



# 4

# FUTURE SCENARIOS FOR NEW ZEALAND

WORK IN PROGRESS EDITION 2

DEVELOPED BY

THE LANDCARE RESEARCH  
SCENARIOS WORKING GROUP

ISBN 978-0-478-09388-9

Published by Manaaki Whenua Press,  
13 Gerald Street, PO Box 40, Lincoln 7640, New Zealand  
[www.mwpress.co.nz](http://www.mwpress.co.nz)

Cataloguing data:

Work in progress: four future scenarios for New Zealand.  
Developed by the Landcare Research Scenarios Working Group; documented with additional commentary by Rhys Taylor, Bob Frame, Kate Delaney and Melissa Brignall-Theyer. 2nd ed. – Lincoln, N.Z.: Published by Manaaki Whenua Press, 2007.

1. Sustainable development – New Zealand. 2. New Zealand – Economic policy. 3. New Zealand – Social policy. I. Taylor, Rhys, 1955- II. Frame, Bob. III. Delaney, Kate. IV Brignall-Theyer, Melissa

UDC 502.33(931)

[scenarios@landcareresearch.co.nz](mailto:scenarios@landcareresearch.co.nz)

Bob Frame and Melissa Brignall-Theyer  
Landcare Research  
13 Gerald Street, PO Box 40, Lincoln 7640, New Zealand

Rhys Taylor  
Environment & Community Consultancy  
5/83 Huxley Street, Sydenham, Christchurch 8023, New Zealand

Kate Delaney  
Delaney and Associates Pty Ltd,  
Suite 6, 84 MacGregor Street, Deakin ACT 2600, Australia

**Health Warning:** Enjoy exploring these possible futures. Any resemblance between the country portrayed here and that more recognisable by people, living or yet to be born, is entirely intentional although most likely flawed. However, any offence, factual error or misrepresentation of view or character is regretted. Any ability to predict the real future is purely fortuitous - only hindsight will show which if any possibilities became probabilities.

## AUTHORS AND ACKNOWLEDGEMENTS

► **Development of the scenarios** was funded through the Foundation for Research, Science and Technology (FRST) programme ‘Building capacity for sustainable development: The enabling research’ (C09X0310), led by Bob Frame. Details of the programme are at [www.landcareresearch.co.nz/research/programme.asp?Proj\\_Collab\\_ID=5](http://www.landcareresearch.co.nz/research/programme.asp?Proj_Collab_ID=5)

Sincere thanks are due to all who participated in the scenario production workshops, the subsequent processes, and made comments on various texts. The errors, however, are the four co-authors’ responsibility.

The scenarios team is led by Bob Frame at Landcare Research, Lincoln, who brings practical experience of sustainable development issues with government, business and communities in New Zealand and overseas. Melissa Brignall-Theyer is also a staff member at Landcare Research, Lincoln. Rhys Taylor, an independent co-researcher, has relevant experience in sustainable development issues through the NZ local-government-led ‘Sustainable Living’ programme, Local Agenda 21 community activity in both New Zealand and the UK, and business sustainability advisory work through The Natural Step Aotearoa NZ Foundation. Kate Delaney, one of Australasia’s leading futurists, has provided invaluable advice and support to the team as the scenarios have been developed. She also works with a broad range of organisations globally to improve their capacity to think and act looking forward.

The team has been ably supported by a wide range of people, including Robbie Andrew and Oscar Montes de Oca Munguia at the NZ Centre for Ecological Economics. Other participants, advisers, facilitators, and researchers are listed in Appendix 1.

In particular the co-authors wish to thank Landcare Research colleagues Christine Bezar, Richard Gordon, James Lennox, Meredith Mackay, Jen McBride, Penny Nelson, Tamsin Rees and Kathryn Scott, and also Airplane Studios for valued input and creative design assistance during the project. ◻

# FOUR FUTURES

## FOR NEW ZEALAND

The first edition in 2005, as made explicit in the choice of 'Work in Progress' as a subtitle, reflected formative activity and published a first draft of the scenarios. This edition takes the continuing work on to mid-2007, and draws upon experience of operational use of the scenarios with varied groups of participants, from within and beyond New Zealand<sup>1</sup> society.

These scenarios have been developed as part of the FRST funded programme 'Building capacity for sustainable development: the enabling research' (C09X0310).

As a work still in progress through to 2009, comments on the scenarios, and their usefulness, are actively sought. Companion material such as appendices are being published on the Landcare Research website at <http://www.landcareresearch.co.nz/services/sustainablesoc/futures/publications.asp>

A summary version of the previous text was produced in May 2005 as a screenplay, published by Landcare Research and available to download in 2007 from our website <http://www.landcareresearch.co.nz/services/sustainablesoc/futures/publications.asp>

The screenplay also appears as a chapter in *New Zealand Identities: Departures and Destinations*, JH Liu, T McCreanor, T McIntosh, and T Teaiwa, Eds (2005), Victoria University Press. pp. 255–290.

The scenarios 'game' materials and facilitator's guide are now available to download from our website, without charge to users who register first at <http://www.landcareresearch.co.nz/services/sustainablesoc/futures/>

Please do not quote without the permission of Landcare Research New Zealand Ltd. Contact the authors at [scenarios@landcareresearch.co.nz](mailto:scenarios@landcareresearch.co.nz)



# CONTENTS

Executive summary .....	4	Tourism .....	35
Structure .....	6	Sport and artistic culture .....	36
<b>SECTION 1 – WHY SCENARIOS? .....</b>	<b>7</b>	Media .....	36
What are Scenarios and why use them? .....	7	Technology .....	36
What are the broad benefits? .....	8	Key Issues in Scenario A .....	37
What is the Scenarios Working Group? .....	9	What are the implications for sustainable development? .....	37
How were the Scenarios constructed? .....	10	<b>SCENARIO B: INDEPENDENT AOTEAROA .....</b>	<b>39</b>
IPCC Scenarios .....	12	Principal drivers of change .....	40
Sustainable Development Scenarios .....	12	Global context favouring Scenario B .....	40
How to use these Scenarios in a strategic conversation .....	14	New Zealand in this context .....	42
<b>SECTION 2 – THE SCENARIOS .....</b>	<b>16</b>	People and social dimensions .....	45
The Scenarios in brief .....	16	Demographics and migration .....	46
Scenarios in a changing climate .....	20	Legislative, political and institutional directions .....	46
Environmental and socio-economic indicators for New Zealand sustainability .....	22	Economy and business conditions .....	47
Technology & innovation in the Scenarios .....	24	Tourism, sport and artistic culture .....	49
<b>SCENARIO A: FRUITS FOR A FEW .....</b>	<b>26</b>	Media .....	50
Principal drivers of change .....	27	Technology .....	50
Global context favouring Scenario A .....	27	Key issues in Scenario B .....	51
New Zealand in this context .....	30	What are the implications for sustainable development? .....	51
Legislative, political and institutional directions .....	33	<b>SCENARIO C: NEW FRONTIERS .....</b>	<b>53</b>
Economy and business conditions .....	34	Principal drivers of change .....	54
		Global context favouring Scenario C .....	54
		New Zealand in this context .....	57



People and social dimensions .....	58
Demographics and migration .....	59
Legislative, political and institutional directions .....	59
Economy and business conditions .....	60
Tourism, sport and artistic culture .....	61
Media .....	62
Technology .....	62
Key issues in Scenario C .....	62
What are the implications for sustainable development? .....	63
<b>SCENARIO D: LIVING ON Nº 8 WIRE .....</b>	<b>64</b>
Principal drivers of change .....	65
Global context favouring Scenario D .....	65
New Zealand in this context .....	67
People and social dimensions .....	68
Demographics and migration .....	68
Legislative, political and institutional directions .....	70
Economy and business conditions .....	70
Tourism, sport and culture .....	72
Media .....	72
Technology .....	72
Key Issues in Scenario D .....	72
What are the implications for sustainable development? .....	73

### **SECTION 3 – SCENARIOS GAME .....** 74

### **SECTION 4 – SUSTAINABILITY .....** 79

A brief history .....	79
Sustainability concepts .....	81
A quantitative model in support of the Four Futures for New Zealand Scenarios .....	83
Reflections: What we are learning about New Zealanders .....	90

### **SECTION 5 – A POSSIBLE FUTURE? .....** 92

Appendix 1: Participants and events .....	97
Notes and references .....	100

# EXECUTIVE SUMMARY

**How many people is the Earth able to sustain?** The question is incomplete as it stands. One must modify the question by asking further: At what level of technology? And modify it still further by asking: At what level of human dignity?

Isaac Asimov<sup>178</sup>

**We cannot say what New Zealand** will be like in the future, but we can creatively discuss how the choices we and others make will affect what may happen so that we, as a nation, are not ill-prepared for the future. We want to explore how our actions today – together with chance and necessity – can widen or shrink the field of future possibilities.

Sustainable development is the lens we use to investigate our world.<sup>i</sup> We believe that we need to choose future directions early; or let human and ecological processes narrow the choices for us. This affects what we consider desirable, what we see as inconsequential and what changes we think will irreversibly affect our choices. We know, however, that just speaking about the future will not make it true; so, the images of the future we create for ourselves need to take into account other people's views and intentions and the choices they might make with the

future in mind. We need to discuss and understand other ways of thinking about sustainability and the capacity for change.

In 2004, we wrote four scenarios about the possible future of New Zealand over the next 20 to 50 years as a platform for launching these conversations. The Foundation for Research, Science and Technology (FRST) funded this work. In the scenarios we imagine circumstances where New Zealand has stopped looking like it did in the past or as it does today. This allows us to invent situations where people have very different attitudes about the environment.

Good thinking about the future is not about identifying what will happen; rather it is about encouraging thinking that leads to action. The actual future is not likely to match with any one of these four scenarios, but it will have elements that can be recognised from

each of these scenarios, as well as things we simply cannot imagine today. The scenarios are not an end in themselves; they are useful only if they catalyse action based on conversations about sustainable development.

New Zealand is at a pivotal point in its development and one that will see the country carve out a new form of identity. The growth from 2005 to 2007 in public awareness of human-influenced climate change and of need for energy alternatives to oil has reinforced our sense of reaching a sea-change.

For New Zealand to take on principles of sustainability we will have to change from a short-term to a long-term mindset and be more focused on future generations' needs. To do this we need to think creatively, rather than continue thinking the way we did to get us to this point. A commissioned 'thinkpiece' from Kate Delaney (Section 5) illustrates the creative thinking process that helps us explore future possibilities.

<sup>i</sup> [www.landcareresearch.co.nz/research/](http://www.landcareresearch.co.nz/research/)



#### ► ABOUT THE SCENARIOS

Scenarios are recognised internationally as a way of thinking creatively about the future. Once people get used to the experience of speculating on *what might be*, as distinct from projecting trends or determining what they hope will be, scenarios become a useful tool. They can help people prepare to make decisions that will in the long term prove more sustainable and 'successful', despite the choices not necessarily being the most appealing or comfortable ones in the short term.

Having devised some plausible New Zealand scenarios, our next steps in 2005-6 were to refine them through sharing them with as many diverse audiences as possible and then include their reflections and ideas in this second edition. Colleagues have also begun modelling futures based on the scenarios – see Section 4.

Further comments on these scenarios are most welcome to: [scenarios@landcareresearch.co.nz](mailto:scenarios@landcareresearch.co.nz)<sup>ii</sup>

In time we hope that these can then be merged with other, more quantitative and extrapolatory approaches that can be used to influence decisions being made now that will affect future generations of New Zealanders.

The four scenarios are summarised below. They range from an increasingly insular society that finds little benefit in diversity other than separating 'winners and losers' to one where multi-cultural aspects are heralded as a cornerstone of the nation's identity. Within these future possibilities our relationship with the natural environment and its resources, on which so much of our current economy depends, can be seen as available for short-term exploitation, at one extreme, or for stewardship and longer-term conservation. Similarly our approach to being a future 'maker' or 'taker' of new technology (such as genetic engineering, biotechnology and information/communication technology) and also the models of governance that we choose will markedly influence which, if any, of these future directions we migrate towards by 2055.

We look at various possibilities for the evolution of the economy. Our New Zealand scenarios suggest that from 2007 looking forward, we could move in a few decades towards any of:

- A an economy with unevenly distributed benefits (80% to minority elite: 20% to the rest), or
- B an economy with equity and very different 'genuine progress' indicators taking the place of GDP growth targets, or
- C we might stay globalised and 'hit the wall' of resource and ecosystem limitations (after several decades), resulting in economic crash and social conflict, or
- D avoid the social conflict 'at the last minute' by creating a localised, inward-looking lifestyle on a depleted resource base. □

ii This is an email address available throughout 2007. Correspondence is warmly welcomed by Bob Frame and Rhys Taylor.

# STRUCTURE

Our intention is to provide source material to anyone seeking to understand scenarios and sustainability.

**The scenarios work** fits into a six-year FRST-funded programme from October 2003 to June 2009. This focuses on key issues faced by society when embarking on the sustainable development journey, namely, understanding sustainability and the attitudes and behaviours shown by individuals and organisations. The programme is achieved through four objectives, pursued in parallel. We are reporting here on the first objective of the programme, the purpose of which is to develop and evaluate a range of sustainability scenarios for the next 20–50 years, to be used to support strategic ‘capacity building’ and planning for government, business, Māori and wider (tau-iwi) society.

This second edition of *Four Futures for NZ: Work in Progress* covers progress to mid-2007 on developing long-term scenarios for New Zealand. It is intended to bring the reader to an understanding of the process used in developing them, describe the scenarios themselves, introduce a ‘game’ employing them (now published on the Web), quote responses from game participants and discuss their implications for New Zealand’s long-term sustainable future. It includes material updated from the first edition.

The scenarios work is designed to complement and support a range of end-user activities by central government, local government, and the private sector. Research information is disseminated to end-users through active engagement in scenarios ‘workshops’ (using the Scenarios Game), publications, and websites. By mid-2006, progress applying the scenarios game with varied users at many locations was being documented by Rhys Taylor and Melissa Brignall-Theyer.

This volume is structured as follows. Section 1 describes the use and development of scenarios. Section 2 describes our development of the four scenarios for New Zealand and illustrates how participants have ‘inhabited them’ to provide imagined voices from future generations. The reader should then be able to embark on development of scenarios, perhaps through use of our four New Zealand scenarios – in a ready-made ‘game materials’ format as discussed in Section 3 (available at [www.landcareresearch.co.nz/services/sustainablesoc/futures/](http://www.landcareresearch.co.nz/services/sustainablesoc/futures/)). Responses to scenario ‘game’ participation are also reviewed in Section 3. Sustainability concepts and the implications of these are discussed in

Section 4 which also introduces an initial economic model linked to the scenarios. We conclude, in Section 5 with a ‘thinkpiece’ by Kate Delaney on New Zealand future directions, to stimulate further debate.

It is supported by extensive endnotes and material on the accompanying website ([www.landcareresearch.co.nz/services/sustainablesoc/futures/publications.asp](http://www.landcareresearch.co.nz/services/sustainablesoc/futures/publications.asp)). □



# SECTION 1

## WHY SCENARIOS?

### WHAT ARE SCENARIOS AND WHY USE THEM?

Thinking about the **future** is both simple and difficult.

**When we create a vivid image of the future**, make a forecast or develop a plan or a policy, we think about what may happen – how the future may unfold. We are able to imagine situations that are different from anything we have known or experienced. This is what artists and novelists do when they create new paintings or books and our children do when they play some games.

Thinking about the future is difficult because the image we construct and what eventually happens are often not the same. It is simply not possible to predict the future with certainty. We know that our predictions and forecasts are mostly wrong. This can be discouraging.

All of us are able to create vivid images of the future from maps or models in our heads about how the world works. Most of our experience in thinking about the future is informal and at times we do not realise we are, in fact, involved in thinking this way. For example, when you buy land and create plans to build a house, when you start a business or when you plan for your child's education you are thinking about the future.

Sometimes these maps or models are accurate and other times they are incomplete, and inaccurate<sup>15</sup>. One of the most important and difficult parts of understanding

how the future may unfold is for us to 'see' what we are not seeing today. Scenario thinking should help us to improve the quality of the way we think about the future by encouraging us to systematically express our ideas about the future, share them with other people who have different perspectives, and test alternative stories (scenarios) about how things have, do and may work.

One of the criticisms of a previous attempt at national future scenario-building in New Zealand at government level, the MoRST Foresight project of the 1990s<sup>16</sup>, was that it 'lacked clarity of purpose' and that the three scenarios (named *Possum in the glare*, *Shark roaming alone*, and *Reaching new heights*) were really descriptions of co-existing sections within existing UK or New Zealand society, 'rather than exploring possible and typically unitary future states, as was the intention, the scenarios merely reflected the designers' manifold present back at them'<sup>184</sup>.

In contrast, our Working Group started with an analysis of drivers of change acting across society, economy and environment, and then varied the drivers' relative impacts in order to explore their effects, and also stretched the time horizon well beyond the present decade.





A useful typology of scenarios<sup>17</sup> presents contrasts between the *predictive* (asking what will happen, short term), the *explorative* (asking what can happen, what is possible, longer term) and the *normative* (how can a vision or target be reached?). The four scenarios developed here are explorative.

This allowed us to better consider changes that ‘may’ happen, because we cannot predict the future. It is important to be clear that these scenarios are not predictions, nor desired visions. They are simply alternative stories of how the future might unfold: explorations that gather information about divergent trends and potential developments into new narratives about how these parts of the future might work together.

Jointly crafting scenarios, as images of the future, allows us to explore both how elements of the future may be the same as today and where they may significantly change in areas of technological, social, economic, environmental and other developments. We may not be more accurate about guessing the future in detail, but our conversations will still help us make better decisions about the future, not least by alerting us in advance of more – and less – desirable directions.

Scenarios help us to take account of different perspectives on issues and opportunities. One person or institution alone does not cause changes in society.

Creating multiple views of the future helps us to understand how different individual and joint decisions, actions, and events can lead to alternative futures. We are not trying to determine what is going to happen; we are trying to understand what might happen in the longer term. Unlike forecasting, scenario planning embraces uncertainty. Where forecasts often assume that the world of tomorrow is a trend-projection of the world of today, scenarios can allow for sudden shifts in the environment.

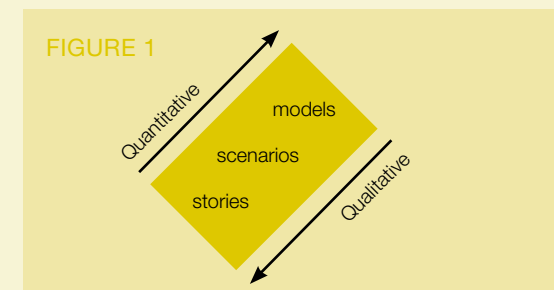
Scenario planning is based on four assumptions<sup>18</sup>:

- The future is unlike the past, and is significantly shaped by human choice and action.
- The future cannot be foreseen, but exploring the future can inform present decisions.
- There are many possible futures; scenarios therefore map within a ‘possibility space’.
- Scenario development involves both rational analysis and creative thinking.

Scenario approaches have been used internationally in different settings, with different specific aims, but they possess traits that distinguish them from more traditional forecasting approaches. Not only do they look further ahead, they also assess changes across many aspects of society. Users are encouraged to develop their own conclusions about possible futures, employing the scenarios as a starting point and then

elaborating and evaluating them in ways that are in tune with their specific interests, needs, cultural perspectives, etc.

Good scenarios help us understand how key drivers, such as governance systems and resource availability, might interact and affect the future weight and momentum of change.<sup>19</sup> They sit between quantitative analysis that models trends and speculative, anecdotal approaches of telling stories about the imagined future.<sup>20</sup>



## WHAT ARE THE BROAD BENEFITS?

The scenario exercise expands the range of future outcomes considered in strategic decision-making, so strategies and policies can be developed to be more resilient to a wider variety of circumstances. This avoids the risk of ‘putting all eggs in one basket’. It places under scrutiny assumptions underlying strategic decisions, for example assumptions about direction of long-term growth prospects or consumer behaviour preferences;

and may offer reasonable challenges to conventional wisdom and expectations of 'business as usual'.

Scenarios may help us to explore structural issues (including the role of inevitable surprises) related to sustainable development, which seemingly cannot be solved with incremental changes.

The process of engaging with scenario elaboration itself can be a valuable contribution to preparing the ground for change. If carried out in an inclusive and positive process, scenario planning can support institutional change through encouraging individual and collective reflection, strengthening strategic thinking at all levels, and helping to point out unnecessary organisational rigidities and routines.

Some responses to scenario game participation from local government councillors & staff attending the July 2006 LGNZ conference (as illustrations of typical participant enthusiasm):

"I enjoyed the process and the way I had to think outside my experience."

Lois Livingston, Environment Waikato.

"Good fun but also thought provoking, making learning interesting."

Heather Kinsey, Central Otago District Council.

There are thus potential internal and external benefits from participation in scenario-making process and using the findings. How to use scenarios in a strategic conversation is explored further on page 14, and the scenarios game is described in Section 3.

The authors hope that these scenarios may help develop a deeper understanding of sustainability issues within a broad range of New Zealand stakeholders, namely policy makers, planners, researchers, educators and the general public, through a broad range of interactions. These insights will be of use for strategic planning at the policy level in Central and Local Government and business, as well as in the wider society in debates on the development of New Zealand's distinctive national identity and direction.

"Great, something outside the square and an opportunity to meet and talk with others on an interesting issue."

Cr Jenni Vernon, Environment Waikato.

"Excellent linkage between economic, social and environmental factors. It was stimulating on our local government responsibilities and roles."

Cr Christine McElwee, Taupo District Council.

## WHAT IS THE SCENARIOS WORKING GROUP?

A group of about 25 people drawn mostly from Wellington staff of Central Government ministries and agencies, supported by several researchers/facilitators, developed the first set of scenarios in the period March to September 2004. This involved four days of workshops in Wellington and discussion between events, including peer review by external advisers. The Wellington participants were informed by their agency backgrounds but their departments are not bound by the collective views expressed. This particular group's scenarios may well differ from those generated by people from other sectors, socio-economic and geographical backgrounds.

The scenarios game (<http://www.landcareresearch.co.nz/services/sustainablesoc/futures/>) has been tested with varied groups of participants, ranging from local government staff and councillors, to secondary schoolchildren, recent Chinese migrants, businesspeople from the tourism industry, and residents from a South Island country town. As we note in Section 3, the Wellington participants' collective 'bias' in assessing significance of drivers of change was towards economic drivers rather than environmental and social ones, and the latter were relatively more prominent overall for people living outside the capital.



### HOW WERE THE SCENARIOS CONSTRUCTED?

Prediction is possible only in a world in which events are preordained and no amount of action in the present can influence future outcomes. That world is the stuff of myth and superstition. The one we inhabit is quite different – little is certain, nothing is preordained, and what we do in the present affects how events unfold, often in significant, unexpected ways. The role of the forecaster in the real world is quite different from that of the mythical seer. Prediction is concerned with future certainty; forecasting looks at how hidden currents in the present signal possible changes in direction for companies, societies, or the world at large.

Thus, the primary goal of forecasting is to identify the full range of possibilities, not a limited set of illusory certainties.

Paul Saffo<sup>179</sup>

There are a number of commonly used methods that can be used to develop alternative scenarios. Our Scenarios Working Group followed one of these by first identifying and analysing driving forces that will shape the environment in which New Zealanders will make decisions about how they will think about and then apply their understanding of sustainable development in the future. Based on prior research, participants discussed what circumstances were likely to persist and could be forecast, and what might likely change and were thus unknowns.

Following these discussions, we chose a range of driving forces, which we knitted together to create a set of plausible storylines. The stories were structured around three key uncertainties. These were:

- Governance: The social and economic rules we play by, degrees of regulation.
- Identity and social cohesion: Self-image, basis of association, relatedness through shared culture, competition versus cooperation, extent of social capital.<sup>21</sup>
- Resource base and capacity of natural systems to cope with human impacts: Useful materials, plus biophysical systems and 'services' they provide to humans.<sup>22</sup>

The scenarios attempt to capture New Zealand’s particular identities and resource base. The decision choices to enable resources to become ‘plentiful’ or ‘depleted’ in future are strongly related to governance issues. One or more environmental dynamics can have catalytic effects on other environmental dynamics. This is a complex concept to capture on two axes in Figure 2 and some difficulties have been experienced in portraying the scenarios on a single plane in this way.

However, to use all of the Working Group’s identified factors simultaneously in scenario creation would lead to scenarios that are too complex and too blurred to read and use. That is why the Working Group selected only those drivers that, in their view, play a great role in the determination of sustainable development.

We believe that the seeds or potential for each of the scenarios is present in New Zealand society today; across the working group we could imagine people we had already met who would live more-or-less comfortably in each quarter of the possibility space explored. Using an iterative process of creation and reflection we sought a set of scenarios sufficiently plausible to be used as a discussion tool by others. We did not, as a group, identify one preferred scenario from the four.

FIGURE 2 The ‘logical grid’ used to locate and distinguish scenarios





Other important drivers were included in the narrative of each scenario. In particular we paid attention to:

- Technology choices and impacts: The tools we use, and from where obtained;
- Sense of security felt by inhabitants: which provides a psychological ‘health’ variable that can also distinguish scenarios.<sup>23</sup>
- Media, arts, sports and other manifestations of shared culture.

The four scenarios provide distinctly different attitudes/relationships to the wider world, and can also be loosely associated, approximately with four ‘cultural types’ of Cultural Theory of Risk<sup>24</sup> (the labels in bold below):

- A** Well-connected globally, but this mostly by an internationally mobile elite, on their private terms. **Hierarchist**
- B** Only selectively connected globally and on ‘our’ terms, democratically controlled. **Egalitarian**
- C** Fully connected throughout society, but on globally-set not local terms. **Entrepreneurial**
- D** Disconnected, but detached more by circumstance than choice. **Fatalist**

Within the context of the scenarios, we have explored different directions of how possible transitions and social transformations related to sustainable development may unfold. These long-term processes, taking at least one generation, often more, involve large-scale technological, economic, ecological, social-cultural and institutional developments that influence and strengthen each other and, frequently, occur at different timescales.<sup>25</sup>

Demographic change, such as the impact of ageing and ethnic mix, is woven into each scenario. These trends are generally predictable for one generation

ahead (reasonably, barring epidemics or war); so the richness in the stories will be about the societal responses/experiences associated with a population that is, in every scenario, both older and more ethnically diverse. The scenarios also reflect the ebb and flow migrations of ‘cultural creatives’ to New Zealand – such as the lifestylers who can give an economic edge.<sup>26</sup>

The scenarios we have constructed help us to explore structural issues (including the role of inevitable surprises) related to sustainable development, which seemingly cannot be solved with incremental changes.

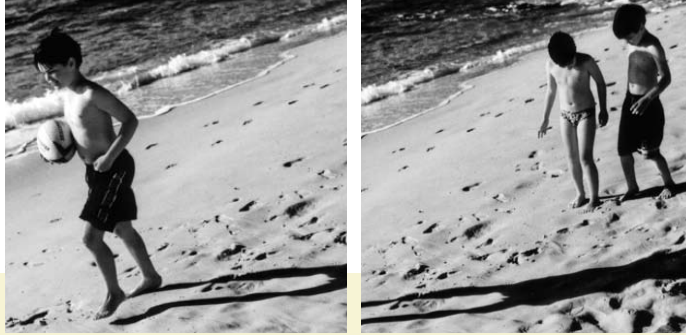
## IPCC SCENARIOS

The Intergovernmental Panel on Climate Change (IPCC) developed long-term emissions scenarios as presented in the Special Report on Emissions Scenarios (SRES) in 2000.<sup>20</sup> These were constructed to explore future developments in the global environment, with special reference to the production of greenhouse gases and aerosol precursor emissions. All the SRES scenarios are ‘non-mitigation’ scenarios with respect to climate change. They have been widely used in analysis of possible climate change, its impacts, and options to mitigate climate change. More detail is available from Landcare Research at <http://www.landcareresearch.co.nz/services/sustainablesoc/futures/publications.asp>

## SUSTAINABLE DEVELOPMENT SCENARIOS

We looked in 2005 at the Global scenarios group (1998)<sup>172</sup>, World Business Council for Sustainable Development (2000)<sup>173</sup>, Global Environmental Outlook (2002)<sup>174</sup>, Robert Costanza (2003)<sup>175</sup> and others.

In updating our review of international reports and scenarios for the second edition, we have selected notable examples of the *types of reports* that have had important impacts shaping global and domestic



opinion about sustainability thinking, measures and practices in the last two years. The reports are:

□ **(on human health and ecosystems)**

The 2005 Millennium Ecosystems Assessment Reports called for by the United Nations Secretary-General Kofi Annan available on <http://www.maweb.org/en/index.aspx>

□ **(on the economic costs of climate change)**

The 2006 Stern Review on the economics of climate change, completed for the British Prime Minister and the Chancellor of the Exchequer, available on [http://www.hm-treasury.gov.uk/independent\\_reviews/stern\\_review\\_economics\\_climate\\_change/sternreview\\_index.cfm](http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm)

□ **(on scenarios portraying the emerging energy mix in APEC economies)**

The 2006 APEC report of Foresighting Future Fuel Technology, undertaken by the APEC Centre for Technology Foresight, available on [http://www.apecforesight.org/apec\\_wide/docs/DraftSumReport.pdf](http://www.apecforesight.org/apec_wide/docs/DraftSumReport.pdf)

□ **(on climate change in different global contexts)**

The 2007 Working Group III Report “Mitigation of Climate Change”, the Working Group II Report “Impacts, Adaptation and Vulnerability” and Working Group I Report “The Physical Science

Basis” of The Intergovernmental Panel on Climate Change (IPCC) for the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP), available on <http://www.ipcc.ch/>

All of these reports suggest that thinking holistically is essential; in this they suggest early action is less costly than late action when making decisions about deep structural changes that will lessen the impact of human activities on ecosystems that underpin societal and economic well-being.

These reports also suggest that *our judgements are sometimes lulled by long lead times* typical of social, cultural and ecological change processes. Most important developments typically start slowly and incrementally, move along quietly for some time, and then suddenly explode. When planning and making future investment decisions we often mistake the quiet time for ‘nothing happening’ so are ill-prepared when matters reach a tipping point, or when a step change occurs. We need to overcome this thinking fallacy.

Current research generally takes the position that there are *no ‘magic bullet’ single solutions* or universal approaches to achieving sustainability. Most often, a series of concurrent activities or initiatives or steps will need to be implemented to achieve a cumulative

improvement effect. This means it will be a hard slog to keep people engaged as panacea solution or ‘big bang’ approaches are more visible and attract greater attention compared to diverse activities which when taken together may achieve more desirable outcomes.

Response options for *what we will do about big-ticket concerns* like water scarcity, energy supply and climate change are now being debated. The options will become more clearly defined over time. In the near term, debates about the ‘right’ mixture of approaches and responses will make for confusing times for most people. While science modelling capability is now robust enough to draw different scenarios in ways that make sense to people, the predictive models that have been developed to link people and environment are still more advanced than our ability to respond to the results. This will place additional pressure on democratic and civil societies at times when the information they have available is exploding.

## HOW TO USE THESE SCENARIOS IN A STRATEGIC CONVERSATION

Scenario uses will depend on the needs of organisations and the time available. Here are four potential ones:

### 1 A VEHICLE FOR PERSONAL REFLECTION

At the simplest level, the scenarios provide each reader with a stimulus to thoughts about how different or similar the future may be from today, and how decisions being taken today will influence directions or trends in society, the economy and environment. Within New Zealand society today there are probably elements or ‘seeds’ of all four scenarios – you may find it helpful to imagine people whom you have already met who would like living in these different futures, and why. Which futures (or elements of those futures) are desirable, or which are to be avoided?

Our preparatory work with a focus group of Māori researchers and trialling the game with Māori schoolchildren in Northcote, for example, suggested that their starting location describing today’s society, as placed on the two-axes diagram, is slightly different from that of sampled Pākehā society. We acknowledge that the ‘appeal’ of different scenarios to any reader will vary culturally, as well as socio-economically.

### 2 A GROUP ACTIVITY WITHIN AN ORGANISATION OR BUSINESS: AS ‘FUTURE PREPAREDNESS’ OR TO BUILD ‘RESILIENCE’

The scenarios provide scope for participation by groups of workmates, board members, managers or professional teams – wherever there is a need to think strategically and consider implications of future change for your organisation. International experience of using scenarios suggests a model of steps that could be adapted for your context:

Assemble the relevant people (stakeholders) in one room, for a least half a day – you may only get ‘one shot’ at this, so it is important to get together all those who would find value from involvement, including senior management (e.g. in a manufacturing company, it would help to have research/development, marketing, finance and production people all present, and not just a ‘strategy team’) – for the scenarios game activity. (Details in Section 3) This could be followed immediately by a discussion that connects the broad scenarios into the more specialist interests of the group (e.g. your business sector, or locality, or a particular policy focus) during which the basic scenarios descriptions can be annotated or elaborated with implications for the main topic focus of the day. You might consider under which scenarios you would

prosper in business – and for how long – or best advance your policy cause, or achieve required care of the local environment, etc. Underlying the exercise are the two questions: **How well prepared are you for change? Are your operations still viable if long-term circumstances or directions change?**

### 3 A CONCEPTUAL FRAMEWORK FOR SECTORAL OR ISSUE-BASED QUANTITATIVE RESEARCH

If your particular interest is just one part of the economy/society/environment, or perhaps a particular geographic region, you may already have access to considerable quantitative data about trends that could provide a platform for looking at and ‘modelling’ different futures. The qualitative picture in these scenarios, and understanding of their different drivers, can provide a logical framework for such quantitative detailed models (such as in Section 4) to help you explore potentially measurable impacts of future trends. Such work generates indicators that you can then use to monitor real change over time, in comparison to the model.



## 4 EVALUATION OF 'FUTURE VISIONS' OR EXISTING LONG-TERM POLICY GOALS

A robust policy-making process requires, ideally, a comprehensive input from all who can usefully inform and be affected by it – so in practice it will be incomplete. These scenarios can be used for dialogue that tests the plausibility of envisioned futures, or of distant policy goals including Long Term Council Community Plans and 50-year development strategies. Because it is based on an explicit structure of change drivers (Table 1, page 19), it helps address questions such as: What circumstances could bring about our vision or what would help attain the policy goals? Back-casting from the goal towards the present day can reveal assumptions you made about change that were not originally explicit. This may lead either to changes in the policy or the vision, or in the methods being used to advance change into preferred directions or avoid the undesirable. □



# SECTION 2

## THE SCENARIOS



### THE SCENARIOS IN BRIEF

The **scenarios developed** by the working group suggest ways in which the ‘structure’ of the future changes over time.

**The scenarios** – when taken together as a set – focus on some boundaries of the *possible or anticipated* future as distinct from a *most likely* future, because:

Statistically, the most probable future is NOT the most likely future. The most probable future from a set rarely has a probability exceeding 50%, making ‘anything else’ the most likely future.<sup>27</sup>

Trends and events outside our thinking about the ‘anticipated’ future have typically created change in the past. Study of world history shows that change has often resulted from relationships between trends, events, ideas and people over long distances and time periods.<sup>28</sup>

Virtually random events often play key roles in the departure from an ‘anticipated’ future: disease, war, shifts in trade, etc.<sup>20</sup>

The scenarios are summarised below and the main drivers used in their design are given in Table 1.

In an Appendix to the First Edition a broad selection of numerical indicators was created to give a more parameters-based response to the narrative in each scenario, in relation to 2004 baseline values. For this edition these are replaced (see Section 4) by an approach modeling change in population, economy and environment, developed from shared assumptions with each of the narrative scenarios.

The material following the four scenario summaries (page 19) considers drivers and then contexts – firstly climate change, followed by environmental impacts of socio-economic changes and technological change.

### ► SCENARIO A FRUITS FOR A FEW

The need to adapt to climate change and accumulating environmental damage led to tight resource control in the 2020s, with benefits held in the private sector and costs spread on the wider public. Natural resources are used more efficiently now in 2055, and access to them is limited by their rich owners, since formerly common resources and public land were mostly privatised by 2030. Those owning property and resources obtained the strongest rights and administrative roles in society, while the government role overall has diminished.

There has been moderate but variable economic growth. Due to environmental and other regulations made by those holding power, the benefits of economic growth are concentrated in fewer hands. Within a divided society, there are strengthening regional and cultural identities. The poorer majority have returned to family structures and traditions of the group for support. Those in power look after each other, financially, but their culture and identity are more internationally



influenced. Sustainability here is a narrow term defined by accountants and economists to maximise profit and environmental protection to the benefit of large corporates.

**► SCENARIO B INDEPENDENT AOTEAROA**  
(This scenario was formerly titled 'The Shire')

By 2055, Aotearoa-New Zealand is a dynamic cohesive society, seeing itself as a global citizen. Whilst outward looking, it remains critical and is confident enough to be distinctly different as a South Pacific nation. Government seeks and coordinates solutions to climate, environmental and social sustainability challenges. This is a slow process, which frustrates some. Sustainability is a conscious lifestyle choice for many, resulting from a value shift<sup>29</sup> as Aotearoa-New Zealand decided to 'go its own way'. Some disagree and contribute much heat to the debate.

In this scenario, geopolitical instability and cultural/social change override the incentives for economic globalisation. There has been a clear shift from a

'first-come first-served' market economics to a more participative governance and regulation. This values social and cultural well-being and long-term benefits for future generations<sup>30</sup> over short-term profits. Although the knowledge-based economy is slow-growing, its benefits are shared equitably. This demand from the State, however, discourages the individualist entrepreneurs, some of whom take their skills abroad. The amount of materials, water and energy required to produce goods has reduced, while economic benefits (and exports) flow from introduction of clean, efficient technologies. Less unprocessed primary produce is exported than in 2020.

**► SCENARIO C NEW FRONTIERS**  
(This scenario was formerly titled 'homo economicus')

In 2055, identity is individualistic, defined by visible financial status, rather than by family and cultural traditions. Society is fragmented – the losers feel there is 'no fair go' (inequality) while the winners enjoy their freedoms as consumers<sup>31</sup>. The State's role is reduced to maintaining law and order and governing markets,

but is much less involved in environmental protection, including climate change responses, than in the 2020s. Once-public services, like health and education, have been privatised, creating new business opportunities. The entrepreneurial culture encouraged a rapid introduction and development of more efficient technology, some of which protect the environment, but the main criterion for success was profitability.

The population still shares a faith in technology to solve problems such as resource-substitution. However, it is shaky. The exploitative and extractive mindset became increasingly desperate as the local resource base depleted, leading to an economic downturn from 2030. In 2055, the economy remains globalised and regional differences have been diminished. Market forces still prevail creating an internationally mobile workforce. The well educated often leave. Sustainability is a notion remembered by a minority without political influence, and sometimes expressed through 'eco-terrorism'.



#### ► SCENARIO D LIVING ON N° 8 WIRE

Until 2025, most people pursued wealth without constraint. 'Sustainability' and responding to climate change were dismissed as the faddish beatings of a liberal minority. Concerns were largely ignored until the social impact of resource shortages, rising environmental degradation and economic downturn, combined to result in a public reappraisal of values. The damaged resource base and ecosystems had also made the country less attractive to multinational investment. After that, public and business concern rose for environmental restoration. The resulting mobilisation of innovative action is visible now, in 2055.

Government began to intervene after 2025 to manage trade-offs between economic gain and environmental degradation, to increase trade barriers and promote equitable redistribution. In 2055, New Zealand has a very modest, more localised economy, with little interest in or capacity to pay for globally traded goods and services. This has created a cohesive, inward-looking society. Due to greater emphasis on living locally, within our modest means, settlements are less densely urbanised. There is a strong emphasis on community initiative and social innovation to find affordable local solutions. These are ingenious people in the Kiwi N° 8 Wire or pioneer tradition.

TABLE 1 Summary of Driver Differences in each Scenario

	Viewpoint (paradigm)	Global drivers	New Zealand governance	Identity and social cohesion	Technology choices & impacts	Resource use/ impacts
<b>Fruits for a Few (A)</b>	An elite promotes economic rationalism and pragmatic environment care, i.e. 'rising tide lifts all boats'	International system parameters set by handful of large countries and large enterprises. Corporations more powerful than governments, but only an elite are globally connected	Representative democracy Centralised / factional, low participation rates Strong lobbying influences protect property rights.	Fierce competition 'Winner Takes All' Distinct underclass Corporation loyalties 80/20 society. Increasing alignment with traditional cultures as population composition diversifies	Wealth creation Cleaner, cost-effective conventional technologies, new technologies adopted as they become commercial	Privatised control/ownership Resource eco-efficiency Ecosystems being restored Resource taxes moderate Limited role for State Effective, early business-led response to climate change; more responsible international management of natural resources use; carbon regime
<b>Independent Aotearoa (B)</b>	Environmentalism, Gaian view (we are an inter-dependent part of the natural environment) <sup>32</sup>	Decline in interest in global trade regimes, changing trade patterns, coupled with signs of emerging regional trade arrangements; environment is one area where international interests are at a global scale	Participatory democracy (MMP) <sup>33</sup> Monthly referenda Devolved decisions where appropriate	Community oriented Consensus-building Deliberative, inclusive 'Oceanic' cultural identity emerges – lifestyle and ethic not related to single ethnicity	Innovation in social technologies, investment in next-generation environmental technologies <sup>34</sup> Educational services New-technology caution	Growing use of renewables Resource taxes high Ecosystems functioning Strong early, effective moves towards 'sustainability' – across the spectrum; carbon and biodiversity markets
<b>New Frontiers (C)</b>	A combination of materialism, consumerism and individualism predominate. Environment = resources	Absence of effective institutional mechanisms and policy frameworks, together with laissez-faire governments, few trade barriers, markets globally accessible, mobile workforce	Technocracy Mercantilist with significant structural change	Individualistic Independent, hedonistic, Success-seeking Decline of national identity, identity derived from self-selected associations	Driven by global market forces Adopt what's available, uncritically Nuclear powered?	High use of resources, depleting (because of volume, despite some efficient technologies) Ecosystems much damaged Resource taxes low Late-response patterns here contribute to resource depletion, worsen environmental conditions
<b>Living on N° 8 Wire (D)</b>	Environmental pragmatism, after initial materialism <sup>35</sup> 'Together we get by'	In this scenario the weight is on local rather than global solutions to economic, social, and environmental sustainability – with a strong emphasis on community initiative and social innovation, and global disconnection	Representative democracy MMP Pluralist Decentralised	Pragmatic Plain, survivalist, Task-focused Drawn together in face of adversity, Māori influences wider society values	Locally developed, social, adaptation and remediation technologies Experiment and repair/re-use	Depleted resource base Ecosystems compromised Resource taxes low to moderate Beginnings of ecosystem restoration after initial neglect

## SCENARIOS IN A CHANGING CLIMATE

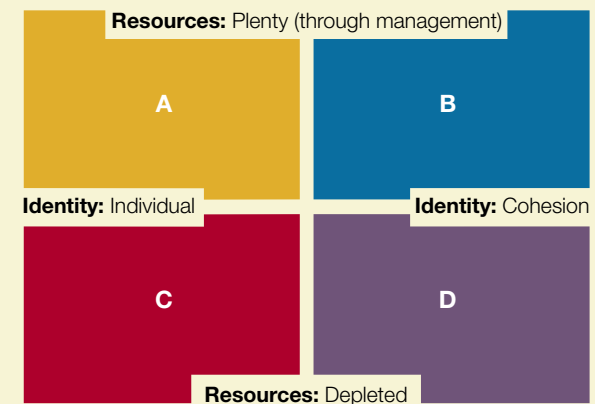
The impact of climate change on how we define and practise sustainable development is undeniable. The Intergovernmental Panel on Climate Change (IPCC) has concluded that we can be certain that the human-induced greenhouse gas emissions (carbon dioxide, methane, etc) are changing our climate. The IPCC scenarios<sup>71</sup> show how the global climate system may respond to a range of different concentrations of greenhouse gases. If we follow the logic of these internationally devised scenarios, we may anticipate changes in New Zealand's regional rainfall patterns such as eastern droughts and rising frequency and severity of events like floods and hailstorms. Sea levels will rise to threaten coastal settlements. Vector-borne diseases and biological ranges for crop plants and animals may also shift southwards<sup>37</sup>.

Our scenarios parallel some aspects of the IPCC scenarios – as described in the First Edition of *Work in Progress*. Like them, we explore the effective development and introduction of technology, the extent of social and cultural convergence, the nature of the economy, the degree of material intensity, and the scale of local or global solutions to environmental problems.

Our scenarios, however, differ in focus. While we describe the global context that might prompt or favour each New Zealand scenario, the narratives explore how these changes may play out in New Zealand over 50 years. In two of the scenarios, *Fruits for a Few* and *New Frontiers*, our agency with respect to sustainable development is constrained by our relatively small size, wealth, and limited ability to influence international economic drivers, to which we remain closely linked. In *Independent Aotearoa* we take early steps to embrace our modest size and wealth, and socio-cultural differences, to choose a less globally connected future. In the fourth scenario, *Living on N° 8 Wire*, New Zealanders' social and cultural ingenuity comes to the fore years later, only after the country is battered by global-scale problems and resource shortages, exacerbated by short-term thinking.

We emphasise the need to choose early; or let human and ecological processes narrow the choices for us. The scenarios explore sustainable development as a process, not an outcome. This allows us to speculate about thinking styles/attitudes (paradigms) that are very different with respect to the extent to which people influence the course of ecological developments.

FIGURE 3



We explore various possibilities for the evolution of the economy. Our New Zealand scenarios suggest that from 2007 looking forward we could move towards any of:

- A** an economy with unevenly distributed benefits (80% to elite: 20% to the rest), or
- B** an economy with equity and very different 'genuine progress' indicators taking the place of GDP growth targets, or
- C** we might stay globalised and 'hit the wall' of resource and ecosystem limitations, resulting in economic crash and social conflict, or
- D** avoid that crash 'at the last minute' by creating a localised, inward-looking lifestyle on a depleted resource base.



Like those of the International Panel on Climate Change (IPCC<sup>20</sup>), in the four New Zealand scenarios we touch on different technology mixes, although we do not explore the many facets of them in detail – such as relative rates of carbon burning. The accompanying models do begin this comparison (Section 4). We have looked at environmental technology outcomes rather than on specific technologies – and what these technologies could bring to bear in the different worlds envisaged. Technologies are generally treated kindly in our narratives, as potentially improving environmental, social and economic conditions, even though we are aware that historically new technologies have often also polluted, exacerbated vulnerable environmental conditions, and been used to wage wars. When they are described negatively, it is in terms of their failure to deliver on their early promise. We did not fully explore the potential for technology breakthroughs to completely alter our physical environment or to populate currently uninhabitable areas, as our four scenarios are deliberately not works of ‘science fiction’.

In terms of identity, political will and value-driven changes, we posit quite different social alignment within the scenarios. Each of these variations grows from ‘seeds’ already visible in today’s society. While we have no doubt that New Zealanders will embrace some new values by 2055; our uncertainty is whether these values will or will not contribute to our national capacity to build the social, environmental and other forms of capital essential to becoming a sustainable society.

The impact of climate change is a large potential wild card. All of the New Zealand scenarios assume that climate change impacts such as warming are already in train; they differ on the extent to which *further* human-induced changes exacerbate these processes and they differ particularly in the socio-economic responses. They do not greatly differ in terms of the speed with which global climate change impacts may occur, although several recent international research studies suggest these are occurring faster than

anticipated by the IPCC scenarios released in 2007, so our scenarios from 2004 may prove too conservative.

Greenhouse gas emissions will be determined by the size, structure, and energy intensity of the economy, which the scenarios and accompanying model suggest could vary. However, New Zealand’s atmospheric carbon contributions will still be only a small portion of the cumulative global human impact, so global-scale climate change will affect all four scenarios.

The severity of impacts is described, across the scenarios, as varying from manageable to unmanageable. In the case of *Living on N° 8 Wire*, for example, we envisage mid-term economic and ecological crisis brought about by poorly made competitive individual choices that plunder natural resources/systems; survival in subsequent decades through global dis-connection, economic austerity, rediscovered ingenuity and increasing social cohesion.



## ENVIRONMENTAL AND SOCIO-ECONOMIC INDICATORS FOR NEW ZEALAND SUSTAINABILITY

The four scenarios explore future uncertainties facing New Zealand under the broad theme of sustainable development, focusing in particular on the interrelationship between New Zealand's natural environment and economic and social 'progress'. Whatever we think about where we are now in relation to the critical thresholds of the Earth's carrying capacity – and a growing number of international reports suggest we have already exceeded sustainable global carrying capacity<sup>38</sup> – the simple truth is that no one knows for certain 'in advance' of crossing such thresholds. Ecological developments, attitudinal changes and subsequent policy and regulatory responses will together dictate how key sustainability issues may play out in the future. These headline indicators for each scenario are shown speculatively in Table 2.

There is considerable uncertainty about the nature of the interrelationships between these indicators. The interrelationships will shape the degree of risk to

productivity of the agriculture sector, one of New Zealand's largest export earners, alongside tourism, also natural-resource-dependent. Looking forward, the impacts of climate change here on ecosystems plus global peak oil production may be two potential wild cards.

We suspect that public and political concern for the environment may vary markedly from today, and have already noted shifts in domestic opinion and media coverage between 2005 and 2007. The scenarios explore different attitudes and effects of early and broadly supported changes (*Independent Aotearoa*) or late-onset reactive changes (as in *N° 8 Wire*), compared with a population mostly unconcerned until too late (*New Frontiers*) or only an elite but influential part of the population concerned and active early (*Fruits for a Few*). Whether environmental issues have a significant political impact may relate to the immediacy of the environmental events, the perception of whether there is a solution available, and the relative level of concern about other issues such as the economy, employment, health or education.

Cultural value shifts are subject to inertia and change slowly. However, in these New Zealand scenarios value changes have been envisaged and prompted variously by:

- Fear of the consequences of unsustainable behaviour to our way of life and future generations
- Personal experience of the negative influence of an environmental phenomenon elsewhere (perhaps in a country of emigration, or during overseas work experience)
- Shared vision of a positive solution, perhaps combining socio-cultural factors with environmental
- Social conformity pressures, fashion and media exposure (which are at present pushing more towards un-sustainability, but might change<sup>39</sup>)
- Business leadership elites, including changes in long-term investment policy.



TABLE 2 Environmental-related Trends in the Scenarios

	NZ trend direction in 2007	A: Fruits for a Few by 2055	B: Independent Aotearoa by 2055	C: New Frontiers by 2055	D: Living on N° 8 Wire by 2055
Attitude on seeking sustainable development	Some interest emerging <sup>40</sup>	Global, early change by elites	Local, early change	No change in attitude in NZ or globally	Local late change
Ecological 'footprint' size	▲	▼	▼	▲	▲
Efficiency of agriculture sector	▲	▲	●	▼	●
Resource depletion rate	▲	●	●	▲	▲
Air quality	▲	●	▲	▼	▼
Land degradation	▲	●	●	▲	▲
Habitat loss (clearance)	▲	▲	▼	▲	▲
Soil quality	▼	▲	▲	▼	▼
Marginal lands – use in human food chain	▲	▼	▼	▲	▲
Habitat destruction	▲	▼	▼	▲	▲
Forest cover	▼	▲	▲	▼	▲
Endemic biodiversity	▼	●	●	▼	▼
Overhunting/fishing	▲	▼	▼	▲	▲
Introduced species	▲	▼	▼	▲	▲
Clean coasts/oceans	▼	●	●	▼	▼
Stream water quality	▼	▼	▲	▼	●
Freshwater quantity	▼	▲	▲	▼	▼
Greenhouse gas climate change contributions	▲	▲	●	▲	▲

KEY: ▲ increase ● no change ▼ decrease

Regulatory and policy responses may well be local (regional or NZ-wide), but the narratives also take into account the possibility of increasingly external (overseas) developments that will drive the sustainable development agenda. Carbon pricing regimes are already in place, from the Kyoto Protocol; other restrictions on trade or transportation are easily imaginable.

Whether New Zealand is able to or seeks to influence the international agenda is another key uncertainty, which we have varied in the scenario narratives – some look inward and others outward. New Zealand's own patchy environmental record will impact on the extent to which it can be credible and make its voice heard on the international scene<sup>41</sup>.

## TECHNOLOGY & INNOVATION IN THE SCENARIOS

Australian eco-design theorist Chris Ryan has argued that, although ‘technical fixes’ of various types in all sectors could go a long way to achieving significant reductions in energy and material usage, there could also be a need for overall patterns of consumption to change, with perhaps a move away from the emphasis on ‘quantity of material consumption’ and on to ‘quality of life’. Otherwise, total consumption would still expand to overwhelm any savings from technical fixes.<sup>177</sup>

### Future advances in science and technology

(Table 3) will affect our personal, family, and work lives<sup>42</sup>. Cultural adaptation, economic necessity, social demands, resource availabilities and attitudes towards the natural environment will affect the scope and pace of technological adoption.<sup>43</sup> It is hard to anticipate, but during the next 20 years we expect most advances will occur in already-affluent countries with high R&D expenditures.<sup>44</sup>

Past technological predictions have usually been wrong, being too optimistic in the short term yet too conservative in the long.<sup>45</sup>

Nanotechnology,<sup>46</sup> biotechnology and biomedicine; advanced computing and information technologies; cognitive neuroscience; and new materials that mimic

nature have potential to fundamentally change industry and society.<sup>47,48</sup> Wolfgang Mikalski<sup>185</sup> suggests we could enter a long boom based in part on technological advance.

*If all goes well, (he argues) scientific convergence is expected to lead to such capabilities as:*

- Expanded human communication, possibly more rapid cognition/responses
- Improved human health and physical capabilities, longevity
- Better, distributed sensors for control, monitoring and surveillance
- Intelligent systems to inform and support complex decision-making.

Future innovations may also arise from the reintegration of existing technology in new ways and through new applications of existing science, even without many new breakthroughs in basic understanding.<sup>49</sup> Convergence of technologies will continue, and the most socially disruptive innovations will likely occur at the intersections of technologies.<sup>50</sup>

Alternatively, much of the literature claims that the pace of technological advance and change is accelerating beyond our social ability to manage it. William Calvin argues we are ‘out-driving our reaction time’, i.e. that we are causing changes in society or ecosystems that cannot be corrected before limits are breached or crashes are triggered.<sup>51, 52</sup> □

TABLE 3 Focus of Technology in each Scenario

	A: Fruits for a Few	B: Independent Aotearoa	C: New Frontiers	D: Living on N° 8 wire
Raised efficiency of resource extraction technologies	■		■	
Energy efficiency improvements in transport, electricity, household uses	■	■	■	
Adoption of less resource- intensive consumption	■	■		■
Less resource intensive methods of production	■	■		■
Technologies that restore the environment <sup>53</sup>	■	■	■	■
Technologies to manage carbon emissions	■	■		
Technologies that lead to improved human health and physical capabilities	■		■	
Social technologies that lead to expanded human communication, support participative decision-making		■		■



# SCENARIO A

## FRUITS FOR A FEW

Competitiveness and sustainability have previously been portrayed as antagonistic, but there is a growing recognition that in fact these two issues are mutually reinforcing. Industrialization and growth without attention to sustainability may not only be problematic for some ill-fated groups in society, but may seriously limit any region's aspiration to prosperity, as the dynamic repercussions of un-sustainability on its citizens may be significant and unexpected.

Erik Bohlin<sup>180</sup>

**In this New Zealand future** we tell a story of 'free market' environmentalism in an economy that is driven more by international interests than national. Large globally active enterprises have extended their power significantly. New Zealand's ability to shape its own national agenda has diminished. Government efforts to influence others internationally have similarly ebbed. Mutual confidence between individuals and trust in the public sector and other service providers are almost absent – everybody understands what it is to fend for their own good.<sup>54</sup>

New Zealand remains an attractive 'resource' pool, for those with access to its natural capital. Internationally, however, exploitation of resources by corporations is tempered by their realisation that these are finite resources in a fragile ecosystem. Enterprises in this scenario are often 'political', in the sense that they put

forward ideas and adopt clear value positions on 'problems' such as resource limitations. Ethical leadership has moved away from elected government onto the pitch of corporations.

Substantial shifts in the cultural mosaic, a 'leaner' government and a closer economic relationship with Australia (including common currency) have created a New Zealand elite that is more international in its consumption patterns and chosen communication channels while the population majority remain more locally or ethnically oriented. Social disparity is greater than in 2007. There is little dialogue between the elite and others.

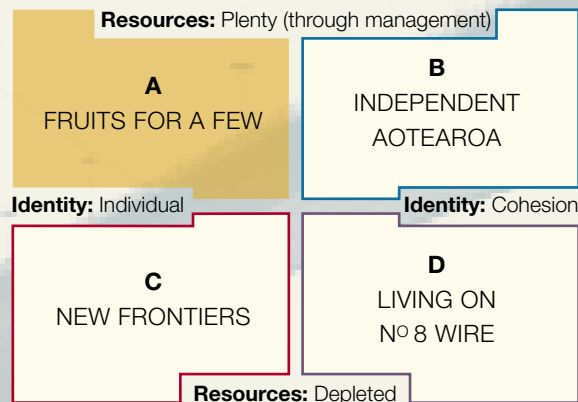
The elite enjoy the fruit of the global system while the majority of the population, still in employment but on low wages, move back towards basics, with gradual decline in both education and health standards.

While there is a superficial 'global culture' of corporate-supplied information and entertainment, this is underpinned by a strong revival of traditional cultures, drawing on deep roots. It is increasingly difficult to convince those firmly anchored in local and/or ethnic culture that the stream of unaffordable global fashions and things, proffered from abroad, are beneficial to society as a whole. Family values and a tendency to larger family size among the poor emphasise the perceived need to rely for support only upon those who are close.

New Zealand society in 2055 is somewhat reminiscent of early-industrial Britain or 20th century South Africa. A paternalistic privileged class – aware of the seeds of discontent – are holding tight the reigns of wealth and opportunity.



## PRINCIPAL DRIVERS OF CHANGE



### IDENTITY IS...

- Based on self-interest plus ethnic/cultural loyalties. People only work together when their self-interest can be influenced towards a common cause. Democracy controlling the State is a pluralism in which the well-financed commercial interest groups prevail.

### RESOURCES...

- Resource stocks remain relatively high due to more efficient use, comprehensive commercial recycling of materials and water and a high level of control exercised by the rich elite.
- Energy use per capita remains high, but is mostly generated from renewable sources, plus domestic oil and gas. By 2055 solar, wind and hydro (incl. tidal) systems are highly developed and efficient.
- Marginal areas previously deforested for primary production land use such as dairying are covered again in native bush by 2055. These forests are also sustainably harvested for specialised products (such as manuka honey and essential oils) and used for private tourism enterprises.
- New Zealand is quick to enforce clean air policies (from which all benefit) after an international agreement on climate change and the environment is passed.

## GLOBAL CONTEXT FAVOURING SCENARIO A

The changes New Zealand experiences are played out on a relatively stable global stage dominated by a handful of business corporations that have common 'economic' interests with a small cadre of powerful nation states (the B8 and G8). This stability is reminiscent of the 1989 post-Berlin Wall period, when many countries believed that the world community could take advantage of a 'peace dividend'. In this view of the future, effective management of complex global terrorism, the economic emergence of China, India, Brazil and others as a counter-weight to the United States and Europe; and financial and economic globalisation are necessary precursors to international stability.

In *Fruits for the Few*, global awareness of the rapidly escalating economic costs of climate change (as highlighted by the Stern Report) created early incentive for both business and government action. Environmental governance is firmly on the economic agenda. While governments are cautious of outpacing



public opinion, larger businesses have been the ones to grab and 'run with the ball'. Early developments in corporate social responsibility, an improved ability to account for embedded resources in all products, a profitable carbon trading regime, and enhanced renewable-energy technological capacity have accelerated the impact of business actions.<sup>55</sup> Globalized technology-oriented organisations dominate the market-based economy. Some of these have a BDP measure larger than New Zealand's state GDP.

Western governments embraced market-based solutions; and the eroding tax base provided them little room to manoeuvre.<sup>56</sup> How else were pressing national interests – economic decline, population ageing, healthcare demands and environmental degradation – going to be 'fixed'? Business' ability to shape the global agenda grew over time. From a small start in DAVOS Mark 2 meetings, where many governments signed up to a climate change rescue package, the influence of business has grown phenomenally. If you had asked the G8 Ministers meeting in Seattle at the turn of the century, they would have had difficulty

foreseeing the emergence of their B8 counterparts, yet today they are hardly distinguishable.

The fully evolved institutional relationships grew out of the seeds of private–public sector contracted working arrangements. Global Treasury and Trade officials are simply amazed when they occasionally look back at negotiations like the Rio (1992) and Johannesburg (2002) summits. They cannot really understand what caused the significant disagreements then on environmental issues such as renewable energy and climate change.

While it is recognised that patterns of economic growth externalising costs will adversely affect ecosystem health, the impact on the social fabric of society is widely regarded as a mythology of the turn-of-the-century environmental movement. Globally, environmentalists have – the media claims – reversed their positions in major areas, now supporting urbanisation, genetically engineered organisms, and nuclear power.<sup>57</sup>

The global Environmental Climate Change Agreement (ECCA) was signed in 2020 because of growing environmental damage and heightened recognition by society's 'elites' of the link between environmental and economic sustainability. ECCA generates huge increases in use of renewable resources to replace non-renewables and a consequent decrease in greenhouse gas emissions.

Natural capital is most often valued and managed in the trans-national system, while social capital is valued and managed locally.

Nearly everyone feels environmental and climate amelioration benefits eventually, but immediate economic rewards (e.g. from pollution taxes, carbon trading income) go to G8/B8, increasing the divide between rich and poor countries. By 2055 there is still environmental damage in some local geographic areas, mostly ones where poor people live. However, degradation does not threaten core life-support systems (air, freshwater), economic production zones, or pleasure domes of the rich.

## voices from the future

Within each of the scenario descriptions we have inserted comments from participants in the 2005–07 Scenarios Game workshops, where they played randomly allocated ‘future roles’ set ahead in their grandchildren’s generation, living in the 2055 scenario that was described to them and discussed in their small group. Dozens of different roles were experienced, so as examples, we have captured some responses, in their own words, for three combined role categories:

- farmers and landowners;
- parents on low incomes;
- business entrepreneurs and managers.

## farmer roles (in the Scenarios Game) Voices from the future 2055: Viewpoints

### ⊕ POSITIVES

- Fewer regulations so less restriction on activity, travel or trade. Ability to diversify and adapt to most demands. Efficient technology and labour available. Free market allows me to get best price.
- Landowning family close-knit and has local community ties. Family members learn skills of working on land, and our traditions, at an early age. Enjoy ability to live a wealthy life style, to provide for my family and the future.

### ⊖ NEGATIVES

- Social inequality – growing gap between rich and poor. Only the wealthy can afford the land and goods. Higher costs also of clean resources, energy and water. No access for many to capital funds, machinery, labour.
- Disadvantaged poor, within ever-decreasing ‘spiral’ of lost wealth for most people without land and resources. Crime results as the poor try to get resources. Family life stressful – leads to children being disruptive at school.
- Limited or no access to private health services – often alternative health practices only.



## NEW ZEALAND IN THIS CONTEXT

The improvement in New Zealand environmental conditions, such as urban air quality, following implementation of the 2020 Environmental Climate Change agreement (ECCA), reinforced the public's faith in the market system to deliver. 'It is these elites who do the original thinking, produce the ground-breaking research, turn it into a project and make the rest of us richer – in money, in pleasure, in our environment'...the argument ran. By 2025 there was no longer a struggle to reach a common understanding of what sustainability means; the general notion of well-being had become so closely tied to economic success and opportunity.

For a few decades, most people believed the commercial media's messages that the well-being of those less well off can be improved with trickle down from economic growth<sup>58</sup> but by the time that they realised that wages and security had not improved in the low-tax regime, the State had neither ability nor resources left to intervene. In most OECD countries – as in New Zealand – social 'security' in 2055 is managed through separation and enforcement of differences. Benefit entitlements are limited and allocation closely scrutinised by the paternalistic taxpaying elite. Society is seen to follow the 80/20 principle.<sup>59</sup>

Secularisation and the growth of New Age and charismatic faiths have occurred hand-in-hand in New Zealand.<sup>60</sup> Officials explain that self-reliance is an

important global value in mid-century. The individual is considered the basic element of society, rather than the community. However, 'family' clusters take care of their own. Individual welfare, social and cultural well-being is most often met through small, local, usually culturally homogenous groups that understand and share particular traditions.

There is a 'free' market economy, but only the rich elite has access, in part because only they are well educated and hence have the know-how. Only the elite can afford further education as governments focus on security and individual property rights at expense of social and education spending.

There is increasing pressure from the growing population of the poor on space and resources. The rich elite provide social packages to appease the poor, but these only deal with societal outcomes of social problems – it is window dressing. Average life expectancy gradually increased until 2055 but is peaking then and begins a decline as the effect of disadvantaged lives and lack of social security in older age shorten the lives of the poor.

The face of New Zealand is very different in 2055. Differential birth and mortality rates and immigration and emigration patterns have created a more diverse population mosaic with the Māori, Pacific and Asian ethnic groups making up a larger proportion.<sup>61</sup> All ethnic populations will age in the coming decades.

However, the Māori and Pacific populations will still have a younger age structure than the current New Zealand population.

New Zealand has moved through a long period in which the industrial labour force has undergone transformation. Many still recall the shift from the primary sector into the secondary alongside the shift between manufacturing and the service industries. This resulted in split growth in the less-skilled personal service sub-sectors, and in skilled sub-sectors, particularly financing and related service industries.

Some social outcomes have not improved. While average living standards are rising and contributing to improvement in other areas of well-being, the distribution of economic resources has deteriorated to some degree. Income inequality is worse and still on the rise.

A handful of New Zealand families move into the global 'Fortune 500'. The majority 'lead lives of quiet desperation' – in the eyes of these fortunate few.<sup>62</sup>

Among the globalised elite, dramatic advances in educational achievement and in economic clout are shaping a cultural confidence which is shared with many people internationally, through mass media, international study and travel.<sup>63</sup> This younger generation of elite New Zealanders has a strong sense of being able to shape their destiny.



The rich can move in and out freely and therefore, by 2055, 70% of the NZ elite are of Asian origin, although many are English-speaking. It is not immigration in the traditional sense; it is global circulation rather than migration. Many travel abroad from here, but also a steady flow of educated, ambitious people move to New Zealand seeking opportunity of wealth and a pleasant living environment. For those who want to resettle permanently, new immigration policies are set in place to allow 'the best' young people from developing countries to settle here. They are trained to join the ruling elite. Intending immigrants have to leave New Zealand if they cannot get employment within 6 months of arrival.

Ethnicity and sex are not divisive issues for the educated 'elite'; acceptance is based on wealth, status and mobility. This appeals to assimilated Māori – those who have individualist rather than collective whanau-focused aspirations, but is distrusted by marae-based Māori traditionalists. Small numbers of highly educated, well-connected iwi members form a new elite, closely connected with the business and government world.<sup>64</sup>

Redistribution of the growing Treaty-settlement wealth within iwi slows under this scenario, as its benefits are being concentrated upon a well-placed few, rather than the many.<sup>65</sup> However, poor Māori are slightly better off than they were in 2005 due to the legacy of

Treaty claim settlement 'completion' in the early years, and they are still able to choose a rural lifestyle. The affluent elite of iwi-based Māori has effective control of many natural resources and therefore money, including increased control over land, as individual property rights increased relative to collective ones. However, there are tensions with the urban Māori business elite who control most of their resources. Great barriers now exist in society to implementing traditional values of giving and sharing for the collective good.

By 2035 the growing national population total is seen as a potential problem by the elite (statistically, the poor have larger families, as they start at a younger age and believe they gain security from family rather than individual finance).<sup>66</sup>

For the '80' within the 80/20 society, the health system and tertiary education are under-funded. Considerable numbers of all ethnic backgrounds depend on family or charity. Personal security has deteriorated.

The average teenager aspires to live in a material world; they are keen observers of the lack of opportunity created by 'resource poverty'.

Tight spheres of identity and loyalty form within the haves and have-nots – the 80/20 society with social capital high *within* many groups (who bond closely together to sustain themselves, or to work collectively

to protect each others' interests), but there is increasing conflict *between* groups – which may be occurring internationally as well. National identity is less important than shared interest group, as a unifying force.<sup>67</sup>

Social by-products of the 80/20 society include gated communities and private security protection of the rich, and user-pays approaches to health and other services. By 2025 much money is being spent on security to protect private property rights. With relatively greater environmental damage and social unrest visible elsewhere around the globe, New Zealand becomes a haven for many rich migrants who pay handsomely to live in safe bio-regions that are policed by private security forces.

By 2055 the rural poor can only afford to live in remoter areas that are designated for an energy use – such as wind farms, and forestry – and not in intensive crop-growing and processing lowland areas, to which they may be bussed daily as a workforce. Poverty, competition for the few resources that are available to them, and lack of education forces the poor into mutually supportive alliances, and by 2055 the identity of these groups is highly developed, and militancy likely.

## low-income parent (in the Scenarios Game)

Voices from the future 2055: Viewpoints



### POSITIVES

- ❑ Increased interaction with extended family, companionship, and emphasis on family values and support. Will hold on to traditional values.
- ❑ Pride in supporting myself without government help. My children grow up understanding the value of work and knowing which whanau/community they belong to.
- ❑ If I'm flexible and adaptable I have potential to earn more or to shorten (otherwise long) working hours.
- ❑ Nicer living environment for all, if it's better managed.



### NEGATIVES

- ❑ Substandard housing, poor-quality food. Becoming sick is a scary prospect; there may be no affordable access to safe healthcare.
- ❑ No decent welfare protection, so I am only a few steps from absolute poverty – it's a real struggle to provide for my children and I worry about their future.
- ❑ No way of getting out of low-paying jobs to improve my situation. No career prospects without expensive retraining.
- ❑ Increasing disparity of society and stress.
- ❑ Crime and mistrust increasing within the have-nots. The rich have all the opportunities. Best things in life are not free, now.



## LEGISLATIVE, POLITICAL AND INSTITUTIONAL DIRECTIONS

New Zealand's technical and economic interdependence with the world is much higher by 2055. These connections have opened doors to new markets, new technologies and new management practices. This has spurred creativity and productivity, and generated wealth for those few able to respond to demands. At the same time heightened interdependence has accelerated structural and organisational changes within the economy, and depressed wages for those outside the elite, because jobs can be outsourced.

The New Zealand government is increasingly marginal to its citizens, a situation amplified by budget squeezes on public services, sale of public assets, and lowering of taxes.<sup>68</sup> Furthermore, the growth in overseas ownership and investment compounds the reduction in local control; and fills the gap created by the decline of government. Many New Zealand firms are branch factories of Australian, Asian and other Northern Hemisphere businesses – capital for investment available in New Zealand hands is very limited. New Zealand superannuation funds are managed by multinationals and invested globally in corporations, not in local or smaller firms.

By 2055 New Zealand and Australian governments are closely harmonised, with New Zealand too small to be economically viable on its own. This, alongside Australian bank ownership, results in a common currency (A\$).

Government interests lie in standardisation with Australia. This includes strict law enforcement by military, police, courts. There is a large private prison population and prisoners do low-wage work for corporations to pay for their subsistence while in prison. Social services, health, further education, etc. are privatised and many services only affordable by the rich.

New Zealand's accession to the Environment Climate Change Agreement (ECCA) leads to many more environmental costs being internalised into economic production processes, in this scenario. Rather than the State bureaucratise the environment (as seen in the *Independent Aotearoa* scenario), New Zealand privatises its efforts to protect the environment, but ensures tighter management and resource control than is seen in the free market *New Frontiers* scenario.

Private stewardship (e.g. of water) is controlled through property rights and market-based trading regimes. This creates a new focus on the importance of intellectual property regimes. Services develop to strictly enforce these resource property and pollution rights, which can be bought and sold in markets.



## ECONOMY AND BUSINESS CONDITIONS

The ECCA has driven an increase in ‘sustainable’ businesses. New Zealand’s universal adoption of full-cost accounting in 2020 is a global first, and leads, temporarily, to increased exports of a few market segments, especially services that help others join the trend. To be accepted by the big players, smaller businesses must show authentication of sustainability production ‘intent’ – value premium is placed on products or flows that are demonstrably environmentally sustainable (certified eco-friendly, ISO standard achieving, etc.). Social sustainability has a lower profile than environmental, in this accounting.

Insurance, security, technological institutes (e.g. nanotechnologies and organic companies) are powerful and globalised. Technology is considered critical to sustainability and the fact that technology IP generally resides in corporations means that private firms are critical to ongoing national movement toward sustainability.<sup>69</sup> There were State-funded research

institute exceptions, but these are privatised and relatively rare by 2030 and tend to focus on specific missions, such as forensics, and secret military technologies. Elite business interest has overtaken public interest as a basis for research.

Most of ECCA-related applied technologies are developed in Asia and distributed to Australia and New Zealand through the B8. New Zealand domestic investment rules favour development of science and technology for environmental problems, especially technologies that can be patented. New Zealand remains ‘successful’ in a few specialist fields where there is marked comparative advantage, for example climate change mitigation/adaptation techniques. However, commercial technologies that result from research are often bought by corporate entities based outside New Zealand. Overall, domestic innovation has flagged despite an early hardening of intellectual property regimes.

Within New Zealand, the economy is a ‘functionality economy’ where firms sell or lease functions, not products, to consumers.<sup>70</sup> In such an economy, for example, automobile companies lease cars to consumers but remain responsible for the maintenance of the vehicle and all aspects of material management, from choice of inputs, routine maintenance, materials, and lubricants, to recycling the materials once the car retires from service. New Zealand’s physical remoteness from global sources of components and recycling facilities, coupled with high energy costs for freight but low local wages, leads corporations to both reduce the range of options available for use here (‘Choice editing’ is especially common when near-monopoly supply positions remove competition) and to innovate to create smaller-scale assembly/dis-assembly/recycling facilities. The resulting technology and systems IP can be exported.



## employer and chief executive (in the Scenarios Game)

Voices from the future 2055: Viewpoints

### + POSITIVES

- Reward for hard work – we eat well. Money buys excellent health and life expectancy, Lots of power, and opportunity to accumulate individual wealth and influence/paternalism.
- Easy to get workers and don't have to pay them much. Minimal role for government regulation.
- Business would be very profitable if one was any good and could beat competition.

### - NEGATIVES

- Ghettos of poor – who need welfare but less tax money is available to support welfare, creating a gap or increasing social divide, which erodes attractiveness.
- Being despised by others as making wealth at their expense.
- Need to live in a 'gated community' with lots of security. A dysfunctional society.
- Resource depletion pressure (e.g. water) from growing population, more rubbish.

## TOURISM

This 'functionality' economy has translated to the tourism sector in two ways. There is more virtual tourism. By 2055 only the super-rich can afford to visit in person from abroad while the rest come here on 'virtual' holidays by computer. These 'virtual' holidays in New Zealand are created in New Zealand, copyrighted internationally and exported. They are very realistic and personalised successors to the coach tour package experience of 2007. Minor heart attacks for sedentary viewers of the virtual bungee-jump or virtual snowboarding are not uncommon, so it carries a health warning.

New Zealand is one of the playgrounds for the global rich. However, wealthier tourists are cushioned from social contact with poor New Zealanders. Related to the gated safe-refuges for the resident wealthy, there is an emphasis on tourist groups being whisked from site to shop to site. Tourists fear being robbed (much of this fear is unfounded, but the perception suits the tour and associated retail operators, who can capture all visitor spending that way). Multinational companies, who control transport, hotels and souvenir sales, mostly expatriate these tourism profits. Once tourist numbers peaked (about 2025, due to high cost of access), inward investment rates fall, until the virtual tourism trade builds up.



## SPORT AND ARTISTIC CULTURE

There are mass spectator sports held in stadia, mainly attended by the poor. The sporting clubs come from the ethnic groups – emphasis is on local or ethnic rather than national patriotism. A small percentage of the rich attend these sports, secluded in private boxes, but most have their own electronic entertainment at home.

Artists (of all genres) become fashion items of their rich patrons. The poor are very culturally and artistically influenced – it is their only ‘free’ mode of expression. Street theatre, song and changing murals are a large part of their identity, reminiscent of South African black townships before Mandela’s release. Māori culture is ‘reduced’ under the global cultural assault to marketable artworks, entertaining music and dance for visitors, and as an academic interest, but is not often featured in the domestic mainstream of social and political life.

## MEDIA

There has been no free-view Māori Television channel and no TVNZ news channel since state funding ended.

TV and other news media providers are concentrated in the same hands; there is no public broadcasting.

While there is unlimited global choice for the rich from satellites or cable, the poor can only view and hear cheap material, which is almost invariably out of date, false or misleading and is always commercially dominated. There is a small underground/alternative local-driven media, circulating informally.

Privileged access to the Internet (or its successor) is available through a limited number of information service providers. Only the most-read news/magazine sites raise enough money to finance their updating, on a pay-when-you-view system. Commerce and environmental values dominate news interpretation. Social issues are poorly reported.

New Zealand capitalises on being a great location for outdoor film-making, but the film industry is run by multinationals, not locals.

## TECHNOLOGY

Globally, the integration of sustainability thinking into business innovation processes presents an export market opportunity. Global and local companies whose products and service solutions receive quick acceptance from society in the ‘test market’ of

New Zealand will benefit. Companies often put sustainability at the heart of their creative and technological development processes, as they ‘redesign’.

In New Zealand there is little taxpayer investment in innovation, research and technology; and globally technology investment choices reside in the ‘hands of the few’. Those technologies that generate wealth, yet do not put already accrued wealth ‘at risk’, are favoured. Investments in the new sciences – biotechnology, nanotechnology, information technologies – grow, as do expenditures on innovative environmental care and eco-efficiency technologies.

The focus on security has resulted in development of a wide array of monitoring and surveillance technologies that have benefited the environment, for example, better management has resulted from the marriage of nano-biotechnology and information systems on many land parcels, for precision farming to precisely suit soils and weather, and similarly at aquaculture sites. Technology that allows people to do what they do today, but better, are preferred over the untried. Access is not universal; it is determined by affordability as the market operates on a user-pay basis.

### KEY ISSUES IN SCENARIO A

- Resources are accessible but used more efficiently, with tight controls on who uses them
- Resource control gives power, which creates an increasing social divide
- Adoption of accounting that internalises environmental but not social costs
- Moderate but variable economic and social growth, closely linked to global fortunes
- Free-market economy – capitalising individual resources, few capital-flow barriers
- Health and life expectancy falling for poorer people, rising for wealthy
- Minimal role for government – based on property rights and security for the elite
- Strong political factions, supported by big business, provide effective lobbying

### WHAT ARE THE IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT?

Kenichi Ohmae<sup>186</sup> argues that globalisation is changing everything. It is transforming the structure of states, the nature of economies, and most of our basic institutions. In essence he suggests that the era of the nation state is drawing to a close, in the face of the intensification of the global marketplace, the knowledge economy, and the information economy. This scenario paints such a picture of globalisation, which is dominated by key actors.

The *Fruits for a Few* scenario tells the story of a New Zealand where power is concentrated in the hands of the larger businesses that have a strong interest (but often not their headquarters) here. We have envisaged declines in the ability of the government to influence the international agenda. In effect we see the emergence of an internationalised 'Business Round Table' equivalent (B8) that early-on establishes the parameters for resource management and sets the trading terms for the national and international response to climate change. In 2006–07 we are already seeing the adoption and early signs of potential profit/financial gains related to market mechanisms for water and carbon markets, in several countries.

In relation to the 2001 Special Report on Emissions Scenarios of the Intergovernmental Panel on Climate Change<sup>20</sup>, the New Zealand *Fruits for a Few* scenario has some similarities with IPCC scenario group B1, described as “ a convergent world with global population that peaks in mid-century and declines thereafter (as in the IPCC’s A1 storyline), but with rapid changes in economic structures toward a service and information economy, with reductions in material intensity, and the introduction of clean and resource-efficient technologies. The emphasis is on global solutions to economic, social, and environmental sustainability, but without additional climate initiatives.” However, this New Zealand scenario differs from the B1 scenario group of IPCC in its individualism and lack of social equity.

While New Zealand enjoys relative resource security (e.g. having soil and water, rather than much oil), the economic benefit derived from local resources is mainly reserved for a few. Offshore investors appreciate that long-term profits to be made in New Zealand require environmentally sustainable industrial processes to protect the investment, and that unfettered quicker profit-taking would damage the resource base (as shown in the *New Frontiers* scenario C).



On an individual basis, for residents, rather than investors of capital, there is less incentive to reduce consumption patterns and as a result household ecological footprints remain large by global standards. The rich are high consumers and only industrial efficiency plus the low-wage economy prevents the average resource-use footprint in New Zealand from growing further.

Better science increases the flow of 'good' environmental information on products and ecosystems. This leads to stronger environmental authenticity and certification, and satisfies the demand of the global high-value market in eco-sustainably produced products, including foods and pharmaceuticals. Profitability leads to significant private investment in long-term environmentally friendly products.

In accord with the collapse of many 'public good' expenditures, natural resource management practices become market-based and the primary mechanism used to address environmental concerns is development of private property rights for environmental stocks/services such as water,

previously considered 'free' as they were held in common. This occasionally leads to perverse outcomes, for example reforestation in lowland Canterbury (earning carbon credits, and reducing demand on water supplies as it replaces 'thirsty' dairying); tourist levies around resorts such as Queenstown (that inhibit further investment in visitor facilities after the 2020s once combined with rising travel costs.)

The food economy is green: 'Buy New Zealand' is supplied by many organic farms owned by multinationals, using New Zealand production innovations that set them ahead of the rest of the world. Farm products will have considerable value added by processing and marketing by the corporations. New Zealand farmed-seafood will be highly valued and well managed and there are kereru (native pigeon) and tuna (eel) farms run by wealthy Māori entrepreneurs.

Although a number of scientists suggested that irreversible climate change impacts are already in train, it is argued that early intervention will diminish some of the more severe impacts that have been described.

The development of new accounting methodology that takes into account the costs of natural (and potentially, but less often, social) capital and the introduction of a carbon trading regime are significant influences. These, together with corporate/key country assumption of leadership, are a practical move towards 'weakly sustainable' development that 'balances' economic, environmental and social interests, as required by the Brundtland (see Section 3) and similar definitions.

The emergence of a cultural 'mosaic' taken together with renewed interests in alternative socio-cultural and spiritual values, looking inward for comfort, potentially diminishes the impact of deepening income inequities. Wealthier New Zealanders' alignment with globalised elites also tempers nationalistic radicalism within the educated in New Zealand. The diminished voice of marginalised individuals and groups has not yet coalesced into effective activism, but by 2050 its potential for social and economic disruption is apparent. □



# SCENARIO B

## INDEPENDENT AOTEAROA

It is in the experience of active concern, active caring for the other, in giving ourselves to the other, that we encounter the other in his/her intrinsic worth...and learn to see the good.

Erazim Kohak<sup>181</sup>

**This is a convergent world**<sup>72</sup> with rapid change in economic structures, and introduction of new cleaner technologies.<sup>73</sup> The relative significance of industrial production has decreased. The emphasis is on finding solutions to environmental and social sustainability, including concerted efforts for rapid clean technology development, dematerialisation of the economy, and improving equity, but from a lower base of wealth.

Here we see fewer 'advances' on the economic and trade front than in scenarios A or C. The GDP rises only slowly, once polluters pay real costs. Since climate change is affecting all countries, the international community have agreed to work together where it can be done. This has created conceptual and practical openings that have not been fully explored by the broader international community, but New Zealand – Aotearoa proves able to respond more quickly to some of the market opportunities created, both domestically and within the Pacific Region.

Sustainability is a conscious lifestyle choice observed across the population. Environmental economics starts with a different index of the effectiveness and 'progress' of the national economy (Genuine Progress Index), as contrasted to an economy measured by throughput (GDP and GNP), yet this can be viable.<sup>74</sup> The attitude–action gap is significantly reduced, as more behaviour reflects intention to care for the environmental functions upon which future generations' lives will depend.<sup>75</sup> The concept of 'sustainable living' connects the sustainable development agenda with the lives of the general public.<sup>76</sup>

The question of what impact the public can reasonably be expected to have on sustainability is a vital one, and early work on sustainable lifestyles in the decade to 2015 essentially mapped out a role for the public to play in delivering sustainability. Without such interpretation effort, the public would have remained stalemated by endless arguments over meaning of the sustainable development concept, and competing world views.

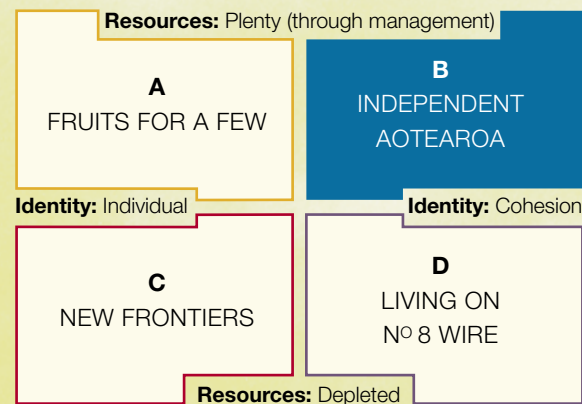
The activities that contribute to a more-sustainable lifestyle include:

- Reduced energy use – in buildings and transport
- Water use efficiency and reduced pollution outputs to waterways
- Waste reduction and recycling (rather than landfill) of most of the remainder
- Household consumables – different food choices and more local food production
- Household durables – buying recycled, favouring durability, repairing, hiring and sharing
- Land use – smaller footprint homes and lifestyles, restoration of natural habitats.

More sociable activities also apply, such as workers' involvement in community projects and neighbourhood volunteering. This greater community interaction, coupled with greater use of public transport, reduces urban anonymity and provides a source of social capital that, for example, contributes to reducing petty crime and clinical depression well below international levels.

The cumulative effect of these value shifts means that New Zealanders consciously decide what aspects of global trends they accept and which they reject. Because decision making has become very participative, many people become frustrated with the time it takes for public decisions to be made and those that are more individually minded, potentially entrepreneurial, may leave to find opportunities overseas.

## PRINCIPAL DRIVERS OF CHANGE



### IDENTITY...

Māori and Pacific cultural flavours are strong and pervasive. Common ground is explored, as people feel more secure in themselves, and become one grouping under a new banner of 'Oceanic' people – a deliberately open definition that represents a lifestyle and ethic rather than an ethnic group. This creates a new 'Aotearoa' national identity, in sharp contrast to identities evolving within the new superpower blocs of China, South East Asia, India/South Asia, and Brazil, along with the United States and Europe. Diversity is embraced in the population, increasing creativity, as less value is placed on conformity (including death of the 'tall poppy' syndrome).

### RESOURCES...

Biophysical systems have strong ecosystem integrity and people proceed to use them more cautiously. People and government are more innovative – becoming efficient in reducing impacts. A surplus of carbon credits is achieved through high levels of native forest regeneration and carbon-fuel-use reduction. The ability to trade these on the global Carbon and Biodiversity market (nicknamed the 'CAB Rank', formed at the demise of the UN system in 2017) is a part-saviour of the rural economy after anticipated collapse of the primary production dairy and timber bulk export sectors, due to resource taxation measures and rising transport costs. Value-added agricultural and forestry products are still exported.

## GLOBAL CONTEXT FAVOURING SCENARIO B

This is a world where we witness greater popular commitment to sustainable development (than in the *New Frontiers* scenario, for example) and, concomitantly, discontentment with economic and financial globalisation that exhausts natural resources. Global warming's unsettling climate effects are becoming more noticeable, with repeated storm winds, floods and rising sea levels affecting many countries. At the same time, the international economy and global trade system are destabilised; the fate of the overborrowed United States economy remains unclear. Although not as powerful an effect as it once was, instability in the United States still causes jitters across the globe.

After Kyoto ratification in 2010 and numerous resource price shocks (oil, rarer metals, phosphates), the first ever stocktake of world waters prompts international environmental treaties on oceans' harvesting and biodiversity. In practical terms, the dozens of environmental treaties put in place internationally are really binding, as was once the case only for economic treaties. Not only is economic power out of the nations' hands and put at the international level, so too is environmental power.<sup>77</sup> These global agreements provide a context for New Zealand's cooperation.

Disasters – many of weather extremes related to climate change, exacerbated by demographic pressures – have continued to increase, leaving more people vulnerable by 2055 than in 2005; even though



early warning and preparedness has long been internationally recognised.<sup>78</sup> Public awareness of the issue has grown around the globe.<sup>79</sup> And, global realism makes clear that the Kyoto Agreement was simply the starting point of a very long endeavour – comparable to the meetings in 1946 at which a group of 23 countries first agreed to reduce trade tariffs.

Many countries and companies have had experience of reducing emissions and have proved that such reductions can be achieved without destroying competitiveness or jobs. Science and technology have advanced on multiple fronts. We have improved our knowledge of the challenges climate change presents, as well as gained a better understanding of the timescales involved.

By 2055, globalisation is understood to be a multidimensional process that is not reducible to an economic logic and which has differential impacts across the world's regions and upon individual states. Globalisation remains a vigorously contested process – and has contributed to a remarkable politicisation of social life while also creating new arenas through which its imperatives are contested. Such developments are most in evidence in respect to economic and political globalisation.<sup>80</sup>

In terms of economic globalisation, US-based multinationals, once the strong proponents of free-trade orthodoxy, flirt with protectionist 'heresy'. During this half century the United States has maintained (and got away with) its bad habit of taking on foreign debt beyond anything any industrial nation has experienced. The United States has narrowly missed 'big trouble,' comparable to Mexico and Thailand just before they crashed in the 1990s. It has clearly lost its appetite for leading globalisation and it is often the United States that now seeks protection, its trade deficits and its capital borrowing from abroad still swollen.

The US habit of promoting calls for stiff tariffs against China and India to staunch trade deficits has created impetus for trade blocs excluding them, and global 'free trade' deals pall. Global economic integration patterns have changed, with world trade and global capital flows first in decline, then moving into groupings by integration within regions.<sup>69</sup>

The pulling back of international economic and trade relationships and the privatisation of financial markets have inadvertently contributed to dematerialisation. Given the causal relationships and time horizons involved in *Independent Aotearoa*, global-level dematerialisation strategies matter enormously.<sup>81,82,83</sup>



## farmer (in the Scenarios Game)

Voices from the future 2055: Viewpoints



### POSITIVES

- Use of 'clean' technology and farming practices, using globally relevant solutions to environmental sustainability problems.
- Improved production efficiency through focus on technological innovation. Amount of materials, water and energy required to produce goods reduced. Shared technology, equipment (co-ops).
- Government support to sustain farmer lifestyle; e.g. guaranteed commodity prices when high quality/healthy food is produced.
- *If an organic farmer:* 'Environmental and social sustainability is a good environment for me – good community awareness of the values of organic food.'
- Labour force is educated, has desire to work, community-aware. Good to be able to have your say on governance.



### NEGATIVES

- Less freedom with what to produce.
- A regulated society, some inefficiencies due to markets being controlled; higher taxes.
- Values well-being over short-term profits.
- Benefits for the whole community are more important than the profitability level on my farm. Long time taken to make decisions by consensus – frustrates.
- Knowledge economy – emphasis shifting away from export of primary products. But where are the drivers for improvement/ innovation and returns for investment in land?

## NEW ZEALAND IN THIS CONTEXT

This scenario tells a story of a very self aware and confident New Zealand that chooses when to play a part in world issues and when not to. New Zealand remains a small player, but is respected by other nations.

Democracy is extremely complex, but it is also extremely concrete. Democracy is about constantly choosing, finding, and developing practical options within the common good. New Zealanders are constantly searching for how to express this in a practical way, not in some grand way, some grand and absolute way, but comfortably. They often reflect on the question: how can the common good be advanced?

New Zealanders are among the most ecologically literate people in the world. They have engaged in conversations – beyond the scientific paradigm – about ecological sensibility. These conversations have brought to light strongly held beliefs and values concerning their relationship with the natural world. There has been a clear rejection of the 'resourcist' attitude to nature – nature is not simply there for humankind to consume.<sup>84,85</sup>

The impact of climate change is noticeable in New Zealand – rising temperatures, fewer frost days in winter and more hot days in summer, higher rainfall in the west and less in the east, more extreme climate

events such as droughts in eastern areas, and floods or deep snow after major downpours.<sup>86</sup>

Many of the Pacific nations closely linked to New Zealand have been affected by climate change, rising sea levels, changes in rainfall patterns, destruction of coral reefs and effects on human health, including with more risk of disease transmission. This has increased the demand on New Zealand for development aid and disaster relief, and to house displaced people: climate refugees.

Following the price shocks of global oil production peak (around 2008) and subsequent crises, New Zealand explored alternatives and efficiencies. These focused on smart design to reduce demand as much as on new energy sources. Public referenda continued the 'no nuclear power' stance against a tide of pro-nuclear political opinion in other developed countries – at least until a Californian reactor radiation-leak in 2018 (at one of the many ageing reactors) affected thousands. Energy prices stay high, carbon and biodiversity sinks in New Zealand are available to the international market. High-energy-use industries such as metal smelting exporters close or downscale for domestic markets only, by 2015. Timber laminates and carbon fibre replace steel and aluminium in many applications.

Urban life involves increased density of living and public transport to increase efficiency. Lifestyle blocks

are abandoned as commuter homes by those unskilled to farm them, for a while reducing average rural land values. Local geographic communities (neighbourhoods) become more strongly differentiated as people spend more time working and living in the same neighbourhood. Individuality and shared communities of interest are widely accepted because of underlying shared ground and political inclusion.

The country chose in 2020 – through deliberate policy decision – to 'step off' the global economic treadmill of increasingly harsh international trade treaties and create its independent image. The New Zealand republic, independent from the British Crown, was declared in 2025 when currency union with an already republican Australia occurred. This generated considerable national introspection and debate on identity, and we did not become another Australian State. By 2055 Aotearoa/New Zealand, with its secure emotional base as a republic, remains a world citizen and is outward looking, alert and critical. New Zealand builds its strengths through deliberative choices and planning, plus judicious use of financial tariffs, capital controls and other regulatory barriers.

New Zealanders have regained the belief in us as people of Aotearoa, able to tackle our own problems without being imitative of foreigners. Of course we need to be in constant dialogue with the world, but we do that confidently, as independent equals.<sup>87</sup> It was

a big step to deal efficiently and effectively with the rest of the world on our own terms, accepting that the collective good was more important than financial benefits to a powerful few, although those few fought vigorously, for example in World Trade courts, to challenge the proposed changes.

New Zealanders have supported a move towards a society that follows an alternative model of development. Choosing this road favours a more participatory, more equitable but still efficient market economy. New Zealand's market system by 2055 is based on three basic principles of economic justice: participation, distribution (capital ownership is spread broadly) and social justice.<sup>88</sup> Structural reforms and tax regimes provide new entrepreneurial opportunities. New Zealanders redefine 'wealth' and 'progress' and judge our systems and economies on how much they create the world we actually want (genuine progress towards a vision), rather than on how much money or throughput they generate – so long as there is a reasonable basic living standard. Many New Zealanders see 'the way the world should be' as an innovative combination of 'traditional' concepts (home-grown, life/work in balance, non-nuclear powered, a great place to raise kids) combined with the best of contemporary global developments (such as increased home-working, virtual-workstations, satellite media links, etc.).<sup>89</sup>

New Zealanders in this scenario recognise the folly of maximising wealth as the primary objective of economic policy. Rather, they believe that sustained happiness over a lifetime is the most plausible goal of human endeavour. Other socio-economic objectives such as political freedom, material well-being, and fulfilling work are just means to procure happy lives.<sup>90</sup>

New Zealand is portrayed internationally as a nation slow to change and prone to excessive dialogue and consensus building. It is diplomatically unaligned, though consistent. Nonetheless its relatively strong 'genuine progress' is viewed with envy by the global elite, as indicated by external property investments and pressure to migrate here. Some residence rights are sold by auction to highest bidders, subject to prior vetting; others reserved for key skills.

### low-income parent (in the Scenarios Game)

Voices from the future 2055: Viewpoints



#### POSITIVES

- Inexpensive health care, education etc. Good diet and health – fewer doctor visits for the children. My children know how to garden and to cook.
- Feeling of belonging. Not judged socially by my earnings or job (which is part-time). Very satisfying work/family/friends mix. Feel supported. Have time for leisure and volunteering.
- This fits well with Pacific Island cultures.
- Respecting the environment, of which I feel a part. Clean environment is healthier.



#### NEGATIVES

- Not being able to buy whatever I want – limited choices. 'Left behind' globally in technology and fashion. Half-empty shops.
- Concern about youth boredom, alienation, rebellion or maybe suicides, by non-conformists. Less freedom in a "nanny state".
- Taxes relatively high, but incomes not.
- Consultation takes too much time – we need to act. My new business ideas (for self-employment) get stifled by bureaucracy and opportunities are lost.
- Those with a rare medical condition not a community priority for treatment are in trouble.

## PEOPLE AND SOCIAL DIMENSIONS

Treaty settlements are completed in 2025 following years of extensive and at times heated deliberation. This realised an increase in local 'sovereignty' for all communities with greater regional difference and interest in decentralisation, and the deliberative process also raised dissatisfaction with representative democracy. Higher levels of citizen political participation, though not strongly Party-politicised, have resulted in the breakdown of the two-party adversarial (Labour, National) system. There is growing interest in, and patience for, reaching consensus through public debate.

Māori cultural distinctiveness from the Westernised global hegemony helps to feed dissatisfaction with what imported global culture offers and denies. Tau-iwi embrace the idea that through te ao Māori, Aotearoa has a unique opportunity. Some anthropologists reflect that New Zealand has developed its own unique brand of 'Aotearoa Creatives'.<sup>91,92</sup>

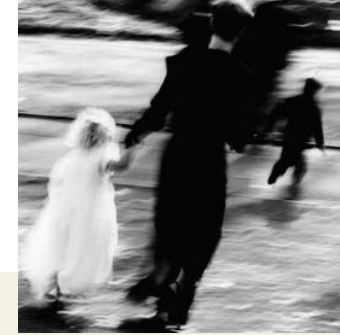
Consensus politics, combined with declining income disparity between the rich and poor, lead to the national realisation that it is just as important to be time-rich as consumption-rich. Emotional literacy and life skills are as valued as professional mastery.<sup>93</sup> Adults continue to learn new skills at intervals through their lives and there is increased value placed on intergenerational learning (to be wise and not just smart).

Investment in education builds understanding, trust, confidence and a more-inclusive society. Tertiary participation rates, which had fallen from 2005 as costs (and loan debts) rocketed, rose to high levels again by 2030. In a landmark election in 2012, all student debts were annulled and paid for by a reform in taxation structure that shifted responsibility from labour to throughput of resources.

A diverse, but identifiable, sense of nationhood with strong moral attitudes is emerging. There is spontaneous cooperation and participation – on common causes. This echoes Habermas' notion of the public sphere, in which individuals respect and take interest in each other's opinions while also looking out for the good of the community as whole.<sup>94</sup> Higher levels of social capital/connectedness are associated with lower compliance costs, because of less monitoring, less litigation, more trust and participative decisions, though this is still perceived by a libertarian minority as surrender of their individuality and 'rights' and this group remain a strong opposition voice at all levels of decision making.

Diversity exists in society as a chequerboard of predominant local styles and cultures. It is leading to local group or place identities, not necessarily anarchic but as examples of 'subsidiarity', being small, focused and purposeful.





Following consultation, a programme of compulsory 'Kiwis in Social Service' is introduced for all. This ensures that everyone, irrespective of age or income, participates in community projects, contributing time to public services and environmental care (media nickname reports on people's experience of this KISSn'tell). Through participation, credits can be gained to access tertiary education and other rationed public services. New immigrants view this as a quaint old-world custom while intergenerational resident families see it as representing a pioneering tradition where all are treated equally regardless of background, and as a social leveller. The very rich can buy out of this time commitment only by substantially sponsoring two others of low income through their tertiary education years (known as 'community skills investment').

New Zealand brands itself *'the new Retro'*.<sup>95,96</sup> Some older people, feeling nostalgic for the 20th century, reassert the quasi-religious label 'God's Own' (Godzone), while others, especially the younger generation, find it too dull, too self-satisfied, and aim to move abroad themselves to seek more entrepreneurial, and risk-taking societies.

- Teenage depression and alcoholism/substance abuse continue to rise. This is a socially hidden malaise, glossed over because of an emerging 'soft drug'-tolerant culture, which assumes that education, social care, a good health service and time will get youngsters through it.
- Restorative justice reduces prison population. Large prisons are replaced by smaller local ones. Using directed community service by offenders loses its stigma and is a welcome source of person-power for projects.

## DEMOGRAPHICS AND MIGRATION

Migration is shaped by local choices, not national policy, though high refugee quotas remain. Physical isolation protects New Zealand from illegal migrants better than in Europe or the United States. Barriers against economic migrants, especially if elderly, are set much higher as part of the quality destination angle.<sup>97</sup> This is successful, as there is high demand to live here.

New Zealand is 'a great place to bring up kids'. Highly successful residential schooling for the visiting world elite relies heavily on a reputation for security, standards, welcoming community and healthy environment. However, since 2025 New Zealand has some difficulty retaining the young high-flyers seeking

rapid promotion and responsibility, although many return after 'mixed' experiences abroad.

Access to private palliative and geriatric services for the rich makes New Zealand a retirement destination. As one of a few countries to legalise euthanasia (2015) under its liberalisation programmes, New Zealand also becomes perceived as a 'comfortable death' destination. This was resisted socially by religious fundamentalist groups well into the 2040s before entrepreneurs dominated through provision of secure, luxurious specialist 'resort-type' locations geared to this purpose, too carefully regulated to ever risk hastening the natural exit of their clients.

## LEGISLATIVE, POLITICAL AND INSTITUTIONAL DIRECTIONS

The strong emphasis on social technologies leads to increased community engagement, justice and social ecology, resulting in a strong participatory democracy. The collective voice is valued and all institutions using it thrive, from trade unions to maraes. MMP is a strong, respected mechanism of political authority with STV proportional representation in local government. New processes for decision making are a less hurried, more participative democracy, with monthly referenda votes on community issues. The institutions of modern democracy and the modern politics of the street developed in tandem.





Parliamentary and electoral processes:

- Provide targets for long-term mobilisation campaigns
- Create channels for the exertion of influence
- Legitimise politics that is carried on by agents of 'the people', with the consent of 'the people', or on behalf of 'the people,' and for conflating these three claims
- Encourage organisers to find the means to demonstrate that their positions have large numbers of adherents (including petition drives, mass strikes, and demonstrations).<sup>98</sup>

New Zealand has adopted major tax reforms that shift taxes onto resource consumption and pollution; so that 'externalities' are internalised. Taxing people is phased gradually into taxing resource use between 2015 and 2025, which assists employment growth, especially part-time work for the growing proportion of older people. Social welfare is a major spending item. The massive shift to resource taxation involves adoption of a polluter-pays principle, for example, the 'true' cost of water is passed to users by shadow accounts and means that costs of some foodstuffs rocket due to cost of water used increasing several-fold. As now, over 10,000 litres of water is needed to produce 1 kg of beef, and there is massive innovation prompted in vegetarian modified proteins and designer

foods. Still a nation of gardeners, home food production becomes more significant. Agriculture restructures to reflect this, having been prepared by far-sighted visioning since 2010 by the research community.

## ECONOMY AND BUSINESS CONDITIONS

Free-trade deals begin to pall by 2010 especially when the consequences – loss of control and autonomy as well as limited economic benefits, while too many jobs are 'exported' – begin to bite in New Zealand. With smaller nations absorbed into new superpower blocs focused around supply-chain multinational corporates, there is, by 2020, growing disquiet about New Zealand's small international role. Strong grassroots political movements result in New Zealand stepping off the global 'conveyor belt' and regaining a positive self-image and more autonomy.<sup>99</sup>

The slow paradigm shift in New Zealand values speaks to living in a manner that is more economically, environmentally and spiritually sustainable and has lifestyle benefits. It is a paradigm in which ample and convenient goods and services do not have sole priority, as has been the case for many in the post-WWII generation. A new breed of consumers concerned about human rights, fair trade, the environment, sustainable practices, and spiritual and



personal development predominates. The marketplace in New Zealand understands that these consumers want to integrate their values with the products and services they buy and use.

Many New Zealand-based businesses concentrate on a combined New Zealand–Australia domestic market and ‘boutique’ high-tech exporting. There are far fewer exports of primary produce (by volume), apart from supplies to drought-affected Australia, partly because other markets were not as open once New Zealand dropped out of trade agreements.

The currency, after currency union with Australia, is known initially as ‘ANZACs’ after images of Gallipoli were printed on the first edition of the smart-cards that replaced both New Zealand and Australian cash in 2025.

Business branding highlights ‘exclusive, green, ethical & honest’. The grocery industry, for example, has employed what it terms ‘whole-health marketing’. This tactic calls for marketing together once-separate departments such as pharmacy, dietary supplements, natural medicines, organic foods, personal care products and fitness supplies, to appeal to the consumer looking to support a healthier overall lifestyle.

More self-regulation on behaviour helps maintain a clean environment. Ecosystem services function well, as economic benefits come from green products and

technology – services that improve quality of life and national ‘brand’. The State focuses on resource allocation rules and resolving local conflicts. Tensions exist between ‘green’ collective responsibility and individual economic freedom. Increased consumer information is available on purchasing choices.

A lack of people willing to undertake low-skill tasks leads to industrial action and civil unrest, and to social innovations requiring State-organised community service, around 2015.<sup>100</sup>

Blue-chip investors and their staff were shown by 2025 to be winning in their long-term financial returns. Ethical investments are widely favoured. There are strong social norms on acceptable investments – no mandatory code exists for this – but high-profile cases of ethically weak, expensive investments in private sports teams and in the Australian nuclear power industry lead to an enduring public furor. As a result, financial advisors express great diligence and conservative advice on potential investments. Corporate Social Reporting, now commonplace, is a complex and time-consuming task.

Society allows regulation, but limits its reach into private lives. This is an approach favoured by industries that supply unique high-value products derived from natural sources, of health value, such as anti-cancer drugs, anti-obesity, eyesight improvers, asthma

antidotes, etc. Retaining the value of these in New Zealand instead of offshore depends on active research, patenting, smart lawyers, protective government, etc.

Investment in New Zealand has been affected by the introduction of new taxation and economic regulations favouring ‘genuine progress.’ Economic growth continues but has slowed: GDP growth is not considered an appropriate barometer of national well-being after publicity discrediting it reached a peak in 2012. A Genuine Progress Indicator (GPI) was developed and widely accepted as a more meaningful monitor than GDP.<sup>101</sup> This socio-economic measure, of the kind proposed in the United States by former World Bank economist Herman Daly, adjusts personal consumer expenditure to account for a variety of economic, environmental and social factors not included in the GDP. For example, the GPI adds in the benefits of household labour, accounts for income inequality, subtracts social costs (such as crime, congestion, accidents, family breakdown) and environmental costs (such as air pollution, resource depletion, and the ‘hidden’ costs of climate change) and makes adjustments for long-term investment and economic sustainability. The index offers a more realistic account of progress than is provided by economic output on its own.<sup>102,103</sup>

## employer and chief executive (in the Scenarios Game)

Voices from the future 2055: Viewpoints



### POSITIVES

- Strong sense of community or tribal identity, and much healthier people living in our community/iwi. This society reflects much more closely Māori values of manaakitanga and whakapapa and kahakitupe.
- Have a high quality of life here overall. Labour market is highly trained and knowledgeable, workers are generally happy and more productive. Less workplace stress.
- Education for all is valued. Diverse cultural make-up of employees... introduces new ideas. Employees are fully involved in decisions – a stable workforce – no strikes. Business world has good networks of businesses supporting each other.
- I'm enjoying beautiful New Zealand resources and natural landscapes, as are the dollar-touting tourists. Being sustainable and 'clean' is not a market – disadvantage. It is the norm.



### NEGATIVES

- Frustrations for entrepreneurs. Less freedom for business/individuals to chart own course. It takes so long to make decisions, e.g. get approval for my venture, because I have to prove that it will be socially and environmentally safe. Safety is overdone! Too much government interference in how I run my business.
- I probably will not earn as great a profit here as from venture capital within other countries. Profit margins low due to high employee benefits. Employees will only work 3--40 hours per week and demand time off for recreation and health. Government regulation/red tape makes employment expensive and taxes are high. Problem with capital investment? Not likely to have latest techno stuff.
- New Zealand seen as a bit of a rebel country globally -they do things differently here! Yet greater difficulties here for the non-conformist. Worried about kids' opportunities and high suicide rate.

## TOURISM, SPORT AND ARTISTIC CULTURE

New Zealand has become a top-end tourist destination only (minimum entry fee, 2-week minimum stay) with guaranteed very high level services, especially in tourism reserves/parks. Retired people are a significant part of the market. The most salient characteristics of this form of tourism are a preoccupation with the self, in which self-development becomes a leisure activity, and an ecological sensibility.<sup>104,105</sup> Tourism here attracts a strong Māori and Pasifika branding.

Although parodied as 'quaint', the healthy New Zealand sportspeople frequently perform well, especially at the increasingly rare international sport events that have not been fully corporatised. Less social value is placed on competitiveness, however.

The artistic world flourishes, especially in terms of amateur performance, participative and taught arts and crafts, but there are fewer professional performances as the cost of staging these has outstripped the ability of many households to pay for tickets to shows.



## MEDIA

The media have reverted to national ownership – local media magnates have emerged. Government prefers local sources, in keeping with New Zealand's international political 'neutrality' and non-alignment, although they still fight media allegations about 'hot topics' (like explanations for high outward migration 'to multi-ethnic Australia, of people outraged at official biculturalism and Treaty settlements'). In fact, the shift in ownership has been helped along by government-introduced legislation on media performance requirements, which discouraged the global media.

The media do not have a stranglehold on information. There are – of course – secure international computer-communications networks. These networks have little influence in New Zealand. Private unwillingness to subscribe to any of the three main high-cost, but secure, international computer-communication networks (the 'Strato-Ethers') leads to a preference for NZ-based libraries taking public subscriptions and hosting other authentic sources of reference material that combine high-tech with humanity. New Zealanders value research before decision and believe it is important to *be authentic*.<sup>106</sup>

## TECHNOLOGY

Technology is used for resource care as well as consumerism. From 2010 New Zealand is a more cautious 'taker' of global technology. Scepticism of new-technology impacts, especially long term, originates in the community – it is not a 'political' stance. The New Zealand emphasis on innovation and low-impact sustainable resource use puts pressure on manufacturers to recycle, leading to conflicts and barriers in relation to the less-sustainable wider world.

Building on biosecurity risk assessment experience, innovative regulation is developed to 'screen' local or import proposals for their long-term benefit and forestall any detrimental effects.<sup>107</sup> People expect high-quality information about new technologies and critical mechanisms for making decisions. International consultancy and intellectual property remain strong export earners.

Some industries have declined, others have emerged. For example, the primary-production protein-export industry has declined. There is a self-sufficient protein industry only, as reducing the eco-footprint requires cuts in such energy- and water-intensive exports as beef and dairy products – very little is exported further than Australia – just enough animal proteins and cereals to live on. We use the 'surplus' productive

farmland for a diversity of tree crops, biofuels, horticulture, etc. The farming community is in 2055 able to understand the use and conservation of phosphates, and manage their farmland organically. Lowland streams are in good health.

Carefully controlled GE and other 'high-tech' processes are still controversial but some are permitted. This leads to successful commercial opportunities. Plains in Canterbury, Waikato and Taranaki are being regenerated for native plants, biofuels, high-quality organic, and small-scale GE farms to produce low-volume, high-value trade products. Conflict between proponents of organics and GE (and associated wider public debate) has continued for decades, exacerbated by the spread of a pesticide-resistant 'super weed' of field crops that was subsequently controlled by a genetically modified insect, as well as by changes in tillage practices.

Road travel has reduced. Auckland's car scheme charged access costs to users electronically via ID cards – other urban centres followed this lead when they saw the strong impact on road congestion and were thus able to reduce road construction spending. True costs of road maintenance fall on heavy vehicles (via taxation) as the main sources of road damage, and are passed on to users of freighted goods.

### KEY ISSUES IN SCENARIO B

- Moderate growth – but the benefit shared equitably, a disincentive to entrepreneurs
- Knowledge and value-added economy – creative resources other than primary commodities
- Dynamic, cohesive society, high participation in governance, involved citizens
- Independent Global standpoint – Aotearoa is outward looking, but critical and ethical
- Role of the Government – agreed direction and system design with light regulation plus public service provision
- Political environment – convergence, shared values, participation
- Restorative of the natural environment

### WHAT ARE THE IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT?

Sustainability is not a new idea, but, effectively bringing people along – from acceptance of an idea to living a new lifestyle – represents a significant step forward. Designing sustainable living criteria, which embrace ‘social’ progress, is an emerging trend that may significantly alter the way we live and account for our lifestyles.

This scenario sees environmental solutions achieved as much by behaviour change<sup>108</sup> (e.g. to reduce resource demand) as applications of technology that gain efficiency or mitigate effects. It includes innovation in technology led both by the state and business, in a spirit of partnership or common cause. There is a bias towards the NZ-based firm over the multinational corporation that is only financially viable, in a small domestic market, if public investment underwrites the research and development stages. The market would not favour smaller manufacturing firms unless there was some tariff protection or cultural disconnection from globalisation, but that is a characteristic of the *Independent Aotearoa* scenario.

In this imagined world, sustainable development is concerned with more than the management of environmental vulnerabilities – the balance of present

and future prosperity; it also addresses social equity and cohesion. Sustainable resource management involves the creation of a framework that facilitates the assessment of issues and problems, in close consultation with the local population, and the development of effective strategies and action plans to maintain the balance long term between system/resource capabilities and their use.

#### ▶ LOCAL PLANS:<sup>109</sup>

- Define in quantitative terms the potential and limitation of each resource and set a level (decision threshold) for its sustainable use
- Ensure that each resource is deployed for the most effective of alternative uses, which is an economic intervention, without landowner compensation for lost financial opportunity, as the wider public need prevails
- Make sure the benefit from the use of the ‘commons’ natural resources such as water accrues to the local community and national needs
- Recognises the risks and costs associated with underuse (and not just overuse) of resources, such as the problem of neglecting pest management or holding buildings empty.



In relation to the 2001 Special Report on Emissions Scenarios of the Intergovernmental Panel on Climate Change,<sup>20</sup> the *Independent Aotearoa* scenario has similarities to IPCC group B2, described as ‘a world in which the emphasis is on local solutions to economic, social, and environmental sustainability. It is a world with continuously increasing global population at a rate lower than A2, intermediate levels of economic development, and less rapid and more diverse technological change than in the B1 and A1 storylines. While the scenario is also oriented toward environmental protection and social equity, it focuses on local and regional levels.’

There are two trend groupings that we observe in relation to the development of this *Independent Aotearoa* scenario. The first is attitudinal; the second relates to the way we currently account for national income flows, or GDP.

The first cluster of trends centres on a rising concern with the quality of life. In addition to the voluntary simplicity movement and attitude sea changes among middle-class people in many Western countries, a quality-of-life movement seems to be gaining momentum. This has the potential to be one of the stronger positive trends we witness in the next few

decades and holds a great deal of hope for the environment, if declining income doesn’t drive social behaviour to the edge. There are major implications for workforce, family, local government, consumer behaviour, etc.

The second collection of trends relates to calls for replacing the GDP as a key indicator of the health of national economies and as a measure of progress, because GDP is considered ‘an income that can not be sustained’ as it fails to take into account the degradation of natural resources. Organisations overseas, such as Redefining Progress, New Economics Foundation, and the Australia Institute, argued for new measures of progress that do measure the general well-being and sustainability of a nation. In the latter part of the 20th century, Redefining Progress found that while United States GDP had been growing for the past four or so decades, GPI or ‘quality of life’ had been decreasing. Australia and the UK were similar. □

# SCENARIO C

## NEW FRONTIERS

The unintended impacts of **human appropriation of the Planet's resources** have become so numerous, voluminous, and entangled feedback loops that they often overwhelm the capacities of decision-makers to cope with current crises, much less prepare for a sustainable future.

Ed Ayres<sup>182</sup>

**This is a future world**<sup>110</sup> of initially rapid economic growth, low population growth, and rapid introduction of new and efficient technology. Ties between global, regional and national economies strengthen and the demarcation lines between them begin to blur.<sup>111</sup> Major underlying themes are economic and cultural convergence, with a substantial reduction in regional differences in per capita income. Here, people consciously pursue personal wealth rather than environmental quality.

In this scenario, global players are led by a secularised faith in technology – *technicism* – as saviour or rescuer of the human condition. Technology is the basis, the motor, and technicism the mark of nearly every cultural activity or field. There is an inherent belief that this culture has many advantages in comparison with the past. There is assumed to be a silver-bullet solution to any problem.<sup>112</sup>

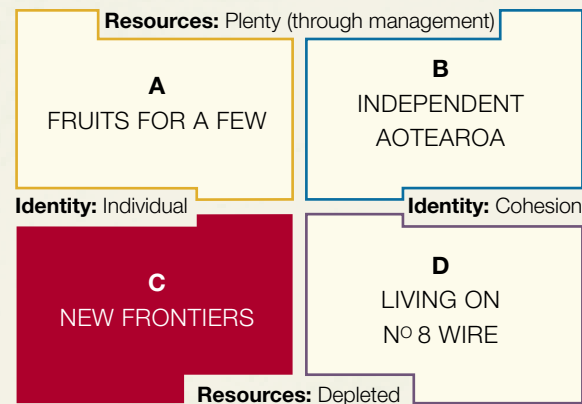
Sustainability is a notion remembered by a liberal minority. Resources are depleted, because there is a short-term-gain attitude that assumed (erroneously, viewed from 2055) that technology would always solve resource scarcity issues, so that frontiers could expand. Long-term planning is rare. For decades people assume a high level of disposability – of people, ideas and materials; this is the ultimate 'junk economy'. It is as if we were on a 'train of growth' that we could not get off, so, we use and waste while we contemplate inventing better ways to keep that train on track, going ever faster.<sup>113</sup> Because politicians here only tackle the present, visible symptoms and ignore the underlying structural causes, they can often damage the immediate future even if they cannot affect the long-term trends.<sup>114</sup>

The market reacts too late to halt the exhaustion of natural, non-renewable resources, the collapse of ecosystems – as a result of overloading and the inability of science and technology to produce compensatory effects. Within 25 years we are arguably 'out-driving our reaction time', i.e. we have caused changes in society or ecosystems that cannot be corrected before crashes are triggered.<sup>40,115</sup>

In New Zealand, an exploitative and extractive mindset becomes increasingly desperate as economic growth declines from 2030 with mobile wealth going offshore as resources here become depleted and polluted. Having damaged its unique natural assets, tourism yield per visitor also declines and it becomes a urban and coastal resort for Indian and Chinese middle-class tourists in higher numbers.



## PRINCIPAL DRIVERS OF CHANGE



### IDENTITY...

New Zealanders' exhibit a strong '*not us*' culture. People have dominion over nature and separation from natural systems, and favour individualism so are less cooperative, less understanding of each other. Aspirational – success is defined only by conspicuous wealth. A '*Do what you like in your own home or on your own land*' attitude prevails. Individuals find it exciting – open to enterprise – a world out there waiting to be exploited – and society is very consumer driven, although the low-wage economy limits the size of domestic market.

### RESOURCES...

Society is driven by consumerism – New Zealand markets itself as a superb niche-market shopping destination because of the après-shop activities – the 'Great Mall for China' theme dominates – both in supply of goods for the New Zealand market and the top-end shoppers visiting here. Resource owners win – especially owners of remaining coal reserves. For example:

- Strip mining of land and seabed for minerals
- Food sources include accessible Antarctic oceans, until fish populations collapse and species extinctions result.

## GLOBAL CONTEXT FAVOURING SCENARIO C

This world for the first 25 years is dominated by rational economic man '*Homo economicus*,'<sup>116</sup> and economic indicators are 'examined under the microscope' not with a wide lens, and a small decline in GDP or rise in taxes is sufficient reason for the fall of a government. There are few models of 'environmental economies' with different indices of national economic 'prosperity' and effectiveness. We cling strongly to the notion that free-market capitalism is relatively benign, because it outlasted communism and there is no visible alternative.

'Global economic rationalism has one supreme value – material wealth.' Key players have but one aim: to make society as wealthy as possible. Proponents of economic rationalism are ideologically bound to the argument that 'the market will secure the highest possible standard of living for all...this is *after all* the 'grand democracy of consumption'. Those who consume cast their votes – *every day* – on how society's resources should be used. Consumers dictate what should be built, what should be eaten, and what should be read.'<sup>117</sup>

This is a world where the ideology and theology of economic rationalism hold a monopoly of power and accept no limits – 'theology asserts propositions that cannot be proven. Ideologues hold stoutly to a world view despite reality. When ideology and theology couple, their offspring are not always bad, but it is always blind. And there is the danger: voters and politicians alike, oblivious to the facts.'<sup>118</sup>

To the reasonably affluent, it seems obvious that the world they inhabit is far cleaner and richer than it once was. We are inclined to take for granted the standard for living we inherit from the past and we strive to increase it, or at least maintain it. Global environmental problems go unnoticed or there is disagreement about what the 'signs of change' mean.





The Kyoto Protocol has collapsed, and global warming accelerates. As resources become scarcer and expensive, short-term technical alternatives replace them. These are often unsustainable in the longer term, with short-term downsides, for example changing oil and gas fuels to more-polluting coal. New Zealand plays a larger part in global warming in 2025 by extensive New Zealand coal burning here and doubled exports.

By 2025 free-trade agreements are globally pervasive. Migration of knowledge and skilled people around the globe increases significantly at the same time. The resilience of the New Zealand economy has continued to surprise many, and economic growth surpassed economists' forecasts throughout these years. Tight labour markets, high commodity prices and buoyant consumer confidence all contributed to a stronger growth profile. New Zealand climbs the OECD ladder to become a higher ranked economy once again. This served to reinforce the 'orthodox' Treasury view in New Zealand that 'growth is best fostered by a stable macroeconomic environment, reduced regulatory costs, a reduced role of the state, lower tariffs, and improved productivity in publicly provided services.'<sup>119</sup> However, global trade deals result in loss of control and autonomy, and favour players larger than New Zealand. Entrepreneurs and risk takers are given free rein, with both good and bad results.

But these early gains are based on economic profit at the direct expense of environmental and social prosperity. We blindly denied the impossibility that everyone on a single Planet Earth could gain a 'Western lifestyle' (circa 2000 levels) when that would require at least three planets – and maintained high consumption throughput. Landfills grew rapidly with short-life products. We did not understand that we are dependent on the continued viability of the natural environment and did not bother to better understand the state of key ecosystems, and our impact on them.

Social inequity is also unnoticed – social services being privatised and globalised: 'individual's right to choose...if you can afford it,' and as with the environment, no action is taken by 2025 – problems just aren't serious enough yet.

It is clear that – *without prior catastrophe* – we are unlikely to achieve sustainable development. Even though people value sustainable development – local economic pressures dictate a greater interest in jobs now, and short-term returns.

By 2030 New Zealand's economy has declined again in relative global ranking due to increased insecurity and depletion of natural resources here and abroad. By 2055 the role of most governments has been reduced to security and law enforcement institutions.

By 2055, a few dozen multinationals, some of them larger than states, control the world. They provide diversity in goods and services. They are also closely aligned to the most powerful governments (those that have the strongest security forces). With 'free trade' based purely on economic gains for its advocates, poorer and smaller countries get locked out by 2055, as they have nothing left to offer, either in resources or markets. Their economies and subsequently their populations, crash, as subsistence lifestyles are difficult due to the environmental degradation, loss of survival skills and loss of means to combat disease.

## farmer roles (in the Scenarios Game)

Voices from the future 2055: Viewpoints

### + POSITIVES

- ❑ Isolated in country from worst of urban social unrest. I can provide produce to richer urban populations in New Zealand and abroad, who strongly desire this.
- ❑ Freedom to produce the most profitable crops (such as marijuana). Little interference from government – can do what I want on my land. No constraints on land use, as environmental protection not mandated. As a result, little respect for the land. High-production – short-term view.
- ❑ Increased wealth through land capital value increase, initially. As resources deplete – higher production costs, lower land value. Possible increasing interest in looking after local resources as things get desperate by 2040s – organic farming (if it survives) may be seen as having valuable knowledge?

### - NEGATIVES

- ❑ Exploit local resources, export overseas, although commodity prices fluctuate – economic uncertainty.
- ❑ Disregard for environment, not using sustainable practices. Environmental quality a poor second after profit. As pollution grows and resources deplete it may become difficult to source phosphate and nitrogen fertilisers etc.
- ❑ Losing neighbours. Small town closing down so is harder to access services/goods – didn't use those shops much anyway, I bought cheaper from Web. The unrest and lawlessness impinges upon my land – now vulnerable to the homeless and hungry.



## NEW ZEALAND IN THIS CONTEXT

In this scenario, after a confident initial period, New Zealand becomes a progressively less desirable place to live due to increasing environmental degradation and low wages. Unemployment grows and, with it, social tensions. Today, in 2055, New Zealand is considered a distant backwater, struggling to retain its educated and skilled workers.

It has been just two decades since New Zealanders supported unbridled individual and economic development – with reduced taxes and regulations and lower barriers to innovation; after all, New Zealand had an abundant resource base (*She'll be right* attitudes such as: 'The minor problems can be fixed, by someone else, later' and 'There were plenty of free resources here, so it's okay to use them'). In fact, in the early decades of the 21st century, there was a resource scramble and the first-in gained access to New Zealand's resources base; as demonstrated historically by competition for access to irrigation water from rivers, since 2000.

Corporate Social Reporting disappeared by 2015 except for charities and community groups, which followed suit sometime in the mid-20s, if they were indeed still functioning.

Although the market is theoretically open to all, as advocated by JS Mill, strong social inequities grow between winners and losers based on wealth, ownership and skills. Some people are openly pessimistic as early as the 2020s, perceiving New Zealand as staving off an inevitable crash from excessive resource exploitation, and sense that 'we are prostituting ourselves' to global corporations.

Although reminiscent of unregulated 19th century gold rushes, New Zealand's economy flourishes at first in this scenario, due to its relatively high initial resource base. This unbridled development underpins entry of transnational corporations, allows capital outflows, and lays the foundation for later erosion of national ties. Transnationals can play countries off against one-another, with little regard for health and environmental impacts on people in weaker countries; but they also serve as efficient conduits for transferring technology, capital, and expertise. As with other unregulated fields, science and technology is fully commercialised. Although only research with expected commercial benefit is funded, some interesting technology innovation – relating to resource extraction – occurs. In other areas of innovation, science and technology, it is fair to say that an ingenuity gap arises, with a notable decline in long-term decision-making capacity.<sup>120</sup>

As the social and environmental neglect of the 2010s and 2020s hits home, and resources are running short, in the third decade of the century, some short-term technology fixes are used to substitute for resources, but options narrow. Unemployment begins to be visible.

Although resources in New Zealand are by 2040 still more available per capita than many other countries, due to the small total population, many environmental risks were taken by science and technology in the past half-century; some resulting in major disasters. Global corporates funding research in climate change management, unfettered here by precautionary principles, use New Zealand as a key field station to experiment with mitigation technologies, some with disastrous flood and soil loss consequences.

By 2055 significant areas of New Zealand are affected adversely by climate change, with migration of the rich from estuaries to higher ground, on realisation of global warming impacts. Manawatu and Bay of Plenty '50-year' floods are an annual event by 2045. Some Coromandel, Bay of Plenty, and Gisborne coastal properties slide into the sea. The urban poor, however, can only afford to live, uninsured, on the flood plains or other locations abandoned by those still in employment.

## low-income parent (in the Scenarios Game)

Voices from the future 2055: Viewpoints



### POSITIVES

- ❑ Basic goods cheaper, access to technology to make life easier has been good = easier living, while resources last.
- ❑ Lots of work opportunities – easy to job-share or work part-time, or to invent, set up cottage industry. Positive thinking means great opportunities to better yourself if you know how and who. Those with capital will do this most easily, of course.
- ❑ As an iwi member, Treaty Claim settlement benefits have flowed down to me, where I and my children are well provided for, able to buy education/health services.
- ❑ Cool cars and gadgets (say my kids)



### NEGATIVES

- ❑ New Zealand has been asset stripped. It's a disaster, only appealing to the wealthy who can escape the environmental damage. I will envy them. Crime is rife.
- ❑ My life is likely to be physically unpleasant and short. I expect to die of starvation and cold, alone.
- ❑ Family is dispersed. Children wish to travel abroad and leave me – could not count on their support nor on the State's.
- ❑ High premiums for health insurance, high education costs, no social support. My kids go to a badly resourced school and I live segregated away from wealthy people. We are segregated into classes based on money, not by ethnicity.
- ❑ We are individuals without a community focus.

## PEOPLE AND SOCIAL DIMENSIONS

Peoples' values are increasingly focused upon themselves as individuals. There is already a tendency away from the traditional values of family, community, and being a loyal employee, towards the post-modernistic values of job-satisfaction, portfolio careers, empowerment of the individual, personal wealth, personal health, and individual rights. There is a lower tolerance of difference from global-marketplace values than in other scenarios.

However, living standards drop markedly from 2025 with New Zealand later being considered equivalent to a 'developing country'. Many social problems worsen, including unemployment, erosion of savings, a politics of blame, growing intolerance, a narrowing sense of community, an accelerating spread of diseases. Most social services are privatised. This leads to an erosion of community trust, accompanied by social unrest and decline in social capital. A breakdown of law and order creates widespread unease. Ethnic gangs – new 'poverty-driven mafiosa' – emerge and fight over the underground economy, which thrives. People need to feel 'secure' and expect that security to be provided by appropriate governance – much as in the United States in 2005–07; they are anxious that the country could drift to an extreme state (fascist totalitarian or anarchic).



Historic Treaty of Waitangi claim settlements have ended by 2025. Those who received material proceeds of Treaty settlements do well, but compensation also results in creation of a Māori elite, the new 'super' rich, with effective control over considerable private land and resources. Iwi focus is on economic more than social development. Large areas of Māori land is leased to multinationals and exploited (e.g. forest clear-felled) for the short-term economic gain of the current generation. Many others, mostly urban and iwi-unaffiliated Māori, remain on low incomes. Education and health disparities for young Māori and Pacific peoples were not 'fixed' by complete immobility – by 2025 there are relatively more present within the elite – but many are left behind in the low-skilled underclass.

Māori whanau are split between those who enjoy the roller-coaster experience of living in the global movie-set, full of electronic gadgets and excitement, and those who are unskilled, long-term unemployed, alienated from iwi resources, for whom the promises of technology are unattainable, except by theft or other wiles. Neither faction is much connected with traditional values or with the community of the marae.

## DEMOGRAPHICS AND MIGRATION

Prior to 2025, immigrants make links back to their home country, attract further relatives and friends, and varied businesses flourish. After 2030 the New Zealand lifestyle and income has deteriorated enough to deter migration of the already-trained mid-age group, and some leave, exacerbating skill shortages. Later New Zealand adopts the 'taker' mentality – especially with huge migration demand from 'Ice-age' Europe (chilled after 2035 as a result of global warming switching off the 'Gulf Stream' North Atlantic Drift Current). Immigration policies are based on wealth and skill – fewer unskilled but ambitious poor refugees are accepted than were in the 2020s.

Low net immigration and falling fertility (for example due to water pollution by agri-chemicals which turned out to be endocrine disruptors) means New Zealand's population is declining. This is compounded by our ageing domestic population structure, exacerbated by an inflow of retired business people with private means, often to live in 'gated communities'. There's a growing trend towards low-paid domestic servants being hired to work and care for the wealthy migrants, which entrenches class differences.

Urbanisation increases – the high inward migration flows impact especially on Auckland and lifestyle/leisure areas such as Wanaka, Queenstown, Nelson, and the Bay of Plenty.

## LEGISLATIVE, POLITICAL AND INSTITUTIONAL DIRECTIONS

This is a laissez-faire economy characterised by 'light-handed' regulation, in which government listens to a powerful lobby of business 'autocrats' who encourage short-term international trade deals, which eventually lead to loss of New Zealand economic control and autonomy. Public policy is demand-driven and caters to interest groups, such as Asian-based international corporations. When government intervenes it is often ex-post facto legislation, if at all, with occasional legal suits taken against token newsworthy sales-people peddling hazardous goods, financial fraudsters and wanton polluters.

Some Māori welcome this freedom, particularly the 'Westernised' entrepreneurs, but it is also increasingly difficult to exercise kaitiakitanga and to retain cultural values.

By 2025, New Zealand has effectively become a state of Australia, with common currency, united defence force, etc. However, there is just enough cultural/social governance to bind people together: 'United under the flag' – but only if led and because of need, not chosen spontaneously. As the lowest totems on the pole, New Zealand and Tasmania vie economically and, of course, their teams compete for the Aussie Cup.



## ECONOMY AND BUSINESS CONDITIONS

After major reversals, New Zealand's economy adapts to new local conditions. New Zealand is a 'services' scavenger – trading on its size, geology, natural beauty, biological capacity (e.g. soil quality, rainfall), relative isolation, and low wages. Mainstream New Zealand organisations that were conservative have found that the employment of a multicultural workforce brings a new vitality to their organisations. Many languages are spoken between people in New Zealand. The learning of languages is common – there's an assumption that everyone 'well educated' speaks three languages.

New Zealanders welcome almost any employment, even in the form of prisons, retirement villages, tree plantations and the like:

- Fiordland and Southland have major new overseas-owned exotic conifer and native tree plantations, replacing both grazing land and native bush areas.
- National parks become franchised by the State, with their own brand of luxury tourist lodges. The conservation estate is smaller after 2025 as it was too large to be maintained by the public purse and insufficient private sponsors came forward to support it. Proceeds support maintenance of the remainder of the estate.
- Businesses gather around the Gateway to Antarctic – source of iceberg 'clean' freshwater for production purposes.

- Encapsulation system, developed in Australia, provides the basis of a billion-dollar industry in receiving, processing and storing nuclear waste (and other toxics) from population centres to the North. Non-resident owners are interested in and exploit the commercial opportunity for 'secure' water-cooled storage of nuclear and toxic wastes from the Northern Hemisphere, on the New Zealand West Coast, although this is politically unpopular. Geologists describe it as too close to fault lines and a disaster-in-waiting.<sup>121</sup>

NZ\$ merged with AUS\$ in 2025 then with Greater Asia ¥ in 2049 (100th Anniversary of Chinese Republic) as part of 'Asian co-prosperity sphere', which expanded to cover most of South East Asia and the Pacific. Only two other significant global currencies remain, the Euro and US\$. States outside these currency blocs are severely disadvantaged as they rely on exchange through global trading.

By 2025 there are very few large entirely New Zealand owned businesses, a few NZ/Australian large businesses, but most are globalised and owned by Asian, European and US blocs. Businesses that survive in New Zealand

got in early on hi-tech 'advances'. Mottoes of market-driven model are 'trust the consumer' and 'buyer beware' and 'the ends overshadow the means', with

a high return generated for some firms and their stakeholders. Outsourced services, anonymity of suppliers, lack of consumer labelling and unfair trade prevail.

The risks of market failure are higher than they were in 2005. Lack of impartial information to consumers leads to fashion-prone trends and to fast turnover, for example:

- Some novelties succeed (winners)
- Some get dropped (losers)
- Some persist (as they are not reversible).

Educational institutes have high level of corporate sponsorship from hi-tech industries, which seek preferential access to their graduates and 'bond' them to work in NZ and/or Australia.

This is free-market capitalism without international barriers; in which competition is high and unregulated. There is a lot of overseas inward private investment in technology, but local capital is just as freely being invested abroad. The most practised investor model is high risks for high returns. Ideas heard in society – from the winners – continue to justify this open economy. The losers' voices have no platform. New Zealand becomes a low-wage economy similar to 'developing countries'.

## employer and chief executive (in the Scenarios Game)

Voices from the future 2055: Viewpoints

### + POSITIVES

- Great for business entrepreneurs – more profit, low/reduced taxes, limited interference from government. Unskilled labour costs reducing, and no unions to worry me.
- Don't need to be committed to good workplace conditions. We don't have to give service and can ignore customers' moaning – few consumer rights!
- Business activity is focused on individual wealth creation. My venture can be about 'take' rather than sustainable good because I'll add to the economy immediately – and that's more valued in society.
- Lots of innovation and creativity for business elite and personal opportunity for our career moves in a globalised world.
- I'm able to offer more business scholarships to Māori.

### - NEGATIVES

- Even the rich will suffer from the degraded natural environment and damage to natural resource base.
- Quality of life isn't very good here, e.g. my health is poor from the air pollution.
- Healthcare is expensive, and taking my profits.
- Shortage of skilled labour – lots of our bright young people 'gone' overseas.
- I feel a bit worried about my effect on employees, and see misery and hopelessness for the majority outside the business world.
- Self-interest and people's suspicion that I'm taking wealth from others creates a social block – I'm feeling isolated and my security is threatened by an underclass. Perhaps we need to bring back a basic minimum wage instead of importing more migrant workers?

## TOURISM, SPORT AND ARTISTIC CULTURE

Tourism remains large – but is foreign-owned – and adapted to new conditions. This sector is a high-volume market, for example shopping & sights tourism through The Red Shacks brand, of particular attraction to the Asian young urban rich, with direct flights to holiday centres, while aviation fuel lasts. New Zealand is increasingly attractive to middle-class Indian industrialists, who jokingly coin the term 'Bharat of Plenty' for their new play-area, after the loss of Kashmir to nuclear terrorism.

Tourists can still participate in adventure sports – although, due to global warming, few snowfields survive and 'scree-boarding' is a major tourist activity instead, although it is hard to obtain insurance cover. Some of the injured visitors study English while in plaster, recuperating in private rest homes that have developed locally in response to this recurring market opportunity.

Professional sport is dominated by those few with individual ability, who have remained in New Zealand for personal/family reasons. There is little amateur activity, no volunteer referees, and few coaches available. It is a long time since New Zealand gained international sports recognition.

Artistic culture is divided between the counter-culture of individual protest writing and design (murals, wall pamphlets, video blogs and guerrilla email poetry) and the mainstream entertainment industry of music, drama and design that implicitly and explicitly promotes products and services, formed by convergence of television advertising, music videos and interactive point-of-sale events. There is little surviving amateur group or community arts activity by 2055. Circus and similar spectacle is still popular, with the extreme human and animal feats now augmented by genetic engineering and drugs as well as electronic illusions.

## MEDIA

Although there are many media outlets, including a few using Te Reo Māori, these are mostly owned either by the Asian State Media or from Australia by M Murdoch (grandson of Rupert). Although touted as 'just the news you want, when you want it' with global content, limited sources, instant and mobile, plus personalisation in content, people find them commercially dominated and 'untrustworthy' – so much so that it is quite possible to remain unaware of major news stories. An example is a disease outbreak of SARS that goes unnoticed by much of the population outside the affected New Zealand city.

## TECHNOLOGY

The Biotech 'frontier' replaces the physical landscape frontiers that faced previous fuel prospectors, with access to biofuel technology dependent on 'patron' corporations and a few rich states. These entities also control GE breeding and biosecurity matters, more than the State.

Physical abilities (strength, longevity, recovery from illness) can be augmented by technology through human body spare parts grown from hybrid human–animal stem cells. Medicine and health care involve virtual access to international expertise; and instant medical diagnosis through whole-body scans is available, albeit at high prices that severely disadvantage the poor. In 2040 a decline in average lifespan for the 'ordinary' low-income New Zealander is first recognised. Toxins now ubiquitous in food and water are affecting human fertility.

## KEY ISSUES IN SCENARIO C

- Identity is individualistic at the expense of social policy, consumption is conspicuous
- Unfettered opportunities for the entrepreneur
- Growth is initially high then declines when becomes resource-limited
- Extractive short-term economy – mining resources and soils, ocean overfishing
- Fragmented society – social unrest and inequity, loyalty to group is not state
- Role for government is minimal – law and order, trade conditions, few services
- Political environment – self-interest rules, 'greed is good'.





## WHAT ARE THE IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT?

This scenario extrapolates the post-WWII notion of development and economic progress held by the International Monetary Fund, the World Bank and the governments of major countries, (more so after the ‘fall of communism’), that suggests that wealth and opportunity and improved living standards will be delivered through a global market and economy.

In relation to the 2000 Special Report on Emissions Scenarios of the Intergovernmental Panel on Climate Change<sup>20</sup> the *New Frontiers* scenario has some similarities to group A1 which describes a future world of very rapid economic growth, global population that peaks in mid-century and declines thereafter, and the rapid introduction of new and more efficient technologies. Major underlying themes are convergence among regions, capacity building, and increased cultural and social interactions, with a substantial reduction in regional differences in per capita income.<sup>122</sup>

*New Frontiers* also plays out Garret Hardin’s ‘Tragedy of the Commons’ which describes the situation where a common pasture open to and used by all has a particular herdsman who receives nearly all the benefits from the purchase of an additional animal. However, the negative effect of buying additional

cattle, which is due to overgrazing, is a problem shared among all the herdsmen on the commons. The benefit of buying more cattle for that individual is then greater than that individual’s portion of the shared negative effects, and the rational herdsman thus decides to add another animal to his herd, and then another, and another, and so on. This decision is reached by every herdsman ‘sharing the commons’ and eventually leads to overgrazing destroying the commons, and bringing ‘ruin to all’.<sup>123</sup> In this scenario, competing and unregulated fisheries would use ever-larger nets, factory processing ships accompanying trawlers, and spend longer periods at sea. The collateral habitat damage of bottom trawling (marine equivalent to forest clear-felling), for example, is borne initially by other sea life and ecosystems, and only later affects the viability of the fish populations targeted by trawlers.

The daily complexities of politics and the need to manage current problems still leave little time to consider the bigger picture. Short-term orientation seems to prevail: corporate stockholders want profits every quarter, forcing a focus on actions that may be at the expense of longer-term earnings; government leaders give priority to immediate issues and aid (and attract) global business with tax cuts, at the cost of

neglecting long-term issues, even when that delay is ultimately more costly to taxpayers, as ‘cures’ cost more than prevention.<sup>124</sup>

Under this scenario, due to its short-term solution ideology, New Zealand would be less prepared for or resilient to sideswipes, such as epidemics, severe storms, floods/tsunami, earthquakes, etc. Ecological systems may begin to exhibit sharp and unanticipated threshold effects – systems that initially responded slowly and incrementally to human intervention are now suddenly changing in character.<sup>125</sup> Many critical systems are on the verge of catastrophic change.<sup>126</sup>

In essence we see a society that places no value on sustainability of communities and ecosystems; the economy as conceived holds people to ransom through its emphasis on ever-increasing production and consumption, at least until resource limits hit. Sustainable development is a concept that never gains traction in these circumstances. □

# SCENARIO D

## LIVING ON N° 8 WIRE

We are like the magician's nephew (apprentice), **having unleashed forces beyond our wisdom**, we now look around wildly for what to do next, not sure whether to congratulate ourselves for our prowess or damn ourselves for our short-sightedness and lack of wisdom.

Sarah Ruth van Gelder<sup>183</sup>

**Paul Romer and his 'new economic growth theory'** are apposite for this scenario. Romer's concepts that ideas are the 'instructions that let us combine limited physical resources in ever more valuable arrangements' is borne out in this future world. Ideas – which allow us to solve practical social and technical problems – have significant productive power and account for a significant portion of economic growth. They allow us to adapt to scarcity in the 2050s.<sup>127</sup>

In this future world the emphasis is on finding appropriate local solutions to economic, social, and environmental sustainability.<sup>128</sup> It is a heterogeneous world with less rapid technological pace of change than back in 2025 but a strong emphasis on community initiative and social innovation to find local rather than global solutions.

In this scenario, sustainability was initially dismissed as the faddish bleating of a liberal minority. It was largely ignored (as in the *New Frontiers* Scenario C) until resource crunches, economic downturn, and environmental degradation resulted in some reappraisal of values

becoming unavoidable. 'Global village' connectedness, providing information on how other countries were faring, moved people to a greater understanding of national and regional *needs* for sustainability.

By 2030 we reached a state where anxiety about environmental degradation, social tensions, lack of long-term financial security and diminishing quality of life were on top of the mind of many citizens (and similarly in many countries). A number of factors shaping change started to operate in the same direction, and the global economy was clearly not going where we thought we were heading to, so that its brilliant successes were only visibly topping a metaphorical 'immersed iceberg' of difficult lives, exhausted natural systems, failed economies and institutions. Ecosystems decline occurred more rapidly than historical trend rates had suggested it might, so room for technology-led manoeuvres was reduced.

In New Zealand, many people realised we had reached a 'tipping point'. Our way of life was very clearly on a collision course of Titanic proportions. We needed to

redesign our economy so that it worked for all and not just the branch factories of casually interested global businesses. The more reflective period from 2030 has been a period of remarkable innovation in remediation technologies and eventual restoration of previously degraded assets. By 2055 a significant amount of capital is diverted from other productive use to clean up and protect the environment. A new – 'we pollute, we pay' – principle is enforced in countries like New Zealand with industrial recycling, functioning institutions, a mobilised public opinion, and just enough wealth creation to support it.<sup>129</sup> Other countries (and the *New Frontiers* New Zealand scenario) in contrast are locked in a production-consumption-destruction experience, spiralling downwards.

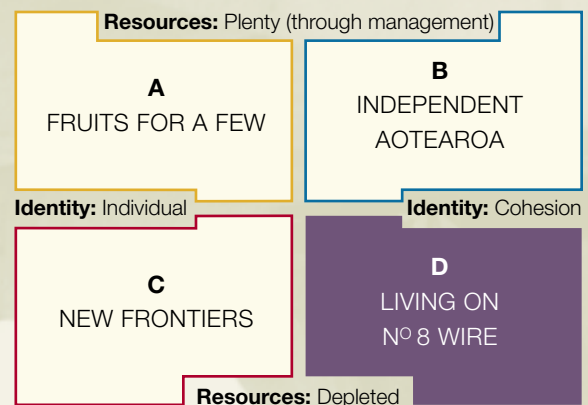
In New Zealand, social ingenuity comes to the fore in this scenario from about 2035. We are able to rebuild government to create, reform and maintain public and semi-public 'goods' including markets, funding agencies, educational and research organisations – a system of institutions that provides material and non-material incentives to entrepreneurs and innovators.



This scenario's ability to support social ingenuity is the key to adaptation strategies and aids adoption of appropriate new technologies.<sup>108</sup>

A rekindling of the 'pioneer' spirit provided a soothing respite from global politics and the rebuilding of a modest and successful nation by 2055.

### PRINCIPAL DRIVERS OF CHANGE



#### IDENTITY...

Reactions to external pressures and shocks tend to unite people and the government encourages this with 'all in the same boat' arguments. Sense of unity (akin to living in the 1940s London Blitz) is born out of struggling with both degraded resource base and economic collapse – working again for a better future, with equity a key concern. Issues are resolved through extensive dialogue. The necessity for Māori of looking after (manaaki) each other gains a stronger focus across society as a survival skill when times are hard. These skills are emulated by non-Māori, which builds tau-iwi appreciation of Māori values.

#### RESOURCES...

New Zealand is battling to recover from resource-scarcity, widespread environmental degradation, and economic decline.<sup>130</sup> Degradation quickly spreads from rural, resource-based areas to press in on and further burden urban areas. The legacy of near collapse – environmental damage – includes (energy-related) pollution, deforestation, diminished crop yields,

overgrazing, water quality concerns, damage to coastal zones. New Zealand is much worse off today when measures of ecological resilience and natural capital are considered and in 2025 there are grave concerns about ongoing carrying capacity.

### GLOBAL CONTEXT FAVOURING SCENARIO D

In the *Living on N<sup>o</sup> 8 Wire* scenario, declining global circumstances – scarcity of resources, ecologically related security concerns, and widespread environmental degradation – come together in an unprecedented way to create 'global scale risks'.<sup>131</sup> We see how global interdependencies and information links eventually provide incentive for adopting a new, less globally reliant, way of life.

In this scenario, the world becomes a place where the richest 1% receives as much income as the bottom 60%, and 80% of the population are classified as poor by United Nations standards. Competition to access

water, energy, sanitation, jobs and economic opportunities creates acute tensions that increasingly drive migration, sometimes break out in local violence, and challenge the prevailing global economic order.<sup>132</sup>

Many global and regional ecological support systems are damaged; their regeneration capabilities compromised, with many systems beyond recovery and natural resources overexploited. After 2015, increasing demand and competition for scarce resources (particularly oil and water in the Middle East and Africa) contribute to increasing tension between and within existing nation-states, fuelling conflicts and ongoing concerns about security issues. These are further compounded by global shocks – climate change, water shortages, agricultural collapses, high fossil-fuel-energy prices after peak oil production, and the collapse of the World Trade Organisation after 2020.

With terrorism and security concerns remaining at centre stage, disputes with the United States lead to an increasingly critical stance being taken by New Zealand politicians, which has the effect of straining New Zealand–Australia relationships. Common cause for international negotiations and treaties is found with Scandinavia, Canada, and nuclear-free pacifist countries, but despite this they are too distant to also be significant trading partners.

## **farmer** (in the Scenarios Game)

Voices from the future 2055: Viewpoints



### **POSITIVES**

- More connection between families and communities, as people stay together locally, at small-town scale. Maybe less crime, dissatisfaction, or depression, and not as much pollution in the country as there used to be.
- Demand for and ability to sell produce to local market, rather than export.
- Local demand/local supply – a sound but small business. Generally being self-sufficient and independent. Mother's ecological approach to life stands us in good stead. We don't feel deprived of high-tech things provided we can feed ourselves, family, and friends. Some others are growing on a part of our land – a barter system: vegetables in exchange for land use.



### **NEGATIVES**

- Very hard to make any money. Big loss due to no export trade, which was previous main source of earnings in farming. Low production. A career as a farmer or farm worker not highly valued in society. Less social/economic mobility these days.
- Moral pressure from community and government to share land and profits – not necessarily formal regulation. Government manages overseas trade, environment rights redistribution. Difficulties getting quality water. Land degradation has reduced sustainability.
- Less recourse to high-technology and imported inputs, e.g. fossil energy, fertilisers. Chemicals for some pest control are still available, but can't always obtain these.

## NEW ZEALAND IN THIS CONTEXT

Before 2025 an export-driven open-market economic system is privileged, similar to the *New Frontiers* scenario. Socio-economic structures and institutions focus on growing within a global economy and New Zealanders become highly dependent on this market system for sustaining economic well-being. Policy development in this first period supports light-handed low-interventions – economically, socially or environmentally.

The emphasis of successive governments on short-term economic and geopolitical priorities marginalises long-term concerns such as environmental sustainability. It is as though we are trying to drive looking only in the rear-view mirror, interpreting the world through the lens of what has passed before, not what lies ahead. Tightening purse strings sharpen trade-offs and amplify vitriolic sentiments between competing economic sectors (e.g. tourism and primary production). As the global situation continues to deteriorate after 2020, tariff barriers go up, to protect balance of payments and stabilise see-sawing currency.

By 2025, ecological systems have become increasingly compromised and degraded (linked to both regional processes and global processes such as climate change). New Zealanders experience several ‘shocks’ (such as eutrophication of iconic lakes; digging up of Southland for brown coal; major air

pollution reducing quality of life in urban centres). After 2025, resource conflict increases over land use, water allocation and coastal space, between rural and urban dwellers, as more city dwellers relocate to rural areas due to declining standards in cities.

By 2035, there has been significant environmental degradation, with continuing conflicts. Many goods are much more expensive. Environmental sustainability concerns are given more priority, and people are working together to fix up many problems (which supports growing social cohesion). It is partly a case of ‘too little, too late’.

Although New Zealand’s environment is still in relatively better condition than for many parts of the world, damage of the previous 50 years may have contributed to irreversible processes. People realise ‘there are significant costs involved with cleaning up from yesterday’s problems...if only people had started making these changes years ago’. After 2035 effort strengthens to maintain social cohesion, protect the economy and, belatedly, the environment.

A drive to ‘buy NZ-made’ proves limited by very few New Zealand manufacturers being left in business after 2025, so we import or do without! Appliance repair instead of replacement by new is relatively affordable again, and becomes popular. More household and workplace equipment and furniture is hired or leased.





After 2035 New Zealand is an inward-looking society that prefers greater self-sufficiency and modest survival to the risks of continued global trade exposure. Total trading volumes reduce. This results in low- or no-net-growth economy. Increased New Zealand Government regulation and management alters what is produced and consumed domestically. Incomes fall but some aspects of health and well-being increase under this 'siege' mentality, as they did historically under wartime stringencies.

New Zealand's international reputation and the 'clean, green' image become more tarnished. Economic systems take a 'hit', with initially wasteful resource use and rising input costs.<sup>133</sup> Some of the traditional export-driven agricultural and forestry industries begin to collapse and GDP falls. Export-driven primary bulk commodity markets become unsustainable for the New Zealand environment: for example, milk powder from irrigated dairying, or shipping unprocessed logs of softwood timber. The tourism trade needs to rely increasingly on high-value, lower-volume visitors, but these tend to be the people who are most critical of the loss of the 'clean green image' and this challenge spurs more community-based remediation.

For locals, the emotional 'loss' of this environment-friendly self-image, taken alongside the real income drop, compounds a craving for authenticity and

distinctiveness from global homogeneity. This craving for a clean environment and goods produced in 'authentic' ways that are environmentally and socially responsible generates widespread public debate over 'who we are'.

## PEOPLE AND SOCIAL DIMENSIONS

A new sense of collective national identity emerges and coalesces over some critical issues, and across ethnic/cultural lines. Increased New Zealand Government regulation and management alters what is produced and consumed domestically. For example, water supplies are renationalised and in 'safe' public hands – this included some buyouts of private firms.

Quality of life replaces quantity as the psychological motivator, and does so for enough people to prevent mass social unrest. However, unskilled young males remain the least environmentally motivated. Government focuses on management by trade-offs between competing demands and redistribution so that the smaller 'cake' is still shared equitably. Public work schemes are devised to occupy and train disaffected young people.

Health of the population until at least 2025 corresponds with global trends towards inactivity, continued smoking and processed fatty/sugary foods

(associated with obesity, diabetes, heart disease, strokes, cancers, etc.) so average life expectancy does not improve, in contrast to some other scenarios.<sup>134</sup>

It rises again by 2040 when the population is leaner, more active (walks and cycles more), better nourished, and is being encouraged into preventative medicine. Only very rich countries, which can afford massive medical and genetic intervention as well as good diets, have a higher life expectancy. New Zealand cannot afford some of the globally patented new drugs, nor some surgical techniques, and makes growing use of various resident cultures' traditional herbal remedies, acupuncture, exercise physiotherapy, and psychology, as valued alternatives.

## DEMOGRAPHICS AND MIGRATION

The Māori proportion of the population grows, generating competition for land use, fresh water, coastal access, etc. Tribal cultural development is not necessarily fostered by the growing isolation of New Zealand, or by the regulatory role of the State. Marae role survives, participant numbers boosted in rural areas by resettlement from urban areas.

English for Speakers of Other Languages (ESOL) businesses were thriving for visitors from China and its neighbours until 2010 but declines by 2025 as the

## low income parent (in the Scenarios Game)

Voices from the future 2055: Viewpoints

### + POSITIVES

- Strong extended-family and community support for parents.
- I'm healthier and fewer people are chronically sick as there's an emphasis on disease prevention, exercise and healthy food.
- Barter-trading, living off the land, community cooperation for self-reliance – makes for cheaper living costs and less materialism.
- Children have fairly equal career prospects and gain sense of social responsibility.

### - NEGATIVES

- Low-paying work and limited opportunities for careers.
- A struggle or stressed if you don't have family nearby – rely on community.
- Limited choice of material things, health care and imported goods are expensive, overseas travel uncommon. Loss of easy visits to Pacific Islands.
- Environment seriously degraded – taking a long time to repair, and poor quality has health impacts.

main client countries by then have sufficient English speakers to organise their own language education much cheaper domestically. Stronger economy and higher wages in those countries begin to stem demand there for emigration to New Zealand, at least until after 2030 when the accumulated environmental damage within China becomes a significant 'push' factor and New Zealand looks relatively appealing.

Asian-descent households are slowly increasing in number; with family links maintained to the Northern Hemisphere that keep them informed on economic and environmental change there. They become increasingly concerned that, during the rush for prosperity, the environmental degradation of their Northern homelands during their parents' era may be repeated in their new Southern home. Consequently they lobby politically for better environmental protection here in New Zealand.

However, there is a reversal of the net flow of migrants from New Zealand to Australia after 2025, as several environmental resource crises hit Australia: desertification, water supply failures, toxic waste build-up, and negligible post-mining restoration. New Zealand is not likely to become another state of Australia in this scenario.



People whose ethics/environmental values match those they see in New Zealand, especially migrants skilled in natural resource management, are welcomed after 2035. New Zealand is of particular interest to WOOFers (workers on organic farms) arriving by sea for two-year overseas experiences.

### LEGISLATIVE, POLITICAL AND INSTITUTIONAL DIRECTIONS

Reducing the tax revenue has strained the State's social and health services. After 2035, taxation shifts towards resource use and away from labour, in an effort to boost employment as well as deal with the informal tax avoiding economy.

Interest in government participation falls initially within the population, in this scenario, but after 2035 interest rises again, in response to social and economic crisis.

Government's return to regulation of the use of environment and natural resources, after a few decades of "laissez-faire", brings a need for legislative and administrative skills, which are no longer as available within a contracted public sector. Multinational corporations offer to supply expertise in

the short term, but prove unaffordable in the longer term. Loss of capacity is a significant handicap in the redirection process after 2035.

### ECONOMY AND BUSINESS CONDITIONS

The youth workforce grew while the economy contracted after 2025, leading to revival of taxpayer-funded work-experience schemes for young urban adults, many of which take a conservation and environmental remediation focus. These formative work experiences prompt demand for further tertiary education in the field; and a scheme requiring 'public work in exchange for your student grant' sees the learners combining theory and practice, which builds useful skills and achieves action of public benefit. Many subsequently work abroad but tend to return after 2035 with families, to a New Zealand that is declining at a slower rate than much of the former developed world. They are more committed to environmental improvement than their less-travelled compatriots, having seen the destruction overseas.

Multinationals have become less interested in New Zealand (except pre-2025 as a limited-size test market

for new products, such as pharmaceuticals, which could still be media-advertised here, unlike in most countries). Population growth in other countries, especially where combined with minimal regulation, is more attractive to mobile capital.

Bartering schemes (local skills and goods exchanges) such as those seen in the high-unemployment 1980s become popular again, and are particularly valued by low-waged people.<sup>135</sup> New technology makes for easy recording of transactions in these alternative currencies by group participants. Some Māori take to the organised barter and local exchange schemes, others preferring the informal, unwritten exchange of reciprocity and mana. More marae-based and charitable businesses develop.

Informal markets are held during the weekend in all cities and small townships, where produce and goods are exchanged and sold. New Zealanders appreciate the use of land, so in cities a new emphasis has been that lawns are uplifted and replaced with food cropping for families. Niche food 'farming' using seawater increases, making full use of the production of fish, shellfish, and seaweed.



NZ\$ floats freely, largely ignored on international investment and speculation market, following slow, inexorable decline in its overseas buying power.

As the frequency and nature of economic and physical catastrophes increase worldwide, the market becomes more risk-averse; less prepared to invest in overseas equity markets, more willing to invest in New Zealand small/medium enterprises that develop high-value niche export markets based on IP, patents, and new design. There is a focus on New Zealand human capital (including return of former emigrants) for solutions and a spirit of local resourcefulness, when international investment capital fails to materialise.

Cleaning up yesterday's problems after 2025 (e.g. bioremediation/restoration costs) leads to investment in appropriate technology and co-construction with 'ingenious' citizens. A small export market – centred on the new IP and skills – is developing into a viable export sector.

### employer and chief executive (in the Scenarios Game)

Voices from the future 2055: Viewpoints

#### + POSITIVES

- Immediate future more predictable or plannable, and reduced economic pressures as fewer competitors. Investments in technology and systems have longer life, with less redundancy or waste of resources.
- Possible to go for quality rather than quantity. Lack of intensification/intensity.
- Value a stable, resourceful, innovative local workforce. Makes possible a 'Project' life style approach from inventors.
- Room for 'community heart enterprise' –integrated in community, with greater social interaction.
- Happier and healthier population and maybe a more co-operative than competitive attitude to resources. Simpler, more-healthy life. Local, carefree, and 'no worries mate'.

#### - NEGATIVES

- Low wages, less disposable income.
- Transport expensive, so limited travel/exposure to broader world-views.
- Narrow perspectives, focus 'trapped' on local markets rather than seeing export growth opportunities. Stronger need to achieve local 'fit' than pursue entrepreneurial spirit.
- Shortage of spare parts and replacement equipment, when fixing is required.
- Reduced services demand as people become more self-reliant and have less spare cash.

## TOURISM, SPORT AND CULTURE

New Zealand attracts fewer travellers due to high international travel costs after 2015, and a higher proportion of these are wealthy travellers arriving on longer summer visits from the Northern Hemisphere's increasingly unpredictable cold/wet/stormy winters. They prefer a city experience to tramping in the bush. The rural car and campervan self-drive touring industry declines as fuel costs rise, but rural areas gradually adapt by offering extended home stays of high quality and greater social involvement during visits (farming hands-on; bush restoration and ecology; working at kiwi zoos; fishing lessons) to replace the previous casual 'new-place-each-night' fast-touring pattern.

Mass attendance big-stadium spectator events are held less frequently due to falling attendances (high travel costs combined with radically different media approaches). There's growing interest in fishing, outdoor team sports and individual or small-team 'challenge' events. For city people, direct contact with nature and rural community life has more appeal than driving through and on it. This prompts some rural resettlement, outside commuting corridors of cities.

Public outdoor tai chi and martial arts become common in city parks, led by the Asian community and joined by many others. Māori stick games, public dances and English Morris-dancing also enjoy a revival in public places, expressing nostalgia for community experiences.

## MEDIA

High-quality information channels are widely viewed, and are more regulated (e.g. no advertising to children) but are not state owned. Niche media meet varied cultural interests and others focus on city-dominated regional markets. Many international broadcasters do not target editorial or advertising on New Zealand, as its market is too small, especially after 2025 as tariff barriers and low purchasing power make global business advertising in New Zealand unrewarding.

## TECHNOLOGY

The technology innovation focus shifts from commodity value-added and security-based technology (e.g. biotechnology) to environmental technology, as self-sufficiency reduces need to compete in many global markets.

Initially there is continued dedication to the car, following the United State's lead in high levels of car ownership and use, rather than Europe's trend to small cars and public transport. The European trend arrives here after 2015, when public transport investment and use is reluctantly accepted as a key part of urban life. By 2035 far more people walk and cycle, and vehicle ownerships are often shared. Short-life imported products become less popular, as durability and reparability become valued again.

## KEY ISSUES IN SCENARIO D

- Low-growth economy, smaller service sector
- New Zealand is now living within its means<sup>136</sup>
- Less urbanised in 2055 than 2025, as city-living loses its glamour and all need to grow food
- Cohesive but inward-looking society, mutually supportive, perhaps more 'tribal'
- New Zealand-centric approach is opting out of the Global society/economy
- Role of the Government stronger 2050 than it was in 2025 – includes managing trade-offs, trade and capital barriers, equitable redistribution (basic minimum wage), environment restoration, regulation, training, and public works

## WHAT ARE THE IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT?

Initially, in the *N° 8 Wire* scenario, sustainability was dismissed as the faddish bleating of a liberal minority. It was largely ignored until resource crunches, economic downturn, and environmental degradation resulted in an unavoidable reappraisal of values. New Zealand's single-minded pursuit of wealth early in the century means that when the two goals – economic consideration and sustainability – conflict, the former has generally won out over sustainability. For decades, short-term economic gains were easier to justify than environmental expenditure, and then from 2025 the balance shifted, prompted by social concerns and rediscovery of common cause and interdependence of individuals, more than by an environmental awareness.

This fourth scenario begins with similarities to *New Frontiers* and is similar to IPCC scenario A1<sup>20</sup>, but then shifts towards IPCC scenario A2: 'which describes a very heterogeneous world. The underlying theme is self-reliance and preservation of local identities. Fertility patterns across regions converge very slowly, which results in continuously increasing global population. Economic development is primarily regionally oriented and per capita economic growth and technological change is more fragmented and slower than in other storylines.'

It was perhaps too little change, almost too late. A price is being paid since 2035 and this will remain so for some decades into the future. Resource-poverty has replaced environmental well-being and sustainability as a key national concern. New Zealand is working hard to lessen the impact and prevent future recurrences of 'resource poverty' – the Resource Poverty Alleviation Act has replaced the Resource Management Act. A much-worse-off New Zealand, still described by some to be near-collapse, struggles to act for future generations, although many citizens do now think and care about it. □



# SECTION 3

## SCENARIOS GAME



**In order to provide a replicable means of conducting relevant workshop scenarios** for New Zealand in groups not familiar with the full several-day scenario process, a ‘game’ was developed, and refined through use with many groups (Appendix 1).

It is now available at <http://www.landcareresearch.co.nz/services/sustainablesoc/futures/>

The opening section built heavily on material co-developed in 2004-05 with the Secondary Futures Hoenga Auaha Taiohi Project ([www.secondaryfutures.co.nz/](http://www.secondaryfutures.co.nz/)), which is supported by the Ministry of Education, but is not Government driven. That project was set up to encourage discussion and debate about the role and purpose of secondary education in New Zealand.

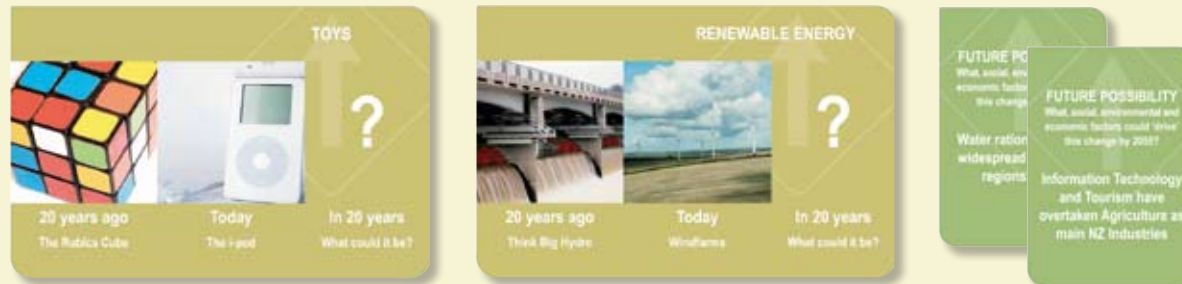
The Scenarios Game is played typically through (multiples of) 16 people seated in small groups of four, discussing a series of cards, usually with support and time-keeping by a facilitator. It can be run in under two hours, but prompts discussion lasting for longer periods.

► THE CARDS COVER SEVERAL STAGES, IN THIS SEQUENCE:

- A warm-up activity, with picture cards, on past 20-year trends. Participants are invited to appreciate the extent of change, then project these trends forward 20 years.
- Future possibility cards, set many years ahead (2055), asking ‘how could we have got here? What drove this change?’
- The session usually pauses, next, to brainstorm together a list of ‘drivers of change’.
- A diagram to depict the scenario possibility space within which the four New Zealand futures have been devised. (See Figure 2, page 11)
- Description of one of the scenarios reaches each table, in multiple copies (hence the value of having enough participants in total for four tables), to be read and briefly discussed – what might life be like in this possible future? Facilitator helps to clarify the descriptions, assuming she/he may have read the

fuller scenario descriptions in this publication.

- Roles are allocated, at random – ‘this might be your grandchild/great-niece/great-nephew! Try to view the scenario through their eyes’.
- Recording sheets are used to focus the task – write down some positives and negatives of this scenario (for your role-play).
- Wild cards illustrate the sudden impact of ‘chance’ global or regional events, alongside more gradual changes. How resilient is this scenario? How would your role be affected?
- If there is time a contrasting scenario from the four could be examined in the same way, staying in the same participant role.
- Reporting back from each table (in role) allows some comparison of life in the scenarios – and may encourage some participants to subsequently read more detail, from this book, on the scenarios that they like or dislike, in order to explore why these do or do



not appeal and *what* might take us toward or away from that future: a process implying policy change.

- See notes page 14 about potential uses of scenarios for further ideas and applications.

Landcare Research developed card content specific to the audiences involved in the Game in 2006. These have included the tourism and health sectors, local and central government, youth and rural communities. The published set should have wide community appeal.

The Game is a primer to introduce groups new to scenarios to the broader subject and to enable them to experience the benefits in undertaking a more in-depth 'futuring' exercise.

We anticipate that an increasing number of requests will be forthcoming for the Scenarios Game, so we are providing interested groups with the full set of materials (as PDFs suitable for colour printing) free via the

Landcare Research website at <http://www.landcareresearch.co.nz/services/sustainablesoc/futures/> and a support service to facilitators available at cost.

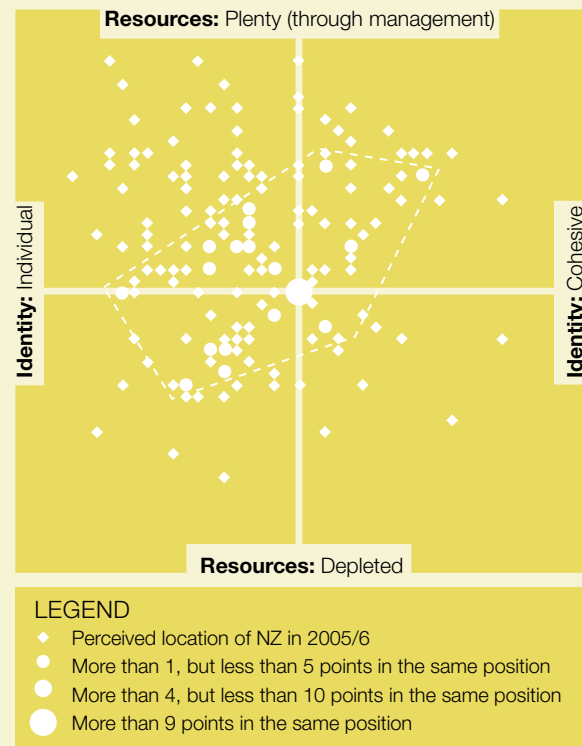
#### ► WHERE IS NEW ZEALAND HEADING?

As part of invited written feedback after playing the scenarios game, hundreds of participants were asked three subjective questions, set within the constraints of our two-dimensional 'logical grid':

- If not at the centre point, where is New Zealand now?
- Where do you want New Zealand to be in 50 years time?
- Where do you think New Zealand is actually heading now?

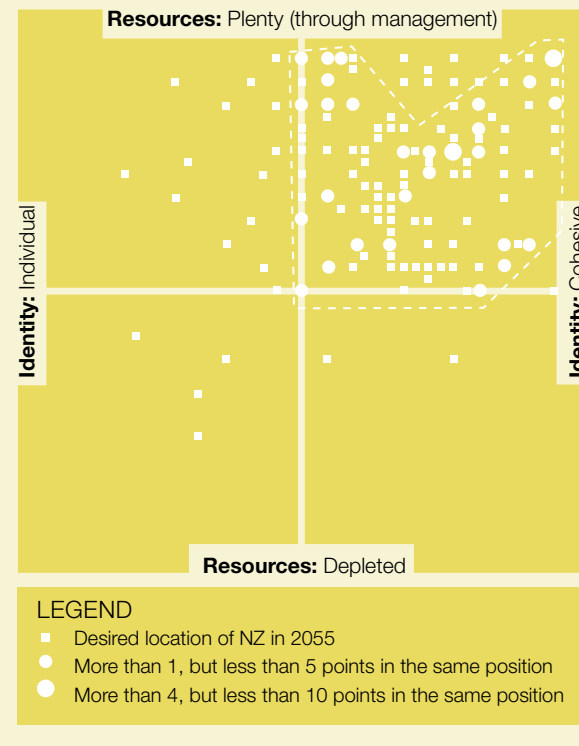
There was not unanimity on these points between participants (Figures 4, 5 and 6), but a cumulative effect began to emerge as the sample size grew to several hundred. The majority of participants located 'now' somewhere within the two quadrants learning towards individualism on the horizontal axis (i.e. *Fruits for a Few* and *New Frontiers*) but varied greatly in their view of the current state and trends of resource depletion/ecosystem functioning on the vertical axis: from or reflecting perhaps a lack of reliable personal knowledge on the state of the New Zealand environment today or their position between optimism and pessimism? (Figure 4)

**FIGURE 4** Game Participants' Perceptions of where NZ is in 2006-7



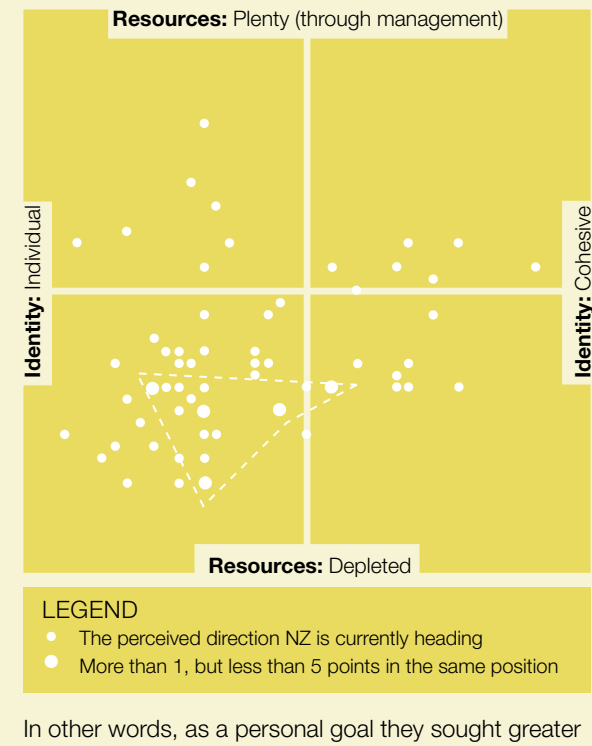
In contrast, nearly all located their personal goal for the future (Figure 5) within the one quadrant for both social cohesion and 'resources plentiful/ ecosystems sound' (*Independent Aotearoa*).

**FIGURE 5** Game Participants' Desired Location for NZ in 2055



Yet the same participants' view of the current trend (Figure 6) was predominantly towards the opposite quadrant, representing individualism plus resource depletion (*New Frontiers*). Note that a smaller number of respondents felt able or willing to answer this question.

**FIGURE 6** Current Trend Direction from 2006 (starting near the centre)



In other words, as a personal goal they sought greater environmental sustainability and social cohesion for the future than they saw as today's position, but many observed a current trend in the opposite direction. This view prevailed both in the potentially more-influential or empowered participants (staff at various Ministries, councillors and staff in local government) and in the apparently less-influential or not empowered (school students, citizens).



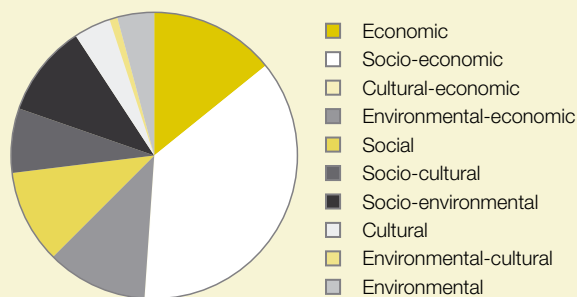
► PERCEIVED DRIVERS OF CHANGES

Each of the Scenarios Game workshops (Appendix 1) included a brief ‘brainstorming session’ (a process where all suggestions are recorded without discussion or judgement by the group) about drivers of change. The many hundreds of suggestions made included duplications and variations on a core list of about 90 concepts. Analysis grouped these into a spectrum from economic, through social, cultural to environmental and also allowed for overlaps between categories. The detail of this table is too great for reproduction here, but we can make some broad observations from it:

The relative balance or weighting between perceived drivers of change varies between participants’ work roles and life experiences. For example, the 2004 Wellington-based original scenario authors and two subsequent workshops for policy analysts in the Ministry for the Environment and Ministry of Transport, also in Wellington (Figure 7), offered proportionately more economic drivers and more cultural drivers within their total (141) than our sample of audience-participants in a dozen workshops outside Wellington.

► WELLINGTON WORKSHOPS

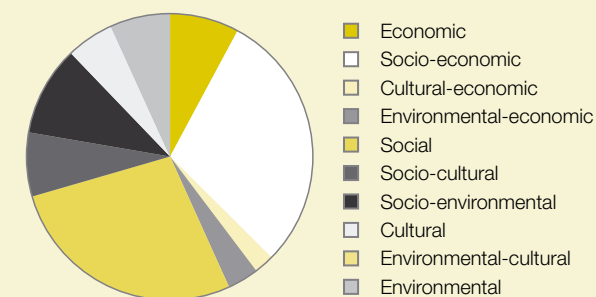
FIGURE 7 Wellington (Government Agencies) sample of drivers of change in New Zealand:



The various community-, school- and local-council-based scenario workshops offered proportionately more social drivers within their total of over 300 drivers. (Figure 8 shows the remainder, representing opinion sampled beyond Wellington.)

► ALL WORKSHOPS MINUS WELLINGTON WORKSHOPS

FIGURE 8 Drivers of change in NZ – view from outside Wellington:

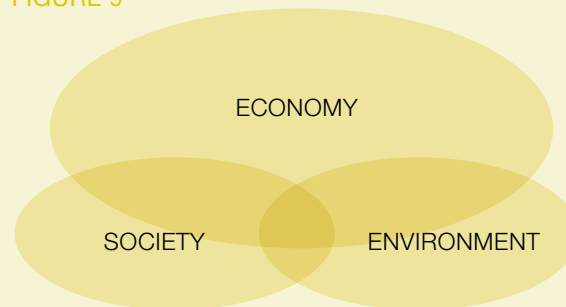


This distinction between views of change-drivers canvassed in Wellington and the provinces, if real (and not a sampling error), has implications for public policy-making. It might suggest that Wellington Government-based policy analysts were understating the significance of environmental and social drivers of change, reflecting Government preoccupation with budgets and exercise of financial control; or perhaps that business lobbies dominated by economics have more effectively captured Wellington’s collective psyche than the provinces; or that Wellington is ‘out of touch’ with some social-environmental priorities emerging recently in the wider country.



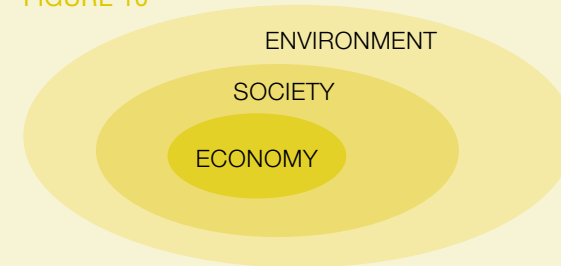
Conversely, people living in the provinces might be free to identify more social and environmental drivers but not accord sufficient weight to the economic, because they are not personally facing the financial allocation decisions? The authors sense that underlying this distinction may be a difference in worldview, between the 'weak sustainability' view of a large economy encompassing a society, within which there are fragments of ecosystem concern (which would be closer to the 2004-2006 sampled Wellington view, as identified also by the Parliamentary Commissioner for the Environment, 2002) Figure 9;

FIGURE 9



...compared to a 'strong sustainability' view of an ecosystem, within which human society is located and the economy then as a subsidiary part of that society (which may be closer to the sampled NZ public view beyond Wellington). Figure 10

FIGURE 10



Recent Prime Ministerial commitments<sup>137</sup> to future carbon-neutrality in public services and to a more-sustainable New Zealand, starting with Government's own actions, suggest a values shift may have begun in Wellington politics towards the priorities also detected in this sample survey, since our 2005–06 main data-gathering period.

The authors offer these opinions mainly to prompt discussion and response from the original scenario creators in Wellington, and from early users of the scenarios game, to whom copies of this 'Work In Progress 2' will be distributed. What reflections have been made in the intervening years, since devising (2004) or applying (2005 & 06) the scenarios? Which futures seem more or less plausible now, as national and international circumstances change? □



# SECTION 4

## SUSTAINABILITY

‘A sustainable world is a world we must first imagine in order to achieve’

Robert Costanza<sup>138</sup>

### A BRIEF HISTORY

Before reviewing the four scenarios for the extent to which New Zealand is ‘living sustainably’ in each, some of the main aspects of sustainable development will be considered.

**Sustainability as an idea** emerged in the 1980s (Table 4) following the 1972 UN Stockholm Conference on the Human Environment, which marked the first major international meeting on how human activities were affecting the environment and putting human futures at risk.

The 1980 *World Conservation Strategy*, prepared by the International Union for the Conservation of Nature along with the UN Environment Program and the World Wildlife Fund, promoted the idea of environmental protection in the self-interest of the human species. In 1987, the UN-sponsored Brundtland Commission released *Our Common Future*, a report that captured widespread concerns about the environment and poverty in many parts of the world.<sup>139</sup>

The Brundtland report said that economic development should not stop, but that it needs to take into account the Planet’s ecological limits. The report noted: ‘Major, unintended changes are occurring in the atmosphere, in soils, in waters, among plants and animals. Nature is bountiful but it is also fragile and finely balanced. There are thresholds that cannot be crossed without endangering the basic integrity of the system. Today we are close to many of those thresholds.’ Brundtland introduced the term ‘sustainable development’.

World attention on sustainability coalesced at the 1992 UN Conference on Environment and Development, in Rio de Janeiro. This conference produced two international agreements, two statements of principles, and a major action ‘Agenda 21’ on worldwide sustainable development.

New Zealand made an international commitment to sustainable development under Agenda 21 at the Earth Summit (1992) and has been working towards that goal,<sup>140</sup> with the Government producing its Sustainable Development Programme of Action in 2003.<sup>141</sup>

The concept of sustainable development is ‘social rather than fundamentally scientific’.<sup>142</sup> The management of a natural resource for a human purpose is open to different interpretations. For example, here are two different, competing views of sustainability:

- **The Critical Limits view** is concerned with Earth’s carrying capacity and resource limitations and the need to preserve natural assets to provide ecological functions and services that the human population relies on for survival. This is a part of ‘strong sustainability’ which presents human activity, including economic, as a sub-set of natural systems, on which they depend.
- **The Competing Objectives view** is focused on balancing social, economic and ecological goals and aims to meet a broad range of human needs, including health, literacy and political freedom as well as a healthy natural environment and other purely material needs.<sup>128</sup> This is a part of ‘weak sustainability’, which assumes that resources can be substituted and that trade-offs are possible between environment, society and economy.



TABLE 4 'Sustainable development' – the concept develops

	1970s	1980s	1990s	2000s
Waves of public interest beginning	Limits to growth: resource depletion wave begins <sup>143</sup>	Dangerous chemical <sup>144</sup> and Pollution wave <sup>145</sup> begins	The 'greenhouse effect' or 'global warming' wave <sup>146</sup> begins	Renewable energy (esp. solar) economy begins
	Related to problems 'within national boundaries'		Transboundary or global issues; emphasis on building international regimes to commonly govern <sup>147</sup>	
International	Conference on the Human Environment (Stockholm)	World Conservation Strategy, IUCN	UN Conference on Environment and Development (Rio)	Kyoto Protocol. Scenarios about climate change <sup>148</sup> Johannesburg summit
		Brundtland Report	WorldWatch reports series	Overall environmental degradation <sup>149</sup>
New Zealand			Local Agenda 21 in a few cities	Sustainable Development Programme of Action for Gov't Growth and innovation strategy <sup>150</sup>

It is not clear whether integrated thinking about sustainable development is able to replace single-issue thinking about the environment – there are a few specific issues that have dominated environmental thinking over the last quarter of a century: vehicle emissions, air quality, biodiversity, global warming and, following the energy crises of the early 1970s, the concepts of 'energy independence' and climate change.

Today, futures work that is related to sustainable development suggests that two *fundamental ecological uncertainties* underpin the ecosystem services outcomes from future human development. The first ecological uncertainty is about the ways and

circumstances in which impacts on the environment at different scales interact, sometimes just amongst themselves but often with human interventions, to produce unexpected and undesirable outcomes. The second uncertainty is about when and where different ecosystems are resilient (able to withstand impacts without fundamentally changing in terms of the ecosystem services they provide) versus fragile (likely to change rapidly and dramatically in terms of the ecosystem services they produce).

Because of the tight linkages between ecosystem services (such as freshwater supply, soil productivity) and human welfare, virtually all policies for human

development involve assumptions about these two uncertainties. Usually, these assumptions are implicit rather than explicit. Policies that are reactive to environmental issues assume resilience until failure is observed (hindsight), while proactive policies at least anticipate the possibility of fragility in some places and at some times (foresight). Policies involving assumptions, about how environmental issues will be dealt with, can make different ecological surprises more or less likely.

Nonetheless, within each of our four scenarios is an assessment in terms of its contribution towards and associated views about sustainability.

World summits like Rio 1992 and Johannesburg 2002 might have a useful role to play in putting sustainable development on the political agenda, but they can never be a substitute for the truly important things, like how we weave sustainable practices into the warp and weft of everyday life – into what we eat, how we travel and how we treat our waste for example. These prosaic, habitual and taken-for-granted features of everyday life will be the real measure of our sustainable lifestyles.

Morgan and Morley<sup>152</sup>

## SUSTAINABILITY CONCEPTS

**Sustainability is a major focus** of NZ Government attention in 2007, far higher in profile than in 2005.<sup>137</sup> Because one of the two main axes chosen (in the 2004 Wellington meetings) as a framework for logical development of the scenarios was resource use and ecosystem impacts, implications for environmental sustainability were being selected at scenario definition. This focus makes the scenarios potentially more useful.

The New Zealand Government's Sustainable Development Programme of Action<sup>127</sup> (2003) takes the widely used 1987 Brundtland Commission definition of sustainable development, namely: 'Development that meets the needs of the present without

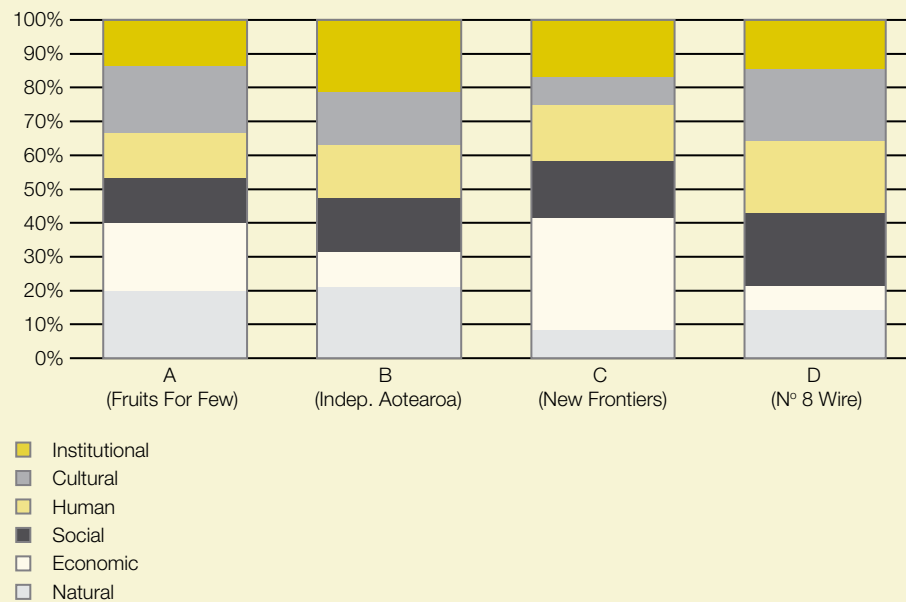
compromising the ability of future generations to meet their own needs.'

To many, this focus on inter-generational equity allows 'weak sustainability', in that it implies a current trade-off between competing demands of economy, society, and environment 'to best meet today's needs' without seeking or hearing a 'voice for the future'. If there was an acceptance of the primacy of living first within limits of the ecosystem and resources – from that 'strong sustainability' viewpoint, the economy is a subsidiary part of society, which itself exists within and depends upon the fragile biosphere of this planet. To the proponents of strong sustainability<sup>62</sup> (see Figure 10) humans in developed countries such as New Zealand

are already living beyond the limits, with a footprint on the Planet's ecosystems that is too large to sustain into the future, and thus are already compromising future generations' prospects. Today's 'needs' are too great in quantity to be sustainable, they say, taking a role as advocates both for future human generations and for other species sharing the ecosystem today.

If we move from a focus on quantity of growth (GDP as typical current measure) to quality of growth (possible measure GPI), other concepts can become useful.

**FIGURE 11** Relative distribution of the six capitals within the four NZ scenarios



The OECD defined a capital approach to sustainable development based on the concept of maintaining our natural, economic and social quality base or 'capitals' over time, so that our future generations have the means and options to pursue their own goals. Paul Hawken's *Natural Capitalism*<sup>153</sup> and Paul Ekins' *New Economics*<sup>154</sup> have contributed to wider discussion of these concepts.

Sustainability occurs when development does not erode, but rather maintains or restores/enhances environmental, economic, social, cultural, institutional and human capital. We take as our definitions a version of the OECD Capitals adapted both by Statistics New Zealand and the Parliamentary Commissioner for New Zealand.<sup>155</sup>:

- **Natural capital** – the renewable and non-renewable stocks of natural resources that support life and enable all social and economic activities to take place. It includes rivers, lakes and aquifers, soil, minerals, biodiversity<sup>139,156</sup>
- **Economic capital** – the human-made means of production like machinery and equipment as well as infrastructure and financial assets.
- **Social capital** – the networks of shared norms, values and understanding that facilitate co-operation and trust within and between groups.
- **Human capital** – the knowledge, skills, competencies and attributes embodied in individuals that are developed through lifelong learning and experience, including through the formal education system.
- **Cultural capital** – the values, histories, traditions and practices that link a specific group of people together.
- **Institutional capital** – the range of formal and informal civic, political, and legal arrangements that underpin economic activities and civic life.

It is interesting to try to apply, subjectively, these six capitals to the scenarios devised in our New Zealand exercise (Figure 11).



## A QUANTITATIVE MODEL IN SUPPORT OF THE FOUR FUTURES FOR NEW ZEALAND SCENARIOS

A comparative sustainability scoring for each scenario was created by the authors allocating for each Capital a fixed number of 10 points, available for distribution between the four scenarios, a process repeated for each of the six 'Capitals'. The results are stacked vertically and expressed here converted to percentages. On this simple and highly subjective analysis, (B) *Independent Aotearoa* and (A) *Fruits for a Few* emerged with higher 'Six Capitals' total rating than the two others, a position to some extent predefined by locating these two towards the richer end of the original 'natural resources' axis, in the possibility space. The Figure suggests key differences in emphasis between the four scenarios.

From the six capitals analysis, although subjective, *Independent Aotearoa* could represent democratic/participative/governmental elements of strong sustainability and *Fruits for a Few* could represent private/technocratic elements of strong sustainability; while scenarios (C) *New Frontiers* and (D) *N° 8 Wire* represent weak sustainability, if any.

► Prepared by: **Oscar Montes de Oca Munguia, Robbie Andrew and James Lennox**

**New Zealand Centre for Ecological Economics** (Massey University and Landcare Research), Private Bag 11052, Palmerston North, New Zealand  
Phone: (06) 356 7154  
[www.nzcee.org.nz](http://www.nzcee.org.nz)

This is a brief and early summary of Version 1 of a more extensive body of work, now published on the website <http://www.landcareresearch.co.nz/services/sustainablesoc/futures/publications.asp>. It will be developed further during 2007-8.

We built an integrated quantitative model, Figure 12, of the narrative scenarios, to better understand the way that the qualitative assumptions underpinning the narrative scenarios 'Four Futures for New Zealand' might come together to conflate environmental stress in alternative futures.

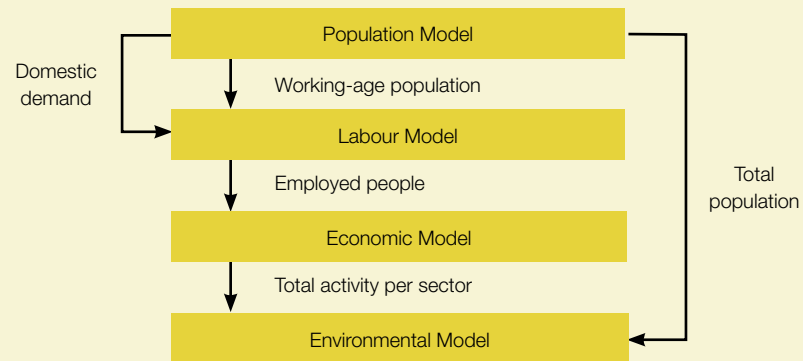
This model paints a numerical picture of the plausible social, economic, and environmental structures described qualitatively in the scenarios. The model illustrates and helps us explore the cumulative impacts individual variables might have in a series of social, economic, and environmental results.

The integrated 'New Zealand Dynamic Ecological-Economic Model' (NZDEEM) is a support tool for the Four Futures scenarios, not a forecasting or predictive tool.<sup>i</sup>

<sup>i</sup> Moss (2007) argued that neither classical statistical nor econometric theory can be presumed to be applicable in conditions of unpredictable volatile episodes in physical and social contexts. Furthermore, forecasting over periods long enough to include such unpredictable events cannot be reliable. NZDEEM is therefore no more likely to be in any sense true than are the four narrative scenarios. However, by integrating the modelling process into the development of narrative scenarios, policy and strategy analysts can obtain the benefits of formal precision and the benefits of the rich expressiveness of storylines and scenarios (Moss, 2007), like metaphors (Khalil, 1992; Jager, 2000).



FIGURE 12 NZDEEM Model structure and information flows



#### ► POPULATION

All scenarios face an aging population by 2050 as seen in Table 5/1, showing the total population and population composition for each scenario. All fertility rate assumptions are within Statistics New Zealand population projections to 2051 (Statistics NZ 2004)

TABLE 5/1 Population composition for 2006 and for each scenario at 2050

Age group	2006	Fruits for a Few (2050)	Independent Aotearoa (2050)	New Frontiers (2050)	N° 8 Wire (2050)
0-14	21%	19%	18%	16%	16%
15-39	35%	31%	31%	30%	31%
40-64	31%	30%	30%	33%	33%
65+	12%	20%	21%	20%	20%
Total Population	4,120,470	5,265,502	5,334,398	4,876,650	5,099,874

The 65+ age group will be 20% - 21% of the total population by 2050 (by comparison in 2006 that age group represented 12%).

► EMPLOYMENT

More people in the 65+ age group will have to work for income under each scenario, except for *Independent Aotearoa* (which has greater State social security and also larger-scale unpaid work: ‘volunteering’). While *Independent Aotearoa* (2050) will have a lower proportion of 65+ people working than now (down from 12% to 10%), *New Frontiers/ N° 8 Wire* (in 2035) for example, assume 15% of 65+ people in the workforce (Table 5/2).

TABLE 5/2 Labour Participation Rates and Unemployment for 2006 and for each Scenario at 2050

Age Group	2006	Fruits for a Few (2050)	Independent Aotearoa (2050)	New Frontiers (2050)	N° 8 Wire (2050)
15-24	62%	68%	57%	70%	62%
25-44	81%	83%	71%	85%	81%
45-64	80%	86%	80%	88%	80%
65+	12%	13%	10%	15%	12%
Unemployment rate	3.40%	3.50%	5%	18%	15%

It was assumed that high unemployment rates become the norm after a 2035 transition under *New Frontiers* and *N° 8 Wire*. High unemployment would probably mean serious social problems. High work-participation rates also imply a decrease of the number of people pursuing full-time study.

► SECTORAL GDP CONTRIBUTIONS

Table 5/3 shows Gross Domestic Product contributions by all sectors. The GDP contribution of primary sectors increases under *Fruits for a Few* in 2050 and *New Frontiers* and *N° 8 Wire* (by 2035) to 10% of GDP. After 2035, the primary sectors collapse for *New Frontiers* and *N° 8 Wire* scenarios. *Independent Aotearoa* shows a decrease in the GDP contribution by the manufacturing sector (in relation to 2001). *Independent Aotearoa* is the only scenario that assumes higher tax level; therefore the public sector size increases.

TABLE 5/3 GDP Contribution by Productive Sectors to the Economy in 2001 and for each Scenario

	2001	Fruits for a Few (2050)	Independent Aotearoa (2050)	New Frontiers and N° 8 Wire (2035)	New Frontiers (2050)	N° 8 Wire (2050)
Primary sectors	8%	10%	6%	10%	5%	6%
Manufacturing sectors	16%	21%	15%	25%	17%	19%
Services sectors	65%	62%	67%	58%	67%	66%
Public sector	4%	2%	5%	1%	2%	2%



The Business Services sector is the main GDP contributor to the *Fruits for a Few* economy in 2050. This is due to the substitution of services providing the functions formerly served by a variety of goods. The health sector is the second contributor to GDP, due to the privatisation of the health sector (health services will be more expensive) and the aging population. Wholesale and Retail also decrease under this scenario. Under *Independent Aotearoa* scenario, all primary sectors (especially dairy farming for export) and most of manufacturing sectors' contribution to GDP decrease. Wholesale and retail also decrease, along with air transport. There is also a noticeable increase of the education sector and the health sector under this scenario.

The economic structure in 2035 for *New Frontier* and *N° 8 Wire* are characterised by a marked increase of the primary and manufacturing sectors, relative to 2001. The health sector increases very slightly, probably implying longer waiting lists and an overall reduction of the quality of services as the population ages. The GDP contribution of the education sector decreases. After the collapse of primary industries envisaged in the scenario narrative, the economy in 2050 for *New Frontiers* looks very similar to the 2001 economy, which is a big change from the peak economic performance achieved in 2035. Only the health sector keeps growing under this scenario. The structure of the economy in 2035 for *N° 8 Wire* was considered to be the same as built for *New Frontiers* 2035. It was adjusted, however, to reflect the changes in total population. The modelled economic structure of *N° 8 Wire* in 2050 is very similar to the economic structure of *New Frontiers* in 2050. Primary industries collapse, foreign capital is withdrawn and only the health sector keeps growing under this scenario, driven by the aging of the population.

#### ► CUMULATIVE ENVIRONMENTAL STRESSORS

The environmental pressures in 2001 and in future under each scenario are summarised in Table 5/4.

**TABLE 5/4 Summary of Environmental Pressures in 2001 and under each Scenario**

Environmental Pressure	2001	Fruits for a Few	Independent Aotearoa	NF & N° 8 (2035)	New Frontiers (2050)	N° 8 Wire (2050)
Petrol (PetaJoules)	101	143	128	139	136	129
Diesel (PJ)	87	123	101	132	115	108
Electricity (PJ)	120	181	136	191	174	159
Energy (PJ)	472	708	540	748	676	626
Energy CO <sub>2</sub> (Gg)	25	31	24	38	35	32
Agric GHG (Gg)	35	53	31	59	36	37
Other GHG (Gg)	6	10	6	9	8	8
Total GWP (Gg)	66	94	62	107	79	77

Abbreviations: GHG = greenhouse gas emissions, carbon equivalent; GWP = Global Warming Potential (excluding forestry offsets) Gg = Giga gram or 1 billion grams



The results for petrol and diesel reflect the changing levels of households and industry, respectively. The majority of petrol is consumed by households for transportation in private vehicles. In contrast, the largest user of diesel in the economy is the road freight transport industry, and with reduced exports under some scenarios, and local production for local use (notably *New Frontiers* and *N° 8 Wire* by 2050), there is a reduced demand for road transportation to processing facilities and to ports. Biofuels have not been assessed.

The agricultural greenhouse gas emissions results reflect the changed export levels under the scenarios. Again, *New Frontiers* and *N° 8 Wire* have significantly reduced exports in 2050 and therefore significantly reduced agricultural production. This directly affects the greenhouse gases emitted by those sectors. There is marked reduction in emissions of agricultural gases between 2035 and 2050 under these scenarios.

Global warming potential is projected to increase under *Fruits for a Few*, to reduce slightly under *Independent Aotearoa*, and to reduce sharply under *New Frontiers* and *N° 8 Wire* between 2035 and 2050, for the same reasons as given above for diesel and agricultural emissions. The total global warming potential figures given in the table *exclude* offsets as a result of forest carbon-sequestration because we have not built the assumptions yet.

Households' environmental pressures in 2001 and under each scenario are summarised in Table 5/5. These environmental pressures reflect the combination of household energy requirements and total population. It can be seen that *Fruits for a Few* households will be more energy demanding in 2050. *New Frontiers* and *N° 8 Wire* societies in 2035 will have the highest energy requirements *per capita*, but their total population projected at that time is lower than other scenarios.

**TABLE 5/5** Summary of Household Environmental Pressures in 2001 and under each Scenario

Environmental Pressure	2001	Fruits for a Few	Independent Aotearoa	NF & N° 8 (2035)	New Frontiers (2050)	N° 8 Wire (2050)
Petrol (PJ)	84	119	108	112	111	107
Diesel (PJ)	12	16	15	15	15	15
Electricity (PJ)	42	60	55	57	56	54
All Energy (PJ)	153	218	198	205	203	195
Energy CO <sub>2</sub> (Gg)	9	10	9	11	11	11

### ► DISCUSSION

This first version of NZDEEM was useful in establishing a tool that can be used to compliment the narrative in scenario creation. The model provides a view of basic interactions between simplified social, economic, and environmental systems.

Future directions for the model's development include re-consideration of assumptions underlying the economic growth model, of productivity and the impacts of changing demand. Resource limitations and efficiencies of use need to be factored-in to the supply side, in addition to labour supply, as they will affect energy supply, transportation, water and many other aspects which are difficult to model in the present format.

### ► UNDERSTANDING THE MODEL

The model's logic was based on the Auckland Region Dynamic Economic and Environmental Model (ARDEEM), developed by Garry McDonald of the NZCEE<sup>ii</sup>. The model's flexible framework tests scenario parameters, their relationships with each other, and their direct and indirect effects on the economy and the environment. Information flows are shown in Figure 12 (Page 84).

Each of the individual components is a full model on its own right; however the interactions between them have been defined very simply, to facilitate understanding of the flow-on effects. While the modellers tried to quantify each assumption by following the narrative of the scenarios as closely as possible, results presented in this *Version 1* document are subject of further reviews and validation, which will be achieved through cycles of interaction with narrators and readers of *Work in Progress*. Table 5/6 shows a list of the main parameters required by the model.

TABLE 5/6 Model Parameters Defined for each Scenario

Population model	Labour model	Economic model	Environmental model
Fertility rates.	Labour participation rates.	Household expenditure profile.	Household environmental pressures profile.
Mortality rates.	Unemployment rates.	Productivity change for each sector.	Productive sectors environmental pressures changes.
Net long-term migration.		Exports profile.	Electricity generation profiles.
		Value added components change for each sector.	Land availability for agriculture and forestry.

The model is intended to be interactive. The main priorities while developing the model were therefore to keep it as flexible and transparent as possible to facilitate its understanding. Barreteau et al., (2003) and Jager (2000) stated that complex systems models developed in isolation from stakeholders are often difficult to assess and accept.

<sup>ii</sup> The New Zealand Centre for Ecological Economics ([www.nzcee.org.nz](http://www.nzcee.org.nz))



**The population module** is a simulation model consisting of the interaction of three parameter groups: fertility rates, mortality rates and long-term migration numbers. Each scenario assumed different fertility rates, mortality rates, long-term emigration, and immigration. The result of the module is a snapshot of the population composition each year.

**The labour force module** consists of applying participation rates and unemployment rates to the working-age population of each scenario to determine the number of people employed.

**The Economic module** is based on a simplified Social Accounting Matrix for the year ended March 2001<sup>iii</sup>.

**The environmental module** consists of applying an environmental efficiency factor for each productive sector and for households. The Environmental Impact Accounts 2001 developed by the NZCEE provided the eco-efficiency factors. The environmental impacts reflect the use of natural resources and pollutants generated (environmental pressures) by the economic productive sectors and households.

#### ► REFERENCES

Barreteau, O., Le Page, C., and D'Aquino, P., 2003. Role-playing games, models and negotiation processes. *Journal of Artificial Societies and Social Simulation*, 6 (2).

Jager, W., 2000. Modelling consumer behaviour. University of Groningen, Groningen.

Khalil, E. L., 1992. Economics and biology: Eight areas of research. *Methodus*, 4 (2):29-45.

Moss, S., 2007. Alternative approaches to the empirical validation of agent-based models. Centre for Policy Modelling, Manchester Metropolitan University Business School., Manchester. <http://cfpm.org/cpmrep178.html>.

Sustainability assessments could be applied to drivers and the logically resulting scenarios, but we assert that the greatest learning value of scenarios as an exploratory tool lies in their being sufficiently different 'spaces' from today to encourage discussion of change processes, and to illustrate how change always involves conscious and unconscious choices, rather than using them to model Utopian futures, as targets.

Sustainable development relates more comfortably to process than destination, especially since it appears scientifically easier to define an unsustainable than a sustainable action. (As for example, when using the four system conditions of The Natural Step Framework<sup>158</sup>.) When different drivers of change are identified and discussed, as key causes of desired or not desired futures, the question of what impact they have on sustainability can be asked. At that point, faced with the scenario's logical consequence derived from a trend and drivers of change, the now alerted participants may be ready to address questions of value and ethics.

<sup>iii</sup> This input-output matrix was provided by Market Economics Ltd (McDonald, personal communication 2007), who updated tables produced by Statistics New Zealand for 1996.

‘Sustainability is an issue of values, not of kilowatts or dollars.  
Sustainability, in practice, is a moral and ethical issue.’

John Peet<sup>160</sup>

## REFLECTIONS: WHAT WE ARE LEARNING ABOUT NEW ZEALANDERS

We hoped that developing the four scenarios in 2004 would be interesting and useful to others, especially during a process of accommodating future change (i.e. capacity building). It is gratifying that they have been used repeatedly for this purpose – see Appendix 1. We also sought to extract useful learning from our observations of hundreds of participants, for others following a similar path (see Section 3).

In 2005 we noted that, many participants found it hard to project themselves into the future, although role playing has helped some. There have been few imaginative leaps that have opened up new possibilities – we have not ventured much into the realm of science fiction. Some game participants have commented that the scenarios appear not to have enough ‘stretch’ to represent 2055 and may be closer to 2035. A test of this is when we look back at the speed of change over the previous 50 years, with the expectation that the future rate of change, especially in technology, will be faster, not slower. This ‘stretch’ will be an area of focus in revising content for the final edition. In particular, we will be interested in ways in

which New Zealanders can experience and undertake greater leaps of creative and innovative thinking, especially given the recent emphasis on this within the New Zealand Growth and Innovation Framework (GIF).<sup>164</sup>

Significant planning went in to creating a process that attempted to be aware of its place in a mono/bi/multi-cultural environment, and not being overly determined by the Pākehā numerical majority, as can be the case.<sup>165</sup>

Subsequent analysis suggests that the end result was still somewhat lacking in this respect. The dialogue that took place around this issue during the preparation of the initial screenplay (*100% Pure Conjecture*)<sup>166</sup> confirmed Pākehā cultural dominance to be the experience for some Māori present. While ‘due process’ was followed throughout, the conclusion drawn was that it was in the end a ‘numbers’ game, and more attention needed to have been given to this than originally anticipated.

The whole issue of identities is highly topical at present in New Zealand and is eloquently discussed alongside our scenarios in other chapters of *New Zealand Identities: Departures and Destinations* (2005).<sup>167</sup>



It is our informal observation that there is often a belief in 'rationality' as a main driver of change rather than values as the drivers. This also manifests itself in a weakly developed deliberative or discursive democracy<sup>168</sup> in New Zealand and far greater emphasis here upon a representational democracy or government-business technocracy. Given recent trends in the academic political science literature<sup>169</sup> this is of considerable concern, as several commentators believe that society must strive towards a much more 'agonistic' democracy, which stresses the importance of the kinds of contested spaces revealed when issues such as sustainability or un-sustainability of current trends are being aired.

#### ► IMPLICATIONS FOR SUSTAINABILITY

Our observation of game participants suggests that many did not understand the implications of environmental, social and economic sustainability. This, in turn, leads to complacency or perpetuation of social myths, such as belief that NZ is 'clean and green' (as shown by repeated opinion surveys<sup>170</sup>) or '100% pure'

(as recently marketed overseas) and which excuses lack of urgency in tackling major environmental issues.

A further reflection on the content of the scenario texts is that all four present degrees of continuing environmental degradation rather than restoration, though there is considerable variance in the extent of damage, in whether it is anticipated and how mitigated. This observation has led us to posit that New Zealand is fast-approaching a 'decision-point' in terms of its use of natural resources and their carrying capacity. While this could be stated as representative on a global scale, it is the fact that New Zealand relies economically and socially to such a large extent on its natural resource base that makes this particular decision moment so important.

Earlier discussion of participants' perceived drivers of change in New Zealand (Page 77) that implied differences between the Wellington and provincial samples' emphasis on economics compared to social and environmental drivers, is also relevant.

Ultimately we may know only from hindsight if we have made a significant contribution. However, we believe that well-structured, open debate on the range of issues brought forward and their interrelationships will be of interest to a broad constituency. Publication of the game on our website opens access to many more users, and we look forward to interesting correspondence with them (and with the original creative team from 2004) as the research continues though to 2009. □

# SECTION 5

## A POSSIBLE FUTURE?

Australian futurist, Kate Delaney, was invited to imagine a specific future for New Zealand to prompt critical readings of our scenarios and encourage wider debate. Her essay follows in full.

Each country has a set of stories its people share with the broader world to explain what it means to be a citizen there. These stories may be myths or histories of its creation, trials and tensions the state faces (such as biculturalism since of the Treaty of Waitangi), and aspirations for the future. As with most narratives, the accuracy of these accounts varies reflecting some balance of fact and fiction. Consider Gallipoli, the seabed/foreshore debate and housing affordability questions, and New Zealand's *clean and green* reputation. These all inform not only internal views but external perceptions of New Zealand.

For outsiders, the 'clean and green' image of New Zealand is strongly tied to its natural beauty, its rural resource economy (e.g. agricultural exports and tourism offered as '100% Pure'), proportionately-representative domestic politics and legislative initiatives (e.g. anti-nuclear, caution on genetically modified organisms). Also noticeable is the country's firm voice in international matters and forums such as the International Whaling Commission and Antarctic Treaty. New Zealand is one of a number of countries that is aware of the need to change course toward sustainability.<sup>i</sup> New Zealand typically leads in many respected international sustainability indices such as the Yale Pilot Environmental Performance Index (2006) in a world that is on an unsustainable course.<sup>ii</sup> Yet New Zealand equals the United States in car ownership

per head of population and received a critical environmental performance review by the Organisation for Economic Cooperation and Development (OECD) in 2007.

### ► SUSTAINABILITY – THE ROAD AHEAD?

Some of today's global trends and patterns – climate change, population growth, high resource consumption, and technological advances – have sufficient momentum they will be very difficult to stop. In aggregate they are signs of deep trouble. For instance, sometime in the lifetime of many of today's teenagers:

- fresh water will run out in some countries, meaning food production will be difficult<sup>iii</sup>
- many fish populations will be decimated beyond the point of species recovery<sup>iv</sup>
- climate mechanisms are likely to go awry, contributing to extreme weather events<sup>v</sup>

But, the future is not predictable and there remains substantial room for surprise. New Zealand, with a low population, is relatively fortunate. Even if the way our planet's weather and ecosystem regulates itself changes, as the Millennium Ecosystems Assessment and International Panel on Climate Change (IPCC) scenarios illustrate, New Zealand may face far fewer catastrophes than many other locales on the planet; unfortunately destitute or failing nations and regions are likely to bear the brunt of such climate mechanism shifts.<sup>vi, vii</sup>

<sup>i</sup> Rt Hon Helen Clark (2007) Prime Minister's Annual Statement to Parliament: 13 February 2007, Wellington, New Zealand.

<sup>ii</sup> The EPI centres on two broad environmental protection objectives: 1) reducing environmental stresses on human health and 2) protecting ecosystem vitality.

<sup>iii</sup> 'Coping with Water Scarcity' was the theme for World Water Day 2007, which is celebrated each year on 22 March. This highlighted the increasing significance of water scarcity worldwide and the need for increased integration and cooperation to ensure sustainable, efficient and equitable management of scarce water resources, both at international and local levels. See: Un\_Water (2007) *Coping with Water Scarcity*. Rome, Italy, Food and Agriculture Organization of the United Nations (FAO).

<sup>iv</sup> Boris Worm, Edward B Barbier, Nicola Beaumont et al. (2006) Impacts of biodiversity loss on ocean ecosystem services, *Science* 314: 787–790.

<sup>v</sup> Kate Ravillious (2007) 2100: A world of wild weather. *New Scientist*.

<sup>vi</sup> Findings of the Scenarios Working Group (2005) *Ecosystems and Human Well-Being: Scenarios*, Millennium Ecosystem Assessment Series, Island Press.

<sup>vii</sup> UN(IPCC) (2007) *Climate Change 2007. Fourth Assessment Report (AR4)*, United Nations Intergovernmental Panel on Climate Change, New York.



In 2004-5 Landcare Research developed alternative stories about the country's future, to explore the road ahead and to identify roadblocks to becoming more sustainable. The Working Group's four scenarios drew a disturbing, yet realistic conclusion: in the future it is a 50/50 proposition – at best – that environmental degradation, social cleavages and change in economic prosperity could easily challenge New Zealanders' capacity to build a more sustainable society in the next 20 to 50 years. A variety of factors, including complex interdependence and spillovers between social, cultural, economic and environmental results, technological and social change, and pressures of economic globalisation will shape this outcome.

The scenarios, however, also highlighted that there are opportunities for New Zealand to excel in the relatively short period of 20 years. While the country's options may at first seem quite constrained, there is solid evidence elsewhere of countries whose conscious strategies have led to major changes in GDP per capita in a very short period. Hong Kong rose from 1982 to 1993. Singapore rose from 1982 to 2000, and Japan also recorded rapid gains from 1982 to 1991 (followed by a rapid fall to 2001).

#### ► POSITIVE SIGNPOSTS

Sustainable development is possible. If New Zealanders lived, consumed and produced things now as they did in 1900 or 1950, even 1970, the country would

be a fairly disgusting place – smelly, toxic, unsanitary and dangerous. Prices, technological innovation, social change and government regulation, as well as a strong tradition of learning from bad experiences and new scientific discoveries, have changed the way people live. There is a track record; New Zealand has successfully shaped the future by identifying and leveraging relatively small changes in the rules to achieve powerful results in the past (e.g. Cairns Group).<sup>viii</sup>

Most of the global trends pushing towards being unsustainable have some leverage points. The change in focus from the disagreement over whether greenhouse gas emissions need to be curbed to the economic costs of early or late action on climate change, energy supply security concerns and freshwater scarcity issues which are being introduced to discussion in international fora such as the United Nations Security Council may be examples of emerging leverage factors. It is interesting to ask what leverage will be effective for New Zealand to achieve the more desired – sustainable – half of the 50/50 possibility of its future scenarios?

#### ► ROADBLOCKS, DETOURS AND DIFFERENT ROUTES

There will be roadblocks along the way. Approaches towards solutions between nation-states and economies will vary, as different concerns will be a priority in different regions. At present, one broad approach covers the development of science-based industries (like biotechnology or nano-technology, regenerative

<sup>viii</sup> New Zealand was a founding member of the Cairns Group. In the mid-1980s a group of 14 small and medium 'fair trading' agricultural exporting nations came together to form the Cairns Group as a pressure group for agricultural trade reform. The Cairns Group effectively put agriculture on the multilateral trade agenda and kept it there. The Cairns Group continues to be in the vanguard of those pressing for further substantial trade liberalisation in the Doha Round of World Trade Organisation negotiations.



medicine, telecom bandwidth, robotics, and computer intelligence) and the other the upgrading of established industries through the dissemination of knowledge or 'putting knowledge to work'. The robustness of both approaches at their extremes will be challenged. There are already questions about the capacity to control new biological technologies.

There is a great deal of international goodwill towards New Zealand, in part, because of its perceived (even if unjustified) respect and care for the environment. This goodwill may not be universal. In late 2006 and early 2007 this image was challenged, not for the first time, but arguably to a different degree, when the 'food miles' debate in the UK targeted imported New Zealand dairy and fruit products and other internationally sourced produce.<sup>ix</sup> If other global interests or institutions were to cast an eye to more deeply explore the 'clean, green' image, what would be the results? Is New Zealand likely to be assessed as moving along a sustainable road into the future, or a source of *greenwash*?

Rethinking how we live on this planet is also contributing to new economic thinking, development of potentially formidable technologies that mimic nature and, importantly, the search for practical sustainability solutions. For example, the speed and extent to which the market internalises *environmental externalities* is an important consideration. An acceleration could result – whether naturally or by dint of government policy choices – of the felt impacts of climate change, making many current industries uneconomic. Climate change adaptation and mitigation strategies are already affecting reinsurance and a few agricultural markets. Some major global companies have committed to greenhouse-gas-reduction strategies and

carbon trading. These markets are stimulating alternative energy technologies, energy conservation and energy efficiency.

#### ► NATURAL ADVANTAGE AND OPPORTUNITIES FOR SUSTAINABLE DEVELOPMENT

New Zealand producers face choices about where and how they do business. Performance in *export markets* will remain a main determinant in how prosperous New Zealand remains. There are *opportunities for export expansion* with traditional partners and emerging economies.<sup>x</sup>

China and India and then other countries in North Asia look set to become relatively economically wealthier and more powerful in global affairs. Many nations in the Asia-Pacific region will wrestle with economic tensions, unstable government, internal violence, disease, poverty, criminal activities and potential environmental disasters. In fact, most emerging economies in Asia Pacific must face the dual challenge of *managing political transitions* to more open and pluralist systems, to allow global trade, while staying together as a single entity.<sup>xi</sup>

Expanding markets in developing countries will sometimes require sales to (newly) middle and lower income consumers. Providing affordable goods and services in these markets may drive technical innovation, new business models and so on (e.g. distributed energy and communication systems in the agribusiness environment).<sup>xii</sup> New Zealand has the potential to become a leading provider of services related to the formation and operation of companies in the primary sector, and in investment and financial management for the resources sector.

<sup>ix</sup> Cerasela Stancu and Ann Smith (2006) Food Miles – the international debate and implications for New Zealand exporters. *Business & Sustainability Series, Briefing Paper 1*. Landcare Research – Manaaki Whenua, Lincoln, New Zealand.

<sup>x</sup> Kate Delaney and Bob Frame (2006) Reshaping Asia: Trends Are Not Destiny, Resource Use and *Environmental Trends over the Next 20 Years: Implications for New Zealand*. A thought-starter report prepared for the Asia New Zealand Foundation, Wellington, New Zealand.

<sup>xi</sup> Foreign Policy (2006) The Failed States Index, *Foreign Policy* (May/June).

<sup>xii</sup> In recent years, innovation has been seen as an increasingly important base for economic dynamism and growth and thus has risen in priority as a concern for governments. Approaches vary significantly between states as innovation has come to involve two quite distinct concerns. Differences between states also reflect normative, technical and other issues concerning such factors as industry structure, research capabilities, circumstances, opportunities, and the role of government (strategies that emphasise innovation systems have been adopted by Denmark, Ireland, Finland, Sweden, Denmark, Ireland, Finland, Sweden) K Smith and J West, (2005) Australia's Innovation Challenges: the key policy issues. Submission to Australian House of Representatives standing Committee on Science and Innovation, 28 April 2005.



Services are globalising, as well as manufacturing. High-end business processes as well as low-end ones are increasingly sourced internationally. Major changes have occurred in the structure of previously structured (planned) economies, including a sharp rise in the share of services in GDP, employment and international transactions. Reforms in policies towards financial and infrastructure services, including telecommunications, power and transport, are highly correlated with inward foreign direct investment. Services policy is one of the significant explanatory variables for the post-1990 economic performance of transition economies. This suggests services could be considered more generally as an opportunity for economic growth. Evidence of growing overseas investment in New Zealand infrastructure and utilities in the past decade shows that mobile capital has found it attractive.<sup>xiii, xiv</sup>

In New Zealand it's become the accepted view that the country needs to reduce its reliance on exported agricultural commodities.<sup>xv</sup> However, food production, transport and distribution will remain as one of the largest business activities in the global economy.<sup>xvi</sup> In agriculture, producers will need to negotiate more competitive environments as new producers from Asian countries come on board. Globally, primary producers and food processors must meet demands of key export markets and evolving consumer preferences such as the rise of demand for organics. Food companies may be targeted by a wave of lawsuits brought on health and safety grounds, e.g. on diabetes and obesity, akin to tobacco in the late 20th century. Resource limitations, especially of water and fossil-fuel energy, may curtail growth in New Zealand export volume.<sup>xvii</sup>

Is it possible that New Zealand needs to accept it is an excellent producer of commodities, and that may not be such a bad thing? New production approaches

that better manage soil, water and biodiversity impacts are becoming commercially important. New Zealand has an advantage of a long-standing food production system with its associated safety protocols and so on. Food safety and surety (certification) of the food chain are becoming increasingly important to wealthy purchasers.<sup>xviii</sup> Development of markets in countries where malnourishment remains an issue is also a possibility, but these are volume rather than premium markets.

New Zealand has economic opportunities in renewable energy technology, particularly wind, geothermal, biomass and, later in the time horizon, wave and tidal. These are more likely to centre on exporting technological 'know how'.<sup>xix</sup> In the energy sector, coal has considerable potential, but only if cleaner-burning technologies can be developed and adopted. Biomass also provides an alternative source of carbon for manufacture of polymers, lubricants, surfactants and solvents. The first plastics have already been manufactured from renewable raw materials. Biotechnology is also important to the pharmaceutical industry and food production (e.g. industrial enzymes and specialty chemicals).

Given prevailing patterns of consumption, waste and production, there are emerging economic incentives and new markets in 'clean' and 'grey' water systems and infrastructure, water reuse, sanitation and waste, and so on. Access rights for water and emission rights for carbon represent new property rights. Those with water-efficient processes may have greater flexibility and more-competitive cost structures (Doering, op cit).

The *ocean environment* is an exciting commercial area that will be developed in the next few years. Considering New Zealand's continental shelf as part of its territory

<sup>xiii</sup> Rafiq Dossani and Martin Kenney (2004) Outsourcing Debate – Part 1. *YaleGlobal*.

<sup>xiv</sup> Robert A Levine (2006) Globalization's Grave Challenges for the West. *The International Herald Tribune*

<sup>xv</sup> John Whitehead (2006) Beyond 2010 – *Preparing for Tomorrow's Economic Challenges Today*. Simpson Grierson Policy Maker Seminar Series, The Treasury, Wellington, New Zealand.

<sup>xvi</sup> Don S Doering et al. (2002) *Tomorrow's Markets. Global Trends and Their Implications for Business*. Geneva, World Resources Institute, UNEP and World Business Council for Sustainable Development.

<sup>xvii</sup> Anita Regmi and Mark Gehlhar (2005) Processed Food Trade Pressured by Evolving Global Supply Chains. *Amber Waves*.

<sup>xviii</sup> Professor David H Buisson (2006) *The Changing Consumer: Trends in Preferences and Tastes*. Library Paper. Conferenz.

<sup>xix</sup> (2006) 2020: Energy Opportunities *Report of the Energy Panel of The Royal Society of New Zealand*. Wellington, New Zealand, The Royal Society of New Zealand.

extends the country's sovereign territory considerably.<sup>xx</sup> (New Zealand is required to lodge its submission with the United Nation's Commission on the Limits of the Continental Shelf by May 2009.) Once recognition is achieved, the Government is likely to consider commercialisation opportunities.

#### ▶ CAUTIOUS OPTIMISM

The most important thing as New Zealanders look ahead is to try to understand the opportunities and challenges. It will be challenging to try to achieve economic affluence without a parallel growth in ecological affluence and in social-cultural cohesion – an issue also explored in the Landcare Research scenarios. While it is possible to develop an economic base that is less harmful to ecosystems services, as suggested in the preceding paragraphs, these need to be underpinned by a quality of life which, equally, is not damaging to the environment. Just as managing political transitions is a key for many emerging countries, managing social and values transitions will be a central challenge for more developed economies like New Zealand and Australia.

The momentum of trends means that many New Zealanders will pursue a wider variety of lifestyles – some will involve high technology, some natural and some cultural interests. The larger this range, the greater the need to suppress the worst impacts of parallel transitions – economic, ecological and technological. If New Zealanders understand these challenges and learn how to manage them sustainably, the possibilities are for a bright future. If New Zealand gets it wrong, the consequences will be quite dark, as foreshadowed in aspects of the Four Scenarios here.

No one can know what *will* happen during the next 25 or 50 years. But it ought to be possible to see the intertwined dangers posed by unsustainable lifestyles, landscapes and livelihoods. It holds true that developments in one area, sustainable or not, will have consequences for the other. Trends and changes that damage the environment will intensify trends and changes in the economy or in social conditions – that is why we see the world taking off in new global directions – such as the 'war on terror' – for decades at a time. Some of these convergences of trends and issues will create instability and regressive episodes, to put it mildly. For example, think about how changes in water, land and energy production and consumption patterns may come together as an example of this sort of nexus. We are already seeing an increase in household energy prices in Australia because of water shortages. There is also speculation that higher energy prices and petrol prices will, in combination, change the Australian suburban proposition.

It does not take much imagination to establish grounds for paranoia or fear in politics, economics, ecology or society. However, it is as plausible that very long term trends will be powerful and positive – inequality will be dampened, sustainable global trade and investment practices will advance towards 'win-win' outcomes and production, energy, transportation and newer technologies will transform how we work and live. New Zealanders have reasons to be optimistic, although tempered, based on the view that many opportunities for sustainable economic, social, scientific and ecological progress remain.

<sup>xx</sup> Under Part VI of the UN Convention on the Law of the Sea 1982 (UNCLOS), coastal states like New Zealand have sovereign and economic rights over the resources of the seabed of the continental shelf out to the 200 nautical miles from the coast.

# APPENDIX 1

## PARTICIPANTS AND EVENTS

Participants in the original Wellington process are listed below and include those present at some or all workshops, advisers who have commented on the texts produced in 2005, and the research team.

Participants	Organisation
Mitzi Austin	Secondary Futures – Hoenga Auaha Taiohi
Shirley Barnett	Massey University
Jan Bebbington	University of St Andrews, UK
Michael Bird	Ministry of Economic Development
Simon Bratt	PricewaterhouseCoopers
Melissa Brignall-Theyer	Landcare Research
George Burt	University of Strathclyde, UK
David Chittenden	Ministry for the Environment
Denise Church	Consultant/facilitator
Jeff Clark	Clemenger BBDO
Patricia Colgate	Ministry of Economic Development
Matthew Dalzell	New Zealand Agency for International Development
Alison Dalziel	Department of the Prime Minister and Cabinet
Tack Daniel	Ministry of Agriculture and Forestry
Kate Delaney	Delaney & Associates Pty
Marianne Doczi	Growth & Innovation Advisory Board, Ministry of Research, Science and Technology
Bob Frame	Landcare Research
Jean Fraser	The Treasury
Paul Frater	New Zealand Trade and Enterprise
Paul Gandar	Ministry of Economic Development

Participants	Organisation
Steve Goldthorpe	Energy analyst
Richard Gordon	Landcare Research
Garth Harmsworth	Landcare Research
John MacCormick	Medium-Term Strategy, Ministry of Education
Margaret McArthur	Department of Labour
Nicola Meek	Secondary Futures – Hoenga Auaha Taiohi
Lesley Moffatt	Consultant/facilitator
Pala Molisa	School of Accounting and Commercial Law, Victoria University of Wellington
Nick Potter	Office of the Parliamentary Commissioner for the Environment
Stephanie Pride	State Services Commission
Atiria Reid	Community worker, Ngāti Raukawa
Andy Reisinger	New Zealand Climate Change Office
Suzanne Snively	PricewaterhouseCoopers
Brendon Stevenson	Massey University
Todd Taiepa	Palmerston North City Council
Kerupi Tavita	Department of the Prime Minister and Cabinet
Rhys Taylor	Independent researcher/facilitator
Hemi Toia	State Services Commission
Catherine Wallace	School of Government, Victoria University of Wellington
Jeremy Webb	Statistics New Zealand
Liu Sheung Wong	Office of Ethnic Affairs, Department of Internal Affairs

### ► THE WORKSHOPS

After their initial development, the scenarios were presented to various groups in New Zealand (most are listed below) and the many comments from those attending have been noted with thanks. This process will continue until June 2009. The four workshops in 2006 marked [LS] were led by 'Learning Sustainability', an associated FRST-funded Landcare Research Team including Alison Greenaway and Daniel Rutledge<sup>171</sup>.

Organisation	Date	Event & approx. no. participants
State Services Commission	Jul-04	Futures Practitioners Forum, 30
Secondary Futures – Hoenga Auaha Taiohi	Aug-04	Ministry of Education Managers' annual conference – Workshop session, 300
Landcare Research, Palmerston North	Sep-04	Focus Group with Māori researchers, 7
Centre for Applied Cross Cultural Research, Victoria University of Wellington	Nov-04	Presentation at weekend retreat, 30
Ministry of Economic Development	Feb-05	Regional Development Conference – Workshop, 40
The Treasury	Apr-05	Presentation, 10
Ministry of Research, Science and Technology	May-05	Presentation, 30
Community and Public Health, Canterbury District Health Board	May-05	Workshop, 40
Tourism Industry Association NZ	May-05	Workshop for major providers, 60
Environmental Impact Association of New Zealand (Wellington Branch)	May-05	Workshop, 15
Geraldine (rural residents)	Jun-05	Workshop, 25
Public Health Association	Jul-05	Conference – Workshop, 20
OPUS, Auckland Univ. and Landcare Research "Learning Sustainability" Project (FRST-funded)	Jul-05	Workshop, 20
Mandarin Chinese language new migrants & other residents in North Shore, Auckland	Oct-05	Workshop (with translators), 50

Organisation	Date	Event & approx. no. participants
Staff and councillors, Far North District	Nov-05	Workshop (and repeat session at the same Council in April 2007), 25
Secondary school students, Northcote	Dec-05	Three Workshops, 10+10+10
Policy staff, Christchurch City Council	Dec-05	Workshop, 45
Canterbury & West Coast Community Public Health workers	Feb-06	Workshop, 20
Community and Council reps, Auckland [LS]	Apr-06	Workshop, 25
Landcare Research staff and guests from University of Auckland	May-06	Workshop, 20
Policy analysts, Ministry of Transport, Transit and related agencies	May-06	Workshop, 30 (and LTNZ follow-up in March 2007, MOT May 2007)
Planners, council staff, Thames [LS]	May-06	Workshop, 30
Planning students, Auckland Univ. [LS]	May-06	Workshop, 70
Planners from several councils across Auckland [LS]	May-06	Workshop, 15
Policy analysts, Ministry for the Environment	Jun-06	Workshop, 45
Tourism Industry Association Annual Conference	Jun-06	Presentation and media briefing, 100
Local Government New Zealand	Jul-06	Conference workshop, 100
International Conference 'Future Matters' Cardiff University, UK	Sep-06	Conference workshop, 35
Dept of Conservation HQ	Oct-06	Workshop with CEO and managers, 20
Ministry of Research Science & Tech.	Nov-06	Conference workshop, 50
Sustainable Otago Christchurch Inc.	Dec-06	Workshop, 25
Postgraduate policy and planning students, Lincoln University	Mar-07	Workshop, 25
Conserv-Vision Conference, University of Waikato & Dept of Conservation.	Jul-07	Workshop
9th South East Asia Survey Congress, Christchurch.	Oct-07	Workshop

This FRST-funded work on New Zealand Scenarios has generated much interest in government and private institutions.

▶ EXAMPLES INCLUDE:

- Invitations to brief central ministries (MED, MSD, Min Ag, MfE, Treasury, MoRST) on our Futures work, in response to the Prime Minister's November 2006 and February 2007 statements prioritising sustainability issues.
- Booz Allen Hamilton (Sydney-based) to undertake work for Scenarios for the future of New Zealand's Transport Sector (for the Ministry of Transport).
- Te Puni Kokiri to advise them on futures issues.
- Fonterra to advise them on futures issues.
- Asia New Zealand Foundation, to produce: B Frame, W Allen, K Delaney, G Harris, A McDermott, R Lattimore, B Newton and C Wheatley (2006) *Reshaping Asia: Sustainability, Resources and the Environment*, Asia New Zealand Foundation, Wellington, New Zealand.
- Contributions on future implications of various policy objectives, and international indicators of change, were received by the Dept of Prime Minister and Cabinet following Landcare Research's review of the Sustainable Development Programme of Action and work with other agencies.
- Parts of the Scenarios Game materials are to be used in a series of Regional Council-hosted workshops on Household Sustainability issues, organised by MfE in spring 2007.
- Media interest in the Futures work has resulted in Bob Frame interview on Radio NZ (*Morning Report and Checkpoint*); TV3 Campbell Live; and items in the Dominion Post, The Independent Financial Review and The Press, which were also syndicated by AP.
- Membership of the New Zealand Futures Trust and the Australasian Scanning Group administered by the Australian Bureau of Rural Sciences, Canberra.
- The project has been presented by Rhys Taylor at a 2006 international conference on future studies in the UK, along with a workshop for participants. <http://www.cardiff.ac.uk/socsi/futures/conference/parallel.html> (PDF download is at foot of page, labelled *Scenarios*).
- Auckland University Business School have enquired about making use of the scenarios within their Leadership Institute; and the University of Canterbury about scope for use in continuing education.
- Project submitted for inclusion in an IUCN Congress in 2008, Spain. □

# NOTES AND REFERENCES

Notes and the references are grouped together, as comments are sometimes given on cited texts. Our intention is that this document should give source material to anyone seeking to understand both scenarios and sustainability.

- 1 The scenarios 'game' was run by team members at 15 NZ events in 2005-06, more in 2006-07 and at an international conference, *Future Matters*, held in Cardiff, UK, in November 2006: <http://www.cardiff.ac.uk/socsi/futures/conference/papers/rhystaylor.pdf>
- 2 [www.landcareresearch.co.nz](http://www.landcareresearch.co.nz)
- 3 Brundtland draws attention to the need for Equity now and intergenerationally, Futurity or a 'future focus', Public Participation and Care for the Environment.
- 4 United Nations Agenda 21 (1992) <http://www.un.org/esa/sustdev/documents/agenda21/index.htm>
- 5 Millennium Ecosystem Assessment (2005) <http://www.millenniumassessment.org/en/Condition.aspx>
- 6 Stern Report (2006) HM Treasury [http://www.hm-treasury.gov.uk/independent\\_reviews/stern\\_review\\_economics\\_climate\\_change/stern\\_review\\_report.cfm](http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm)
- 7 Intergovernmental Panel on Climate Change, Reports (2007) <http://www.ipcc.ch/>
- 8 Creating Our Future – Sustainable Development for New Zealand (2002) Parliamentary Commissioner for the Environment, Wellington. [http://www.pce.govt.nz/reports/allreports/1\\_877274\\_03\\_8.shtml](http://www.pce.govt.nz/reports/allreports/1_877274_03_8.shtml)
- 9 J Liu, GC Daily, PR Ehrlich and GW Luck (2003) Effects of household dynamics on resource consumption and biodiversity. *Letter to Nature* 421 (January): 530-533.
- 10 Parliamentary Commissioner for the Environment (May 2007) speech, Wellington.
- 11 This is an email address available throughout 2007. Correspondence is warmly welcomed by Bob Frame and Rhys Taylor.
- 12 D Meadows, D Meadows and J Randers (1992) *Beyond the Limits*, Chelsea Green, Vermont; G Barney, J Blewett and K Barney (1993) *Global 2000 Revisited*, Millennium Institute, Arlington; A Toffler and H Toffler (1995) *Creating the New Civilization*, Turner, Atlanta.
- 13 Peter Mederly, Pavel Novacek and Jan Topercer (2003) Sustainable development assessment: quality and sustainability of life indicators at global, national and regional level, *Foresight* 5(5).
- 14 Christiane Freiling and Claude Fussler, *Sustainable Development Systems Map* (2002). Publication realised and distributed with the material support from Dow Europe, The American Academy of Berlin, and the World Business Council for Sustainable Development.
- 15 Laurence Gonzales (2003) *Deep Survival*, WW Norton.  
\* [http://humandevlopment.bu.edu/papers/civic\\_entrepreneurship.pdf](http://humandevlopment.bu.edu/papers/civic_entrepreneurship.pdf)
- 16 Ministry of Research, Science and Technology (undated) The Foresight Project Backgrounder and Building (1997) *Tomorrow's Success*, reviewed by D Wallace (2007) From future states to images of identity. *Foresight* 9(1): 26-36.
- 17 L Borjeson, M Hoyer, K Dreborg, T Ekvall and G Finnveden (2006) Scenario types and techniques: Towards a user's guide, *Futures* 38: 723-739
- 18 DTI (Department of Trade and Industry) (2003) *Foresight Futures 2020: Revised Scenarios and Guidance*, DTI, London, UK, [www.foresight.gov.uk](http://www.foresight.gov.uk)
- 19 Additional notes are available outlining uses of scenarios in organisations and policy process.
- 20 UNEP. IPCC (Intergovernmental Panel on Climate Change) (March 2000) *Emissions Scenarios: A Special Report of IPCC Working Group III*, Cambridge University Press, <http://www.grida.no/climate/ipcc/emission/025.htm>
- 21 R McCoy (1994) *The Best of Demming*, SPC Press, Knoxville, TN, USA.  
  
Since 2004 the concept of social capital has become more contested and definitions blurred. We intended high social capital to represent social connectedness and mutual-cooperation rather than internal cohesion achieved at the expense of or by exclusion from wider society.
- 22 Equivalent Foresight Futures work led by Sussex University in the UK had used a social values axis (ranged from individual to community) intersecting a system of governance axis (from autonomy to interdependence). The Wellington participants felt the lack of a resource component and overemphasis on social drivers in the UK model was a weakness, and perhaps fundamental when a sustainability analysis of scenarios is to be part of the NZ study's brief.
- 23 It would be a secondary driver, influenced by several of the above. Although aspects such as biosecurity, disease impacts, levels of (and liberality of) education, economic security and employment, perceived risk for investment, and personal safety, were noted, we decided this was not a strong enough variable to be taken as a main driver.
- 24 Cultural Theory (after A Wildavsky, Thompson & Ellis 1990) was not used explicitly in the creation of the scenarios, but is interesting to apply. The horizontal axis of this diagram can represent the contrast of unfettered competition between individuals (low group importance) at the left, compared to fettered competition where the group role is more important (high group importance) at the right. A second contrast, not as easily represented by this diagram, because it would require addition of a third dimension, is between society with many physical or social barriers to individual communication or transactions (high grid) and one with low barriers, where all can interrelate (low grid). The high-grid scenarios are *Fruits for a Few* and *N° 8 Wire*, while the low-grid ones are *Independent Aotearoa* and *New Frontiers*. When we first devised the scenarios a third axis used in distinguishing the scenarios was described as 'Governance'.
- 25 R Kemp and J Rotmans (Sep 2001) The management of the co-evolution of technical, environmental and social systems, Conference Paper for *Towards Environmental Innovation Systems* Conference, Garmisch-Partenkirchen, pp. 27-29.
- 26 Sarah Ruth van Gelder (1999) Self and the cultural creatives. *Futures* 31: 822-826. Cultural Creatives are divided into two groups – the core Cultural Creatives are those with both person-centred and ecological values. They are interested in personal and spiritual growth, self-expression, and social and ecological issues. They value characteristics associated with women and appreciate diverse cultures. There are twice as many women as there are men in this group, which totals about 20 million people in the United

- States. The green Cultural Creatives have many of the same values as the core Cultural Creatives, except that they express less interest in personal and spiritual growth.
- 27 Jay Forest, unpublished paper: *System Dynamics, Alternative Futures, and Scenarios*, SDSG – The Strategic Decision Simulation Group.
- 28 James Burke (1997) *The Pinball Effect: How Renaissance Water Gardens Made Carbuirettor Possible – and Other Journeys*, Back Bay Books.
- 29 D Meadows, D Meadows and J. Randers, *Beyond the Limits*, Chelsea Green Publishing, Vermont (1992); G. Barney, J. Blewett and K. Barney, *Global 2000 Revisited*, Millennium Institute, Arlington (1993); A. Toffler and H. Toffler, *Creating the New Civilization*, Turner Publishing, Atlanta (1995).
- 30 Peter Mederly, Pavel Novacek and Jan Topercer (2003) Sustainable development assessment: quality and sustainability of life indicators at global, national and regional level, *Foresight* 5(5).
- 31 Christiane Freiling and Claude Fussler (2002) *Sustainable Development Systems Map*. Publication realised and distributed with the material support from Dow Europe, The American Academy of Berlin, and the World Business Council for Sustainable Development.
- 32 James Lovelock (2000, revised) *Gaia, a New Look at Life on Earth*, Oxford University Press.
- 33 Jan Nederveen Pieterse (2001) Participatory democratization reconceived, *Futures* 33. Participatory democracy is now usually thought of, rather than as wholesale system change, in partial reforms, particularly decentralisation and politics of empowerment.
- 34 Robert Lempert, Parry Norling, Christopher Pernin, Susan Resetar and Sergei Mahnovski (2003) *Next Generation Environmental Technologies: Benefits and Barriers*, RAND.
- 35 Andrew Light and Eric Katz (1996) *Environmental Pragmatism* (Environmental Philosophies), Routledge.
- 36 Millennium Ecosystem Assessment Scenarios(2005) <http://www.millenniumassessment.org/en/Scenarios.aspx>
- 37 Climate Change Impacts NZ, Ministry for Environment, Wellington <http://www.mfe.govt.nz/issues/climate/about/impacts.html>
- 38 WWF, Living PlanetReport (2006) [http://www.panda.org/news\\_facts/publications/living\\_planet\\_report/index.cfm](http://www.panda.org/news_facts/publications/living_planet_report/index.cfm)
- 39 Parliamentary Commissioner for the Environment (2004) *See Change: Learning and Education for Sustainability*, Wellington, NZ.
- 40 For example, the Prime Minister's speech at opening of NZ Parliament, February 2007.
- 41 OECD (2007) Environmental Performance Reviews: New Zealand <http://www.sourceoecd.org/environment/9264030573>
- 42 Joseph Coates (2003) *Future Innovations in Science and Technology*.
- 43 Philip S Anton, Richard Silbergliitt and James Schneider (2001) *The Global Technology Revolution*, approved for public release by the National Defense Research Institute; distribution unlimited. Prepared for the National Intelligence Council.
- 44 The major economic areas of the United States, Japan, and EU currently dominate overall expenditure on research and development (R&D). The US currently accounts for around 43% of the developed world's combined public and commercial R&D expenditure. US R&D investments outdistance, by more than two to one, R&D investments made by Japan, the second largest performer, as well as the aggregate efforts of the EU, which account for the third largest grouping (with the UK pre-eminent within the EU). In terms of focus, the US and EU are primarily spending on the automotive, aerospace, health (pharmaceuticals), and industrial development (communications and chemical) sectors, with a greater emphasis by the Japanese on energy. The overall trend according to OECD figures is for expenditure on R&D to increase. UK Ministry of Defence, Strategic Trends, Joint Doctrine and Concepts Centre (March 2003).
- 45 For more information see [www.longnow.org](http://www.longnow.org) and *The Clock of the Long Now – Time and Responsibility*, by Stewart Brand (1999). The Long Now Foundation believes that civilization is revving itself into a pathologically short attention span. The trend might be seen in the acceleration of technology, the short-horizon perspective of market-driven economics, the next-election perspective of democracies, or the distractions of personal multi-tasking. All are on the increase. The Foundation proposes that some sort of balancing corrective to the shortsightedness is needed – a mechanism or myth that encourages the long view and the taking of long-term responsibility, where 'long-term' is measured at least in centuries. Their concept of a 'Long Now' Clock and Library endeavours to help people reframe the way they think about these issues, and to become an icon for public dialogue.
- 46 Greg Tegart (2004) Nanotechnology: the technology for the twenty-first century, *Foresight* 6(6): 364-370.
- 47 Philip S Antão, RS Silbergliitt and James Schneider (2001) *The Global Technology Revolution: Bio/Nano/Materials Trends and Their Synergies with Information Technology by 2015*, RAND, MR-1307-NIC.
- 48 Robert J Lempert, Parry Norling, Christopher Pernin, Susan Resetar and Sergei Mahnovski (2003) *Next Generation Environmental Technologies Benefits and Barriers*, Prepared for Office of Science and Technology Policy by RAND Science and Technology Policy Institute.
- 49 *Ministry of Defence, Science and Technology Dimension, Strategic Trends Report 2003*, Joint Doctrine & Concepts Centre (UK) (2003). Strategic Analysis Programme, Ministry of Defence, Shrivenham.
- 50 Donella Meadows (1999) *Chicken Little, Cassandra, and the Real Wolf – so many ways to think about the future*, Whole Earth.
- 51 William H Calvin and Elizabeth F Loftus (April 2002) *The Poet as Brain Mechanic: A 2050 Version of Physics for Poets*, an occasional paper for the Global Business Network; and other papers on his website such as *When Climate Staggers* (Tuesday, 8 July 2003) University of Washington, Biology lecture UW [great slide show] on <http://williamcalvin.com/2000/2050.htm>
- 52 Victor Vinge (classic article (1993) reprinted in *Whole Earth*, Spring 2003) *The Singularity, Whole Earth* and *What Keeps Jaron Lanier Awake at Night*, interview in *Whole Earth* (Spring 2003). The entire issue is about singularity – see it at <http://www.wholeearthmag.com>. Stewart Brand (Feb 1998) *Freeman Dyson's Brain* by *Wired* magazine, and Kurzweil Ray (1999) *The Age of Spiritual Machines: When Computers Exceed Human Intelligence*, Viking, New York.

- 53 Joseph F Coates, John B Mahaffie and Andy Hines (1996) 2025: *Scenarios of U.S. and Global Society Reshaped by Science and Technology*, Oakhill Press.
- 54 Francis Fukuyama (1999) *The Great Disruption*, Profile Books. This book explores linkages between capitalism and the social order.
- Fukuyama identifies factors that contribute to the social order, in which companies and their values play an important part. The first part of the book explores 'the Great Disruption' that has occurred over the last 40 years, as the developed world has been making the shift from the industrial to the information society. Parallels are drawn with the previous discontinuity that occurred with the industrial revolution and the transition from the agrarian to the industrial age. The Great Disruption is characterised by increasing levels of crime and social disorder, the decline of families and kinship as a source of social cohesion, and decreasing levels of trust. It is suggested that these have collectively led to a deterioration in 'social capital' – the set of informal values or norms shared among members of a group that permit cooperation between them. It is suggested that the essential reason for the Great Disruption is more fundamental; it relates to the balance between individual autonomy and the desire for freedom and participation in a 'community' based on shared values. As personal autonomy has been emphasised in the Great Disruption, community has fragmented and circles of trust have been reduced.
- 55 Dave Elliott (2000) Renewable energy and sustainable futures, *Futures* 32. The development of renewable-energy technology is now widely seen as important if the world is to move towards a sustainable approach to energy generation. However, there are a range of obstacles facing the rapid development of these technologies: they are trying to establish themselves in an outdated institutional, market and industrial context.
- 56 B Emmott (2003) *Lessons of the 20th Century for the 21st Century*, Allen Lane/ Farrar, Strauss & Giroux. The Editor of *The Economist* raises two longer-term questions: Will the US continue to lead the world and keep the peace? Will capitalism's strengths sufficiently outweigh its weaknesses for most peoples to hold by it? The answers to both are affirmative but well considered, though with a limited understanding of the effects of self-interested US peacekeeping in some regions.
- 57 Stewart Brand, *Environmental Heresies*, TechnologyReview.com (May 2005). See (1 of 3), 15 Apr 2005, 5:35:47 p.m.
- 58 Parliamentary Commissioner for the Environment (August 2002) *Creating Our Future: Sustainable Development for New Zealand*. In the report summary it has been noted that 'Successive governments have largely ignored the Agenda 21 commitments made in 1992 and have not provided the necessary leadership. It is only in recent years that central government has made any significant commitment to developing a New Zealand strategy on sustainable development. Other sectors, including individual local authorities, business organisations and community groups, have made progress with their own initiatives. They have endeavoured to incorporate sustainable development principles into their policies and activities, and have encouraged others to do likewise. It is the 'local initiatives' dimension of sustainability thinking and action that has made the biggest contribution to awareness of sustainable development in New Zealand.
- 59 Barbara Hug (2005) Looking at the sufferings of mankind in *Current Concerns* No. 1. The 80/20 divide in society, in which 80% of wealth/resources are controlled by 20% of people. The power elite engages in mythmaking, producing oversimplified logics and stories that keep them in power. Chomsky calls this the 'manufacture of consent.' Elites create the illusions of participation, while keeping the majority of people out of meaningful participation and governance. 80/20 Rule: Chomsky argues that 80% of the populace is side-tracked into fundamentalist, silly, and time-wasting propaganda, so that 20%, the relatively well educated elite, can manage, write, and vote. This bleak model of the 80/20 society is being resolutely implemented by social technologists. Elitism and suffering are the result, and there is very little else in between. The rich elite have no desire to see the misery they produce, and seek to cut themselves off from the rest of society.
- 60 Ruth Wildbore (December 2002) *The Future of Christianity in the West*, An International Conference held in Dunedin, <http://latimer.godzone.net.nz/morecomment.asp?ColD=60>
- 61 Gillian Smeith and Kim Dunstan (June 2004) *Ethnic Population Projections: Issues and Trends*, Demography Division, Statistics New Zealand.
- 62 Henry David Thoreau (1950) *Walden 1854 in Walden and Other Writings*, Brooks Atkinson Ed., Modern Library, New York, pp. 3-297.
- 63 Ian Pool, A Dharmalingam and Janet Sceats (2000) Periodicity in NZ Family Formation, paper presented at the FFS Flagship Conference *Partnership and Fertility a Revolution*, Brussels, Belgium, 29-31 May 2000. Other major long-term trends that changed direction in the 1970s related to the factors of income inequality and purchasing power. It has been shown, in the only such analysis available for New Zealand, that 'post-war New Zealand has undergone two contrasting periods in the level and distribution of income: a period of gradual equalisation, and of incomes rising in real value, followed [from 1976] by a period of relatively rapid but also fluctuating dis-equalisation, and with incomes static or declining in real value' (Martin 1998: 269). *What happened in the Seventies Mummy?*
- 64 John Robinson (2004) Family and work – the changing pattern, *Future Times* 3. Robinson explains 'The linkages among social experiences, and the recent negative trends, are particularly marked among struggling and underprivileged groups. The increase in social anomie is seen in the recognition of an underclass in New Zealand society. That underclass is disproportionately Māori as the steady improvement of the post-war years reversed in a number of key measures. Māori have experienced the general (and global) increase in inequalities; while some have moved steadily ahead, as indicated by many education and employment statistics, others have fallen behind. Ethnic gaps remain substantial and persistent, and ethnic statistics provide a measure of the differences within New Zealand society and the experiences of a struggling minority.'
- 65 E. Rata examines 'brokerage politics', as the political elites of the Treaty partners make deals behind closed doors, *NZ Political Review* (Spring 2004).
- 66 Ministry of Social Development. The Social Report 2003 states 'It is common knowledge the New Zealand population is ageing. As the post World War II 'baby boom' generation gets older it is followed by much smaller generations of younger people. This will mean a smaller ratio of working-age people to the number of people at retirement age over the next 30 to 40 years. What the



- social report makes clear is that outcomes for those currently young, who will be the workforce when the 'baby-boomers' retire, are not good. Youth suicide, youth unemployment, and children living in families with low incomes do not bode well for the skills and resilience of New Zealand's future workforce. Counter-intuitively, one of the best ways to prepare for an ageing population may be to invest in the young.
- 67 See detailed discussion at The Challenge! Forum ([www.chforum.org](http://www.chforum.org))
- 68 Ministry of Social Development, *The Social Report 2003*. New Zealand's performance compared to other countries is also a source of concern. According to this report, 'Although New Zealand is doing well compared to other industrialised countries in some areas such as paid work and civil and political rights, social outcomes in many areas lag behind the OECD average. New Zealand has a lower life expectancy and higher suicide rates than many comparable countries. Market income lags behind other industrialised countries (although recently New Zealand's economic growth rate has been near the top of the OECD) and the prevalence of household crowding is relatively high.' The social report monitors the social well-being of New Zealanders.
- 69 Allenby (1994); OECD (1992).
- 70 WR Stahel (1994) *The Impact of Shortening Lifetime of Products and Production Equipment on Industrial Competitiveness and Sustainability*, Report to Commission of EC, DG III/93/61, Brussels.
- 71 UNEP, Special Report on Emission Scenarios (2001) [http://www.grida.no/climate/ipcc\\_tar/wg3/081.htm](http://www.grida.no/climate/ipcc_tar/wg3/081.htm)
- 72 This scenario relates to the global IPCC SRES B1 storyline and scenario family.
- 73 Thomas Clarke and Stewart Clegg (2000) *Changing Paradigms*, HarperCollins. Sustainability is seen as one of the most difficult, and yet most necessary, paradigm shifts that business must realise. There is a brief review of world environmental problems and social inequalities, and the limited success so far of governments in addressing them, such as at the Rio/Kyoto summits and with the proposed Third World debt write-off. The necessary role of regulation and stakeholder approaches is clear, as is the need to move from cleaning up the environment, through reducing environmental damage, to clean technologies which leave the environment undamaged. Business strategies have a key role in setting the necessary direction.
- 74 HE Daly and JB Cobb (1989) *For the Common Good – Redirecting the Economy towards Community, the Environment and a Sustainable Future*, Beacon Press, Boston, MA.
- 75 Several models for pro-environmental behaviours derived from psychology, sociology, geography and other academic disciplines are united by the concept of the 'value-action gap' (also called the 'attitude-action gap'). A reflection of how influential this concept has become is that a special issue of the journal *Environmental Education Research* was devoted to it (in 2002), under the title: 'Exploring the Gap'. The key paper in that volume, 'Mind the Gap' (by Kolmuss and Agyeman) represents many of the available models for pro-environmental behaviours, and concludes that 'the question of what shapes pro-environmental behaviours is such a complex one' that no one model or framework can adequately express all the forces at work.
- 76 M Clark (2001) Domestic futures and sustainable residential development, *Futures* 33: 817-836. See also [www.sustainableliving.org.nz](http://www.sustainableliving.org.nz)
- 77 *Social Change Media*, Record of lecture on Democracy and Globalisation by John Ralston Saul (1999) on <http://www.abc.net.au/specials/saul/default.htm>
- 78 The Platform for the Promotion of Early Warning (PPEW), <http://www.unisdr.org/ppew/about-ppew/aims-background.htm>
- 79 John Browne (July/August 2004) *Beyond Kyoto*, Foreign Affairs.
- 80 David Held and Anthony McGrew, Globalization entry for *Oxford Companion to Politics* on <http://www.polity.co.uk/global/globocp.htm> A sceptical world view of globalisation which is much more cautious about the revolutionary character of globalisation. 'Whilst generally recognizing that recent decades have witnessed a considerable intensification of international interdependence, the sceptical interpretation disputes its novelty. The emphasis upon footloose capital and a new global capitalist order is over-stated as is the decline of the welfare state. Rather than a new world order, the post Cold War global system has witnessed a return to old style geo-politics and neo-imperialism, through which the most powerful states and social forces have consolidated their global dominance. In presuming the novelty of the present, so the sceptical position suggests, then you ignore the continued primacy of national power and sovereignty.'
- 81 Robert Herman, Siamak A Ardekani and Jesse H Ausubel (1989) Dematerialization, in Jesse H Ausubel and Hedy E Sladovich (Eds) *Technology and Environment*, National Academy Press, Washington, D.C., suggest dematerialisation refers to the decline over time in the weight of materials used in industrial end products or in the 'embedded energy' of the products. More broadly, dematerialisation refers to the absolute or relative reduction in the quantity of materials required to serve economic functions. This involves the replacement of a physical product with a non-physical product or service, thereby (1) reducing a production, demand and use of physical products; and (2) end-user's dependence on physical products. Lower materials intensity of the global economy has reduced the amount of garbage produced, limited human exposures to hazardous materials, and conserved landscapes.
- 82 National Research Council of Canada. Published 20 Jan 2003.
- 83 Robert A Frosch (1992) Industrial ecology: A philosophical introduction, *Proceedings of the National Academy of Sciences of the USA* 89: 800-803.
- 84 John Rodman (1983) Four forms of ecological consciousness, in Scherer and Attig (Eds) *Ethics and the Environment*, Prentice-Hall. The term 'sensibility' is chosen to suggest a complex pattern of perceptions, attitudes, and judgments. Ecological sensibility means thinking about non-human beings or natural entities as subjects rather than objects. These subjects deserve respect and should be treated as if they had a 'right' in the most basic sense of being entitled to exist in a natural state.
- 85 Parliamentary Commissioner for the Environment (January 2004) *See Change: Learning and Education for Sustainability*. This development can be connected to what Belich refers to as the 'modern populist engagement with the landscape', including the 'the boat, the bach, the beach and the barbecue', that are symbolic of the enjoyment many New Zealanders have in the 'great

- outdoors'. A sense of identity for many Pakeha/European New Zealanders today is not tied to British roots. The landscapes of New Zealand and its unique flora and fauna have played a dominant part in the construction of national identity. This is often reinforced by tourism branding, which conjures up images of a '100% pure' environment.
- 86 [www.climatechange.govt.nz](http://www.climatechange.govt.nz) Climate change information sheet: Impacts on New Zealand.
- 87 Brian Easton, *Nationbuilding and the Textured Society*, the Bruce Jesson Memorial Lecture 2001.
- 88 Norman G Kurland and Dawn K Brohawn (2004) *Lousi Keslo's Economic Vision for the 21st Century*, Center for Economic and Social Justice.
- 89 See for example Ministry of Social Development (2005) *Trends in Economic Wellbeing: Changing Patterns in New Zealand 1989 to 2001* Research Report, which may be indicative of this trend.
- 90 Richard Layard (2005) *Happiness, Lessons from a New Science*, Allen Lane. If Layard is right then the implications for policy are strong. It obligates policymakers to identify when economic well-being is enough and not assume it never is.
- 91 Paul Ray and Sherry Ruth Anderson (October 2000) *The Cultural Creatives: How 50 Million People Are Changing the World*, Harmony Books, New York. In his research Ray found that essentially media and social analysts had failed for some time to recognise that issues popular in the 1960s, such as peace, ecology and human rights, had survived, taken root and evolved to become governing principles for many people – the group Ray calls the Cultural Creatives.
- 92 Colin James, Ethnicity and the Treaty: no simple matter, *NZ Herald* column for 17 June 2003 – James cites Paul Callister, a respected social researcher, as finding that single ethnic identities to be increasingly outdated concepts. More helpful is the concept of a complex emerging society where a significant number of people claim to have dual or multi-ethnic ancestry, Callister told a social research conference in late April.
- 93 New Economics Foundation, see their homepage for a range of articles about what policy making and the economy would look like if their main aim were to promote well-being. <http://www.neweconomics.org/gen/>
- 94 Jurgen Habermas (1980) *Discourse Ethics: Notes on Philosophical Justification. Moral Consciousness and Communicative Action*. Trans. Christian Lenhart and Shierry Weber Nicholson. MIT Press, Cambridge.
- 95 A good example of building a national brand is that of Switzerland – see: A special case, *The Economist*, 12 Feb 2004, where it is argued that 'Swissness covers a range of attributes that Switzerland has been using to good effect to sell itself to other countries – and perhaps even to itself. It stands for democracy, fairness, stability, quality, meticulousness, punctuality, thrift, efficiency, openness and all sorts of other desirable things. For the buyer of a Swiss watch, it means clockwork reliability. The rich man will confidently entrust his money to a Swiss bank. The holidaymaker is sure to have a comfortable night, courtesy of Swiss hotel-school training. And Swiss chocolate will be dependably delicious.
- 96 This is well received publicly and internationally, and exceeds the success of 'Brand New Zealand' – *Brand New Zealand: New Zealand New Thinking* which aimed to create a national brand that will differentiate New Zealand internationally, better support key sectors, and enhance New Zealand's established and emerging areas of competitive advantage. <http://www.nzte.govt.nz/section/11772.aspx#bpp>
- 97 See Department of Labour, *Future of Work, Jobs coming and going* <http://www.dol.govt.nz/futureofwork/workforce-global.asp> for a discussion of the globalisation of labour and its impact on New Zealand. They note 'Yet the increasing freedom of people to travel the world for employment – the globalisation of labour – also contains threats for New Zealand. Particular challenges for New Zealand in this fast-changing environment are: The risk to the economy longer-term of skills shortages: Labour markets for particular types of skills are becoming increasingly globalised. New Zealand faces ongoing challenges to ensure that it is able to attract and retain highly skilled individuals. Effects on obtaining and using skills: New Zealanders who leave the country use their publicly funded training elsewhere. Offsetting this, many migrants bring education and skills obtained at no cost to New Zealand.
- In the longer run, if inward migration is seen as displacing local workers, this may create disincentives for locals to invest in education and training. Ensuring good outcomes for migrants in the labour market: The potential benefits of migration are conditional on whether new immigrants and returning New Zealanders settle and find employment successfully. The New Zealand labour force includes a higher proportion of migrants than most OECD countries.
- 98 John Markoff (1999) Globalization and the Future of Democracy, *Journal of World-Systems Research* V(2): 277-309, <http://jwsr.ucr.edu/>
- 99 This would require a substantial shift in opinion – the Economic Development Indicators 2005 report by the Ministry of Economic Development and the Treasury. The report shows that the New Zealand economy has performed well over the last few years, with GDP per capita growth above the Organisation for Economic Co-operation and Development (OECD) average. However, the report suggests there are some ways to go to achieve per capita incomes similar to those in the top half of the OECD. Much of New Zealand's recent growth has been sourced from labour utilisation, and to maintain this growth it will be essential to lift labour productivity further. Overall, New Zealand's ranking within the OECD for many of the indicators in this report remains relatively low. That said, the direction of change in areas such as investment, patenting and expenditure on research and development is positive. New Zealand's economic foundations – macroeconomic stability and the institutional and regulatory environment – are solid.
- 100 Jeffrey M Ayres (Ed.) (Winter 2004) Framing collective action against NeoLiberalism: The case of the anti-globalization movement, In *Global Social Movements Before and After 9/11* No. 1.
- 101 See <http://www.redefiningprogress.org/projects/gpi/> for a discussion of the Genuine Progress Indicator.
- 102 New Economics Foundation, *Chasing Progress: Beyond Measuring Economic Growth*, undated on <http://www.neweconomics.org/gen/uploads/izgu3e45tr1dy0e2qzb4wt5516032004125132.pdf>

- 103 [http://www.pce.govt.nz/reports/allreports/1\\_877274\\_03\\_8\\_indicators.pdf](http://www.pce.govt.nz/reports/allreports/1_877274_03_8_indicators.pdf)
- 104 J House (1994) *An Alternative Form Of Alternative Tourism?* Unpublished MA thesis; and (1997) *Re-defining Sustainability: A Structural Approach to Sustainable Development*.  
M Stabler (Ed.) (1998) *Tourism in Sustainable Tourism*, CAB International, Wallingford, Oxon.
- 105 John Rodman, Four forms of ecological consciousness, in Scherer and Attig (Eds) *Ethics and the Environment*, Prentice-Hall (1983) The general material on environmental ethics is drawn from this essay. 'Ecological sensibility' has three parts: (1) A theory of value that recognises intrinsic value in nature without simply extending value in nature from human value (as 'moral extensionism' does); (2) A metaphysics that takes account of the reality and importance of relationships and systems of nature, as well as of individuals; and (3) An ethic that includes such duties as non-interference with natural processes.
- 106 'Fashion is for people who don't know who they are.' Quentin Crisp.
- 107 NZ Parliamentary Commissioner for the Environment (2001) – Key lessons from the history of science and technology: knowns and unknowns, breakthroughs and cautions.
- 108 Rhys Taylor and Will Allen (2007) Behaviour change for sustainability – exploring a role for community education. NZ Society for Sustainability in Engineering and Science, Conference. <http://nzsses.auckland.ac.nz/Conference/2007/manuscripts.htm> and presentation: <http://nzsses.auckland.ac.nz/conference/2007/presentations/TAYLOR.ppt>
- 109 FAO, Food and Agriculture Organization of the United Nations and South Pacific Regional Environment Programme – Programme for Sustainable Development in the South Pacific, Technical Consultation of South Pacific Small Island Developing States on Sustainable Development in Agriculture, Forestry and Fisheries. Apia, Samoa, 6-9 May 1996.
- 110 This scenario relates to the global IPCC SRES A1 storyline and scenario family.
- 111 Francis Fukuyama, Bring back the state, *The Observer*, 4 July 2004. He notes it is important to distinguish between the scope of states, and their strength. State scope refers to a state's range of functions, from domestic and foreign security, the rule of law and other public goods, to regulation and social safety nets, to ambitious functions such as industrial policy or running parastatals. State strength refers to the effectiveness with which countries can implement a given policy. States can be extensive in scope and yet damagingly weak, as when state-owned firms are run corruptly or for political patronage.
- 112 Egbert Schuurman (Fall 1997) Philosophical and ethical problems of technicism and genetic engineering, *Techné: Journal of the Society for Philosophy and Technology* 3(1).
- 113 Ken Ducatel (2001) Balance of nature? Sustainable societies in the digital economy, *Foresight* 3(2).
- 114 David Mercer (1998) *Future Revolutions: A Comprehensive Guide to Life and Work in the Next Millennium*, Orion Business Books.
- 115 William H Calvin and Elizabeth F Loftus (April 2000) The poet as brain mechanic: A 2050 version of 'Physics for Poets,' an occasional paper for the Global Business Network and other papers on his website such as When climate staggers, Biology lecture, University of Washington, 8 July 2003 [great slide show] on <http://williamcalvin.com/2000/2050.htm>
- 116 Pavel Novacek (June 2000) A sustainable future for the Czech Republic, *Foresight* 2(3).
- 117 Lindy Edwards (2002) *How to Argue with an Economist*, Cambridge University Press.
- 118 Bill Moyers, Cited by Alan Ramsey in *Seeing beyond Blind Faith to a Dire Revelation*, Sydney Morning Herald, 9 March 2005.
- 119 John Bishop, Think Tank Head: economic woes misdiagnosed (in *The National Business Review* 6 August) on <http://www.johnbishop.co.nz/news/art060804.shtm>
- 120 Thomas Homer Dixon (2000) *The Ingenuity Gap*, Knopf. See also his website <http://homerdixon.com/ingenuitygap/order.html>
- 121 Paul Gorman and Leanne Scott, Energy Central, NZ: Expert warns nuclear power is on the cards, 2 Sep 2004 on <http://www.energybulletin.net/1875.html> The argument is that nuclear power stations may be operating in New Zealand as soon as 2015 if coal continues to be shunned as a fuel source.
- 122 The A1 scenario family of IPCC develops into three groups that describe alternative directions of technological change in the energy system. The three A1 groups are distinguished by their technological emphasis: fossil intensive (A1FI), non-fossil energy sources (A1T), or a balance (A1B).
- 123 G Hardin (1968) The tragedy of the commons. *Science* 162: 1234-1248.
- 124 Jerome C Glenn and Theodore J Gordon (2002) Creating a better world: 15 global challenges, *Foresight* 4(5).
- 125 Yujiro Hayami and Vernon Ruttan (1971, 1985) *Agricultural Development: An International Perspective*, John Hopkins Press, Baltimore.
- 126 The classic example of a critical system is a sandpile adding one grain at a time. At some point in time, the system gets into a critical or supercritical state where each new grain has the potential to avalanche the whole pile. But this state emerges gradually so you can't tell exactly when the pile becomes critical and, more importantly, which grain will start the avalanche.
- 127 Paul Romer (Winter 1994) The origins of endogenous growth, *Journal of Economic Perspectives* 8(1), or Paul Romer (1993) *Two Strategies for Economic Development: Using Ideas and Producing Ideas*, World Bank, Proceedings of the World Bank Annual Conference on Development Economics, 1992, p. 64.
- 128 This scenario relates to the global IPCC SRES B2 storyline and scenario family.
- 129 The Polluter Pays Principle was first widely discussed in the United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil, in June 1992. The principle was endorsed by all the attending representatives of countries and nations.
- 130 The question of resource poverty has been raised in developed countries with respect to specific or single issues, for example, DEFRA in the UK reports on matters related to energy poverty – see <http://www.defra.gov.uk/environment/energy/fuelpov/>
- 131 Larry Cromwell (June 2001) The global risks of global change: will we see them coming? 5<sup>th</sup> International Conference of Maintenance Societies.

- 132 There is a large body of literature on the concept of resource wars. One example is MT Klare's book *Resource Wars: The New Landscape of Global Conflict* with a new introduction by the Author, Owl Books (2002).
- 133 New Zealand's green image has been subject of much debate and government reporting – see, for example, Ministry for the Environment report (August 2001) *Valuing New Zealand's Clean Green Image*, Ref. ME405.
- 134 WHO, World Health Report 2005, <http://www.who.int/whr/en/>
- 135 Barter economies are already in place in New Zealand. Walker-Davey Business Talk, Summer 2001, [www.walkerdavey.co.nz/pages/newsletters/2001summer.htm#barter](http://www.walkerdavey.co.nz/pages/newsletters/2001summer.htm#barter). See also NZ, What NZ? Thought-provoking and challenging. Our future is in the balance. <http://www.anewnz.org.nz/vision.asp?id=143>
- 136 John Whitehead, Secretary to the Treasury, *New Zealand's Economic Growth: A Near and A Far View*, Paper presented to the New Zealand Association of Economists' Annual Conference, 30 June 2004. He mentions long period of relative income decline, which is now tempered – i.e. 'New Zealand is now holding its ground, thanks to improved economic growth.' However, to catch up with the OECD median in 10 years for example, New Zealand per-capita GDP has to grow approximately 2% more on average per annum than the OECD median for the next 10 years. Over a 20-year horizon the required rate is about 1% more than the OECD. It is plausible to imagine that environmental degradation coupled with a reversion to the long-term slow decline could lead to a subsistence situation.
- 137 Rt Hon Helen Clark, Prime Minister's Statement to Parliament 13 Feb 2007 <http://www.beehive.govt.nz/ViewDocument.aspx?DocumentID=28357>
- 138 Robert Costanza (2003) A vision for the future of science: reintegrating the study of humans and the rest of nature, *Futures* 35: 651-671.
- 139 G. Brundtland (Ed.) (1987) *Our Common Future: The World Commission on Environment and Development*, Oxford University Press.
- 140 PCE (Parliamentary Commissioner for the Environment) (2002) *Creating Our Future: Sustainable Development in New Zealand*, Wellington, New Zealand [www.pce.govt.nz](http://www.pce.govt.nz)
- 141 DPMC (Department of the Prime Minister and Cabinet) (2003) *Sustainable Development for New Zealand: Programme of Action*, Wellington, New Zealand.
- 142 J Tait and D Morris (2000) Sustainable development of agricultural systems: competing objectives and critical limits, *Futures* 32: 247-260.
- 143 Martin Agerup – In 1973, the Club of Rome published its first 'Limits to growth' report, and through the 1970s and early 1980s, resource depletion was high on the agenda.
- 144 The 'dangerous chemical wave' began in 1962 and focused on DDT and other pesticides. More recently, environmental oestrogens, or endocrine disrupters, have been added to the list of dangerous chemicals.
- 145 The 'Pollution wave' was very big in the 1980s but has since subsided because both water and air pollution have been decimated since the 1960s.
- 146 The 'Greenhouse effect' or 'global warming wave' has become the focus of much environmental debate since the late 1980s.
- 147 OECD (1996), Globalisation and environmental perspectives from OECD and dynamic non-member countries.
- 148 IPCC (Intergovernmental Panel on Climate Change) (2000) *Emissions Scenarios: a Special Report of IPCC Working Group III*, Cambridge University Press. The open process defined calls for the use of multiple models, seeking inputs from a wide community and making scenario results widely available for comments and review.
- 149 The Millennium Ecosystem Assessment (MA) is an international work programme designed to meet the needs of decision makers and the public for scientific information concerning the consequences of ecosystem change for human well-being and options for responding to those changes. Its 2005 report is available at [www.millenniumassessment.org](http://www.millenniumassessment.org)
- 150 Growth & Innovation Advisory Board (GIAB) *Research on growth and innovation* (2004), [www.giab.govt.nz](http://www.giab.govt.nz)
- 151 Steve Cork and Kate Delaney (2004) Occasional Paper: *Future Challenges for Natural Resource Management in Australia, A source-book to support thinking about the future of Australia's landscapes*, unpublished draft.
- 152 Kevin Morgan and Adrian Morley (2002) *Re-localising the Food Chain: the Role of Creative Public Procurement*, in association with Powys Food Links, The Soil Association, Sustain.
- 153 Paul Hawken, Amory B. Lovins and L. Hunter Lovins (1999) *Natural Capitalism – Creating the Next Industrial Revolution*. The authors argue that the dilemma we face in the 21st century is how to create more wealth to solve social problems and at the same time protect the environment and improve the quality of life. Three conclusions are made:
- the environment is not a minor factor of production but rather is 'an envelope containing, provisioning, and sustaining the entire company;
  - the limiting factor to future economic development is the availability of natural capital, badly designed business systems are the primary cause of the loss of natural capital;
  - future economic progress can best take place in a democratic market based on systems of production and distribution.
- 154 P Ekins (Ed.) (1986) *The Living Economy – a New Economics in the Making*.
- 155 Source: Based on Statistics New Zealand (2002: 89) and on OECD criteria – see <http://www.stats.govt.nz/domino/externalwebnzstories.nsf/htmldocs/Sustainable+Development+Appendix>
- 156 R Perman, Y Ma, J McGilvray, M Common (1999) *Natural Resource and Environmental Economics*, 2nd edition, Longman, Essex. Human populations are not usually included as a 'stock' within this category. Renewable flow resources, such as solar radiation and wind resources, are not included as part of the stock of natural capital either – they can be considered as services of natural capital.

- 157 Defined using concepts such as Manfred Max-Neef's nine basic human needs: subsistence, protection/security, affection, understanding, participation, leisure, creation, identity/meaning and freedom. Max-Neef, M., *Human Scale Development: Conception, Application and Further Reflections* (1991), The Apex Press, New York.
- 158 K-H Robert (2002) *The Natural Step Story*, New Society; also B Natrass and M Altomare (2002) *Dancing with the Tiger: Learning Sustainability, Step by Natural Step*, New Society.
- 159 S James and T Lahti (2004) *The Natural Step for Communities: How Cities and Towns Can Change to Sustainable Practices*, New Society.
- 160 J Peet, Sustainable Development – why is it so difficult? *Pacific Ecologist* Summer 2002-2003: 16-20.
- 161 B Frame and R Taylor (2005) Partnerships for sustainability in New Zealand: Effective practice? *Local Environment* 10 (3) 275-299.
- 162 George Norwood (June 1996) *Maslow's Hierarchy of Needs*, <http://www.deepermind.com/20maslow.htm>;  
Abraham Maslow (1970) *Motivation and Personality*, 2nd ed., Harper & Row.
- 163 This diagram is adapted from an 'energy needs pyramid diagram' found in the World Economic Forum, Energy Industry Agenda Monitor, May 2004.
- 164 Growth & Innovation Advisory Board (GIAB), *Research on Growth and Innovation* (2004) [www.giab.govt.nz](http://www.giab.govt.nz)
- 165 E Said (1993) *Orientalism*, Penguin, London.
- 166 '100% PURE CONJECTURE: Accounts of our future state[s]' developed by Bob Frame, Pala Molisa, Rhys Taylor, Hemi Toia and Wong Liu Shueng in Liu et al. (see next reference). This chapter accounts for research on building scenarios for the future of New Zealand. Although the screenplay representation is playful, the medium reflects a sense of scripting films of the future and captures the various voices that will contest that 'possibility space'. Both were key elements in the development of the scenarios. The approach has been used before in academic papers (e.g. R Delgado (1993) Rodrigo's fifth chronicle: Civitas, Civil Wrongs, and the politics of denial, *Stanford Law Review* 45: 1581-1605).
- 167 JH Liu, T McCreanor, T McIntosh, and T Teaiwa (Eds) (2005) *New Zealand Identities: Departures and Destinations*, Victoria University Press, Wellington.
- 168 J S Dryzek (1990) 'Discursive Democracy', Columbia University Press
- 169 Bebbington J., Brown J., Frame B., and I. Thompson, (2007), 'Theorising Engagement: The Potential of a Critical Dialogic Approach', *Accounting, Auditing and Accountability Journal*, 20(3), 356-381.
- 170 Hughey, K.F.D., Kerr, G.N. Cullen, R. 2004. Public Perceptions of New Zealand's Environment: 201, 2002, 2004, 2006
- 171 [http://www.landcareresearch.co.nz/research/research\\_details.asp?Research\\_Content\\_ID=179](http://www.landcareresearch.co.nz/research/research_details.asp?Research_Content_ID=179)
- 172 P Raskin, Gilberto Gallopin, Pablo Gutman, Al Hammond and Rob Swart (1998) *Bending the Curve: Toward Global Sustainability*, The Stockholm Environment Institute, Stockholm <http://www.gsg.org/index.html>
- 173 World Business Council for Sustainable Development (2000) *The Wizard of Us*, Sustainable Scenarios Project.
- 174 UNEP (United Nations Environment Programme) 2002: Global Environmental Outlook 2002. Earthscan, London.
- 175 R Costanza (2003). A vision for the future of science: reintegrating the study of humans and the rest of nature, *Futures* 35: 651-671
- 176 R McCoy (1994) *The Best of Deming*, SPC Press, Knoxville, TN, USA.
- 177 C Ryan (1994) The practicalities of eco-design, in M. Harrison (Ed) *Eco-Design in the Telecommunications Industry*, RSA Environmental Workshop, 3-4 March, London.
- 178 Isaac Asimov (1974) Utopian Change lecture at John Hopkins University, 3 March 1974
- 179 Paul Saffo (2007) Six Rules for Effective Forecasting, in Harvard Business Review (republished by Economist Intelligence Unit, 7 Sept 2007 at <http://www.eiu.com> )
- 180 Erik Bohlin (2001) A New Age of Enlightenment? In *Foresight* 3 (2) April 2001
- 181 Erazim Kohak (2000) The Green Halo - Bird's Eye View of Environmental Ethics. Open Court, Chicago.
- 182 Ed Ayres (1999) God's Last Offer - Negotiating for a Sustainable Future. Four Walls Eight Windows, USA.
- 183 Sarah Ruth van Gelder (1999) Symposium: Self and the Cultural Creatives, In *Futures* 31. pp. 822-826.
- 184 Wallace, D. (2007) From future states to images of identity. *Foresight*, 9, pp. 26-36.
- 185 Wolfgang Michalski, Riel Miller and Barrie Stevens et al (1999) The future of the global economy; Towards a long boom? OECD, Paris France.
- 186 Kenichi Ohmae has written several books about globalisation including; *The Next Global Stage: The Challenges and Opportunities in Our Borderless World* (2005); *The Invisible Continent: Four Strategic Imperatives of the New Economy* (2001); *The End of the Nation State: How Regional Economies Will Soon Reshape the World* (1995); and *The Borderless World: Power and Stretgy in the Interlinked Economy* (1990).



## The Future

The future is not a contraption.  
It is the second you just passed  
on the way to the next one.  
The future is looking back at us,  
asking whether we are up to it.  
It is the place you need to walk to  
to hang your bright ideas  
on the blue undisturbed air.

Richard Langston (2006) ©  
Contributed in response to this project.



Last Sunday I took the kids to the beach. It's a wild place, abrupt drops to the water's edge, rocky and undulating with pockets of grass and scrub. In a hollow just out of the wind, we built a 'hut' from driftwood. I stretched out in the sun and the kids charged off. I wanted to doze, but I kept a wary eye on the perimeters of our little encampment. Kids trust us not to let them stray into danger. Similarly, they expect that tomorrow will be much like today and the day before, and that they will be kept safe throughout.

For this publication Airplane has created artwork to remind us of some of the things we hold dear, that which may be valuable and necessary for the happiness of our children's children in that tomorrow, their future.

Design and layout by Airplane Studios  
All photographs copyright © Bruce Foster  
[www.airplane.co.nz](http://www.airplane.co.nz)

Printed by Printlink, Wellington  
Cover Stock 9Lives Uncoated 280gsm  
Text Stock 9Lives Uncoated 120gsm

Bruce Foster  
Director, Airplane Studios



## **Landcare Research** **Manaaki Whenua**

### **OUR VISION**

**Quality of life and economic well-being from healthy land environments  
Te whai huanga me ngā rawa mai te oranga o te whenua**

### **OUR MISSION**

**To future-proof natural, rural and urban ecosystems through world-class science innovation  
Kia noho pai te taiao me ngā taone nunui pakupaku rānei mai ngā hua o ngā mahi pūtaiao puta noa**