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Scenarios for selected timber markets

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Scenarios for Selected Timber Markets

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Forest & Wood Products

Research & Development Corporation

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SUMMARY

Forecasting Timber Consumption

What are the major forces of change driving timber supply and demand in Australia over the next 35 years and how will those changes influence conditions in the Australian timber market in 2020, especially the nature and level of timber consumption?[1]

These were the key questions considered by a group of timber industry stakeholders at a workshop in March 2005. Future timber consumption is of great interest to the owners and managers of Australia's forests, timber mills and processing factories as well as residential builders, architects and manufacturers of timber products. While future timber supply is rather predictable, consumption is subject to a wide range of influences making its future highly uncertain.

Traditional economic forecasting techniques are limited in not being able to account for discontinuities and previously unexpected events or patterns. Using the technique of scenario planning it is possible to explore a number of likely timber consumption futures that are plausible, logical, internally consistent and novel, each clearly linked to conditions in the present. In this project, timber consumption outcomes are explored through three scenarios which serve as a valuable framework or testing ground for those involved in the industry, to explore strategy or policy choices for the future. The context of each scenario was used to define critical parameter values for ABARE's model of domestic timber consumption, thereby linking scenario planning to traditional economic forecasting. Quantitative estimates of timber consumption in 2020 were determined using the ABARE model. However and importantly, this process is not attempting to provide quantitative forecasts of future timber consumption, but to explore three different futures and their implications for timber consumption. The future is not predictable and it can be a risky decision to lock in one particular view or assessment of the future. Realistically, the future is likely to consist of elements of all three scenarios developed in this study.

2005 – A Base Line to Many Possible Futures

Australia in 2005 is under the influence of political, economic, social, environmental and technological factors that may combine in many different ways to shape the nation's future. Most of these change drivers are beyond the influence of an individual company or industry. Knowing how they might evolve and interact over the medium to longer-term can be of great value to important strategic and policy decisions.

The first step in scenario planning is to understand the present and the events and patterns that have helped shape it.

After 14 years of economic growth averaging 3.5% a year, signs of a slowdown are apparent with a decline in the housing cycle, low unemployment and emerging capacity constraints in the economy. What impact will oil price hikes, international terrorism, climate variability or major disease outbreaks have on our economy?

[1] Question posed at Scenario workshop in Canberra, March 2nd 2005.

Household consumption expenditure and debt are at record levels. The influence of China's growth has been positive for Australia, but we have an ageing population and the pace of economic and structural reform has declined. Australia's international competitiveness has declined in recent years. The future is unlikely to be an extension of the past.

The rate of population growth in Australia has been declining in line with a declining fertility rate as women delay having children and family sizes fall. Life expectancy however, is increasing. Despite these trends, the size of the labour force is expected to grow, although critical labour shortages in some skill areas are emerging, especially in rural areas. The contribution of net migration to population growth has been significant in recent years. However, there is considerable uncertainty about future immigration policy, the level and type of immigration and how it will affect Australian society in the future. Household formation has grown faster than population, while average household size has fallen. More Australians are relocating to coastal areas away from metropolitan areas and residential densities are increasing in Australia's largest cities as many choose to live closer to work. One commentator described Australian society in 2005 as being insecure and wearied by too many changes, seeking refuge in matters under their own control.

Recent droughts and water supply shortages for major cities and towns heightened environmental awareness for most Australians during 2005. Climate change and variability, land degradation and dryland salinity, water quality, biodiversity conservation, energy management and greenhouse gas emissions increasingly influence individual and collective decisions. Governments, industry and community are involved in a range of programs to protect and improve the natural environment. Will these patterns continue into the future or will they change and if so, how might they change?

Australia's forest and timber industry has changed under the influence of economic growth, population dynamics and natural resource management policies and regulations. Timber production over the past decade has increased at more than 4% a year, largely from softwood plantations. Hardwood production has been stable as access to natural forests has declined. Sawntimber demand has been high under the influence of a housing boom, with some 70% of sawntimber directed to residential housing. Timber supplies from Australia's expanding hardwood plantations will grow over the next ten to fifteen years with product options likely to expand beyond woodchips. But with the economy slowing, uncertainty around immigration intake numbers and the prospect of further restrictions on access to native forests, the industry faces an uncertain future.

Australian industries, governments and households face many uncertainties. The use of scenarios can help organisations and individuals to better understand how the future might unfold from the conditions of the present.

Critical Drivers of Change

The critical drivers of change are those assessed as having the greatest impact on future timber consumption in Australia and those that are the least predictable. The stakeholder workshop identified a total of twenty six change drivers. Following further analysis, eight of these were selected as the most critical drivers with respect to timber consumption. They are:

- Climate change and environmental services (influences and responses)
- Political decision making and governance (regulations)
- Infrastructure investment and development
- Domestic economic growth
- Energy costs
- Health issues
- Skilled labour supply
- Australian population and demographics including social change.

The Scenarios

Three scenarios describing three distinct futures were defined using the critical uncertainties and building on preliminary scenarios developed during the stakeholder workshop. The scenarios are:

- **Building Bridges** - a world of new and strengthened relationships between institutions and individuals driven by a shared vision for a better world.

- **High Rise Living -** a world driven by growth, ambition and personal achievement with many opportunities and just as many dangers

- **Little Boxes** - a planned and ordered world with the government taking control of Australia's environmental destiny and the means of getting there.

Building Bridges

This scenario describes a world of new and strengthened relationships between institutions and individuals driven by a shared vision for Australia to be a healthy, wealthy and wise nation by 2020. Environmental sustainability is paramount, achieved through collaboration between public and private institutions and individuals and organisations. Inspirational leadership and a major rethink about personal and national values has moved Australia from a narrow economic management culture in the early years of the new millennium, to a culture based on achieving balance among social, environmental and economic objectives. The focus is on the long-term and multiple outcomes: economic growth, environmental sustainability and social equity. In 2020 the business environment is competitive and the economy open. Ethical investments and triple bottom line accounting are common in the corporate sector.

High Rise Living

This scenario describes a world driven by growth, ambition and personal achievement. It is a highly competitive world with lots of opportunities but also lots

of pitfalls for the unwary. The main game is economic growth and wealth creation. Governments, private organisations and individuals are preoccupied with insecurity and uncertainty emanating from sources such as the threat of international terrorism, a major down-turn in the property market, rising energy costs, career opportunities in Australia, skills shortages, immigration policy and climate change. Their time frames are short-term however, so there is little interest in structural reform. It's all about here and now and the impact of changes on the bottom line. It's about building status and becoming affluent and getting to the top as a nation, a company or an individual as quickly as possible. There are just a few areas of national cohesion and unity and these are challenging and costly to sustain because of the lack of integration among Australia's economic, social and environmental systems and institutions. A few companies and State governments go it alone on environmental management and have some success. It is a risky existence and many who are disillusioned with government and corporate leadership are seeking new ways. This scenario can best be described as a laissez-faire economy with lots of individual freedom and almost absolute reliance on markets.

Little Boxes

This scenario describes a world that is planned and ordered with the government taking control of Australia's environmental destiny and the means of getting there (i.e. big brother or nanny style government). The government has a strong environmental orientation. It is a major reversal of trend in terms of the role of government in the management of public goods and services. It was imposed as a result of the high level of dissatisfaction among Australians with the predominantly economic rationalist approach to governance and economic reform in many sectors of the economy including natural resource management.

Australians demanded an end to harvesting in natural forests, farming in sensitive ecosystems, the wasteful use of natural resources especially water, and the adoption of more humane livestock practices. They wanted a government that would sign the Kyoto Protocol, get serious about carbon emissions targets and commit to the protection of Australia's unique and fragile natural environment including the protection of its biodiversity and the quality of land and water resources. Little Boxes is a world of targets, regulations, standards and taxes. The government is committed to its environmental reform agenda and to positioning Australia as a world leader in sustainable production. While there is widespread support for better outcomes for the natural environment many individuals and organisations object to the government's high-handed approach, especially where it adds to the cost of production and is funded from increases in taxes. Furthermore, regulations often conflict, such as the preservation of old buildings versus the pursuit of energy efficiency. Such conflicts can lead to delayed and protracted planning approvals. There have been some costly mistakes and a lot of compromises, but government is still directing management of the natural environment and those activities which impact on it.

Timber Consumption Perspectives 2020

Timber consumption levels in 2020 differ between the three scenarios because of differences in the way the critical uncertainties play-out within each scenario. In Table S-1 below the state of each critical uncertainty is described for each scenario. The purpose of this table is to demonstrate the distinct differences between the three scenarios.

Table S-1:
Differences between the Scenarios

Drivers	Building Bridges	High Rise Living	Little Boxes
Domestic economic Growth (Ave GDP)	Moderate 2.95%	High 4.0%	Low 1.5%
Population and demographics including social change Average annual Population Growth rate	0.83%	1.11%	0.55%
Population in 2020	22.95 million	23.93 million	22.02 million
Household formation rate	Slightly above trend – marriage on the rise again, fewer relationship break-ups, retirees shift to coast and bush and invest in city apartments	Higher than trend – high relationship turnover, high divorce, career focus ahead of children, retiree investment in city apartments	Below trend – slow down in relationship turnover, children stay in parental home longer, retirees work to 65 with few upgrading or downgrading housing
Immigration intake	High	High	Low to moderate – population policy
Environmental Services	Market based instruments	Mixed market & regulations	Regulations
Political Decision Making	Decentralised	Status Quo	Centralised
Energy Costs	Declining	Fluctuating	Increasing
Skilled Labour Supply	Adequate with mobile workforce	Shortages with a mobile workforce	Variable with low workforce mobility
Technological Innovation	High – balanced investment	Low - Cost Driven Imported technology	Green driven – government funding
Health issues	Shared responsibility	Individual responsibility	Public responsibility
Resource security	High	Low	Uncertain
Social license to operate	Certainty	Uncertain	Uncertain
Building regulations	National system, cooperative; self managed	Variable between jurisdictions; moderate enforcement	State based, fragmented; strict enforcement

Conditions within the three scenarios have both positive and negative influences on timber consumption over the next 15 years, as shown in the following tables.

Building Bridges

Positive	Negative
▪ Environmental attributes of timber especially its low embodied energy ▪ Relatively stable housing starts (averaging 157 000 a year by 2020) ▪ Increase of 15% in timber usage in multi-residential buildings (including engineered wood products) ▪ Increase of 5% in timber use in detached dwellings by 2020 ▪ Shift of retirees to the coast and their preferences for green buildings ▪ A 10% fall in alterations and additions activity but partially offset by an increase in timber usage (15% above 2005 levels).	▪ Share of multi-residential dwellings increasing relative to detached housing (43.5% in 2020, up from 32% in 2005) ▪ Decrease in the average floor area of new dwellings in 2020 to 90% of the 2005 averages ▪ 10% decline in alterations and additions activity in 2020 relative to 2005. ▪ A slow-down in the rate of household formation.

High Rise Living

Positive	Negative
▪ Increase in average housing starts (to around 180 000 a year by 2020) ▪ Continued increase in household formation (trend) ▪ Use of timber for formwork (panels), flooring and appearance products (hardwood) ▪ Shift of retirees to the coast and the country.	▪ Share of multi-residential dwellings increasing relative to detached housing reaching 47.4% by 2020 ▪ Technical developments in steel and concrete contribute to lower construction costs and better performance than timber structures (durability, maintenance) ▪ Decrease in the average floor area of new dwellings to 80% of 2005 averages by 2020 ▪ Consumer perceptions are negative towards wood ▪ A 10% decline in timber use in all dwellings by 2020 ▪ Decline in alterations and additions activity by 10% as householders shift to higher density living; timber use in alterations and additions also down by 10%.

Little Boxes

Positive	Negative
▪ Regulations and targets favour timber use over other materials for residential buildings ▪ Increase in the use of timber in new houses by 8% over 2005 levels and in multi-residential dwellings by 10%	▪ Housing starts decline from 2005 levels to 130 000. ▪ Real housing costs are higher in 2020 associated with the costs of regulation compliance ▪ Decline in the average floor area of new dwellings to 80% of 2005 averages by 2020 ▪ Shift to higher density living with multi-residential dwellings representing 47.4 % of new residences built in 2020 ▪ High level of re-use and recycling of materials, including timber, due to government set targets ▪ 5% decline in alterations and additions activity compared to 2005 levels ▪ The rate of household formation declines over the next 15 years.

ABARE's timber consumption model incorporates these parameters as well as other important factors such as population and household formation trends and economic growth to estimate timber consumption through to 2020. Estimates of aggregate structural timber consumption in 2020 show that in only one of the three scenarios consumption significantly exceeds 2002-03 consumption of around 6.2 million m^3. Table S-1 reveals that the outcomes vary widely. Estimated consumption is highest at 7.2 million m^3 in the *Building Bridges* scenario because of the high number of housing starts and the preference for timber because of its environmental attributes. Low housing starts and the greater use of recovered and recycled timber in the *Little Boxes* scenario results in a decline in timber consumption. Despite the high level of housing starts in the *High Rise Living* scenario, the preference for lower cost concrete and steel and the increasing rate of multi-residential building construction relative to detached housing, results in timber consumption rising only slightly above 2002-03 levels by 2020.

Table S- 2:
Aggregate Timber Consumption Projections

Product	units	Apparent consumption 2002-03	Building Bridges	High Rise Living	Little Boxes
Softwood	Million m^3	3.182	4.077	3.518	3.028
Hardwood	Million m^3	1.089	1.524	1.179	1.496
Panels	Million m^3	1.898	1.605	1.523	1.257
Total	Million m^3	6.169	7.206	6.220	5.781
Population	Million	19.872	22.950	23.930	22.020
Per capita consumption	m^3	0.31	0.314	0.260	0.262

The projections of timber consumption under the three scenarios present a range of possible outcomes. The reality is likely to be somewhere within this range. Rather than select one of the three scenarios as a preferred future and plan accordingly, the best option for the industry or individual businesses is to use all three scenarios to identify priority areas for strategy and policy development. Furthermore there are a number of changes that the industry or individual organisations can make that will be of value regardless of how the future unfolds. The scenarios are helpful in directing important strategic choices.

- The *High Rise Living* scenario presents a rather bleak future for the timber industry. Despite a high level of housing starts low timber demand growth is likely to lead to the closure of small operators and greater concentration of ownership in the sawmilling and timber processing segments of the industry. However, this is most likely to happen if the industry fails to take evasive or corrective action such as competing effectively with substitute materials on the basis of timber's attributes and addressing consumers' perceptions about the performance of timber relative to other materials. Investing in scientific research in the areas of timber durability, low maintenance timber surface treatments and timber construction systems and technologies will contribute to more positive timber consumption outcomes than the *High Rise Living* scenario indicates.

- A *Building Bridges* future requires a number of changes in society and government to achieve the projected timber consumption levels. This does not mean it could never happen, as there are signs already that such changes are occurring. The timber industry can capitalise on those early changes by taking timely actions to strengthen its competitive position for the future. For example, the industry could promote the benefits of plantation timber relative to non-wood building materials including its energy and greenhouse advantages and environmental and community development advantages – a triple bottom line message. Targets of this promotion should include designers and builders of residential buildings as well as home buyers, especially retirees. The industry could get behind efforts to enhance the economic and technical attractiveness of timber including investment in scientific research into timber's durability, flexibility, adaptability and compatibility with other materials. Prospects for collaboration among organisations from across the value chain including forest owners and managers, timber millers, product manufacturers and fabricators, architects, developers and builders, should be explored.

- The *Little Boxes* scenario presents the Australian timber industry with some real challenges, especially with respect to re-use and recycling of timber. Total consumption of structural timber declines under this scenario is largely due to the low housing starts. While regulations and targets determine the levels of timber re-use and recycling it is costly for builders and home buyers to use recycled timber resources. The industry can prepare for this future by supporting efforts to develop economically viable building products and other product options for wood waste and end-of life timber products previously disposed of in landfills. In 2005, environment protection legislation in two States incorporates extended producer responsibility requirements which places responsibilities on producers of timber-based products to ensure that they reduce waste to landfill. Research challenges include overcoming the interference from contaminants such as paints, adhesives and preservatives and efficient recovery of used timber.

Decisions on which changes to make now can be based on an assessment of the likelihood of possible options or issues occurring. Those options or issues that are common to a majority of the scenarios are likely to be robust choices for early action.

Areas with Potential for Strategy and Policy Development for Australia's Timber Industry

Issues and outcomes common to all three scenarios are often referred to as robust because regardless of whatever future occurs, they have a high likelihood of happening. These are priority areas for strategic consideration and attention. The following were identified as those areas with potential for strategy and/or policy development:

- Demand for products, services and materials that are less energy intensive in their production and their operation or use

- The shift towards medium and high density living

- Prefabrication and modularisation of residential buildings and internal building flexibility to keep costs down and accommodate lifestyle changes
- Smart wood composites and engineered wood products
- Migration from the cities to the coast (sea change) or country (tree change) associated with retiring baby boomers and changing lifestyles, and importantly shifting urban attitudes to these locations
- Decline in alterations and additions activity
- Advances in steel and concrete technology.

There are a number of other areas that occur in more than one of the scenarios which are of future significance. These include:

- The re-use and recycling of all building materials
- Regional delivery of government policies and programs
- Preferences for building materials that require low maintenance, are highly durable and environmentally benign and are cost competitive with substitutes
- The prospect of skills shortages in the building industry and related sectors
- The trend towards more integrated natural landscape management with implications for forestry and agriculture and residential developments
- The rise in sustainable production and certified products and services.

The Australian timber industry and public and private sector organisations linked to timber resources and their use should take these issues and changes into account in their planning and strategy development for the future. The development of specific plans and strategies is beyond the objectives of this study. However, some possible strategic response areas for a selected number of issues and events are evaluated.

Using the Scenarios Framework to Assess Possible Events and Changes

The framework provided by the three scenarios is very useful for establishing the likelihood and consequences or impact of particular events or possible changes to existing arrangements in the uses of a selected range of timber products. The following ‘what if’ events were assessed:

Table S- 3:
Impact of Some Scenario 'What ifs'

Event	Likelihood	Market Loss (m^3pa)	Market Opportunities (m^3pa)	Response Areas
1. The top five house builders shift to steel framing	Low to moderate	(500 000)		▪ Embodied energy ▪ Technology ▪ Timber promotion ▪ Cost competitiveness.
2. Regulators give higher energy ratings to masonry wall frames	Moderate to high	(450 000)		▪ Government ▪ Policy / Regulation ▪ Timber promotion ▪ Embodied energy.
3. Major pallet manufacturer shifts to recycled plastic	Low to moderate	(65 000)		▪ Waste regulations ▪ Technology.
4. Heart in stud wall frames banned	Medium	(300 000)		▪ Regulations ▪ Technology ▪ Alternatives.
5. Access to harvesting in native forests is stopped	Moderate to high		900 000	▪ Public attitudes ▪ Imports ▪ Alternatives.
6. All building products to be recyclable	High	(650 000)		▪ Regulations ▪ Technology.
7. Import Restrictions on rainforest timbers	High		110 000	▪ Public attitudes ▪ Alternatives ▪ Government
8. Expansion of softwood estate ceases	High	Market growth lost to imports.		▪ Land prices ▪ Government ▪ Log prices.
9. $A appreciates to equal $US	Low	(270 000)		▪ Imports ▪ Explore new opportunities and markets.
10. Australian economy falls into deep recession	Low	(760 000)		▪ Explore new markets. ▪ Cost competitiveness.
11. Ban the use of formaldehyde in panels	High	Industry is expected to adopt alternative technologies		▪ Policy ▪ Health ▪ Technology.
12. Alterations and Additions decline by 50%	Moderate to High	(750 000)		▪ Explore new opportunities ▪ Policy & Regulations ▪ Timber Promotion.
13. Skills shortages	Moderate			▪ Industry promotion ▪ Technology.
14. Certification	Moderate to High	Loss for non certified products	Opportunities for certified products	▪ Policy & Regulation ▪ Promotion.
15. Integrated Land use Planning	High	Increased product acceptance		▪ Policy and Regulations ▪ Industry networks.

The suggested response areas in Table S- 3 include areas which may be monitored in some cases and areas that require direct action to enhance or limit the impact of the particular event. This selection of events is by no means exhaustive but it includes issues of increasing importance to the timber industry. The scenarios framework can be used to test and explore issues like these as well as to evaluate the likely success of particular response actions across all scenarios.

Implications for Australia's Timber Industry

The results of this project indicate that Australia's timber industry stands to strengthen its position in the residential construction industry if it aligns itself with the opportunities that are expected to emerge and strengthen over the next couple of decades. These include:

- Householder preferences for higher density living and multi-residential buildings
- Costs of building materials as well as the overall costs of construction
- Energy intensity of materials in production and utilisation
- Management of regulations and political decision making.

Strategies are needed to ensure that timber achieves its fair share of the residential construction market based on its performance, environmental attributes, cost, flexibility and aesthetic appeal. To achieve this requires timber promotion, investment in materials and building systems technologies, continuing education of builders, designers and developers and engagement with regulatory authorities. The role of governments through regulations, standards and planning will be a key factor for the industry to monitor in relation to both how products are used in the future and where and how the resource is developed.

Selection and development of appropriate strategies are decisions for the timber industry and individual companies within the industry. With the aid of scenarios this study has broadened the scope of considerations regarding decisions for the future. The final choices are for the industry, companies and policy makers to decide.

1 INTRODUCTION

This project explores plausible scenarios for the future of the Australian forest and wood products industry based on possible variations in demand associated with changes in economic, technological, environmental, regulatory, social and other factors.

Traditionally the Australian forest industry has adopted a "business as usual" approach for long-term forecasts of supply and demand. For example, ABARE's 1999 Research Report (99.5) on Forest Products – *Long-term consumption projections for Australia* has been typical of the industry's view of the future. Generally this approach has allowed only for modest changes in economic and demographic factors and is unable to predict structural changes such as the increased use of recycled fibre in paper production or the development of new reconstituted or engineered wood products.

On the other hand, a scenarios approach allows many factors that may influence timber demand to be considered including previously un-encountered events.

Undertaking a scenario analysis is timely for the Australian forest industry as it faces a number of major challenges including:

- Significant changes to the supply demand balance with increasing volumes of hardwood pulpwood coming on stream, softwood supply seeming to plateau and native forest supply declining. These changes will have impacts on processing potential and industry competitiveness.
- Environmental pressures on building regulations, energy production, plantation development and greenhouse gas reduction are creating both opportunities and threats for the industry.
- Substitute products particularly steel, concrete, aluminium and plastics are making concerted attempts to move into traditional timber markets such as house framing and packaging.
- Through advances in processing technology, engineered wood products have the potential to compete with traditional sawn structural products and also will challenge steel in some industrial market segments.

This project report investigates these and other challenges to timber consumption through the application of scenario planning. Following an industry workshop in March 2005 to identify key change drivers on timber consumption, a set of plausible and internally consistent scenarios were developed. They were reviewed and revised to produce three plausible scenarios or views of the future. The scenarios have been tested with industry prior to undertaking further research to assess their potential impact.

The scenarios are used to test the likelihood of a number of challenges and issues facing timber consumption and to assist the timber industry in the formulation of suitable response strategies.

Before exploring possible futures with the aid of scenarios an understanding of the present and the influences that have shaped Australia in 2005 is needed. In the following section a review of recent events is presented together with perspectives on Australia's economic, social and environmental conditions in the future.

2 AUSTRALIA IN 2005 – SETTING THE SCENE

2.1 The State of the Australian Economy

The Australian economy has benefited from strong growth over the past 14 years. Since 1991 real GDP growth has averaged 3.5% a year, with growth in the last 10 years averaging 3.8%. The reasons behind this growth are manifold, including external factors such as strong economic growth in many of our trading partners and domestic factors such as the economic reforms pursued throughout the 1980s and 1990s and the recent growth in the housing cycle.

Australia's sustained high growth has been achieved despite several events such as the Asian financial crisis, rising oil prices, periods of drought and the growing international uncertainty associated with terrorism.

Signs of restraint on Australia's recent and near-term growth are emerging in 2005 with the housing cycle appearing to have peaked, the incidence of international terrorism increasing and signs of some capacity constraints in the Australian economy, with the related threat of higher inflation and hence interest rates.

These issues will continue to pose threats to Australia's economic growth in the future. There are additional key uncertainties that will have potentially profound implications for Australia's future. For example, government policy choices and reforms relating to both the economy and the environment may dramatically change the shape of Australia's economy and society. International events such as economic growth in our major trading partners, especially the influence of China and India, and international trade reform issues will also be of key importance.

2.1.1 Medium-term Prospects

In December 2004 Martin Parkinson from the Australian Treasury warned that there are significant medium-term challenges involved in maintaining Australia's economic performance.[2] These include the impact of random events such as oil price hikes, drought, disease epidemics such as Bird Flu or SARs and imbalances in the economy such as the growth of household debt linked to high house prices. Financing of this debt has relied on increased borrowing from overseas which has contributed to an increase in the nation's current account deficit. Household consumption has been increasing faster than income, with the difference made up from borrowings based on household wealth (largely the equity in private dwellings).

While Treasury forecasts a benign adjustment, they note that there is considerable uncertainty and the risk that falling house prices 'could prompt a sharper correction in investment and consumption, and, hence in overall economic activity'. Parkinson suggests that the US current account deficit is another major imbalance which may have economic consequences for Australia. Where imbalances arise in an economy there has to be a correction or adjustment. 'Just how adjustments take place and the ability of the economy to cope with adjustments become the key

[2] M. Parkinson, 'Australia's medium term challenges', presentation to the Australian Business Economists Annual Forecasting Conference, 14 December 2004, cited at www.treasury.gov.au.

concerns of policy makers'.[3] Furthermore, the consequences can extend beyond solely economic considerations.

The third area of risk or challenge that Parkinson addressed is associated with policy inaction or the inability of the economy to adjust to major structural shifts. Examples include the ageing of the population, the integration of China into the world economic and trading system and Australia's slow export growth.

With low unemployment levels there are some concerns that the Australian economy is approaching full capacity. This may imply a restraint on future growth and potentially higher inflation, which would lead to higher interest rates. According to Ken Henry, Secretary of the Treasury, over the next decade growth will be lower than for the past decade for two reasons:

1. The fall in the unemployment rate from 9% in 1994-95 to 5% currently, is unlikely to be repeated over the next decade. Therefore, this historically low unemployment rate implies some constraint on future growth of the Australia economy.

2. The ageing of the population and its effect on labour force participation will contribute to a slowing in economic growth. Labour force participation will reach a peak in 2006-07, declining thereafter as the age distribution of the population gradually tilts in favour of older age groups with lower average rates of labour force participation.[4]

Treasury forecasts an average growth rate for GDP over the coming decade of 3.1%, slower than the 3.9% average over the past decade. This rather conservative estimate assumes that labour capacity constraints will be reached. Indications are that there is unused capacity, as demonstrated by the average hours worked by those in the workforce (just over 20 hours). Despite strong terms of trade increases, there is unlikely to be significant inflationary pressures. The high resource prices will decline as extra supplies come on stream in 2006-07 and 2007-08. Henry concluded that 'only a flexible and resilient economy will be able to deal with the challenges that confront us'.[5]

ABARE expects the Australian economy to remain robust over the period to 2010 with economic growth assumed to average 3.3% a year.[6] An expected easing of consumer spending in 2005-06 will be offset by an increase in business investment expenditure. Annual inflation is assumed to be around 2.5% over the medium-term, which is slightly higher than recent years. Given modest inflationary pressure and robust economic growth, ABARE assumes that interest rates will not increase significantly over the period to 2010. Prime lending rates are assumed to average 9.0% a year in 2004-05, 9.1 in 2005-06 and remain at around 8.7% through to 2010. The value of the Australian dollar is assumed to fall over the period to 2010 inline with declining commodity prices (easing terms of trade), lower interest rates and a stronger US dollar. By 2010 the Australian dollar is assumed to average

[3] Ibid.
[4] K. Henry, 'The Fiscal and Economic Outlook', address to the Australian Business Economists, Sydney, 17 May 2005.
[5] Ibid.
[6] J. Penn and B.S. Fisher, 'Economic Overview – prospects for world economic growth to 2010', *Australian Commodities*, 12(1), 2005, pp.15-18.

around USD0.65. This exchange rate assumption is based on assumptions that economic reforms will continue uninterrupted, high productivity growth will be achieved and sound economic management will continue.

2.1.2 The Forest Industry in Australia

While output from the forest industry in Australia has generally increased over recent decades, the contribution of the industry to the national economy has gradually declined. As a proportion of GDP, the forestry and fishing sector has contributed a constant share of GDP since 1996, while the contribution made by the wood and paper products sector declined from 0.8% in 1996 to 0.7% in 2004. Employment in the forestry and harvesting sector declined slightly between 1999 and 2004 and employment in the wood and paper products sector increased by 20% from 65 000 to 78 000. Total employment in these sectors represents almost 1% of total employment in Australia.

Timber production in Australia has been steadily increasing each year for several decades, with roundwood removals increasing by an average of 3.5% a year between 1983 and 2003 and 4.3% in the last decade. However hardwood timber removals have been relatively constant between 9 and 12 million m^3 throughout this period, with softwood timber supply accounting for most of the increase in timber production. This reflects the large areas of softwood plantations established since the 1960s in response to federal government support under the Commonwealth Softwood Agreements Act (1966).

While the majority of softwood plantation timber products are sawlogs and virtually all of the hardwood plantation timber is pulplog, there has been a substantial change in the balance away from sawlogs to pulplogs harvested from native forests over recent decades. Historically, natural forests have dominated the Australian forest products harvest, being 84% in 1960, but have declined steadily since, to around 44% in recent years. This decline is expected to continue.

As a result of these factors, the domestic hardwood sawntimber sector has declined over time largely due to constrained supply, with output down 23% since 1998. Over the same period, softwood sawntimber output increased by 29%. Sawnwood consumption has increased in recent years to almost 4.7 million m^3, 85% of which is domestically produced. The share of imports has been relatively constant since 1998, although the share of plantation softwood in total sawnwood consumption has steadily increased, reaching 76% by 2004.

The rise in sawnwood consumption has largely been fuelled by the housing cycle, with 70% of sawntimber being used in residential housing. Strong economic growth and low interest rates have fuelled the recent housing cycle, and changes to some federal and state tax structures have encouraged expenditure on house renovation.[7]

Production of panel products has also increased significantly, most notably MDF for the export market. Total panel production has increased by 29% since 1998,

[7] R. de Fégely, 'Overview Supply and Demand Australian Forest Products', presentation to Outlook Conference, Canberra, 1 March 2005.

with around 20% of total output exported. Imports comprise only a small fraction of supply to the domestic market.

The production of paper and paper products increased by about 20% between 1998 and 2003. The rise in production was attributable to packaging and industrial paper and printing and writing paper. While almost 30% of production is exported, imports are significant and account for around 39% of total domestic consumption.

Woodchip exports have increased by 20% since 1998, however significant growth occurred through the 1990s, when exports increased by 82%. The volume of softwood woodchips among these exports has remained constant since 1998. There has probably been some substitution of plantation for native pulplogs in this but data is unavailable.

Australia's domestic forest sector will face many challenges in the future. With the housing cycle seeming to be at an end, domestic demand growth for sawntimber may abate. There is also increasing pressure on harvesting natural forests, with a decline in the volume of sawlogs available from natural forests and pressure by some environmental groups on the major Japanese Pulp & Paper companies (e.g. Mitsubishi Paper Mills, Nippon Paper Industries and Oji Paper)[8] to source hardwood pulpwood only from plantations. The sheer extent of short-rotation hardwood plantation development in Australia, advanced principally under MIS schemes, may make this trend inevitable; however there are also some modest concerns about future prices for natural hardwood woodchips given plantation supply growth in other countries and the relatively static pulpwood/woodchip demand in Japan.

2.2 International Growth Prospects

Recent economic growth has been strong in many of Australia's major trading partners, particularly the US, Japan, China and Malaysia.[9] However concerns about escalating energy prices and the sustainability of China's advance have tempered expectations.

In the United States higher interest rates in the coming year are expected to restrict economic growth below recent levels, while Japan's growth is also expected to ease because of the vulnerability of the economy to energy prices and the weaker US dollar. The principal economies in east and South-East Asia, including Chinese Taipei, Malaysia and Indonesia are expected to remain robust. China's growth is expected to moderate from recent levels, although remain high relative to other economies, after a government announcement to target more sustainable growth. India is also expected to become increasingly important over the next 15 years.

Over the medium-term, the principal issue for the US economy is the continuing trade imbalance, which increased in 2004 despite the significant depreciation of the US dollar.[10] Increases in monetary and fiscal policy stimuli in recent years have contributed to this, and while monetary policy is now returning to neutral levels,

[8] Mitsubishi Corporation, Letter to Greenpeace Japan and The Wilderness Society, 14 May 2004 and Greenpeace International, press release, 18 May 2004.
[9] J. Penn and B.S. Fisher, 'Economic Overview – prospects for world economic growth to 2010', *Australian Commodities*, 12(1), 2005.
[10] Ibid.

there are concerns that a prolonged fiscal deficit in the US will contribute to worsening trade and current account deficits.

Japan's economy went through a prolonged period of stagnation throughout the 1990s and has only managed short periods of export-led growth. The principal issue with Japan's economy is the excessive level of regulation. This has hampered recovery despite extreme levels of fiscal and monetary stimulus which has resulted in official interest rates falling close to zero and the largest fiscal deficit of the developed countries. The extent to which Japan is able to return to sustained economic growth will depend on its commitment to economic reforms.

South-East Asian economies are expected to continue to grow strongly over the medium-term, principally because of strong domestic demand and competitive exchange rates. The principal downside risks to these countries are higher oil prices and a potential easing of growth in China.

2.2.1 The China Factor

Of particular importance to international, and importantly Australia's, economic growth is the economic performance of China over the medium to long-term.

China's share of global exports increased from 3% in 2000 to over 6% in 2004. China's growth has benefited Australia with strong demand for our natural resources pushing up prices. Australia imports manufactured goods from China because of their relatively low cost. As a result, our terms of trade and living standards have risen. Any disruptions to Chinese growth will be felt in Australia with China accounting for 9.3% of the total value of Australia's merchandise exports in 2004.[11] China faces challenges including achieving more balanced growth, reforming its financial and banking system and addressing medium-term fiscal and demographic pressures.[12] A successful outcome on a free trade agreement with China will help Australia in terms of market access for goods and services, foreign investment and creation of new jobs. The first round of the negotiations on the FTA commenced in May 2005. A feasibility study revealed that an FTA would generate significant economic benefits for both nations.

There is pressure on China to allow greater flexibility in its exchange rate. A small revaluation occurred in 2005 and there is considerable pressure, particularly from the US, to see further adjustments.

While Australia's exports to China grew by an impressive 21% in 2004, Brazil's exports with China grew by 69% in the same year. Brazil is a major competitor for Australia in China in mining and agricultural products and could be a major forest products competitor as well. While Australia debates how to finance the expansion of port capacity, 'Brazil is building five new ports to export its agricultural and raw material resource commodities'.[13] Other countries are moving much faster while there is money to be made in China. Brazil is a country that is very focused on China and its growth. A point made by Jonathan West in his 2005 Alfred Deakin

[11] Department of Foreign Affairs and Trade 2005, 'China Fact Sheet', DFAT, Canberra, 2005, cited at http://www.dfat.gov.au/geo/fs/chin.pdf .
[12] M. Parkinson, op cit, p.15.
[13] J. West, 'Designing a future or tempting fate?' presentation made at The Alfred Deakin Innovation Lectures 2005, 22 May 2005, cited at www.abc.net/rn/bigidea/stories/s1371255.htm, p.5.

Lecture is that China will not always be a consumer, but it will become a competitor and a 'force that induces new capacity that will replace ours'.[14] For example, in a move that shocked the US government, China's state-controlled oil group China National Offshore Oil Company made a bid of USD18.5 billion for the independent US energy group Unocal in June 2005. Although the bid was later withdrawn by CNOOC, it is seen as part of China's strategy to secure energy and mineral resources.[15] There is very strong interest from China in investment in Australia's mineral and energy sectors.

The strength of the Chinese economy will drive continued growth in demand for resource exports from Australia, while growth in manufactured goods will remain more subdued than the levels achieved in the 1990s. Resource exports are set to grow significantly as investments come on stream – mostly natural gas and iron ore including the North West shelf and the Pilbara. This is one of Australia's fastest growing regions as people are attracted by employment opportunities.

Massive infrastructure developments, the 2008 Olympics, rapid economic growth and continuing improvement in living standards 'have driven an increase in timber consumption for infrastructure development, building construction and interiors and furniture manufacturing' in China.[16] China is relatively poor in forest resources especially since the ban on harvesting from all natural forests in the south west and reduced harvesting in the northeast instituted in 1998. China is the largest importer of industrial logs and the second largest importer of forest products. The forest plantation program established in 2000 is expected to deliver 133 million m³ of logs annually by 2015 which is estimated to be 40% of domestic consumption. According to Lu, 'this harvest, together with that from already existing plantations and from natural forests excluded from the harvesting ban, could enable China to balance its domestic timber supply and demand in the future'.[17]

Investment in timber processing capacity has positioned China as a major exporter of high quality and price competitive value-added wood products, especially furniture and plywood. Exports of forest products are growing at a faster rate in value terms than imports of wood resources with the prospect of balanced trade within the next five years. The Russian Federation supplies 60% of China's industrial roundwood imports which were almost 27 million m³ in 2003. Sawnwood imports, which were around 7 million m³ in 2003, are mostly hardwood sourced from Southeast Asian countries.

Investment incentives including preferential taxation and land tenure arrangements have encouraged domestic and foreign companies to establish processing facilities. As a result of these investments and China's low costs of production it is rapidly becoming a major producer of panel products. Total production was 42 million m³ in 2003, which is near to the level of production in the US. High domestic demand for plywood and MDF are driving production with export surpluses increasing and imports declining each year. According to Lu 'the most promising wood product

[14] Ibid.
[15] H. McRae, 'US has woken up to the China challenge', *The Canberra Times,* 30 June 2005, p.19.
[16] W. Lu, 'China's growing role in world timber trade', *Unasylva*, 219(55), 2004/5, cited at www.fao.org
[17] Ibid, p.2.

for Chinese exports is furniture'.[18] China supplies around 30% of Australia's wooden furniture imports.

Over the next 10 years China will be a significant importer of industrial roundwood. Beyond 2015 the growth in imports is expected to decline as increased domestic supplies come on stream.

2.3 The State of Australian Society

Changes in the structure of Australian society can influence patterns of employment, settlement, consumption, investment and leisure as well as general attitudes to economic, environmental and social issues. It is difficult to project changes of this type, as they can be influenced by a range of conditions including international events and natural disasters as well as local issues. For example international terrorism may heighten domestic anxiety and distrust and events like the December 2004 tsunami in Asia may influence society's attitudes towards aid and development and raise awareness of environmental protection issues.

Measures of social performance typically relate to population, health, education, employment, housing and other aspects such as crime. Demographic trends, which relate to the population and its structure, and lifestyle trends are fundamental shapers of Australian society.

2.3.1 Demographic Trends

Changes in population have a significant bearing on the extent and nature of consumption in society.

Population Growth

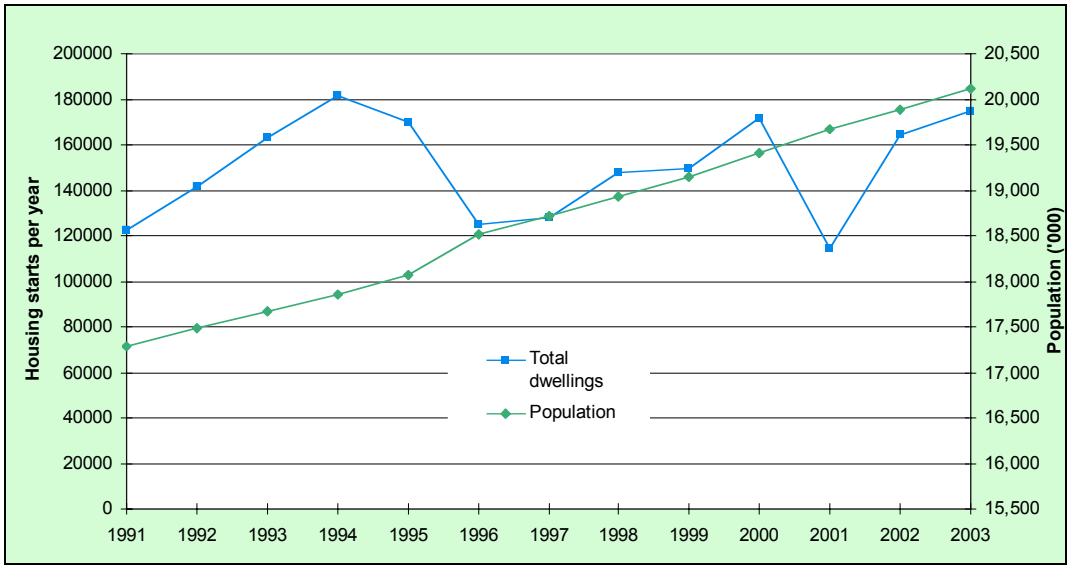
As Figure 2-1 shows Australia's population has been increasing under the influence of natural increase (the excess of births over deaths) and net overseas migration. The nation's population exceeded 20 million persons in 2003. The rate of population growth over the past decade has been markedly slower than the rates of previous decades. Falling fertility since the mid-1960s has led to a decline in the rate of natural increase. By 2002, the total fertility rate had fallen to 1.75 which is below the replacement level of 2.1, defined by the Australian Bureau of Statistics (ABS) as 'the number of babies a woman would have to have over her lifetime to replace herself and her partner'.[19] The total fertility rate peaked at 3.55 in 1961 during the baby boomer years. Attempts by governments around the world to increase fertility rates with incentives and inducements have failed. Family friendly policies which work at the margin to sustain current fertility levels may be more successful.

The total fertility rate and net migration are the principal factors that affect population growth. In addition the life expectancy of the population has an important influence on its size and in particular, its age structure. While there are certain historical trends that can allow fertility to be projected, net migration is

[18] Ibid, p.7.
[19] Australian Bureau of Statistics, *Measures of Australia's Progress*, ABS Cat No. 1370.0, ABS, Canberra, 2004, p.1.

affected by a number of factors such as government policy and events overseas, and is therefore prone to greater variability.

Figure 2-1:
Housing Starts and Population



ABS population projections are based on a range of assumed levels for the critical factors of fertility and net overseas migration.[20] Three population growth scenarios are presented, with 'Series A' and 'Series C' representing high growth assumptions and low growth assumptions respectively. For the ABS scenarios, the fertility rate is assumed to range between 1.4 (Series C) and 1.8 (Series A) from 2011. Net overseas migration (net immigration to Australia) is assumed to range between 70 000 and 125 000. Life expectancy (at birth, from 2050-51) is assumed to range between 84.2 years and 92.2 years for males and from 87.7 years to 95.0 years for females. Based on these assumptions, Australia's population is projected to range between 21.6 million (Series C) and 22.9 million (Series A) by 2015, and 23.3 million and 27.9 million by 2035.

In its Intergenerational Report, the Treasury also estimated demographic trends.[21] For this report, they assumed the fertility rate would trend down to 1.6 by 2042, net overseas migration would be 90 000 people and life expectancy would be 82.5 years for males and 87.5 years for females by 2042. Based on these assumptions, the Treasury projected a population of 21.5 million by 2012 and 24.5 million by 2032. However, there are some uncertainties associated with these projections. In particular, net migration has increased from 135 000 in 2001-02 to 165 000 in 2003-4, which is significantly higher than the assumptions made by both the ABS and Treasury. While governments can determine the level of immigration, international events such as military conflict will affect the amount of pressure to change existing immigration policy. Hence there is considerable uncertainty about future immigration policy and the level and type of immigration and how it will affect Australian society in the future.

[20] Australian Bureau of Statistics, *Population Projections 2002 to 2101,* ABS Cat No. 3222.0, ABS, Canberra, 2004, pp.4-25.

[21] Department of the Treasury, *Budget Paper No. 5 Part II: Australia's Long-term Demographic and Economic Prospects*, Commonwealth of Australia, Canberra, 2002.

There is also some debate about whether the declining trend in fertility rates, and in particular the trend toward child bearing later in life, will continue. Recently these issues have been the focus of significant political and media attention and there is some anecdotal evidence that the trend may have changed.[22]

Ageing Population

As the fertility rate of Australian women has declined since 1961 and higher standards of public health have contributed to increased longevity, Australia's population has been progressively ageing over recent decades. Offsetting this to some extent has been net migration inflow, which has tended to be younger than the resident population.[23]

Currently around 12.7% of Australia's population is aged over 65 years. Based on ABS assumptions, the proportion of the population aged 65 years and over is projected to increase to over 25% by 2041. Over this period the median age is projected to increase from 35.9 years to around 46 years. A key factor in this growth is the contribution expected from the retirement of the baby boomer generation, born between 1946 and 1965 after World War II. ABS expects that between 2011 and 2031 the numbers of people aged 65 years and over is projected to increase from 3.2 to 5.7 million.

The ageing population has significant implications for Australia's working population and attitudes to retirement. As the population ages, a greater proportion of people are out of the workforce, dissaving (spending their savings) and not paying significant amounts of tax. Living and lifestyle choices change after retirement and a greater proportion of retirees may imply a greater proportion of people living outside urban areas and closer to the coast.[24]. There may also be trends towards living in northern states (e.g. Queensland) and a preference for smaller, single-storey homes and townhouse villages.

According to research by the Australian Housing and Urban Research Institute (2004), 'population ageing is driving enormous changes in housing demand'.[25] With an estimated 18% of Australia's population aged 65 years and over by 2021, households will be more diverse and present new challenges for housing an ageing Australia including:

- More young-old retires seeking housing suited to their lifestyles including 'sea-changers'
- More frail, very old people, especially older women living alone creating greater demand for housing that incorporates some form of support
- Sustained and substantial numbers reaching old age as renters and whose housing choices will diminish as they grow older

[22] R Gittens, 'Our ageing problem may be diminishing', *Sydney Morning Herald*, 25 July 2005, pp. 17-18.
[23] Op cit, p.21.
[24] T. Burke, R. Slaughter, J. Voros, J, 'Long-term Housing Futures for Australia: Using 'Foresight' to explore alternative visions and choices' report for the AHURI, Melbourne, 2004 p. 7.
[25] Australian Housing and Urban Research Institute, 'Housing futures in an ageing Australia', *AHURI Research and Policy Bulletin*, Issue 43, Canberra, 2004

- Increasing intergenerational inequity stemming from transfers of housing assets.

The study concluded that 'there is a need to develop clear strategic objectives in housing policy that address the increasingly diverse housing needs of older Australians and their varying capacity to use their housing assets to meet these needs, including paying for residential aged care.'[26]

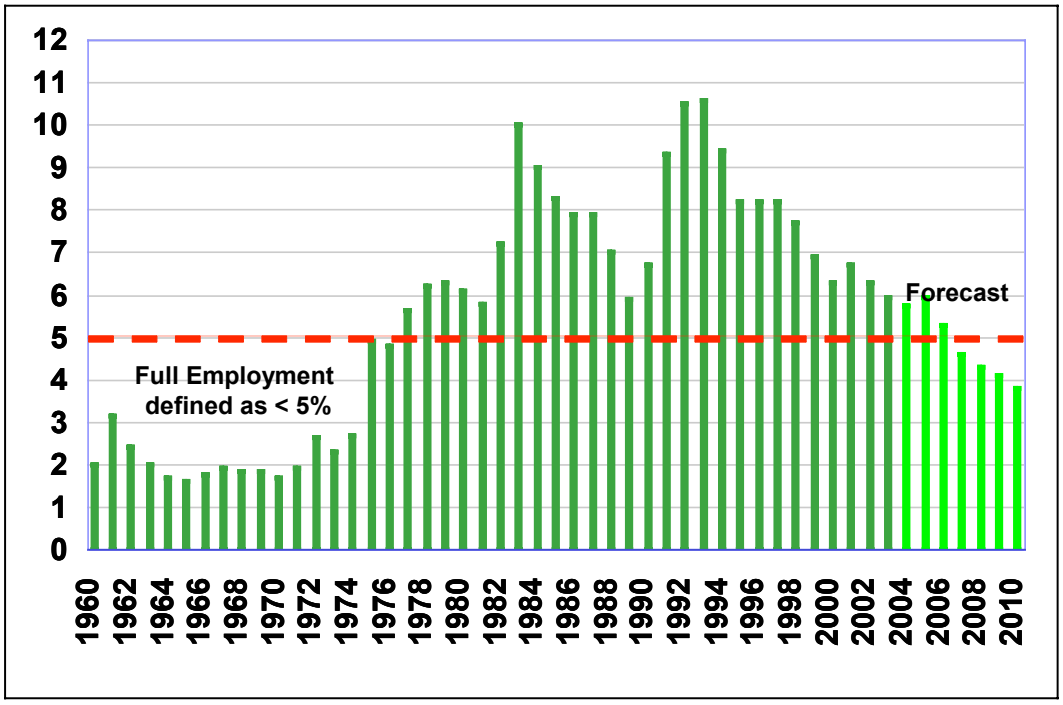
Employment and Skills

While the proportion of retirees is projected to increase over time, and the proportion of the population of labour force age is projected to decline as a proportion of the total population, the number of people in the workforce (the age group between 15 and 64) is expected to increase from 13.2 million in 2002 to 15.4 million in 2042.[27] Australia is one of only a few OECD countries projecting continued labour force growth over the next 40 years.

Employment patterns have also changed significantly in Australia. Since 1992 the share of persons employed in agriculture and manufacturing sectors has declined from 29% to 25%. The number of persons employed in the service sectors has increased from 5.6 million to 7.2 million over the same period. This growth has also implied an increase in the casualisation of the workforce.

Figure 2-2 illustrates the fall in unemployment as a shift from a buyer's to seller's market for labour. This is a position the Australian economy has not seen since the 1970s.

Figure 2-2:
Australian Unemployment Statistics, 1960-2010[28]



[26] Ibid.
[27] Department of the Treasury, op cit, p. 22.
[28] P. Ruthven, Presentation to Australian Institute of Company Directors, ABS/IBIS World, Melbourne, 2004.

Over time trends in ageing and the structure of the workforce are likely to continue and will have implications for peoples' housing and lifestyle choices.

One concern emerging in Australia is that of skills shortages as many sectors approach capacity limits. The Building and Construction Industry addressed its skills issues under the Commonwealth Government National Industry Skills Initiative. Several recommendations were made to improve training outcomes including fast tracking new entrants and broadening and deepening the pool of skills available to the industry, including opportunities for participants to develop business management skills as well as relevant technical skills. Despite these initiatives, concerns are real that skills shortages in the future will be unsettling for consumers, as the scenario in Box 2.1 suggests.

Box 2.1: Building Industry Faces an Uncertain Future

01 Jun 2005

It's 2015 and you have decided to renovate your home. But the builder will tell you there is a two month wait for a carpenter, a four month wait for a bricklayer, a four month wait for a cabinetmaker and the entire project will cost you much more than it did a decade ago.

This is the scenario facing Australia, unless builders and subcontractors take on more apprentices, warns Master Builders Australia Chief Executive Officer, Wilhelm Harnisch.

"We are moving into an uncertain era of labour shortage. Our economy is growing rapidly so we need more skilled tradespeople to support our daily lives," Mr Harnisch said.

"Over the next decade, there could be a national shortage of approximately 100 000 traditional tradespeople. With the population estimated to increase by two and a half million people this means finding a local tradesperson will become an almost impossible feat.

"And when you eventually find someone to do the work, it might cost up to twice as much.

"The community will be faced with significant price increases, not to mention the dire affect the shortage of apprentices will have on the Australian economy. The cost in lost output could be in the order of $7 billion.

"We urge builders and subcontractors to take the lead on this issue and give apprentices a go.

"Unless employers of this industry are prepared to make the commitment, the future is looking very bleak," Mr Harnisch said.

Master Builders Australia has launched a campaign urging employers to hire more apprentices.

Unlike previous campaigns targeting potential apprentices, the new campaign, funded by the Federal Government, will be targeted at small business employers in the building and construction industries.

2.3.2 Lifestyle Trends

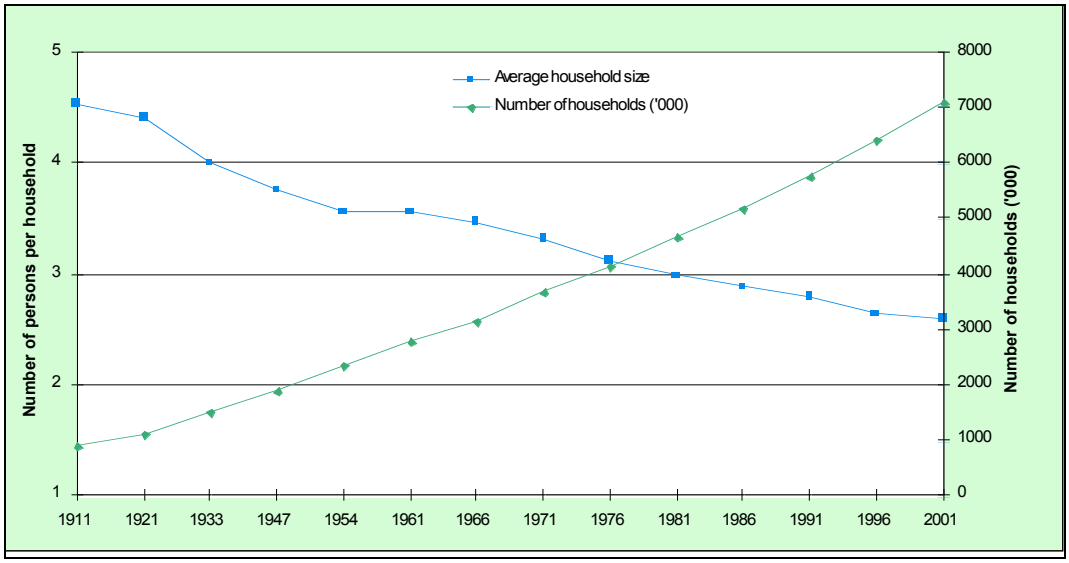
There are distinct trends in lifestyle in Australia that will influence housing choice and hence the consumption of timber products. The principal trends in this respect relate to household size and the location of population growth.

Household Size and Composition

The rate of change in household formation is a more important factor in housing demand than the general rate of population growth. Household formation in Australia has increased strongly for many years under the influence of falling marriage rates and rising divorce and separation rates, general economic conditions, employment, housing affordability, interest rates and the ageing of the population. Figure 2-3 shows the trend in household formation since 1911. ABS projections of the number of households in 2026, based on their Series B population projections, range between 10.2 and 10.8 million, up from 7.4 million in 2001. This is equivalent to an increase of between 39% and 47%, much greater than the projected population increase of 25%.

The number of persons per household has fallen consistently (though at a decreasing rate) over the past 35 years. At the same time the number of households formed has increased steadily, as Figure 2-3 illustrates.

Figure 2-3:
Trend in Australian Household Numbers and Size, 1911-2001



In 1961 the number of persons per household was 3.55. By 1996 this had fallen to 2.72. The reasons for the fall are various and include: a reduction in the proportion of the population in the younger age groups generally associated with high household formation; rising income per person, which may have provided people with more options as to the type of household in which to live; and an increase in breakdown of relationships and marriages and the rate of divorce. The implications of this are that a higher number of dwellings are required for a given population.

Population Distribution Patterns

Another important lifestyle trend is the geographic distribution of population growth. Currently, over 80% of Australians live within 50km of the coast, the so-called 'sun-belt'. More importantly, from the perspective of future housing trends, between 1991 and 1996, around 25% of Australia's total increase in population was

accommodated within 3 km of the coast.[29] Much of this growth has been in non-metropolitan areas, with the number of Australians living on the coast outside a capital city increasing from 2.5 million to 3.6 million in the last 25 years.[30]

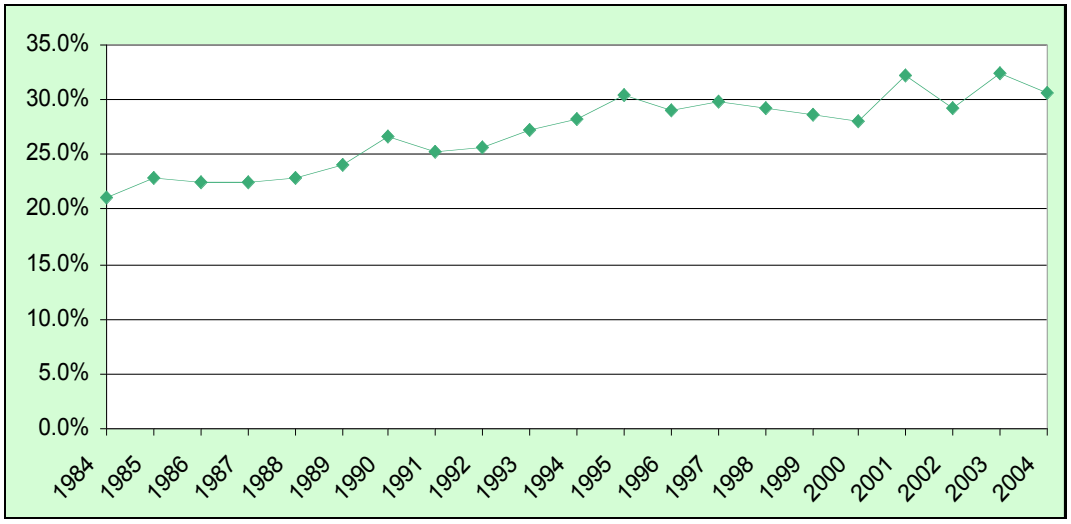
People are moving away from rural centres towards burgeoning urban centres. Many large cities, particularly along Australia's east coast, are expanding and connecting as functional metropolitan cores joined by commuter belts, termed 'mega-metro regions'. It is estimated that the population living within the five largest metropolitan cities will increase from 11.5 million in 2001 to 13.0 million by 2011.[31] These centres are projected to experience the fastest population growth among settlement types during the first decade of this century, at 1.2% a year compared to 0.9% annual growth for the total population. The 'mega-metro regions' were estimated to account for 72% of Australia's population in 1999.

The proportion of the population residing in 'mega-metro' regions is expected to increase as the urban fringes of large cities continue to expand and join. The growth of these mega-metro regions raise significant environmental and social issues for policy makers, such as the supply of water and transport infrastructure, the management of waste and the pressure on rural fringe and coastal environments.

There are two trends interacting in the urbanisation of Australia's population. The first is re-urbanisation (where population densities rise in inner suburbs of major cities). While residential densities in Australia are low by international standards, the rates are increasing in Australia's largest cities as more people prefer to live closer to work and metropolitan facilities such as restaurants and entertainment. Between 1991 and 2001 the number of private occupied dwellings increased by 21%, equivalent to 1.2 million additional dwellings. During this period the number of detached houses increased by 17.5% compared to 37% for medium and high density multi-residential dwellings.[32] Despite the much higher growth rate, higher density multi-residential dwellings represented around 30% of all new residential buildings in 2004, up from around 20% in 1984, as shown in Figure 2-4. The trend to higher density living reflects changing family and household structures and lifestyles. Residents of higher density dwellings differ to those of detached housing in that they are more likely to rent, live alone and travel to work by public transport, bicycle or walking than by private motor vehicle.[33]

[29] Newton et al., 'Human Settlements', *Australia State of the Environment Report 2001*, CSIRO Publishing, Canberra, 2001.
[30] Burke et al, op cit
[31] Newton et al. op cit, p. 13
[32] Australian Bureau of Statistics, *Australian Social Trends. Housing – Housing Stock: Changes in Australian housing*, ABS Cat No: 4102.0, ABS, Canberra, 2003.
[33] Australian Bureau of Statistics, *Australian Social Trends 2004, High-rise living. Housing and Lifestyle*, Cat No. 4102.0, ABS, Canberra, pp.166-70.

Figure 2-4:
Share of Multi-residential Units in Total Household Starts, 1984-2004



The trend is also linked with trends in employment, as former centres for manufacturing decline and become centres for services, which in turn attracts residential growth.[34] There are diverging views on the role of the technology sector in this trend.[35] On the one hand, it is argued that the technology revolution has increased the need for face-to-face contact and therefore economic activity will be located in a small number of spatially concentrated areas. Additionally, the relatively high incomes associated with these occupations afford significant discrete income to spend on entertainment. On the other hand, it is argued that technology has freed many occupations from the need for direct contact, and there will be a greater trend to remote, home-based work. This would provide an impetus to the spread of population away from urban areas.

The second trend in the urbanisation of Australia's population growth is suburbanisation which is the progressive expansion of city boundaries, often pushing into former rural areas. Suburbanisation has been most important in shaping Australia's post-war residential structure. Population growth in outer suburban and fringe areas often anticipates the development of much of the infrastructure required to provide for these rapidly growing populations, and hence places pressure on many environmental and lifestyle issues.

Social Attitudes

The Inaugural Australian Survey of Social Attitudes (AuSSA) was conducted in late 2003 and reported in 2004 that:

'While evidence of increasingly liberal attitudes emerged in areas such as social spending and immigration, views on genetic testing and media power revealed a more sceptical nation. From a historical perspective, it seems that despite all the talk of economic rationalism and neo-liberal reforms, people have not given up on the importance of governments as an agent of social and economic control. Nor it would seem have they abandoned the idea of the importance of community or lost their faith in key institutions like the Courts, Parliament and Police. Indeed, overall

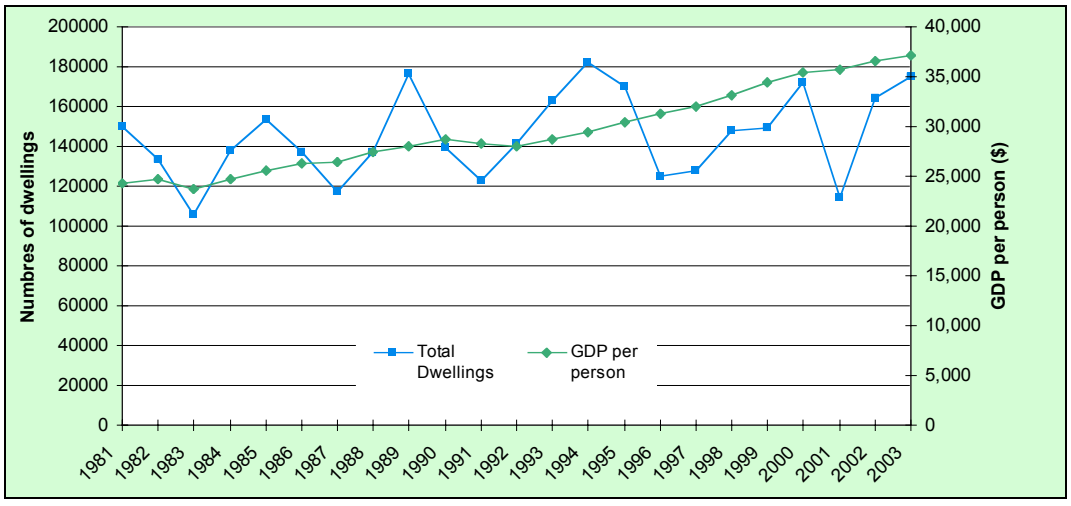
[34] Newton et al. op cit, p. 23
[35] Burke et al. op cit.

there does seem to be strong evidence that Australians are quite trusting as a nation and display a marked willingness to get involved in voluntary associations.'[36]

Hugh MacKay[37] offers an alternative assessment arguing that after almost two decades of instability and uncertainty with endless reform and restructuring nationally and internationally, Australians seemed to reach a point around the turn of the century, where they sought refuge in a kind of social disengagement. MacKay suggests that people knew there was a 'big picture' demanding our attention, but were wearied by too many changes and too many issues: globalisation, Aboriginal reconciliation, the republic, foreign investment, youth unemployment, population policy and then, on top of everything else, the threat posed by international terrorism.

MacKay argues that Australians have responded by turning inwards and focusing on things that are within their individual control like home renovations, backyards, their children's schools and next holiday destination. There is a tendency to retreat and disengage from the social and political agenda. 'It is a time when extreme and simplistic voices are likely to be given more attention than they normally are, almost as if our insecurities create a vacuum we yearn to fill with simple certainty.'[38]

Figure 2-5:
Growth in Numbers of Dwellings per Income per Person



Alan Wu offered some perspectives on social attitudes on behalf of young Australians in his Alfred Deakin Innovation Lecture in May 2005.[39] He identified a generation of young Australians that is obsessed with individualism and materialism. Young Australians are motivated by personal achievement and recognition more than by a sense of benevolence or obligation. He believes that young people are cynical of institutions including parliaments, churches and

[36] R. Gibson, 'Portrait of a Nation 2003: Reporting on the Inaugural Australian Survey of Social Attitudes (AuSSA)', report from the Academy of Social Sciences in Australia Workshop, Canberra, June 2004, cited at: www.assa.edu.au/policy/papers/2004/aussa.pdf.

[37] H. MacKay, 'Social Disengagement: A Breeding Ground for Fundamentalism', Annual Manning Clark Lecture, Canberra, 20 March 2005, cited at: http://www.abc.net.au/rn/bigidea/stories/s1323906.htm

[38] Ibid.

[39] A. Wu, 'Designing a Future or Tempting Fate', The Alfred Deakin Innovation Lectures, May 2005, cited at: http://www.abc.net.au/rn/bigidea/stories/s1371255.htm .

universities which are seen increasingly as inadequate, inaccessible and irrelevant to their functions. While young people have wider social networks than previous generations of Australians, their networks are shallower. Finally, Wu concludes that young Australians are more technologically savvy than their predecessors having grown up with mobile phones, the internet and e-mail. A possible downside of these trends for the future is that they challenge traditional perceptions of community and how a community functions.

2.4 The State of the Environment

Agricultural, mining and mineral processing, manufacturing and household activities place considerable demands on Australia's natural environment. For example, in 2001-02 more than half of all farmers (including broadacre and dairy) reported signs of degradation on their properties, with 23% reporting significant degradation.[40] Manufacturing consumes considerable natural resources including energy and water and disposes wastes into the atmosphere, waterways and to landfill. In 1997-98 17% of total CO_2 emissions were from Australian industries, the second highest contributor after electricity generation. The construction industry has direct and indirect impacts on the environment. Direct impacts include use of land, materials and energy, which in turn leads to greenhouse gas emissions and the production of other wastes. Indirect impacts include the energy consumed in providing building materials and in operating buildings after construction. According to the ABS 'Australians currently send annually per person approximately one tonne of construction and demolition waste to landfill. This can make up to 40% of landfill and represents a potentially valuable natural resource being wasted. Materials include metals, concrete and bricks, glass, fittings and fixtures from demolished or refurbished buildings, wood and wall panelling'[41].

In recent years public attention has been drawn towards many environmental issues that have directly affected the standard of living in Australia such as the quality and availability of drinking water in both rural and urban areas. Australians' greater awareness of environmental issues and the practices which contribute to environmental degradation are factors in the greater willingness of consumers to change their behaviours for better environmental outcomes.

Many current environmental problems are a direct consequence of inappropriate and poorly informed land use and natural resource management decisions and practices. There is a need for new land use practices that are better suited to Australian conditions and that can produce truly sustainable outcomes.

2.4.1 Environmental Attitudes

The attitude of Australians to environmental issues has important implications for consumption trends, such as preferences for 'ethical' or environmental attributes in a range of products from food to housing. Currently there are trends towards food labelling and energy ratings for many products. Depending on the extent to which

[40] R. Nelson, F Alexander, L Elliston, A Blias, 'Natural Resource Management on Australian Farms', ABARE eReport 04.7 prepared for the Australian Government Department of Agriculture, Fisheries and Forestry, Canberra, May 2004.

[41] Australian Bureau of Statistics (2003), *Environment by numbers: Selected articles on Australia's Environment*, Cat No. 4617.3.

environmental awareness grows in the community, the levels of water and energy consumption, loss of biodiversity and waste management may become increasingly important attributes in many different consumer products.

In a 2005 survey of young Australians (from 14 to 30 years of age) by the Business Council of Australia the environment was number two on their list of things changing in Australia today, with education being number one.[42] They considered the environment to be the number one challenge or issue for both the government and the community over the next 20 years. They were concerned about the impact of continued environmental degradation on their quality of life and that of future generations. They also saw opportunities for government and communities to work together.

Within the Australian community there has been a long running and passionate debate about the harvesting of natural forests. The debate has increased to the point where some activist groups want to stop harvesting in natural forests altogether. The solution was seen to be the development of plantations, however even these are coming under pressure over issues such as water yield impact, lack of biodiversity, chemical use and displacement of traditional farming industries. Many of these issues are more a problem of perception rather than reality but the resulting negative feeling and attitude to the industry can be the same.

2.4.2 Land and Water Resources

One of the most important environmental issues that Australia faces is dryland salinity which contributes to water quality, soil productivity, loss of biodiversity and infrastructure deterioration particularly in rural areas. It is estimated that at least 2.5 million hectares (5% of cultivated land) are currently affected by dryland salinity,[43] with the area expected to increase over time as the delayed effect of many past practices such as land clearing become apparent. It is estimated that around 17 million hectares could eventually be affected,[44] over half of which is estimated to occur in Western Australia.

Australia's inland water resources are under increasing pressure from over-extraction, pollution, algal blooms, catchment modification, habitat destruction and flow regulation.[45] In particular, the increasing salinity of Australia's catchments and inland waters places considerable strain on aquatic ecosystems and irrigation and drinking water supplies.

Because Australia is a dry continent, with an average rainfall of only 469mm a year and extremely high evaporation rates, irrigation is an important feature of agricultural enterprises, accounting for around 75% of Australia's water use. This, along with urban water use, has placed water resources and the natural ecosystems that rely on them under significant pressure.

The unchecked spread of dryland salinity and other sources of environmental degradation throughout agricultural areas implies a significant reduction in the

[42] G. Chin, 'Consultation of Young Australians', Business Council of Australia website, cited at: http://www.bca.com.au/content.asp?newsID=94480, 2005.
[43] J. Williams. et al, *Biodiversity - Australia State of the Environment Report 2001*, CSIRO Publishing, Canberra, 2001, p.47.
[44] Hamblin, A, *Land - Australia State of the Environment Report 2001*, CSIRO Publishing, Canberra, 2001, p. 80.
[45] J. Ball et al, *Inland Waters - Australia State of the Environment Report 2001*, CSIRO Publishing, Canberra, 2001, p. 1.

agricultural production potential in the future. To avert this loss implies an added burden on society to prevent the spread of such degradation. How governments, industries and communities will continue to address these problems and their causes is uncertain over the longer term.

There are a variety of government and community-based programs aimed at addressing these issues and adapting land management practices. At a national level these include the Natural Heritage Trust (NHT) and the National Action Plan (NAP) for Salinity and Water Quality. The latter has been endorsed by the Council of Australian Governments (COAG), while the NHT includes many community-based programs, such as Landcare. However these programs are costly and their success is uncertain. For example, the NHT is a five year, $1 billion program, while the NAP represents a $1.4 billion commitment over seven years. In many cases Australia's environmental degradation problems will require longer-term commitments and hence further public investment. It remains to be seen whether society will accept these costs, whether agricultural systems can adapt to retain agricultural production while reducing environmental degradation, and whether rural communities will accept the consequences of substantial changes associated with rural activities that are more integrated with environmental objectives. In many cases solutions involve landscape re-vegetation, such as catchment rehabilitation to redress rising water tables, improving soil quality and providing habitat for native animals which are better balanced with commercial land uses based on a landscape management plan. This may result in an expansion of agro-forestry enterprises and increased timber supplies. However, depending on prevailing land use policy there may be restrictions on tree harvesting on private land associated with the protection of environmental values.

2.4.3 Climate Variability

Australia's unreliable rainfall, recurring droughts and floods are an inherent risk of agricultural and forest production. Land management practices have evolved to encompass climatic variability. At the same time these risk factors have influenced the location of Australia's population and various lifestyle choices including housing design and choice of building materials.

Over the next 30 to 50 years it is expected that Australia will experience climate changes partly as a result of human-induced influences.[46] The potential implications of this will be diverse across the continent, associated with changes in average temperatures and increases in the frequency and severity of extreme weather events such as droughts.

There is considerable uncertainty regarding the speed and extent of climate change. There is also debate about what Australia and other countries should be doing in response to these changes, including preparations in advance of likely extreme events. Recently the Australian government in association with the US, Japan, South Korea, China and India formed the Asia-Pacific Partnership on Clean Development and Climate. This agreement seeks to reduce greenhouse gas emissions through partnerships to develop and transfer low-emission technologies, without compromising the development and poverty-eradication needs of the countries involved.[47]

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[46] Allen Consulting Group, *Climate Change Risk and Vulnerability*, AGO DEH, Canberra, 2005.

[47] Joint Press Release, 'Australia Joins New Asia-Pacific Partnership on Clean Development and Climate', media release, 28 July 2005, cited at http://www.pm.gov.au/news/media_releases/media_Release1482.html.

Choices regarding the most appropriate means to reduce our impact on the environment will have significant economic and social implications. One possible response to the threat of climate change may be to limit the consumption of energy intensive products. Alternatively, countries and industries may invest heavily in cleaner technologies and energy efficiency. The approach adopted will reflect the wishes and principles of the governing authorities, which may or may not align with the desires of the people. Importantly, whatever policy measures or guidelines are introduced to reduce greenhouse gas emissions they should be well informed and based on reliable scientific evidence. The risks of implementing poorly informed policy and standards include unnecessarily high costs for consumers and lower than expected emissions outcomes associated with higher energy consumption. For example, research and surveys have found that the Nationwide House Energy Rating Scheme (NatHERS) is an unreliable standard for reducing energy consumption.[48] It is unclear if building energy standards will be revised in the future and therefore what the impact will be on timber consumption.

The response to apparent climate change is an important consideration from the perspective of understanding the future characteristics of the Australian society and economy. An increase in average temperatures or the prevalence of extreme weather events will have implications for Australian agriculture, the location of Australia's population, the design of housing and the types of construction material used.

[48] Productivity Commission (2004), *Inquiry into Energy Efficiency Issues Paper*, September 2004.

3 USING SCENARIOS TO UNDERSTAND FUTURE TIMBER CONSUMPTION

3.1 Forecasting

Forecasting aspects of Australia's timber markets in 2020 is a challenging yet necessary task. The previous section revealed the high level of uncertainty surrounding future directions for timber consumption and the many influences on it. There are many possible and plausible pathways to the future, but picking the winning pathway is impossible. Traditional economic forecasting techniques are limited by reliance on established relationships and historical patterns. They are unable to accommodate previously un-encountered events or discontinuities. When looking out 15 to 20 years into a dynamic and complex world, investors and policy makers need tools that allow them to explore and imagine new horizons as well as projecting forward a 'business as usual' or 'familiar territory' future. Scenarios facilitate consideration of multiple futures that are plausible, internally consistent, relevant and challenging with clear links to current conditions.

Understanding how the market works and how changes in key variables can influence changes in consumption for timber and timber products is critical to good decision making for the future. The use of scenarios or scenario planning can help decision makers map a course to the future that is well informed about the influences and impacts of a range of critical uncertainties, including factors that may not have been encountered previously and factors that may have totally different influences on timber consumption in the future than they had in the past. A scenarios approach was adopted for this project to better understand changes in Australia's timber market over the next 15 years.

3.2 Why Scenarios?

Scenarios are not predictions or forecasts of the future, nor are they science fiction or fantasy stories constructed merely to titillate the imagination. Scenarios are stories about the future based on an understanding of the present and the factors that have shaped current conditions and sequences of events from the present to the future. In section 2 an overview of the forces that have shaped the present was presented together with a number of possible pointers to the future, although few with any certainty.

Scenarios help decision-makers understand what is truly uncertain and what is more predictable. They are instruments for ordering people's perceptions about alternative futures in which decisions made today might play out. A scenario embodies a plausible view or perception of the future in a given year linked to conditions in the present via an internally consistent sequence of events. A scenario could be described as a road map from the present to the future.

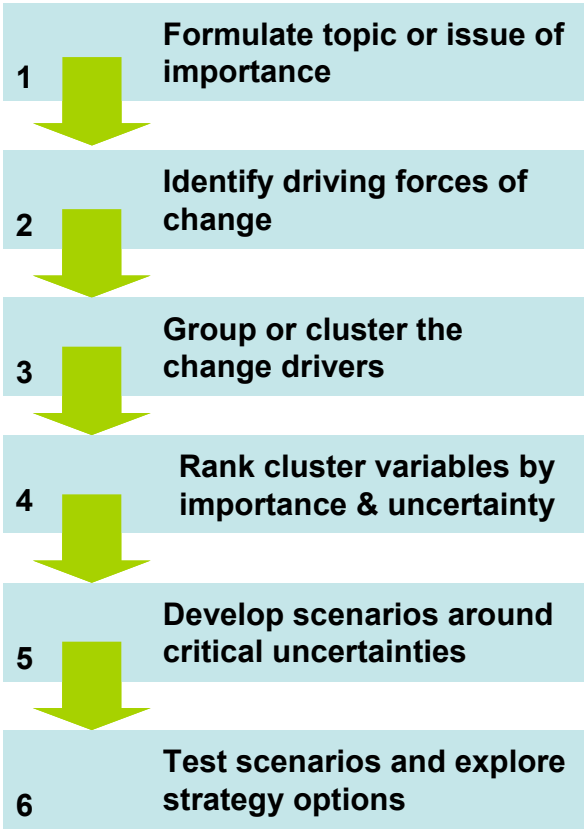
3.3 Creating Scenarios

There are a number of different approaches to creating scenarios but they all have a common starting point. That is to clearly formulate the topic or issue of importance to the client audience. The subsequent steps are a journey of learning and discovery

for those involved, through identification of critical uncertainties to seeing how those uncertainties can drive change in different ways with significantly different outcomes via the scenarios. Figure 3-1 shows the key steps involved in creating scenarios.

A scenario planning workshop was held in Canberra on 2 March 2005 involving representatives of Australia's forest and wood products industry.

Figure 3-1:
Steps to Creating Scenarios



The agreed topic for the scenario planning workshop was formulated as three distinct questions:

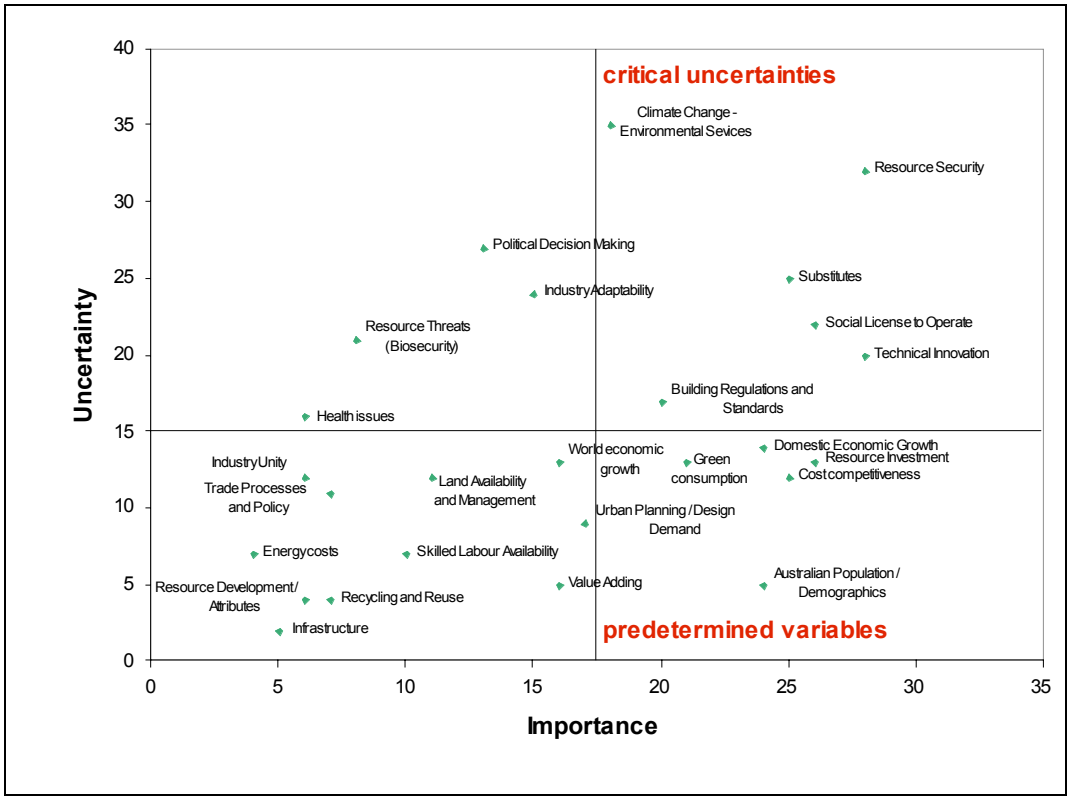
- What are the major forces of change affecting the Australian timber industry over the period 2005 to 2040?
- How will those changes influence conditions in the Australian timber market in 2020, in particular the nature and level of timber consumption?
- What will be the implications for suppliers of timber and timber products to Australian and international markets in 2015?

While the primary focus of this study is wood and wood products consumption over the next 10 to 15 years, the participants agreed that a longer-term perspective was required as decisions taken over the next decade or two reflect conditions over the next 35 years. Therefore, change drivers were identified by the workshop participants within this longer timeframe, although the scenarios reflect possible conditions over the period 2005 to 2020.

Political, economic, environmental, social and technological change drivers were identified by the workshop participants. These were clustered or grouped into 26 key variables. This process of identification and clustering generated many valuable exchanges between the participants, which is one of the strengths of scenario planning. Through this exchange individuals from different industry segments and sectors shared their different perspectives on the future drivers of change on timber consumption, thereby broadening the range of inputs to the development of the scenarios.

The next step involved ranking the 26 key variables by their relative importance to or impact on the topic and by their relative uncertainty or predictability. This separated the key variables and identified the critical uncertainties, which are the most important and most uncertain variables. Figure 3-2 presents the plot of the key variables including the critical uncertainties.

Figure 3-2:
Importance and Uncertainty of Key Variables



Six critical uncertainties were identified. In addition, a number of variables were identified as being of high importance or impact, but low uncertainty. These are referred as the predetermined variables. These are significant trends with more predictable impacts and included such factors as green consumption, domestic economic growth, and Australian population and demographics. Four preliminary scenarios were developed during the workshop based on the critical uncertainties and the predetermined variables. The dominant discriminating variables used to define the preliminary scenarios were resource security and substitutes.

Following the one-day workshop the preliminary scenarios were reviewed and revised in the context of the cluster variables. A systems analysis was conducted using a causal-loop diagram to refine the set of key change drivers likely to

influence timber consumption over the next ten to fifteen years. This confirmed the following nine change drivers as the basis of the revised scenarios:

- Political decision making and governance
- Infrastructure investment and development
- Australian population and demographics including social change
- Domestic economic growth
- Climate change and environmental services – influences and responses
- Energy costs
- Health issues
- Social license to operate
- Skilled labour availability.

Other important and uncertain variables identified at the workshop such as substitutes, technological innovation, resource security and building regulations were labelled as drivens. These variables tend to change in response to changes in the drivers. Brief descriptions of the key drivers are presented below.

Political decision making and governance is a critical driver in many areas. In the case of governance it is the style or ideology underlying government decision making that is uncertain. Over the next 15 years Australia's style of government could range from one of centralised, singular control to a decentralised and shared management format. Will Australia be a republic in 2020? Will Australia persist with the federal system and its three tiers of government? Changes in government policy and philosophy have repercussions for housing outcomes (for instance income tax deductibility for interest paid on negatively geared property is considered important for housing investment) and therefore, for timber consumption. Government policy also impacts inflation and interest rates which affects the capacity to borrow for property investment or purchase a home which has a direct impact on timber consumption. Governments will also have indirect impacts such as through Industrial relations policy which may affect an individual's employment and their capacity to borrow funds. Answers to these questions can be explored in scenarios embodying different governance philosophies.

Infrastructure investment and development is a key factor in Australia's economic growth. Productivity improvements in the last decade have contributed to higher economic growth and international competitiveness. China's sustained economic growth has created strong demand and high prices for iron ore, coal, natural gas and other natural resource commodities from Australia. By many measures Australia has been operating at capacity in recent years to meet the demands of international markets. Expansion of existing transport and port facilities and investment in new facilities will allow increased exports of iron ore, coal and natural gas. Will infrastructure investment occur? How will it be funded? Will

Australia sustain its competitive position in international commodity markets? These are some of the uncertainties surrounding infrastructure development.

In relation to *Australian population and demographics* there are a number of trends and patterns that are likely to continue over the next 15 years. While some statistical trends are robust such as the ageing of the population, increasing household formation and the decline in average size of households, events can occur to break those trends. What is unpredictable is how people respond to these trends: will it be the same as in the past or will it be different? These aspects of change can be explored through scenarios.

Domestic economic growth has been strong in Australia for the past 14 years. In 2005 the Australian economy is slowing in response to domestic and international events. Will Australia continue to grow at rates of 3% per year and above over the next decade? Will economic reforms occur to allow industry to sustain productivity growth? How will changes in international markets influence the performance of the Australian economy? We cannot be certain of the performance of the Australian economy over the next 15 years, but we can explore its dynamism through different scenarios.

Climate change and environmental services embraces both the occurrence of climate change and variability and the responses to it by governments, organisations and individuals. It also embraces occurrence and response for other natural resources and their management including water, carbon and other environmental services from forests (biodiversity). Environmental and natural resource management issues exist already. The way in which institutions and individuals respond to them and the impact of those responses are uncertain. They could range from holistic, integrated long-term management funded by public and private investment to fragmented, short-term and piecemeal management, as well as various states in between.

Energy costs encompasses the consumption of energy in the production and use of materials, and energy rating systems used for new buildings. Energy use and costs may become more important considerations for house buyers influencing decisions on design, materials, and environmental aspects. Will consumers place weight on embodied energy as much as they do on operating energy in the choice of housing design and building materials? If the answer is yes, timber consumption will gain, but if it is no, other materials are likely to take market share from timber. There is uncertainty around energy costs and how consumers will respond and what role authorities will play in establishing and enforcing energy standards.

The *health issues* driver encompasses the health of the population on many fronts and possible institutional and personal responses and behaviours. Health issues influence lifestyle choices and preferences and potentially have a significant impact on settlement patterns, housing styles and the use of timber. This is particularly relevant in an ageing population and with a large number of baby boomers retiring over the next decade. Will they continue to migrate from the city to the coast as current patterns suggest? Concern for personal health and fitness can influence the choice of materials used in buildings as consumers become more knowledgeable of chemical additives and emissions and demand clean and green materials. How far this will go and what impact it will have on markets is unknown, yet it is critically important to suppliers to the building and furniture industries.

A *social license to operate* for the forest industry is not guaranteed. The acceptance and belief by Australian society, especially local communities, in the value creation of forestry is critical to the expansion of forest plantations and the right to sustainably harvest established forests. Community attitudes in the cities and the country towards forestry activities are critical to securing the supply of forest resources. Unknowns include changes in the level of knowledge and understanding among all stakeholders of the economic, social and ecological impact of forests at a regional level, actions by the forest industry to address community fears and the willingness and capacity of the community to work with the industry for mutually beneficial outcomes.

Access to skilled labour has a positive effect on operational efficiency within an industry. There are concerns in many sectors that shortages of skilled labour are harming Australia's ability to compete and grow. If Australia's productive capacity is limited by a lack of skilled labour, economic growth will fall, industries will struggle to maintain competitiveness and opportunities will be lost while corrective action is taken to recover. What actions will be taken to address labour shortages? Will we see adoption of more labour saving technologies and processes or will governments offer greater incentives for education and training? Or will we see an increase in skilled immigrants?

Building on the original four scenarios identified in the workshop, this analysis produced three scenarios:

1. **Building Bridges -** a world of new and strengthened relationships between institutions and individuals driven by a shared vision for a better world.

2. **High-rise Living -** a world driven by growth, ambition and personal achievement with many opportunities but just as many dangers.

3. **Little Boxes -** a planned and ordered world with the government taking control of Australia's environmental destiny and the means of getting there.

The following section describes the world captured in each of these three scenarios and identifies the implications for timber consumption in each case.

4 BUILDING BRIDGES

This scenario describes a world of new and strengthened relationships between institutions and individuals driven by a shared vision. Potentially a series of events such as climate change, international terrorism and bird flu create are a catalyst for greater community awareness and sharing. Australia aspires to be a healthy, wealthy and wise nation by 2020. Sustainable development is paramount, achieved through collaboration between public and private institutions and individuals and organisations. Inspirational leadership and a major rethink about personal and national values has moved Australia from a narrow economic management culture in the early years of the new millennium, to a culture based on achieving balance among social, environmental and economic objectives.

4.1 Weak Signals of Change

Recent events and signs, albeit weak, pointing to a building bridges future include:

- The response by Australians to the devastating Indonesian tsunami brought people and institutions together, with many questioning their purpose and value to society. A new approach was needed that accounted for a wider range of values.
- An easing of Commonwealth government arrangements for refugees and detention.
- The National Water Initiative.
- 'Tree change' or 'green change' property developments like those in the river valleys of the far north coast of NSW which emphasise sustainability and social awareness.[49]
- Signing of the Asia-Pacific Partnership on Clean Development and Climate by Australia, the US, Japan, South Korea, China and India to reduce greenhouse gas emissions through partnerships to develop and adopt low emission technologies.
- The WWF blueprint for the Tasmanian forest industry which outlines a future for the industry from both natural and planted forests.[50]
- Following the 2000 Olympics Australia understands it can present to the world successfully.

[49] For example, see: http://mebbinsprings.com/.
[50] WWF Australia, *A Blueprint for the Forest Industry and Vegetation Management in Tasmania – a proposal from WWF Australia*, July 2004.

4.2 The Building Bridges Journey from 2005 to 2020

By 2020 Australia has smaller government than it had in 2005 with government expenditures at less than 20% of GDP. Alliances between the different levels of governments and between public and private sectors have grown. In fact these have been the cornerstone of Australia's new order. The focus shifted to the long-term and multiple outcomes: economic growth, environmental sustainability and social equity. The business environment is competitive and the economy is open. Ethical investments and triple bottom line accounting are common in the corporate sector.

By 2020 Australia is a unified nation where its citizens are treated equally and fairly including the aged, disabled, indigenous and immigrants. With some 20% of the population (around 4.5 million) now over 65 years of age[51] opportunities abound for them to actively engage in both paid and unpaid work. The refugee detention situation was resolved finally in 2007 when greater flexibility was offered to those seeking asylum in Australia, including the ability to live and work in the community. Increasing numbers of skilled immigrants have been attracted to the modern Australian lifestyle and the prospects of well paid jobs under new programs brokered by the Commonwealth government in association with a number of global human resources firms in 2006. Skilled immigrants and labourers including temporary migrants have been drawn increasingly from Asia and the Pacific and less so from European nations in the past. Australia is moving away from its European heritage and communities that had been strongly influenced by two world wars (and its relationship with timber buildings) to a new multicultural society focused on Asia (whose heritage is more in concrete than timber). Australia's young and ambitious knowledge workers continue to travel the world as trans-national professionals gaining business and cultural experience. Increasingly, expatriates are bringing their experiences home and applying them in Australian and in international companies that have a global management culture. These companies also benefit from the skills and knowledge of workers who come to Australia from other countries to advance their careers and to experience life down-under. Many of these high-flyers have settled here which has helped stem the brain drain that was alarming industry and government in 2005.

In 2010 a treaty was signed between indigenous people and the Australian government that set out a range of mutual rights, obligations and opportunities. This agreement established a framework for the relationship with interlocking agreements at the national and regional level.

Australia experienced 14 years of economic growth to 2004, built on economic reforms that commenced in the early 1980s. In 2005, economic growth declined as the economy reached near full capacity. Consumer spending and household debt were at record levels. Consumption had been increasing faster than income, with

[51] Australian Bureau of Statistics, *Population projections Australia 2002-2101*, ABS Cat No. 3222.0, ABS, Canberra, 2003: According to ABS projections this age group is expected to increase from 2.5 million (13% of the population) in June 2002 to around 4.5 million in 2021(19 to 20% of the population).

the difference made up by borrowings based on household wealth. The threat of falling house prices caused many people to take stock and reassess what was important to them. Subsequently, the value set of Aussies changed during the first decade of the new millennium.

Since 2006 priorities have shifted from short-term consumption and the pursuit of economic wealth to greater savings and investment and addressing longer term needs including protecting the environment and looking after the disadvantaged. The challenge was to achieve improvements in each area. There were some short-term adjustment costs.

Growth remained below 3% per year until 2012, when it turned up as earlier investments began to pay off and consumers were more willing to pay for environmental and social attributes of goods and services. Australia's certified sustainable agricultural and forest products enjoyed premiums in international markets. Economic growth is only one measure of national performance in the second decade of the 21st century. Australia is internationally competitive on many fronts.

The consequences of climate change were accepted by Australians despite the Commonwealth government's resistance to sign the Kyoto Protocol. The impact of drought on Australia's major cities and towns in 2005 and 2006 changed the attitudes of many people. Although Australia never did ratify the Kyoto Protocol climate change, emissions management and energy use have been integral elements of life and business in Australia since 2006-07. Australia was very active in the development of the successor to the Kyoto Protocol, which came into play in 2012. Australia was prominent in building bridges between developed and developing nations, facilitating dialogue that resulted in a truly international treaty agreeable to all industrialised and many developing countries. The achievement of lower emissions in Australia has been the result of governments working with industry, community and NGOs for balanced outcomes. Prevention has been a key strategy driven by incentives and taxes coupled with a national greenhouse gas emissions trading scheme.

Innovation in energy generation and distribution has combined with creative demand management by industry and households to reduce energy use and greenhouse gas emissions. The use of low embodied energy materials in construction has increased since 2008. Improvements in the technical and economic efficiency of alternative energy sources including renewables (from wind, biomass, solar, tidal change and hot rocks) have been responsible for their increased market share in 2020. New generation steel production technologies which came on stream in 2012 are less energy intensive.

Energy rating systems have been embodied in a dynamic and efficient Australian building code that sets broad guidelines for environmental, social and cultural elements of buildings and the surrounding landscape – linked to local planning guidelines (landscape management). Consumers have a range of choices within set parameters. Innovation and R&D receive strong support from government and industry, contributing to reduced energy consumption. While consumers are paying higher tariffs for cleaner energy they offset these hikes by investing in energy saving appliances and systems including energy-conserving house designs. Modern dwellings are energy smart.

A healthy nation was an integral part of the 2021 vision for Australia – to create a cleaner environment, a healthy nation and a prosperous economy, or healthy, wealthy and wise. Changes have occurred in school education, public and private sector work environments and recreation and leisure. There are more good nutrition convenience foods and fast food outlets. More people choose a stress free work environment with greater workplace flexibility. Many people work from home taking advantage of mobile technology or they live within a 30 minute journey to their place of work. More balanced lifestyles are the result. Employers are more accommodating towards meeting staff needs in a more competitive labour market. Health care services are provided by public and private institutions, although the burden on the public purse is less than is was at the turn of century.

A quick response to skills shortages emerging in 2004-05 included revised training programs for trade apprentices, new approaches to attracting enrolments in science, IT and accounting and development of new courses, especially more integrated degree and technical certificates. Skilled migrants also addressed critical shortfalls.

Infrastructure investment increased significantly to cope with projected increased demands in cities and regional centres resulting in efficient services that are also environmentally positive. In the main these are privately owned and operated in accordance with internationally agreed environmental standards which complement the sustainable production and processing systems in place for agriculture, forestry, fishing and minerals industries.

4.3 Implications for Housing and Timber Demand

Consumers are environmentally conscious and savvy in 2020. They demand houses that are:

- Energy efficient in terms of embodied energy and operating energy; householders want homes that generate low greenhouse emissions and have low running cost (utilities).
- Good for personal health – zero emissions, natural light, fresh air circulation (the air conditioning boom peaked in 2007).
- Functional buildings with efficient use of space, based on a modular design to allow for future additions yet without compromising unique character.
- Compact – smaller size than the energy-guzzling MacMansions of the late 1990s and early 2000s.
- Technologically advanced – integrated information and communication technology with lots of smart composite materials.
- Integrated into the landscape with natural features retained including vegetation, slope and natural water courses.
- Secure from theft and natural disasters – houses will not be built in high risk environments.
- Use recycled building materials where possible.
- Connected to a suburban or district waste water recycling system.

- Low maintenance with building materials and treatments (paints etc) environmentally benign.

Detached houses are still popular, especially among retired baby boomers and young families:

- The average floor area of new detached houses has fallen to around 205 m^2 (a fall of around 10% since 2002-03) but the total number of detached houses built continues to grow.
- Average household size fell to around 2.4 persons and the number of new households formed per year increased from 7.4 million in 2001 to 9.2 million (2016) and 9.7 million (2021).[52]
- New suburbs have emerged on the perimeters of major cities based on consultative planning principles; urban planning is conscious of cost, social dynamics and environmental impacts.
- Regional centres with a reliable water supply including waste water recycling systems, efficient transportation links to State capitals and high capacity telecommunications links have grown, especially in coastal districts. In some cases sustainable growth limits have been reached because of environmental constraints.
- Many retirees migrated from the cities to the coast. Many of the coastal houses they created are almost organic, with independent water storage, integrated water recycling, solar energy and use of low embodied energy materials and recycled materials.

Medium density and high density housing dominates suburbs within 30 minutes travel time to the city centre and major business and commercial centres.

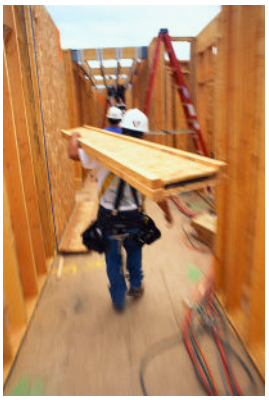
- Many 'inner suburbs' have been remodelled and population densities have increased to establish sustainable neighbourhoods, with reduced dependence on private motor vehicles and greater focus on public transport and spaces for people to meet face to face (cafes, restaurants, parks). A big challenge for developers and architects has been to respect existing neighbourhood character, create something new and 'fit-in'. Between 1991 and 2001, the number of multi-residential dwellings in Australia increased by 37%, more than twice rate of increase for detached dwellings. In the early years of the century multi-residential dwellings represented between 30 and 32% of all new housing starts. By 2020 that proportion has increased to 43%.

Alterations and additions activity has declined over the past decade, as house sizes have declined with retirees shifting from large family homes to smaller dwellings in medium to high density developments in major cities and on the coast. The level of demolitions has generally increased particularly replacing larger inefficient houses built in the latter half of the 20th century with smaller houses or semi detached townhouses with more efficient design features. Often this is two houses from one development. Prices of larger houses have fallen relative to prices for the more efficient, smarter and more compact homes that dominate new starts in 2020. For many it is a cheaper option to relocate or redevelop than to extend.

[52] Based on ABS population projections: Australian Bureau of Statistics, *Household and Family Projections Australia, 2001-2026*, ABS Cat. No. 3236.0, ABS, Canberra, 2004.

Timber usage in residential dwellings has increased, although average dwelling size has declined:

- A renaissance has occurred over the last decade in Australia in the form of a multi-story timber building culture that was last popular in the 1930s. The revival was spurred on by reductions in greenhouse gas emissions and energy use, management of building costs and innovations in floor-ceiling and wall design systems and materials.
- The biggest area of increased timber usage has been in multi-residential units, especially medium density dwellings of up to three stories. This development was facilitated by innovations in floor-ceiling systems with low acoustic ratings, use of engineered wood beams (I joists etc.) and practical integration of timber with steel and masonry. Issues with fire separation and timber framed walls between adjoining units had been overcome during the 1990s.
- Many of the coastal dwellings built by retiring baby boomers used certified sustainably produced plantation, natural and recycled timbers. Techniques continue to improve for efficient recovery of building materials from demolished buildings and their re-use in composite and engineered wood-based materials. The cost of reusable materials is relatively high, with builders preferring to use plantation timber.



- Lightweight timber framed buildings are still the dominant choice of new home buyers in the outer suburban developments, built with certified plantation pine. Modular designs allow substantial pre-fabrication in framing factories and there is increasing use of engineered wood and wood composites.
- There is increasing use of smart wood composite materials – wood plastics for internal and external use and wood metal composites for internal use.
- Low maintenance timber based exterior wall cladding and window frames are popular choices for beach houses. These materials also have high fire resistance properties.

The timber industry has expanded over the past twenty years with growth in demand for certified timber from plantations and natural forests. The natural forest timbers are used for high value niche uses including furniture, feature panels, decorative architectural applications and art pieces. Timber importers have benefited from the growth in demand as domestic supplies are unable to satisfy demand for all wood-based products. Forestry has been granted a social license to operate in many regions based on its satisfaction of ecological, community building and economic objectives. This contrasts to the protests against land use change around the turn of the century when plantation companies bought up former grazing land. The industry is more united allowing greater focus on skills development, R&D and marketing and promotion which is a far cry from the multitude of associations and divided industry opinions of 2005. Per capita consumption of timber products is increasing albeit slightly but wood is appreciated by consumers for all its natural values. The industry is more integrated with the community and harmonized in rural areas with production coming from regrowth forests, plantations and agro forests and the divide between public and private growers which was a hallmark of the industry in the 20th century has all but disappeared.

5 HIGH-RISE LIVING

This scenario describes a world driven by growth, ambition and personal achievement. It is a highly competitive world with lots of opportunities but also lots of pitfalls for the unwary. Short-term market fluctuations are good for some and disastrous for others. The main game is economic growth and wealth creation and there is a growing divide between the haves and have-nots which creates increasing social tension. Governments, private organisations and individuals are preoccupied with insecurity and uncertainty emanating from sources such as the threat of international terrorism, a major down-turn in the property market, rising energy costs, career opportunities in Australia, skills shortages, immigration policy and climate change. Their time frames are short term however, so there is little interest in structural reform. It's all about here and now and the impact of changes on the bottom line. It is about building status and becoming affluent and getting to the top as a nation, a company or an individual as quickly as possible. It is a 'free for all' kind of future with just a few areas of national cohesion and unity. But these are challenging and costly to sustain because of the lack of integration among Australia's economic, social and environmental systems and institutions. A few companies and State governments go it alone on environmental management and have some success. It is a risky existence and many who are disillusioned with government and corporate leadership and are seeking new ways. Will it lead to chaos or will there be some kind of national epiphany that turns Australia towards greater balance and recovery?

5.1 Weak Signals of Change

Recent events and signs, albeit weak, pointing to a high rise living future include:

- High levels of private consumption and household debt and high economic growth over the past 14 years. Household consumption has been rising faster than after tax income since the mid-1990s and in 2005 household saving as a share of GDP is at a record low level.
- State and territory governments threatening to go it alone on such matters as emissions trading in response to climate change.
- Salaries of corporate executives and the widening gap between rich and poor.
- Reform fatigue may be contributing to a reversal of form. Following a twenty year rise in Australia's prosperity on the back of substantial economic reform, the nation is in danger of slipping back. According to the World Competitiveness Yearbook of Switzerland's IMD Australia fell from fourth in 2004 to ninth in 2005. In August 2005, the Business Council of Australia called on the federal government to 'show leadership with a reform program that goes beyond workplace relations' and embraces 'tax, infrastructure, education, competition policy and immigration'.[53]

[53] Business Council of Australia, 'Big gains for average Australians if reforms continue says BCA research', News Release, 6 August 2005, cited at: http://www.bca.com.au/content.asp?newsID=98702.

5.2 The High Rise Living Journey from 2005 to 2020

By 2017 cooperative federalism and the COAG model of national governance are working effectively once again after more than a decade of turbulent Commonwealth – State relations. It had become increasingly difficult for this mechanism to achieve consensus as the States jealously guarded their powers and the Commonwealth refused to listen. The alliance between the Commonwealth Government and the State and Territory Governments started to decline in 2007. COAG's main focus of attention narrowed to national security matters, infrastructure investment to facilitate international trade and equity in health and education services. However, major changes to Australia's political system and structure of government are imminent. In 2020 people are looking forward with hope and excitement to the commencement of the Republic of Australia next year, following a resounding vote in support of change at the end of 2019.

Despite earlier reforms in natural resource management especially for the national water economy, achieving a national approach to other environmental matters had been intractable until 2016 when past problems came to a head. Dust storms over Sydney, Melbourne and Canberra, devastating bushfires adjacent to rural-urban interface zones and increasing traffic congestion and declining air quality in the capital cities were threatening people's lifestyles. These were the result of years of unsustainable natural resource management practices in many sectors. Natural resource management in 2020 is a problem for government but one that is receiving much needed attention after years of neglect.

In 2006-07, reform fatigue peaked following further changes to workplace relations and the full privatisation of Telstra. Employees, especially those with large mortgages, feared the loss of their jobs. The Generation X and Y have a weaker wage structure and more casual employment than their baby boomer parents resulting in a poorer credit risk and as such could see initially a greater shift to lower cost housing away from the main city areas. Planned reforms to infrastructure services especially freight and passenger transport services, health and aged care, education and natural resource management were delayed as the governments worried about loss of voter support. The Australian governments through COAG announced a major new reform agenda in March 2006. The publicity campaign supporting the reforms failed to win over the Australian people who had weathered enough adjustments over the past decade and who wanted to relax and enjoy the dividends of past reforms. Much needed reforms to improve labour productivity and the efficiency and effectiveness of service delivery were put on hold until 2011. During this time there were two changes of government at the federal level with a short-lived and ineffectual Labor government losing office to the Liberals under new leadership.

The 14 years of economic growth enjoyed by Australia up to 2004 were built on economic reforms that commenced in the early 1980s. In 2005, economic growth declined as the economy approached full capacity. Consumer spending and household debt were at record levels. Consumption had been increasing faster than income, sustained by borrowings against increasing household wealth. Falling house prices in 2005 made governments, investors and home owners fearful of a

major downturn in the property market. Home owners stayed in the market and the number of investors who withdrew was less than expected. This reflected the high proportion of household investors in residential property[54] who had chosen to invest for the long-term. Subsequently the so-called soft landing that emerged in 2004-05 was sustained and real house prices fell by less than 2%.

While the 'Great Australian Dream' of home ownership is still alive it is becoming a more distant dream for many. Home ownership aspirations are delayed in favour of lifestyle aspirations. Housing affordability reached a low level in 2003-04 with high prices. Interest rates turned upwards at that time as well adding further to the costs of home ownership and dampening demand. House prices declined. Despite lower house prices later in the decade many potential purchasers were reluctant to take on huge mortgages in these uncertain times, especially while rents remained competitive and job security was low. Although official figures indicated high rates of employment, they masked the high proportion of workers who were employed as part-time or temporary workers. Household formation continued to grow as relationships dissolved forcing more people into the rental market. Many young adults were opting to stay longer in the paternal home which complemented their lifestyle and financial ambitions.

Consumer demand picked up with renewed confidence in 2008 under the influences of high employment, rising per person income and further tax reforms which increased personal disposable incomes. However, with domestic production at near capacity levels in many sectors the volume and value of imports increased placing upward pressure on inflation and interest rates. This resulted in slight downward pressure on housing demand, especially by investors.

During the period 2005 to 2011 a short-term focus dominated government actions. Most attention was on fixing up problems and most solutions were band-aids. There was a lack of commitment to investing in long-term structural reform. The governments' approaches were piecemeal with little attention on the big picture or the longer-term. People had become disillusioned with public institutions.

The net brain drain reached new depths as many of Australia's best young talents were attracted overseas by higher salaries, better working conditions and more exciting lifestyles offered by multi-national corporations and foreign cultures. Government programs to attract skilled immigrants were not enough to offset the out migration. During this period many intending retirees were offered attractive packages to remain in the workforce as consultants and contractors, much to the chagrin of aspiring Gen-Xers. These actions further exacerbated the skilled labour supply situation and many organisations lost good young people. Several long established companies became unviable and folded. This saw the rise of a new breed of company headed by Gen-X and Gen-Y leaders who were hell bent on being successful, but via a more inclusive and purpose driven approach. In 2020 these companies are making their mark in the manufacturing and services sectors.

Climate change was questioned by industry and government for many years, despite its pervasiveness and the impact of drought in many parts of eastern Australia in 2005-06. The government favoured investment in inquiries and investigation rather than policies and projects to reduce emissions. The Kyoto

[54] For example, Bond reported that households accounted for about 90% of lending for established dwellings for investment in 2002-03, up from 65% in the early 1990s - J. Bond, *Recent developments in the Australian housing market,* The Department of the Treasury, Canberra, 2003, cited at http://www.treasury.gov.au/documents/780/HTML/docshell.asp?URL=03_Housing_Market.asp.

Protocol was never signed. Other priorities dominated their attention, especially during the first decade of the millennium. Expectations of people that the government will look after environmental matters were unrealistic. This created further disillusionment with public institutions. By 2012 a few large private companies working with NGOs, State government and privately funded environmental research organisations were doing more for environmental management than the Commonwealth government. These were multi-national companies involved in energy resources and distribution, motor vehicle manufacture and construction materials.

Financial more than environmental and social aspects dominates individual consumption and investment decisions. Rising energy and material prices under the influence of China's growth spurt lead to slight reductions in consumption and increased demand for energy-saving technologies, materials and systems. Efficiency and cost reduction are the main game. A coordinated approach to innovation and investment is difficult with the States and Territories openly competing for international investors and establishing rival research and innovation centres of excellence. Most companies increasingly relied on imported technologies and had become less willing to invest in R&D because of time delays and communication difficulties with researchers, especially those from government agencies. Agreement on national standards such as an energy rating system for residential buildings was not achieved, with most jurisdictions adopting their own unique system. This fragmentation added to costs for nationally based businesses.

Electricity supply disruptions occurred from time to time as outmoded power stations faulted under increasing power demand from a digitised community with HD television, broadband wireless communication and intelligent home management systems and a smarter industrial sector seeking efficiency improvements through information and telecommunications technologies and robotics. Reform delays and under-investment in power generation and distribution capacity in the decade up to 2010 came home to roost in 2011 to 2013. Inadequate investment in infrastructure in other areas including rail transport, port facilities and water distribution limited Australia's productivity growth and international competitiveness. Many companies transferred operations overseas. Skilled jobs shifted overseas as well.

Personal health and fitness are high priorities among younger workers in 2020. Retirees are learning from past mistakes and seeking healthy diets and clean, stress-free lifestyles. The public health system like the public education system is largely about dealing with the underprivileged. Over the past decade many Australians have opted out of the public systems and chosen private education and health and medical services.

By 2013 most Australians had had enough of the decline in Australia's reputation. The pursuit of economic goals had come at a high cost and Australia had fallen behind most other developed nations in a number of areas. Australians demanded new leadership, new institutions and new ideas. A federal election was held in 2014 and won under the leadership of an articulate young Australian born woman of Asian parentage. The 2006 reform agenda was reviewed, revised and implemented in 2015. The government prepared the people for reforms in fiscal management, including instruments such as taxes on socially and environmentally harmful levels of activity by companies and individuals. The State governments are not happy, but they have little choice as the Commonwealth government has taken over their debts.

The transition to a national republic is in full swing in 2020. Legislative reforms are occurring in areas where responsibilities have been transferred from the States to the Commonwealth. State government does not feature in Australia's new system of government. It will be a two tiered structure. Regional governments are to become the service providers for national government programs and policies. The national government is responsible for national policy and strategy and for collection and allocation of funds. This is an exciting yet disruptive period in Australia's history, but a time that will be seen as a turning point for our great nation.

5.3 Implications for Housing and Timber Demand

Consumers and investors remain cost conscious in 2020, although they are slowly becoming more environmentally aware and responsible under new leadership from the national government. Prior to about 2015, environmental aspects of houses are unlikely to be of much importance.

In 2020 housing demand will be characterised by:

- Growing demand for medium and high density dwellings that require less maintenance and maximise the amount of time occupants have for work and socialising. Demand for town houses and apartments in multi-storey buildings will be steady over the period to 2008, when growth will pick up and investors will return to the property sector. Home buyers and property investors will be looking for dwellings that are:
  - Energy efficient but primarily with respect to operating costs with minimal concern for embodied energy in building materials, use of recycled materials or carbon emission levels
  - Stylish with distinctive design using materials that look good, are maintenance free and low cost
  - Spacious with room for entertaining – smaller family sizes will see a rebalancing of the space from four and three bedrooms to bigger living areas; home office work spaces will be popular as well
  - High tech – building management systems that facilitate internal and external communication (voice and data), monitor energy and water consumption, regulate solar radiation and maintain safety and security for occupants as well as protecting the building and its contents
  - Well located – close to employment centres, transport, shopping centres, school and higher education establishments, recreational and fitness centres and remnant natural vegetation or parks
- Fluctuating demand for detached housing, falling initially, remaining flat and then gradually picking up as confidence returns to home buyers. Features that home buyers desire are similar to those for multi-residential dwellings. Pressure to reduce building costs will be high, especially over the next ten years:
  - Operationally efficient
  - Stylish
  - Spacious – blocks will be small but house designs will be pretty much fence to fence
  - High tech ready – systems and appliances can be added

- Location – for working families buying their first home, it will be in the new suburban developments on the edges of the big cities; for the retiring baby boomers it will be comfortable castles on the coast. The under-investment in transportation and energy infrastructure maintenance and development will restrict movers to established centres. As demand in these desirable areas pushes up prices, local governments will move quickly to open up new estates to developers. The down side of this is increased risk of failures in building performance and utility services and increasing demand for costly repairs within seven to ten years after construction.
- Modular design and construction will be popular giving home owners extension options for later years as families grow and also facilitating lower building costs

- Timber usage in residential buildings will decline over the next ten years, but then increase as environmental aspects factor more prominently in building purchase decisions.
  - Concrete, steel and glass will be the preferred choice of building materials for architects, engineers and builders of multi-residential dwellings; their relatively low costs will be attractive to home buyers as well as their low maintenance requirements and durability
  - Wood's share of the market will decline because of performance and price
  - Timber imports will fall
  - Softwood demand will fall while hardwood's share of total consumption will increase – mainly for use in flooring and furniture
  - Composite panels consumption will increase – engineered wood will be a bright spot for timber; consumption will grow over the next 15 years
  - Composite boards such as MDF and particle board will be popular substrates for appearance materials for use in decorative panels and furniture
  - Interest in timber will increase in the late teens as companies, consumers and governments get serious about environmental issues and impacts
- Alterations and additions activity declined over the past decade as lifestyle changes influenced housing decisions. The wave of retiring baby boomers with their preferences to relocate to higher-density and/or coastal dwellings has had a significant impact on residential construction.

What's happened to the forest and forest product industry over this time? State owned forests were sold off in the early teens and the processing industry became more concentrated as smaller mills closed or amalgamated with larger operations. Engineered wood processing and production capacity expanded. With the trend to lower building costs and modularisation, factory built homes are on the increase.

6 LITTLE BOXES

This scenario describes a world that is planned and ordered with the government taking control of Australia's environmental destiny and the means of getting there. The government has a strong green orientation. It is a major reversal of trend in terms of the role of government in the managing public goods and services. It was imposed as a result of the high level of dissatisfaction among Australians with the economic rationalist approach to governance and economic reform. Resistance intensified in 2006-07 when the government of the day introduced a new raft of reforms to environmental management using market-based mechanisms and instruments.

Australians demanded an end to harvesting in natural forests, farming in sensitive ecosystems, inhumane management of livestock and the wasteful use of natural resources especially water. They wanted a government that would sign the Kyoto Protocol, comply with carbon emissions targets under the terms of the protocol and commit to the protection of Australia's unique and fragile natural environment including the protection of its biodiversity. Little Boxes is a world of targets, regulations, standards and taxes. The government is committed to its environmental reform agenda and to positioning Australia as a world leader in sustainable production. While there is widespread support for better outcomes for the natural environment many individuals and organisations have grown tired of the government's high-handed approach, especially where it adds to the cost of production. In 2020 it hasn't turned out as anticipated in every case with some costly mistakes and a lot of compromises, but a firm hand of government is still directing management of the natural environment.

6.1 Weak Signals of Change

Recent events and signs, albeit weak, pointing to a Little Boxes future include:

- Banning of plastic bags in South Australia
- Victorian government's decision to stop grazing on the alpine high plains
- Restrictions on use of CCA for protecting timber against bio-degradation
- Commonwealth government's proposals to take over the ports
- Efforts by the Commonwealth government to centralise control of education
- The Australian Building Codes Board –Five Star Energy rating system which potentially discriminates against timber flooring
- Queensland government's decision to withdraw from native forest harvesting by 2025
- The failure of the Commonwealth government to consult the community on matters like native forest harvesting in Tasmania at the time of the 2004 election and imposing management regimes that appeal to the city-based voters

- Decision by the NSW Government to construct a desalination plant at Kurnell in south east Sydney to supplement Sydney's water supply without consulting local residents and apparently without considering greenhouse gas emissions implications relative to alternatives.

6.2 The Little Boxes Journey from 2005 to 2020

Protracted and widespread drought, record high prices for oil, bushfires on the edges of major cities, water supply shortages and climate variability heightened awareness among Australians of a national environmental crisis in 2006. A more knowledgeable, wealthy, urbanised and concerned society lobbied governments for more immediate action to reverse environmental degradation in the cities and in the bush.

Insecurity was a big concern for people back in 2006-07. People were looking for stronger leadership and a clear Australian identity. They were disillusioned with the free-market ideology of government and the globalisation of our society. They were looking for a distinct Australian identity built on social and environmental values underpinning industrial development, sporting and cultural activities and community programs. In 2007 they elected a national government that would uphold these values.

Despite many years of government down-sizing, regulatory reform and relinquishing the delivery of public services to the private sector and market based mechanisms, a change occurred in public sector management in 2008 in relation to natural resource management. This was in response to public concerns and growing fears about market-based approaches associated with inefficient and inequitable service delivery and failure to achieve planned outcomes. The 2006 audit of the state of the environment for the federal government revealed an alarming rate of decline in the quality and performance of the natural environment and recommended a major rethink of environmental management including use of more targeted efforts by government to avert further decline. A new model of environmental governance emerged with public agencies and authorities taking greater control than in most other areas of public service delivery.

Relations between the States and Commonwealth on natural resource management matters are based on the Environment and Natural Resources Treaty which was brokered in 2008. A program to harmonise the raft of regulations, codes of practise, standards and instruments relating to environmental matters in all areas of industry were harmonised across the jurisdictions by 2010 was agreed. In 2020 this ambitious plan is still being addressed. Many areas remain where regulations conflict each other making life difficult for households and businesses. While the States have retained constitutional responsibility for the environment and natural resource management, the 2008 Treaty established a strategic policy framework with agreed national targets and broad strategies for meeting those targets. The States and Territories relinquished some control for greater Commonwealth financial and administrative support to meet agreed environmental targets.

One of the first acts of the Commonwealth government after the environment and natural resources treaty was agreed was to sign the Kyoto protocol and revise Australia's greenhouse targets.

Management of environmental quality has grown to be one of the biggest areas of public investment in Australia by both public and private sector organisations. Regulations impact on all economic and social activities. New taxes and incentives were introduced, linked to natural resource use targets. The National Environment Institute, established under the ENR Treaty, has administrative responsibility for natural resource management with the approval of the states and territories. The Institute is governed by a joint board comprising Commonwealth, State and Territory government representatives and is staffed by personnel from all jurisdictions.

In 2020 Australia's National Environment Institute has strong links to regional Australia. Regionally based agencies and organisations have emerged as the key service providers for national natural resource management programs. There is strong networking and knowledge exchange between agencies, facilitated by a network of federally funded natural resource and environment knowledge brokers.

Under the new natural resource management governance regime, social and community tensions increased in the bush especially during the early years of its implementation. The livelihoods of many farmers were at risk as plans were developed and implemented to transform rural landscapes. In highly vulnerable areas traditional agricultural and grazing activities were banned and re-vegetation for environmental services was mandated. Commercial tree plantings also increased under these arrangements. In areas of moderate risk sustainable agricultural production was integrated with the management of the natural landscape for environmental and commercial outcomes. While farmers whose land was resumed by the government were compensated to leave the land, smaller rural towns have struggled to support declining rural communities. The increased risk of fire associated with expansion of environmental and commercial tree plantings is of concern to rural residents in 2020, especially where rural populations have been declining. All rural districts are required to have a current natural disaster risk management plan based on a national standard and registered with local authorities and with the Commonwealth's Emergency Management Authority.

High levels of government spending on major programs for the environment over the years 2008 to 2012 were aimed at boosting economic growth. These program investments were complemented by an international marketing campaign launched in 2012 to promote Australia's clean and green image in an attempt to differentiate the quality of Australian commodities, products and services. While regulations and bureaucracy added to private costs of production, markets were reluctant to pay higher prices for Australia's 'green' goods and services. In fact, many other nations were joining the green market trend making it difficult to differentiate Australian commodities and attract a price premium. Consumers gained the greatest share of benefits. To keep costs down, public investment in R&D and new technologies were increased substantially in the areas of integrated landscape management, energy use and greenhouse gas emissions management, water management and whole of life management of built assets. This did not happen until 2013 and there was pressure on research providers to deliver management solutions with haste. All Australian products including mining and agricultural commodities, manufactured goods and commercial services are subject to certification schemes that ensure that

they are sustainably produced. These schemes are governed by the National Environment Institute. In 2020 it is impossible to export any product or service to anywhere in the world without appropriate environmental certification.

In some regions, the pressure to act resulted in decisions being made prematurely with insufficient technical and economic information and analysis. This resulted in costly mistakes for government and private organisations with unexpected and unanticipated outcomes – unintended imposts on innocent parties. For example, reclamation of former agricultural land in the central Murray Darling Basin in 2011 has not yet had a positive impact on dryland salinity. With the benefit of hindsight and an injection of research resources, scientists have identified a number of problems including plant species selection, their placement in the landscape and inadequate understanding of landscape dynamics. The information required for a successful outcome was not available in 2013 but administrators had planting targets to meet and budgets to spend by set dates. The system of Regulation Impact Statements was by-passed by the respective Minister in the interests of expediency in the early years. Following a couple of spectacular failures the RIS system was revised and reinstated in 2014 with the effect that recent regulations have been more effective and efficient.

The focus is on targets and regulations to reduce emissions in line with Kyoto, to conserve fossil fuels, to re-use or recycle materials and resources and to protect vulnerable ecosystems. Energy ratings are mandatory in all states based on the national system which applies to consumer goods, vehicles and all buildings. Despite the best intentions of the regulators, the system struggles to keep up with advances in technology such as energy efficient house designs and building materials because of testing and approval requirements. The National Environment Institute and Standards Authorities are working together to discover ways of speeding up the process.

Australia in 2020 is governed by a green-oriented federal government, although it does not admit to being a green government. Green is normal and necessary for survival. Environmental impacts and consequences are factored into most decisions and regulations abound to maintain compliance. Compliance costs are high and for industry to remain internationally competitive, new technologies and processes that help reduce costs are in high demand. The government is supporting R&D to identify, develop and adapt such technologies. While there are concerns in some sectors about skills shortages, where technology can substitute for labour and it results in an environmentally positive outcome, industries are choosing technology.

6.3 Implications for Housing and Timber Demand

While consumers are environmentally aware, many consumption decisions have had the environmental dimension made for them by way of government regulations and standards. In this world, housing choices are more limited. Designers, builders, component manufacturers and service providers must comply with environmental regulations governing such aspects as total energy use, sustainability, whole of life management, waste management and greenhouse gas emissions. In 2020 houses are environmentally and technologically ‘smart’ in line with regulations and cost. Regulations have added to building costs, but technology has attempted to keep pace so that costs are not beyond the means of young Australians.

In 2020 housing demand will be influenced by:

- Building codes and land zoning regulations that restricts the size of homes, the siting of housing developments, the cost of building blocks, the building materials that can be used, water management regimes and greenhouse gas emissions over the life of the building.
- Urban development plans are based on energy efficiency, waste reduction (re-use and recycling), water use efficiency and greenhouse gas emissions, integrated with social initiatives to build sustainable communities and limit population density to sustainable levels. New housing developments in major cities occur within existing suburban boundaries, with low density housing replaced by medium and high density housing. Many of materials from the detached houses which were demolished for the new housing estates are recovered and re-used in the new developments in accordance with regulations.
- Greenfield housing sites are subject to strict environmental impact assessment and will only proceed where the development is complementary to the landscape and its environmental services. This has increased the cost of land development and individual blocks. Medium density housing is more likely under these circumstances, although regulations will limit population densities and individual building heights in line with environmental targets. Housing costs have increased, offset to some extent by a trend towards smaller dwellings.
- Improvements in transport infrastructure have been and will continue to be critical to the success of new housing developments. High petrol prices and increasing road congestion and travel times have seen a reduction in motor vehicle ownership in capital cities and increased use of public transport, especially rail. Light rail systems are expanding. Hybrid and electric motor vehicles are popular, with technology improving rapidly. These factors have intensified demand for and supply of housing within existing rail catchments.
- To keep building costs down and deal with expected shortages of skilled workers, greater use is being made of technology for prefabrication, modularisation and easy transport and assembly of multi-storey and single storey residences. While this may result in efficient house construction, a downside is a lack of design variability. It depends on housing affordability for individuals and what builders can do within the building code and other binding regulations. Many smaller builders struggled under this governance system, resulting in increasing concentration of the home building industry and the exit of a number of smaller building companies.
- Timber is a big winner in a regulated world. Energy rating standards for residences are best met by timber which rates well for embodied and operating energy. However, technology improvements in steel production have improved its embodied energy rating significantly over the past five years and there are likely to be further improvements. Technology has also improved recovery procedures for both timber and steel and their efficient conversion into valuable materials. Re-use of timber and recycling of recovered timber compete directly with certified plantation timber resources.
- Certified timber can only be sourced from plantations. Regulations have shut up native forests in response to public outcries against the impacts of harvesting on ecosystem function. The price of timber increased as domestic supplies were

unable to keep up with demand. With greater use of timber in new houses, imports have grown and will remain high until supplies from new plantations come on stream. Imports must have recognised certification as well. Many of the new plantations were planted under government sponsored landscape management programs as farm lands were planted to trees. Harvesting in these areas will be strictly monitored.

- Technology has resulted in more efficient use of timber resources, especially through composite materials and engineered products. These feature in new building systems that reduce the costs of construction. Building systems are highly advanced under the Little Boxes world, having benefited from the injection of public funding for R&D into environmental management since 2013.
- Higher density city living is less attractive to retiring baby boomers who have been selling up their suburban blocks to make way for the new higher density developments and moving to coastal and bush locations. In their new neighbourhoods they faced significant building restrictions associated with bushfire risk and environmental impact. In many cases, the dream of a house in the bush near the beach was put beyond their means. Even in coastal areas, medium density housing has been the best option. Strict regulation of population densities and building designs does result in better protected environments which are within easy reach of local residents. Demand is strong.
- Home owners contemplating additions and renovations are subject to the same strict building and environmental codes. Where approval is granted they are required to retain the style of the original building, yet use energy efficient and environmentally positive materials and processes. In cases where a house is located in an area that has been rezoned (or might be rezoned) for higher density development, local government will not approve renovations and additions. Since 2005 renovations to existing homes has declined.
- With the increased use of timber in residential buildings there is increased demand for building protection and maintenance systems that are relatively low cost, have low environmental impact and require low and infrequent input of residents' time. These will feature in new building systems that combine timber and other materials with wood composites and various environmentally safe resins, adhesives and protective finishes that meet all performance and environmental standards. All (new) buildings are designed and managed on a whole of life basis.

The timber industry is a recognised natural products industry delivering certified materials and building components.

7 FUTURE TIMBER CONSUMPTION PERSPECTIVES AND STRATEGY DEVELOPMENT AREAS

The three scenarios represent a range of developments that could happen over the next 10 to 15 years and which might impact on timber consumption in Australia. The scenarios provide a valuable context for use in the development of industry and organisation strategies and policies. Using ABARE's domestic timber consumption model, timber consumption levels are estimated for each scenario. The model is used as an adjunct to the scenarios to quantify timber consumption outcomes consistently with political, economic, social, environmental and technological conditions of each scenario. They are not definitive forecasts and are more to define the difference between the scenarios rather than identify the absolute level of consumption.

While there are a number of distinct differences between the scenarios, there are also a number of common opportunities and threats. Issues that are common to each scenario represent prime targets for strategy and/or policy development to ensure that the best possible outcomes eventuate. This section presents details on the main influences on consumption in 2020 for each scenario. An analysis of opportunities and threats for each scenario is provided for the timber industry to consider for developing their strategies or policies in preparation for success in an uncertain future.

7.1 Timber Consumption Perspectives, 2020

Timber consumption levels in 2020 differ between the three scenarios because of differences in the way the critical uncertainties play-out within each scenario. In Table 7-1 below the states of the critical uncertainties are described for each scenario. The purpose of this table is to demonstrate the distinct differences between the three scenarios.

Table 7-1:
Differences between the Scenarios

Drivers	Building Bridges	High Rise Living	Little Boxes
Domestic Economic Growth (Average GDP growth %)	Moderate 2.95	High 4.0	Low 1.5
Population and demographics including social change Average annual Population Growth rate	0.83	1.11	0.55
Population in 2020	22.95 million	23.93 million	22.02 million
Household formation rate	Slightly above trend – marriage on the rise again, fewer relationship break-ups, retirees shift to coast and bush and invest in city apartments	Higher than trend – high relationship turnover, high divorce, career focus ahead of children, retiree investment in city apartments	Below trend – slow down in relationship turnover, children stay in parental home longer, retirees work to 65 with few upgrading or downgrading housing

Drivers	Building Bridges	High Rise Living	Little Boxes
Immigration intake	High	High	Low to moderate – population policy
Environmental Services	Market based instruments	Mixed market & regulations	Regulations
Political Decision Making	Decentralised	Status Quo	Centralised
Energy Costs	Declining	Fluctuating	Increasing
Skilled Labour Supply	Adequate with mobile workforce	Shortages with a mobile workforce	Variable with low workforce mobility
Technological Innovation	High – balanced investment	Low - Cost Driven Imported technology	Green driven – government funding
Health issues	Shared responsibility	Individual responsibility	Public responsibility
Resource security	High	Low	Uncertain
Social license to operate	Certainty	Uncertain	Uncertain
Building regulations	National system, cooperative; self managed	Variable between jurisdictions; moderate enforcement	State based, fragmented; strict enforcement

The following sections describe the implications for timber consumption in each scenario. These descriptions provided the basis for defining assumptions for a number of critical drivers of timber consumption, as shown in Table 7-2. These were fed into a quantitative model to provide estimates of timber consumption in 2020.

Table 7-2:
Forest and Timber Industry Drivers for each Scenario

Driver	Building Bridges	High Rise Living	Little Boxes
New Housing Starts (2004-05 – 156 000)	157 000	180 000	130 000
% of multi -residential to total new dwellings (2004-05 is 33% but trend to 38% by 2020)	43 (5% points above trend)	48 (10% points above trend)	48 (10% points above trend).
% change in timber use per new detached dwelling	5%	-10%	8%
% change in timber use per new multi – res dwelling	15%	-10%	10%
Change in Alterations and Additions	-10%	-10%	-5%
% change in timber use in Alterations and Additions	15%	-10%	0%

7.1.1 Building Bridges

Timber use per dwelling in 2020 has increased in the Building Bridges future because of its more attractive environmental attributes for house construction. Housing starts are assumed to increase in line with continued growth in household formation and the decline in household and family sizes. While detached dwellings are still the dominant choice for new residences, the share occupied by multi-residential dwellings has increased significantly from around 33% in 2005 to more than 43% in 2020. Timber usage in multi-storey residential buildings also has increased significantly due to technological advances and user preferences for timber. The average floor area of houses has fallen by about 10% since 2005 in line with changed social values and the shift of retirees from large suburban homes to smaller coastal cottages. Many baby boomer retirees have invested in a unit or two on the proceeds from the sale of their large family home. Despite the lower level of alterations and additions activity in 2020 relative to 2005, the increased use of timber has resulted in a net increase in timber use in this market segment.

7.1.2 High Rise Living

Timber consumption is under threat in the High Rise Living future as housing preferences shift to multi-residential dwellings. Non-timber materials are cheaper and perform better, especially steel and concrete. Housing starts have increased in line with continued growth in household formation and the decline in household and family sizes, but detached dwellings have lost ground to units and townhouses. Multi-residential dwellings have increased to more than 47% of total new dwellings and are set to take over from detached houses by 2025. Timber use in new houses and multi-residential residences has declined by 10% per dwelling since 2005. The floor area of detached houses and multi-residential dwellings has increased since 2005. One bright spot for timber consumption is panels for formwork which declines only slightly as it is used in construction of the popular steel and concrete multi-storey residential buildings. Alterations and additions activity has also declined as household preferences shift towards higher density living which better complements the lifestyles of committed city dwellers. The shift to the coast by retirees has eased with many baby boomers downsizing to a townhouse or high-rise apartment while continuing to work in the city.

7.1.3 Little Boxes

The regulatory environment of Little Boxes has resulted in increased consumption of timber. Higher costs of housing coupled with national programs to reduce energy and water use and greenhouse gas emissions have lead to a shift to more sustainable, higher density living. The average area of new houses and multi-residential dwellings has declined in line with smaller building blocks and higher development and building materials costs. As a result new housing starts have gradually declined since 2005. The rate of household formation has declined with young people tending to stay longer in the family home. The regulatory environment is not perfect with conflicting regulations such as the preservation of heritage houses and the requirement for more energy efficient buildings, frustrating builders and home owners. With smaller family sizes, greater environmental consciousness and hefty penalties for exceeding energy consumption thresholds imposed on a range of materials, products and services, extending a house has become a more costly option

than moving into an energy efficient townhouse or apartment located close to public transport and within easy reach of work, shops and recreation facilities. Regulations on re-use and recycling have had a significant impact on consumption of new timber. As a result increases in consumption of new timber are rather modest.

7.2 Forest Product Consumption in 2020

Consumption of wood products in Australia in 2002-03 as shown below in Table 7-3 is used as the base level for the 2020 consumption estimates. Timber consumption in 2005 was somewhat higher being around 6.6 million m^3 in total reflecting the current boom in the industry. It was decided to use the 2002-03 figures as these are more representative of past consumption trends.

Table 7-3:
Apparent Consumption in Australia in 2002-03[55]

Product	Volume millions m^3
Softwood sawnwood	3 182
Hardwood sawnwood	1 089
Wood based panels	1 898
Total	**6 169**

The estimates of timber consumption for 2020 were determined using ABARE's econometric models of domestic timber consumption.[56] The models for structural wood products estimate aggregate consumption as a function of the number of detached dwellings commenced each year, the number of multi-unit dwellings commenced and real GDP. The model provides estimates of total structural timber consumption and the shares of softwood sawntimber, hardwood sawntimber and panels in overall timber consumption.

The model parameter values specified to represent each of the scenarios were outlined in the previous section. Specifically, parameters have been added to modify the volume of timber assumed in detached houses and multiple-unit dwellings and the share of alterations and additions in total housing expenditure. Table 7-4 presents the results.

Table 7-4:
Timber Consumption estimates for each scenario in 2020

Product	Units	Building Bridges	High Rise Living	Little Boxes
Softwood	million m^3	4 077	3 518	3 028
Hardwood	million m^3	1 524	1 179	1 496
Panels	million m^3	1 605	1 523	1 257
Total	million m^3	**7 206**	**6 220**	**5 781**
Population	million	22.95	23.93	22.02
Per capita consumption	m^3	0.314	0.260	0.262

[55] ABARE, 2005 – *Australian Forest and Wood Products Statistics,* ABARE, Canberra, 17 May 2005.
[56] For a full description see Love, G., Yainshet, A. and Grist, P., 'Forest Products: Long term consumption projections for Australia', *ABARE Research Report 99.5*, Canberra, 1999.

Demand for structural timber is significantly driven by the level of housing starts and the volume of timber used in construction. The results indicate that aggregate timber consumption exceeds current levels in two of the three scenarios. Consumption in the Little Boxes scenario is likely to be higher than these results indicate if re-used and recycled timber is accounted.

The high level of timber consumption in the Building Bridges future is driven by a combination of high housing starts and the increased timber use per dwelling. Timber consumption is projected to reach around 7.2 million m³ by 2020, which is 16% higher than the level in 2002-03.

The lowest level of timber consumption is estimated for the Little Boxes scenario which is due to the low level of housing starts associated with a decline in the rate of household formation, low economic growth and a decline in timber consumption over the next 15 years. In this scenario timber consumption is estimated to be less than 5.8 million m³ in 2020, which is about 94% of 2002-03 consumption.

Timber consumption under the High Rise Living scenario is estimated to be just 2% higher 2020 than consumption in 2002-03.

From a sector perspective softwood consumption displays a similar pattern to aggregate timber consumption and demand is greatest under Building Bridges. Hardwood sawntimber consumption is estimated to be lower in 2020 in the High Rise Living scenario and slightly higher in the other two. The reason for this is cost. As hardwood becomes scarcer it is anticipated to increase in price and other cheaper products will be sought under this scenario. The Building Bridges and Little Boxes scenarios assume a slight reduction in native timber availability, but should maintain a sustainable timber flow over time. The consumption of panel products is estimated to be higher in the Building Bridges scenario and to more or less hold the line with the High Rise Living scenario and decline in Little Boxes.

7.3 Opportunities and Threats for Australia's Timber Industry – Identification of Strategy Development Areas

The previous section indicated that total structural timber consumption in 2020 could range from as low as 5.8 million m³ to as high as 7.2 million m³. This wide range reflects the very different conditions in the future described by the three scenarios. However, it is likely that there are some issues, conditions and outcomes which are common to the three scenarios. These are very important to those involved in the timber industry including private companies and policy makers because regardless of how the future actually unfolds these issues and outcomes are likely to occur. They are robust elements and as such companies and policy makers can put in place strategies to effectively capitalise on these issues and outcomes.

The approach to discovering the robust issues, conditions and outcomes is first to identify opportunities and threats for Australia's timber industry in each scenario. The next step is to find those opportunities and threats which are common to the three scenarios. These are referred to as the robust issues. The final step is to formulate suitable strategies to enhance the opportunities and avert or minimise the impact of the threats.

Building Bridges	
Opportunities	**Threats**
▪ Australia's free trade agreements with Asian nations ▪ Skilled migration ▪ Certification for all food and fibre products (sustainable production) including timber ▪ Reduced energy consumption ▪ High energy prices ▪ Infrastructure investment ▪ Re-use and recycling of building materials (timber) ▪ Residential buildings complement natural landscapes ▪ High level of household formation ▪ Migration from cities to the coast ▪ Medium and high density residential developments ▪ Prefabrication, modularisation ▪ Smart wood composites	▪ Advances in steel technology with respect to energy intensity and greenhouse emissions ▪ High energy prices ▪ Trend towards more compact houses ▪ Re-use and recycling of building materials ▪ Low maintenance building materials that are environmentally benign ▪ Decline in alterations and additions activity

High Rise Living	
Opportunities	**Threats**
▪ High rate of household formation ▪ Strong rental market, mostly units ▪ Demand for energy-saving technologies, materials and systems ▪ Demands of a more digitised community ▪ Personal health a priority ▪ Transition to a republic ▪ Rise of regional governments ▪ Cost conscious consumers ▪ Style, design, appearance count most ▪ Growth in medium and high density residential developments ▪ Flexible internal building design ▪ Building management systems ▪ Increasing size of residences ▪ Shift to the coast ▪ Demand for building repairs ▪ Non-wood building material preferences ▪ Decline in timber imports ▪ Increasing interest in engineered wood products and composite panels ▪ Emerging environmental concerns towards 2020 ▪ Industry concentration ▪ Factory built homes	▪ Tension between states and Commonwealth with few areas of agreement – fragmentation of standards and regulations ▪ Failure to secure a national approach to natural resource management ▪ Slow down in economic reform ▪ Skills shortages ▪ General disillusionment with public institutions ▪ Inadequate investment in infrastructure ▪ Company failures and shifts overseas ▪ Building failures ▪ Decline in alterations and additions activity ▪ Industry concentration

Little Boxes	
Opportunities	**Threats**
▪ Carbon trading ▪ Sustainable production systems ▪ Agreement between States and Commonwealth with establishment of the Environment and Natural Resources Treaty ▪ Harmonised standards, codes and regulations ▪ Public and private sector investment in management of the natural environment ▪ Rise of regional agencies and organisations ▪ Increased commercial tree plantings ▪ Integrated agricultural and environmental land management ▪ Clean and green Australian produce marketed internationally ▪ Increased R&D investment ▪ Whole of life management of built assets ▪ Certification for sustainable production ▪ Re-use and recycling ▪ Demand for energy-saving and low emissions products and services – national energy ratings system in place ▪ Cost reduction technologies and systems ▪ Shift to medium and high density residential developments ▪ The shift from the city to the coast ▪ Infrastructure investment in line with environmental objectives ▪ Prefabrication and modularisation of buildings ▪ Product efficiency benefits engineered wood products and composite materials ▪ Building systems ▪ Low maintenance materials that are environmentally benign	▪ Government control ▪ Centralisation of power in the Commonwealth ▪ Tensions in rural areas of changed landscape management policies ▪ Green competition in international markets ▪ Hasty and poorly informed decisions made in some regions on environmental management ▪ High compliance costs add to the costs of new residences – housing affordability ▪ Skills shortages (technology substitution) ▪ Smaller residences ▪ Advances in steel production technology to reduce embodied energy ▪ Harvesting in native forests banned ▪ Increased timber imports ▪ Decline in alterations and additions activity

Opportunities common to all three scenarios are:

- Demand for products, services and materials that are less energy intensive in their production and their operation
- Shift towards medium and high density living
- Prefabrication and modularisation of residential buildings and internal building flexibility to keep costs down and accommodate lifestyle changes
- Smart wood composites and engineered wood products
- Migration from the cities to the coast (sea change) or country (tree change) associated with retiring baby boomers and changing lifestyles but also a change in social attitude in these regions as well.

Threats common to the three scenarios are:

- Decline in alterations and additions activity
- Advances in steel and concrete technology

A number of other areas that occur in more than one of the scenarios include:

- Re-use and recycling of all building materials
- Regional delivery of government policies and programs
- Building management and monitoring systems
- Building materials that require low maintenance and are highly durable and environmentally benign
- Managing skills shortages in the building industry and related sectors
- Integrated natural landscape management with implications for forestry and agriculture and residential developments
- Sustainable production and certified products and services.

These areas are of critical importance to the future success of Australia's timber industry. Appropriate strategies need to be developed at industry and individual organisation level.

8 SOME SCENARIO 'WHAT IFS'

The Australian forest industry has traditionally tended to focus on changes in supply (typically nature, quantity and quality) of the forest resource and its impact on the wood products industry. However, there are also changes occurring to the nature of demand for forest products both within Australia and internationally. Issues including substitutes and changing product standards and regulations within Australia and increasing demand for a range of forest products from countries like China has made predicting the future path for Australia's wood products industry uncertain.

The following section investigates some specific impacts with the aid of the scenarios. The scenarios are particularly useful for establishing the likelihood of a particular event or change occurring. Where an event is highly likely and the consequences of it occurring are significant, then actions should be taken to ensure that positive outcomes eventuate. There are many other events and changes that can be tested within the safe framework of the scenarios. The selection presented here is by no means exhaustive nor are they necessarily the most important issues of concern to the industry.

8.1 The Top Five House Makers Shift to Steel Framing

In 2003-04 the top five house makers collectively built 13 991 detached houses and 1 755 multi-units, accounting for 12% and 3% respectively of the Australian total. Based on the 2003-04 fiscal year results, the demand for framing timber (frames and trusses) from these top five house makers is estimated at around 245 000 m^3/a, which represents approximately 5% of the total sawntimber consumption in Australia.

Another critical and likely outcome of this event is that this would lead to a portion of market followers tagging along with the major home builders and switching away from timber framing. Taking that into account, it is estimated that the actual impact could potentially be twice as much in volume terms.

Consequently, if the top five house makers shifted to 100% steel framing, the market size for framing timber could downsize by some 500 000 m^3/a, which is equivalent to about 10% of the current national sawntimber consumption.

Factors that may lead to this shift in material use include the following:

- Relative costs of materials – steel vs. wood
- Total building costs – as influenced by advantages in prefabrication and modularisation of building components, use of robotics, the level of skilled labour required to assemble frames, floors and trusses, the ease of use of steel
- Home buyer perceptions and preferences in light of material durability, maintenance requirements and design features
- Technological advances in steel manufacture resulting in lower carbon emissions and reduced costs of production
- Failure of timber-framed buildings in particular areas or in extreme events

- Application of energy efficiency ratings place less emphasis on the embodied energy of building materials than on the operating energy of buildings.

The likelihood of this event occurring in each of the scenarios is as follows:

Building Bridges	Low to moderate (depending on technological advances in steel manufacture in relation to carbon emissions and energy use and commitment to life cycle analysis as the basis of material use)
High Rise Living	High (cost competitiveness dominates)
Little Boxes	Low (would be higher if technological advances offset wood's environmental advantages and it became difficult to access planted forests thus increasing the cost of timber)

On balance the likelihood of this event occurring is in the low to moderate range. The consequences of such an event occurring are significant and are likely to be felt more strongly in particular regions, such as those where the threat of termites is high. Indicators to monitor include the following:

- Technological advances in steel manufacture related to energy use, carbon emissions and cost of production – would lead to increased steel consumption.
- Major failure of timber-framed building built within the last ten years due to termite attack and widely publicised by the media – would lead to increased steel consumption.
- Embodied energy accounted for in energy ratings for buildings – would lead to increased timber consumption.
- Demand for energy resources and steel in developing economies, especially China – would increase relative price of steel and lead to increased timber consumption.
- Major building company from Western Australia or South Australia with experience and reputation in steel-framed houses establishes operations in one of the eastern states.
- Advances in multi-storey timber-framed buildings, which would improve timber's competitiveness relative steel resulting in increased timber consumption.
- The level of acceptance by engineers of the benefits of engineered wood products including I beams and LVL would influence timber consumption relative to other materials.

Decisions taken in response to changes in these indicators would be in the context of other relevant factors and would not be acted upon independently.

8.2 Building Regulators give Higher Energy Ratings to Non-wood Products

The Five Star Rating for house development is reportedly to become a national standard in May 2006 under the Building Code of Australia Sustainability Regulations. Housing related construction is a significant end use for timber products and any shift in regulations that preferences non-wood products would have a major impact on the industry. An example is the recent introduction of the Five Star Code in Victoria which preferences concrete flooring over suspended timber floors because of its higher thermal qualities.

The present market share of concrete and brick wall frames in residential housing is around 35% of the total residential housing starts which are currently around 150 000 units/a. In this hypothesis it is assumed that the market share of concrete and brick wall frames could increase to 50% of the new houses. If this occurred the demand for framing timber would reduced by approximately 400 000 m^3/a. This quantity accounts for over 8% of the current softwood sawnwood consumption in Australia.

Timber sub-floors lost a significant share of the new house market to concrete in the 1970s and 1980s and the proposed changes in the code, if permanently implemented, will hasten further loss of market share for timber.

Factors that may lead to this shift in material use include the following:

- Relative costs of materials – non-wood vs. wood
- Total building costs – as influenced by any advantages in fabrication and modularisation of building components – tilt up slabs,
- Skilled labour requirements for wood versus non-wood
- Home buyer perceptions and preferences in light of material durability, maintenance requirements and design features
- Technological advances in the manufacture of non-wood products resulting in lower carbon emissions and reduced costs of production
- Failure of timber-framed buildings – strength, termites, durability etc.

The likelihood of this event occurring in each of the scenarios is as follows:

Building Bridges:	Low to moderate (depending on technological advances in the manufacture of non-wood building products in relation to carbon emissions and energy use and commitment to life cycle analysis as the basis of material use)
High Rise Living:	High (cost competitiveness dominates)
Little Boxes:	High if non-wood products gain acceptance as low energy products. Low if woods environmental advantages are accepted.

On balance the likelihood of this event occurring is in the moderate to high range. The consequences of such an event occurring are significant. Indicators to monitor include the following:

- Planning regulators acceptance of non-wood products as low energy or low environmental impact.
- Technological advances in non-wood products related to energy use, carbon emissions and cost of production – that will lead to increased consumption of these products.
- Embodied energy accounted for in energy ratings for buildings – would lead to increased timber consumption over concrete, steel and aluminium.
- Conversion to cleaner energy (renewable or nuclear) which lowers the impact of energy hungry products.
- Major building companies convert to modular construction such as tilt up slabs and factory built non wood components and fittings.
- Technological advances (structural and cost competitiveness) in multi-storey timber-framed buildings would lead to increased timber consumption.
- Acceptance by engineers of the benefits of engineered wood products including I beams and LVL would increase timber consumption.

Decisions taken in response to any changes in these indicators would be in the context of other relevant factors and may not be mutually exclusive.

8.3 The Major Pallet Manufacturers Shift to Recycled Plastic

It is estimated that the wooden pallet manufacturing industry in Australia annually consumes 60-70 000 m^3 of mainly industrial grade sawntimber. This is equivalent to approximately 1.5% of the total sawntimber consumption in Australia but is an important market for the low grade sawntimber that does not meet structural or appearance grades.

Pallets are the wooden bases that are used for transporting goods and they are generally defined as either one way or two way pallets.

One way or one off pallets are used once and then are lost to the system. Two way pallets are often leased by the major pallet hire companies to companies to transport their goods and are then returned once the goods have been shipped.

A major issue for the pallet hire companies is tracking their pallets and knowing where their pallets are any time. The concept of plastic pallets has been mooted as they can have a tracking chip installed in the plastic mould of the pallet which can be used for tracking and identification.

It is understood wooden pallets today represent 70% of the total pallet trade.

Factors that may lead to this shift in material use include the following:

- Relative costs of materials – wood vs. plastic or non-wood pallets

- Improved performance and cost competitiveness of non-wood pallets,
- New transport or freight systems that reduce the need for pallets
- Higher dumping fees which improves the recycling of pallets.

The likelihood of this event occurring in each of the scenarios is as follows:

Building Bridges:	Low to moderate (depending on technological advances in the manufacture of non wood pallets).
High Rise Living:	Low as wooden pallets are cheaper than most of their non-wood competitors.
Little Boxes:	Medium if a ban on one way pallets and/or demand products such as recycled plastic is used in such instances. Low if woods environmental advantages are accepted.

On balance the likelihood of this event occurring is moderate to low. The consequences of such an event occurring are significant. Indicators to monitor include the following:

- Major pallet companies seek to move to non wood pallets.
- Banning the dumping of wood waste in landfill as pallets are a major form of this waste.
- Technological advances in non wood pallets in relation to cost of production, durability in use and tracking capacity.

Decisions taken in response to any changes in these indicators would be in the context of other relevant factors and may not be mutually exclusive.

8.4 'Heart in Stud' Wall Frames were Banned

The total demand for timber framing in Australia is approximately 2 million m^3/a, of which about 15% (or 300 000 m^3/a) is estimated to be heart-in material. This is sawntimber that contains the heart in the end product and heartwood can only withstand compression not tension so can only be utilised in a vertical position. However if a piece of sawntimber that contains heart material is put under tension in a horizontal position it can fail.

The structural integrity of wooden products when used correctly if very sound however it would not be as forgiving as steel if used incorrectly. Given the increasing litigious nature of society using steel or wooden products that do not contain heartwood could be considered lower risk by construction companies. This could lead to outlawing of heart in studs purely on a pre-cautionary basis.

Within the current softwood plantation estate the total harvest is not expected to increase dramatically from the present volume which means that a supply gap would be created by the removal of heart in studs from framing timber. This volume would need to be fulfilled by sawmills producing an additional volumes of structural lumber from outer wood which would be difficult, additional imports or

sawing of plantation hardwood for structural timber which is only just becoming technically possible.

One of the most critical consequences of this event from the timber industry's perspective is that the additional market for core wood would have to be sought; for example more industrial grade applications in the domestic market or exporting flitches. Given the market conditions in those alternative markets for such surplus heart-in (core wood) material at commercially attractive values would indeed be a challenge.

Factors that may lead to the removal of 'heart in studs' include the following:

- Major failure of a wooden construction using heart in studs
- Lobbying by steel frame manufacturers to lift structural standards
- Major increases in cheap imports of higher quality imports of structural timber
- Building regulators reviewing standards to improve structural characteristics.

The likelihood of this event occurring in each of the scenarios is as follows:

Building Bridges:	Low as current standards seem to be under no real threat
High Rise Living:	Low as heart in studs are relatively cheap to produce
Little Boxes:	Low if wood is accepted for its green qualities.

On balance the likelihood of this event occurring is low. However if such an event does occur the consequences will be significant. Indicators to monitor include the following:

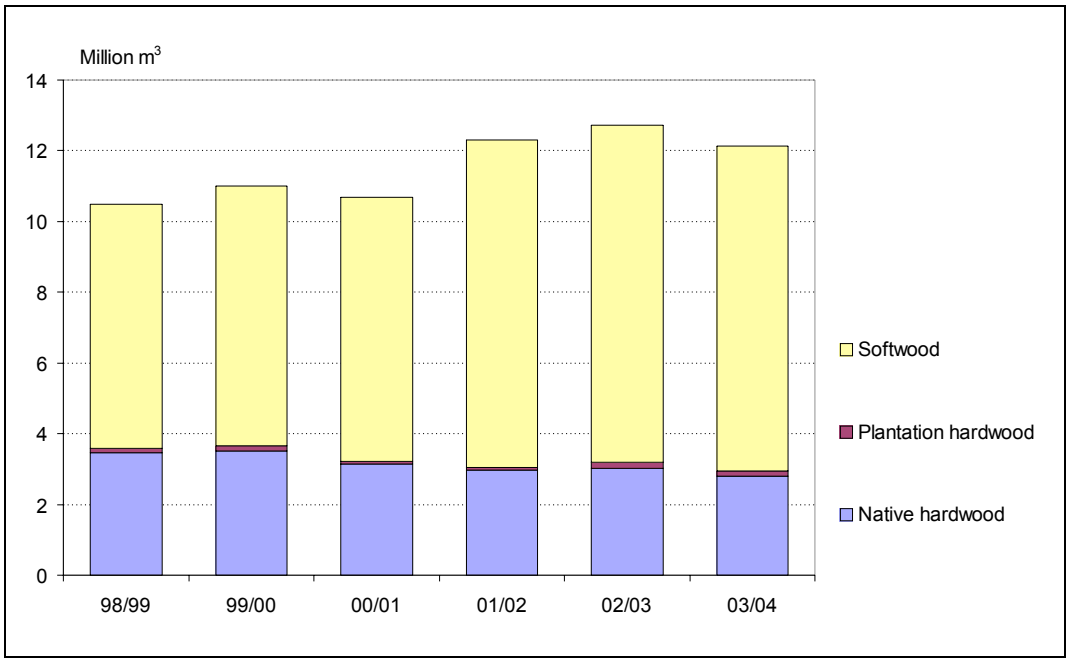
- Building regulators questioning the current structural standard.
- Steel framing industry approach to promotion and regulation.
- Technological advances in other wood products such as engineered or imported products.
- Construction companies expressing a concern at either the risk or in-service performance of Heart in Studs.

Decisions taken in response to any changes in these indicators would be in the context of other relevant factors and would not necessarily be acted upon independently.

8.5 A Ban on the Harvesting of Natural Forests

Australian sawlog/veneer roundwood removals in 2003-04 totalled 12.1 million m^3 of which native hardwood accounted for 23%. During the six-year period from 1998/99 to 2003/04 and shown in the figure below, the quantity of native hardwood has declined at an average of 4.3%/a, while softwood harvested increased at 5.9%/a. To date the share of plantation hardwood sawlogs has been insignificant.

Figure 8-1:
Australia Saw and Veneer Log Removals, 1998-99 – 2003-04



As shown in Figure 8-1 above, native hardwood removals classified as saw or veneer logs were 2.8 million m^3 in 2003-04. The products recovered from those logs have been sliced cut veneer, flooring, specialist construction timbers, finishing timbers and furniture timbers. The immediate impact to the industry is that those manufacturers currently processing wood from native forests would lose the supply and thus have to consider their future or import replacement products from overseas. The approximate volume of replacement products would likely be around 900 000 m^3/a.

Factors that may lead to the ultimate banning of the harvesting of natural forest include the following:

- Green groups continue to successfully lobby state governments to ban harvesting natural forests
- Community concern over the harvesting of forests in water catchments
- End users develop product sourcing policies that exclude natural forest products
- Governments perceive voter support for the creation of new national parks
- The community is unconvinced of the environmental qualities of natural forest products.

The likelihood of this event occurring in each of the scenarios is as follows:

Building Bridges:	Moderate as the natural forest is seen for all its triple bottom line values which includes some harvesting
High Rise Living:	Moderate – depends on cost competitiveness
Little Boxes:	Very high as green concerns would outweigh industry.

On balance the likelihood of this event occurring is moderate to high. The consequences of such an event occurring are likely to be significant, although it would depend on the approach taken by authorities and its timing. Indicators to monitor include the following:

- The intensity and frequency of lobbying by green groups for more reservation of natural forests
- Community concern over forest activity in water catchments
- Planning authorities developing product sourcing guides that discriminate against natural forest products
- End user suppliers developing sourcing policies that preference plantation grown timber products or other substitutes.

The ban of harvesting of natural forests would create significant additional demand for sawntimber products that could not be supplied from existing plantations in Australia and hence would increase the demand for imports.

8.6 All Building Products have to be Recyclable

Ensis recently reported that an estimated 1 million tonnes of wood waste per year is being dumped in landfill[57]. With increasing pressure on local government to reduce the volume of product going into landfill and/or extend the life of existing landfill sites then any product that can be safely removed and/or re-used will come under pressure to be diverted. Wood is an obvious candidate for diversion from landfill however there are two categories: treated and untreated wood.

Treatment of wood is commonly undertaken with a Copper Chrome Arsenic compound or more commonly known as CCA to improve its resistance to termites and its durability. The dumping of CCA treated timber is now severely restricted and is an issue of major concern to the industry and could lead to a ban or reduced usage of (un-recyclable) treated timber products or alternatives being sought such as:

- Wood preservatives that do not prevent wood from being recycled which may require extra costs
- Preference for species with natural durability, e.g. cypress
- The use of recyclable non-wood materials, e.g. metal, plastic and composites, could be enhanced where applicable.

It is estimated that approximately 21% of the timber used in house constructions is treated for use in decks, pergolas or fencing and this represents an annual volume of around 800 000 m^3/a.

Untreated wood can be recycled either for particleboard or re-used in other applications such as furniture and flooring.

[57] Taylor, J. Mann, R. Warnken, M. Reilly, M. Pincic, D. Death, D. *Recycling and End-of-Life Disposal of Timber Products*. PN05.1017 Forest and Wood Products Research and Development Corporation, June 2005.

Factors that may lead to the requirement for all building products to be recyclable could be:

- Planning authorities raise land fill fees to maximise recycling and impose penalties for dumping recyclable products and materials
- Improvements in systems for the recovery of timber and other recyclable products from the waste stream
- End users or suppliers to end users develop product sourcing policies that require products to contain a percentage of recycled product (this is common in some paper grades)
- Governments move to minimise landfill
- Virgin wood products increase in price.

The likelihood of this event occurring in each of the scenarios is as follows:

Building Bridges:	Moderate as the natural forest is seen for all its triple bottom line values which includes some harvesting
High Rise Living:	Low as unlikely to be cost competitive
Little Boxes:	Very high government would see this as an option to reduce waste.

On balance the likelihood of this event occurring is moderate and the consequences are significant, as the Little Boxes Scenario timber consumption projections reveal. Indicators to monitor include the following:

- Planning authorities focusing on diversion of landfill
- Banning of treated product entering any landfill
- Improved technology for use in retrieving and processing recycled products
- Planning authorities developing product sourcing guides that discriminate against natural forest products
- End user suppliers developing sourcing policies that preference products with either a recycled content or high capacity for recycling.
- Consumer preferences for materials and products with a recycled content or high recyclability.

Decisions taken in response to changes in these indicators would be in the context of other relevant factors and would not be acted upon independently

8.7 Imports of Rainforest Timbers are Restricted

Currently Australia imports around 100 000 to 120 000 m^3 of sawntimber from tropical rainforests which represents around 2% of demand. In addition a significant volume is also imported as furniture and panels particularly plywood. Tropical rainforest sawntimber is used for decking, furniture products and mouldings. The potential exists for the banning of imports of tropical rainforest timbers due to concerns over illegal and unsustainable harvesting in the source countries of these resources.

If trade barriers were imposed on tropical rainforest timber and timber product imports, the use of products from sustainably managed forests would be accelerated to address the supply gap. Domestic processors of imported rainforest timbers would have to find alternative sources to satisfy local demand. However as supplies from Australia's plantation forests are not expanding the loss of rainforest timber imports would be replaced by sustainably produced imports or non-timber substitute products. Some local processors and product manufacturers would likely find it difficult to obtain or locate suitable alternative materials without compromising the physical characteristics of their product.

The impact of trade barriers on imported rainforest timbers is likely to be localised given the current volume of rain forest timber traded. The economic impact on the overall Australian timber industry would be relatively minor.

Factors that may influence decisions to restrict tropical forest imports to Australia could be:

- Environmental non-government organisations successfully lobby for import restrictions.
- Certification and/or chain of custody programmes fail to adequately address the concerns of illegal and unsustainable harvesting.
- Rulings by the World Trade Organisation in relation to the use of environmentally linked trade barriers.
- Implementation of sustainable forest management policies and practices to govern the remaining tropical rainforests.
- Publicity surrounding illegal/unsustainable harvesting demands an immediate response from government.
- Lobbying by suppliers of sustainable produced Australian native timber resources.
- Changes in the pattern of environmental cooperation between nations.

The likelihood of this event occurring in each of the scenarios is as follows:

Building Bridges:	Low as certification and chain of custody schemes would deliver acceptable results
High Rise Living:	Low as imports are often cheaper
Little Boxes:	Moderate to high as government could see this as an acceptable policy from a domestic perspective.

On balance the likelihood of this event occurring is low and the consequences are likely to be low. Indicators to monitor include the following:

- ENGO's action on illegal and unsustainable harvesting of natural forests
- Governments' responses to concerns over illegal harvesting both in the supplying nations and in Australia and other consuming nations
- End user and supplier attitudes to illegal harvesting and sourcing strategies
- Increased public awareness of illegal harvesting and options for controlling it

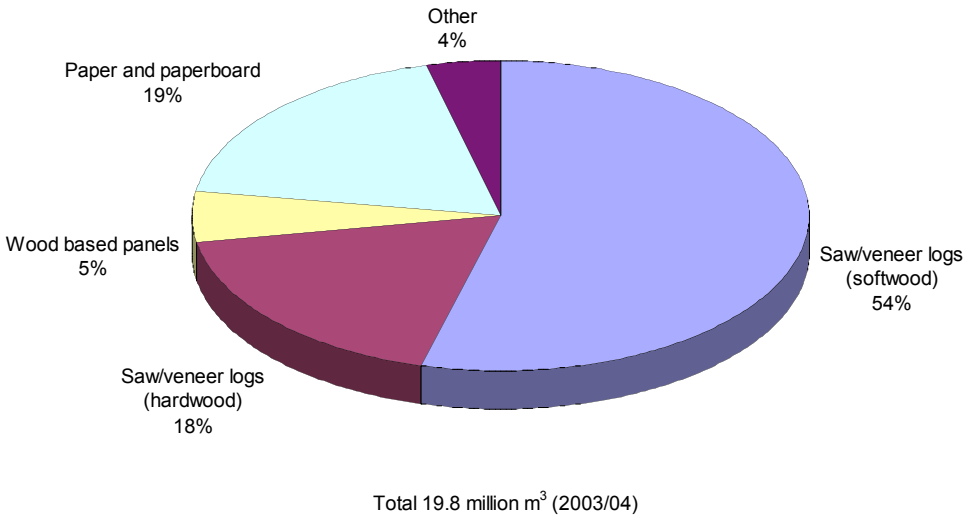
- Rulings by the WTO on environmentally linked trade barriers
- Establishment of multi-lateral and bi-lateral environmental cooperation agreements.

8.8 Expansion of the Softwood Estate Ceases

As at December 2004 Australia had 1.7 million ha of plantation forests, of which 58% were coniferous. New softwood plantation establishment in the period of 2000-2004 has been on average 9 000 ha/a, compared with a higher rate of 12 300 ha/a recorded during the previous five years. The establishment trend for softwood has been declining

In terms of roundwood consumed, the domestic industries' demand for saw and veneer logs in 2003/04 was 14.3 million m^3, of which 75% was softwood. In the same year, by comparison, the wood based panel industry and the paper and paperboard industry consumed 1.1 million m^3 (of which 95% was softwood) and 3.7 million m^3 (of which 53% was softwood) roundwood respectively.

Figure 8-2:
Australia Total Roundwood Consumption by End Use, 2003/04



The total softwood roundwood demand in Australia at 14.0 million m^3 in 2003/04, has increased by 1.7%/a over the last five years. Today, Australia's board and paper industries are based primarily on softwood and the loss of softwood log supply would hypothetically be considerable.

Given the plantation forests already established, if expansion of the softwood forest estate stopped today, the supply volume could still theoretically remain at current levels on an ongoing basis assuming that the 'cut over' areas are replanted.

The key consequence of any lack of expansion is continued reliance on imports and this reliance would tend to grow as demand increased over time. Substitutes would also tend to increase their market share as Australian sawntimber would struggle to

maintain market presence in all product categories. Factors that could lead to the continuing decline in softwood plantation development include:

- Continued poor investment prospects for softwood plantations due to high land cost, medium growth rates and static log prices
- Planning authorities reducing the area of land that can be established in any year
- Social discontent with expansion of the plantation estate
- Cheap imports of high quality softwood products
- Development of cheap substitute products

The likelihood of this event occurring in each of the scenarios is as follows:

Building Bridges:	Moderate as some small increase in plantations is seen as a positive diversification
High Rise Living:	High as other products are likely to be more cost competitive as unlikely to be cost competitive
Little Boxes:	High as increasing the development of exotic plantations is not seen as good for the environment or socially.

On balance the likelihood of this event occurring is high and the consequence significant. Indicators to monitor include the following:

- Price of land in plantation regions
- Approach by planning authorities to plantation development
- Attitude of green groups to the development of exotic plantations
- Local community reaction to plantation expansion
- Disinterest in development of softwood plantations by governments
- Privatisation of public plantation estates.

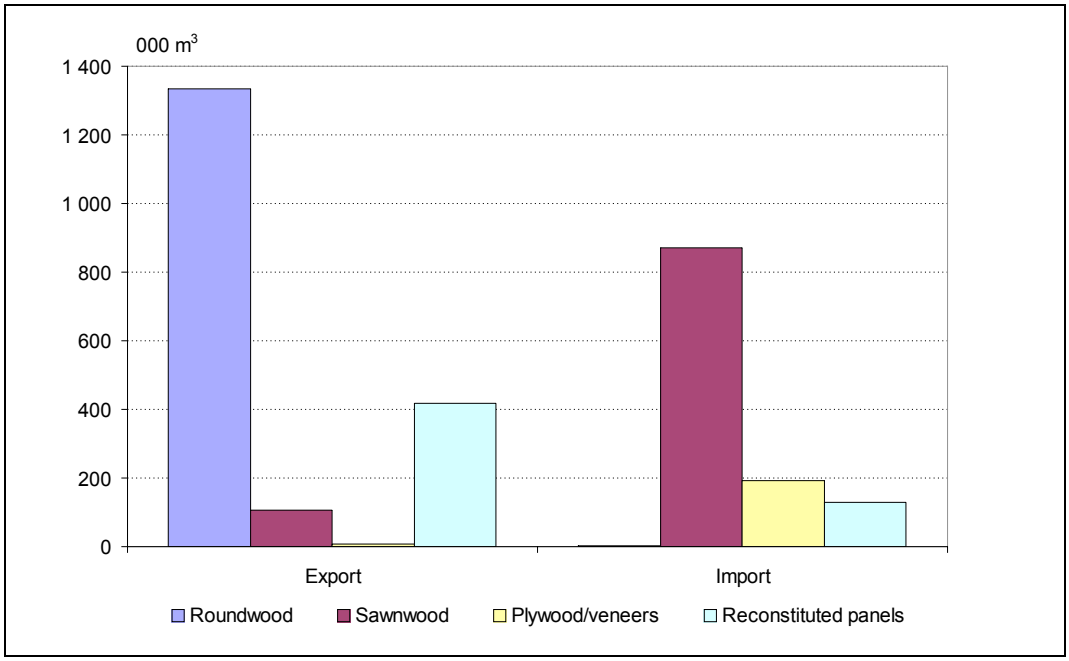
8.9 The Australian Dollar reaches 1 US Dollar

If this proposition was to be thoroughly analysed it would have to be discussed in conjunction with the movement of other competing currencies and the relevant economic conditions. However, in general terms, it is reasonable to assume that the event would work against export businesses due to Australian supplies losing their comparative cost competitiveness and, vice versa, in favour of imports into Australia.

As far as the selected timber product markets are concerned, to date, Australia's export activities have been relatively minor. In 2003/04 the country exported 1.3 million m^3 of logs, 107 500 m^3 of sawntimber and 8 500 m^3 of veneers and plywood. South Korea, China and Japan have been the main buyers of export logs from Australia, together accounting for 89% of the total in 2003-04.

As for imports, Australia imported 1 700 m^3 of logs, 871 100 m^3 of sawntimber and 191 600 m^3 of veneers and plywood in the 2003/04 fiscal year. New Zealand has traditional been the principal supplier of wood products into Australia, followed by North America. In recent years the supply countries have increasingly diversified and now include product from Europe and Chile.

Figure 8-3:
Australia Selected Wood Products Trade, 2003/04



To date much of the solid wood product exported from Australia has been relatively low-value commodity for which cost competitiveness is a key success factor. A substantially appreciated Australian dollar would be expected to result in a business environment where Australian manufacturers/exporters are unlikely to be able to compete purely on costs and would therefore have substantial motives to re-focus on the domestic market.

Should this 'what-if' happen, it has been assumed that export activities would cease and imports of sawn/processed timber would likely increase by 30%.

On the other hand, a high Australian dollar would benefit the competitive position of imported products. Coupled with the expected slow-down of export activities by the industry, the nature of the domestic business environment and respective industry rivalry would become more competitive as both domestic producers and importers would be motivated to increase their emphasis on the Australian market, which could potentially lead to an over-supply situation.

8.10 The Australian Economy goes into Deep Recession

This hypothesis was provided in very general terms. In that context, the likely outcome would be a slow down of Australia's economy, including the building industry, which is by far the largest consumer of wood products in Australia. Another likely consequence is that a recession would likely result in a weakening of the Australian dollar.

Let us say for the sake of argument that the deep recession would mean that the building industry activities drop by 20%. It is estimated that housing industry is responsible for approximately 80% of timber products consumption in Australia. Based on that assumption, total domestic consumption of timber products would decline by 16%. The current usage of sawn/processed timber in the construction industry has been estimated at 3.8 million m^3pa.

Affected manufacturers would be forced to reduce their throughputs or explore new product-market opportunities in order to maintain production at pre-event levels. Despite the weakening Australian dollar that would be beneficial for the export businesses, it is considered unlikely that most manufacturers would be able to find new product-market opportunities that fully complied with the demand gap created by the event. As a consequence, it is more likely that the activity level of affected manufacturers would drop overall by some 10 to 15%, with complementary adjustments to raw material supply.

8.11 Formaldehyde is Banned in Reconstituted Panels

Exposure to high levels of formaldehyde, which is used as a resin in reconstituted panel boards, is suspected to be carcinogenic. The timber industry is aware that there are technological solutions commercially available on the market to deal with this issue, although they are more costly than conventional technologies.

If this event occurred in Australia, there would likely be a short-term advantage for solid wood producers of mouldings. However, the reconstituted panel industry would eventually and successfully adapt to the revised health, safety and environmental market requirements. Therefore, it is considered that such an event would not have a significant impact on the future wood products supply and demand situation.

Factors that may lead to the requirement for all building products to be recyclable could be:

- Medical researchers establish a link between exposure to formaldehyde and cancer
- Planning authorities ban the use of formaldehyde in domestic premises

The likelihood of this event occurring in each of the scenarios is as follows:

Building Bridges:	Moderate to high as the formaldehyde is known to be a problem chemical and is likely to be banned or voluntarily phased out in this scenario.
High Rise Living:	Moderate as unlikely to be cost competitive, although health concerns are important.
Little Boxes:	Very high as government would see this as an option to remove a potentially harmful chemical.

The likelihood of this event occurring is high while the consequences over the medium term are likely to be moderate. Indicators to monitor include the following:

- Medical research investigating cancer and exposure to formaldehyde
- Planning authorities questioning and/or removing formaldehyde in new buildings

- Construction companies demanding low or non formaldehyde products
- Increased public awareness of the problems associated with formaldehyde and other carcinogenic materials and substances
- NGO's such as the Green Building Council taking action to ban or downgrade any building material that contains formaldehyde products.

8.12 Alterations and Additions decline by 50%

Alterations and additions have become an increasingly significant market segment for timber consumption. There are a number of reasons for this. First, the family home is capital gains tax free which means any investment that increases its value is tax free income if the owners decide to sell. Second, the cost of selling and buying another house is not insignificant as the Stamp Duty on a $750 000 house in Victoria is around $40 000 and there are potential additional costs of agents selling fees, advertising, bank charges and moving costs which can mean a total moving cost of around $60 000 which is not insignificant. If homeowners are happy with their home location then it appears many are making the decision to invest in their current home rather than move house.

As the population ages and with increasing house prices there is an incentive for homeowners to release some of the value in their home for living expenses or to fund retirement. Conversely young people may have a real difficulty in affording the purchase of a detached house and instead may look for cheaper options such as apartments and semi-detached townhouses. This will cause a change in the structure of housing in the city and suburbs with a shift from predominantly detached housing to apartments and semi-detached. This will mean that construction will move away from alterations and additions towards total redevelopment of detached housing into higher density accommodation.

The alterations and additions sector in Australia's housing industry represents a considerable portion of domestic solidwood products consumption. In investment value terms, the market has grown at a rate of over 10%/a over the last five years. This notable increase has been driven primarily by the high cost of purchasing new housing and the owners of existing housing stock spending on renovation projects to improve their homes rather than take on the significantly increased debt required to purchase or build a new home.

Factors that could lead to a decline in alterations and additions:

- Increased house demolition rate with redevelopment for apartments and townhouses
- Continued high house prices
- Increasing pressure to change planning laws to increase the density of housing around the major cities
- Higher commuting costs and declining efficiency of public transport.

The likelihood of this event occurring in each of the scenarios is as follows:

Building Bridges:	Moderate as the concept of higher density living is seen as part of a balance with the environment and the economy.

High Rise Living:	High as house prices increase the family home on a large block creating a financial incentive to subdivide.
Little Boxes:	Moderate to high as regulatory change could increase the density of the housing.

On balance the likelihood of this event occurring is moderate to high and the consequences are significant particularly for softwood sawntimber and hardwood beams which are the main structural building products in the alterations and additions sector. It is estimated that the Australian alterations and additions sector consumed approximately 1.5 million m^3 of sawn (or equivalent) timber products in 2005. Consequently, a 50% decline in 'alterations and additions' would mean a reduction in sawn timber demand of around 750 000 m^3/a.

Indicators to monitor include the following:

- Increase in house prices versus affordability
- Rate of demolition of detached houses
- Any potential change in the taxation structure on housing
- Improved technology for the integration of steel and wooden frames
- Low level of superannuation – existing home owners needing to sell their house to top up super or subdivide
- Pressure to increase housing density around the CBD of major cities
- High fuel prices increasing the cost of commuting
- Smaller family sizes
- Lifestyle shift away from backyards and space to more condensed convenience living.

8.13 A Skills Shortage in the Building Industry and Related Forest Sectors

A declining skills base is a long-term concern for the industry's future. The main implication of this would be a loss of skilled field and processing staff which will increase costs and at the construction end of the sector a shift towards pre-fabricated housing methods (as opposed to building at site) and the supply of suitable pre-cut and ready-to-assemble components for such purpose.

What remains uncertain is to what degree in Australia this trend will (continue to) occur in the medium to long term.

If this trend continued to occur, automation of operations where possible will become extremely important and in the construction sector prefabrication and modularisation of building components would be inevitable. This would likely involve the introduction of suitable hi-tech processing technologies and potentially a new system of building and distribution. Timber may have to win a place in these new building systems. The natural forest sector and hardwood in particular would be significantly impacted by a skills shortage particularly as it is reasonably labour intensive.

Whilst it has been proven that timber products are capable of being prefabricated and modularised as building materials, how this industry trend impacts on timber

consumption in the future would need to be assessed in conjunction with the availability, costs and benefits of other building materials such as steel

Factors leading to this could include:

- Age of carpenters and lack of apprentices
- Industry sponsorship for recruitment and training in the sector
- New technology and new work processes
- New skill requirements and multi-skilling
- Families moving away from forest growing and processing areas
- Poor industry image or record.

In general, a shortage of skilled workers in growing, processing and building has already been recognised as an industry trend not only in Australia, but globally.

The likelihood of this event occurring in each of the scenarios is as follows:

Building Bridges:	Moderate to low as the industry is in control of its destiny and investing accordingly and it has developed appeal within the community as an attractive career option with a sound future.
High Rise Living:	High as the industry is not prepared to invest for long term gains as short term profit is king.
Little Boxes:	Moderate and while government may have an interest in the industry it will be bureaucratic which could mean a slow response time to skills development.

On balance the likelihood of this event occurring is moderate and the implications of this could be significant particularly for the more labour intensive industries such as hardwood sawmilling, some flooring products, specialty builders and furniture.

Indicators to monitor include the following:

- Ongoing job vacancy and high participation rates
- Changes in technology and work processes
- Enrolment numbers at education institutions
- Number of apprentices recruited to the industry
- General attractiveness of working in various sectors.

8.14 Certification of Timber Products becomes Mandatory

There has been a growing interest in certification of timber products and chain of custody systems that are designed to provide some certainty to the end user that the product they are buying has come from a legal and sustainable source. This interest has been promoted by ENGO groups like the WWF and Greenpeace.

It is ultimately the wood products consumers' demand for certified products that will be the driving impetus for the timber industry adopting the concept of forest and forest products certification. There are also other aspects which could

accelerate the trend, including international market competition where certified products are promoted to achieve a point of product differentiation, or where environmental activities orchestrate the change.

The Australian forests products industry is largely domestically focussed but there is a significant level of imports that are gaining increasing interest in respect of legality and sustainability.

Factors that may influence a mandatory requirement for certification include:

- Increasing pressure from environmental groups for certification
- Retailers demanding certified products to reduce pressure on them by environmental groups
- A decision by the industry to distance itself from poorer industry operations in other parts of the world.

The likelihood of this event occurring in each of the scenarios is as follows:

Building Bridges:	Moderate to high as the industry and environmental groups work towards common goals and consumers demand environmentally sustainable goods and services.
High Rise Living:	Low as the industry and government are more interested in low cost options and certification is seen as an additional cost. Environmental protection comes from Codes of Practice and penalties rather than prevention systems.
Little Boxes:	High as certification would be seen as a mandatory process to ensure triple bottom line outcomes.

On balance the introduction of industry wide certification of timber products in Australia is moderate to high and while this will have some cost implications it is probably considered more of a cost of doing business and must be accepted by industry as such. Indicators to monitor include:

- Market pressure by ENGOs to retailers such as Bunnings, Mitre 10 and Home Hardware
- Market response by major retailers and construction companies to certified products
- Industry reaches consensus with ENGOs for an agreed certification process
- Certification becoming a part of trade regulations or similar policy shifts.

8.15 Integrated Landscape Management becomes Mandatory

Integrated landscape management that explicitly evaluates the trade-offs and synergies between economic prosperity, social equity and environmental sustainability have been the goal of many land use planners but historically has been difficult to do.

Ensuring the sustainable prosperity of rural communities requires both healthy landscapes and productive, profitable primary industries.

The recent significant increase in plantation development particularly blue gums has exposed the forest industry to criticism (fairly or otherwise) by farming groups who are uncertain about massive land use change.

Factors leading to this could include:

- A requirement from planning authorities for the formation of landscapes that have multiple functions, by using ecosystem services to support production and protection
- Increasing pressure from community groups against single crop development such as blue gum plantations, cotton, rice etc.
- A requirement to make agriculture more resilient and sustainable, through diversification options for enterprises that harness ecological functions on farms
- Increasing interest in the creation of 'sustainable livelihoods', where development is balanced around a framework of human, physical, social, financial and natural capital
- A requirement to minimise the impacts of pests in landscapes.

The likelihood of this event occurring in each of the scenarios is as follows:

Building Bridges:	High as the industry is working in harmony with environmental groups and government to create a more sustainable approach to forest production and integration of operations with other land uses is the only way the industry can expand.
High Rise Living:	Low as this is seen as a cost element and there is unlikely to be the social harmony or goodwill to support integration
Little Boxes:	High - government is likely to legislate it.

On balance the likelihood of this event occurring is high and the implications of this could be significant in a planning sense but if carefully developed could expand the industry.

Indicators to monitor include the following:

- Changes in landscape planning legislation
- Collaboration among farming and environmental groups
- Community desire to improve landscapes and develop land use mosaics
- Government opportunities to invest in landscape repair and biodiversity enhancement
- Increasing awareness of landscape values and opportunities for integration.

9 CONCLUSIONS

This report has reviewed many factors that may or may not influence the consumption for wood products over the next 15 years. The development of scenarios is neither a prediction nor an end. They are designed to stimulate ideas around how the industry may develop if certain things happen. Hence, there is no right or wrong scenario. In fact, it is most likely that the future will be an amalgam of the three scenarios presented.

What the three scenarios do illustrate is that if *Little Boxes* or *High Rise Living* were to become the dominant forces in the market then the industry will be in for a difficult period. Conversely *Building Bridges* illustrates a very bright picture for the demand for wood products and industry would do well to work towards developing a future along the lines depicted in this scenario.

As Australia's forest industry and the organisations involved across the industry value chain develop plans and strategies for the future they should recognise the potential impact that many of the factors presented in this report could have on industry outcomes and plan for them accordingly.

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