VISION AUSTRALIA: A STOCKTAKE OF FUTURE SCENARIO REPORTS FOR AUSTRALIA

Securing Australia's Future Project #SAF01

Final Report: Scenario Review and Causal Layered Analysis of Selected Scenarios

Prepared for The Australian Council of Learned Academies

by the Centre for Australian Foresight

Centre for AUSTRALIAN FORESIGHT

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1 Report Overview

This report represents a stocktake of scenario reports that was commissioned for the *Australia's Comparative Advantage* (ACA) project, one of six projects identified for the *Securing Australia's Future* programme (SAF) . SAF is a three-year research program funded by the Australian Research Council (ARC) and conducted by the four Learned Academies through the Australian Council of Learned Academies (ACOLA) for the Prime Minister's Science, Engineering and Innovation Council (PMSEIC), through the Office of the Chief Scientist. *Securing Australia's Future* delivers research-based evidence and findings to support policy development in areas of importance to Australia's future.

Twenty-eight scenario reports were reviewed using an agreed template (Section 3). The scenario reports are divided into three categories:

Australian scenarios - those reports with a clear focus on Australia as a whole,

Industry scenarios – those reports focused on particular industries and that also had implications for Australia, and

International scenarios – reports developed globally, particularly by Europe where a strong government foresight capacity has developed since the 1990s that also have relevance for Australia's future.

Section 2 provides an overview of scenario planning and its value in strategy development. Section 3 provides details of the assessment template used, with the template itself provided in Table 1 (Page 6). The rationale for exclusion of various elements in the template is provided in Appendix 1.

Sections 4-6 provide the analysis of each individual scenario using the assessment template. Section 7 provides a synthesis of the analysis using the outcome requirements provided by the ACA project team. It is this section that provides what might otherwise be viewed as an Executive Summary.

Section 8 applies Causal Layered Analysis to four selected scenarios to provide a deeper analysis and identify how different approaches to project design can influence outcomes. Section 9 provides some design principles for scenario planning projects that have emerged from the review process. Section 10 details some key scenario planning and Causal Layered Analysis references.

Finally, the assessments of scenario reports made by the team from the Centre for Australian Foresight (CfaF) have been made based on their perspectives and experience as foresight practitioners, their expertise in the design of scenario development and practice for clients, what is regarded as 'good' scenario work, and their interpretation of quality factors that define useful scenarios. Other reviewers may well assess these reports differently.

When dealing with the future, there are no right or wrong answers, just assessments of plausibility and relevance for particular contexts, which are in turn influenced by individual perspectives and beliefs about the future.

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2 An Overview of Scenario Planning

2.1 What is Scenario Planning?

There are a number of ways through which individuals and organisations can explore and plan for their potential future. Perhaps the three most common approaches are trend analysis (identification of patterns of behaviour over time), forecasting (the extrapolation of trends and other current factors to some point in the future), and scenario planning.

Short term future assessments made through forecasting approaches are methods that most typically rely on the use of known data. Extrapolated to a point in the future, forecasting is most useful in steady state or low change areas of consideration. Forecasting breaks down in two ways: first, the future time-frame extends beyond the point at which change in known data is likely; and second, when forecasts are used as predictive statements and 'certainties' for policy making or strategy development. This tends to 'lock-in' a preferred future outcome while succumbing to 'confirmation bias' by ignoring counter signals of change and seeking confirming evidence.

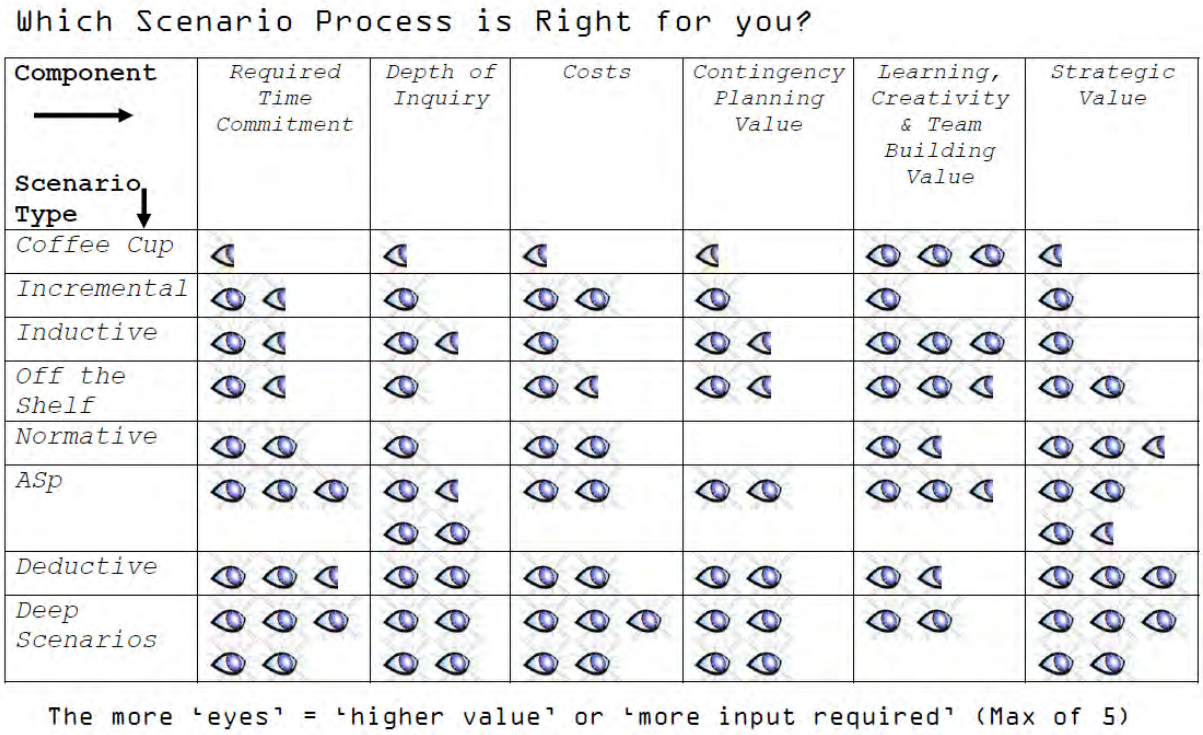
To explore the future in a more open minded way, scenario planning can create a safe conceptual space to for more forward looking analysis that is unrestricted by current ways of thinking or entrenched approaches to industry delivery, product development or service provision. Where trends rely on historical patterns and forecasting considers an extension of those patterns over time, scenario planning takes participants forward and offers them the opportunity to consider a wider array of factors than those typically considered in operational planning or forecasting based strategy development today. Scenarios typically occupy the space between patterns of development we see today that we can expect with reasonable certainty to continue, and the realm of hope where we have no idea how a particular change force will evolve over time.

Bradfield et al. (2005:796) observe, however, that 'there appears to be virtually no area in scenarios on which there is wide-spread consensus; the literature reveals a large number of different and at times conflicting definitions, characteristics, principles and methodological ideas about scenarios'. Other writers comment that the term scenario has become ill-defined, elicits 'all kinds of vague and loosely defined concepts', and is increasingly 'misused and abused' (Bradfield et al. 2005:796). A useful definition is that used by Godet (cited in Chermack 2011:15): 'a scenario is simply a means to represent a future reality in order to shed light on current action in view of possible and desirable futures'.

Adding to the methodological confusion is a wide array of scenario planning techniques, including Visionary Scenarios and Archetype Scenarios which are useful methods for one-off workshops but less useful for major national, industry and international long-range planning and development projects. Bishop et al (2007) found eight categories and 23 variations of scenario techniques. Barber (2009:141) developed a scenario typology that ranks scenarios from the superficial to the 'deep scenarios best suited to larger pan-national assessments' (Figure 1). Bradfield et al (2005) grouped the techniques used for long-range planning into three schools, the Intuitive Logics School, the Probabilistic Modified Trends School, and La Prospective Strategique from The French School, a blend of the former two. This methodological diversity is represented in the scenario reports reviewed here.

2.2 Designing Scenario Planning

Given the methodological diversity referred to in the previous section, the first question to ask before undertaking a scenario exercise should be: 'which version of scenario planning should we undertake given our context, our familiarity with scenario planning and the complexity of our strategic issues?' An inappropriate method can lead to significant waste in resources or even lead to the development of strategic decisions that do not match up to the emerging reality identifiable through a more suitable scenario method. The range of scenario planning methods and strategic value is shown in Figure 1 below.



Note: ASP = Accelerated Scenario Planning

Figure 1: Scenario Types and Strategic Value (© Looking Up, Feeling Good, 2006)
Available at: http://www.lufg.com.au/files/media/which_scenario_process_is_right_for_you.pdf

Scenarios usually start with a focus question relating to a particular strategic issue or decision that addresses three factors:

- how far ahead do we need to look?
- what do we need to understand? and
- how will we uncover what that future might look like?'

From that starting point, a range of known and potential trends and drivers of change that are relevant to the organisation are used to develop a number of alternative future scenarios, followed by an assessment of plausible future outcomes.

Scenario methods aim to overcome confirmation bias and reliance on narrow trends, freeing organisations from the 'organisational blinkers' that narrow understanding of emerging challenges and lead us to ignore signals of change that do not fit our experience. Although the range of scenario methods shows varying degrees of complexity in how they are developed, scenarios need not be complex. They are, essentially, stories about a set of possible futures.

For scenarios to maximise their utility therefore, there are there are five key factors that need to be considered:

Assumptions: have our assumptions of what exists now, been tested – are they valid?

Expectations: based on our assumptions about a potential future, to what extent are our expectations realistic?

Breadth: have we removed our 'blinkers' and sought out views of the world we do not normally consider?

Depth: given what we believe is important, to what extent have we unpacked the importance or otherwise of what we understand? Have we managed to move past the sound-bites to get to the real substance of what we've identified?

Distance: how far ahead are we looking? Have we lifted our eyes beyond the here and now to consider emerging issues? Have we ensured that our future assessment is grounded in reality such that decision making is plausible?

There is an array of methods that can be applied to ensure high quality coverage in each of these five domains. They need not be complex or involve a lengthy process but these five factors must be considered in scenario planning project design to ensure maximum output and value.

Section 9 also provides a number of scenario project design principles that have been highlighted by their presence or absence in the reports reviewed.

2.3 The Value of Scenarios in Strategy Development

As stories about possible futures, scenarios are not predictions of one future that urge us to 'bet the farm' on a single locked in strategic or optimal choice. Instead they implore us to take the opposite approach – to find strategies that are robust, that stand us in good stead regardless of how the future finally comes to be. Scenarios represent a range of potential outcomes for an organisation, from which consideration of strategy today can be informed. As Jeremy Bentham, Head of Shell Scenarios, writes in the Shell Lens Scenarios publication (see Section 6.2), scenarios are "an amalgam of a strategic thinking process, a mode of analysis, a social process of engagement and influence, and at its most powerful, an enabler of individual and group exploration and discovery". They are a tool, not an end product, and the participative process of developing scenarios is often more important for organisations than the end product.

As narratives about potential future spaces, the biggest failing in the use of scenarios is attempting to use the scenario itself as a predictive tool. This can be most often seen in the 'official future' outputs where preference and weighting of the narrative is shaped towards a preferred outcome that is more or less business-as-usual. These are most common in 'traffic light' scenarios – one good future (green), one not so good (amber) and one bad (red) narrative that are designed less as deep explorations in search of a potential and sustainable future, and more as justifications for a future loaded with untested assumptions and bias.

As readers will discover, many of the scenarios identified in this report focused on selected 'drivers' without adequate exploration of other influencing factors, such as emergence of new business models or alternative means of production. Others have relied on too few inputs and generate superficial outcomes because assumptions have been allowed to go untested. Quality scenario outputs are whole system views, not just dot points about drivers of change or preferred future outcomes. They do not dismiss or attempt to explain away outliers of potential disruption.

In the space between the preferred future and the likely future that actually emerges over time lies *the land of dreams and disappointment*, for when the single, preferred future does not come to pass, there can unfortunately be only one outcome for the organisation that has bet the farm on their optimal strategic choices.

Our starting position in assessing the scenarios in this report is one of 'positive intent'. That is, we make the assumption from the outset that any scenario narrative has been generated for the purpose of a deep and rich exploration of potential futures. We then check for process issues that may have led to a less than the hoped for depth and richness of output.

3 Template Framework

The template framework used to assess each scenario report is provided below as Table 1. The framework elements incorporate CfAF's standardised methodology assessment with those applicable from the template guidelines provided by ACA Project Team. The final template is designed to both describe the scenario reports and assess the overall quality of each report. Further details about how the template was designed are provided in Appendix 1.

A summary dashboard was developed and included in the template to provide a quick overview of the quality of each scenario, based on the critical framing components of any quality scenario – **Breadth** of inputs and of influencing factors considered important to the issue being explored, **Depth**, the extent to which consideration of available and perceived information has moved beyond 'headlines' and surface level noise to identify the important factors influencing current and future change and **Distance**, the degree to which the scenario looks beyond the issues of today to consider the issues of tomorrow. Note however that a perceived 'high rating' (scored out of 30) does not immediately indicate a high quality scenario, as a low rating in one of the three domains (Breadth, Depth and Distance) could limit the assessment of any scenario.

These individual summary dashboards have been consolidated into a single dashboard in Table 2 (Page 63).

Table 1: Scenario Review Template and Definitions

Title/Description Report and Scenarios Overviews	
Organisation	Sponsoring organisation
Scenario Target Year	Target year for the years, typically 5 year increments
Geographic Scope	Local, Industry, Region, Australia, Global
Motivation for Study (Context)	Key factors for motivating the analysis
Focus Areas	Broad focus areas for the scenarios
Objectives	Aim of scenarios and/or intended purpose
Target Audience	The audience whom the sponsoring organisation hopes to influence
VSTEEP Category	Values, Social, Technology, Economy, Environment, Politics – identifies dominant themes in the scenarios
Underpinning Drivers	External drivers and trends driving the scenarios
Triggering Factors for Drivers (if identified)	Included if possible to determine from the report
Megatrends/Game Changers and Scenario Impact (if identified)	Included if the report specifies these
Missing Drivers and Potential Impact on Scenarios	Included if possible to determine from the report
Goals/Targets/Reponses/Actions (Policy/Qual/Quant)	Any goals or targets specifically identified Actions and responses to respond to challenges/opportunities identified by scenarios specifically identified
Theme Integration (Social, Economic, Environmental)	Integration of themes and how themes might impact on each other
Plausibility of Assumptions Underpinning Scenarios	Where we are able to identify assumptions being made in the scenario, can we also determine whether those assumptions seem plausible, all things considered or known about them?
Degree of Testing of Assumptions	Within the scenario narrative, have the assumptions made, been tested for viability? To what extent has CDA (Confirming, Disconfirming and Alternative) data/evidence been identified?
Known Factors for Plausibility	Within the scenarios, are key factors identified that enable the scenario narrative and conclusions to be considered plausible?

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Name of Scenario	Breadth of analysis across multiple drivers/themes	Depth of analysis used to build and interpret scenarios	The target year for the scenario – 10 years and beyond as a minimum	Sum of Breadth, Depth and Distance categories

4 Scenarios about Australia's Future

4.1 Negotiating our Future: Living scenarios for Australia to 2050

Report Overview
This is a two volume report, with over 500 pages. The first volume is a set of syntheses of the project outcomes, while Volume 2 is a set of background papers. The study explores the connected challenges of environmental sustainability and social equity that Australia is facing, aiming to both characterise the dual challenges and then to 'move beyond viewing these challenges as a set of disjointed problems with isolated solutions towards a consideration of how the goals of environmental sustainability and social equity together define an overarching challenge: negotiating an uncertain future in the face of differences in values and perceptions that characterise an open society'. A second goal is around the idea of living scenarios – shared, ongoing explorations of how the future might unfold, leading to evolving visions for the future that are plausible, acceptable and workable.

Scenarios Overview
Nine scenarios were developed, with three in each of three categories: Climate Change, Government and Complexification. Chapter 4 in the first volume describes how these scenarios were developed, and provides an excellent overview of scenario development in general. The scenarios were: Business as usual, Muddling through and Clean new world (Climate Change), Postmaterialism, Going for growth and Tax and spend (Governance), and Failing to cope, Struggling to cope and Modest gains (Complexification).

Organisation	Australian Academy of Science
Scenario Target Year	2050
Geographic Scope	Australia
Motivation for Study	Seeks to identify approaches to social equity using sustainable development initiatives.
Focus Areas	Environment, Sustainability, Social Equity
Objectives	• Assess a multitude of possible pathways over coming decades, and especially their implications for environmental sustainability and social equity • Find ways to negotiate a pathway, where negotiation implies both steering a path through uncertainties and obstacles, and also agreeing on a shared course in the face of differences in values and perceptions that are a hallmark of an open and pluralistic society.
Target Audience	Broad – policy makers are the likely main target.
VSTEEP Category	vSTeEp
Underpinning Drivers	• World trade • Climate change • Energy and resource depletion • Population issues • Some Australian centric drivers included, as are some critical uncertainties

Triggering Factors for Drivers (if identified)	None identified
Megatrends/Game Changers and Scenario Impact (if identified)	None identified
Counter Trends	No explicit discussion about political decision making other than a mention of it as a critical uncertainty across all scenarios, although explicit in the 'Governance' scenarios.
Missing Drivers and Potential Impact on Scenarios	None identified
Goals/Targets/Reponses/Actions (Policy/Qual/Quant)	Policy development based on leveraging sustainable development approaches. A challenge is the inconsistent development approach used which makes selection of Actions context specific, yet not necessarily grounded to a 'robust' strategy selection. Appears to rely on 'Optimal' (specific to purpose) approaches.
Theme Integration (Social, Economic, Environmental)	Clear and close integration between social and environmental themes.
Value Positions taken	Reliance on 'small' v Values assessment appears to miss value systems construct.
Plausibility of Assumptions Underpinning Scenarios	Mostly a good solid collection of assumptions which have been expressly stated. Reliance on 'small' v Values assessment appears to miss value systems construct. Assumes feedback = willingness (or ability) to change. A challenge in the '3 options' approach is the automatic tendency to do one that is 'a bit better', 'a bit worse' and 'much the same'. More questioning of final outcomes would need to occur for this to be verified. An overarching theme from this scenario is the ability of 'science' to communicate effectively with the public. It reads as a 'fait accompli' when it could be argued strongly that such a capability is missing in science's track record of engaging with the public.
Degree of Testing of Assumptions	Yes, states that assumptions were contested by those involved in scenario build - indicates that the 'Living Scenarios' are narrow in focus.
Known Factors for Plausibility	The issues and factors used in the development of the scenarios are high in plausibility.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Negotiating Our Future (Australian Academy of Science)	8	7	8	23

4.2 Scenarios for Australia to 2025

Report Overview
The National Workforce Development Strategy by the Australian Workforce and Productivity Agency (AWPA) is a comprehensive attempt to use scenario planning to inform workforce strategy for Australia. Skills development, labour productivity and labour force participation were considered as the core preconditions for a strong future for Australia as it transitions to a knowledge economy. The report evaluates alternative strategy options emerging from the range of scenarios developed for achieving workforce goals by 2025.

Scenarios Overview
Four scenarios were developed, each representing a plausible path for Australia's future development: Long Boom, Smart Recovery, Terms of Trade Shock and Ring of Fire. The empirical analysis in the report is based on modelling and testing of the four scenarios to develop projections of labour demand and supply conditions across different industrial sectors, including various levels of skills under each scenario. Although the four narratives offer different views of Australia, they do not read as being connected to each other, nor do they read as being diametric opposites. As such, it is difficult to assess whether the development of the four scenarios used the 2x2 matrix method which assessed nominated drivers across all scenario domains, or whether each narrative was developed 'clean' of the others.

Organisation	Australian Workforce and Productivity Agency
Scenario Target Year	2025
Geographic Scope	Australia
Motivation for Study (Context)	Help deal with uncertainties involved in assessing future demand for skills
Focus Areas	Workforce, Employment
Objectives	• Input into 2012 National Workforce Strategy
Target Audience	Australian business
VSTEEP Category	VSTEep
Underpinning Drivers	• Social, demographic and cultural trends • Economic and financial trends • Labour force and workplace trends • Science, technology and innovation • Sustainability (water, population and energy) Dominant drivers in the narratives appear to be resources, weather events and level of Australian dollar, with some mention of technology development. It is not clear how the nominated drivers were arrived at.
Triggering Factors for Drivers (if identified)	Work skills shortages, technology developments
Megatrends/Game Changers and Scenario Impact (if identified)	Technology is a high driver though not at the 'Game Changer' level

Missing Drivers and Potential Impact on Scenarios	None identified
Goals/Targets/Responses/Actions (Policy/Qual/Quant)	• Workplace laws • Competitive strategy
Theme Integration (Social, Economic, Environmental)	The economic theme is dominant because of the focus on the future of work.
Plausibility of Assumptions Underpinning Scenarios	Each of these four scenarios contains a significant number of assumptions that would need to be accepted as viable in order for each narrative to be considered plausible. The use of the STEEP methodology though sound, will miss completely the contextual influences only identified through the Values Lens. A reliance on six experts for inputs to each nominated key driver can accelerate the process while also increasing risk of a narrow view of issues.
Degree of Testing of Assumptions	None of the scenarios appear to test assumptions fully. One such assumption was the fiscal benefit derived from an increase in skills (qualifications) of adults. To be plausible there would need to be an increase in the types of jobs available to USE those skills.
Known Factors for Plausibility	Each scenario draws on existing factors with a potential to influence our future – ageing population, rising Asia, globalisation and skilled workforce.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Scenarios for Australia to 2025	6	5	7	18

4.3 Our Future World: Global megatrends that will change the way we live

Report Overview
The report details six interconnected megatrends shaping Australia's future. The report is included because the drivers underpinning these megatrends also underpin the other scenario reports analysed here. Megatrends are defined as "a major shift in environmental, social and economic conditions that will substantially change the way people live.

Megatrends Overview
Each megatrend is summarised and then covered in more detail. Each section includes data describing the nature of the megatrend and questions about potential implications for Australia. The megatrends are: More from less (living in a resource depleted world), Going, going, gone? (biodiversity), The silk highway (the West to East economic shift), Forever young (ageing population), Virtually here (increased connectivity), and Great expectations (demand for experiences over products).

Organisation	CSIRO
Scenario Target Year	2032
Geographic Scope	Global
Motivation for Study (Context)	Initially (2009) to 'inform internal and long range investment planning choices'. After release in 2009, the focus shifted to meeting external demand for 'evidence based strategy and foresight consulting'. The report was updated in 2012.
Focus Areas	Resource scarcity and doing more with less, biodiversity, the silk highway, population pressures, increased connectivity, changing societal expectations
Objectives	• Provide information on global megatrends to meet demand from industry
Target Audience	Business, industry
VSTEEP Category	vSTEEP
Underpinning Drivers	• Climate change • Population growth • Economic growth in developed and developing countries • The role of older generations in society and industry • Digital connectivity and associated trends including collaborative consumption, micro-transactions, disrupted business models, virtual crime, cybersecurity • Working from anywhere While covering a wide range of drivers in their analysis, a review of the references used suggest a focus on conventional sources, with few explicit futures/foresight reports used. This is probably not surprising since there is no formal foresight expertise on their team. This risks producing projections that are 'business as usual' rather than challenging current ways of thinking.
Triggering Factors for Drivers (if identified)	None identified

Megatrends/Game Changers and Scenario Impact (if identified)	While plausible, the megatrends are not of themselves Game Changers, as most have been developing for significant periods of time and are what can be called 'pre-determined factors'. An exploration of 'what might negate these megatrends?' may identify potential Game Changing events.
Missing Drivers and Potential Impact on Scenarios	There is good coverage of drivers of change visible today.
Goals/Targets/Responses/Action (Policy/Qual/Quant)	None. The megatrends are presented for use in the development of scenarios by other organisations. Several questions are asked throughout around implications for Australia for use in generating policy responses.
Theme Integration (Social, Economic, Environmental)	All six megatrends are presented as an integrated whole, using a Venn diagram, a user friendly representation. Integration of Social, Economic and Environmental themes is strong.
Plausibility of Assumptions Underpinning Scenarios	The background provided in the publication suggests that the megatrends were developed in response to today's demands by organisations for information about the future, rather than a specific scenarios project.
Degree of Testing of Assumptions	None apparent in this publication.
Known Factors for Plausibility	All drivers and trends identified are present today and the projections produced by the CSIRO team are therefore plausible at the present moment. Whether the degree of plausibility remains at the same level as the world continues to change remains to be seen.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Our Future World: Global megatrends that will change the way we live	7	3	5	15

4.4 Future Australian Climate Scenarios

Report Overview
This chapter is in a larger piece of work using quantitative modelling to produce future Australian climate scenarios produced by CSIRO.

Scenarios Overview
The chapter focuses on projections rather than scenarios, stating that the projections are based on combining results from the best available of the global climate models. Three main projections are provided around temperature, drying and rainfall.

Organisation	CSIRO
Scenario Target Year	2030
Geographic Scope	Broad range but focused on impacts to Australia
Motivation for Study	Assess the influence of climate change on a range of areas in society
Focus Areas	'How human activities affect our climate…'
Objectives	• Assess possible impacts of climate change on society, economy and environment by examining implications of a changing climate on agricultural production, water availability, health-care issues, bushfire danger and vulnerability to storms or flood damage
Target Audience	Not specified
VSTEEP Category	vSTeEp
Underpinning Drivers	• Greenhouse gas emissions • Rainfall • Temperature • Regional climate changes in Australia • Extreme events • Abrupt changes
Triggering Factors for Drivers (if identified)	None identified
Megatrends/Game Changers and Scenario Impact (if identified)	None identified
Missing Drivers and Potential Impact on Scenarios	While not missing from the analysis, the point is made that there are two uncertainties that qualify the outcomes of the projections in this report: first, the level of humanity's future greenhouse gas emissions, and second, the precise response of Earth's climate system to those emissions. This indicates the importance of using qualitative scenarios in conjunction with more quantitative scenario approaches that allow uncertainty to be explored by stakeholders and policy makers.
Goals/Targets/Responses/Actions (Policy/Qual/Quant)	Broad range both policy and social settings. Provide information to enable drawing up of action plans at national, state, regional and global levels to adapt to most likely changes.

Theme Integration (Social, Economic, Environmental)	The environmental theme is dominant, although integration with social/economic themes is mentioned.
Plausibility of Assumptions Underpinning Scenarios	All assumptions are drawn from scientific data. Perhaps one area of testing comes in their recommendations for actions as it is not stated what barriers to action might prevent these steps being taken. There is also a question over the benefits of agriculture and forestry as key players in mitigation as the scenarios themselves do not appear to give rise to such a perspective.
Degree of Testing of Assumptions	Assumptions are tested to the extent that data is derived from ongoing and widespread scientific assessment.
Known Factors for Plausibility	Extensive use of scientific data and computer modelling based on plausible data today. The models will need to be regularly updated as change continues to occur to remain of value to stakeholders and policy makers.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Future Australian Climate Scenarios	9	9	7	25

4.5 Future Focus

Report Overview
This report is written by two people aiming to "consider the outlook for the Australian nation and people over the next 10 years". Two pathways into the future are provided: one "where there is a global, growing and engaged Australia, confident of who we are and our place within the rest of the world", and two "an Australia that is more measured, a place where we are more intent on fixing problems here rather than going out and conquering the world". While the report is published under the KPMG banner, it is not clear why the report was prepared, apart from an indication that the two authors were interested in the topic.

Scenarios Overview
Two scenarios are provided. The first scenario is Measured Australia in 2020 and the second is Global Australia in 2020, reflecting the two pathways into the future. The report also includes responses from consumers who were consulted after the scenario reports were written. There is no link between the scenarios and potential action today, and providing twos scenarios only risks readers choosing their favourite or the one they view as most likely. This defeats the value of scenarios in moving the thinking of participants beyond what they view as plausible today to considering alternative and new ways of viewing an issue.

Organisation	KPMG
Scenario Target Year	2020
Geographic Scope	Australia
Motivation for Study	Answering the question: 'what will our customers and workforce look like in 10 years?'
Focus Areas	A wide range of social, environmental, political and work areas are covered in the scenarios, since the scope of the report is ambitiously "the outlook for the Australian nation".
Objectives	• Map the different pathways to Australia's future
Target Audience	All Australians
VSTEEP Category	vStEEP
Underpinning Drivers	• Demographics • Technological and social change • Shifts in wealth and geopolitical allegiances • Values and ideas Because one of the authors is an eminent demographer, it appears that the demography driver is used as a major change force throughout.
Triggering Factors for Drivers (if identified)	Not identified
Megatrends/Game Changers and Scenario Impact (if identified)	Not identified

Missing Drivers and Potential Impact on Scenarios	There were many drivers considered but it appears all input came from two people and their staff. It also appears that those people did not in any overt way challenge their assumptions. The result is two scenarios that reflect the views and unquestioned beliefs of the two authors, which makes the scenarios of lesser value. The binary nature of the scenario output is also risky, since readers will tend to pick their 'favourite' at the expense of considering the changes explored in the other scenario.
Goals/Targets/Responses/Actions (Policy/Qual/Quant)	The scenarios, according to the report, are 'designed to expose alternative trajectories for the nation' by being 'read out to consumer groups and business leaders in order to elicit unprompted response'. Reading scenarios out to people is a novel approach to consultation which is not recommended, since it turns consumers into passive receivers of the scenario output. The conclusion outlines a number of general responses: government action to deal with infrastructure, addressing reliance on fossil fuels, improved communication between consumers, business and government about China, and 'more structured consideration of the future that engages all Australians and that addresses some of the discord that exists between business and the community on issues such as population growth, resources and foreign investment'
Theme Integration (Social, Economic, Environmental)	The main focus appears to be social themes, along with climate change and the role of government.
Plausibility of Assumptions Underpinning Scenarios	This is difficult to judge because no assumptions were discussed or detailed in the report.
Degree of Testing of Assumptions	No obvious testing of assumptions was done.
Known Factors for Plausibility	All the issues raised are plausible for a business as usual future. The factors are projected out from today rather than considered in an evolutionary framework – there appears to be no real challenging of the status quo.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Future Focus	7	2	4	16

4.6 Change is Inevitable Progress is Not: Aspire Australia 2025

Report Overview

The report from the Business Council of Australia represents the output from a comprehensive scenario planning project about Australia's future. A wide range of experts and other participants were involved in the development of the scenarios and the report makes a point of saying that the scenarios emerged from the thinking of these participants. As well as the scenarios, three modules are also provided. These modules focus on how macro-changes, challenges and opportunities identified in each scenario will have an impact on Australia. This project involved Shell UK, a company with a long history in scenario planning and that expertise is reflected in the quality of this report.

Scenarios Overview

Three scenarios were developed: Riding the Wave (consequences of breakdown in trust between people and institutions), Stormy Seas (focusing on Australia's international relationships) and Changing the Crew (examining the social dimension of change in Australia and value tensions between generations). The scenarios were produced to allow further exploration of key inter-relationships, decisions and opportunities for Australia that provide a tool for resting policy and strategy. A useful one page guide to using the scenarios is also provided.

Organisation	Business Council of Australia
Scenario Target Year	2025
Geographic Scope	Australia
Motivation for Study (Context)	To 'enable Australia to prepare for the future' and to address 'the challenges of change and uncertainty [that] continue to confront us…in ways that are far different from those we have experienced in the past'.
Focus Areas	Australia's ability to build security, prosperity and social harmony – the focus question was 'what relationships will shape Australia's capacity to build security, prosperity and social harmony?'
Objectives	• To 'help Australia prepare better for the future and achieve greater success in building security, prosperity and social harmony'. • To 'encourage heightened awareness of Australia's position and future direction. • To 'foster a robust ongoing debate on the things which will affect this future direction.
Target Audience	The process aimed to 'engaged with as wide an audience as possible', including business, social and education leaders, and the outcomes are to be 'widely disseminated among government, business and the community'. Their aim was to contribute to "the full spectrum of public policy debate".
VSTEEP Category	vStEeP
Underpinning Drivers and/or Themes	• Social cohesion and shared values • Regional stability • Speed and direction of economic growth • Government structures, processes and relationships • Scientific and technological innovation (world class critical mass) • Local environmental issues

	• Australian trends also identified: continuing growth of Sydney, more older people in the population, US continues to dominate world politics to 2025, and technology will only partly address Australia's tyranny of distance from major trading partners These trends were collapsed into six themes: economic growth and social change, values and cultural norms, global competitiveness, Australia's place in the global and regional order, sustainable development and governance and the political system. Three key challenges for Australia were identified: capacity, ability to adapt, and social cohesion.
Triggering Factors for Drivers (if identified)	• Shift away from income as sole measure of success • Ineffectiveness of government spending sparks community driven debates about political reform • Decline in regional stability and increasing fear of terrorism • Diversity of Australian population increases
Megatrends/Game Changers and Scenario Impact (if identified)	None identified
Missing Drivers and Potential Impact on Scenarios	There is little meaningful discussion of the impact of environmental change on Australia in the scenario narratives. It is mentioned but does not appear to be a significant driver for change. However, one of the accompanying modules deals with the environment, and assesses the impact of environmental challenges in each scenario.
Goals/Targets (Policy/Qual/Quant)	The report states that the scenarios will facilitate further discussion about 'key inter-relationships, tough decisions and exciting opportunities' and provide a 'tool for testing policy and strategy'. For each scenario, a set of challenges is identified to inform these discussions.
Possible Responses/Actions Identified	Need to promote trust between people and institutions and ensure effective government
Theme Integration (Social, Economic, Environmental)	Social themes in their broadest sense dominate the scenarios, although economic and environmental themes are present in all scenarios.
Plausibility of Assumptions Underpinning Scenarios	Assumptions were not identified explicitly.
Degree of Testing of Assumptions	Little testing of assumptions has been reported. There was for example, an assumption that economic growth would continue, but no assessment of the new economy or new forms of capitalism emerging that may slow down economic growth as a major driver for national prosperity in the future.
Known Factors for Plausibility	All factors identified in the scenarios are plausible, as they build on current trends seen today.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Change is Inevitable Progress is Not: Aspire Australia 2025	8	6	7	21

4.7 A Clean Energy Future for Australia

Report Overview
This report by the Clean Energy Future Group (a collective of Australian energy associations) explores the potential for deep cuts is emissions of greenhouse gas and carbon dioxide in Australia. It is very focused around energy use reduction and after developing a single scenario for Australia in 2040, uses a combination of forecasting and backcasting to develop possible responses to be considered today. It is a detailed and data rich report and includes a set of policy options and strategies.

Scenarios Overview
Four scenarios are produced: a baseline scenario and Scenarios 2, 3 and 4. The scenarios are quantitative and deal with varying assumptions about energy demand and usage across the energy types as it is understood today. Three additional scenarios – 5, 6 and 7 – are produced within an 'innovative scenarios' framework and have a focus on alternative energy types that produce "several alternative pathways to 80% (or more) reductions in carbon dioxide emissions.

Organisation	Clean Energy Future Group
Scenario Target Year	2040
Geographic Scope	Australia
Motivation for Study (Context)	Explores the potential for a clean energy approach to both current and future demands, based on the need to cut greenhouse and carbon dioxide emissions today.
Focus Areas	Clean Energy across a range of energy types, both conventional and alternative.
Objectives	• Explores the potential for a clean energy approach to both current and future demands
Target Audience	Government policy makers
VSTEEP Category	VSTEEP
Underpinning Drivers	• Existing energy technologies • Demand factors • Climate change • Social impacts • Economic activity
Triggering Factors for Drivers (if identified)	None identified
Megatrends/Game Changers and Scenario Impact (if identified)	None identified
Missing Drivers and Potential Impact on Scenarios	Not relevant as this study is very focused on the evolution of clean energy through to 2040.

Goals/Targets (Policy/Qual/Quant)	A detailed set of principles, goals and targets are provided in the final section to the report, as are options for government and specific industries, with areas covered including: shaping the market for energy services in order to remove barriers to efficient energy use, renewable energy and natural gas, taxes and user charges, regulations and standards, organisational structures and processes, education, information, training, and targeted funding for infrastructure, Research, Development and Demonstration, retooling of manufacturing industry and alleviating energy poverty among low-income earner.
Theme Integration (Social, Economic, Environmental)	The environmental theme dominates as expected.
Plausibility of Assumptions Underpinning Scenarios	All assumptions based on both empirical scientific data and scientific forecasts available as of 2004. An area of additional development may be the identification of likely barriers or impediments on a social/political scale.
Degree of Testing of Assumptions	All assumptions are tested as part of assessment though this does at times read like an in-depth forecast process. A subset were flagged towards the end when some of the assumptions underpinning the scenarios were 'wind-tunnelled'. The end result was a better than expected energy outcome only when steps beyond efficiencies were included. Some more testing might be a worthwhile use of time and to an extent, the assumptions were 'pre-tested' given the extensive scientific data supporting them.
Known Factors for Plausibility	All indicated were plausible at time of writing.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
A Clean Energy Future for Australia	9	9	9	27

4.8 Australia 2020: Foresight for our Future

Report Overview
This is not a set of scenarios, but rather a position paper on why the Australian government should adopt foresight to inform its policy making. It has been included because it is a clear exposition of the need for the Australian government to adopt foresight as a policy tool across government. The primary value position taken is that adopting a foresight approach to inform policy making will increasing the efficiency and effectiveness of that policy making and the ability to the Australian Government to respond to change in a timely manner.

While the paper is over 10 years old, the arguments for establishing a government foresight program remain valid today. The assessment here is related to the positioning taken by the author in 2001 and his analysis of the value of foresight for government.

Scenarios Overview
Not relevant.

Organisation	Parliamentary Library
Scenario Target Year	None applicable
Geographic Scope	Australia
Motivation for Study	'Assess the kind of Australia that we want for the long term'
Focus Areas	General focus on the future of Australia, with a particular emphasis on policy making approaches.
Objectives	• Increasing awareness of, and commitment to, the use of foresight and scenario planning as tools to help reassess Australia's progress and direction
Target Audience	Australian government
VSTEEP Category	vsteeP
Underpinning Drivers	• Globalisation • Global connectivity • Knowledge systems • National innovation trends • Population issues • Sustainable development
Triggering Factors for Drivers (if identified)	Not applicable
Megatrends/Game Changers and Scenario Impact (if identified)	Not applicable

Missing Drivers and Potential Impact on Scenarios	Not applicable
Goals/Targets (Policy/Qual/Quant)	Establish a Foresight program within government, specifically technology foresight
Possible Responses/Actions Identified	Establishment of a foresight program for the government
Theme Integration (Social, Economic, Environmental)	Not applicable
Plausibility of Assumptions Underpinning Scenarios	Not applicable.
Degree of Testing of Assumptions	The paper aims to test current assumptions about the future of Australia that underpin government policy making.
Known Factors for Plausibility	The paper makes the point that many overseas governments now use foresight as a policy input. This is particular true in the UK and Europe.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Australia 2020: Foresight for our Future	7	5	7	19

4.9 Alternative Futures: Scenarios for Business in Australia to the Year 2015

Report Overview

This is the preceding scenario report developed by the Business Council of Australia to the more recent set reviewed in Section 4.6. Produced in 2000, it's one of the earliest set of scenarios about Australia's future. This set of scenarios focus primarily on business while the second set focused more on the future of Australia. The drivers of change used in this scenario exercise are still relevant today. The process used included a literature review on drivers of change and critical uncertainties for Australia's future, desk research, interviews with experts, analysis and commentary from business, social and educational experts, three scenario workshops and a series of interviews and focus groups around Australia to validate the emerging scenarios. This is one of the few reports reviewed that provided an outline of what to do with scenarios by providing three questions to consider that are still valid today: how robust or at risk is Australia given these scenarios?, what are the critical responses Australia needs to make?, and what do you and your sector/business/organisation/community need to do?

Scenarios Overview

Four scenarios were developed. First Global Nation (a successful Australia adapting with flair and flexibility to globalisation and an online economy), Sound the Retreat! (a world in which geopolitical instability and cultural/social backlash override the benefits of globalisation), Brave Old World (an Australia where we are comfortable with our lifestyles and economic and social systems, with a laconic approach to the future hide the need to respond the future urgently) and Green is Gold (where global agreements on environmental management imperatives play out in Australia for business and the community).

Organisation	Business Council of Australia
Scenario Target Year	2015
Geographic Scope	Australia
Motivation for Study (Context)	Make sense of how the future could pan out for businesses, and to assist all those involved to anticipate and adapt to change, whether it is an unpredictable external shock or an as yet unimagined new opportunity.
Focus Areas	Future of business in Australia
Objectives	• Assess the future operating environment in Australia in light of business competitiveness and profitability • Identify robust strategies that maximise ability to generate wealth and jobs, integrate into global markets and contribute to a rising standard of living for Australia as a whole
Target Audience	'Widest possible audiences throughout Australia', including business and government
VSTEEP Category	vstEEP
Underpinning Drivers	• Australia as a taker rather than a shaper • Globalisation and economic reform • Environment and sustainability • Technology and the interconnected world • Knowledge economy and innovation • Australian economic and social policies

Triggering Factors for Drivers (if identified)	None identified
Megatrends/Game Changers and Scenario Impact (if identified)	None identified
Missing Drivers and Potential Impact on Scenarios	Almost entirely missing from the list of people involved are any social enterprise or material aid agencies, which may have provided alternative perspectives.
Potential Wildcards	While not wildcards per se, the scenarios include a list of factors that could derail each scenario.
Goals/Targets (Policy/Qual/Quant)	Five broad strategy areas derived from the scenarios are provided, all of which are still relevant today: • Market creation and access • Creating business opportunities • Technology upgrading and continuous innovation • Human investment • Community Consciousness
Scope for Future Quant Analysis	There is little data provided in this report, but may have been available in supporting reports.
Possible Responses/Actions Identified	The report does not detail specific responses/actions, but does provide a step by step process for developing strategies and related indicators (and identifies a range of indicators for each scenario).
Theme Integration (Social, Economic, Environmental)	Social and Economic primarily
Plausibility of Assumptions Underpinning Scenarios	Assumptions are stated and are plausible, though reading this in hindsight we must forgive participants for over-estimations in some areas and under-estimations in others.
Degree of Testing of Assumptions	For the scenario narratives to be plausible, all assumptions are assumed to be valid and are therefore not tested. This is an issue with process of using stand-alone scenarios as each story is self-contained and cannot be validly compared to any of the others for a direct 'counter view'.
Known Factors for Plausibility	All factors included were likely considered plausible at the time. We note (as mentioned) the lack of alternative perspective due to a shaping of participants' backgrounds

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Alternative Futures: Scenarios for Business in Australia to the Year 2015	6	7	7	20

4.10 After Now: What do you think the future holds? (In progress)

Report Overview
This is a work in progress, and appears to be very focused on social cohesion. It is designed to provide a participative process about describing the policies needed to promote inclusive growth. It is included here as an indicator of the types of scenario work currently in progress that will involve wide participation of people from the beginning of the process, using technology to facilitate this participation. This approach is in contrast to other more quantitatively focused scenario approaches.

Scenarios Overview
Not applicable at this stage.

Organisation	Brotherhood of St Laurence
Scenario Target Year	Next 10 to 15 years
Geographic Scope	Australia
Motivation for Study	Informs the Brotherhood's work on inclusive growth policy
Focus Areas	Social inclusion
Objectives	• 'Stimulate a robust public debate about policy direction, after now, if our future is to be one of growth and inclusion'
Target Audience	Not specifically specified, but it is implied that they want the audience to be as wide as possible.
VSTEEP Category	vSteep
Underpinning Drivers/Themes	• Growing levels of consumerism and querying of extent to which current lifestyles are sustainable into the future • Erosion of social cohesion, solidarity and decline in neighbourhood affiliations • Need for visionary leadership • Continued threat of climate change and our incapacity to act • Increasing inequalities of wealth and income
Triggering Factors for Drivers (if identified)	Not applicable
Megatrends/Game Changers and Scenario Impact (if identified)	Not applicable
Missing Drivers and Potential Impact on Scenarios	Not applicable
Goals/Targets (Policy/Qual/Quant)	Not applicable
Possible Responses/Actions Identified	Not applicable

Theme Integration (Social, Economic, Environmental)	At this time, it appears the scenarios will integrate mainly social and environmental themes.
Plausibility of Assumptions Underpinning Scenarios	Not applicable at this stage
Degree of Testing of Assumptions	Not applicable at this stage
Known Factors for Plausibility	The drivers identified to date are present today and so are very plausible as factors to use to inform scenario development. Stretching thinking about the evolution of these drivers over time will be important.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
After Now: What do you think the future holds?	5	7	8	20

4.11 Moving Australia

Report Overview
This report was produced by a taskforce consisting of a number of organisations to provide a detailed transport plan for a productive and active Australia. This is not a set of scenarios and has been included as it provides a comprehensive plan for the future of Australia transport beyond the transport industry. The report is very detailed and provides a roadmap for governments to design transport infrastructure that integrates (i) movement of people and goods, and (ii) "our spatial planning system with effective transport systems". The report identifies a range of goals for Australia's sustainability, prosperity, liveability, prosperity and health.

Scenarios Overview
This report does not use narrative scenarios, but rather uses a series of quantitative projections across a number of areas: infrastructure and congestion, funding, freight. Three additional sections appear to summarise the implications of the projections in three areas: a sustainable nation, a liveable nation and a healthy and active Australia.

Organisation	Moving People 2030 Taskforce consisting of a number of health and transport organisations involved in Australia's transport system.
Scenario Target Year	2030
Geographic Scope	Australia
Motivation for Study (Context)	'To see non-partisan leadership to deliver policies and programs that ensure Australia remains the best country in the world to live'
Focus Areas	Transport infrastructure, integration of spatial planning systems with effective transport networks. However social implications of these factors seems to be a primary focus with "the long-term wellbeing and quality of life of every Australian" a stated consideration.
Objectives	• The report states a vision that 'by 2030, Australia's transport system should be a key foundation on which a prosperous, sustainable, liveable and healthy Australia is built'. • Ultimately, the report focuses on the role of the transport system in creating a healthy society.
Target Audience	The report is intended for federal, state and territory government policy makers and non-government organisations.
VSTEEP Category	vStEEp
Underpinning Drivers	• Population growth, mobility and changes • Climate change and energy security • Traffic congestion, changing travel needs and patterns, integrating transport and land use planning • Public health • Evolution of economy
Triggering Factors for Drivers (if identified)	There is detailed discussion about each of the drivers across sections in the report and discussion of the potential impacts for the future of Australia of not taking action today.
Megatrends/Game Changers and Scenario Impact (if identified)	None identified

Missing Drivers and Potential Impact on Scenarios	Technology is assumed to be a solution across all areas to a varying degree, but is not identified as a driver of change.
Goals/Targets (Policy/Qual/Quant)	A summary of the 2030 vision, principles and goals are set out on pages 1-3 of the report. There are four major goals: • Sustainability – to improve and sustain our natural environment, and maximise the efficiency of our built environment • Prosperity – to deliver efficiency, growth and maintain our high standards of living • Liveability – to improve the quality of life in our communities • Health – to improve the health of our cities, regions and population There are four major targets: • 30% of passenger trips in 2030 by public transport, walking and bicycling • Carbon emissions 50% below 2000 levels • Fuel consumption 30% less than current levels • Range of mobility and transport modes convenient/accessible for all Australians Detailed recommendations are provided on pages 6-9 of the report.
Possible Responses/Actions Identified	Continued and increased investment in mass, social and active transport.
Theme Integration (Social, Economic, Environmental)	Social is the strongest theme, with environmental issues also reportedly high on their agenda. The economic theme underpins much of the discussion, since the report seeks to improve efficiencies generally.
Plausibility of Assumptions Underpinning Scenarios	There is no discussion of the process used to create the report, so it is not clear what, if any, assumptions underpinned thinking. In the absence of those details, the only comment that can be made is based on an assumption that no futures thinking/no overt exploration of the future occurred, and that the recommendations are therefore projections of today's issues which have not been tested in possible futures. This is one of the biggest flaws associated with policy development that does not take the future into account, as the degree of resilience of recommendations in the face of future uncertainty and complexity is likely to be very low.
Degree of Testing of Assumptions	Not applicable
Known Factors for Plausibility	Since all the issues discussed are based on today's knowledge, they are plausible to that extent. Future plausibility has not been tested.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Moving Australia: A transport plan for a productive an active Australia	4	8	2	14

4.12 Australia 2025: A Framework for Analysing Australia's Possible Future Workplaces and Workforce Development Requirements

Report Overview
Skills Australia was the predecessor to the Australian Workforce and Productivity Agency (AWPA) that has a newer set of scenarios included in this report (Section 4.2). These scenarios were developed in 2009 as part of the process to develop a National Workforce Development Strategy. New scenarios were not developed; rather Shell's then current *Global Scenarios to 2025* provided the broad context for considering what sort of Australia would exist in 2025 under each scenario. This was followed by a discussion of implications for Australia's National Workforce Development Strategy which were then later validated by stakeholders. This is a useful approach to scenario planning where resources are limited and a full, participative scenario planning project cannot be undertaken.

Scenarios Overview
The three Shell scenarios are: Low Trust Globalization (global markets and coercive states), Open Doors (global markets and cohesive civil societies), and Flags (a world of dogmatic, zero-sum assertion of social values and coercive attempts by states to rally divided societies around the flag). Each Shell scenario is presented, followed by detail of implications for Australia's workforce strategy. A useful comparison table of major issues across the three scenarios is provided (page 35) as is a summary of potential action steps/responses that would be robust across all scenarios.

Organisation	Skills Australia
Scenario Target Year	2025
Geographic Scope	Australia
Motivation for Study (Context)	To realise Australia's growth potential through a highly skilled and adaptable workforce where skills are used effectively to meet the increasingly complex needs of industry, and individuals are able to fulfil their potential.
Focus Areas	Workplace requirements including required workforce skills
Objectives	• To gain an insight into possible futures, with modelling to underpin planning for what is likely to occur, and what is more uncertain.
Target Audience	Policy makers, Business leaders, Australian government
VSTEEP Category	vStEEP
Underpinning Drivers	The Shell scenarios used three main drivers of change: • market incentives, • equity and social cohesion, and • state coercion and regulation. Drivers identified during the development of Australia in 2025 in response to the scenarios included: • Technology, • social forces including increase in activism, • natural disasters, and • demographics.

Triggering Factors for Drivers (if identified)	Not identified
Megatrends/Game Changers and Scenario Impact (if identified)	Not relevant
Missing Drivers and Potential Impact on Scenarios	None identified
Goals/Targets/Responses/Actions (Policy/Qual/Quant)	The report highlights that many existing government strategies reflected "the best features of each of the three future scenarios". Responses to each scenario include a number of 'we will need' statements that indicate potential policy responses. These cover a range of areas including demographics, social equity, knowledge and skills technology and the role of government.
Theme Integration (Social, Economic, Environmental)	The economic theme is dominant, although social issues appear throughout discussion of Australia in each scenario context.
Plausibility of Assumptions Underpinning Scenarios	Given that the scenarios used were produced by Shell, which has a long and distinguished history in the use of scenario planning, the degree of plausibility of assumptions is likely to be high.
Degree of Testing of Assumptions	Shell's approach is designed to challenge assumptions and mental mentals, so it is highly likely that all assumptions were well tested during development.
Known Factors for Plausibility	All factors considered are considered plausible.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Australia 2025: A Framework for Analysing Australia's Possible Future Workplaces and Workforce Development Requirements	8	9	8	27

5 Industry Based Scenarios

5.1 Possible Futures: Scenario Modelling of Australian Alternative Transport Fuels to 2050

Report Overview

CSIRO have been generating a series of futures based assessments for a significant period of time. CSIRO's scenario methodologies vary from a forecasting approach often aligned to existing industry needs, through to some more qualitative approaches that would be considered more open ended. It is known that CSIRO have struggled at times to develop both a consistently robust model and to explain their scenarios to a broader audience. Steps to overcome those limitations are believed to be well underway.

Scenarios Overview

Five scenarios were developed based on quantitative projections for fuel prices, transport fuel mix, road sector engine mix and greenhouse gas emissions outlook. While the scenario drivers include social factors, this appears to be confined to social attitudes in relation to vehicle drive range and paying for lower emission vehicles. CSIRO's approach here has been highly quantitative and this develops a fairly rigid view of the potential future of Alternative Transport Fuels. Given the vast amount of data available, such an outcome is disappointing as it limits the scenario's utility for seeking out or discovering alternative pathways of development. This becomes problematic considering the time phase is some forty years, and given the sector and increasing pressures for alternative fuels, one could plausibly justify increased focus on creating alternatives. In the end, the lack of breadth limits their value.

Organisation	CSIRO
Scenario Target Year	2050
Geographic Scope	Australia
Motivation for Study (Context)	Inform the development of the Alternative Transport Fuels Strategy
Focus Areas	Alternative Transport Fuels
Objectives	• To inform the development of the Alternative Transport Fuels Strategy by the Australian Government • To make publicly available the modelling assumptions, inputs, results and analysis used in the study
Target Audience	Not specified
VSTEEP Category	vsteEp
Underpinning Drivers	• Carbon price • Demand • Social attitudes • Fuel prices
Triggering Factors for Drivers (if identified)	Not identified

Megatrends/Game Changers and Scenario Impact (if identified)	Summary states that none of the scenarios depict unpredictable 'game changing' events or developments such as major global responses to climate change or major technological breakthroughs/changes in energy or vehicle technologies, or any direct future government intervention beyond current policy settings. These constraints mean the scenarios developed have bounded the range of possible futures they considered. A major technological breakthrough for example, could undermine one or more scenario findings that appear plausible today.
Missing Drivers and Potential Impact on Scenarios	Not relevant
Goals/Targets/Responses/Actions (Policy/Qual/Quant)	There are a number of projections detailed that have emerged from the scenario modelling process, but no specific responses or actions are detailed.
Theme Integration (Social, Economic, Environmental)	Environmental issues, along with economic issues, are dominant.
Plausibility of Assumptions Underpinning Scenarios	Assumptions are specified and impact described across each of the five scenarios developed. All assumptions are plausible.
Degree of Testing of Assumptions	Each scenario tested a set of assumptions across a range of alternative fields.
Known Factors for Plausibility	Because the scenarios are conservative, the degree of plausibility is high.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Possible Futures: Scenario Modelling of Australian Alternative Transport Fuels to 2050	2	6	8	16

5.2 Future Scenarios for Australian Bushfires

Report Overview
The Bushfire Cooperative Research Centre aims to extend the wider understanding of causes and control of bushfires in an array of settings. This 2030 assessment focuses on fuel loads and the implications for managing that load in changing environmental and social condition. This set offers potential export skills to countries likely to experience increased levels of combustible materials due to global warming.

Scenarios Overview
The scenarios focus on the question around to what extent are parts of Australian society exposed to risk due to variations in fuel loads and increased risks due to social management decisions around issues such as planning laws, reduction methods, increased population? The scenarios question policy settings and to an extent, question decision-makers' approaches to infrastructure planning in peri-urban, rural and urban settings, in the light of expected challenges through bushfire hazards.

Organisation	Bushfire Cooperative Research Centre
Scenario Target Year	2030
Geographic Scope	Focus is on factors affecting combustibility of the Australian setting, though this knowledge may have widespread benefits to other countries that may begin to experience more bushfires than they've previously experienced.
Motivation for Study	Understanding nature of changing world where anticipated changes in climate, fuel dynamics and ignition rates are expected to modify future fire regimes and nature of effects on key social and environmental assets.
Focus Areas	Impact of bushfires on the environment and people
Objectives	• Assess the risks associated with increased bushfire risks in light of changes in climatic conditions and assess implications for assets and their management
Target Audience	This piece has wide scale application though initially the output would be for the benefit of the CRC partners.
VSTEEP Category	vSTEEP
Underpinning Drivers	• Climate change • Fuel dynamics • Mitigation approaches • Policy
Triggering Factors for Drivers (if identified)	Not relevant
Megatrends/Game Changers and Scenario Impact (if identified)	Not identified
Missing Drivers and Potential Impact on Scenarios	Not relevant

Goals/Targets/Responses/Actions (Policy/Qual/Quant)	Policy development is core area though additional factors include risk management for the Insurance and Building sector. Recommendations are context specific based on whether the climatic conditions suggest increased drying in the fuel load, or increased growth of the fuel load.
Theme Integration (Social, Economic, Environmental)	Environmental theme is dominant
Plausibility of Assumptions Underpinning Scenarios	Significant research and scientifically derived assumptions have been used.
Degree of Testing of Assumptions	Assumptions have been tested through modelling
Known Factors for Plausibility	Known factors are plausible and support scenarios

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Future Scenarios for Australian Bushfires	9	9	6	24

5.3 Horizon 2020: Future Dairy Scenarios

Report Overview
Dairy Australia aims to conduct research into methods and issues relating to the broad spectrum of dairy farming and the products from and services for that industry. Dairy Australia is technically not a representative body, though its research is widely used to inform decision regarding the sector. This report was designed to provide medium to long term priorities for Dairy Australia.

Scenarios Overview
The GBN four quadrant model was used for this project. Four scenarios were developed: Drift, Cohesion, Implosion and Aggression, based on the intersection of the degree of industry integration (integrated or fragmented) and industry size and value growing or shrinking. The Aggression scenario was considered to be most likely to occur in the period through to 2020, and shaped recommendations. This is a flawed approach to scenario planning, since the aim is not to focus on one scenario, but rather to look for strategies that would be robust across all scenario worlds. The scenarios here purport to represent a view of the sector out to 2020 and as such have a narrow time frame and a short term view. Although suggesting that this is a document that aims to inform investment decisions, with such a limited time horizon and a narrow field of vision, the scenarios provided do little to broaden or deepen our understanding of the industry's potential future.

Organisation	Dairy Australia
Scenario Target Year	2020
Geographic Scope	Australia
Motivation for Study (Context)	'Raising the sights above short-term preoccupations' is mentioned. It should be noted however that ANY assessment of such short forward duration (in this case 5-10 years) is HIGHLY unlikely to be able to shift that focus beyond near term thinking.
Focus Areas	Consideration of strategic investment and development opportunities within the dairy sector
Objectives	• Providing constructive direction and recommendations as to areas where Dairy Australia should invest
Target Audience	Dairy Farmers
VSTEEP Category	vsTEEp
Underpinning Drivers	• Global dairy landscape • Future world order • Feeding the world • Community, consumer and customer • Sustainability agenda • Enterprise wealth • Innovation
Triggering Factors for Drivers (if identified)	• Growing demand • price volatility • Consumer expectations • Supply Chain costs

Megatrends/Game Changers and Scenario Impact (if identified)	Not identified
Missing Drivers and Potential Impact on Scenarios	Not relevant
Goals/Targets/Responses/Actions (Policy/Qual/Quant)	Consolidation of the industry is one potential goal, as is requirement of increased investment by farmers in technology and product management. A set of recommendations is made, ranging from communicating the scenarios to creating scope for private farm Research and Development joint ventures.
Theme Integration (Social, Economic, Environmental)	The economic theme is dominant.
Plausibility of Assumptions Underpinning Scenarios	Assumptions where indicated (growing dairy demand, fragmentation of current industry, need for coherence) seem plausible.
Degree of Testing of Assumptions	What remains untested is why, given Dairy Australia's place in developing research and models for the industry, the sector and farmers now find themselves in such a poor state. One would perhaps question what Dairy Australia has or hasn't been doing.
Known Factors for Plausibility	All factors used for narrative build would be deemed to be plausible. The challenge is what factors were NOT used. I'd suggest that this output has missed significant elements already covered by the scenarios developed around 2010 by the Young Dairy Network – see their 2025 scenarios http://www.dairyaustralia.com.au/Standard-Items/News/Dairy-News/Skimming-the-Cream-climate-change-forum.aspx.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Horizon 2020: Future Dairy Scenarios	3	5	2	10

5.4 eFuture: explore Australia's electricity future

Report Overview

This is a web based tool produced by CSIRO which allows users to explore Australia's energy futures. The model here is more of an information prompting and awareness raising tool, rather than a set of scenarios per se**.** This is an indicative tool that can be used to engage the public with the future of any industry. Its advantage is that it focuses not only on general information about energy futures, but on the implications of individual choice.

Scenarios Overview

This tool enables what would be best described as an Inductive Scenarios approach. People can use the website and probe their own understanding with questions and considerations about Australia's energy future, using the domains of energy consumption, provision and alternative technologies.

Organisation	CSIRO
Scenario Target Year	Current
Geographic Scope	Australia
Motivation for Study	Help people learn more about the future of energy in Australia and the numerous factors that will impact what this future looks like
Focus Areas	Electricity, energy futures
Objectives	• eFuture helps people learn more about the future of energy in Australia and the numerous factors that will impact what this future looks like
Target Audience	All Australians
VSTEEP Category	vsteEP
Underpinning Drivers	• Electricity demand • Fuel prices • cost of new/alternative energy technologies
Triggering Factors for Drivers (if identified)	None identified
Megatrends/Game Changers and Scenario Impact (if identified)	None identified
Missing Drivers and Potential Impact on Scenarios	Not applicable
Goals/Targets (Policy/Qual/Quant)	The site makes a comment that this work is used 'by government and industry to help inform decisions around energy investment and policy'
Possible Responses/Actions Identified	None identified

Theme Integration (Social, Economic, Environmental)	Environmental focus
Plausibility of Assumptions Underpinning Scenarios	None identified, apart from enabling the public to learn more about the impact of their technological use.
Degree of Testing of Assumptions	Not identified
Known Factors for Plausibility	This is a very focused scenario tool, with limited applicability, based on data and modelling undertaken by CSIRO. Plausibility is high.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
eFuture: explore Australia's electricity future	2	2	2	6

5.5 Delivering a competitive Australian power system Part 2: the challenges, the scenarios

Report Overview
The Global Change Institute resides within the University of Queensland and aims to assess a wide variety of issues relative to the idea of 'change'. This report is the second in the a three part series and has as its main focus the subject of 'stationary' energy systems – or what might be better described as the current fixed transmission network and large scale power generation system including existing hydro and coal power generators.

Scenarios Overview
A business as usual scenario is used representing the principles set out in the Government's Draft Energy White paper. A second scenario is based around large scale renewal energy, the third was focused around consumer action, a fourth which combined renewable energy and consumer energy, a fifth is focused on carbon capture and storage, and a sixth on nuclear power energy. While these have different parameters, there are no narratives, and the implications are based on quantitative projections.

The assumptions identified in reading this scenario set suggests that this is a paid industry report. It significantly downgrades alternative methods of energy production, is dismissive of stand-alone systems and suggests (without enough material or data support) that Australia's energy needs could only ever be met through the existing stationary network. While some would argue this is an accurate perspective, the lack of alternatives, lack of depth and lack of exploration of potential significantly limits the value of this report.

Organisation	Global Change Institute, University of Queensland
Scenario Target Year	2035
Geographic Scope	Australia
Motivation for Study (Context)	Specifically viewing the 'stationary energy system'
Focus Areas	Energy provision and delivery
Objectives	• To assess the extent to which the energy system can remain competitive given changes brought on by renewables and increased costs associated with delivery of existing mainstream power provision
Target Audience	Not stated though one could suggest it is aimed at Government policy makers
VSTEEP Category	vsTEEP
Underpinning Drivers	• Emissions constraints • Public support for renewables • Rising prices • Infrastructure renewal • Shift to new energy technologies
Triggering Factors for Drivers (if identified)	Not identified

Megatrends/Game Changers and Scenario Impact (if identified)	Not identified
Missing Drivers and Potential Impact on Scenarios	Complete dismissal of renewables as a viable alternative. Given the challenge at hand, this output is extremely poor let down badly by the lack of testing of assumptions made
Goals/Targets/Responses/Actions (Policy/Qual/Quant)	No recommendations, but three questions raised for further discussions, and strategies for reducing risk are provided.
Theme Integration (Social, Economic, Environmental)	The environment is the strongest focus in this set of scenarios.
Plausibility of Assumptions Underpinning Scenarios	No change, some change, radical change '3 scenario' typology suggests that assumptions have not beeen explicitly stated
Degree of Testing of Assumptions	No sense that assumptions have been plausibly tested. The scenario narratives read like a less than subtle advertisement for a particular viewpoint. Given its recent publication, this is a poor output.
Known Factors for Plausibility	Reliance on technology fixes, reliance on infrastructure investment are included.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Delivering a competitive Australian power system Part 2: the challenges, the scenarios	6	4	4	14

5.6 Australia's Forestry Industry in 2040

Report Overview
This report was generated by an individual as part of their university study assessing the Managed Forestry sector and its potential environmental contribution to Australia as a whole. Although limited in scope, it makes explicit its assumptions and therefore does not aim to extend its value beyond that scope.

Scenarios Overview
The GBN four quadrant model was used to develop the scenarios using demand for forestry products and climate change as the intersecting drivers of change. Three scenarios were plotted across the four quadrants. Scenarios were: Low and Slow where demand is controlled and climate change is managed, Dizzy where both change drivers have developed unchecked, and Most Likely Scenario where demand is government controlled and there has been limited progress towards managing climate change. The scenarios aims to assess what part the managed forestry industry could play for Australia's pursuit of lower carbon emissions. It seeks to assess how managed forestry products could become a significant contributor for carbon abatement through carbon capture occurring through tree growth.

Organisation	Individual Author
Scenario Target Year	2040
Geographic Scope	Australia
Motivation for Study (Context)	No explicit context provided though we can take a clue from this being an essay submitted as part of the author's Bachelor of Science degree – also see notes under 'Degree of Testing of Assumptions'.
Focus Areas	Managed forestry sector
Objectives	• Part of university student project
Target Audience	To explore the value contribution made by the forestry sector and its part in carbon abatement.
VSTEEP Category	vstEEp
Underpinning Drivers	• Climate change (especially extreme weather events) • Consumer demand
Triggering Factors for Drivers (if identified)	None identified
Megatrends/Game Changers and Scenario Impact (if identified)	None identified
Missing Drivers and Potential Impact on Scenarios	Missing is any discussion over whether alternative means of carbon capture or reduction would negate the need for the increase in commercial forestry activities.
Goals/Targets/Responses/Actions (Policy/Qual/Quant)	A lightly stated Goal is further development of Australia's Managed Forestry sector.
Theme Integration (Social, Economic, Environmental)	The environmental theme is dominant.

Plausibility of Assumptions Underpinning Scenarios	This appears to be another of the 'three scenarios' framework: a bit good, a bit bad, and the one most likely. There are in fact four scenario variants identified, but only three discussed. Main assumptions used are stated in relation to how the industry would need to respond given possible changes.
Degree of Testing of Assumptions	The narratives flesh out some of the assumptions and given the nature of the piece, though sufficient, not to an extent that would normally be required. The use of a viewpoint of someone working within the forestry industry is a good idea.
Known Factors for Plausibility	Factors considered are plausible.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Australia's Forestry Industry in 2040	6	6	6	18

5.7 Future food security in Australia under projected climate change scenarios (in progress)

Report Overview
As a work in progress, it's difficult to assess what these scenarios might produce, but this is included because it is a global problem that all countries need to be addressing today. The issue of food security is being heightened as climate change impacts and population demands add increased pressure on food supply networks. It is stated that these scenarios aim to provide a global assessment of the food production activities on a country by country basis with projections of increased or decreased production out to 2050, within the specific context of food security as impacted by climate change.

Scenarios Overview
The scenarios themselves are not yet available.

Organisation	Global Change Institute, University of Queensland
Scenario Target Year	2050
Geographic Scope	Australia
Motivation for Study	To address the growing challenge of increasing populations and demands for resources including demand on food production
Focus Areas	Agriculture and food
Objectives	• National maps on plant productivity and current production of major foods • National maps that depict food fluxes for domestically produced food within Australia and to global markets • National maps that project by decade to 2050 potential shifts in plant productivity and national food production taking into consideration prediction for climate change, the national landscape and land use patterns
Target Audience	Not clear
VSTEEP Category	vSteEp
Underpinning Drivers	• Climate Change
Triggering Factors for Drivers (if identified)	Not identified
Megatrends/Game Changers and Scenario Impact (if identified)	Not identified
Missing Drivers and Potential Impact on Scenarios	From the text on the site, there is no obvious consideration of technology, although one can assume that technological advancements will assist in increasing agricultural productivity.
Potential Wildcards	Not identified
Goals/Targets/Responses/Actions (Policy/Qual/Quant)	Not identified
Theme Integration (Social, Economic, Environmental)	The Environmental theme is dominant.

Plausibility of Assumptions Underpinning Scenarios	Assumptions are not specified in the limited text on the site, apart from the limitation of input of climate change as the major driver.
Degree of Testing of Assumptions	Not identified
Known Factors for Plausibility	The factors influencing food demand are global in nature, and uneven in impact. They are highly plausible and have the attention of global governments, particularly in developing countries.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Future food security in Australia	2	5	8	15

5.8 Central Highlands Water: 2025 Scenarios

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Report Overview

Central Highlands Water (CHW) is a Victorian Government water agency that covers a significantly large geographic area centred on Ballarat. Like all water agencies in Victoria, it has a requirement to undertake planning activates as mandated and to a large extent how mandated by the State Government. This report provides an overview of CHW's approach to finding a more effective way to plan than a reliance on forecasting methods widely used in the water sector, and is an assessment of required skill sets needed to manage water supplies and infrastructure especially in light of dynamic changes in the operating environment.

Scenarios Overview

CHW's 2025 Scenarios emerged following a recognition that the industry standard approach to water management and planning (steady state, slow change) was significantly poor and of high risk, especially at time of ongoing water stress. These scenarios assessed a wide array of influencing factors with regard to water management and infrastructure planning. Subsequently a set of seven robust strategic options were generated and tied to operational planning frameworks. The scenarios were created using the GBN four quadrant method, using the intersecting drivers of the political environment and rate of climate change. The four scenarios were Hot, Fast and Nimbin (community driven politics and rapid climate change), Barry's World (steady climate change and community driven politics), Global Report (party driven politics and steady climate change) and Make my Day Hot Punk (party driven politics and rapid climate change).

Organisation	Central Highlands Water
Scenario Target Year	2025
Geographic Scope	Ballarat and District, Victoria
Motivation for Study	Assessment of the long term planning approaches to water provision and infrastructure in the water sector in light of considered factors of change.
Focus Areas	Ability of CHW to provide adequate water supplies to its customer base and capabilities needed to deliver services.
Objectives	• Overcome the industry wide limitations of planning approaches reliant on business as usual and the barriers of inflexible operational constraints imposed upon it by a Government task master
Target Audience	A broad range of stakeholders were involved.
VSTEEP Category	VSTEEP
Underpinning Drivers	• Climate change • Water variability Cash flows • Infrastructure development • Population growth • Waste management • Government policy settings

Triggering Factors for Drivers (if identified)	Not identified
Megatrends/Game Changers and Scenario Impact (if identified)	A series of wildcards were considered as part of the scenario development.
Missing Drivers and Potential Impact on Scenarios	Not relevant
Goals/Targets/Responses/Actions (Policy/Qual/Quant)	Detailed specific to scenario – list of seven robust strategic areas were identified across all narratives which were then connected to critical operational outcomes for the business.
Scope for Future Quant Analysis	These scenarios and methodology have significant potential for water agencies across Australia and around the world.
Theme Integration (Social, Economic, Environmental)	Social, economic and environmental themes were integrated closely.
Plausibility of Assumptions Underpinning Scenarios	Assumptions are considered plausible.
Degree of Testing of Assumptions	All assumptions were tested in both group assessment during the build and in customer surveys prior to scenarios being developed.
Known Factors for Plausibility	All factors considered were plausible.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Central Highlands Water: 2025 Scenarios	8	9	8	25

6 International Scenarios

6.1 Global Trends 2030: Alternative Worlds

Report Overview

The Global Trends 2030: Alternative Worlds report is the fifth and latest instalment in a series of reports "aimed at providing a framework for thinking about the future". The report is targeted at decision-makers across sectors (government, business and academia) both within the USA and globally. The report aims to inform and facilitate better decision making rather than prescribe or proscribe specific policies or strategies. Unless other reports that may have a narrow focus on specific industries and/or themes, this report primarily aims to stimulate thinking about broad generic issues including critical trends, opportunities and threats that likely to bear upon and influence the world until 2030.

Scenarios Overview

Megatrends (factors likely to occur in any scenario) and game changers (critical variables whose trajectories are less certain) are used to develop four scenarios: Stall Engine, Fusion, Gini Out of the Bottle and Non State World. Robustness of conclusions was tested by extensive engagement with and feedback from national and international experts from government, business, academic and society at large.

Organisation	National Intelligence Agency
Scenario Target Year	2030
Geographic Scope	Globally defined though it should be strongly noted that in this instance a Global assessment does not mean one that looks at issues of a Global nature, but rather those that assess Global issues in light of their implications for a preferred US future
Motivation for Study	The next iteration of scenario perspectives from the NIC. It could be taken as a long range forecast output rather than a set of scenarios per se.
Focus Areas	Assessment of major global trends
Objectives	• 'Identify critical trends and potential discontinuities' (note: from a USA perspective)
Target Audience	A US centric tome
VSTEEP Category	VSTEEP
Underpinning Drivers	• US as main actor governing world affairs • Rising China • Individual empowerment • Diffusion of power • Demographic patterns • Nexus of food, water energy

Triggering Factors for Drivers (if identified)	Not identified
Megatrends/Game Changers and Scenario Impact (if identified)	Potential for increased conflict, economic crisis; governance issues (ability of government to cope with issues), new technologies. Others are listed as a series of 'Black Swans' though many of these do not fit the true definition of a surprise event and are more in line with a wide scale change-wave.
Missing Drivers and Potential Impact on Scenarios	There is a good range of drivers identified.
Goals/Targets/Responses/Actions (Policy/Qual/Quant)	These are a set of global scenarios, not designed specifically for any country. Of interest for Australia is the following proposition: To what extent does Australia agree with the assessment made here?
Theme Integration (Social, Economic, Environmental)	Mainly Social and Economic themes
Plausibility of Assumptions Underpinning Scenarios	The plausibility of each of the (well written) narratives hinges on a single core assumption – the role that the US will play and its willingness to (minimal testing of 'capability to') shape the world.
Degree of Testing of Assumptions	All assumptions are well considered and to a larger extent, tested through the narratives.
Known Factors for Plausibility	The question is over which assumptions were NOT included in the scenarios and that if tested may render major portions of the scenarios implausible. Arguably the single biggest assumption that was missed is the internal assessment of USA capability. To what extent does it have the desired and internal structures available to it for it to be able to continue to act as a coherent 'whole'? If that question was tested, one might discover significant chunks of the considered actions of the USA null and void, rendering the scenarios highly implausible.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Global Trends 2030: Alternative Worlds	6	7	7	20

6.2 New Lens Scenarios: A Shift in Perspective for a World in Transition

Report Overview
This is the most recent set of scenarios by Shell which they have been producing for close to 40 years. With significant experience and resources available to them, these scenarios are some of the most detailed and well presented. The scope of analysis is significant and comprehensive.

Scenarios Overview
Two scenarios are provided: Mountains, a world in which those occupying positions of power and advantage work to create stability in ways that promote the persistence of the status quo, and Oceans, a world of competing interests and the diffusion of influence, where there is a rising tide of accommodation. The narratives are analysed using three paradoxes – prosperity, connectivity and leadership and through the lens of a number of major shifts now occurring such as urbanisation, energy demand, geopolitical shifts and economic growth (or not) – as well as persistent patterns from today into the future. Two basic pathways into the future are presented – room to manoeuvre and trapped transitions.

Organisation	Shell
Scenario Target Year	2100
Geographic Scope	Global
Motivation for Study (Context)	Assessment of potential future policy settings of governments and the implications for industry.
Focus Areas	Resource constraints, world in transition – described as the Stress Nexus, the intersection of water, energy and food.
Objectives	• Additional iteration of Shell's ongoing scenario activities, part of an ongoing process to 'challenge executives' perspectives on the future of the business environment'. • Aim is to explore complexity and ask searching questions about "how we create a more reflective, responsive, and resilient business."
Target Audience	General public, policy makers
VSTEEP Category	vStEEP
Underpinning Drivers	• Power of the Influential • Locus of Power to Influence • Access to resources
Triggering Factors for Drivers (if identified)	Not identified
Megatrends/Game Changers and Scenario Impact (if identified)	These are considered as part of the narratives framed as a series of Paradoxes: Prosperity, Leadership, Connectivity. Yet despite these paradoxes, just two pathways are presented, either one in which room to manoeuvre is available, or one in which transitions to a more sustainable world get trapped and are never completed.
Missing Drivers and Potential Impact on Scenarios	Not relevant

Goals/Targets/Responses/Actions (Policy/Qual/Quant)	There are no specific goals or actions recommended, since the scenarios are provided as an input into further conversation across business organisations and government. The two suggested pathways – Room to Manoeuvre and Trapped Transitions – provide explicit choices however, and could be read by decision makers as a 'fait accompli'.
Theme Integration (Social, Economic, Environmental)	All three themes are present throughout the scenarios.
Plausibility of Assumptions Underpinning Scenarios	Shell traditionally makes significant assumptions drawn from research and extrapolations of forecasting and relies heavily on quantifying assumptions. The process used in producing these scenarios follows that pattern. Note here though, that while quantitative analysis plays a large role in the development of the scenarios, the data produced is not used as 'a' scenario, but rather strengthens assumptions underpinning generation of narratives.
Degree of Testing of Assumptions	Shell has tended to 'product-ise' their scenario outputs in recent years. That is to say that narratives are becoming increasingly clever stories, well written, engaging and attractively labelled. But the risk here is that the assumption of an either/or pathway proposed locks in the trajectory and requisite choices for action which is equivalent to 'betting the farm'.
Known Factors for Plausibility	This work is based on highly plausible drivers of change.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
New Lens Scenarios	6	6	9	21

6.3 Catalogue of Scenario Studies

Report Overview
Produced by the European Environment Agency, this report brings together a wide range of scenario reports related to the environment for the Knowledge Base for Forward Looking Information and Services (FLIS) to "support the inclusion of long-term perspectives and preparedness in decision-making and environmental policy making". This knowledge base is described as 'living' which is underpinned by the same principle as 'living scenarios' proposed by the Australian Academy of Science (Section 4.1) – that because the world continues to change, the output of any foresight process should be not fixed, but rather used as a starting point that shifts and is adapted over time.

Scenarios Overview
A detailed framework was developed to assess the 45 scenarios reviewed in this report assessed by geographic area, including some global studies, all focusing on environmental challenges being faced today. The report will form the basis of an online inventory of scenarios with an advanced search tool which will be updated regularly.

Organisation	European Environment Agency
Scenario Target Year	Not applicable
Geographic Scope	Europe, with some global studies included
Motivation for Study (Context)	Emerged from need to prepare a forward looking assessment of the pan-European region's environmental prospects for the 'Environment for Europe' Ministerial Conference in 2007.
Focus Areas	Wide range of environmental challenges across a range of countries – climate, energy, biodiversity, water, land use, transport, intelligent infrastructure, forests and demographics.
Objectives	• To introduce forward looking components and perspectives into existing environmental information systems to create an expanding knowledge base to: (i) support networking, (ii) encourage capacity building and exchange of experiences, (iii) facilitate institutional change to ensure appropriate knowledge and information is available and used in environmental policymaking, and (iv) enable relevant, credible and scientifically sound forward-looking assessments.
Target Audience	Researchers and policy makers who can "benefit from previous studies and make use of – and build on – previous studies and sets of scenarios.
VSTEEP Category	vSTEEP
Underpinning Drivers	• Identified STEEP drivers across all scenarios reviewed, categorised into environment and sustainability, global futures and cross-sectoral studies. A wide range of drivers of change are identified across all scenarios.
Triggering Factors for Drivers (if identified)	Not relevant
Megatrends/Game Changers and Scenario Impact (if identified)	Not relevant

Missing Drivers and Potential Impact on Scenarios	Not relevant
Goals/Targets/Responses/Actions (Policy/Qual/Quant)	Not stated in the framework used. Individual scenarios may include recommendations relevant for the country/organisation producing the scenarios.
Theme Integration (Social, Economic, Environmental)	Primarily environmental, but social themes are also dealt with in some scenarios.
Plausibility of Assumptions Underpinning Scenarios	From a review of the scenarios in this Catalogue, the degree of plausibility is high. Assumptions are not reported on in the summaries, but the drivers and scenario and resulting scenario narratives are plausible.
Degree of Testing of Assumptions	Not relevant
Known Factors for Plausibility	The environmental challenges underpinning the scenarios reported here are highly plausible.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Catalogue of Scenario Studies	4	8	7	19

6.4 Overview of Selected European IST Scenarios

Report Overview
The report was produced by The Manchester Institute of Innovation Research (MIoIR - formerly PREST) for the FISTERA project (Foresight of Information Society Technologies in the European Research Area). It assesses five major scenario reports that provide a holistic view of Information Society Technologies (IST) and have been developed systematically. They identify a number of socio-political challenges emerging from the scenarios, including privacy, security and trust, ethics and social innovation.

Scenarios Overview
Five scenario reports are reviewed based on the methodological approach chosen: Euforia (Delphi based), Star (survey based), Seamate (projection-based), ISTAG (workshop based), Flows (panel based). Each scenario set has three or four scenarios. The common factor is the use of IST into the future, although the authors make the point that "they are extraordinarily different studies". This is not unusual, given different starting points and issues being considered via the scenario planning approach.

Organisation	FISTERIA (European Union)
Scenario Target Year	2010, 2015, 2030
Geographic Scope	European-centric with external views also considered
Motivation for Study (Context)	Challenge existing wisdom of perceived futures, test robustness of policy settings and objectives, introduce different 'world-views' and to identify potential signals of change.
Focus Areas	Europe, global development
Objectives	• See Motivation for Study
Target Audience	Policy makers, society in general
VSTEEP Category	VSTEEP
Underpinning Drivers	10 driving forces were identified from an analysis of all drivers used in the reports: • relationships and communication, • ageing population and health, • cultural pluralism, • community learning, • miniaturisation of technology, • interconnectivity and systems, • mobility and trade, • environment and sustainability, • government efficiency, and • security concerns.

Triggering Factors for Drivers (if identified)	Not relevant
Megatrends/Game Changers and Scenario Impact (if identified)	Not relevant
Missing Drivers and Potential Impact on Scenarios	Additional drivers that WERE included focus on social constructs around ethics, access to information and finances and robustness (resilience) of systems. Both the methodology and range of focus areas act as significantly well-grounded stepping stones for further exploration.
Goals/Targets/Responses/Actions (Policy/Qual/Quant)	Two approaches to developing scenarios for FISTERA are provided: global political IST economy and social ecology of IST. The first relates to Europe's global IST competiveness and the second relates to the social implications associated with IST use.
Theme Integration (Social, Economic, Environmental)	There is a strong underpinning technological theme, with social and environmental themes most apparent.
Plausibility of Assumptions Underpinning Scenarios	Assumptions appear to be tested through general assessment and internal questioning by those writing each narrative. Those selected are plausible given the time at which they would have been selected. The final output does read a little like some aspects have been added to the larger body of work at the last minute.
Degree of Testing of Assumptions	With a wide variety of narratives developed, each assumption is exposed to a degree of testing
Known Factors for Plausibility	Factors considered are plausible and given these were developed back in 2004, it would be useful to start the construct again to assess whether those considered then, are still relevant today.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
FISTERIA IST Forum	9	7	7	23

6.5 A review of global scenario exercises for food security analysis: Assumptions and results

Report Overview

This report aims to review scenario literature with a particular focus on the implications for global food security. The report provides the EU Work Package 5, a set of scenario narratives developed as part of the EU Food Secure Project. The study finds that all the scenarios deal only with two of the four dimensions of food security (food availability, food accessibility, food utilisation an stability), mainly caused by the nature and limited scope of the models used in the analysis, and none deal with an energy transition from a fossil to bio based economy.

Scenarios Overview

Nine scenario reports published between 2000 and 2012 are covered. Four focus on agriculture and the food system, four others have a broader perspective such as climate change while the ninth study focuses on Shared Socioeconomic Pathways (SSPs) which were developed to inform the Fifth IPCC Assessment Report. An excellent review of scenarios that have assessed Food Security around the globe and identifies the flaws of scenarios that ignore the consumer side of food security

Organisation	European Union
Scenario Target Year	Varies dependent on which scenario study was assessed
Geographic Scope	Global
Motivation for Study	Seeking to identify issues and impacts of global food security
Focus Areas	Food security
Objectives	• An assessment of nine different scenario reports which focus on global food security
Target Audience	Policy, NGO's and Corporations in food sector
VSTEEP Category	Varied depending on scenarios
Underpinning Drivers	• Varied depending on scenarios and states that ALL of the scenarios focused on Food Availability and Food Accessibility • Three major factors underpinned all scenarios – population growth, economic growth and technological change
Triggering Factors for Drivers (if identified)	Varied
Megatrends/Game Changers and Scenario Impact (if identified)	Not relevant
Missing Drivers and Potential Impact on Scenarios	Author suggests that all studies missed two key drivers: Food Utilisation and Food Stability. Given the estimated wastage of edible food in developed nations of between 30 and 45%, this assessment is worrisome and of extreme importance. The lack of attention to a potential energy transition (from fossil to bio fuels) is also noted as absent.
Goals/Targets/Responses/Actions (Policy/Qual/Quant)	Varied depending on scenarios
Theme Integration (Social, Economic, Environmental)	Varied depending on scenarios, but Environment and Social themes are strong.

Plausibility of Assumptions Underpinning Scenarios	Author has done an excellent job identifying the assumptions made within each of the scenarios assessed
Degree of Testing of Assumptions	Varies depending on which scenario though author has shown that most have failed to test their inherent assumptions (or world-views)
Known Factors for Plausibility	Factors considered are plausible allowing for lack of testing of assumptions

Summary Dashboard

Name	Breadth	Depth	Distance	Total
A review of global scenario exercises for food security analysis: Assumptions and results	9	9	6	24

6.6 Blue Growth Study - Scenarios and Drivers for Sustainable Growth from the Oceans, Seas and Coasts

Report Overview
This is a summary report of a scenario exercise for the European Commission to contribute to the Europe 2020 strategy. It is a very detailed report, using the Global Business Network four quadrant approach to developing scenarios and is a good example of developing a conventional set of scenarios. Little detail is provided about how the scenarios were developed; rather the focus is on identifying potential courses of action to achieve the goals of the project.

Scenarios Overview
Four scenarios were generated using economic climate and degree of sustainability as the two matrix axes. Fragile Recovery is a world of strong emphasis on sustainability with a slowing recovering world economy, Sustainable Growth is a world with strong emphasis on sustainability with a stable global economy, Boom and Bust is a world with a slowing recovering world economy and low emphasis on sustainability, and Pursued Growth is a world with a stable global economy and limited emphasis on sustainability. The scenarios are assessed against a number of key themes: economy, science and technology, environment and climate, international relations and the role of public authorities.

Organisation	European Union Maritime Forum
Scenario Target Year	2020
Geographic Scope	Global assessment of oceans, seas and coasts
Motivation for Study (Context)	The extent to which oceans, seas and coasts can provide sustainable support and solutions for humanity given issues such as poverty, social mobility, global warming and use of natural resources.
Focus Areas	Key economic areas for future sustainable growth or oceans, seas and coasts and assess impacts of policy interventions that may contribute to realising potential.
Objectives	Provide policy makers with a comprehensive, robust and consistent analysis of possible future policy options to support smart, sustainable and inclusive employment growth from the oceans, seas and coasts.
Target Audience	Policy Makers within the EU and beyond
VSTEEP Category	vSTEEP
Underpinning Drivers	• Demographics • Economic and market trends • Technology and science • Environment and climate change • Politics and institutions
Triggering Factors for Drivers (if identified)	None identified
Megatrends/Game Changers and Scenario Impact (if identified)	None identified
Missing Drivers and Potential Impact on Scenarios	Not relevant

Goals/Targets/Responses/Actions (Policy/Qual/Quant)	• Promote maritime Research and Development – in particular for the pre-development maritime economic activities to bridge the gap between research and market uptake • Boost access to finance – to foster maritime economic actors in the pre-development stage and to help overcoming the "valley of death" • Invest in smart infrastructure – for the mature maritime economic activities to flourish further • Provide maritime cluster support – to have more critical mass of actors, also across EU Member States • Anticipate maritime skills needs – and attract skilled workers also in remote and peripheral places • Promote maritime spatial planning – to overcome the increasing complexity of maritime spatial use and to increase public acceptance for pre-development and growth-stage marine economic activities • Foster integrated local development – for a sustainable development of Blue Growth • Stimulate public engagement – a vital ingredient to fully unleash the Blue Growth potential
Theme Integration (Social, Economic, Environmental)	Integration of three themes is present; economic activity seems to be dominant.
Plausibility of Assumptions Underpinning Scenarios	Assumptions have been made about the future for various areas of interest such as offshore oil and gas and shipping, but any assumptions underpinning the scenarios themselves are not clear.
Degree of Testing of Assumptions	Not apparent that any testing has occurred.
Known Factors for Plausibility	There is significant evidence for plausibility of the factors covered in the scenarios.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Blue Growth Study: Scenarios and Drivers for Sustainable Growth from the Oceans, Seas and Coasts	4	7	5	16

6.7 Oxford The Future of Cities Scenarios

Report Overview
The Oxford Programme for the Future of Cities sponsored the development of this set of scenarios. This is a summary report of this project from one of the participants. Because the original scenarios site is no longer available, a full analysis of this scenario set is not possible. The report has been included here because it deals with the future of cities, a major issue for the future of all nations. This reflects the continuing need to understand how urbanisation will evolve and its likely impact of societies across the globe.

Scenarios Overview
Three scenarios were developed from 23 interviews worldwide and a workshop. The Global Business Network four quadrant method was used, with gradual or disruptive change, and fragmented or coordinated response the two axes. The three scenarios were Gulliver's World, Massive Socio-Technical Revolution and Triumph of the Triads. Gulliver's World incorporated two quadrants of the four future quadrants, characterised by a set of environment, urban, social and political tensions. Massive Socio-Technical Revolution was a result of a decade of decline, characterised by social tension and natural disasters leading to an uprising and a new generation of leaders which results in greener cities and greater quality of life for all. Triumph of the Triads is characterised by frequent natural disasters, market failures, increasing conflict and breakdown of infrastructure. Self-sufficiency becomes critical, urban tribes increase and the world muddles through.

Organisation	Oxford University
Scenario Target Year	Unclear
Geographic Scope	Global
Motivation for Study	Unknown
Focus Areas	Future of Cities
Objectives	• Unknown
Target Audience	Appears to be quite wide, given the open nature of communication and sharing of information about the scenarios by key participants
VSTEEP Category	VSTEEP
Underpinning Drivers	• Growing income equality • Lack of capital availability • Role of centralized governance • Infrastructure decay • Lifestyle change and value shifts • Resources shortages
Triggering Factors for Drivers (if identified)	Not available
Megatrends/Game Changers and Scenario Impact (if identified)	Not available

Missing Drivers and Potential Impact on Scenarios	Not available
Goals/Targets/Responses/Actions (Policy/Qual/Quant)	Not clear if any were identified (the Oxford project link no longer works).
Theme Integration (Social, Economic, Environmental)	A number of integrated themes are reported, which cross social, economic and environmental factors. • The simultaneous retreat of the State in some areas and its growing influence and power in others. • Competition between civil society groups and community-driven initiatives versus the role of organised crime and warlords. • The potential for large energy producers and infrastructure companies to act as local governments and municipal services providers. • Cultural shifts towards enhanced quality-of-life values, including stronger family, ethnic or community bonds. • A hopeful potential for civil society-led, bottom-up regeneration of local communities. • A focus on wealthy, ageing communities. • The end of most large infrastructure mega-projects.
Plausibility of Assumptions Underpinning Scenarios	It is unclear what assumptions underpinned the scenario development, but the Oxford group is well versed in the GBN scenario methods that has the challenging of assumptions as an integral part of the method.
Degree of Testing of Assumptions	Unknown
Known Factors for Plausibility	The drivers of change used are all highly plausible.

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Oxford Future of Cities Scenarios	8	5	7 (estimate)	20

6.8 Security 2025

Report Overview
This set of scenarios is a summary report only and is therefore lacking considerable detail about why and how they were produced. They were included here as an indicator of the types of issues being considered by other countries and governments. This set of scenarios falls into the category of thinking triggers – they are produced by a reputable foresight group, and so are of a high quality, but there is no clear purpose apart from pointing out that the emerging new world of personal and public security presents many opportunities and risks.

Scenarios Overview
Four detailed scenarios were produced: The Secure City, Banks Off-Line for Four Days, Crisis Communication Below Freezing Point and Airport Experience. These are quite detailed scenarios integrating a range of social issues around security. The scenarios highlight the risk of overdependence on technology both for financial and human health reasons, the emerging fear of invisible that are less comprehensible to the ordinary person (radiation exposure, nanoparticles) with the media playing a key role in surfacing and strengthening the issues, a rising demand for insurance products to offset risks, a linking up across the security sector to address risks, and the conflict between private and public security. The importance of social resilience into the future is highlighted.

Organisation	Zpunkt The Foresight Company
Scenario Target Year	2025
Geographic Scope	Global
Motivation for Study	Exploring security in public space for individuals
Focus Areas	Personal security
Objectives	Zpunkt explores a number of areas as part of its foresight research program - this is one of those areas.
Target Audience	Mainly business organisations
VSTEEP Category	VSTeep
Underpinning Drivers	• Social trends • Business trends • Risks • Tension between security and individual freedom • Role of media
Triggering Factors for Drivers (if identified)	Unclear
Megatrends/Game Changers and Scenario Impact (if identified)	Not identified
Missing Drivers and Potential Impact on Scenarios	Not identified

Goals/Targets/Responses/Actions (Policy/Qual/Quant)	Appears to be a set of scenarios designed as conversation starters in organisations.
Theme Integration (Social, Economic, Environmental)	Primarily social and economic themes.
Plausibility of Assumptions Underpinning Scenarios	No assumptions are reported in the summary or in the scenario report.
Degree of Testing of Assumptions	Not possible to assess from reported text
Known Factors for Plausibility	Not possible to assess from reported text

Summary Dashboard

Name	Breadth	Depth	Distance	Total
Security 2025	6	7	6	19

Table 2 Consolidated Summary Dashboards (ordered by Total)

Report Name	Total
A Clean Energy Future for Australia	27
Australia 2025: A Framework for Analysing Australia's Possible Future Workplaces and Workforce Development Requirements	27
Central Highlands Water: 2025 Scenarios	25
Future Australian Climate Scenarios	25
A review of global scenario exercises for food security analysis: Assumptions and results	24
Future Scenarios for Australian Bushfires	24
FISTERIA IST Forum	23
Negotiating Our Future (Australian Academy of Science)	23
Aspire Australia 2025	21
New Lens Scenarios	21
After Now: What do you think the future holds?	20
Alternative Futures: Scenarios for Business in Australia to the Year 2015	20
Global Trends 2030: Alternative Worlds	20
Oxford Future of Cities Scenarios	20
Australia 2020: Foresight for our Future	19
Catalogue of Scenario Studies	19
Security 2025	19
Australia's Forestry Industry in 2040	18
Scenarios for Australia to 2025	18
Future Focus	16
Possible Futures: Scenario Modelling of Australian Alternative Transport Fuels to 2025	16
Scenarios and Drivers for Sustainable Growth from the Oceans, Seas and Coasts	16
Future food security in Australia	15
Our Future World: Global megatrends that will change the way we live	15
Delivering a competitive Australian power system Part 2: the challenges, the scenarios	14
Moving Australia: A transport plan for a productive an active Australia	14
Horizon 2020: Future Dairy Scenarios	10
eFuture: explore Australia's electricity future	6

Key

Text in black are Australian scenarios

Text in red are international scenario

Test in black bold are industry scenarios

7 Synthesis

The ACA Project Team specified that this scenario stocktake is intended to be used for three related activities:

(i) contributing to the final report through identification and discussion of significant drivers of Australia's future social, economic and environmental wellbeing,

(ii) identifying the character and nature of existing scenario studies, including gaps, as a basis for designing a customised scenario analysis for the ACA project, and

(iii) helping articulate parameters for subsequent empirical analysis, including modelling.

This synthesis section is therefore structured around each of these three categories.

7.1 Significant Drivers

The following drivers of change were present across most scenarios.

Social and cultural – covered a wide range of areas including health, learning, personal security, degrees of influence.

Economic/business/financial – cover a range of factors depending on the scope of the scenarios.

Sustainability and the environment – broad range of environmental issues/threats, often related to energy, water and urbanisation.

Demographics, particularly population issues – self-explanatory, usually population growth and ageing population.

Climate change – a common driver in many scenarios, variously defined.

Government structures/processes/policy/efficiency – many scenarios were developed by government departments, or governments were the target audience.

Geopolitics – regional security, shift in wealth and allegiances, role of USA, rise of China.

Digital connectedness – collaborative consumption, micro-transactions, disrupted business models, virtual crime, cybersecurity.

Science and technology innovation – self-explanatory, a major driver but not present in all scenarios.

Infrastructure in cities – housing, energy, transport.

While all the vSTEEP areas are covered here, the technology driver was least represented across all scenarios. It appeared in most studies in one form or another but did not appear to be a significant driver for many scenarios. Food Security was mentioned in two scenarios as a driver which is not surprising given that ramping up agricultural production to feed the world is one of the major Millennium Goals of the United Nations. It is also a major driver for Australia and its relationship with Asia.

None of these drivers should be considered in isolation in a scenario project. Rather they should be viewed as a whole that forms a change ecosystem that is interdependent and interconnected (see Section 9).

7.2 Theme Analysis

A second analysis was also undertaken around the degree of integration of the three themes – social, economic and environmental – across the scenario reports. For some reports, particularly those which are compendia, the primary theme was derived from the focus/summary of the report. Table 3 below shows the spread of themes across scenario reports. Note that where more than one theme is present, each theme is reported separately. As a result, there are more themes reported than scenario reports reviewed.

Table 3: Report Theme Analysis

Theme	Australian Reports	Industry Reports	International Reports	Total
Integrated (the 3 themes were integrated across the scenarios)	1	1	3	4
Social	5	0	4	9
Economic	3	1	2	5
Environmental	3	6	3	12

The focus on environmental issues in these reports is probably not surprising, since climate change, food security and other issues are topics high on the agenda of most governments today. Likewise, social issues are another primary focus for governments as the world grows smaller, social inequities and conflict continues, and more Western countries see an increase in the cultural diversity of their populations.

Each theme is important in its own right but for scenario work and the exploration of alternative futures, change will not be neatly packaged into themes that can be addressed independently. The four scenario projects that integrated the three themes – Australia 2050 (Section 4.1), Global Megatrends (Section 4.3), Central Highlands Water (Section 5.8) and Oxford Future of Cities (Section 6.7) therefore can be viewed as examples of the value of considering change from a systems perspective (see also Section 9).

7.3 Character and Nature of Scenario Reports

There were two major forms of scenario reports reviewed.

The first was what we have termed **general scenarios**, designed around a specific issue or problem and which appeared to have been designed to trigger conversations among stakeholders or the general public. Examples of this first type included Future Focus by KPMG.

The value of this first type of scenario project is limited unless a communication and implementation plan is included in the planning at the beginning of the project. Too many scenario projects fail, not because of the quality of the work, but because the purpose for doing them in the first place was not clear, or worse, was never really discussed before scenario development began. The popularity of scenario planning as a strategic methodology and the quantum of books produced on how to produce scenario narratives means that it is easier to assume that if you followed a specified process, you will have successful outcomes which is not the case.

Other scenario development projects were undertaken to address specific purposes – transport, food security, electricity/power, climate change and workplace productivity for example. Some included recommendations, others were focused on modelling particular issues, particularly those associated with climate change.

Gaps in Scenario Planning

The biggest gap across all scenarios is the lack of overt connection of the potential strategic action identified in the scenarios with today's strategic processes – this is why so few scenarios had recommendations/actions/responses. This connection is built by backcasting, and the team did not note any scenario report reviewed that had undertaken backcasting. The one report that had significant recommendations was not actually a set of scenarios, but rather than an analysis of today's trends in the transport industry, and the resulting recommendations were not terribly new.

This reflects another common error in scenario planning – the term 'future' in interpreted in many senses – modelling or creating recommendations and strategies without having first explored possible/alternative futures certainly produces recommendations and outcomes. However, these outcomes are likely to become irrelevant very quickly as the external environment changes and produces challenges not foreseen or explored. In these cases, the focus of discussion 'about the future' was based on extrapolating what is known about today's trends rather than exploring and interpreting the implications of possible future change across a range of possible futures.

It is worth noting that many of the scenario projects used the Global Business Network's four quadrant method to generate the scenario worlds. It is also a core CfAF method. This is a deductive scenario planning approach, with its process rationale not difficult for participants to understand. Nor is it a difficult process to engage with, but the process must be focused on outcomes across the four scenarios generated rather than focusing on individual scenarios as end products.

7.4 Parameters for Subsequent Empirical Analysis

Instead of identifying specific scenario reports that individually have potential for further quantitative analysis, the following drivers of change used most across all scenarios suggest areas in which further quantitative analysis can be undertaken. Quantitative analysis in these areas is both feasible and likely to produce useful information to inform the development of any scenarios for Australia's future wellbeing.

- Economic/business/financial issues
- Energy demand
- Demographics
- Climate Change
- Digital Connectedness

It is important that any quantitative analysis and/or modelling is used as part of a scenario development process rather than the resulting projections used as 'the' scenario.

8 Applying Causal Layered Analysis to Selected Scenario Reports

8.1 Overview of Causal Layered Analysis as Method

Causal Layered Analysis (CLA) is a methodology that seeks to delve beneath the apparent and surface signs of an issue to explore underpinning systems, structures and worldviews. Developed by Sohail Inayatullah (2004), the method allows 'drilling down' beneath the superficial reporting of feelings and reactions surrounding an issue to explore and understand often unconscious and unarticulated views and perspectives influencing and shaping that issue. It allows the range of meanings associated with the issue to be identified, and locates the issue within the broader social structures within which it is seen and experienced.

The method accepts all perspectives as valid, and by surfacing different and often divergent perspectives, it is possible to see how an issue has often been defined more by perceptions and myth rather than reality. More importantly, moving among the levels creates a deeper understanding of the issue being explored, and creates what Inayatuallah (2009: p 7) calls a transformative dimension – "to deconstruct so that alternative futures can be investigated and desired futures created."

The four levels are (Figure 2):

- Litany: the official public description of the issue, unquestioned and unchallenged,
- Social Causes: the drivers of change shaping the Litany, questioned within the dominant paradigm,
- Worldview: the deep assumptions and discourse underpinning the issue - ideological, stakeholder, civilizational and epistemological, including questions such as whose voice is dominant, and who is 'othered', and
- Metaphor/Myth: the deep stories, often emotive dimensions of the issue, operating at the cultural level and that unconsciously shape our perspectives.

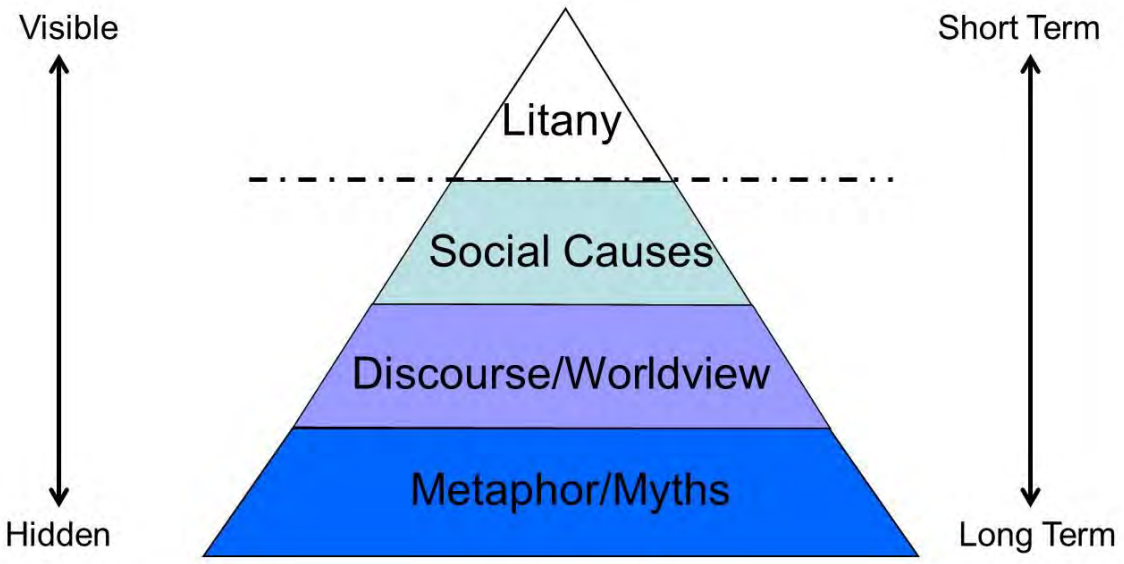

Figure 2 Causal Layered Analysis Levels

The Litany is the most visible - the tip of the iceberg. It is the home of newspaper headlines and media reporting. Phenomena at this level require little analysis to understand – we 'get it' - and are usually just accepted without questioning. We take them for granted, and there is no personal responsibility for events happening. Here there is an immediate focus.

Feeding the Litany are **social causes**, which may be documented through statistics or quantitative analysis (for example, government reports). Causes can be attributed to social, technological, economic, environmental or political factors. At this level, assumptions underpinning the analysis of the issue are not questioned outside of the dominant paradigm in which they were created, and often the intersection of those factors are not explored – they are instead assumed to be linear and in their evolution and isolation in their impact on the issue. Here the focus is short term.

This questioning of assumptions takes place at the **discourse/worldview** level, where individuals' belief systems and mental models underpinning meaning and sense making are surfaced. This is where multiple perspectives shaping the issue can be identified and potential multiple alternative responses to the issue emerge. At this level, we are also interested in exploring whose perspective dominates, shapes and legitimates the issue, and whose voice is not heard. Worldviews are usually deeply embedded belief systems that have been held for long periods of time.

Metaphor/myth is the deepest level where work focuses on images and stories, and involves gut reactions or emotional responses to the worldviews being explored. It taps into myths that enable and constrain alternatives being discussed. Images of the future emerge at this level.

Used as method, CLA deepens understanding of the connection between the taken for granted Litany response to perceived reality and the deeper structures underpinning those responses. It allows for alternative solutions to issues and problems to emerge that do not merely replicate the present.

In particular, CLA allows an assessment of the quality and depth of discourse on any given topic. At its core it seeks to answer three questions:

- Who are the 'winners' if I accept the position that has been posed?
- Who are the 'losers' or displaced if I accept this position?
- Who specifically, is doing the 'saying' and what are their preferred perspectives?

Another way of understanding CLA is that is a method to uncover the type of bias in a speaker, organisation or view point. There is no judgement call in this assessment, with bias being more aligned to a 'weighting' of, or preference for a point of view.

Using CLA as an assessment approach for analysing scenarios can deepen the quality of the conversation about implications of those scenarios for an organisation. This deeper, more reflective approach to assessing scenarios can also identify potential gaps or limitations not explicit in the scenario narratives and suggested actions that emerge.

8.2 Applying Causal Layered Analysis to Selected Scenario Reports

8.2.1 Selecting the Scenario Reports

After reviewing the 25 scenarios reported in Sections 4, 5 and 6 of this report, the CfAF team decided that the best approach to take in identifying potential candidates for CLA analysis was to suggest that the ACA Project Team consider the top 10 scenarios based on Table 2 Consolidated Scenario Dashboards (summarised in Table 4 below), and choose four from that list.

Table 4 Top Ten Scenario Reports

Name	Total
A Clean Energy Future for Australia	27
Australia 2025: A Framework for Analysing Australia's Possible Future Workplaces and Workforce Development Requirements	27
Central Highlands Water: 2025 Scenarios	25
Future Australian Climate Scenarios	25
A review of global scenario exercises for food security analysis: Assumptions and results	24
Future Scenarios for Australian Bushfires	24
FISTERIA IST Forum	23
Negotiating Our Future (Australian Academy of Science)	23
Aspire Australia 2025	21
New *Lens Scenarios*	21

Key

Text in black are Australian scenarios

Text in red are international scenario

Test in black bold are industry scenarios

This decision was made to ensure that the scenario reports used for further analysis were most appropriate for the needs of the broader *Securing Australia's Future* project. The choice of scenarios is best made by the people who will be taking the outcomes into the next project stages – since they, rather than the CfAF team, will have a clearer understanding of what is needed and what is most useful for those next stages.

The 10 scenarios in Table 4 were each well-developed enough to provide a base from which CLA could be undertaken. They are also varied enough in their purpose and outcomes to ensure differentiation across them in terms of CLA analysis.

The ACA Project Team selected the following four scenarios:

- A Review of Global Scenario Exercises for Food Security Analysis: Assumptions and Results,
- FISTERIA IST Forum,
- Negotiating our Future (Australian Academy of Science), and
- Australia 2025: A Framework for Analysing Australia's Possible Future Workplaces and Workforce Development Requirements.

CLA has been applied to these reports in the following sections. Note that only one report (Australia 2025) consisted of scenarios developed for a particular project. The remaining three reports were reviews of a range of published reports on particular topics.

8.2.2 Australia 2025: Three Global Scenarios: A Framework for Analysing Australia's Possible Future Workplaces and Workforce Development Requirements

Available online at: http://www.awpa.gov.au/our-work/national-workforce-development-strategy/documents/Aus2025Scenarios.pdf

These three scenarios developed in 2009 as part of a Skills Australia project have identified three core factors likely to shape the workplaces of the future:

- market incentives,
- aspirations to equity and social cohesion, and
- coercion and regulation by the state.

These are the 'big headlines' from which the scenarios emerge with each using two of the three aspects to frame their assessment (Market Incentives + Aspirations, Market Incentives + Coercion, and Coercion + Aspirations). It is stated within the document that the scenarios have leveraged the Royal Dutch Shell's (2005) scenarios: *Global Scenarios to 2025* as their key informing document. There is no discussion as to whether Skills Australia considered either other drivers more relevant or the veracity of the scenarios developed by Royal Dutch Shell. It can be assumed (though is not specifically stated) that the selection of the three drivers above is based on ones identified by the 2005 Royal Dutch Shell scenarios:

'Each of these forces is directed towards objectives that are valued to different degrees by all societies:

- efficiency,
- fairness or social justice, and
- security.'

The document also makes explicit the next CLA level (Social Causes) by stating the judgement criteria for action in response to the three key drivers:

'These scenarios are intended to be used to consider the possible future nature of Australian industries, organisations and the workplaces within them, on the one hand, and the possible future demand and supply of the skills that Australia will need in order to be judged "successful" by all key stakeholders, on the other. The analysis will be carried out against the backdrop of "success" as that term is likely to be interpreted by the key stakeholders in each possible future scenario' (3).

The final output from Skills Australia is three scenarios which are considered in the remainder of this assessment:

Low Trust Globalization – a world of global markets and coercive states,

Open Doors – a world of global markets and cohesive civil societies, and

Flags – a world of dogmatic, zero-sum assertion of social values and coercive attempts by states to rally divided societies around the flag.

Scenario 1: Low Trust Globalisation

In a world of scepticism the responses at a social level manifest themselves through heavy regulation, compliance focus and an abundance of lawyers and accountants. This world is driven by high costs of regulation, a lack of market based mechanisms suited to dealing with trust and rapidly changing regulations and a society with a highly short term view of handling social issues.

The main players at a global level are large multinational corporations who call on Global institutions to find a means for simpler terms of trade within and between nations. As countries move back toward artificial trade barriers, the worldview of the MNCs is clear – an economic and regulatory driven worldview which sees them move to where the best incentives for business are located.

The Worldview of countries is also well stated – in this scenario keys aspects are protection of borders and national security. At a Social Causes level, this is seen in a thriving National and private security apparatus. The idea of a Global Commons evaporates under the pressure of National interests, which include internally focused research and development and intellectual property protection measures.

Education imperatives are driven by the needs of the labour market and wage negotiations are both decentralised and highly varied among industries and sectors. The approach has a short term focus delivering training that plugs gaps and immediate needs, with the rise of private training providers generating much of this capacity in skills development. Yet even as this is taking place, participants in this workshop recognised the likely polarisation of workplaces across skilled and unskilled employees and across society through income levels.

Where government capacity is insufficient or not prioritised, we see at the social and worldview levels, the rise of NGOs providing 'oversight' for market abuses or dysfunction.

The underpinning Myth/Metaphor of this low trust globalisation scenario is the ability to 'pick winners' and develop appropriately skilled employees in advance of the emerging industry opportunity. This is recognised as the need to have a 'benevolent dictator' approach at a Government level whose task it is to identify the growth area potential and set policy accordingly. The impact and shift toward short termism is further heightened via a lack of long term perspectives at both Government and large Institutional levels.

Stakeholder Feedback: the responses to the feedback highlight a 'post response' mindset, wherein actions and ideas are suggested in light of the scenario existing, but almost nothing indicating ways in which such a scenario could be avoided. This is a common challenge with 'off the shelf' scenarios

Scenario 2: Open Doors

The Litany level of the Open Doors scenario is one of high trust and one in which globalisation has come to be seen as inherently beneficial. 'Success' is defined by being a good local, corporate and global citizen. Participatory decision making thrives, with advocacy and dialogue to the fore.

Major entities (government, religions, corporations and society) are working together in a systemic way, seeking out and developing ever more effective ways to better the state of all inhabitants, with an aim of 'win/win' and increasing tolerance. Much of the innovation in society occurs in knowledge clusters involving inputs from all levels and layers of society.

Part of that push is the drive for consensus with the state acting as a referee of sorts, helping parties reaches shared understanding. This is an interesting development as concurrently governments hand responsibility over to NGOs and reformed state institutions to aid in capacity building for consensus and tolerance, while simultaneously, corporate entities are more likely to engage in partnerships and joint ventures.

At the Social Causes level we see a greater level of trust shown in the way that corporation go beyond reporting of bottom line financial results, in line with Investors taking a much longer term

outlook. Society has a great focus on ethical investing and there has been a move away from litigation and lawsuits to one in which corporate social responsibility and the 'court of public opinion' hold sway.

The scenario suggests that provision of traditionally state-provided goods and services has been blurred, with many of those now being provided by society, though little is suggested as to how the influx of a private enterprise into these areas increases the trust levels across society as a whole.

The Worldview level is quite clear: policy settings of governments are geared toward the distribution and creation of more equitable societies. The dollar matching incentives to private entities, the development of an increasingly skilled and mobile workforce all exist. The question for the reader is whether there is a chicken and egg position: does trust need to exist before a skilled workforce and policy settings that aim for equity emerge, or do those policy settings lead to the required level of trust?

The underlying Myth/Metaphor level for this scenario to be plausible is based on two factors stated as success in the Middle East enabling peace to develop, and 'Reputations' as being more important than qualifications or shareholder returns. There is nothing in the scenario that questions why the Middle East is singled out as being the existing challenge to peace overall, nor whether other regions/entities exist that might be preventing the development of global peace. While the scenario shows why a positive reputation is important, there is no discussion as to how such a setting emerged or developed, or what is required to enable one to emerge or develop.

Stakeholder Feedback: Australia's role is explored by participants who indicated the likely emergence of a 'One-Party' state, increased permanent and temporary immigration and reduced inequality. Some of the social responses include a move to increase literacy rates among the disadvantaged and the increasing distribution of technology, and a shift in Government toward the role of facilitator rather than regulator.

Interestingly although it is stated that trade would be dominated by global entities, the respondents then suggest that decision making would be slower yet more sustainable, though no discussion as to why these two factors go hand in hand.

Scenario 3: Flags

At the Litany level, the Flags scenario is structured around a more dogmatic world where 'self-identity' statements are key and where globalisation is fragmented. It could be suggested that this is a world where 'Buy Australian' and 'Australian Made' (specific to each country) dominates the ways in which businesses attract customers and develop their brands. Governmental policy settings only entrench that position.

Success in this world would require alignment or membership of an important 'tribe' as ruling elites and their friends dominate social structures.

At the Social Causes level, media is focused on corruption issues and political compromises and societies develop increased layers of rules and regulation that impede intrusion from outsiders, while also leading to increased compliance costs internally.

As society develops its preference for multiple singular identities, the rise of populist politics, favours, incentives and opaque government relationships increases the lack of trust across society. Violent protests increase and weakened international institutions are unable to assist. The fragmented nature of global politics is matched by a reduction in investment by corporations, and the state is turned to as provider of services and goods once the main domain of industry.

At the Worldview level we see the lack of internal competition leading to increasing inflationary pressures. Trade Barriers that entrench and prop up national industries only exacerbate those pressures, but nothing is done to ease the barriers. Bilateral and regional trade agreements are pursued but there is little enthusiasm for international developments in any area.

The Flags scenario does not readily suggest a dominant Myth and Metaphor layer though if anything stands out, it is the shift toward 'National Identity' as likely. The question for the reader however is what a National Identify might look like for a multi-cultural society and which identity might emerge as dominant?

Stakeholder Feedback: participants responded to this scenario indicating a rise in indoctrination of thinking (as opposed to education for thinking), diverse groups across society, increased nepotism and corruption and a drop in innovation and productivity as likely.

Interestingly, despite trade barriers, there is the suggestion that new industries would emerge at a time when at a political level, protection of elites is counterbalanced by the push to assisting the disaffected. The indication is the rise of grey/black market economies and a rise in criminal and illicit activities.

It is clear that this scenario indicates the increases in 'preferred supplier' status as Governments choose friends to supply goods or services.

To an extent the responses to this scenario seem counter intuitive: despite the appeal of nationalism and the protection of elite interests, there will be a rise of and attraction to leadership in the form of privileged elites with a strong social conscience. This occurs at time of rejection of leaders with more conservative values. Nothing in the scenario seems to test this proposition despite the narrative presented to them.

Overall Assessment

If it is accepted that one of the main aims of CLA is to identify bias, then these scenarios provide a good example of what can emerge when the starting propositions (main drivers) are untested at the outset. There is much good thinking that has emerged and the narratives are well designed. The challenge however, is identifying whether or not the thinking has been shaped by the underpinning assumption that the main drivers of change over the identified period (market incentives, aspirations to equity and social cohesion, and coercion and regulation by the state) predominant as main drivers of change. If additional data is available that suggests they do not exist, then the scenarios themselves and the ideas for responses that have been generated as a result are moot.

8.2.3 IST Fisteria Scenarios

Available online at: http://www.cs.cas.cz/itstar/files/Scenario_Pool_version_11.6.pdf

The synthesis set of Information Society Technology (IST) scenarios are one of the better scenario reports that were reviewed. Focused on IST in the European Union, from its outset the report identifies weaknesses and strengths of differing scenario process and clearly states their intention to overcome those weaknesses using the approach they have taken.

There is a clear identification of the key drivers believed to be shaping the future, as well as an indication of why these drivers are believed to be important for their forward view. Drivers identified are:

- relationship and communication,
- ageing population and health,
- cultural pluralism,
- community learning and planning processes,
- miniaturisation of communication devices,
- interconnectivity and systems integration,
- mobility and evolution of trade and economic affairs,
- environment and sustainability,
- government efficiency, and
- security concerns.

The challenge that the identified drivers are influenced by differing member state's approaches to IST issues and overall policy settings is flagged at the beginning. From a CLA perspective, the report has from the outset aimed to clarify what issues are considered important in generating the scenarios, as well as taking a wide view of drivers.

There are however, challenges in using CLA as an analytical tool on this report given the differing methodologies used in the scenario projects reviewed. For instance, the Euforia scenario was generated through the Delphi method, typically gathering subject matter experts through a multi stage survey with opportunities for refinement of opinion. The STAR scenarios were generated via survey while SeaMate scenarios were projection based or forecasts. The ISTAG scenarios were workshop based, and FLOWS scenarios were panel based, which typically share a similar morphology as a Delphi but with fewer numbers of people involved in the input phase. As this report is a synthesis of scenarios, it is useful to assess it as a whole rather than selecting anyone scenario or methodology.

Litany

The report flags the 'major issues constraining the future integration of IS technologies in the EU society'. This is the 'big headline' element that focuses attention of the scenarios aiming to respond to those issues. It is not stated why Information Systems technologies are important and to an extent, the reader must take if at face value the significance of them.

If accepted that the scenarios as a whole consider those integration barriers to IST across the EU, then we would seek out what responses societies would be expected to take to minimise the barriers and increase the IST uptake.

Social Causes

The report quickly jumps into the social layer by nominating five response areas which will demand attention:

- privacy,
- security and trust,
- reliability and robustness,
- ethics,
- uneven access to finances and information resources, and
- social innovation - IST literacy and capabilities.

Each of these response areas is unpacked further for the reader, explaining why they are considered important. Some of the emerging questions that may need to be answered in order to develop a strategic or policy position sufficient to deal with the five response areas are also identified.

The report goes to great detail as to what actions emerge in varying scenarios which overall respond to the five main areas, while also alerting the reader to variations such as when one scenario assesses the much broader area of 'knowledge' rather than the more narrowly focused IST.

Worldview

As would be expected and as is confirmed, the dominant worldview is one of Information Technologies experts and practitioners and the benefit they believe IST will likely provide the wider European Union audience. From this worldview we are guided to believe that greater consensus, innovation and economic improvement will be the results of increased application of IST throughout the European Union.

In reading the multiple scenarios within the report, there is no questioning as to whether IST is the only way in which social improvements can be attained, nor is there any serious discussion as to whether alternative methods can provide the sought after improvements obtained through IST.

The worldview problematique (as seen in the social causes and potential actions) is positioned as the *lack of access* as a major problem to avoid or overcome. Any counter view that an excessive access, or just access to IST may be a challenge is not considered.

Myth and Metaphor

Delving more deeply into the scenarios, the underlying mythology is that IST is a 'good' thing, and that those who do not have sufficient access to it are likely to be the new marginalised people in any given society in the future. Further, there is a hint that societies likely to benefit more are those that take a more consensus driven, widespread IST approach, versus those that are competitive and have restrictive approaches to IST. To an extent a metaphor is low IST access = low social cohesion.

Additional Thoughts

Further analysis across the many scenarios considered in this synthesis may be possible by assessing the endnotes section that offers a number of resources that assist in understanding the context of each individual scenario.

8.2.4 Food Secure: A review of global scenario exercises for food security analysis

Available online at: http://edepot.wur.nl/250425

This report is very clearly focused on food security and was conducted to inform further work to be undertaken in the European Union Work Package 5 in the Food Secure project (2012-2017). The scenario reports reviewed dealt with the environment and/or climate change and included some reference to food production and consumption, or were set up to explore the future of agriculture and the food system. As is the case with the IST Fisteria scenario report (Section 7.2.1.2), using CLA as an analytical tool on this report is also difficult given the range and diversity of reports reviewed. The assessment below is largely based on the summary analysis provided in the main report.

Litany

The issue addressed in this review is about how to ensure global food security in the future. It focuses on four aspects – availability, access, utilization and stability, noting three major indicators – food prices, calorie availability and child malnutrition – that create the parameters of the food security problem as they see it. That food security is a critical issue for governments to explore to ensure future sustainability for communities is accepted to the extent that no rationale is given for why a regional government would be interested in this type of project. This indicates that 'food security' as a problem is taken for granted and not questioned.

Social Causes

In the analysis of the individual reports, the following common drivers of change were identified:

- population growth,
- economic growth, and
- technological change.

The report recognised that more social and human based factors were not included, largely because of the type of modelling used. Data alone is only part of the story however, and the narrow focus of the report on food security and quantitative modelling risks ignoring a major potential change factor likely to undermine assumptions about what social causes are important – how humans might behave when faced with challenges such as declining food supplies.

The report identified two factors that would influence the future of agriculture and food security:

- climate change, and
- biofuels.

While all the scenarios dealt with climate change in some way, the report points out that no scenario incorporates the potential impact of increasing demand for biofuels/biomaterials on food security, noting that 'it is essential that the scenarios analysis and model quantification take into account the shift towards a bio-based economy" (21). This statement is an assumption in itself however, and while current trends suggest this shift will occur, it is not a certainty and that applies to all factors used to design scenarios. Decisions have to be made in all scenario work about which drivers of change to include or not and how wide to go when considering the potential development and impact of those drivers. The Food Secure report makes the point quite clearly that not including the potential shift to a bio-based economy as a contextual element for the scenarios diminishes the value of individual reports.

Other drivers were also assumed to be relevant without challenge. There was, for example, no suggestion that the economic growth driver might not be the most appropriate driver in a world already feeling the impacts of climate change and resource shortages and constraints. New forms of capitalism are being explored that move away from profit driven operations, and new forms of food generation and supply are emerging such as regenerative farming, local food, urban agriculture which do not depend on global markets. The aim of the Food Secure project uses the term 'sustainable growth' which is not the same as economic growth, yet there does not appear to be any definition of 'sustainable'. Economic growth is assumed to be the continuing driver.

The Food Secure report also appears to accept the validity of the three major drivers of change identified above, and given they are not recommending new scenarios be developed (see Worldview section), it can be assumed they see no point in challenging the validity of these drivers. This is a flaw in their project design, since as indicated above, there are very clear signals today that challenges to dominant economic modes are present today and need to be considered in any discussion about the future. Similarly, population growth is one aspects of a much broader set of issues around demography and social change that need to be considered if a robust set of strategic options are to be developed.

Worldview

The focus on quantification in this review reflects a scientific worldview where only data is regarded as valuable, and an assumption that any idea or concept that cannot be quantified is irrelevant. The dominant worldview however, is that of government, and given that one recommendation was not to develop new scenarios with stakeholders, this narrows the value of the report and represents the exclusion of stakeholder voices. The proposed lack of attention to stakeholder needs beyond government reflects a continuing faith in the ability of government policy making to address national and global challenges such as food security. That faith however, is being tested in most countries across the world today, with responses such as open government suggesting that the belief in governments to be able to build policy to deal with increasingly global, interconnected and complex issues is waning.

The report authors do suggest that workshops with stakeholders would be useful, but only to reflect on scenarios to be produced by the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment. The authors expect these IPCC scenarios to become the dominant story for climate change in the coming years and therefore do not expect those scenarios to be questioned, particularly because they are a 'high level' process. This is another assumption that needs to be tested and is an indication of the worldview of the authors influencing the analysis in a ways that has not been made overt. It might also represent the most cost effective option for this particular project, but in this case it is possible that a focus on costs may reduce the usefulness and take-up/acceptance of outcomes by stakeholders.

Myth/Metaphor

The 'data is good' metaphor underpinning the report is constraining because it focuses the scenarios reviewed on those with a data base. Accordingly, 'assumptions' in this report are viewed as data assumptions, not assumptions underpinning individual, organisational or cultural mindsets and beliefs about the future. The recommendation to not develop new scenarios also means that this belief in data will not be challenged.

Data is important in any good scenario project, but not at the exclusion of more qualitative factors. The Negotiating our Future scenarios reviewed in Section 7.1.2.4 are a good example of how to manage the combination of qualitative and quantitative data in a scenarios project.

Overall Assessment

The analysis in this report stayed largely in the Litany and Social Causes level, valuing quantitative over qualitative data and did not challenge assumptions underpinning that data, instead taking it for granted. Primary drivers of change for the scenarios reviewed were also accepted without challenge, although the authors did note the lack of any consideration of energy transition issues.

Solutions to challenges at these two levels are generally expected to come from government and partnerships between different groups, not from stakeholders or innovators. The underlying story across these scenarios is that economic growth will continue and that technology will provide solutions to any problems emerging. This may be the case, but equally it may not be the case, and this report has not paid attention to any non-data focused scenarios using qualitative inputs to develop a wider range of alternative responses to managing food security.

Given its focus on quantification CLA was quite difficult to apply – where there is a focus on empirical evidence only, discerning the subtler levels of worldview and myth/metaphor can be a challenge. The biggest issue here is that the narrow focus on food security from only a data perspective has reduced the capacity of those doing the review to consider change factors beyond those directly related to the food system.

8.2.5 Negotiating our future: Living scenarios for Australia to 2050

Available online at: http://www.science.org/policy/australia-2050

This project report consists of two volumes, the first reporting on process and outcomes and the second consisting of background papers. The two volumes comprise over 500 pages of work. For the purposes of this CLA analysis, only the synthesis chapter in Volume 1 was analysed, since this brought together, in a quite detailed way, the outcomes from the four working groups involved in the project.

The report was prepared by the Australian Academy of Science and focuses on the dual and interdependent challenges for Australia of environmental sustainability and social equity aiming to characterise these challenges and more fundamentally, aiming to rise the importance of an overarching challenge: "negotiating an uncertain future in the face of differences in values and perceptions that characterise an open society" (i).

The process used four foci – system resilience and social and cultural perspectives that address aspirations for Australia as a nation, and scenarios and quantitative models as tools for navigating the future. The focus of the work is to assess the multiple pathways Australia has to the future, and to promote the concept of living scenarios – "shared, ongoing explorations of how the future might evolve…" (3).

This is a project which takes an overt futures perspective, underpinned by the need to build adaptive capacity to deal with the reality that the future is uncertain, contested and ultimately shared. The Steering Group suggest that this work might "spark a process of national foresighting" and "become a more formal national project". Nine scenarios were produced and it is how the narratives merge to produce options for Australia's future that is a notable element of this work. That is, the scenarios themselves are not the focus of the exercise, but rather what the exploration of alternative futures suggest would be robust responses for Australia to consider in deliberations about its future.

One of the useful outcomes of this work is a model for developing living scenarios (pages 42-44) that focuses on developing a process to keep thinking about the future of Australia in an active way that allows the scenarios to become an input for government planning and policy making over time

Litany

A broad question captured the Litany problem addressed in this work – what is our realistic vision for an ecologically, economically and social sustainable Australia in 2050 and beyond? The unquestioned issue here is that Australia is in need of an integrated approach to responding to ecological, economic and social problems to ensure a sustainable future. This integration is notable because it is more common to see one issue emerging in headlines and driving policy making, rather than recognising that no trend or change exists in isolation.

Social Causes/System

The report provided a detailed overview of the following drivers shaping response to the Litany question:

- globalisation, particularly in the sense of interconnectedness,
- economic growth, but this concept of growth as business as usual is challenged,
- population growth and ageing,
- increasing affluence, especially in south and east,

- increasing environmental pressures,
- rapid technological change, and
- increasing connectivity and complexification.

The last six are regarded by the authors as well-established and persistent.

A strong systems perspective pervades the work and draws together these drivers, which results in discussion of 'emergent properties' such as growth or collapse, reactions to shocks and 'vicious' and 'virtuous' cycles, alternative outcomes and pathways. This perspective is important in foresight work, because it recognises that trends and drivers of change are interdependent in both positive and negative ways. It also goes some way towards balancing purely quantitative analyses that run the risk of assuming that future events are independent rather than correlated – described in the report as 'Australia as an adaptive system made up of interacting natural and human components' (1). The drivers are analysed through modelling and deep discussion among participants, looking for both objective and subjective perspectives about how these drivers might develop over time.

Worldview

There is an expert worldview dominating this project indicated by, among other things, the framework used by the workshop designers – the Dahlem model which promotes interdisciplinary communication and cooperation among scholars. Given that the work is sponsored by the Australian Academy of Science, this is not a surprising approach to take. The range of people involved in the project is quite diverse however, and the text indicates that there were robust discussions and disagreements during the process which suggests that challenging of views and moves to be inclusive were encouraged.

While quantitative modelling is included, the report does not have a primary data focus. The value of participatory modelling is also stressed, for example, as a way to promote discussion among groups with differing objectives and to remind people that not everyone views the world in the same way. This is one of the fundamental design principles of good scenario work.

Myth/Metaphor

One metaphor is 'strength in numbers' – the report stated the critical role of interactive, participatory processes in grappling with the future. The process used was very heavily designed to generate that participation, albeit with mainly experts as opposed to more public and community participation. There is a suggestion here that a more inclusive and consensus driven approach would be of great benefit to Australian society.

"Living scenarios' is a second metaphor – this concept has the potential to be an underpinning story about how Australia faces the future, looking not for THE future pathway, but seeking out options that are plausible (consistent with natural laws), acceptable (consistent with aspirations for human wellbeing) and agreed (to the extent necessary for action).

Overall Assessment

Unlike most of the reports reviewed, the process used in this project set out to challenge assumptions and worldviews about the future of Australia, and the depth of output is a reflection of this approach. Solutions to the challenges explored are not seen as coming from experts and government only but rather the participants see the value of a widely based, continuing process to engage Australians in exploration of their future. It is an excellent report in terms of design and process.

9 Scenario Project Design Principles

The review of individual scenario reports (Sections 4, 5 and 6) and the CLA analysis in the last section has highlighted the importance of several design principles for ensuring the development of high quality scenario narratives and relevant and useful strategic outcomes.

Quantitative AND Qualitative Data

The Food Security report was a good example of how narrow a scenario project can become if it relies exclusive on quantitative data modelling to generate the scenarios. The Australia 2050 report was a good example of a deep and broad scenario development process that took advantage of the power of both quantitative and qualitative inputs to produce high quality outcomes. The message here is not to privilege any one form of data in scenario planning projects.

Systems Perspective

A narrow focus in a scenario project may enable very focused recommendations for action today to be developed. The risk, however, is that the drivers of change considered to create the context for the scenario development are confined to those with a direct impact on the topic. The potential result is that when change occurs outside these drivers, the agreed actions will no longer be relevant or useful. A systems perspective is essential in scenario work to take into account the interconnected and interdependent change 'ecosystem' and ensure a robust understanding of possible future outcomes is achieved.

Challenging Assumptions

The individual scenario report assessments CLA analyses cite several instances of assumptions that have not been challenged during the scenario build process. This inevitably produces scenario outcomes that are more of today rather than addressing possible and alternative futures. Humans are prone to a number of cognitive biases when it comes to thinking about possible futures, and we tend to believe that the future will essentially be more of today. Not challenging assumptions and their underpinning biases means that scenario project outcomes are likely to be flawed and become irrelevant as soon as the world changes.

Seeking Alternative Futures

Good scenario work produces a range of distinctively different future worlds within which particular strategic issues or questions can be explored. There is never a single, linear future. Rather, there are a range of possible, alternative futures that can be analysed and interpreted to identify both future change drivers likely to affect an organisation, and possible strategic responses. This is why at least four scenarios are preferable, to avoid the *good and bad* scenario set or the *no change, some change, radical change* scenario set that do not generally provide enough differentiation to challenge the thinking of participants. Seeing possible – and plausible - alternatives is essential to generate new, innovative ideas that prepare participants and their organisations for change in the future.

Participatory Processes

The choice about whether or not to include a broad range of participants in scenario work is one that is usually based on cost, resources and time available. Wherever possible however, a wide range of stakeholders should be included in scenario work from the beginning of the project, as opposed to asking them for feedback on prepared scenarios as was the case in the Future Focus scenarios (Section 4.5) or the Skills Australia project (Section 4.12). Stakeholders are critical 'players' in the implementation of scenario project outcomes and cannot be expected to own be involved in implementation of those outcomes if they are not provided opportunities to have their say in the shaping of the scenarios themselves.

Seeking Outcomes that Both Pull and Repel

When developing scenarios, it is often easy to identify those aspects of the future that appeal to participants and that *pull* them into a preferred future. This is important since these aspects will form part of a shared vision for an organisation or government, and can represent strategic opportunities. Elements that cause a repelling reaction among participants are also necessary, since the future will consist of more than positive change. The ability to identify those aspects of a future that participants *don't* want is a critical part of scenario driven strategic decision making, and these elements can form part of an organisation's risk management plan and its scanning program to develop contingency plans and to monitor the evolution of those risks over time.

Connect the Future with Today

Many of the scenario reports reviews suffered from the gap that is common to many such projects – a failure to connect the exploration of alternative futures with today's strategy development. As indicated in Section 7.3, it is this lack of an overt connection of potential strategic actions with today's strategic processes that undermines the value and utility of scenario work in practice – and this lack of connection is clear because very few reports reviewed identified strategic actions to be considered today.

One way to avoid this gap is to be very clear about not only the purpose of the scenario project, but also how the outcomes will be integrated into existing strategic processes, whether at organisation or government levels. If this proposed integration is clear, participations will know how the outcomes will be used, and the project will avoid being relegated to the realm of 'nice but useless in practice'.

10 About the Centre for Australian Foresight

Centre for AUSTRALIAN FORESIGHT

Founded in 2012 the Centre for Australian Foresight exists to provide forward looking intelligence to support strategic decision making, policy formulation and community development. For the first time in Australia, an unparalleled depth of expertise across an array of domains is collaborating under the central banner of the Centre for Australian Foresight. The founders of CfAF and our partners offer an extension of strategic capability to any organisation anywhere in Australia.

We aim to enable individuals, organisations and communities develop the capacity to be futures ready, to anticipate change locally and globally and to understand the implications of those changes on our choices for action.

At the Centre for Australian Foresight (CfAF) we understand that to many people, the world appears to be increasingly complex and fast paced. Our experience shows, however, that organisations and individuals struggling with the 'rate of change' share a single common characteristic: their models of decision making are well past their use by dates. With a suite of proven methodologies and tools, ANY organisation or individual can slow down the perceived rate of change and simplify the world around them. To do so requires a willingness to explore both the world around you and your internal processes in ways that sift out the critical issues from the noise of everyday life.

More information is available on the CfAF website at: http://cfaf.com.au.

Questions and requests for clarification/further information should be directed to Marcus Barber (marcus.barber@cfaf.com.au) or Maree Conway (maree.conway@cfaf.com.au).

11 References

11.1 Scenario Planning References

Hardin Tibbs' paper, Making the Future Visible: Psychology, Scenarios and Strategy, is a must-read paper for anyone interested in using scenario planning. Tibbs writes about the future as a strategic landscape and uses this graphic to explain it (Figure 3).

Figure 3: The Future as a Strategic Landscape (Hardin Tibbs, used with the author's permission)

The "star" in Hardin's image is the long term guiding purpose for an organisation, the reason why organisations exist, and the pull of the future that keeps us going when the chessboard gets difficult to navigate. The chessboard is the land of scenarios, where we develop strategies to move us closer to the star. The key in futures work is to clearly define your star, and keep your eye on that as you move through the chessboard of day-to-day life.

Other key scenario planning references are provided here.

Ron Bradfield, George Wright, George Burt, George Cairns and Kees Van Der Heijden, 'The origins and evolution of scenario techniques in long range business planning' *Futures* 37: 795-812, 2005.

Thomas Chermack, *Scenario Planning in Organizations: How to Create, Use and Assess Scenarios*, San Francisco: Berrett-Koehler Publishers, 2011.

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Mats Lindgren, Hans Bandhold, Bruce Pilbeam, *Scenario Planning: The Link Between Future and Strategy,* Palgrave: Macmillan, 2003.

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Bill Ralston and Ian Wilson, *The Scenario Planning Handbook*, Mason: Thomson Southwestern, 2006

Rafael Ramirez, John W Selsky, Van der Heijden, Kess, and Cable, Vince, *Business Planning for Turbulent Times: New Methods for Applying Scenarios,* Milton Park, Earthscan, 2006.

Gill Ringland, *Scenario Planning, Managing for the Future*, John Wiley and Sons, 1998. Also *Scenarios in Business* and *Scenarios in Public Policy*, both published by John Wiley and Sons, 2002.

Peter Schwartz, *The Art of the Long View*, New York: Doubleday, 1991. This is a 'classic' reference). See also *Inevitable Surprises: Thinking Ahead in Times of Uncertainty*, New York: Gotham Books, 2003.

Kees Van der Heijden, *Scenarios: The Art of Strategic Conversation*, John Wiley and Sons, 1996. See also *The Sixth Sense*, also published by John Wiley and Sons, 2002.

George Wright and George Cairns, *Scenario Thinking: Practical Approaches to the Future*, Palgrave Macmillan, 2011.

Other Scenario Planning References

GBN (Global Business Network) has produced a scenario planning guide for non-profit organisations titled The Art of Scenario Thinking which is an excellent reference guide.

Volume 13, Number 3 (2009) of the Journal of Futures Studies has a number of articles in a 'scenario symposium', reflecting on the current state of scenario planning.

10.2 Section 7 (CLA Analysis) References

Inayatullah, S, (2004) *The Causal Layered Analysis (CLA) Reader*, Taipei: Tamkang University Press.

Inayatullah, S, (2009) 'Questioning Scenarios', *Journal of Futures Studies*, 13: 75-80.

Appendix 1: Template Decisions

The template used in this review incorporates elements sourced from the guidelines provided by the ACA Project Team and an assessment by the CfAF team about those factors that provide the critical context for building a plausible forward view of a future operating environment for any organisation, and what would be most useful to readers of this report.

There were a number of decisions made to omit suggested elements from the template, and the rationale for these decisions is provided here.

The team made a decision to leave out *Scope for Further Quantitative Analysis*, while recognising this was a key factor for later project stages. An assessment of a number of major drivers that are most amenable and most appropriate for further quantitative analysis is made in Section 7.

This decision was made as there is almost by default some scope for further quantitative analysis for any scenario, particularly when large global forces are identified such as population, economic growth, technological change, environmental change. There is much data on these factors that can be used for further quantitative analysis for Australia's context. Which scenarios are best suited to this sort of follow-up is again problematic because quantitative modelling risks assuming a certain outcome and a single linear future unless the modelling process is sophisticated and takes account of the impact of a range of drivers. Some of the scenarios reviews showed this flaw, with quantitative projections being used as 'the future' rather than just one possible future. Nevertheless, as indicated above, the team has indicated a number of drivers that may be suitable for further analysis of this type.

The team also decided not to include '*Recommendations for responses to insights and conclusions from the scenarios, and assignment of responsibilities for such responses*' because this would be impossible for us to do in any meaningful way. Where recommendations are provided in the reports, these have been included, but given our level of knowledge of the key players in, and intended audience for, the project, we would be able to provide only a general and superficial response which in our view would be of little value. Similarly, identifying responses and responsibilities needs to be conducted by the people who know their industry, their sector and who will be responsible for implementing any action required. Consistently, knowing the preferred position of a scenario author or industry sector will be a better indicator of the likely preferences for action.

The quality of the scenario reports varied in detail and depth which often made it difficult to identify value propositions, assumptions underpinning the scenario development, and response variables. Value positions may become more obvious in those scenarios selected for further analysis using Causal Layered Analysis (CLA).

Wildcards/black swan events were not included in the template. There is no easy way to identify wildcards as they must be considered against each particular set of scenarios, and individually designed to match each scenario. There are a number of simplistic global wildcards which can be applied to any scenario – for example, the internet being hacked, or contact with extra-terrestrial life – but these are of little value if not designed to have an internal logic in particular scenarios. How and why the internet was hacked or how extra-terrestrial life came to be contacted matters if these factors are to be relevant for the scenario worlds created and the possible strategies to be developed. Without this contextualisation, it is easy to dismiss wildcards as irrelevant, thus preventing new ways of thinking about strategic issues to emerge.