thenewzealandinstitute

New Zealand's response to climate change

March 2008
www.nzinstitute.org

THE AIM OF THIS PRESENTATION

- This presentation summarises the research, analysis, and recommendations made in the New Zealand Institute's programme of research on how New Zealand ought to respond to climate change. This presentation draws from the following releases:

- 'The economic effects of climate change: Positioning New Zealand to respond', New Zealand Institute essay, June 2007

- 'We're right behind you: A proposed approach to emissions reduction for New Zealand', New Zealand Institute Discussion Paper 2007/2, October 2007.

- 'Actions speak louder than words: Adjusting the New Zealand economy to a low emissions world', New Zealand Institute Discussion Paper 2008/1, March 2008.

- These are all available for download from www.nzinstitute.org

AGENDA

New Zealand's exposure to climate change: What is the nature and scale of New Zealand's economic exposure to climate change?

New Zealand's strategic response: What are the costs and benefits associated with different strategic approaches, and which is the preferred strategic choice?

How does New Zealand deliver?: What are the broad options open to New Zealand in delivering on New Zealand's chosen approach to climate change, and how is New Zealand doing to date?

The way forward: There is a need for strategic clarity as to the response to climate change, combined with a clear programme of action to deliver against this aspiration.

NEW ZEALAND CAN EXPECT CHANGES IN ITS CLIMATE, BUT LESS THAN IN OTHER COUNTRIES

New Zealand will experience some change

New Zealand will be warmer, with more rain in the west and less in the east. This is not expected to have a major negative impact on the primary sector, although effects will vary by region and adaptation will be required.

This change will occur on a variety of fronts

New Zealand may also experience increased risk of invasion by pests, threatening agricultural industries, as well as coastal erosion due to sea level increases.

New Zealand is relatively well off

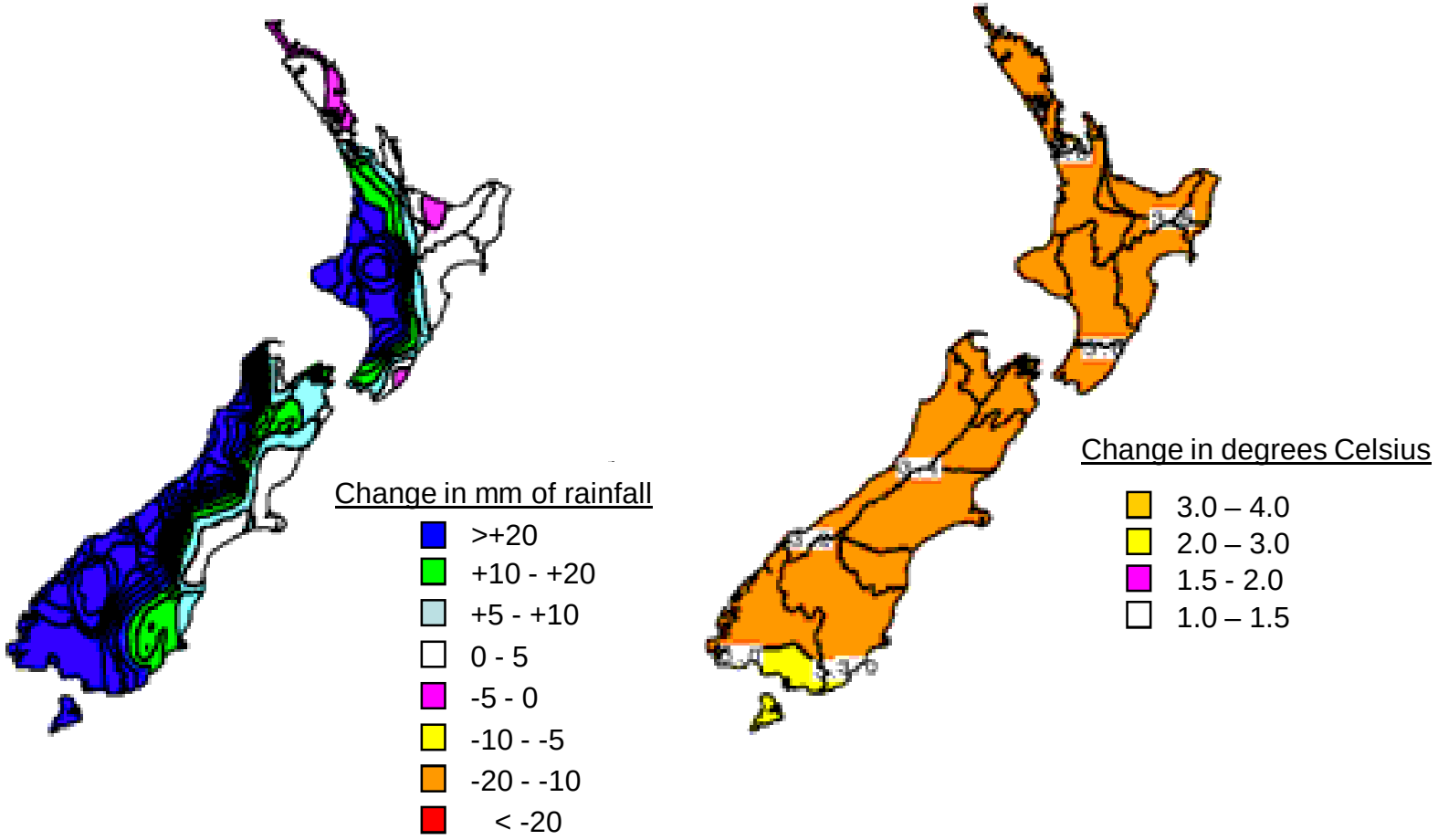
New Zealand appears to be better off than many other countries, such as Australia who may experience severe drought in many agricultural regions.

Overall, significant costs are not expected

Overall, it does not seem likely that the projected rainfall and temperature variation will impose a significant cost on the New Zealand economy over the next few decades (at least based on the current scientific projections).

EXPECTED RAINFALL AND TEMPERATURE CHANGE BY THE END OF THE CENTURY

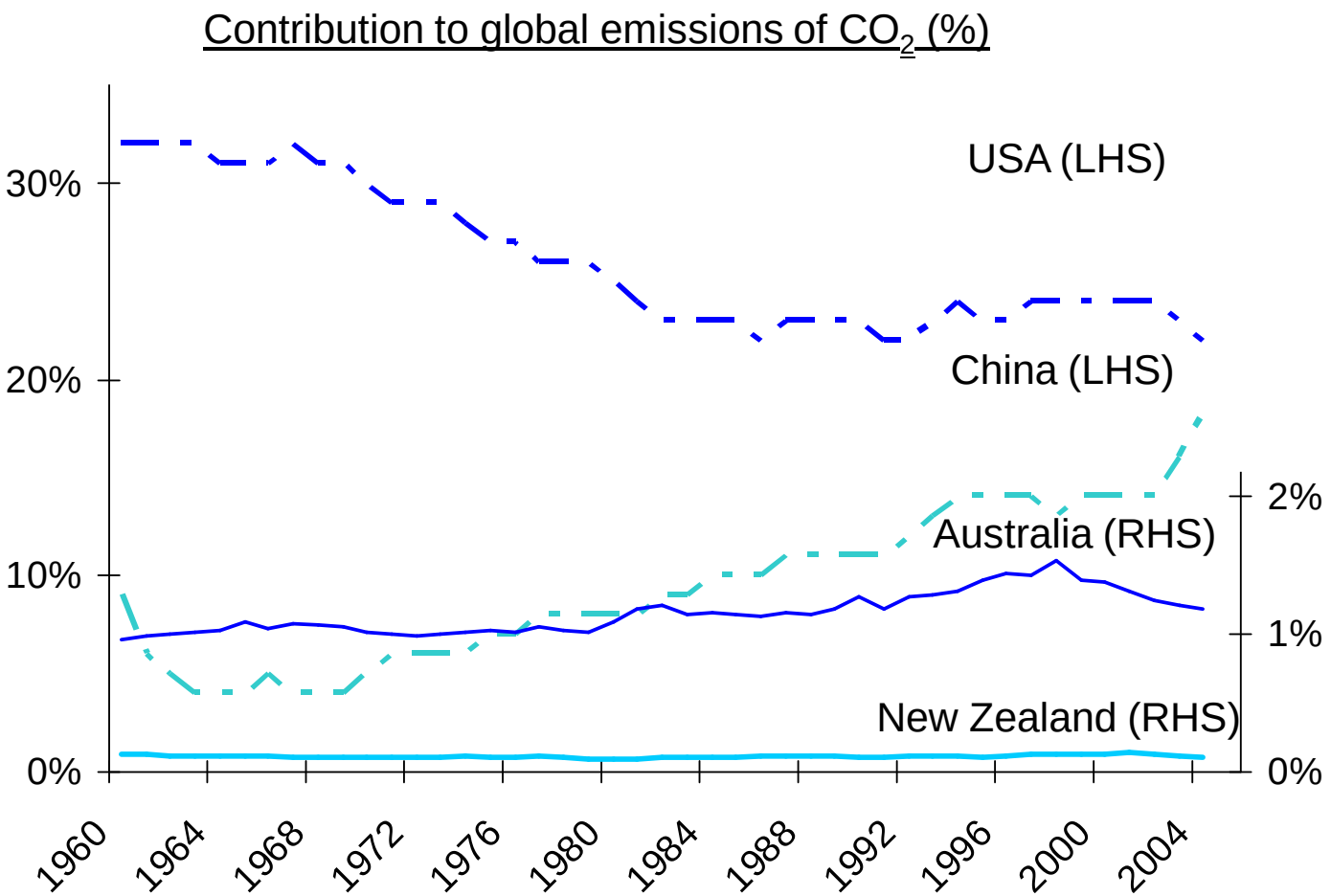
Rainfall and temperature variation, highest modeled in 2001 for the end of the 21st century



Source: National Institute of Water and Atmospheric Research. Changes based on highest modeled changes from IPCC Third Assessment released in 2001, forecast to the 2080s.

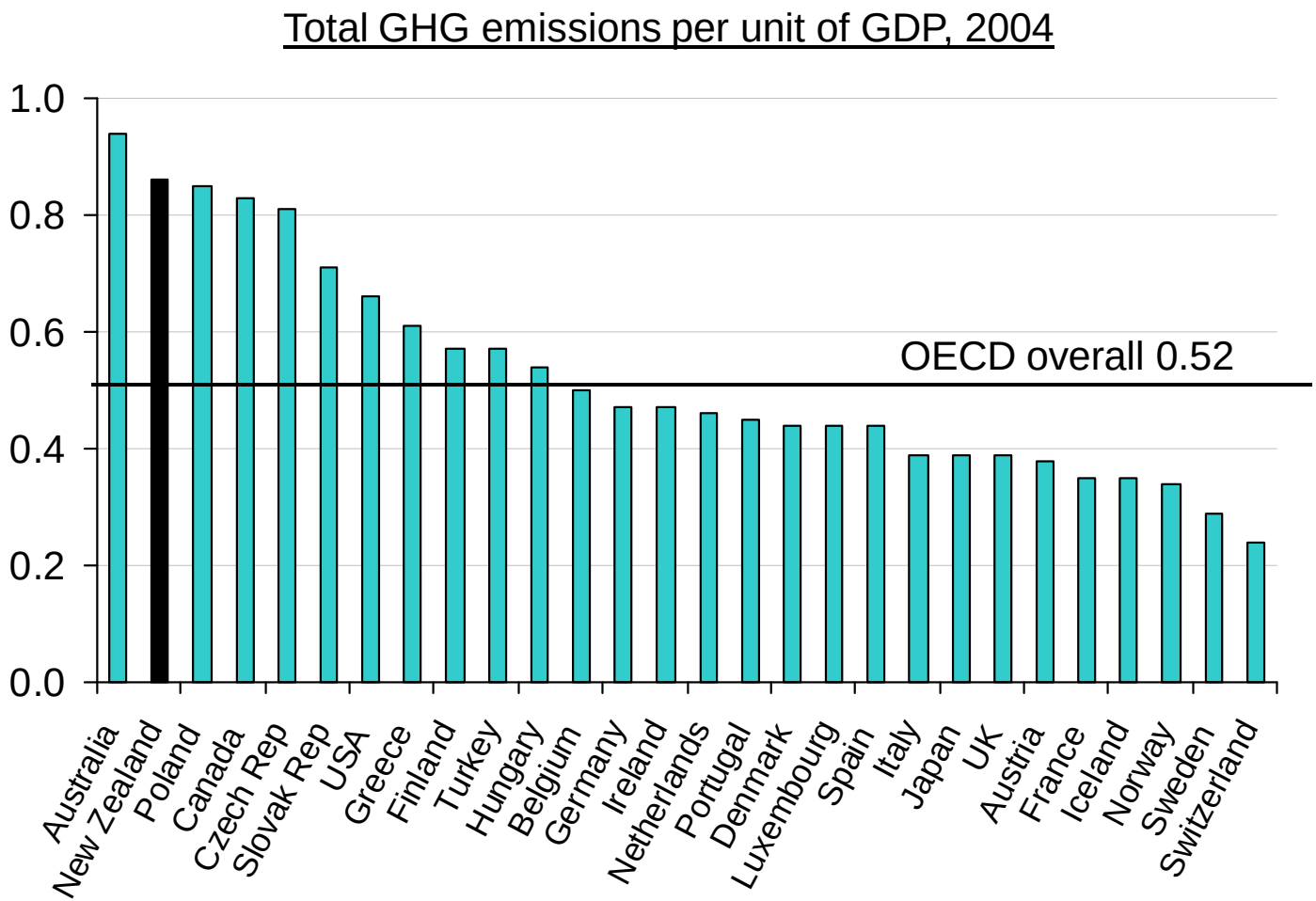
.

NEW ZEALAND IS A MINOR CONTRIBUTOR TO GLOBAL EMISSIONS



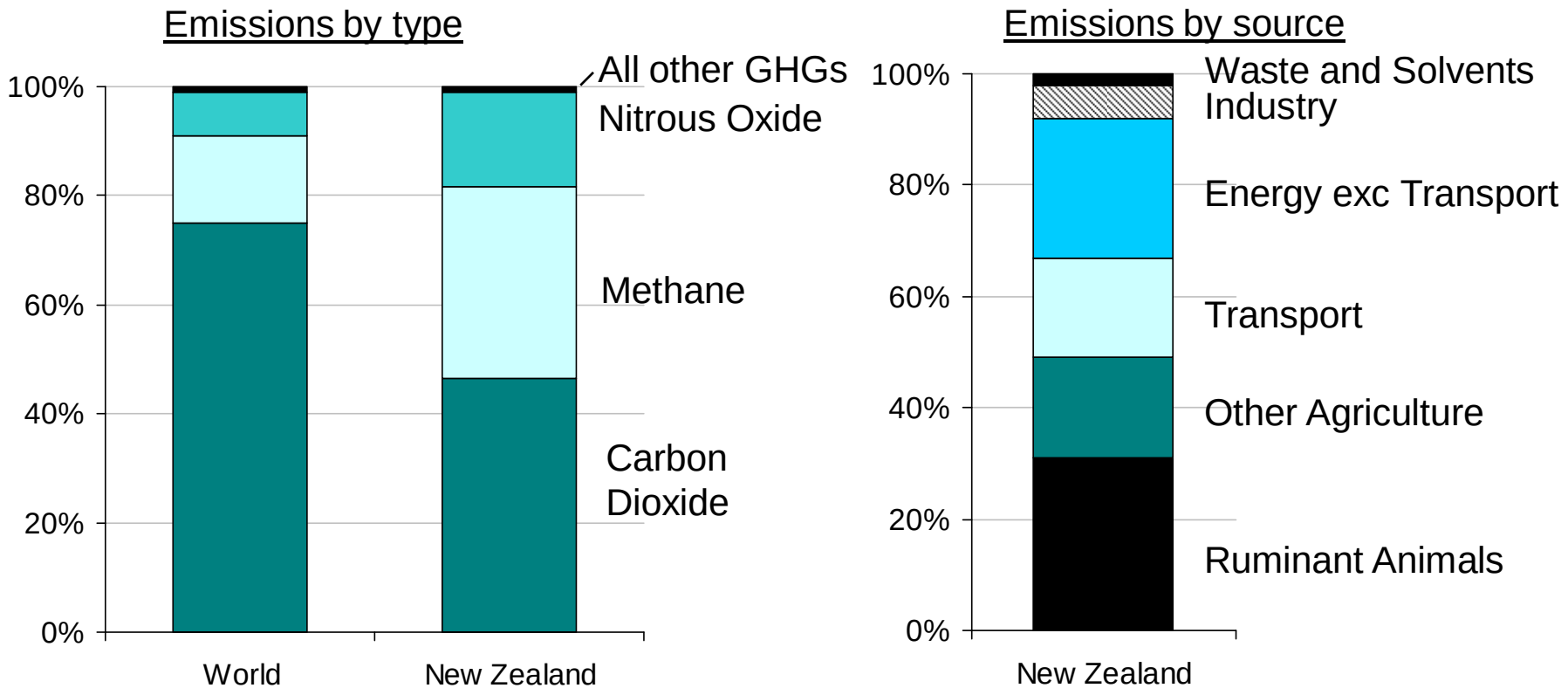
Source: Carbon Dioxide Information Analysis Center of the US Department of Energy.

BUT NEW ZEALAND IS THE SECOND MOST EMISSIONS INTENSIVE ECONOMY IN THE DEVELOPED WORLD



Note: Data not available for Korea or Mexico. GHG = greenhouse gas.
Source: United Nations Framework Convention on Climate Change.

NEW ZEALAND'S EMISSIONS PROFILE IS UNUSUAL, WITH METHANE EMISSIONS FROM AGRICULTURE THE MAJOR SOURCE



Note: New Zealand data 2005; World data 2004.
Source: Ministry for the Environment; Netherlands Environmental Assessment Agency.

NEW ZEALAND'S EMISSIONS INTENSITY CREATES AN EXPOSURE TO THE INDIRECT ECONOMIC EFFECTS OF CLIMATE

International government action

There are numerous commitments and proposals for binding emissions reduction targets, at national and global level, often in the range of 50-80% by 2050. At the recent Bali talks, there were proposals for a 25-40% reduction by 2020.

Changing consumer preferences

Consumer preferences may be changing towards environmentally friendly goods and services. The food miles debate is one example of this emerging trend. New Zealand's food and beverage and tourism industries have particular exposures to these changes.

New technologies and business models

Changing consumer preferences and emissions pricing will create demand for new technologies, products and services. This potentially creates new commercial opportunities for New Zealand's firms.

A RANGE OF EMISSIONS REDUCTION TARGETS HAVE BEEN PROPOSED BY GOVERNMENTS

Source	Proposed target
Bali discussions	20-45% below 1990 levels by 2020
IPCC	60-85% below 1990 levels by 2050
Australia	60% below 2000 levels by 2050
Norway	Carbon neutral through offset purchases by 2050
California	80% below 1990 levels by 2050
USA	Leading legislation proposes 70% below 1990 by 2050
Germany	40% below 1990 levels by 2020
EU	20% below 1990 levels by 2020 or 30% reduction depending on action by other countries
Sweden	25% below 1990 levels by 2020

THERE ARE INDICATIONS OF CHANGES IN CONSUMER PREFERENCES

Changes occurring in NZ's major markets

Many of New Zealand's major export markets, primarily in Europe and the US, are exhibiting shifts in the level of awareness and concern about climate change issues.

Retailers are involved in this shift

In addition, retailers – for example, supermarket chains in the UK – are demanding that their suppliers meet more demanding emissions levels, and may choose not to stock products that are not seen to be sufficiently low emissions.

Major export categories are exposed

Significant parts of New Zealand's export base are exposed to changing consumer preferences with respect to the emissions content of the goods and services that they purchase, particularly the food and beverage and tourism sectors.

This is a mix of risk and opportunity

This creates a risk for some New Zealand firms, but is also a potential source of opportunity for some firms

OVERALL: THE NATURE AND SIZE OF NEW ZEALAND'S EXPOSURE TO CLIMATE CHANGE

The direct effects are not a major exposure for New Zealand

The direct effects of climate change do not look to be a major source of economic exposure over the next several decades. New Zealand is not as exposed to these direct effects as many other countries.

The indirect effects represent a major exposure

The indirect effects of climate change – the potential for international government action or for big shifts in consumer preferences – represent a major economic exposure for New Zealand. New Zealand's response should be focused on these indirect effects.

Action is required despite scientific uncertainty

This means that action is required even with remaining scientific uncertainty. Changes in government, consumer, and firm behaviour are occurring independently of the scientific debate.

Climate change is a substantial economic exposure

This is a very significant economic exposure. The way in which New Zealand responds will have a major effect on the New Zealand economy.

AGENDA

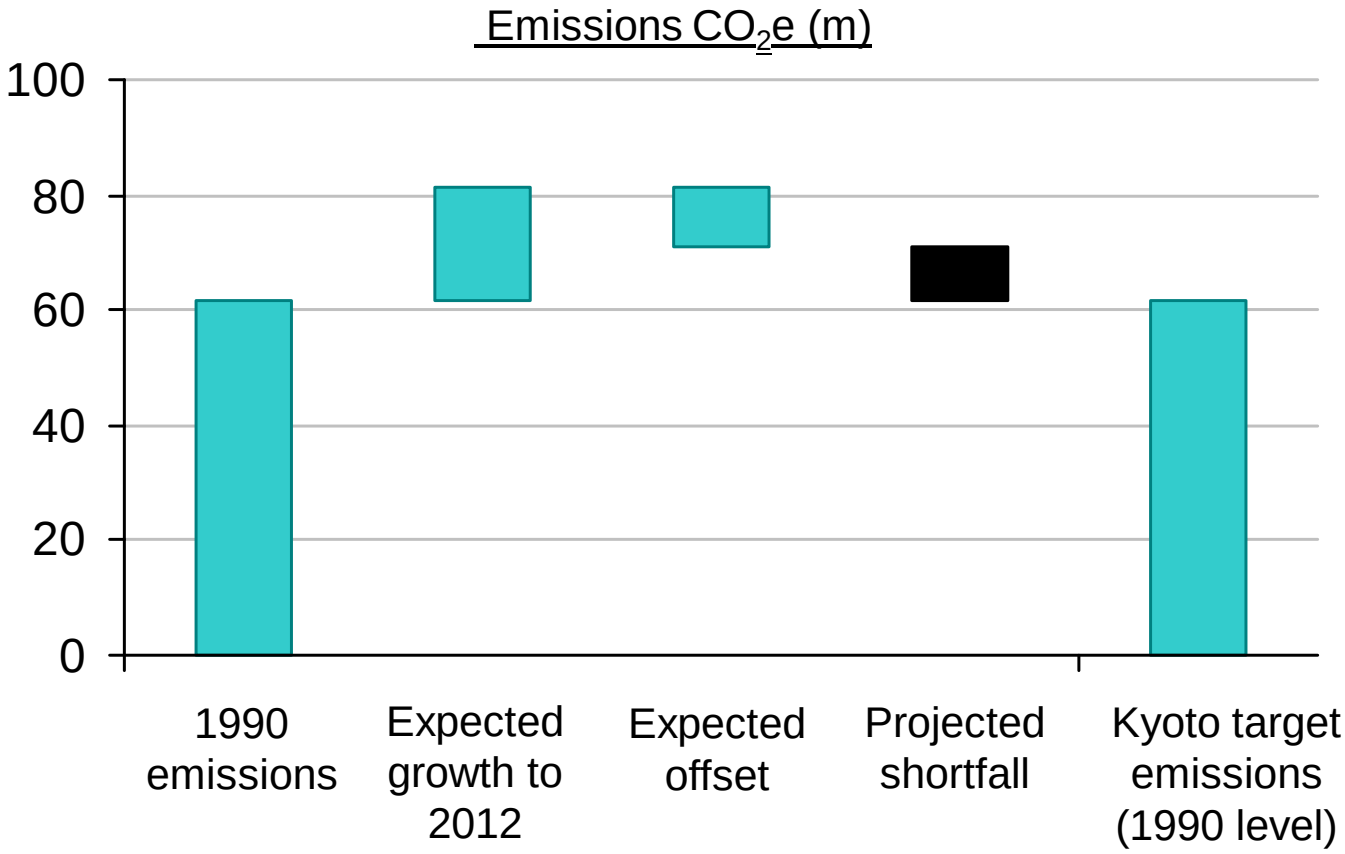
New Zealand's exposure to climate change: What is the nature and scale of New Zealand's economic exposure to climate change?

New Zealand's strategic response: What are the costs and benefits associated with different strategic approaches, and which is the preferred strategic choice?

How does New Zealand deliver?: What are the broad options open to New Zealand in delivering on New Zealand's chosen approach to climate change, and how is New Zealand doing to date?

The way forward: There is a need for strategic clarity as to the response to climate change, combined with a clear programme of action to deliver against this aspiration.

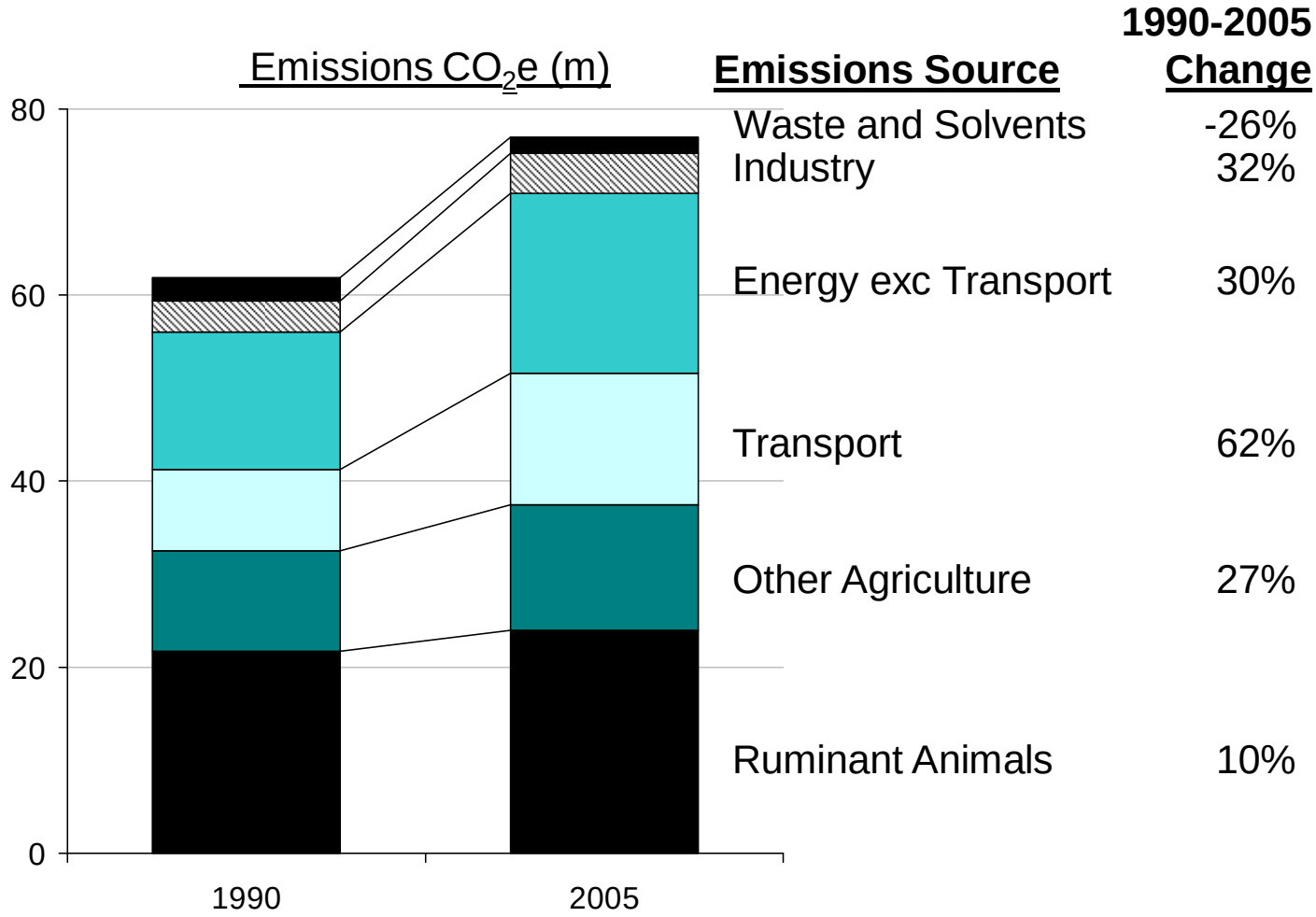
NEW ZEALAND'S EMISSIONS HAVE BEEN GROWING STRONGLY, MAKING REDUCTION TARGETS MORE CHALLENGING



As of January 2008, NZ's Kyoto liability is estimated by Treasury to be $963m based on an emissions price of NZ$21 a tonne.

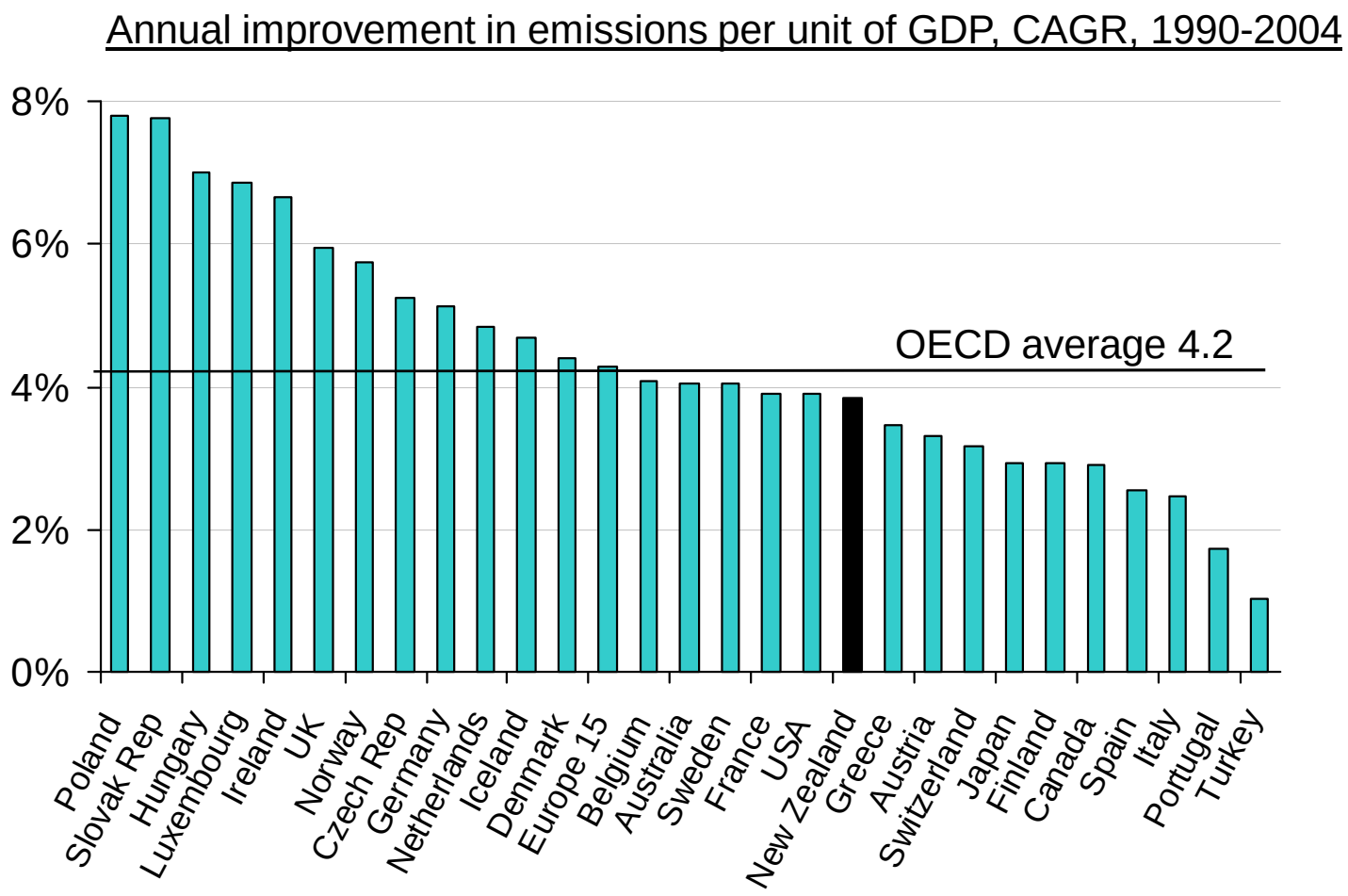
Note: Growth, offset, and shortfall based on quantum used to calculate Kyoto liability in May 2007. Offsets are due to Land Use, Land Use Change and Forestry activities. CO_2e = GHG emissions in equivalent tonnes of carbon dioxide.
Source: United Nations Framework Convention on Climate Change; Treasury; Ministry for the Environment.

NEW ZEALAND'S GREENHOUSE GAS EMISSIONS HAVE GROWN STRONGLY ACROSS THE ECONOMY



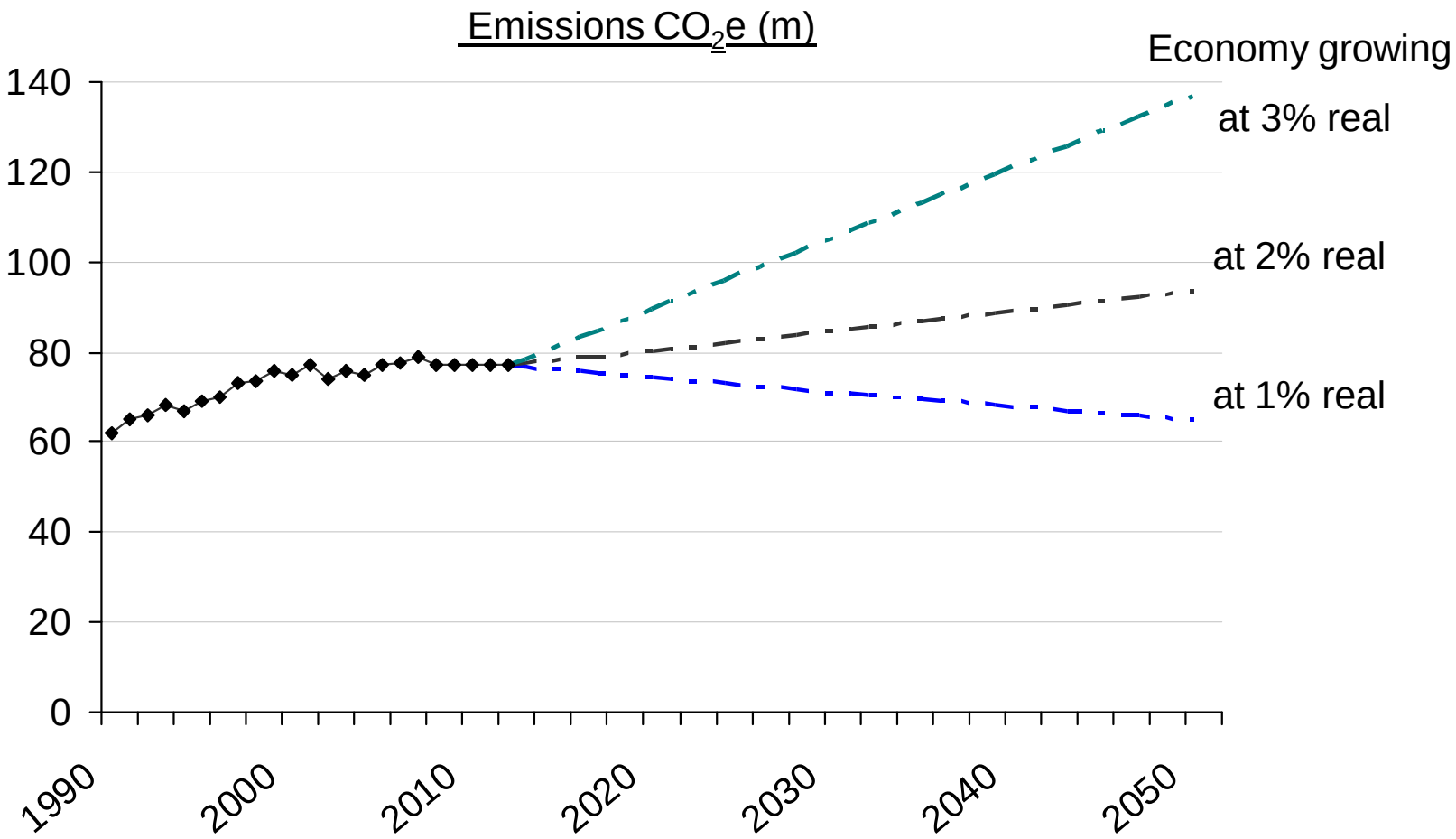
Note: CO_2e = greenhouse gas emissions in equivalent tonnes of carbon dioxide.
Source: Ministry for the Environment; United Nations Framework Convention on Climate Change.

NEW ZEALAND'S EMISSIONS INTENSITY IMPROVEMENT HAS BEEN BELOW AVERAGE



Note: CAGR is Compound Annual Growth Rate. Data not available for Korea or Mexico. Estimates made by OECD to achieve comparable timeframe for Slovak Rep and Poland. Dataset expressed in international dollars to enable cross country comparison, may differ from calculation in local currency due to exchange rate variation.
Source: United Nations Framework Convention on Climate Change; OECD.

ON CURRENT COURSE AND SPEED, NEW ZEALAND'S EMISSIONS WILL CONTINUE TO GROW STRONGLY OVER TIME



Note: Projection 2013 to 2050 includes emissions intensity improvement of 3.4%. September 2007 estimate for first Kyoto period reduced by Minister's expectation of additional 20m tonne emission reduction. CO_2e = greenhouse gas emissions in equivalent tonnes of carbon dioxide.
Source: Statistics New Zealand; Ministry for the Environment.

NEW ZEALAND'S RATE OF EMISSIONS INTENSITY IMPROVEMENT WILL NEED TO INCREASE SIGNIFICANTLY

Required emissions intensity improvements, 2012 - 2050

Real economic growth rate	2050 emissions target (below the 1990 level)		
	30%	50%	70%
1.0%	4.4%	5.2%	6.5%
1.5%	4.9%	5.7%	7.0%
2.0%	5.3%	6.1%	7.4%
2.5%	5.8%	6.6%	7.8%
3.0%	6.2%	7.0%	8.3%

New Zealand achieved emissions intensity improvements of 3.4% annually between 1990 and 2004.

Source: Statistics New Zealand; Ministry for the Environment; New Zealand Institute calculation.

REDUCING NEW ZEALAND'S EMISSIONS IS LIKELY TO BE CHALLENGING AND COSTLY

NZ has to reduce emissions from a high starting position

New Zealand is starting from a poor position, with current emissions significantly higher than their 1990 level, and with few abatement opportunities.

Negative cost abatement opportunities are not enough

Negative cost abatement opportunities are estimated to amount to about 15% of 1990 emissions, and will only deliver a small proportion of the required reductions.

NZ already has a high renewable energy share

New Zealand already has a high share of renewable energy (70%), and so the gains from moving further in this area are relatively limited.

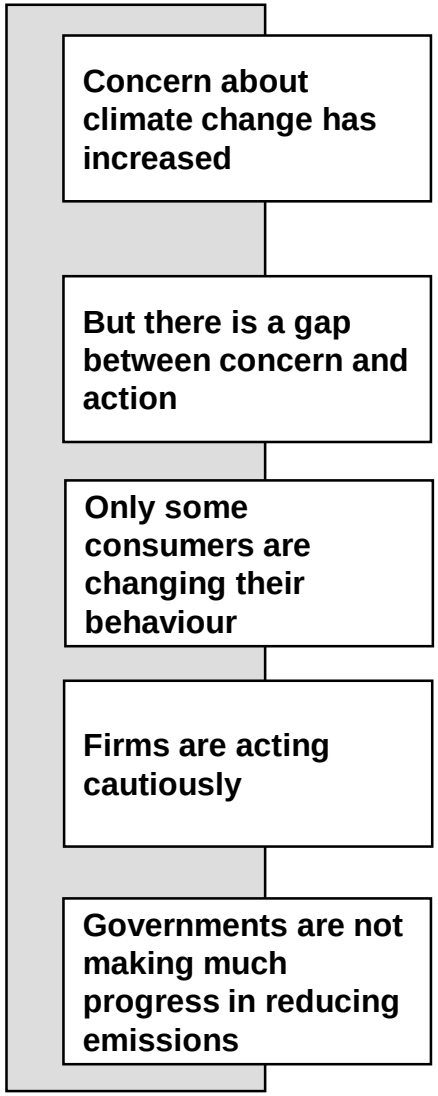
Few options to reduce agricultural emissions

There are relatively limited options for reducing agricultural emissions. Current technologies may allow for emissions reductions of around 10-15% of current emissions.

Other countries have more abatement opportunities

Many of the projected improvements in emissions intensity are in sectors that are less significant to New Zealand (such as industrial processes).

AND THE NATURE OF THE UPSIDE FROM ACTING TO REDUCE EMISSIONS IS NOT CLEAR



Climate change has become a mainstream issues across much of the developed world. Awareness and concern about climate change has increased significantly among individuals, firms, and governments.

But this has not yet translated into significant changes in behaviour. There is a clear gap between actions and words.

Surveys report consumer concern but, outside of niche markets, there is little evidence of decisive shifts in behaviour.

Some firms are changing, but many of the investments made to reduce emissions are either negative cost or precautionary in nature.

Countries are declaring aspirational targets, but for the most part, emissions are continuing to grow and there is a reluctance by governments to impose significant costs.

THERE IS SIGNIFICANT UNCERTAINTY ABOUT WHAT THE WORLD WILL LOOK LIKE IN THE FUTURE

NZ needs to position itself for an uncertain future

A good strategy should respond to the expected future environment rather than to the prevailing environment. However, it is difficult to make confident predictions about how preferences and behaviours regarding climate change will evolve.

There are many possible and plausible futures

It is possible to tell plausible, but very different, stories, about how consumers, firms, and governments will act with respect to climate change over the next few decades. It is possible that consumers will decisively shift their purchasing behaviour, or that they talk but do not act. And it is possible that governments across the world adopt demanding emissions reduction targets, with sanctions imposed on countries who do not, or they may do very little.

There is a reasonable likelihood that change will occur

Despite this uncertainty, we believe that there is a reasonable likelihood that governments, and to some extent consumers, will shift their behaviour towards sanctioning emissions intensive goods and services.

OBJECTIVES FOR NEW ZEALAND'S CLIMATE CHANGE RESPONSE

New Zealand should respond to this uncertainty by positioning itself to operate successfully in what may be a low emissions global environment.

The aim is to develop a New Zealand strategy rather than a global strategy, which is generally applicable. New Zealand faces particular circumstances – it is a small emitter, and faces few abatement opportunities. The appropriate New Zealand strategy is therefore likely to have distinctive features.

It is important that there is strategic clarity in New Zealand's response to climate change in order to guide action that will need to be sustained over several decades.

Broadly speaking, New Zealand's strategic choices range from adopting a global leader approach, to moving with the pack, to doing as little as possible.

WE PROPOSE THAT NEW ZEALAND BE A FAST FOLLOWER

NZ needs to act to reduce emissions to manage its exposure

New Zealand needs to move to a lower emissions mode of operating, as a way of managing New Zealand's exposure to the risk that governments and consumers will require emissions reductions.

But reducing emissions will be costly

But reducing emissions will be costly given the available abatement opportunities. The aim should be to reduce emissions gradually over time rather than in a big bang way.

The motivation is risk management not capturing an opportunity

The motivation is to act to reduce emissions in order to manage a potentially significant economic exposure, rather than to capture any economic upside that may be generated.

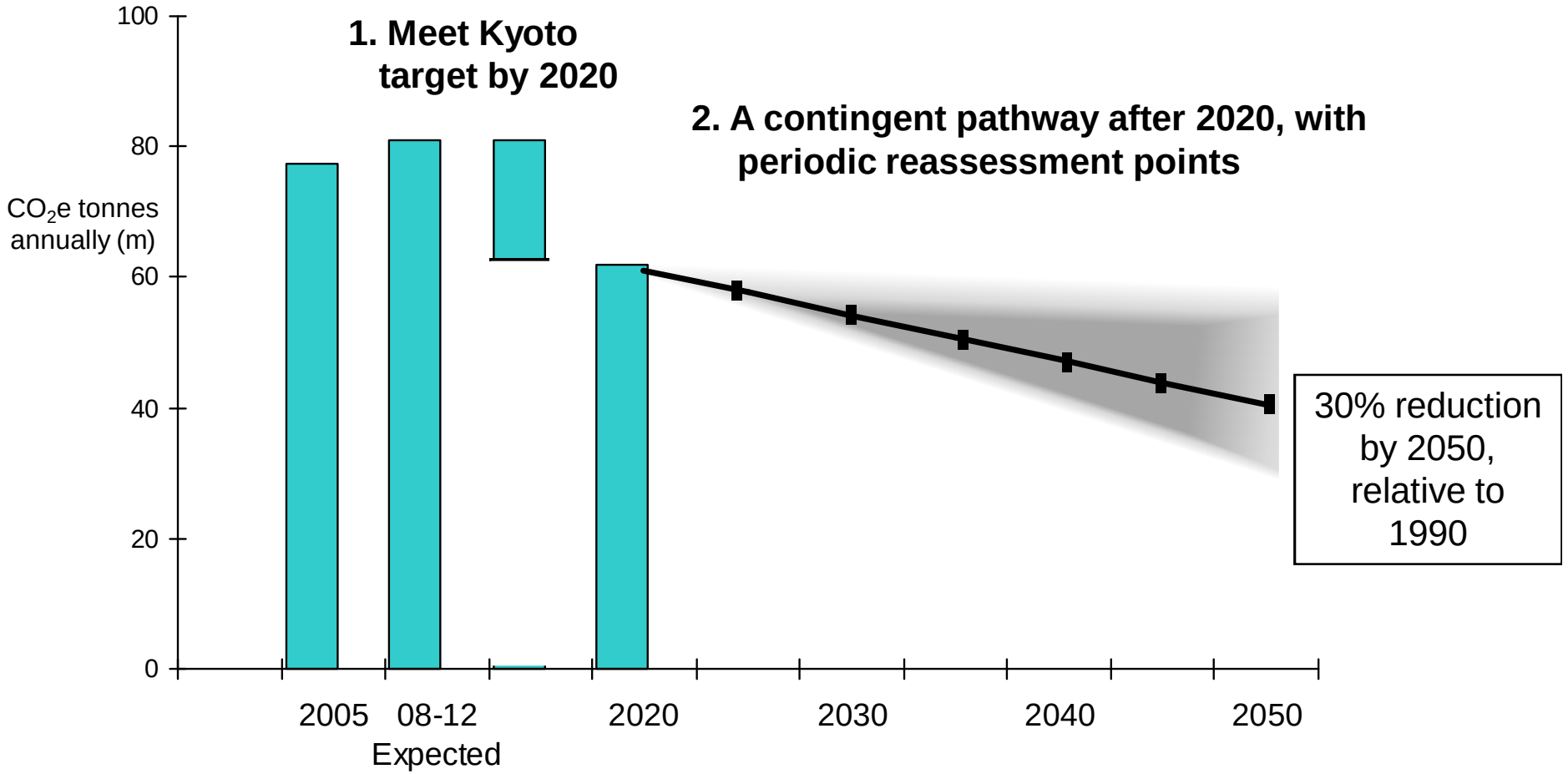
We recommend that NZ adopt a fast follower strategy

On this basis, we recommend that New Zealand adopt a fast follower strategy, aiming to reduce its emissions at a pace roughly in line with the actions of other countries.

The pace of reductions should be contingent

A fast follower strategy is inevitably contingent on the actions that are taken by other countries, as well as demonstrated changes in consumer behaviour and changes in abatement opportunities.

WE BELIEVE A FAST FOLLOWER STRATEGY TRANSLATES INTO A SPECIFIC INITIAL EMISSIONS REDUCTION PATH



AGENDA

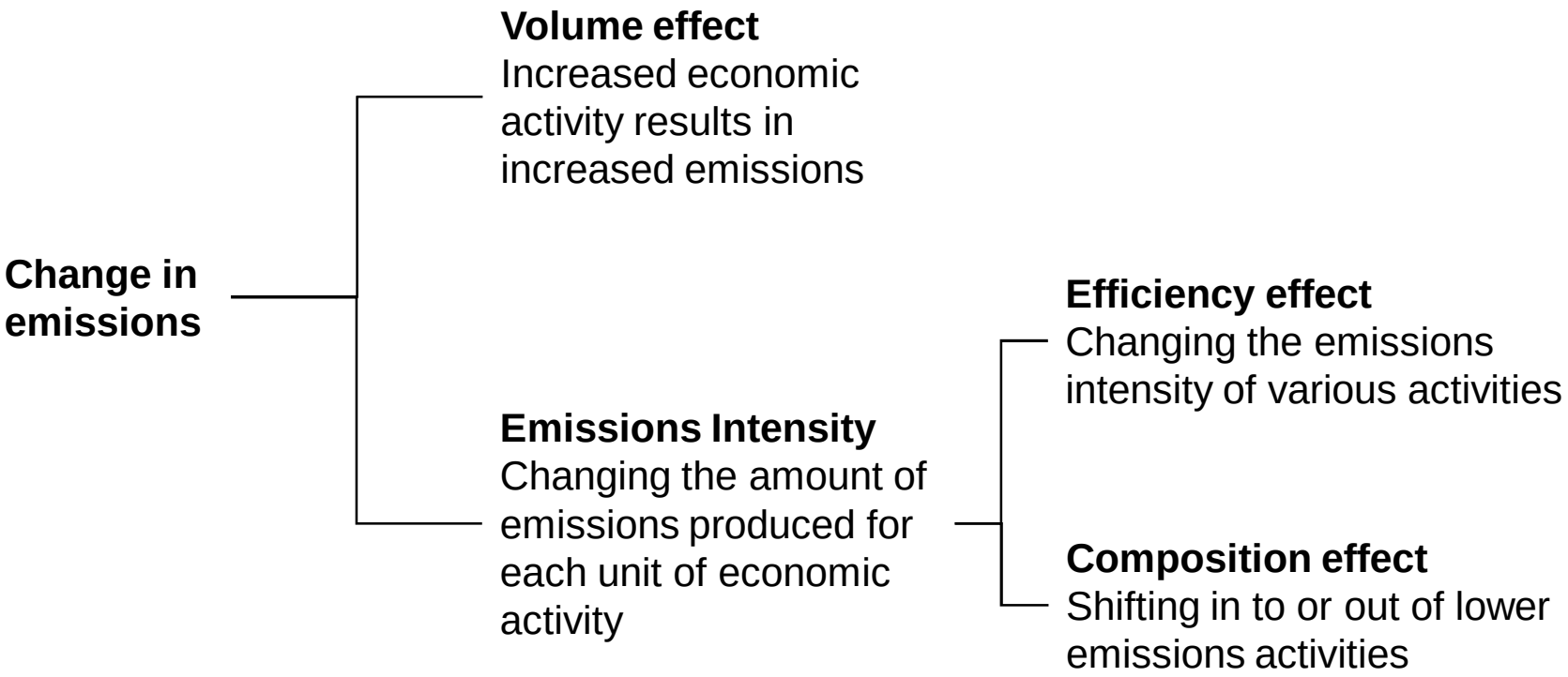
New Zealand's exposure to climate change: What is the nature and scale of New Zealand's economic exposure to climate change?

New Zealand's strategic response: What are the costs and benefits associated with different strategic approaches, and which is the preferred strategic choice?

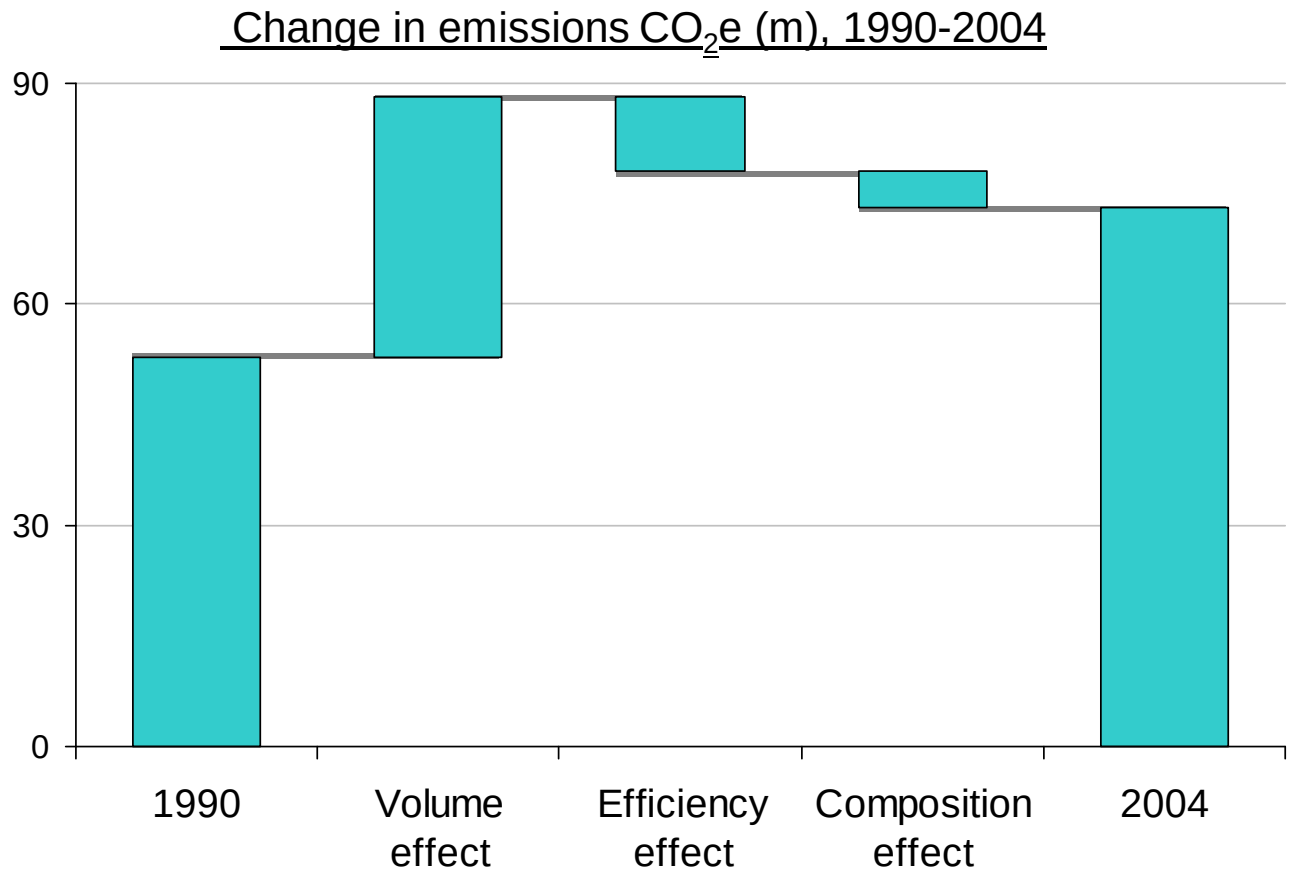
How does New Zealand deliver?: What are the broad options open to New Zealand in delivering on New Zealand's chosen approach to climate change, and how is New Zealand doing to date?

The way forward: There is a need for strategic clarity as to the response to climate change, combined with a clear programme of action to deliver against this aspiration.

DRIVERS OF EMISSIONS CHANGES



BOTH THE EFFICIENCY AND COMPOSITION EFFECTS HAVE MADE CONTRIBUTIONS TO NEW ZEALAND'S EMISSIONS GROWTH



The composition effect has made a significant contribution in many countries, and is likely to be important for New Zealand given the limited abatement opportunities.

Note: Household emissions excluded. CO_2e = greenhouse gas emissions in equivalent tonnes of carbon dioxide.
Source: Statistics New Zealand; New Zealand Institute calculations.

THE GOVERNMENT HAS NOMINATED A RANGE OF TARGETS, WHICH AMOUNT TO AN IMPLICIT 2050 TARGET OF A 40% REDUCTION

Government targets declared	2050 emissions reduction (m tonnes CO2e p.a.)
Energy excluding Transport	29
Carbon neutral in energy by 2040	
Carbon neutral in stationary energy by 2030	
Carbon neutral in electricity by 2025	
90% of electricity renewable by 2025, no new fossil-fuel generation	
Transport	26
Carbon neutral in transport by 2040	
By 2040, per capita transport GHG emissions will be halved	
One of first countries to widely deploy electric vehicles	
Agriculture and land use	
Remain a world leader in agricultural emissions reduction science	No impact targeted
By 2020 net increase in forest area of 250,000 hectares over 2007	~7
TOTAL REDUCTIONS TARGETED	62
Resulting percentage below 1990 emissions	~40%

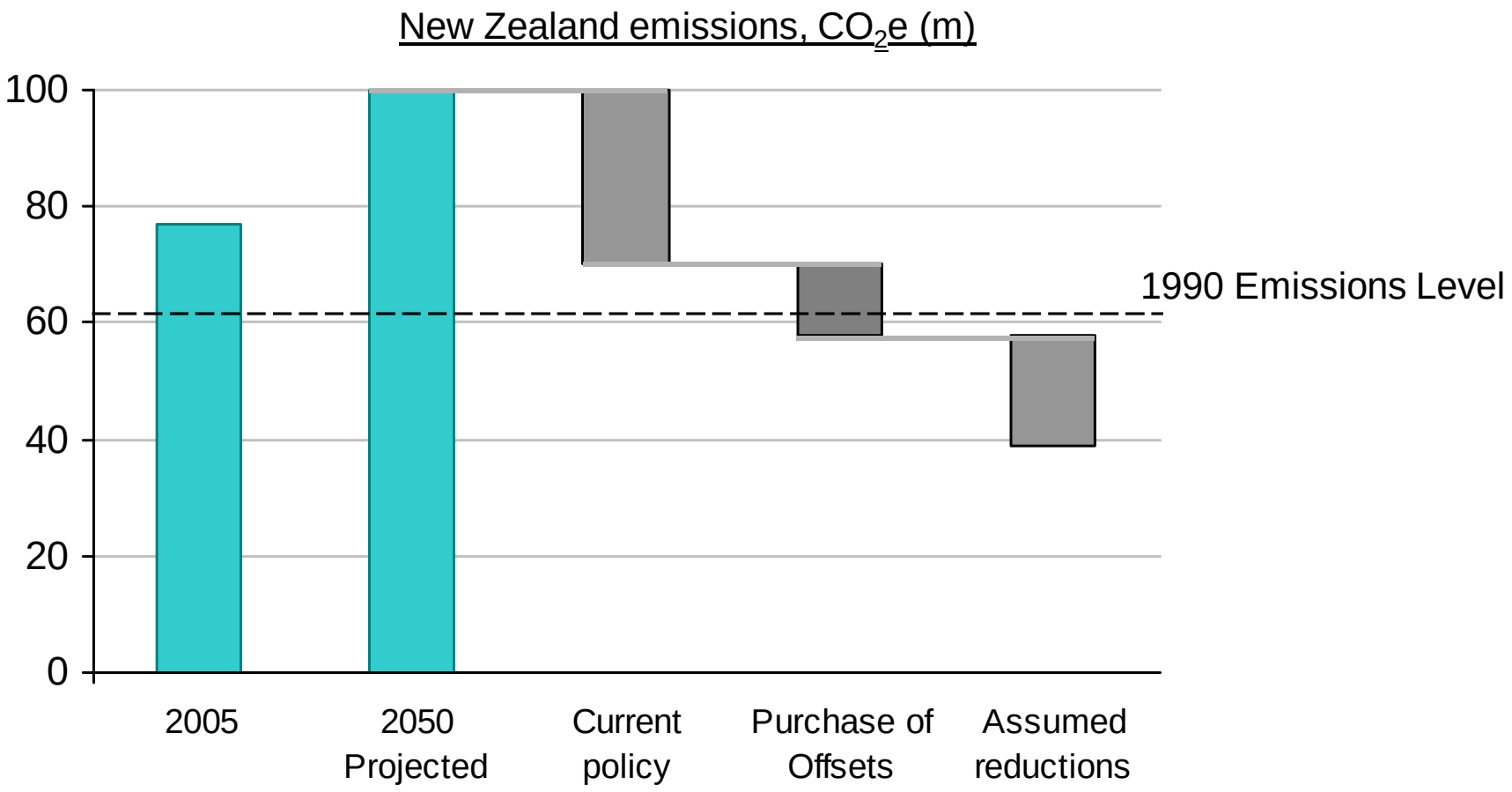
Note: Estimated reduction includes offset purchases. Emissions growth as forecast by MED in Low Carbon Energy Scenario for energy sector, all other sectors projected, with modifications, based on past rate of change.

MANY POLICIES ANNOUNCED, BUT ESTIMATED TO HAVE MODEST IMPACT

Initiatives to achieve emissions reductions	Impact (m pa)	Associated costs and considerations
Energy excluding Transport Efficient and renewable electricity system ~24 programmes including restriction on fossil-fuel based generation and shift to 90% renewable Energywise Homes ~20 programmes Energywise Business ~35 programmes	8-9	Increased cost of electricity generation Increased wholesale and retail prices Capital costs such as solar heaters, insulation Compliance costs for reporting
Transport Biofuel sales 3.4% of fuel Energywise Transport ~30 programmes planned	4-5	Increased price of fuel Capital costs of abandoned assets Compliance costs
Research and land use Investment in agricultural research and NO reduction By 2020 net increase in forest area of 250,000 ha	~7 ~7	Research funding
Emissions impact quantified	<30	
Additional initiatives Emissions Trading System	TBD	High prices likely to be required to achieve emissions reductions
Total emissions reduction	TBD	

Note: Agricultural emissions impact based on reducing methane emissions by 10-15% and reducing nitrous oxide emissions by 25%. Some programs have not had estimates made of potential impact. Programs are numerous and impact may overlap.
Source: Ministry for the Environment; Ministry of Economic Development; New Zealand Energy Efficiency and Conservation Strategy; New Zealand Institute calculations.

CURRENT EMISSIONS REDUCTIONS POLICIES ONLY GET NEW ZEALAND'S 2050 EMISSIONS TO ABOUT THEIR 1990 LEVEL



Note: Impact of ETS beyond 2012 is not included in current policy.
Source: Ministry for the Environment; Ministry of Economic Development; New Zealand Institute calculations.

NEW ZEALAND NEEDS TO LOOK BEYOND IMPROVING THE EMISSIONS INTENSITY OF EXISTING ACTIVITY

Improving emissions efficiency worthwhile but limited impact

Actions aimed at improving emissions efficiency will have an impact on reducing New Zealand's emissions, but they will not deliver change with the required materiality because of the limited abatement opportunities.

It is difficult to identify additional priority actions

Additional actions include adopting new standards as they are implemented overseas (e.g. fuel standards), and investing in public transport and broadband. But these are also likely to have limited materiality.

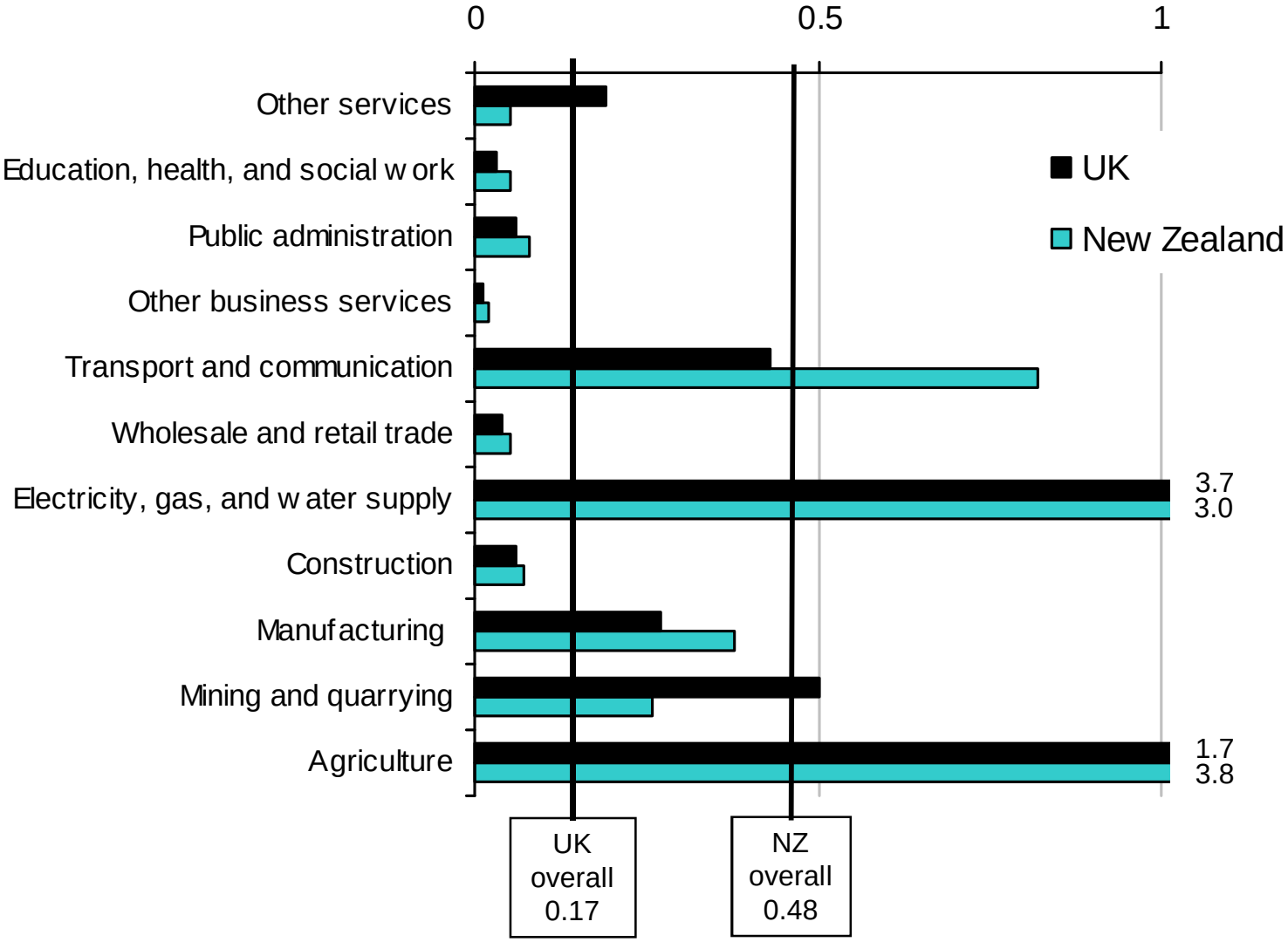
Hard for the current New Zealand economy to deliver significant reductions

It is difficult for New Zealand to reduce its emissions significantly without a major shift in the New Zealand economy. Demanding targets for emissions reduction are equivalent to a claim that the New Zealand economy will need to be transformed.

New Zealand needs to consider how to change the composition of the economy

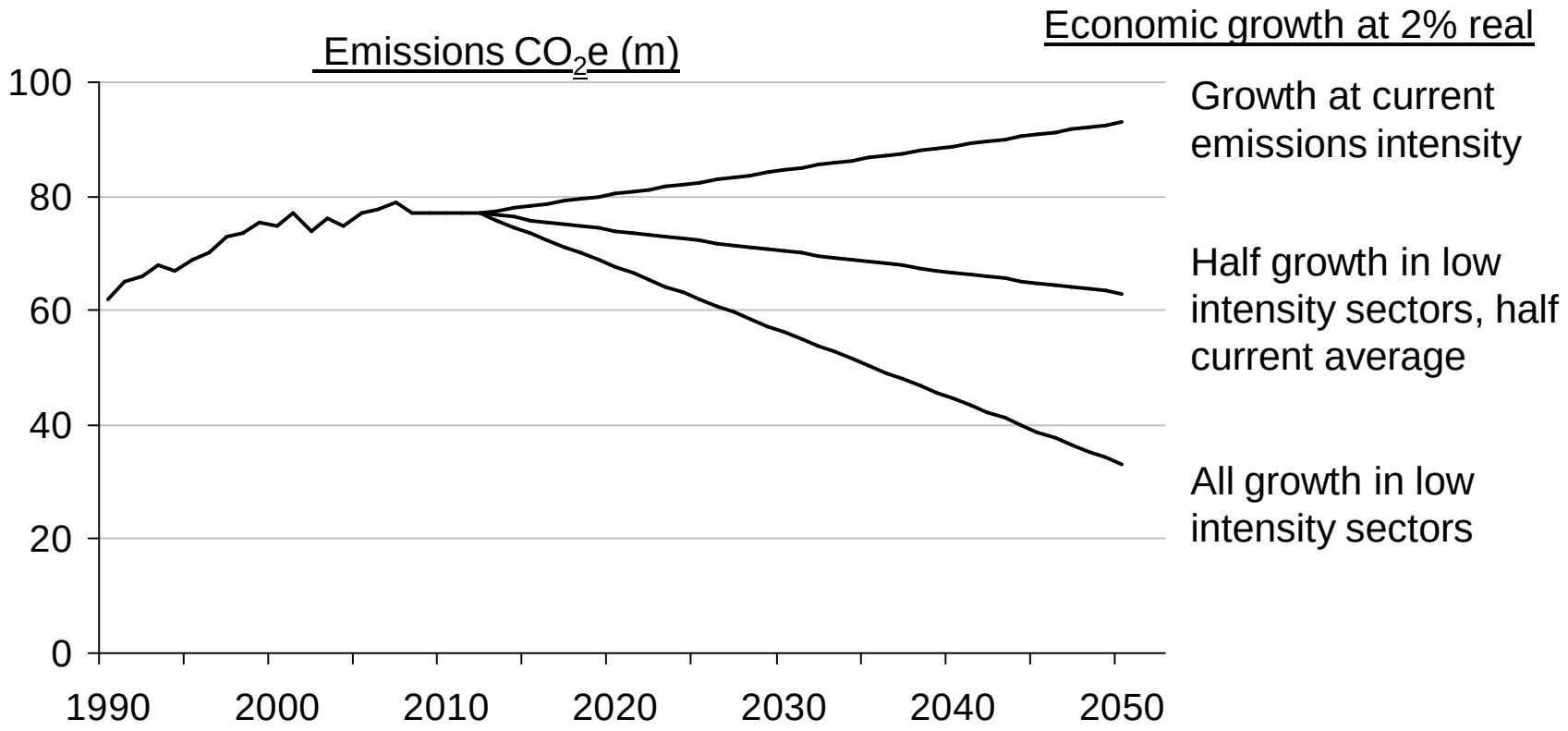
New Zealand should focus on the composition effect, in which there is a greater reliance on low emissions economic activity. This will reduce the reliance on improving the emissions efficiency of existing activity.

THERE IS SIGNIFICANT VARIATION IN EMISSIONS INTENSITY BY SECTOR



Note: Household emissions excluded. Values shown are emissions per unit of economic value in tonnes.
Source: Statistics New Zealand; Office of National Statistics, UK.

CHANGING THE COMPOSITION OF ECONOMIC GROWTH TOWARDS LOW EMISSIONS SECTORS CAN MAKE A SIGNIFICANT CONTRIBUTION



Note: 3.4% annual efficiency improvements achieved 1990-2004 assumed to 2050 across all activities. Low emissions intensity sector is 'other business services' with an emissions intensity of 0.02 compared to an average of 0.48. CO_2e = greenhouse gas emissions in equivalent tonnes of carbon dioxide.
Source: Ministry for the Environment; New Zealand Institute calculations.

NEW ZEALAND SHOULD DELIBERATELY SEEK TO BUILD LOWER EMISSIONS STRENGTHS IN ITS ECONOMY

Unlikely to change spontaneously in New Zealand

Many developed countries have reduced emissions by moving naturally from agriculture to manufacturing to services. The location of New Zealand's comparative advantage makes this transition process less likely.

Pricing emissions creates an incentive for change

Pricing emissions will create an economic incentive to shift out of high emissions activities into lower emissions activities e.g. services may be advantaged relative to heavy manufacturing.

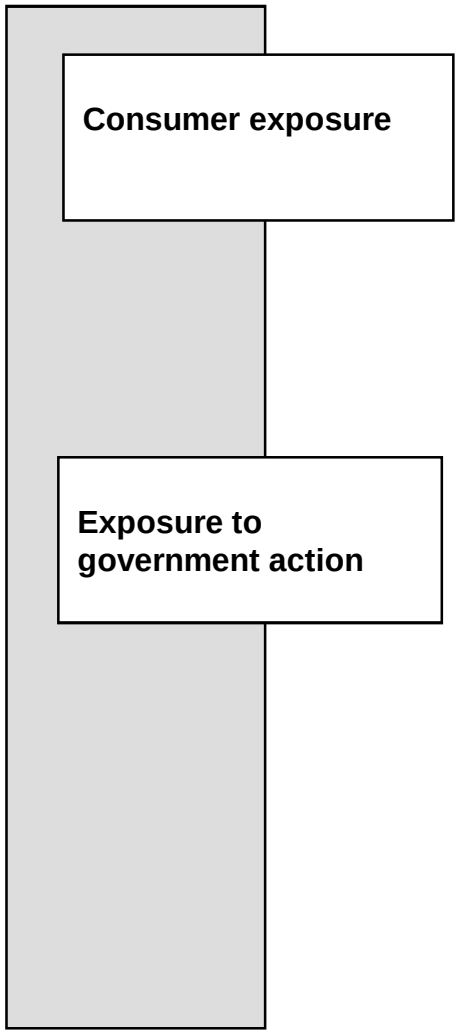
But New Zealand also needs to position itself as an attractive location

In addition to creating the right domestic price signals, New Zealand needs to be positioned as the best location for this low emissions activity. Otherwise, it may be that high emissions activity is reduced in New Zealand and the low emissions activities are located offshore.

New Zealand should seek to encourage low emissions activities

New Zealand should invest in creating a competitive environment for low emissions activities. This may involve many of the priority actions identified as important in creating a weightless economy: education, research, broadband infrastructure, and the like. There needs to be a coherent economic strategy to encourage this type of activity.

OTHER ACTIONS ARE NEEDED TO MANAGE NEW ZEALAND'S EXPOSURE TO CONSUMER AND GOVERNMENT ACTION



Consumer concern about the sustainability of goods and services extends beyond emissions. New Zealand should be investing more heavily in New Zealand's environmental outcomes to ensure that New Zealand's clean, green brand can be sustained. This is an area in which New Zealand can be globally distinctive, but hard work remains to be done.

New Zealand should be actively arguing its case in international negotiations, emphasising its unique circumstances with respect to agricultural emissions. To achieve this, New Zealand needs to be careful not to send mixed messages e.g. that we are leading the world, aiming for carbon neutrality, as this creates reputational risk and may make it more difficult to achieve the appropriate treatment.

AGENDA

New Zealand's exposure to climate change: What is the nature and scale of New Zealand's economic exposure to climate change?

New Zealand's strategic response: What are the costs and benefits associated with different strategic approaches, and which is the preferred strategic choice?

How does New Zealand deliver?: What are the broad options open to New Zealand in delivering on New Zealand's chosen approach to climate change, and how is New Zealand doing to date?

The way forward: There is a need for strategic clarity as to the response to climate change, combined with a clear programme of action to deliver against this aspiration.

THE WAY FORWARD

New Zealand is exposed to climate change

New Zealand's has a major economic exposure to the effects of climate change in terms of shifting consumer preferences as well as international government action requiring lower emissions.

New Zealand should be a fast follower

There is a reasonable likelihood that New Zealand will be required to reduce emissions substantially. Reducing emissions will be costly, but necessary. We recommend that New Zealand adopt a 'fast follower' approach, aiming to reduce 2050 emissions to 30% below their 1990 level.

New Zealand is currently a slow follower

The policies announced to date only reduce New Zealand's 2050 emissions to their 1990 level, which is not enough. Because of the limited abatement opportunities, there is a need for policy that develops low emissions strengths in the New Zealand economy.

New Zealand should establish a clear pathway

The priority should be to establish a clear and robust strategy, set a clear target for emissions reduction, and then deliver a clear programme of action to achieve this. To position New Zealand to compete successfully in a low emissions global economy requires tough action, not just words.