagement is essential to foster green technological innovation. Our biodiversity loss and ecosystem degradation continue to escalate, putting New Zealand's tourism business at risk. If managed properly, however, these challenges can be turned into significant new opportunities to enhance New Zealand's future.[62]

"More investment is needed, however, to build a robust system; one that meets future demand and places New Zealand on a firm path to a low carbon energy future." [60]

Nobuo Tanaka,
former executive director,
International Energy Agency

The economic and environmental benefits of moving towards a green economy are immense. However, competition for attention and funds is fierce. Countries must play to their inherent strengths. New Zealand needs to differentiate itself and identify areas where it can be a global leader as it makes the broader progression of its domestic economy. New Zealand has much to gain from this transition. In progressing to a green economy, New Zealand could:

- bolster primary export and tourism industries by responding to market pressures and premiums and by fostering the development of the Maori economy.
- develop new cleantech export niches by anticipating what will be in demand as other countries evolve their economies. This includes exporting replicable solutions (knowledge, technology, products and services) developed by addressing challenges in our own backyard.
- attract high value energy-intensive industries and greater flows of Foreign Direct Investment (FDI) and skills to New Zealand.
- create new jobs and industries in New Zealand for New Zealanders.
- create fertile ground for New Zealand to identify and exploit the as yet unknown/unknowable opportunities that may arise in the future.

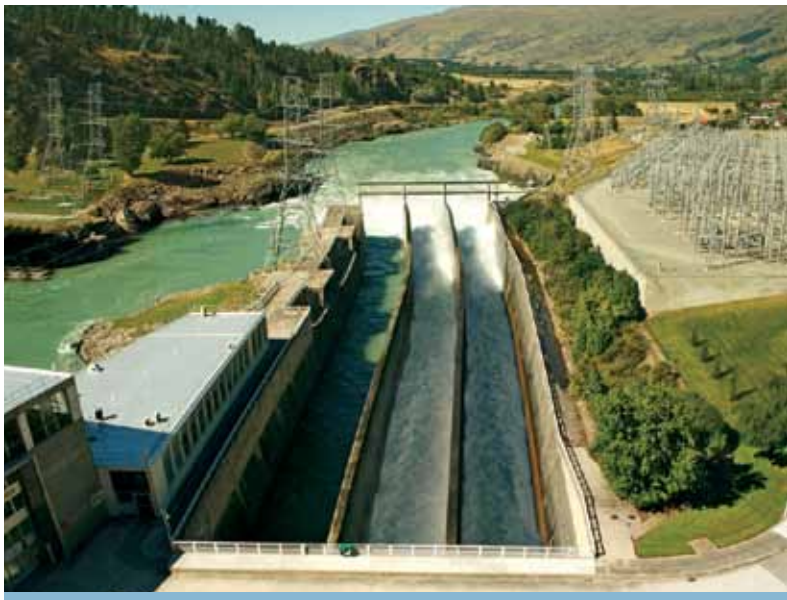
It is generally accepted that the New Zealand economy needs to perform better and shift from the mediocre performance widening the gap between our economy and our main trading partners. As the OECD notes,

Green growth would help to consolidate New Zealand's long run growth potential... The emissions trading scheme is a major development, but market-based instruments to give natural assets a value should be used more broadly.[63]

As seen in recent decades, New Zealand's potential exports of green technologies are likely to be geared towards the increasingly important Asian market. Japan, Korea, Taiwan and Singapore are of particular interest. These countries are looking to reduce their reliance on traditional fuel sources and are investing heavily in alternative energy and energy efficiency.

This is perfect for a country like New Zealand, with a clean, green competitive advantage and an FTA with China. Asian markets could provide significant opportunities, including through the delivery of efficient agricultural methods, sustainable forestry, water and waste management, clean food production, clean technology and geothermal technology.

Ultimately, the move towards green growth offers a new way of viewing the New Zealand economy. In moving towards an economy based upon energy efficient buildings, renewable energy sources and protection of our precious biodiversity, New Zealanders will be able to enjoy a higher quality of life both economically and environmentally.



THE IWI ECONOMY

"Traditionally focused on primary industry, our tribal businesses are increasingly looking to diversify portfolios: telecommunications, property, carbon forestry, digital technology and, of course, power generation. NZ Inc. is that much stronger with Maori as an integral part of it. This is our unique edge we have over the rest of the world."

Pita Sharples, co-leader, Maori Party (Feb 2012)

When considering the future of New Zealand and green growth, it is impossible to ignore the iwi economy: Maori business interests have grown since 2006 to NZ$37 billion. Maori interests cover forestry, fisheries, agriculture, processing of primary products, a large hand in tourism and an increased involvement in infrastructural assets, representing some of New Zealand's biggest growth opportunities.

Given this significant asset base, and the apparent synergy between corporate tikanga and that of green growth, an opportunity exists for government, iwi and other private investors to jointly conceive and deliver key green growth outcomes. There are already emerging examples of these partnerships but a more consolidated and coordinated approach could yield further and more rapid investment.

BIOENERGY

"The world's energy system is at a crossroads. Current global trends in supply and consumption are patently unsustainable – environmentally, economically, and socially. But can – and must – be altered; there is still time to change the path we are on." [64]

International Energy Agency,
World Economic Outlook, 2008

While renewable energy makes up 70% of New Zealand's electricity generation profile, New Zealand is a net importer of energy, primarily in the form of oil used to meet almost half of total energy needs and almost all transport needs. Oil and gas are also critical feedstocks for industry and agriculture. Gas, for example, is used to make fertiliser.[65] The Government has identified energy security as a key goal, and the responsible development of New Zealand's offshore carbon intensive oil and land based mineral reserves as a priority.

New Zealand has already seen several examples of energy companies investing in bioenergy infrastructure. While the wood processing industry is one of the largest users and producers of bioenergy (45 PJ per annum) in New Zealand, consuming around 7% of total biomass residue, there is still low domestic demand for wood pellets. These are instead exported to meet Europe's growing demand for woody biomass.

There is substantial potential for biomass use in New Zealand. Large volumes of woody residues are left in NZ forests following logging – two million tonnes in 2011, a figure that is expected to rise to five million tonnes (32 PJ) by 2025.[66] Studies indicate production of bioenergy could increase substantially if marginal land is used for forestry planting.[67] Infrastructure (residue transport and thermal generation plants) and limited uptake of district heating systems (despite space heating comprising 34% of current domestic energy use) mean there are many bioenergy opportunities yet to be exploited.

ENERGY EFFICIENCY IN THE BUILT ENVIRONMENT

Increasing the efficiency of buildings is 'low hanging fruit' for greenhouse gas (GHG) abatement as domestic energy consumption accounts for 34% of total generated electricity.[68] New Zealand's built environment shows how easy it is to become 'locked in' to carbon intensive development, making it more difficult to achieve necessary and timely emissions reductions.[69]

Most of the developed world (and increasingly the developing world) recognises the opportunity that improvements in the built environment offers for carbon emission abatement. Despite progress – for example, a total of 343,000m^2 of office space (11.4%) is undergoing Green Star NZ certification – New Zealand is falling further behind all our major trading partners in building energy efficiency.[70]

Table 4:
INTERNATIONAL BUILDING ENERGY EFFICIENCY STANDARDS

COUNTRY	STANDARD
China	All new buildings expected to reduce energy use by 65%
UK	All new schools zero carbon by 2016, all public sector buildings by 2018, all new buildings by 2019
Australia	Australia's Building Energy Efficiency Disclosure Act 2010 requires sellers or lessors of office space of 2000 m^2 or more to obtain and disclose an up-to-date energy efficiency rating.
Singapore	80% of buildings green by 2030, all new government buildings must achieve Greenmark platinum, and all existing buildings with central HVAC must achieve Greenmark gold.
USA	Commercial Buildings Initiative (CBI) - zero-net energy for all newly constructed commercial buildings by 2030, 50 % commercial stock by 2040, and all US commercial stock by 2050. LEED (US equivalent to GreenStar) rating scheme uptake in most states. Economic recovery package included US$4.5 billion to green federal buildings. Cutting federal energy bills.

SUSTAINABLE EFFICIENT AGRICULTURE

New Zealand boasts a world-leading ability to add value to agriculture. New Zealand's ability to counter the unsubstantiated food mile and energy use claims surrounding our primary exports only enhances our reputation as a highly efficient food producing nation. Fonterra, the world's largest dairy company and New Zealand's largest private sector investor, has invested in innovation centres in New Zealand, Australia, China and Singapore. These innovation centres are dedicated to developing technologies in a broad range of sectors including forage and bovine genetics, nutrition, flavours, texturants and packaging materials.

This research is sought after around the world to replace less efficient farming systems. One only has to look to the US to demonstrate the large size of this market and the opportunities it offers. In the US alone, the market for New Zealand's export of rotational grazing technology is potentially four times larger than the entire New Zealand market.

New Zealand also leads a major effort to understand the mechanisms of methane production as part of the Global Research Alliance on Agricultural Greenhouse Gases (see box). The Alliance's work is based on New Zealand's own Pastoral Greenhouse Gas Research Consortium (PGGRC) and Agricultural Greenhouse Gas Research Centre (NZAGRC) work programmes. New Zealand co-leads the world with the Netherlands in livestock research – work that is critical to delivering solutions to ruminant methane emissions and, in the short term, to mitigating the risks of emission related trade barriers for New Zealand's dairy sector. This type of work is critical to New Zealand's Pure brand as it brings significant opportunities to export skills, intellectual property and green services.

Dairy co-products also provide New Zealand with an opportunity to add value to our exports without further degradation to the environment. For example, New Zealand has become a world leader in adding value to its agriculture through colostrum. This is the type of export where New Zealand can add value without any increased environmental effects and yet still derive substantially more value. It is not only the dairy sector where New Zealand companies are getting ahead with biologically active products. The bioactive Manuka honey export industry is already worth NZ$100 million and is set to increase rapidly.[71]

THE GLOBAL RESEARCH ALLIANCE ON AGRICULTURAL GREENHOUSE GASES

The Global Research Alliance on Agricultural Greenhouse Gases is a transnational organisation, with more than 30 member countries, that seeks to improve the efficiency of food production and minimise associated carbon emissions. Currently, agriculture is responsible for 14% of the world's carbon emissions – a figure projected to rise to 30-40% on 2005 emission levels by 2050 as global demand for food increases.[72] By finding ways to improve agricultural productivity and increase soil carbon sequestration, the Global Research Alliance can help reduce carbon emissions and feed the planet's growing population. It is a perfect example of a suite of intellectual agricultural technologies presenting a significant opportunity for New Zealand. The bioscience industry employs 1900 people (57% holding Bachelor's degrees or higher), generated 370 new patents in the two years ending June 2011 and generated NZ$677 million in income in 2011 – with 56% of this figure (NZ$376 million) coming from exports.[73] If New Zealand continues to focus its attention towards the strategic development of this intellectual property, an even bigger industry and export market could emerge.

GEOTHERMAL

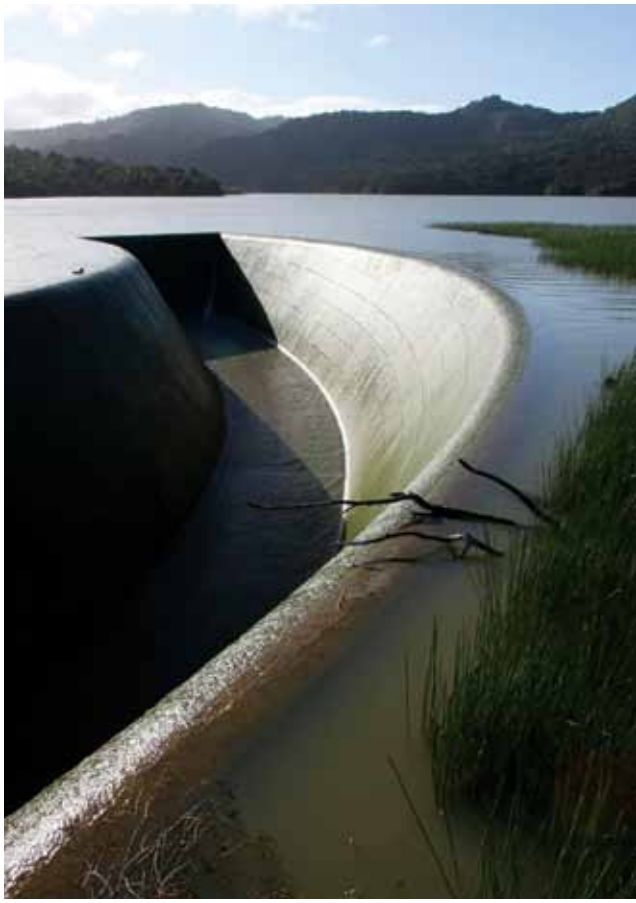
New Zealand geothermal operators are world leaders. Two New Zealand companies, Mighty River Power and Contact Energy, rank in the top ten geothermal companies in the world in terms of installed capacity. New Zealand can look to Iceland as a perfect example of how, as a result of extensive geothermal investment, a country can emerge as a global leader in geothermal technology.

There are already some examples of where New Zealand companies might succeed. Mighty River Power has started a global strategy to export key geothermal institutional capabilities (academic, scientific, project development, business operations) already developed in the New Zealand market. Global opportunities in the geothermal energy industry are growing fast. Mighty River Power is committing US$250 million to GeoGlobal Energy to develop a geothermal development pipeline in an example of renewable energy partnerships at work. GeoGlobal Energy, in return, helped Mighty River Power secure a number of prospects, including in emerging geothermal nation Chile and in the US.

Table 5: TOP TEN GLOBAL GEOTHERMAL OPERATORS

	COMPANY	COUNTRY OF OPERATION	INSTALLED CAPACITY
1	Chevron	Indonesia, Philippines	1273
2	PNOC-EDC	Philippines	1163
3	CFE (Comision Federal de Electricidad)	Mexico	785
4	Calpine	US (Geysers)	725
5	Enel	Italy, United States	678
6	Ormat	United States, South America, Africa, Philippines	388
7	Mighty River Power	New Zealand	385
8	Terra-Gen (Caithness)	United States	347
9	Contact Energy	New Zealand	280
10	NCPA (Northern California Power Association)	United States	220

Source: Ministry of Foreign Affairs and Trade.



WATER MANAGEMENT

As world water scarcity becomes increasingly important, New Zealand can become a world leader in ways to conserve water through water management technology. New Zealand water management companies are already making headway. In 2009, New Zealand companies made 18 deals (across the world) worth NZ$45 million. Traded technologies ranged from automated irrigation and crop yield enhancing technologies to physical water quality monitoring, various smart water technologies and water saving appliances.

A lack of targets for nutrient flows is holding back the uptake of solutions for nutrient discharge management, such as inhibitor development and nutrient management plans. Proper targets must come from the government. New Zealand is missing an opportunity to use knowledge it already has towards freshwater quality gains. This is unfortunate, as those two technologies are increasing productivity in the dairy sector at an estimated NZ$180 million and NZ$330 million respectively per year.[74]

BIOFUELS

Production of alternative carbon neutral liquid fuels, such as biofuels, could help reduce New Zealand's exposure to international oil supply disruptions and impact positively on New Zealand's balance of payments. While the first generation of biofuel production is criticised for using almost as much fossil fuel as the energy it produces, a cleaner and more efficient generation of biofuels is emerging. Second generation biofuels have the potential to act as a net sink for GHGs. The IEA estimates these types of biofuels are profitable once oil prices top US$100 (NZ$127) a barrel, something likely to become a permanent feature of the world economy.

Scion, a New Zealand Crown Research Institute (CRI), estimates it is technically feasible to provide 100% of New Zealand's liquid fuel needs, 100% of New Zealand's heating needs and 85% of New Zealand's electricity through biofuels. This scenario involves planting an extra 1.8 million hectares of forest on marginal land as it becomes available over the next 25 years.[75] This would help with our economic base and energy security, and help sequester 500 million tonnes of CO_2.

The production of liquid biofuels is still a fledgling industry in New Zealand, contributing less than 1% of total fuel production in 2009, but there is significant scope to expand. The current New Zealand Biodiesel Grants Scheme is not as effective as it could be and does not have a sufficiently long term strategy to encourage investment in production facilities.[76] Sweden offers an example of a positive way forward. Sweden is targeting the commercialisation of second generation technologies, such as cellulosic ethanol, with a US$95 million (NZ$121 million) stimulus package spread over the next three years. New Zealand, which currently has over five million tonnes of unrecovered biomass, is well placed to take part in global research exploring opportunities in bioenergy conversion technologies.

There is the chance to seek bio-alternatives to fossil fuel based products. Countries such as Denmark are looking into ways to create bio-alternatives to high-value fossil fuels.

SMART GRID

Smart grids are digitally enhanced electrical grids that can make the grid more intelligent by gathering, distributing and acting on information gained from its users. This helps to improve the efficiency, cost and reliability of electricity generation. It is also a crucial component of maximising the potential of renewable energy and electric vehicles. The OECD has found that smart grid development will help countries reduce projected peak demands between now and 2050 by 13% to 24%.[77]

While New Zealand's expertise can contribute significantly to smart grid development, it is not being fully exploited. New Zealand's major problem is the lack of a national smart grid infrastructure blueprint.[78] Providing one will require a long-term strategic approach by both government and the private sector. As smart grids take five to ten years to implement, the government will need to pursue a long-term strategy that encourages private sector action.

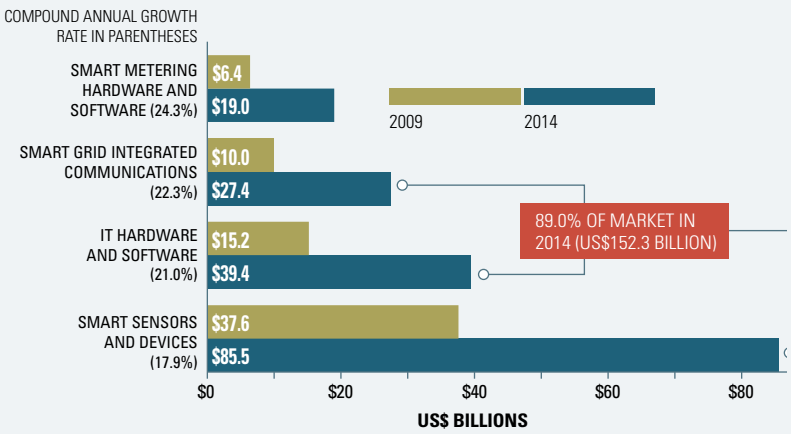
New Zealand has much to learn from other countries' experiences. Australia will soon launch an AU$100 million (NZ$128 million) government funded smart grid/smart city project. The project aims to connect 10,000 households and will join with the new national broadband network. As part of the US' economic stimulus package, the Obama administration committed US$20 billion (NZ$25 billion) for smart grid and related infrastructure investments. The EU made €3 billion (NZ$4.9 billion) available for smart grid developments. Korea is also investing high levels in smart grid R&D.

"Expected future increases in electricity demand will create a substantial economic case for smart technology in New Zealand."

Professor Goran Strbac, Electrical Energy Systems, Imperial College London

Smart grid development presents major opportunities that extend beyond utilities, energy producers and investors. Devices, hardware, software and communications equipment are expected to comprise 89% or US$152.6 billion (NZ$194 billion) of the global smart grid market in 2014. New Zealand's manufacturing industry could benefit from this incredible growth.

Figure 23: PROJECTED GLOBAL SMART GRID MARKET BY TECHNOLOGY



Source: *Smart Grid: Hardware and Software Outlook*, Zpryme Research and Consulting, 2010, p.2.

ELECTRIC VEHICLES

Electric vehicles (EVs), already available in many international markets, are highly likely to expand their market share within the next five years. Farsighted governments around the world are supporting EV ecosystem development with US$15 billion (NZ$19 billion) already directed towards vehicle subsidies and support for battery manufacturing and infrastructure.[79]

New Zealand's renewable electricity generation has, according to our Energy Efficiency and Conservation Authority (EECA), enough spare capacity in the national grid during off-peak times to recharge all New Zealand's cars if they were to be replaced by electric models. This is a major opportunity to reduce our dependency on imported oil.

New Zealand is not, however, keeping pace with other countries' investments in EV infrastructure or driving demand for the EV market. South Korea is aiming for a 10% market share for EVs in its small car market by 2020 and is doing so by rolling out significant electric vehicle infrastructure. In New Zealand, EVs are exempt from road-user charges until 2012 but there are currently only a small number of such vehicles in the country.

BIODIVERSITY

The importance of biodiversity to New Zealand cannot be overestimated.

Tourism generates NZ$20 billion for New Zealand's economy and contributes 18% of our export earnings. This equates to 9.2% of our GDP and 1 in 10 jobs.[80] The number of visitors to New Zealand annually is projected to rise to 2.9 million by 2016. These are numbers that we cannot ignore. New Zealand's green image is the key to this success. We've seen, however, New Zealand's Pure brand may be under fire. If it fails to keep its clean, green image, we may miss out on the burgeoning industry of ecotourism.

Ecotourism provides an opportunity for the long term protection of New Zealand's resources while at the same time encouraging innovative green growth. The importance of having sustainable tourism is growing. Ecotourism is worth US$30 billion a year and is growing by 30% a year.[81] According to a survey by the Travel Industry of America, 38% of American travellers would pay more to use travel companies that strive to protect and preserve the environment. American visitors spend almost NZ$450 million in New Zealand each year.[82]

For the New Zealand tourism industry it is of upmost importance to keep the environment in premium condition. The Ministry of Economic Development (MED) estimates that those tourists who come here for nature-based tourism stay longer than other tourists and spend more on average per trip to New Zealand (NZ$3,040 versus NZ$2,680).[83] These are the type of high-value tourists we need to encourage to return and to tell their friends back home how New Zealand really does live up to its 100% Pure branding.

Australia's efforts to embrace ecotourism offers insights for New Zealand. Australia has made efforts to promote the right regulatory framework and has provided the necessary long term commitment to ecotourism that the industry needs to invest with confidence. Similar to New Zealand, nature-based tourists to Australia spend more than other tourists per visit (AU$5,898 versus AU$3,614) as well as spending longer in the country (42 nights compared to 21 nights).[84]

In 2011, the Queensland Government, in conjunction with the tourism sector, provided a perfect example of long-term strategy and leadership when they launched the widely praised Tourism in Protected Areas (TIPA) initiative. TIPA was designed to provide a pathway to make all Queensland's tourism sustainable, achieve best practice for maximum economic gain and to provide certainty for industry so as to foster long-term investment.[85]

AQUACULTURE

New Zealand, as an isolated island, has abundant marine wildlife and associated industry knowledge. The rise of aquaculture offers opportunities for New Zealand. In the past 30 years, aquaculture in New Zealand has grown from very small beginnings to a significant primary industry, with worth currently estimated in excess of NZ$380 million and with a target goal of reaching NZ$1 billion in sales by 2025.[86] Sustainable aquaculture has the potential to make a significant contribution to New Zealand's economy. The industry currently employs over 3,000 people and this figure is expected to increase significantly in coming years.

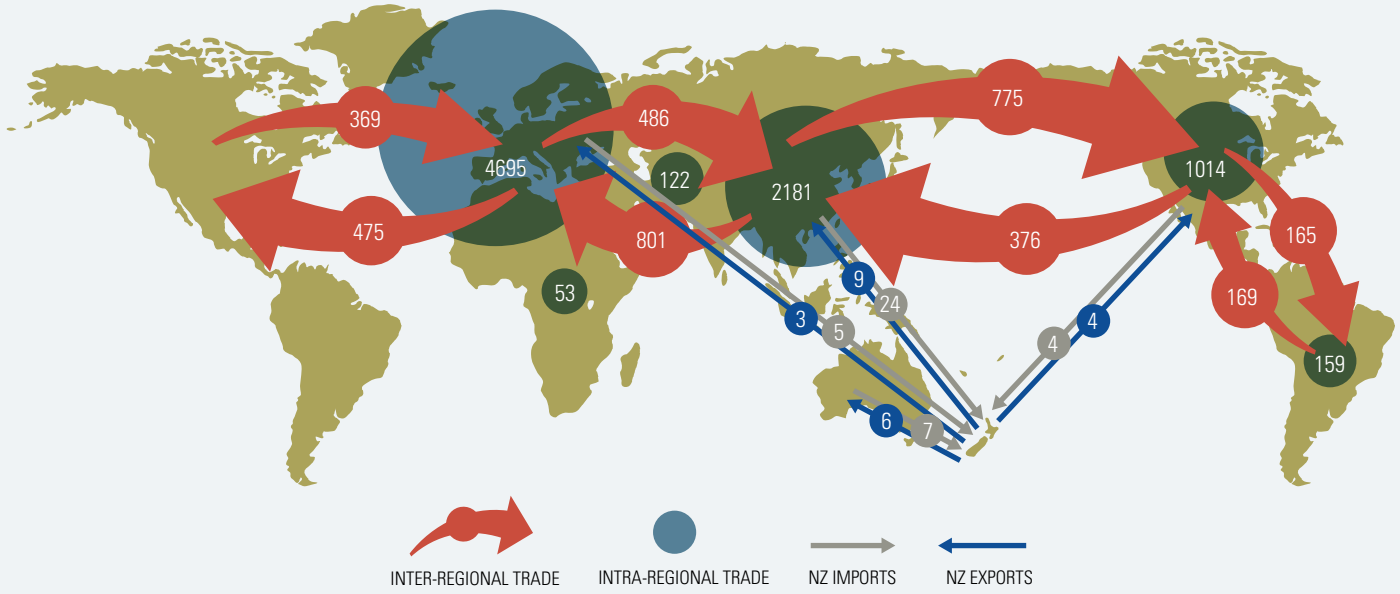
The aquaculture sector is the world's fastest growing seafood sector. The Food & Agriculture Organisation (FAO) predicts global demand for seafood will almost double from 45 to 85 million tonnes by 2015.[87] Aquaculture is expected to increase from 42% to 58% of global seafood production by 2020.[88] Fish farming has drawn criticism because for every kilogramme of fish production up to 10kg of feedstock (often in the form of bycatch) is required. It may be possible to address these issues through the development of algal proteins as a feedstock.

New Zealand's aquaculture produce is currently exported to 79 countries.[89] An industry drive, supported by the Government, for new species development is supporting the sector to move towards new, high-value species and value added products. New Zealand's quality assurance programme for shellfish is recognised as one of the strictest in the world, giving us a world-leading edge in terms of consumer perception.[90] New Zealand is also unique in that it does not use antibiotics, pesticides, growth enhancers or vaccines in salmon farming practices.

The high quality of New Zealand's coastal waters, their abundance of plankton and prevalence of sheltered harbours and inlets create ideal conditions for shellfish aquaculture. While some aquaculture fisheries have come under fire for environmentally degrading practices, a Ministry of Agriculture and Forestry (MAF) survey of the New Zealand industry in November 2011 found no significant environmental problems.[91]

LEAN MANUFACTURING & THE CLEAN, GREEN SUPPLY CHAIN

Figure 24: GLOBAL INTERNATIONAL TRADE FLOWS - $US BILLIONS

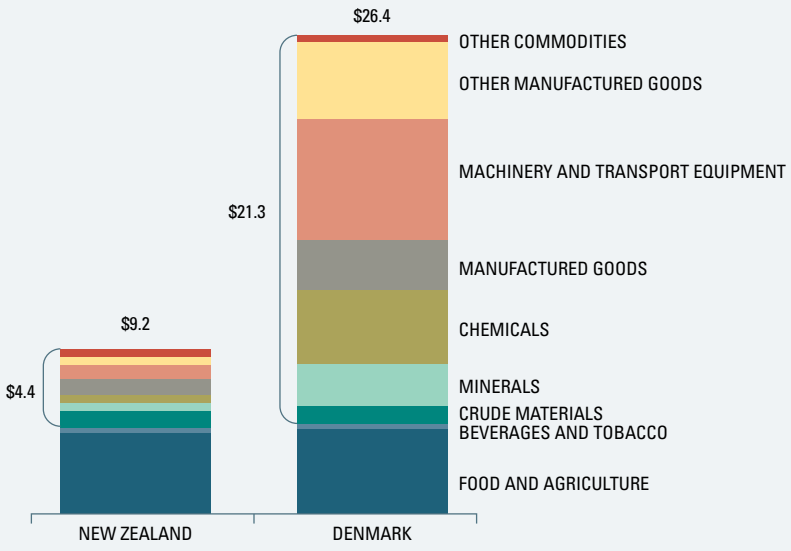


Source: Rockpoint, 2010

New Zealand's size and distance from major markets is well recognised. The OECD estimates New Zealand's distance to world markets acts as a 10% penalty on our GDP. Shortening the logistics chain and getting goods faster and more efficiently to market is therefore essential. Producing higher value products helps offset this. Figure 25 demonstrates how Denmark has been able to increase its export base through the export of high-value manufactures;[92] Figure 26 shows the continued dominance of agricultural produce in New Zealand's export profile.[93]

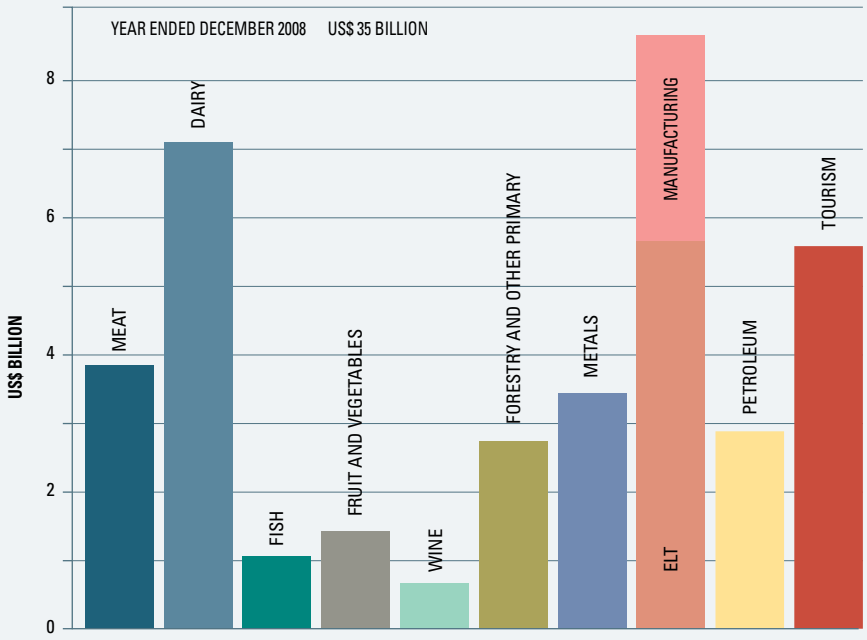
At present, the value of each tonne that New Zealand transports is relatively low – some NZ$1,500 per tonne compared to NZ$3,200 per tonne in the US.[94] One way to reduce the freight burden is to move along the production chain and produce more highly processed products. New Zealand does, however, have a relatively strong manufacturing base with 57% R&D investment.

Figure 25: EXPORTS PER CAPITA, 2009, NZ$000s



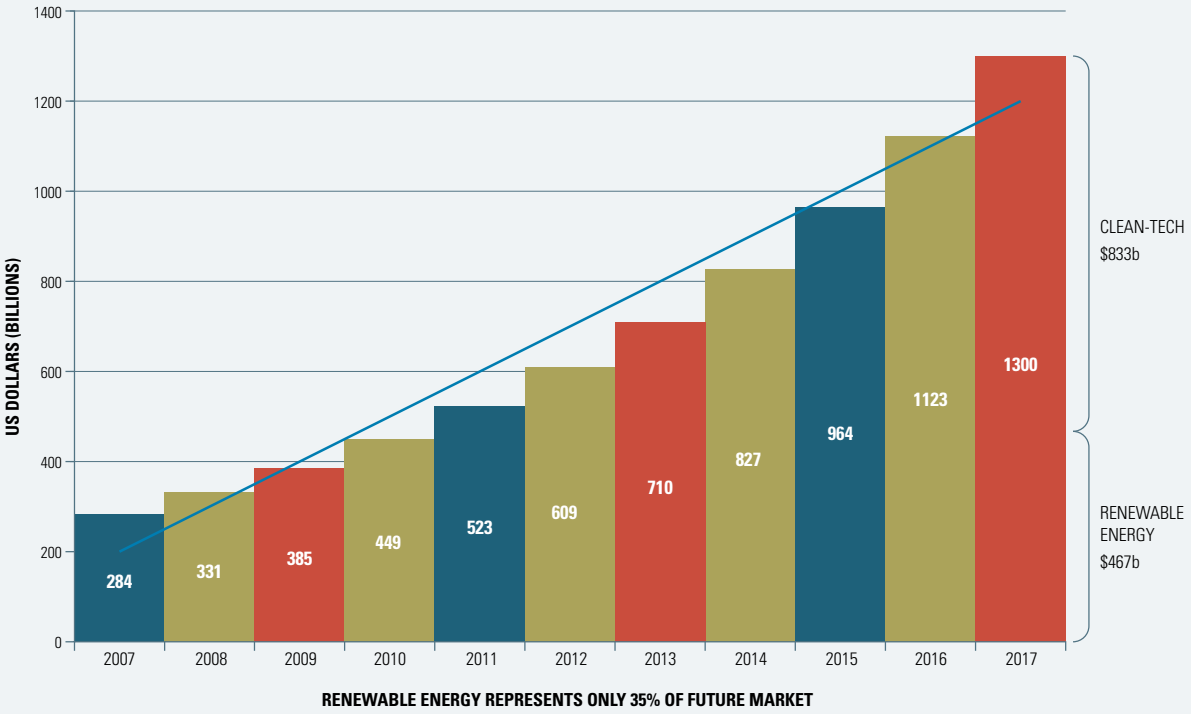
Source: *A Goal is Not a Strategy: Focussing Efforts to Improve New Zealand's Prosperity,* The New Zealand Institute, 2010, p.32.

Figure 26: FOREIGN EARNINGS (US$ BILLION)



Source: *Global New Zealand: International Trade, Investment and Travel Profile,* The Ministry of Foreign Affairs and Trade, 2008.

Figure 27: THE ESTIMATED GLOBAL MARKET VALUE FOR CLEANTECH PRODUCTS AND SERVICES



Source: *Cleantech Opportunities in South Australia,* Australian Cleantech, 2010, p.6.

GREEN CERTIFICATION

Given New Zealand's existing clean, green brand, many New Zealand companies could benefit from green certification. The Consumer Goods Forum (CGF), a key influencer of retailers including Tesco, Unilever and Walmart, has a strong focus on sustainability and efforts to reduce GHG. The CGF has introduced carbon labelling for over 70,000 products worldwide.

Carbon neutral certification for export producers limits the risks of not meeting these increasingly stringent requirements in overseas markets. This will be increasingly important for New Zealand companies as governments around the world begin to enact legislation in response to climate change. Secure access for New Zealand's agricultural and horticultural produce to UK markets alone is worth over NZ$1 billion.[95] One economic analysis conservatively estimated the value of certification to the New Zealand Wine Company at over 15 times its investment in earning that certification.[96] Increasing export returns for a carbon neutral kiwifruit industry are estimated at over NZ$76 million.[97]

New Zealand's certification systems have gained international accreditation and products have been successfully licensed for use in other carbon markets.

The UK, as a leader in carbon financing and trading, aims to lead the development of the emerging green certification industry.

In the US, the market for products with green certification is huge and expanding rapidly.[98] One of the largest supermarket chains, Whole Foods, stocks its shelves with organic, fair-trade and carbon neutral foods.[99] Whole Foods is one of the biggest supermarket retailers in the US and consumer demand for such goods caused a huge spike in profits and store numbers. In 2009, Whole Foods became the first US retailer to be certified organic and benefited from the process.

WHOLE FOODS

In 1980, Whole Foods consisted of a single store in Austin, Texas, employing 19 people. Today, it has over 310 locations in the US and UK and employs more than 62,000 people.[100] It was the first certified organic grocer in the United States and in 2010 sold in excess of US$9 billion.[101] Whole Foods' success is rooted in their values-driven philosophy, which is exemplified in their declaration of interdependence. This manifesto lays out the core beliefs behind the company, including a commitment to selling the highest quality natural and organic products available. This values-driven philosophy helped Whole Foods carve out a niche in a mature market, by appealing to the conscious or ethical consumer. This is an important trend in first world markets and represents a real export opportunity for New Zealand's green food producers.

Whole Foods also invests in renewable power sources, including by purchasing renewable energy credits, fitting sixteen retail locations and a distribution centre with solar panels and using biodiesel powered vehicles in their transport fleet.[102] While retrofitting stores to improve energy efficiency is a considerable investment (US$10 million in the 18 months from March 2012), Whole Foods asserts that, on average, savings in energy costs mean this cost of investment is recovered within two years.[103] Further, 28% of people aged 20-24 were found to base purchasing decisions on ethical beliefs .

NEXT STEPS

SECTION FIVE:

THE ROLE OF GOVERNMENT

Governmental levers to stimulate market activity fall into two broad categories: legislative, where changes in statutory requirements serve to direct or encourage market action, and fiscal, which includes direct financial incentive to encourage market activity in a specific sector. China and California provide examples of these two methodologies in a green growth context. The two countries took quite different but ultimately successful approaches to stimulating domestic clean energy solutions and associated technologies.

In reaction to a sharp drop in GDP in 2008, China's government developed a stimulus package to inject US$586 billion or NZ$745 billion (13.4% of US' GDP) into its economy over two years. According to the OECD, 40% of this was directly invested in green growth, making it the largest green stimulus package globally.[104] The investment focused on developing low carbon infrastructure, particularly through high speed railway lines and grid modernisation projects (38% of total spending)[105] and was spread almost equally across bank lending, local and central government. Besides public investment, growth in green sectors in China is supported through adoption of green targets and standards. Prior to the global financial crisis, the Chinese government projected green investments of US$220 billion (NZ$280 billion) or about 1.35% of GDP in its 2006-2010 five-year plan.[106] In its latest five-year plan, its 12th, China has further ramped up investment in smart grids, energy efficiency, green buildings and low emission transportation.

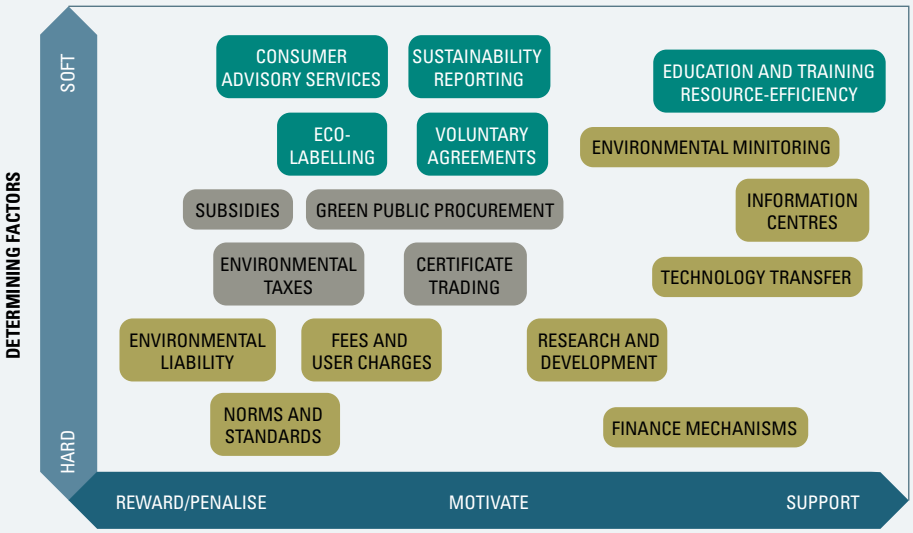
Investments in energy conservation and renewable energy amount to US$71 billion (NZ$90 billion) and US$214 billion (NZ$ 272 billion) respectively. Chinese investment in energy efficient buildings is expected to reach US$214 billion (NZ$272 billion) by 2020. In addition, the renewable energy sector is expected to generate at least US$118 billion (NZ$150 billion). Energy consumption should be cut from 1.22 tonnes of standard coal to 0.98 tonnes by 2010 and the renewable energy share should be raised to 10% of total commercial energy use.

California implemented its first environmental policy legislative measures in 1947. Its green growth strategy since then is largely focused on energy efficiency. A study at the University of California, Berkeley concluded California's energy efficiency comparative advantage has generated US$56 billion (NZ$71 billion) in net economic benefits since 1972.[107] In 2008, California released a long-term energy efficiency strategic plan of aggressive targets to meet the state's GHG reduction goals. This plan is set to create between 15,000 and 18,000 jobs and rebrands energy efficiency as normative behaviour rather than crisis response.[108] California's case shows that strong government leadership and ongoing investment in clean technology can create real economic benefits in sustainable industries without direct financial stimulus.[109]

A strategic willingness by government to induce change is important in the implementation of green growth. Such willingness is not readily apparent in New Zealand, nor is there a track record of direct funding to industry. There are, however, isolated examples in New Zealand of industry-specific incentives, through the manipulation of taxation and other statutory hurdles, leading to economic benefits.

Several Asia-Pacific countries including Japan, the Republic of Korea and Thailand have already successfully enlarged markets for environmentally friendly products and services through policies such as green public procurement and eco-labelling. The experience of these countries offers positive insight into the direction New Zealand could go.[110]

Figure 27: GREEN INDUSTRY POLICY MATRIX



Source: *Promotion of Green Industry for Green Growth,* United Nations Economic and Social Commission for Asia and the Pacific, 2009, p.12.

NEW ZEALAND'S BUSINESS GROWTH AGENDA (BGA)

The Government's Business Growth Agenda (BGA) focuses on six core areas, including:

- capital markets
- innovation and ideas
- skilled and safe workplaces
- natural resources
- infrastructure (including electricity, broadband, transport)
- export markets

Part of the current growth agenda includes a clearly stated mandate to expand the exploitation of natural resources, such as coal and oil. These are largely considered 'dirty industries', as they involve unsustainable extraction of finite resources, large scale industrial production and high emissions intensity.

It's not only environmental issues that arise from this: the economy can be seriously distorted too. One only needs to look at the difficulties that Australia faces. The development of the 'two-speed' economy – one based upon dirty commodities and one based upon the rest – has undermined Australia's value-added manufacturing exports. Australia's manufacturers are struggling to compete internationally due to a high Australian dollar, a strength driven largely by the booming commodities sector.

Successive governments have assumed that various aspects of these dirty industries can over time be 'greened' to create more benign environmental outcomes. Commentators also argue that industries such as mining and oil are 'must haves' for any economy. If New Zealand is to increase the economic significance of intrinsically 'dirty' activities, albeit in a 'greener' way, this raises several key questions:

- Which criteria were used to conclude that further investment in dirty industry is the best long-term strategic outcome for New Zealand? Were these criteria solely economic or did they include purposeful consideration of local, regional and global environmental issues and obligations? Did the economic evaluation include the cost of path dependency and the consideration of the possible need for retrenchment of these industries in future?
- Which low carbon or green growth options were considered and on what basis were they excluded?
- What is the difference between New Zealand's 'must have' requirement for oil and mineral extraction and the point at which the country is simply exploiting the resource because it is available?
- Is the greening of dirty activities sufficient to maintain a 100% Pure status? Is it sufficient for New Zealand to be green at some things but not green at others?

"Faced with low growth, high unemployment and weakened public finances countries need to pursue new sources of growth to put the global recovery back on track. Green growth can help. With the right policies to encourage innovation and stimulate new markets, it can boost productivity, spur growth and jobs, and change our behaviour as consumers. Green growth can also mobilise revenues in ways that do not undermine the economic recovery, while eliminating wasteful and environmentally harmful spending."

Angel Gurría, Secretary-General, OECD

By recognizing the subtle yet significant difference between 'greening existing growth' and 'green as a new source of growth', we are better equipped to compare and consider alternatives. For example:

Table 6: COMPARING ALTERNATIVES FOR DOMESTIC LIQUID FUEL PRODUCTION

GREENING EXISTING GROWTH			GREEN AS A NEW SOURCE OF GROWTH		
INITIATIVE	UPSIDE	DOWNSIDE	ACTIVITY	UPSIDE	DOWNSIDE
Lignite used as a feedstock for the production of diesel oil using the Fischer-Tropsch process.	Domestic production of diesel improves energy security and balance of trade while creating new industry jobs.	High carbon intensity creates uncertainty in long-term production costs. High capital cost locks New Zealand into long-term high-carbon pathway. Affects our international reputation and brand.	Woody mass from plantation forestry used as feedstock for biofuel production.	Domestic production of carbon neutral liquid fuel that is consistent with long-term low carbon trends improves energy security and balance of trade, while providing new industry jobs. Combination with other high value uses of woody mass such as bio-adhesives.	High capital cost.

MISSED OPPORTUNITY: THE GREEN GROWTH ADVISORY GROUP

There is little evidence of serious consideration by government of alternative economic growth options, in particular, it seems, those associated with anything 'green'. The Government's Green Growth Advisory Group (GGAG) appeared to be a useful forum to reconsider the strategic direction of New Zealand's economy. Under tightly controlled terms of reference, GGAG released its recommendations in March 2012, with a focus on practical and low cost activities for 'greening' New Zealand's growth.

Some of the recommendations may ultimately contribute to the welfare of the environment, yet there is a sense that, by heavily restricting the GGAG's terms of reference, the Government missed an opportunity to explore new forms of economic growth and instead used the GGAG process to mildly green business as usual. As an economic commentator noted,

"The government gave an impossible task to the Green Growth Advisory Group […] to make the Economic Growth Agenda a touch greener. As a result, the group has come up with 26 recommendations. Some are good but will likely be hijacked or ignored by the government; some are vague; and some are outright bad." [111]

It is not all bad news. Environmental regulatory reform endorsed by the Government, such as the Land and Water Forum, indicates acceptance of the need to address key issues in a timely and thorough manner. Similarly, the GGAG process demonstrated a willingness to begin creating some understanding of the issues. It would be wrong to say the Government has made no progress in growing the green economy, and the box below illustrates some of the progress made.

THE GOVERNMENT HAS:

- Set a target for net 2050 levels of emissions at 50% of gross 1990 levels.
- Established a domestic Greenhouse Agricultural Research Centre.
- Hosted an Asia-Pacific workshop on carbon markets and an international workshop on monitoring, reporting and verification (MRV).
- Committed NZ$347 million to insulate 188,500 homes.
- Committed NZ$1.6 billion to upgrade and electrify Auckland's rail supply.

THE CARBON WAR ROOM

The Carbon War Room (CWR), a global nonprofit organisation founded in 2009 by successful entrepreneurs including Sir Richard Branson, aims to create market-based solutions to problematic climate change. The philosophy behind the organisation is that, while policy is important in addressing any issue, "true progress is rarely made by policy makers but instead led by visionaries who see opportunities that others have missed".[112]

CWR projects include efforts to improve energy efficiency in the shipping industry, encourage the retrofitting of homes and businesses to improve their energy efficiency and develop renewable jet fuels.

Retrofitting shipping vessels to improve efficiency could reduce associated emissions of carbon and other pollutants by 30% and reduce fuel costs by US$70 billion per year.[113] CWR has engaged with www.shippingefficiency.org on a framework for shipping industry eco-labelling. This service rates the efficiency of about 60,000 vessels and allows customers of the shipping industry to make informed decisions on the carriers they use.[114]

THE ROLE OF CORPORATES

International examples show green growth is most successful when delivered through a structured partnership programme between industry and government. What is the role of industry in the development and rollout of a national green growth strategy?

It is clear that SMEs are too financially constrained and inexperienced to invest in large scale projects. Therefore it is important that New Zealand's large corporate entities take a key leadership role.

The potential commercial and strategic benefits for corporates willing to take a leadership role in New Zealand's green growth are huge and may include:

- A significant and robust long term competitive advantage.
- Improved profitability and financial performance.
- Greater insight into and preparedness for future emissions and environmental policy changes.
- Greater preparedness for market access restrictions which relate to emissions and environmental performance.
- Activation of previously unrecognised innovation potential.
- Discovery of new market opportunities not previously considered.
- Stronger relationships with key suppliers and stakeholders.
- A credible basis for assuming a sustainability leadership position in their industry.

WORKING WITHIN THE FRAMEWORK WE HAVE

While the possibility of future governmental support remains, there is a need to be realistic about how developed the green growth business case actually is. At this point, we can only cite international examples and provide anecdotal suggestions as to where New Zealand's long-term economic advantage lies. There is a clear need for more coordinated thinking and research into our green growth strategy.

The Government is maintaining its commitment, in the context of a weak economic recovery, to a wide ranging programme of macroeconomic reforms, alongside the implementation of mixed ownership for public infrastructure assets and a leaner public services programme. These activities aim to balance the books by limiting expenditure and reducing debt.

DEVELOPING A GREEN GROWTH STRATEGY

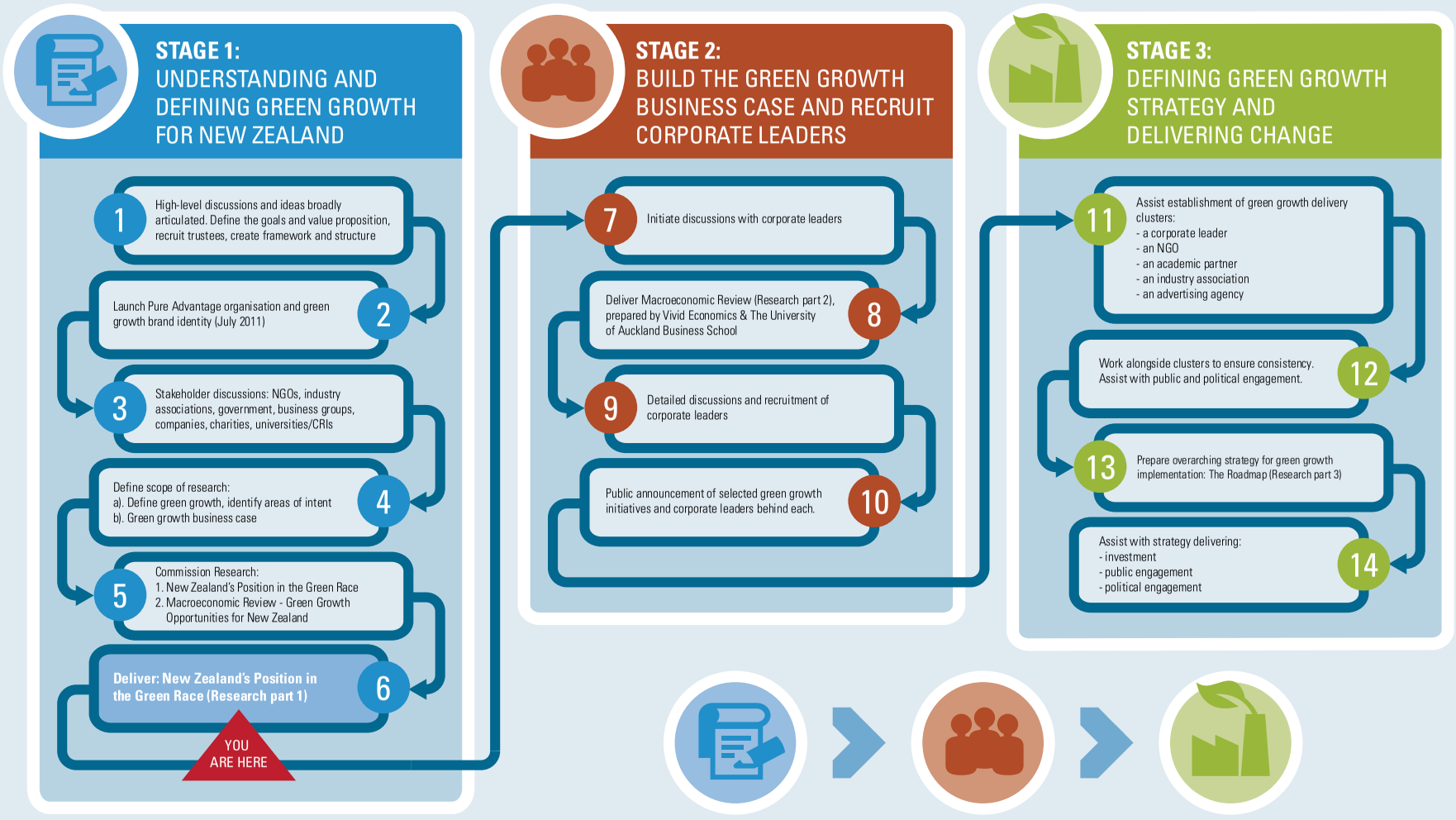
Pure Advantage has developed a series of core assumptions regarding green growth in New Zealand:

1. Green growth is a concept that is sometimes poorly conveyed to and often poorly understood by businesses, government and the public. New Zealanders generally share a strong ethos and emotional connectivity towards preserving environmental quality. Without being specific about what green growth actually means though, long term and complex environment and economy issues don't register highly, as they must compete with other important issues in people's lives such as personal income, tax, crime and health.
2. By extension, policy makers and government advisors perceive a lack of support for green growth.
3. Implementation is complex and requires a unique and detailed set of policies and ideas for each country.
4. There is uncertainty about the required investment and financial outcomes associated with some green growth initiatives. This does not remove the need for further investigation and strategy. Instead, it implies the need for a more cautious approach coupled with industry/government partnership.
5. Pure Advantage does not anticipate extensive government investment in green growth in the foreseeable future. Industry is therefore best placed to take a leadership role as it has the largest financial imperative and the greatest ability to invest.
6. Given there is some interest by government, and assuming green growth as a source of economic prosperity will increase over time, government may be willing to remove policy roadblocks and provide incentives if industry leaders demonstrate a willingness to invest.

UNIQUENESS

It is important to emphasise the need to develop a unique green growth strategy for New Zealand. The traditional view of economics considered environment and economy as two discrete items. Today we recognise their intrinsic interdependency. International green growth strategies largely revolve around the substitution of carbon-intensive energy generation with renewables. As our electricity generation is already dominated by renewable energy, New Zealand can't expect to simply replicate the green growth activities of other nations in the hope of success. Work must be undertaken to better understand the unique aspects of our own environment and economy in order to determine where and how the most benefit can be derived. An effective green growth strategy can only be developed after these attributes of New Zealand's economy and environment are properly understood.

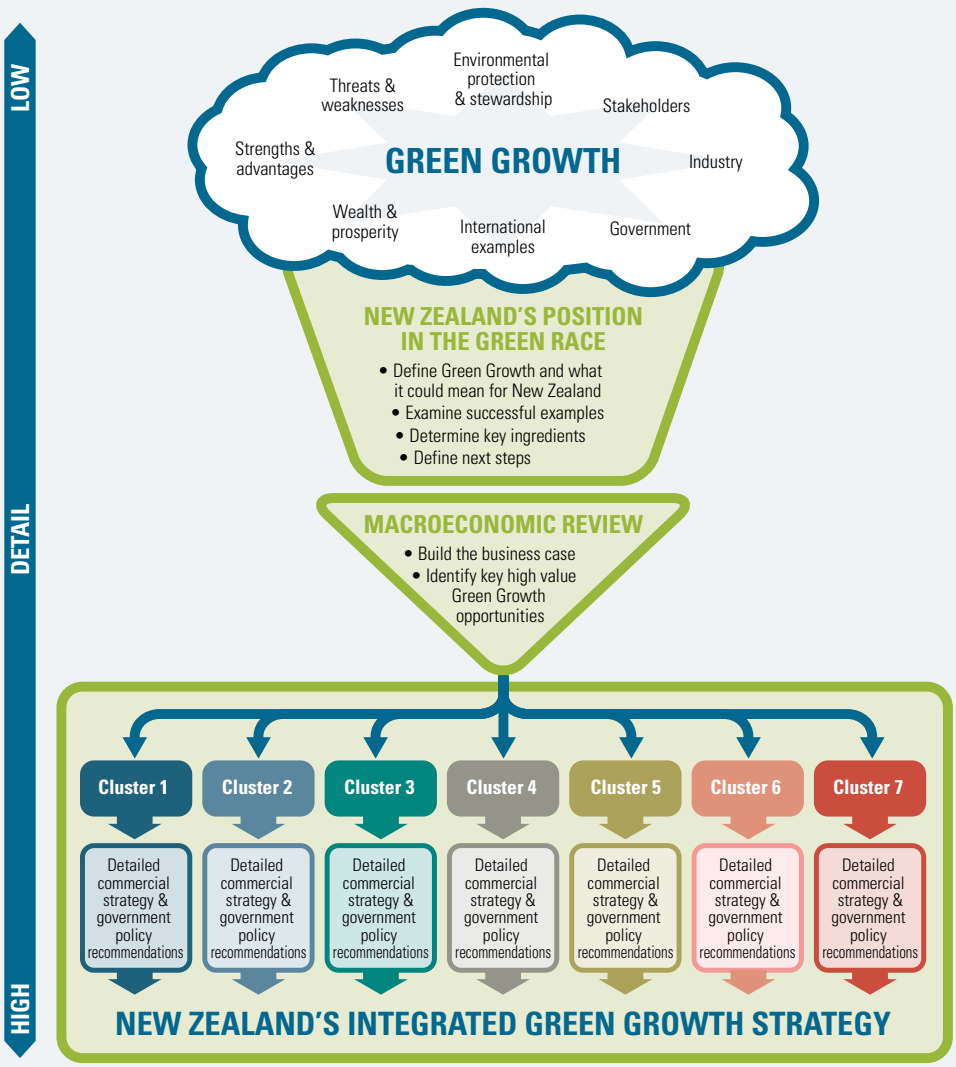
PURE ADVANTAGE METHODOLOGY FOR DELIVERING GREEN GROWTH IN NEW ZEALAND



PURE ADVANTAGE IS FOCUSED ON GALVANISING INDUSTRY AND IS PREPARING A GREEN GROWTH STRATEGY FOR NEW ZEALAND.

Our methodology for the development and delivery of this strategy follows:

1. Understand the issues, benchmark performance and define the drivers of success
2. Undertake solid and credible economic research to identify specific high value green growth targets (termed 'green growth initiatives')
3. Build a credible business case for the implementation of these green growth initiatives
4. Recruit corporate champions to undertake the next phase of strategy development and implementation
5. Assist corporate champions to build green growth delivery clusters, comprising:
   a. **A large corporate:** provide governance, funding, management expertise, and, when appropriate, engagement with government
   b. **An academic partner:** undertake technical research, strategy and policy development an industry association and to provide connectivity to industry players and interested parties
   c. **An advertising agency:** to work alongside the process and communicate the benefits to the public.
   d. **A non-government organisation:** to maintain contact with green stakeholders and ensure that key aspects of the proposal meet expectations of broader stakeholder groups.
6. Support those champions in the rollout and delivery of green growth initiatives
7. Measure and report progress



GREEN GROWTH DELIVERY CLUSTERS

Green Growth Delivery Clusters are a relatively low cost multi-stakeholder methodology for progressing specific green growth initiatives by identifying and mobilising parties with the greatest vested interest in helping to progress each initiative. We don't yet have the final formula. Pure Advantage will, however, continue to develop the cluster methodology in conjunction with the green growth business case over the coming months. This includes the release of our macroeconomic research in the third quarter of 2012.

RISK OF FAILURE

Encouraging New Zealand's corporate leaders to 'take the first step' does not necessarily remove pressure from government to undertake green growth policy reform. It could, however, be perceived as such, especially given the traditionally non-interventionist economic approach taken by recent governments. This risk may be somewhat mitigated by generating public debate around topical issues of specific national interest. For example, there was fierce public debate on the recently proposed mining of conservation land – it is possible there are other economically viable and environmentally sustainable alternative uses of this land however the business case for these alternatives was not effectively positioned. By focusing attention on credible, yet previously unconsidered, green growth alternatives, the public may be compelled to examine the broader implications of such proposals more closely.

The fundamental delivery risk lies in failing to provide a credible business case for industry. There is inherent uncertainty in the development of any new economic strategy which does not remove drivers for change or diminish the potential benefits to New Zealand's economy and environment. This risk can be managed, in the first instance, by utilising world-class expertise to assist in the development of a New Zealand specific integrated green growth strategy that is backed firmly by credible economic research.

BUILDING THE BUSINESS CASE

Pure Advantage has commissioned a macroeconomic review to determine the key high value green growth opportunities for New Zealand. Internationally respected economists, Vivid Economics, are carrying out this work in conjunction with the University of Auckland Business School (UoABS).

The analysis by Vivid Economics is predominantly macroeconomic in nature and is concerned with understanding the relative 'greenness' of New Zealand's economy and identifying our true comparative advantages. UoABS will provide a more granular analysis of domestic environmental and economic performance data in order to position a series of specific green growth initiatives.

"Green Growth Opportunities for New Zealand" is due for release in the third quarter of 2012.

New Zealand currently faces many unprecedented challenges; it also faces unprecedented opportunities. If we wish to leave for future generations a New Zealand that is not only prosperous but also enjoys the spectacular 100% Pure New Zealand, then now is our chance.

In the coming months Pure Advantage will be working with corporate leaders to further develop our green growth strategy for New Zealand.

Together we can help build New Zealand's advantage – our Pure Advantage.

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