Industry Skills Scan

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

forestworks
LEARNING AND SKILL DEVELOPMENT
FOREST, WOOD, PAPER & TIMBER PRODUCTS INDUSTRY

A research summary of industry developments and directions impacting on skills training and workforce labour demands

Acknowledgements

The work undertaken in developing this forest, wood, paper and timber products Industry Skills Scan 2011 involves the contribution of numerous industry stakeholders and other participants. ForestWorks acknowledges and thanks all contributors for their efforts in ensuring that this report accurately reflects the state of play for the industry and its skills needs for 2011 and the years ahead.

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Executive Summary

Our industry operates in an era of rapid transformation and structural change with changing market configurations. This inevitably influences industry growth, the structure and capacity of its skilled workforce and the frameworks for future employment, education and training.

Markets, investment in trees and a social licence to operate are the key components of the current and future challenges for the forest and timber products industry.

ForestWorks continues to actively interact with the industry and government to find ways to engage all parties in playing a significant role in fulfilling the innovation and adaptation needs related to skills development.

This report unites information founded on years of industry engagement activities and robust data collection methodology from industry participants. It forms part of a series of periodic research publications produced by ForestWorks. It stimulates and invites the forest, wood, paper and timber products industry stakeholders and government organisations to discuss, plan and consider the skill strategies suggested throughout the report.

The strategies suggested in this report are indicative and they propose directions for meeting the current and future skills demand of the industry, which evolve from and are affected by the consequences of a society with increased socio-environmental values. In such a society the forest, wood, paper and timber products industry and the skills utilised by it will continue to have importance above and beyond its traditionally recognised products and benefits.

This report's key points are:

- The forest, wood, paper and timber products industry is the only industry that naturally captures and stores carbon. Thus, it has the potential to make a major and sustainable contribution to the national and global carbon-constrained economy.

- To fully realise its potential, this nationwide 'carbon-storage industry' needs major and immediate reforms. However a question remains – are the regulators and other influential community groups prepared to support this industry to the degree necessary?

- The industry understands the need to continue to work with the community and government to build well-informed policy directions and roadmaps for a sustainable industry

- Over recent decades, this industry has experienced ongoing and disruptive structural changes that have significant ramifications for those people and communities who rely upon the industry.

- The adoption of new technological and material design developments, in the medium to long term, is strategically important for the industry's future growth, competitiveness and sustainability objectives. This will require new skill demands for the industry at all levels.

- The evolving structure of the industry and any revitalisation of its potential are likely to progressively introduce new opportunities and capacity for new groups of highly skilled workers.

Section One: Latest Intelligence

We live in a carbon-constrained environment and economy. The forest, wood, paper and timber products industry's key assets – forests and wood – are renewable, 'carbon sink' resources, making the industry unique in its potential to both respond to climate change challenges and deliver significant carbon reduction outcomes to society.

The forest, wood, paper and timber products industry is the only industry that naturally captures and stores carbon. Thus, it has the potential to make a major and sustainable contribution to the national and global carbon-constrained economy.

For years, forests have been at the forefront of climate change efforts governed by the Kyoto Protocol and undertaken by the majority of the world's nations. Despite this, the forest, wood, paper and timber products industry in Australia remains an industry with great potential but with a weak stimulus from regulators and some community opposition that influences and often restricts its development.

Globally, this industry has received limited recognition for its unique ability to store carbon in its forests and wood products, or for its capacity to sustainably produce both renewable energy and low-carbon alternative products[1]. At one stage, Europe made a distinction in this regard by introducing local policy incentives to create renewable energy from biomass, which rapidly increased the production, consumption and trade of wood for energy (UNECE and FAO, 2010). Canada and Japan have also responded, establishing government-led campaigns to promote wood as the first choice for public buildings (FP Innovations Wood Products Division and Ministère des Ressources Québec, 2008; Umeda, 2010). Only recently, the carbon sequestered in wood products made a firm case at the 2010 UN climate change negotiations in Cancun for inclusion in the future global carbon accounting framework (L. Marty and B. Smith - ForestWorks communication, December 2010).

Global forest and timber products industries recognise that a full and widespread credit for the significant amount of carbon that this industry removes and has the potential to remove from the atmosphere can only be achieved through enhanced communication and well-informed, constructive relations with policy-makers, communities and marketplaces (UNECE, 2007; ForestWorks, 2010a).

In Australia, legislation regarding national greenhouse gas emission targets has brought new hope for the forest, wood, paper and timber products industry although bioenergy does not appear to be considered a key option for cutting emissions (Department of Climate Change and Energy Efficiency, 2011a). The federal and state governments are yet to develop transparent plans and directions for meeting these targets.

To fully realise its potential, this nation-wide 'carbon-storage industry' needs major and immediate reforms. However a question remains – are the regulators and other influential community groups prepared to support this industry to the degree necessary?

With a carbon-offset scheme (the Carbon Initiative Farming) to be rolled out in the second half of 2011 (Department of Climate Change and Energy Efficiency, 2011b), it is becoming clear that 'carbon sink' farm forests will increasingly become a prime emission-offsetting option for large polluting industries. However, the forest industry's potential for 'sinking' greenhouse gases is much larger than that of farm forestry. Involving the operation of the entire supply chain of the industry, this industry can generate a growing pool of wood and recycled wood products which store carbon[2] and realise a greater utilisation of woody residues from plantations and wood processing for alternative electricity and fuel products[3]. While in other countries bioenergy production and other new environmentally friendly initiatives are being actively promoted and implemented, in Australia, the ongoing uncertainty about precise policy directions, which normally underline these developments, only continues to stall important initiatives in this area for the local forest and timber products industry.

For many years, the industry has been exposed to global phenomena, but the industry continues to operate as a largely integrated whole with a reasonably close relationship between the resource sectors (Forest Growing and Management, Harvesting and Haulage), the processing sectors (Sawmilling and Processing), manufacturing sectors (Wood Panel and Board Production, Timber Product Manufacturing, Pulp and Paper Manufacturing) and the market and services sector (Timber Merchandising).

[1] Refer to Appendix I for key details about the low-carbon advantages offered by the forest, wood, paper and timber forest products industry.
[2] Ibid.
[3] NAFI (2008) estimated that around three million megawatt hours of electricity per annum can be generated from utilisation of woody residues from wood processing in Australia.

The impacts have mainly been felt from the development of global production networks and markets for the forest resource and wood products, increased wood fibre costs globally due to the rapid increase in consumption of wood energy in Europe, the introduction of new legislative and customer/socially-driven frameworks with stricter requirements to demonstrate due diligence in purchasing wood, and the recent global financial crisis with its consequences.

Over the recent decades, this industry has experienced ongoing and disruptive structural changes. This situation is expected to continue with significant ramifications for those people and communities who rely upon the industry.

The land use decisions made nationally in 2010 for a decreased access to native forests, and a significant reduction of investments in plantation forests have also affected the industry by reducing its supply of forest resources. It will be 15 years or more until some of these resources will be replaced and reach maturity for being used again in manufacturing. As a result, continued short-term uncertainty over land use policy exacerbates the future of manufacturing sectors, causing serious impacts on the industry and the Australian economy.

With the current historically high value of the Australian dollar, the industry is also faced with increasing challenges from significant volumes of cheaper imports of a range of timber and manufactured goods from countries with lower manufacturing costs and subsidies from governments. It is expected that this could further reduce demand for local products and therefore investment, leading to more capacity reductions, plant closures and reduced employment options.

Corporatisation and privatisation of previously government-owned commercial forests and the formation of regulatory organisations and third-party auditors to oversee codes of forest practices and certification schemes are other examples which demonstrate the changes occurring in this industry. New institutional frameworks will continue to evolve in the new climate in which the industry operates. For instance, industry economists (Ferguson, 2010) predict that different institutional arrangements are likely to develop as larger organisations merge for economies of scale and scope. Also, there is no doubt that a much larger 'carbon sink' farm forestry sector is going to develop in the near future and that smallholder farmers will make adjustments to their businesses to improve their economic and environmental value through tree farming and recreational diversification.

The scale of change and uncertainty in the industry has resulted in a reluctance to invest and a relatively low-level adoption of advanced technological solutions to improve production efficiency and capacity.

The adoption of new technological and material design developments, in the medium to long term, are strategically important for the industry's future growth, competitiveness and sustainability objectives.

A review of technology developments in wood industries (Teischinger, 2010) indicates that, in the years to come, wood technology, material design and associated services will be heavily driven by 1) the new broader resource spectrum (i.e. semi-natural forests as energy carriers, forest plantations, agroforestry, woody residues and recycled materials); 2) demand for material and building components with multifunctionalities (more durability and stability, with easy recoverability and recyclability, etc.); 3) a focus on the resource and environmental efficiency of the wood products from primary and secondary processing and engineered wood materials; 4) aesthetic competition of wood surfaces (veneer and solid wood) with technical surface structures regarding UV exposure; and 5) increased interest in bioenergy and new bio-based products from wood and wood fibres. An evolution in this direction will allow the industry to increase the relevance of its products and processes to people's lives and will create more interesting, higher skilled and attractive jobs.

ForestWorks' Skills Enhancement and Training (SET) project (2010b) and years of interaction with stakeholders reveal that many people working and learning in the forest, wood, paper and timber products industry find it to be rewarding. Satisfying the vocational skill needs in this industry is not driven by a workforce supply generated via the traditional, horizontally-connected government, Vocational Education and Training (VET) system, training provider and trainee system as it is for many other industries and economic sectors. In this industry, skilling, learning and further development of the workforce is generally attained effectively through an interconnected and interactive network where training delivery is focused on existing and new employees in the workplace (ForestWorks, 2010b)[4]. A shortage of people with technical skills and an understanding of timber and timber engineering will continue to affect the industry's ability to educate designers, architects and builders about timber and working with timber.

[4] Refer to Appendix I for a graphical illustration of the forest and timber products industry's framework for sustainable workforce development.

Organisational changes and an advanced manipulation of forest and forest resources will introduce greater work and job diversity, but for the time being it is widely recognised that a broader sense of relevance about the importance of the industry for society and, implicitly, about working in this industry needs to be created. At the International Symposium on Forestry Education (2010), the common indicative view was that training and degree programs need to be aligned to the new industry paradigm and structures through further development of skills programs, career pathways, jobs and education options.

The evolving structure of the industry and revitalisation of its potential are likely to progressively introduce new opportunities and the capacity for new groups of highly skilled workers. However, in the short to medium term, a broad sense of relevance for working in this industry needs to be created.

Through this report, ForestWorks advances a series of strategies aiming to support the Australian forest, wood, paper and timber products industry's directions by enhancing recruitment, skilling and retention of a dedicated workforce in this industry. A summary of these strategies, articulated with findings from the ForestWorks SET project (2010b) is below.

Summary of strategies

Skilling and retaining a dedicated workforce by:

- Finding ways to assist enterprises and training providers to establish sound business cases for successful skill development as outlined in the SET Project Lesson 2 (ForestWorks, 2010b) through:
  - facilitating communication, learning, trust, collaboration and ongoing effective relationships through the provision of information and assistance as set out in SET Project Lesson 1 (ForestWorks, 2010b)
  - meeting the enterprises' training needs by establishing, nationally and regularly, a coordinated critical mass of trainees
- Assisting enterprises to develop training plans to build the long-term skills of their employees including 'topping up the knowledge' of the already-skilled workforce.
- Responding proactively to the emerging skills needs by:
  - continuously assessing the technical changes and developments undertaken, or likely to be undertaken, by the industry
  - evaluating the options for using cross-industry competency standards for those units with relevance for the new areas and trends emerging in our industry
  - developing new skill sets and qualifications as required to address skill gaps in fields such as strategic communication, community and customer relations, management of carbon-sink farm forestry, small business management, biofuels and bioenergy, mechanised plantation, and mechanised biomass harvesting.

Supporting recruitment by:

- Increasing community awareness about the industry and its contributions to society and the environment
- Assisting industry to acquire skills at enterprise level in strategic communication, community and customer relations
- Promoting the job opportunities available in the industry by:
  - enhancing formal connections between enterprises, industry associations, Registered Training Organisations (RTOs), universities, high schools, regional communities and career promotion experts
  - establishing links between vocational qualification programs, school programs and university programs
- Where greenfield site developments occur and/or regional skill shortages exist, promote and make use of the SET pre-employment training model (ForestWorks, 2010b) and other models applied with success in regional or remote areas
- Facilitate the understanding of why people leave the industry via the collection and analysis of data from exiting employees to inform recruitment and retention workplace practices.

Sector Overview

	Forest Growing and Management	Harvesting and Haulage	Sawmilling and Processing
Sector profile	• Responsible for managing 11 million hectares of forest from the 150 million hectares of total forest area • 40% reduction in the new planted area from 2007 to 2009 • Business/ labour force mobility expected to continue over the next few years • Communication skills and skills for carbon farm forestry will underline the sector in the short term	• The sector harvest approximately 30 cubic metres of wood per annum • The movement away from harvesting native forest has affected Tasmanian contractors • Biomass harvesting will provide long term opportunities alongside plantation harvesting, if bio-plants operate on a large scale	• Responsible for primary and secondary conversion of Australian timber harvest • Hardwood from plantations becomes the main production supply and requires technical and skills upgrades • Most of the training continues to be driven by compliance with safety standards • Any appropriate policies for biofuel and bioenergy production will attract a range of new skill needs
Skill shortages	• Forester (professional) • Forestry worker (including cultivators and forest technical officer) • Forestry trainer and assessor	• Mechanical harvesting operator • In-field chipping operators • Truck drivers • Steep terrain work/manual fallers in steep terrain	• Timber drying/kiln operators • Saw doctors • Wood machinist • Machine/Operation/Plant supervisor
Skill gaps	• Specialised skills in geographic information systems (GIS) • Skills in resource analysis and management of environmental risks	• Skills in small business management • Language, literacy and numeracy (LLN) skills at business management level • Skills to supervise and manage forest harvesting operations • Skills in grading logs (segregation and marking to maximise the value of the timber) • Skills in fire management and fire salvage operations • IT knowledge to support increasingly mechanised equipment	• Skills in timber treatment • IT skills to support computer-based equipment
Emerging skill needs	• Skills in strategic communication, community and customer relations • Skills for 'carbon sink' farm forestry/agroforestry • Skills for advanced technologies • Skills for forest growing and management in far northern Australia	• Skills in cording and matting of log extraction tracks and log processing loading areas • Skills for operating biomass harvesting machinery • Truck drivers for larger truck (B-Double, B-Triple)	• Skills for processing plantation hardwood resources • Skills for implementing due diligence code of practices (illegal logging legislation) • Skills for new timber drying techniques • Skills for biofuels and bioenergy • Skills for measuring the impact of businesses on sustainable development

	Pulp and Paper Manufacturing	Timber Manufactured Products	Wood Panel and Board Production	Timber Merchandising
Sector profile	• Ongoing sector reform started in 2010 with the strategy proposed by Pulp and Paper Industry Strategy Group • Any changes brought by new technological upgrades and extension into the renewable energy area will attract new skill needs	• Employs 37,800 • The new levels of regulations from building codes and energy rating systems increase the access to construction and building materials market • Adoption of new technological and material design developments will require higher levels of skill than currently exist	• Provides a range of engineered wood products primarily to the building industry • Market climate has prevented investments in the latest technology • Industry-wide transition to a production based on plantation forest resources could represent a long-term opportunity	• Employs 22,000 people. Wholesaling sector alone employed 6100 people by 2009 • Enters the category of highly specialised retail businesses • Requires high level timber and wood specific knowledge • Highly exposed to due diligence practices in purchasing timber products
Skill shortages	• No industry specific skill shortages • Electricians and maintenance fitters	• Wood machinists • Designer • Estimator/detailer for roof trusses, floor systems and wall frames	• Electricians, plumbers, fitters	• Mobile equipment operators • Stock inventory officers • Sales/marketing representatives (sales assistants, salespersons, retail supervisors) • Warehouse managers • Timber yard operators
Skill gaps	• Technical skills among pulp and paper operators to operate highly integrated and up-to-date machinery and equipment • Line management and team leader skills for production line supervisors • Engineering and computer operating systems skills	• Skills to operate computer-based equipment • Skills to operate advanced and complex operation machineries	• Technical skills of new, and among the existent operators, to use sector specific new technologies	• General knowledge about timber and timber products
Emerging skill needs	• Skills for future environmental sustainability developments • Skilling new labour for pulp and paper manufacturing operations • Skills for implementing due diligence code of practices (illegal logging legislation)	• Skills for implementing due diligence code of practices (illegal logging legislation) • Skills for measuring the carbon footprint	• Skills for implementing due diligence code of practices (illegal logging legislation) • Skills for measuring the carbon footprint	• Skills for implementing due diligence code of practices (illegal logging legislation)

Section Two: Analysis of Workforce Development Needs

Forest Growing and Management

Workforce trends and conditions in this sector

The forest growing and management sector includes all businesses that manage plantation estates and native forests for the purpose of commercial wood and fibre production, as well as farm forestry enterprises with all their business scopes (recreation, carbon offsets, farm diversification, wood production), nurseries and other forest service-related businesses. The native forest component involved in this sector represents around 1% of the available multiple-use native forest resources (Wood. Naturally Better, 2011a).

In 2006, when the area of new plantation establishments was just below its peak (recorded in 2007), this sector employed 7300 people. At present, employment could be much lower due to the substantial reduction in the new planted area (of about 40%) that occurred from 2007 to 2009 (ABARES, 2010a). The depressed investment in trees continues, having further implications on the workforce demand in this sector, and this is linked to the existent mechanisms for investment that have lost their credibility; two major forestry Managed Investment Scheme (MIS) companies (Timbercorp and Great Southern) collapsed and the financial situation of other plantation companies (Forest Enterprises Australia, Elders Timber, Rewards Group, Willmot Forests) has significantly declined over recent years.

Privatisation of some state governments' plantation assets (Forestry Plantation Queensland, Forest Products Commission WA and, in plan, Forestry SA) has also marred this sector in the recent period. However, the change in forest governance has not indicated job losses for the sector at this time. Among other causes that negatively impacted the sector, but not the workforce stability in the sector, was the disastrous February 2009 bushfires in Victoria. A study by Schirmer (2010a) reported that, in fact, 40% of bushfire-affected forest growers increased staff hours of employment in order to plan and manage salvage logging and the replanting and regeneration of fire-affected plantation estates and native forest areas.

The dynamics of plantation establishments over the last decade and a progressive reduction in access to native forests for production have imprinted a changing profile to the sector's workforce. For years, the sector has featured a growing demand for skills associated with hardwood plantation, as well as a steady decline for competencies needed in the management of native production forests.

Business and labour mobility is expected to continue over the next few years in this sector. There are two main reasons: firstly, the industry tends to progressively move away from native forest harvesting and production (currently manifested distinctly only on isolated fronts and independent position of various key industry leaders (Manning and Darby, 2010; Morton and Millar, 2010; CFMEU FFPD, 2010)) - and embrace new plantation models for future production. As this occurs, businesses may migrate from native forest harvesting to plantation harvesting and individuals may migrate to plantation harvesting. While there are many synergies in the skill requirements, differing skills required may pose a barrier to this labour mobility. Secondly, the new Carbon Initiative Farming (Department of Climate Change and Energy Efficiency, 2011b) will open opportunities for farm forestry to become an important part of this sector. In this context, the sector will need to progressively consolidate its labour and skills base to assist with the establishment and/or management of trees on large areas and small-scale farmland alike, for commercial and environmental reasons.

More than 90% of production forests are environmentally certified nationally (ABARES, 2010b). To respond effectively, promptly and on a continuous basis to the forest certification requirements, this sector needs to acquire more specialised skills in regard to resource analysis, management of environmental risks, spatial inventory, forest and chain of custody, integrated planning and logistic tools.

Positive image creation and public education about forests and their social value has long been considered by the industry but little has been achieved in this regard. At present, and more than ever before, industry recognises that clear and effective communication at different levels of communities (local and broader community, merchants and educators, green groups and policy-making community) has the potential to improve the social licence carried by this industry and remove political pressures and investment uncertainties. In this regard, the forest science community and forest professionals need to build on communication skills to create effective science-social and science-policy interfacing mechanisms that work towards this end.

	Rationale	*Potential strategies for enterprises, industry associations, union, RTOs and ForestWorks*
Skill shortages		
Forester (professional)	Enrolments for Bachelor of Forest Science and Management and Master of Forestry have declined over recent years (de Fegely, 2010) and the industry feels the pressure of having fewer foresters available. The forester occupation is on the Skilled Occupations List, which reflects the high-value skills Australia needs (Department of Immigration and Citizenship, 2010).	Establish formal connections between universities and industry through forestry associations. Facilitate and promote effective pathways that connect vocational qualifications with higher education. Increase community awareness of the industry and its contribution to society.
Forestry worker (including cultivator and forest technical officer)	Past estimates of the forestry sector workforce suggest that the vocational-level workforce engaged in forest growing and management, forest operations and primary processing remain less formally qualified than all other primary industry sectors (Pratley et al, 2010). In February 2009, bushfires in Victoria destroyed extensive areas of native forests and plantations. Four and five-year processes for replanting trees have been initiated by VicForests and HVP Plantations respectively and they are expected to require a large number of seasonal workers over the next one to five years (Gray, 2010).	Promote the values of forests and forest resources for society, together with the forestry sector's role in using and conserving those values to the best advantage. Support companies with initiatives for upskilling forestry supervisors to certificate III qualification. Investigate flexible training models either through teleconference, Skype, flexible modules, etc. or by considering partnerships between organisations. Consider a 'shared labour pool' (i.e. Great Lakes Business shared labour pool project (2010)) or 'integrated training solutions' with other industries in the local area with like labour skills (for instance, linking seasonal work in viticulture or horticulture).
Forestry trainer and assessor	The regional nature of this sector and the lack of constant demand/enrolments for forestry vocational qualifications have restricted the trainers. The ongoing viability, capacity and efficiency of training providers are all under pressure.	Use ForestWorks to assist the sector and training providers to coordinate a critical mass of trainees at a national level and the use of existing learning and assessment resources. Promote links between RTO trainers and assessors and workplace trainers.
Skill gaps		
Specialised skills in GIS.	The use of GIS for collecting forest information (mapping and spatial statistics of inventory within coupes) and IT technologies for integrated harvest planning (growth models, logistics software, harvest planning and compartment allocation models, reporting and communication services) have expanded rapidly as part of the Environmental Management System of the plantation estates. Forests New South Wales will commence using GIS tools later this year (Spatial Source, 2011).	Assess and evaluate the use of cross-industry competency standards (i.e. AgriFood training package competency standards on preparing maps by GIS). Alternatively, work with universities via ForestWorks to develop GIS education resources relevant for the sector and deliver programs for foresters. Use mechanisms established by associations at the sector level to promote opportunities in this field, especially to students in the final years of high school.
Skills in resource analysis and management of environmental risks	Forest certification is designed to be an ongoing process with audits taking place regularly. Undertaking resource analysis and solving problems associated with environmental issues (i.e. water, salinity, rainfall, fire, pest and disease hazards) in a sustainable manner is a necessity in forest certification process and requires specialised skills and knowledge.	An advanced diploma integrating units of competence with a sustainability focus is currently being finalised by ForestWorks. The development of new units of competency for fire management is on ForestWorks' agenda as well. Develop an online, centralised system of 'expert profiles' to concentrate consulting services available in forest sustainability matters. Promote inter-enterprise collaboration to use existing expertise.
Emerging skill needs		
Skills in strategic communication, community and customer relations	In order to fully use all forests' functions and potential sustainably, industry recognises the need for investment in skills to promote and facilitate communication, conflict management, consensus-forming and cross-border collaboration between groups and communities.	Consult community relations experts and industry to identify the skills and knowledge required for these types of roles and develop skill sets/qualifications. Form 'forest communication networks' (UNECE, 2007) by harnessing the knowledge, skills and practical experience of forestry practitioners to dispel public misconceptions about the industry.
Skills for 'carbon sink' farm forestry/agroforestry	Investment decisions for farm forestry have long been dominated by a lack of confidence in returns and uncertainty about long-term markets. With the opportunities offered by carbon credentials and biofuel/bioenergy projects, these barriers are relaxing to some extent and farm forestry is expected to gain value shortly. As carbon becomes a commodity, the sector will need to accumulate skill sets for accounting and monitoring carbon storage, calculating carbon offsets and understanding carbon trading.	ForestWorks is investigating the knowledge and skills needed to confidently operate farm forestry plantations. The outcome will be new units of competency and adequate integration of these units in the existing skill standards of the industry and other related industries (e.g. agribusiness).
Skills for advanced technologies	The sector is increasingly adopting advanced information and transportation technologies (planning and logistics tools, decision-making tools and systems that reduce noise and pollution), quality control technologies (to address forest and ecosystem health issues) and material science advancements (regarding tree genetics or the DNA signature of wood).	Undertake analysis to determine the most likely uptake of these technologies. Develop skill sets/qualifications accordingly.
Skills for forest growing and management in far northern Australia	There is potential for industry to expand in this region due to the area's higher rainfall, the range of species types, demand for new products and opportunities for Indigenous economic development and landscape management.	Develop knowledge and skills related to new species and new product types.

Harvesting and Haulage

Workforce trends and conditions in this sector

The harvesting and haulage sector is predominantly comprised of small businesses, often family owned and multigenerational, that require a high level of investment in machinery and faces high operational costs. The working conditions in this sector are unique and are frequently compounded by low wages. In 2006, the sector employed approximately 8900 people, of which, the majority is an ageing labour force.

Over the last few years, the forest, wood, paper and timber products industry has witnessed a continuum of events including slowdown in the economic activity of the industry, reduction in access to native forest resource and depressed woodchip export markets. These events have deprived the harvesting and haulage sector of a significant work load and a large number of jobs, particularly in Tasmania (Schirmer, 2010b). On this basis, it is reasonable to say that at present this sector employs a significantly lower number of people than in 2006. It is noted also that the industry has lost many workers to industries such as mining and construction which are more prosperous (Victorian Forest Contractors Association - ForestWorks correspondence, Feb 2011).

As recently as September 2010, the condition was accentuated by an historic event in the industry with the signing of the Statement of Principles in Tasmania. These principles form the basis for future discussions and significant changes in the forest industry in Tasmania. The Statement of Principles seeks agreements on a set of measures, including a progressive implementation of a moratorium on the logging of high conservation value forests (Tasmanian Forests Statement of Principles to Lead to an Agreement, 2010).

Predominant or complete plantation-based production is becoming a reality at a regional level in Tasmania. The first impact of the movement toward a predominant plantation resource will be perceived in early 2011 when Gunns Limited implements its decision to reduce its contracts with 50 harvesting and haulage contractors. This will involve the loss of up to 750 jobs in the sector (WoodWeek, 2010). A wider adoption of plantation-based production is expected to have additional implications for this sector, creating a further reduction in jobs and businesses across all native forest intensive regions. If a substitution of eucalypt plantation timber for native timber occurs in a sawlog-driven context, there would be a reduction of about one third in the harvesting workforce, with haulage employment levels remaining the same (Tasmanian Forest Contractors Association - ForestWorks correspondence, Feb 2011); that will possibly lead to a rapid restructure of the activities if positive signals for alternative business opportunities and financial support exist.

For some contractors, the most realistic opportunity would be the transition to plantation harvesting operations, in combination with business relocation. Many hardwood plantations will reach commercial maturity in the next few years and the growth in plantations ready for harvest is expected to continue until 2030, though at a slower rate (DAFF, 2010). This is expected to drive a high demand for hardwood plantation forest contractors. However, the scale of future harvesting regimes and workforce requirements are difficult to predict. For instance, the harvesting opportunities envisaged to exist in the Green Triangle region (Kellas, 2010) are not yet apparent (Tasmanian Forest Contractors Association - ForestWorks correspondence, Feb. 2010). The optimism that businesses demand in one area masks the broader social factors that influence job relocation, but the opportunities attract demand from another area and produce a labour balance; there is no seamless transition.

In the future, alternatives may be presented by the advancements in using forest plantations biomass for biofuels and bioenergy. For some contractors this will provide the opportunity to move into the area of biomass harvesting alongside a conventional harvesting operation. However, the potential to generate revenue from residue is still a long way off.

In the medium to long term, job and training opportunities for this sector will exist. For instance, there is a movement away from high, fixed-cost chipping to lower-cost, in-field chipping that eliminates double handling. With a new pulp mill planned for Bell Bay in Tasmania it is estimated that in five years time there will be 30 to 50 mobile chippers in the state, compared with only one currently (Tasmanian Forest Contractors Association - ForestWorks correspondence, Feb 2011). The challenge will be to relocate and re-skill contractors and employees that move out of native forest harvesting in a way that minimises impact for them. Generally, access to information and training resources represent a hurdle for this sector during the transitional time primarily due to the rural locations where the work needs to be done. A greater hurdle is however the social impact of relocation – many Tasmanian contractors relocating to Victoria for work have already returned to Tasmania after finding the social impact too difficult (Tasmanian Forest Contractors Association - ForestWorks communication, Feb. 2011).

	Rationale	*Potential strategies for enterprises, industry associations, union, RTOs and ForestWorks*
Skill shortages		
Mechanical harvesting operator	Full-scale hardwood plantation harvesting in the Green Triangle region began in 2010 and will reach full capacity by 2011. It has been reported that this will equate to almost 400 extra harvesting and haulage skilled workers (Kellas, 2010) but opportunities are not yet apparent.	Recommend skill sets to satisfy mechanised plantation harvesting. Develop strategies for transition and mobility of native forest harvesting operators to plantation areas in demand for harvesting. Apply the SET project learning (ForestWorks, 2010b) on successful components of pre-employment programs for greenfield sites.
In-field chipping operators	In some regions this is a skill shortage but in other regions, such as areas of Tasmania, this is an emerging skill need. The maintenance of the in-field chipping equipment will also require specialised operational skills for knife sharpening as well as for the electronic, diesel and hydraulic units.	Coordinate the in-field chipping training programs across regions.
Truck drivers	The average age of truck drivers is 55 years and preferences for working in this role continue to be influenced by the industry's image and remote locations (Australian Forest Contractors Association - ForestWorks correspondence, Feb 2011). Specialised driving skills are required for driving on high country roads.	Increase the relevance of this job by promoting the industry and its values.
Manual fallers in steep terrain	There is a need to maintain skilled workers in this field as working with harvesting machinery in steep terrain requires specific skills.	There is some formal training for these roles; however, it is necessary to find ways to assess skills on the job.
Skill gaps		
Skills in small business management	Business owners identified the need to improve business management skills. Industry-specific skills and knowledge, and the level of demand, limit the use of a generic training model for these skills needs.	Potentially develop customised qualification by targeting small business management contractors.
LLN skills at management level	Business owners in the harvesting and haulage sector identified the need to improve the LLN skills essential to business management.	Encourage participation in specialised courses by increasing awareness about the existence of such programs.
Skills to supervise harvesting operations	Supervision of operations requires a very broad skill set with formal training, particularly for people with limited experience.	Offer more formal training and/or a qualification/licence to emphasise this role.
Skills in grading logs	There is an acute need to adopt 'best practice' methods to maximise the recovery of logs and add value by sorting the resources for the most appropriate uses.	ForestWorks is considering the upgrade of the industry training package with grading logs competency standards.
Skills in fire management and fire salvage operations	The 2009 bushfires in Victoria revealed skill gaps in fire management and fire salvage operators. The harvesting and haulage sector can have a role in this field.	ForestWorks is considering the upgrade of the industry training package with relevant fire operations competency standards.
IT knowledge for mechanised equipment	Harvesting is increasingly mechanised and assisted by advanced IT. In this context, IT knowledge becomes an integral part of being a mechanical harvesting operator.	Ensure training package keeps abreast of technical changes through the circulation of information on emerging technologies. Support professional development for trainers/assessors within the sector.
Expert services in demand		
Mechanic - Diesel fitter/Tyre fitter/ Hydraulic fitter	These skills are an integral part of the sector's service industry. They are increasingly absorbed by industries with booming economic perspectives such as mining.	Design the promotional activities and materials of this sector to focus on the benefits for technical specialists (career and/or lifestyle benefits).
Experts in low-carbon alternative fuels	This sector has the potential to improve the industry's carbon emissions profile by using low-carbon alternative fuels.	Liaise with carbon advisory services to identify options to satisfy this need.
Experts in community relations	There is a need to convey that harvesting and haulage jobs are meaningful for the community, industry and other parties.	Engage with experts in community relations and communicate effectively with communities.
Experts in career pathway promotion	New technological developments adopted by this sector have the potential to appeal to young enthusiastic operators. Attracting young people to this sector is not a new issue.	Engage with career promotion experts to promote and enhance publicity of jobs in this sector. Engage with career advisors and parents.
Emerging skill needs		
Skills in cording and matting of log extraction tracks and log processing loading areas	Forest certification principles require that harvesting and haulage contractors comply with specific environmental criteria by using agreed practices.	ForestWorks and industry will review the relevant units of competency.
Skills for operating biomass harvesting machinery	Specialised machines such as bundlers and mobile chippers are used in harvesting biomass. Contractors have the potential to play a role in forest biomass harvesting for bioenergy.	Develop skills standards in consultation with industry.
Truck drivers for larger trucks	Bigger trucks have the potential to increase the efficiency of haulage operations where their use becomes feasible.	Facilitate programs and more training for B-Double and B-Triple drivers.

Sawmilling and Processing

Workforce trends and conditions in this sector

A variety of wood processing operations are performed within the sawmilling and processing sector, including the production of solid wood products for construction, peeling logs or slicing blocks of wood for timber veneer production and chipping wood for pulp.

Over the last decade, the forest, wood, paper and timber products industry and, in particular, downstream processors have been challenged by two opposing economic conditions (described below) that have distinctly restructured the production capacity and the workforce profile of this sector.

During the first half of last decade the sawmilling and processing sector found itself needing to increase its production scale by becoming more diversified and adaptable to meeting production targets of a large market demand. By mid 2006, the sector was reaching a high level of development, closing many older and small capacity hardwood sawmills and facing a shortage of labour and skills. At this stage the sector employed approximately 19,000 people.

From late 2007 through to and including 2010, the global financial crisis converged with an increasing demand from overseas markets for FSC-certified plantation woodchips and, more recently, with the rise of the Australian dollar's value. This determined the need for a new and different reform for the sector: temporary or permanent closures of mills. The sector's restructure generated an oversupply of specialised labour in many regional areas across most of the states and from the second half of 2010, there was a progressive switch by mills to plantation logs, which continues to substantiate the closures and job losses, particularly in Tasmania (WoodWeek, 2010). ABARES (2010a) estimated that by 2010 the employment in this sector will have dropped by about 33% from 2006 levels.

In contrast with other regions, sawmills in Queensland were in the situation of closing their operations in 2010 due a lack of employees and the means to attract workers. During ForestWorks' 2010 conference for industry, Timber Queensland raised concerns that this sector has had difficulties in attracting and retaining wood machinists and saw doctors, roles that are critical for any sawmill to operate. For the first three quarters of 2010, these occupations were classified by the Clarius Skills Index as being among the top five national occupations with the highest levels of skills shortages (KPMG Econtech, 2010).

With the growing trend of using plantation-sourced hardwoods, this sector will soon need to review current milling and drying practices to handle the smaller and immature logs that will become the basis of the log supply. This might require minimal technical adjustments (White, 2010) and upgrade of skills to handle this new resource.

Recent market studies signal a fall in construction activity in the coming quarters (URS, 2010), meaning that the housing construction sector is less likely to substantiate further developments in this sector in the short to medium-term, in terms of investments and workforce development needs. For the last few years there has been a lack of confidence to invest in longer term training due to the uncertainty in many business's futures. Most of the training continues to be driven by compliance with safety standards.

Chain of custody certification is emerging as an essential operating requirement in both domestic and international markets. Over the last few years, an increasing number of enterprises have made commitments to seek chain of custody certification from manufacturing mills and have taken steps to become part of a certification scheme. A further step in this direction will be taken with the introduction in 2011 of legislation restricting the importation and sale of illegally logged timber that will apply 1) to all timber products including sawn timber, wood panels, pulp, paper, wooden furniture and composite products, and 2) to all timber suppliers, including both importers and domestic wood processing mills that first place timber products on the Australian market (DAFF, 2010). Shortly, all enterprises in the industry's supply chain will need to acquire skills that enable the business to report on material sourcing, production controls and transaction documentation.

Under clear and established national and state policies for forest biomass and the production of biofuel/bioenergy, this sector is well placed to embrace technological developments for biofuel and bioenergy production. It is anticipated that appropriate policy frameworks will stimulate this sector in the longer term to utilise its timber and forest biomass residues to improve its own carbon footprint and to access to bioenergy markets. In this context, a range of new skill sets and skill development needs will emerge in this sector.

	Rationale	*Potential strategies for enterprises, industry associations, union, RTOs and ForestWorks*
Skill shortages		
Timber drying/ kiln operators	Qualified workers are essential to ensure that correct and energy-efficient drying is achieved. A shortage of kiln drying operators is reportedly indicated in WA, SA and Victoria. The main factors are associated with lack of industry promotion and local training, as well as isolated locations and uncompetitive rates of pay.	Undertake greater promotion for the skill sets, as a package of units, and explain the importance of undergoing structured training. Offer pathways from high school, provide training for existing workers and improve working conditions.
Saw doctors Wood machinists	Saw doctor is a highly specialised occupation that makes, repairs, maintains and sharpens a wide range of cutting tools and saw blades in timber mills. Saw doctors also maintain mechanical parts of a range of production machines. Wood machinists operate specific machines and undertake specialist operations to convert logs to usable timber or wood chips. Most saw doctors and wood machinists are employed in regional centres, in businesses from small to large processing plants, often with wages that that are not perceived as competitive. A shortage of skills for these occupations is recognised nationally (DEEWR, 2011; KPMG Econtech, 2010) despite the significant increase in enrolments for these qualifications over the last years (Table 1 of Section 3).	Undertake greater promotion, offer pathways from high school, provide training for existing workers and improve working conditions. The units of competency for saw doctor and wood machinist are in ForestWorks' current Continuous Improvement Plan work for review. The review aims to evaluate the excess units in certificate III and possibly move some up to certificate IV.
Machine/Operation/ Plant supervisor	Effective supervision and leadership is critical in all teams. For many years, a greater focus has been sustained on technical skills rather than supervisory skills, which has led to a shortage in this area.	Encourage the uptake of supervisory-related qualifications and training for team leaders and supervisors. Work with RTOs to assist in the development of customised qualifications.
Skill gaps		
Skills in timber treatment	New alternative timber treatment technologies are becoming available and there is no dedicated qualification or pathway for operating timber treatment units. Currently there is only a skill set in the industry training package. This role is not promoted nor is it widely understood.	Examine the viability of specific skill sets. Undertake greater promotion, offer pathways from high school, provide training for existing workers and improve working conditions.
IT skills to support computer-based equipment	Sawmilling and processing is increasingly assisted by advanced IT (i.e. advanced timber grading technologies using ultrasound). In this context, IT knowledge is a prerequisite for specific equipment operators.	Ensure training package keeps abreast of technical changes. Commit to more targeted engagement and consultation for those areas of rapid technology change. Circulate information on emerging technologies. Support professional development for trainers and assessors.
Expert services in demand		
Experts in chemical use and handling	Chemicals are used to protect timber from termites and decay and the handling of these chemicals is a highly specialised and regulated area.	Establish a network of experts to assist in meeting operational health and safety standards, and environmental regulations.
Expert in career promotion	The shortage of skills critical for this sector indicates the difficulty in attracting new workers. New technological developments adopted by this sector can motivate, but how to attract young operators has long been an issue for this sector.	Engage with career promotion experts and industry associations to promote jobs in this sector. Engage with career advisors and parents.
Emerging skill needs		
Skills for processing plantation hardwood resources	As more plantations come online and less native hardwood is used, skills that accommodate technological adjustments and the varied properties of immature wood will become more important.	Develop programs to upgrade the skills of existing workers.
Skills for implementing due diligence code of practices (illegal logging legislation)	Illegal logging legislation is expected to be enacted in 2011. The legislation is likely to introduce stricter requirements in purchasing wood (information about material sourcing, production controls and transaction documentation). In this sector, log yard employees are likely to be affected by this legislation.	ForestWorks acknowledges that industry will be given up to two years following the commencement of legislation to establish due diligence systems (A3P, 2010) and remains alert to the developments and evolving skills needs.
Skills for new timber drying techniques	Timber drying techniques are evolving to be more energy and time efficient. Generally, as better methods of timber drying are developed, implementation is broadly accepted.	Identify latest drying techniques. Review current drying units of competency to ensure they are in step with evolving trends.
Skills for biofuels and bioenergy	The development of a national Biorefinary Research Institute is being considered (Timberbiz/Daily Timber News, 2010). The location of mills and amount of biomass residues resulting from local operations allow this sector to economically integrate biofuel and bioenergy production. The biofuel sector includes a range of specialised technologies for a handful of specialised products yet the regulatory system is causing confusion and limiting investment.	Investigate current technologies and be alert to their uptake. Consult with industry to accurately identify the skill needs and evaluate the need for skills standards at certificate II, III, IV and diploma levels.
Skills for measuring the impact of businesses on sustainable development	There is an increased focus on production and cost efficiencies to ensure competitiveness in a globalised economy. The market is also driving an increased interest in energy use, water use minimisation and the recycling or selling of generated residues, which were previously ignored. Skills for undertaking life cycle analysis and carbon accounting will become imperative for all organisations.	An advanced diploma with a sustainability focus is currently being finalised by ForestWorks and includes skill standards for carbon accounting at enterprise level.

Pulp and Paper Manufacturing

Workforce trends and conditions in this sector

Pulp and paper manufacturing is a very capital-intensive sector, integrating continuous and highly technical manufacturing processes that require high skill levels. The sector is characterised by substantial multinational ownership (Kimberly Clark, SCA Hygiene, Nippon Paper, Norske Skog, Amcor, Visy, ABC Tissue and Solaris) and is highly concentrated on 20 major operating mills, predominantly located across the lower South Australian-Victorian border, central Victoria and Tasmania, as well as across New South Wales and south-east Queensland.

This sector directly employs approximately 3500 people (a 59% decrease from 2006) and up to 15,000 employees in downstream activities such as converting and other remanufacturing (ABARES, 2010a). Many of these employees work in rural and regional areas. The skills in pulp and paper manufacturing span the occupations responsible for manufacturing, printing and communications paper, newsprint, packaging and industrial paper, as well as tissue products.

These skills are learned mainly in the workplace and in exchange for these high skill levels above average pay and working conditions are awarded, ensuring that jobs in this sector are in high demand.

Over recent years, the Australian paper manufacturing sector has witnessed increases in the importation of paper and paper products and changes in customer preferences, particularly for newsprint resources and digital communication means. The sector also identifies itself as competing in an aggressive global environment characterised by oversupply from low-cost and large-scale producers in China, Indonesia, Brazil and India that often have questionable environmental credentials and dumping practices. These conditions led to the closure of uncompetitive or no longer feasible sites and the loss of more than 400 highly skilled jobs in north-west Tasmania (Williams, 2009; Kempton, 2010) with another 170 jobs to be lost in south-east South Australia by May 2011 (Kimberly-Clark Australia & New Zealand, 2011), with little capacity to relocate them to other areas. A worker assistance project has been funded by the Department of Education, Employment and Workplace Relations and is run in Tasmania by O Group in collaboration with ForestWorks, Forest Industry Education and Training Service and other stakeholders to offer employment solutions to these displaced workers.

Strategies for reform for this sector exists go hand in hand with the adoption of emerging technologies (new technological upgrades), investment and modernisation of current manufacturing processes and extension/progression of the sector's role in the production of renewable energy (The Pulp and Paper Industry Strategy Group, 2010). Workforce planning and development represents an important component of this sector's plan for reform.

As mentioned in previous sector sections, an industry code of conduct for due diligence requirements to keep illegal timber out of the domestic markets is being regulated and will most likely come into force during 2011 (DAFF, 2010). Pulp and paper suppliers will need to comply with new requirements and, as a result, they will need a skilled workforce to report on material sourcing, production controls and transaction documentation.

Intensive programs for skilling new labour are expected to be required once two long-awaited, major, state-of-the-art pulp and paper projects (Bell Bay pulp mill in Tasmania and Penola pulp mill in South Australia) move from the financial investment decision stage to a construction phase.

	Rationale	*Potential strategies for enterprises, industry associations, union, RTOs and ForestWorks*
Skill shortages		
No industry specific skill shortages	This sector generally offers above average pay and high standard working conditions.	
Mechanical and chemical engineers	These skills are increasingly absorbed by industries with booming economic perspectives.	Design industry-focused promotional activities to show benefits for technical specialists (career and/or lifestyle benefits).
Electricians and maintenance fitters		
Skill gaps		
Technical skills among pulp and paper operators to operate highly integrated and up-to-date machinery and equipment	This sector integrates continuous, highly technical manufacturing processes and develops commensurate skill levels. There are gaps in applied skills knowledge, mainly regarding new and company-specific technologies, compromising troubleshooting competencies for equipment and process operations.	Employers need to engage skilled personnel to develop the necessary resources to fill gaps identified. Employers need to continuously improve their skills development systems to support national training including the application of resources developed to fill identified gaps.
Line management and team leader skills for production line supervisors	Pulp and paper manufacturing is based on end-to-end processes, aligned with a specific manufacturing technology that entails high-level coordination of activities and workers engaged in a production line.	Promote via ForestWorks the newly endorsed Diploma of Pulp and Paper Process Management.
(Remote) control systems and production operations skills and knowledge	Technology upgrades and the level of process integration and computerisation are ever increasing in this sector. Technology and process integration across multiple processes and technologies (.e. centralised control) and between different technologies (i.e. old and new) are common features.	Ensure enterprises support workforce development for roles associated with (remote) control systems and production operations. Employers may collaborate and/or consult with other industries with high technology applications and continuous processing.
Expert services in demand		
Research and development professionals in biofuel technologies and water and energy efficiency solutions	The Pulp and Paper Industry Innovation Council was formed in April 2010 as part of the government's response to the Pulp and Paper Industry Strategy Group's Final Report. The council currently develops terms of reference for an appropriately funded Biorefinery Research Institute that will focus its research and development effort on fibre-based biofuels and other bioproducts. The council also identifies opportunities and devises ways to maximise water and energy efficiency (Timberbiz/Daily Timber News, 2010).	Partner with researchers and assist with in-house expertise and experience.
Emerging skill needs		
Skills for future environmental sustainability developments	The implementation and operation of environmental sustainability developments and technologies (i.e. biofuel/conversion into renewable energy, water and energy efficiency solutions) necessitate specialised skills that are readily available.	New units of competency with a focus on sustainability will be added to the Diploma of Pulp and Paper Process Management. An advanced sustainability diploma is currently being finalised by ForestWorks. ForestWorks will be alert to the latest developments and seek advice from technology-related professionals and the industry to recommend skill sets and develop appropriate competency standards.
Skilling new labour for pulp and paper manufacturing operations	The construction of major state-of-the-art pulp mills in Tasmania (Bell Bay pulp mill) and South Australia (Penola pulp mill) will demand additional workers for this sector.	Promote the industry across relevant geographical areas. Engage ForestWorks to support national training for greenfield sites.
Skills for implementing due diligence code of practices (illegal logging legislation)	Illegal logging legislation is expected to be enacted in 2011. The detail of the legislation will operate is not yet known however it is likely to introduce stricter requirements regarding due diligence in purchasing wood (information about material sourcing, production controls and transaction documentation).	ForestWorks acknowledges that industry will be given up to two years following the commencement of legislation to establish due diligence systems (A3P, 2010) and remains alert to the developments and evolving skills needs.

Timber Manufactured Products

Workforce trends and conditions in this sector

The timber manufactured products sector covers a wide range of secondary wood-processing operations including roof truss, floor systems, wall frame manufacture, laminated beams, re-sawing, cabinetmaking, box and pallet manufacture, veneering, window and door manufacture, flooring, furniture and kitchen manufacturing. The sector is largely populated by small to medium sized businesses, which are located mainly in the outer suburbs and light industrial areas of major cities.

It is estimated that this sector employs approximately the same number of people as last recorded in 2006 - 37,800 people. Unlike the upstream sectors of the supply chain, the employment in secondary wood product manufacturing remained relatively constant over the last five years (ABARES, 2010a). In broad terms, this sector has been able to manage the reduced demand for wood products during the GFC period better than other sectors mainly due to its more flexible operating environments. However, it is reported that in some regions such as south-east Queensland, the market has reduced by as much as 75% (Northside Truss and Frames - ForestWorks communication, Feb 2011).

Throughout 2010, the overall domestic demand for Australia's structural wood products has improved markedly (ABARES, 2010a). Yet, in the short to medium term, the prediction for growth in employment in this sector remains conservative as there are indications (high interest rates and low government incentives) that domestic building activities will fall again in the near future (URS, 2010). In addition, the recent floods in Queensland and Victoria together with the cyclonic event in North Queensland will concentrate the construction priorities on the repair of damaged houses, limiting further the scale of new housing construction and timber products use in the short term.

The timber manufactured products sector has been moving towards the adoption of high technology production systems (such as automated machine tools and manufacturing lines, computer-aided design programs), requiring higher levels of computer operating skills. The metropolitan location of employment in this sector may suggest a better access to workforce, skills and training centres, as opposed to the forest growing and management sector and primary processing, both of which are located in regional areas. However, in metropolitan locations there are other factors which negatively impact on labour recruitment and retention and these relates to a competitive environment to recruit and a consistent challenge to the industry.

Shortly, due diligence measures may be incorporated within an industry-developed and Commonwealth-accredited code of conduct to reflect the control and legal nature of origins of wood (DAFF, 2010). Chain of custody will probably become an integral part of this code of practice. As with every other sector in this industry, once this code of conduct comes into force, the timber product suppliers from this sector will need to have a skilled workforce to comply with those requirements (i.e. report on the system's quality, material sourcing, production controls and transaction documentation).

With green building requirements increasingly embedded in building codes, the timber manufactured products sector is exposed even greater to construction and building materials market. The revised Green Star environmental rating system accords credentials to all solid timber certified by any scheme accredited by FSC or PEFC (Nolan, 2010). To support the benefits of this voluntary scheme, this sector must ensure that it has the technological capacity and sufficient labour and skill sets to align its products to green building criteria (e.g. approved chemicals, timber sourced from certified forests/chain of custody certification, recycled materials).

It is recognised that some of the routines required to satisfy the Green Star rating system will, in fact, become compliance practices with the implementation of future illegal logging legislation measures.

There is an increasing demand for demonstrating the sustainable development of businesses/products and this raises the pressure for efficient use of energy, water use minimisation, recycling (or selling of generated residues) and timber certification. The methods for assessing enterprise sustainability, such as life cycle analysis and carbon accounting, might become part of many businesses in this sector, requiring a wide range of specialised skills.

	Rationale	*Potential strategies for enterprises, industry associations, union, RTOs and ForestWorks*
Skill shortages		
Wood machinists	Wood machinists operate specific machines and undertake specialist operations to cut, plane, shape and sand wood to a required shape and size. The operations often involve undesirable working conditions (noise and wood dust) and uncompetitive wages. Wood machinist is recognised as a national skill shortage (DEEWR, 2011; KPMG Econtech, 2010).	Undertake greater promotion, offer pathways from high school, provide training for existing workers and offer pathways to existing workers. Reduce the number of units of competency to complete this specialisation to make it more accessible.
Designer (estimator/detailer for roof trusses, floor systems and wall frames)	Reportedly, designers (estimators/detailers) are still in short supply (ForestWorks, 2010d). These roles require computer literacy with technical ability and the ability to read architectural plans and structural drawings. Designers are also expected to be familiar with 3D design fabrication softwares and/or computer-aided design (CAD) packages to provide professional presentation of building layouts and construction details to builders and truss, floor and wall installers. The industry is moving towards 'whole of house design' and manufacture, including provision of all ancillary services. It is recognised that these skills are going to offshore estimating businesses and that there is a need to find ways for providing training for these roles in Australia (Frame and Truss Manufacturers Association - ForestWorks correspondence, Feb 2011).	Enhance promotion of these jobs by marketing the sector as high tech (i.e. showcase the 3D design systems) and by promoting the new industry training package and career pathways. Facilitate participation of existing workers in specialised training programs for operating specific software. Some companies are sourcing design services and have established joint ventures that provide integrated construction and design services. Some hardware and software developers (nail plate providers) work in conjunction with RTOs and employers to establish traineeships.
Skill gaps		
Skills to operate computer-based equipment	Wood machining and parts assembly operations are increasingly assisted by computer-aided design (CAD) and computer numerical control (CNC). With the lack of young operators, this sector faces a real challenge to upskill existing employees to program and control computer-assisted equipment.	Undertake progressive and constant training for existing workers. Attract and train young people. Train in-house IT experts to reduce the reliance on external sources to solve problems that interrupt business.
Skills to operate advanced and complex operation machineries	The new and sophisticated technologies for wood products production have introduced complexity in jobs, in terms of multitasking and specialisation. In this context, employees need to take on new levels of training to acquire the skills to manage complex operations.	Employers need to organise training for employees in regions where these technologies originate.
Expert services in demand		
Expert in career promotion	The adoption of new technological developments requires workers who are willing to learn new processes; attracting workers remains an issue for this sector.	Engage career promotion experts and industry associations to promote jobs in this sector. Engage with career teachers and parents. Promote industry-specific job search websites and encourage their use.
Emerging skill needs		
Skills for implementing due diligence code of practices (illegal logging legislation)	Illegal logging legislation is expected to be enacted in 2011. The detail of the legislation is not yet known, however it is likely to introduce stricter requirements regarding due diligence in purchasing wood (information about material sourcing, production controls and transaction documentation).	ForestWorks acknowledges that industry will be given up to two years following the commencement of legislation to establish due diligence systems (A3P, 2010) and remains alert to the developments and evolving skills needs.
Skills for measuring the carbon footprint	An increased focus on production and cost efficiencies to ensure competitiveness in a globalised economy is still of prime importance for any business. The market is also driving an increased interest in energy use, water use minimisation and the recycling or selling of generated residues. Skills for undertaking life cycle analysis and carbon accounting will become imperative for all organisations.	An advanced diploma with a sustainability focus is currently being finalised by ForestWorks and includes skill standards for carbon accounting at enterprise level. National databases/frameworks with large applicability will be essential for wider implementation of life cycle analysis.

Wood Panel and Board Production

Workforce trends and conditions in this sector

This sector is comprised of engineered wood products manufacturers that are largely represented by about 10 particleboard and MDF enterprises, dispersed across most states. The sector produces a wide range of engineered wood products (for structural use, residential and commercial formwork flooring and feature cladding) and veneer products. Manufacturing is production line based, using highly specialised and integrated technologies and operations that are being aligned to rigorous quality regulations.

In 2006 the sector employed approximately 9000 people yet estimates are that employment in this sector has been reduced over recent years and this trend is likely to continue. The rationale behind this assumption is the evidence of slightly lowered levels in production, increased levels of imported products and increased prices for log resources (ABARES, 2010a). All these factors have prevented investment in the latest technology - an essential component for the internationally competitive panel product markets.

The imports are particularly in the lower value product area (plywood products), often failing to meet Australian Standards related to technical functionalities (i.e. structural strength, delamination, formaldehyde emissions) accepted for such products. This lack of compliancy poses a threat to workers safety and serious product liability implications for timber manufacturing sector and for the buildings in which they are used (Engineered Wood Products Association - ForestWorks correspondence, Feb 2011). Training of the construction and timber framing fabrication sectors around the Australian Standards, and appropriate regulations for these imported products are needed in order to protect all users of these wood panel products.

A short to medium-term opportunity for production and labour in this sector is the Strategic Indigenous Housing and Infrastructure Program, a recent initiative that will spend over $600m in remote communities in the Northern Territory (Strategic Indigenous Housing and Infrastructure Program, n.d.). A challenge for remote Indigenous housing projects is to provide resilient, cost-effective building materials.

A longer term opportunity is likely to emerge with the transition from a native forest based resource to a plantation based resource. The engineered wood products sector will be well positioned to utilise, likely at a feasible price, the smaller, more immature logs that pose technical problems to solid timber products.

The new regulations announced for 2011 and intended to reflect due diligence in the control and legal nature of origins of wood, will apply to wood panel products as well (DAFF, 2010). Therefore, this sector will need to prepare its workforce for those future requirements, which will most likely be in the area of reporting against the system's quality, material sourcing, production controls and transaction documentation.

Similar to the timber and paper manufactured products, increased customer interest in the environmental footprint of products places a growing pressure on this sector. The use and application of the methods for assessing enterprise sustainability, such as life cycle analysis and carbon accounting, will become part of the everyday activity in this sector, requiring a wide range of specialised skills.

	Rationale	*Potential strategies for enterprises, industry associations, union, RTOs and ForestWorks*
Skill shortages		
Electricians, plumber, fitters	People with these skills are increasingly absorbed nationally by industries with booming economic perspectives.	Employ apprentices whenever possible. Design industry-focused promotional activities to underline the benefits of working in this industry (career and/or lifestyle benefits, 'fly in, fly out' options).
Skill gaps		
Technical skills of new and among the existent operators, to use sector specific new technologies	This sector integrates in-line and highly technical manufacturing processes, expecting commensurate skill levels from operators.	Establish regular mentoring programs for newer operators with the support of more experienced operators/supervisors.
Expert services in demand		
Experts in chemical use and handling	The use and handling of chemicals is a highly specialised and regulated area. Dealing with binding agents, this sector has to ensure it is compliant with operational health and safety standards and environmental regulations.	Establish a network of experts in chemical use and handling to service the sector.
Emerging skill needs		
Skills for implementing due diligence code of practices (illegal logging legislation)	The illegal logging legislation is expected to be enacted in 2011. The detail of how the legislation will operate is not known at this stage; yet, the measures are expected to introduce stricter requirements for demonstrating due diligence in purchasing wood and wood products (information about material sourcing, production controls and transaction documentation).	ForestWorks acknowledges that industry will be given up to two years following the commencement of legislation to establish due diligence systems (A3P, 2010) and remains alert to the developments and evolving skills needs.
Skills for measuring the carbon footprint	There is an increased focus on production and cost efficiencies to ensure competitiveness in a globalised economy. The market is also driving an increased interest in energy use, water use minimisation and the recycling or selling of generated residues, which were previously ignored. Skills for undertaking life cycle analysis and carbon accounting will become imperative for all organisations.	An advanced diploma with a sustainability focus is currently being finalised by ForestWorks and includes skill standards for carbon accounting at enterprise level. National databases/frameworks with large applicability will be essential for wider implementation of life cycle analysis.

Timber Merchandising

Workforce trends and conditions in this sector

The timber merchandising sector has traditionally operated through three main channels: 1) wholesaling sector (including importers and exporters), represented by timber wholesalers and building supply wholesalers whose primary activity includes the supply of plywood and veneer, hardwood and particleboard timbers, carpentry and joinery timbers (dressed timber, rough sawn timber, wood panel) and general timber dealing, 2) retail sector that includes builder merchants, specifiers and other retailers (such as hardware stores) and 3) end-user. Some of the merchandising companies are closely linked to, or are part of, timber production, often with a wholesale component run by the processing company.

Based on past ForestWorks' data, the timber merchandising sector, including wholesalers with all import and export merchants, retail outlets, timber recycling depots and marketing services associated particularly with this sector, employed approximately 22,000 people in 2006. A more recent study (IBISWorld, 2010) indicates that the timber wholesaling sector alone employed 6100 people by 2009.

Distributing a wide range of products for various uses, this sector enters the category of highly specialised businesses where customers increasingly expect that workers at the point of sale have extensive timber knowledge. Suppliers (or primary and secondary producers) also expect merchants to offer this knowledge, on their behalf, throughout the distribution channel to the end users through services such as product training, employee training/installation advice, product display and promotional material. The merchants' knowledge and skills are critical for the efficient use of these products and for the marketing of new products, especially given that new developments in engineered wood products occur at a fast rate. While these aspects are clearly indicated, at present formal post-school qualifications are not essential to work in this sector (myfuture, 2010). Thus, the sector largely lacks essential knowledge-based skills across many of its businesses.

The need for appropriate skill development for this sector is vital. There is a tendency of acquiring a variety of skills and qualifications from a range of providers, which in fact do not meet the sector's needs. Employers need to be educated as to the most appropriate training and service provider to meet the needs of their organisation. The timber merchandising qualifications within the FPI05 training package are of most benefit to the sector, however the employers and enterprises need to be aware of this and understand its value.

In addition, with the increasing customer awareness of the environmental qualities of wood and the availability of a wide range of contemporary means to demonstrate these values - such as chain of custody and other due diligence or code of practice for suppling timber products, building/star rating tools and commercial instruments (carbon footprint trademarks, labels and claims) to promote social and environmental qualities of products - this sector is expected to be the point at which the environmental benefits inherent in wood products effectively reach the customer. To meet this expectation and also sustain its efficiency and competency, this sector is challenged by the need to change the operating procedures (re-coding, stock logistics, extra space and new racking, re-pricing) and upgrade computers, undergo audits and fees and, ultimately, undertake training for employees.

The release of a policy platform that addresses the importation of wood and forest products sourced from potentially illegal harvesting operations (refer to the previous sectors' sections) will particularly affect this sector, with importers and all other timber merchants who first place timber products in the Australian market. This policy will expose this sector to the need to acquire skills that are able to track legal evidences about raw materials' origins, production controls and transaction.

Career opportunities in this sector exist for stock inventory officers and sales/marketing representatives, up to middle managers (such as sales assistants, salespersons, retail supervisors), particularly in regional areas (ForestWorks, 2010c). Jobs opportunities are also available for warehouse managers, as well as importers and exporters (myfuture, 2010).

	Rationale	*Potential strategies for enterprises, industry associations, union, RTOs and ForestWorks*
Skill shortages		
Mobile equipment operators	It is believed that the main factors causing these skill shortages are associated with competition for labour from other retail sectors. It is also generally believed that the community, and regional society in particular, is not aware of the types of jobs available in the timber merchandising sector. The sector reports that there is a lack of young people entering this business.	Work closely with career advisors in schools and in employment placement centres such as Job Services Australia (JSA) to ensure that jobs available in this sector are advertised. Engage with career promotion experts. Promote qualifications to advance career pathways to senior managerial positions.
Stock inventory officers		
Sales/marketing representatives (sales assistants, salespersons, retail supervisors)		
Warehouse managers		
Timber yard operators	Timber yardmen normally need timber and merchandising knowledge. However, businesses do not recognise the importance of having a qualification for this occupation, or are not aware that appropriate units of competency exist. Consequently, these workers are not offered career pathways.	Increase awareness of the units of competency relevant to these occupations.
Skill gaps		
General knowledge about timber and timber products	Traditionally, this sector has not expected formal qualifications as a prerequisite for employment or provided formal training for employees once employed. Consequently, trainers with specific product-related knowledge are rare in the VET sector.	Promote a training culture within the sector. If viable, develop relevant qualifications or units of competence.
Expert services in demand		
Expert in career promotion	This sector is characterised by opportunities in the sales and marketing area, especially in regional areas. As with the other sectors in this industry, attracting young people is quite difficult.	Engage with career promotion experts and industry associations to promote jobs in this sector. Engage with career teachers and parents.
Import and export agents with timber knowledge	For international transactions, the sector generally engages specialised agents in importing/exporting commodities, many of whom do not have knowledge about timber. Moreover, the introduction of illegal logging legislation will require knowledge of Australian Standards for assessment of imported products.	Advise and assist the import/export agents with relevant information.
Emerging skill needs		
Skills for implementing due diligence code of practices (illegal logging legislation)	Illegal logging legislation is expected to be enacted in 2011. The detail of the legislation is not yet known however it is likely to introduce stricter requirements regarding due diligence in purchasing wood (information about material sourcing, production controls and transaction documentation).	ForestWorks acknowledges that industry will be given up to two years following the commencement of legislation to establish due diligence systems (A3P, 2010) and remains alert to the developments and evolving skills needs.

Section Three: Current impacts of training packages

The use of the industry training packages

The national training packages

ForestWorks is contracted by the Commonwealth Government to develop, maintain and continuously improve the following national training packages for the forest and timber products industry:

- FPI05 Forest and Forest Products Training Package
- FPP10 Pulp and Paper Manufacturing Industry Training Package

FPI05 consists of 24 qualifications across the following six industry sectors:

- Forest Growing and Management
- Harvesting and Haulage
- Sawmilling and Processing
- Timber Products Manufacturing
- Timber Merchandising
- Wood Panel and Board Production

FPP10 covers the pulp and paper manufacturing industry and consists of seven qualifications and comprises 80 industry-specific units of competency. A further 117 units are imported from other industries offering a total of 197 units for skills development.
Both training packages provide a framework of qualifications that align with occupations or occupational levels, based on units of competency that define the skills required to fulfil particular functions in the industry.

VET learning as a pathway

ForestWorks has learnt from its industry workforce development projects and through consultation with various stakeholders that, for many people, VET learning is a pathway not a destination. For many people, skills development, learning and training can be a challenging experience. However learning for work is often a pathway to a new job, self satisfaction and sense of achievement. When a new job is secured or acceptable standards of living are achieved, formal learning may stop or be interrupted. ForestWorks found that training for training's sake, without an outcome, is less supported by many of our stakeholders.

When reported in the context of the forest and timber products industry, the single indicator of qualification completions does not represent an appropriate performance measure. What it does indicate for our industry is that people are interested in skills development more than continuing to learn to gain a qualification.

Formal skills in this industry are generally acquired through workplace-based and workplace-planned skills delivery training. Therefore, completion of a whole qualification, while valued in the forest and timber products industry, is best supported by the acquisition or recognition of skills that can be completed unit by unit and often in small clusters that reflect skills sets relevant to the job. It means that emphasis should be placed on identifying the client's intent and providing the means to encourage and assist them to progress through the system to achieve their educational or work related goals.

VET activity is increasing in the forest and timber products industry as reflected by actual total course enrolments in both training packages. Over the last two years enrolments have increased by 26% from 4931 in 2007 to 6196 in 2009. Of these enrolments, the majority (61%) were in the 30-59 years age bracket, with 27% from the 20-29 years age bracket. Training for entry workers in the 15-19 years age bracket is less than 10%. This reflects an industry where training is predominantly accessed by existing workers within the workplace.

Career opportunities within the industry continue to strengthen, with many jobs located in rural and regional areas where employment prospects are often otherwise limited. Young people may hold negative perceptions about the forest and timber products industry due to the remote work locations, the physical nature of the work and lower

wage levels than other industry. Exacerbating this view is the perception that the industry faces an uncertain future and does not offer long-term career prospects.

Despite perceptions that work within the industry is physically demanding, changing industry practices require increasingly technical skills. Industry technology is advancing rapidly to provide increased rates of production and more value-added products. Continuous production requires skills of problem solving, quality improvement and a comprehensive knowledge of work product flow. Activities such as mechanised harvesting, kiln drying and wood machining all require specific technical skills. Continuous industry development requires an ongoing supply of specialist skills.

Nationally the task of providing skilled people to drive the performance of the forest and timber products industry is complex. People need to be aware of the training and skills development opportunities and how to access these opportunities. Training providers have the tools but require assistance to identify and respond to market demand so that they meet the requirements of individuals and businesses. Enterprises use the training package to help identify and develop their workforce.

Table 1: National Enrolments in Forestry Training Package Qualifications (2007 - 2009)

	2007	2008	2009	% Change
Forest Growing and Management				
FPI10105/FPI10199 – Certificate I in Forest and Forest Products	37	65	12	
FPI20105/FPI20199 – Certificate II in Forest Growing and Management	1223	1460	1729	
FPI30105/FPI30199 – Certificate III in Forest Growing and Management	512	674	781	
FPI40105/FPI40199/FPI40399 – Certificate IV in Forest Operations	130	41	87	
FPI50105/FPI50199/FPI50299/FPI50399/FPI50599/FPI50799 – Diploma of Forest and Forest Products	21	16	20	
Total - Forest Growing and Management	1923	2256	2629	37%
Harvesting and Haulage				
FPI20205/FPI20399 – Certificate II in Harvesting and Haulage	238	312	328	
FPI30205/FPI30399 – Certificate III in Harvesting and Haulage	846	1116	780	
Total – Harvesting and Haulage	1084	1428	1108	2%
Sawmilling and Processing				
FPI20305/FPI20699 – Certificate II in Sawmilling and Processing	626	480	597	
FPI30305/FPI30699 – Certificate III in Sawmilling and Processing	380	523	768	
Total – Sawmilling and Processing	1006	1003	1365	36%
Timber Manufactured Products				
FPI20505/FPI20499 – Certificate II in Timber Manufactured Products	105	65	84	
FPI30505/ FPI30499 – Certificate III in Timber Manufactured Products	154	208	155	
FPI40205/FPI40699 – Certificate IV in Timber Processing	27	59	34	
Total – Timber Manufactured Products	286	332	273	-5%
Wood Panel and Board Production				
FPI20405/FPI20299 – Certificate II in Wood Panel Products	107	167	96	
FPI30405/30299 – Certificate III in Wood Panel Products	74	98	99	
Total – Wood Panel and Board Production	181	265	195	8%
Timber Merchandising				
FPI20605/FPI20599 – Certificate II in Timber Merchandising	42	92	29	
FPI30605/FPI30599 – Certificate III in Timber Merchandising	47	76	52	
Total – Timber Merchandising	89	168	81	-9%
FPI30705 – Certificate III in Sawdoctoring	25	44	60	140%
FPI30805 – Certificate III in Woodmachining	25	60	74	196%
Pulp and Paper Manufacturing				
FPP10101 – Certificate I in Pulp and Paper Manufacturing	81	60	60	
FPP20101/FPP20201 – Certificate II in Pulp and Paper Manufacturing	73	85	123	
FPP20201 – Certificate II in Pulp and Paper Services	0	0	1	
FPP30101/FPP30201 – Certificate III in Pulp and Paper Manufacturing	80	222	146	
FPP40101/FPP40201 - Certificate IV in Pulp and Paper Manufacturing	78	85	81	
FPP50101 – Diploma of Pulp and Paper Operations	9	0	0	
Total – Pulp and Paper Manufacturing	312	461	411	32%
Grand Total	4931	6017	6196	26%

Source: NCVER (2011)

Table 1 indicates that the highest numbers of enrolments are in the Forest Growing and Management with certificate II and certificate III qualifications accounting for almost 41% of total enrolments.

Industry support for safety is demonstrated in Table 2 with 1283 enrolments in OHS policies and procedures.

Table 2: Commencement for units of competency

Unit of competency	CII	CIII	Total
FPICOT2221A Trim and cross cut felled trees	1538	794	2332
FPICOT2204A Maintain chainsaws	945	948	1893
FPICOR2205A Follow OHS policies and procedures	1071	212	1283
FPIFGM147A Read and interpret maps	127	873	1000
FPIFGM162A Collect, treat and store seed	715	38	753

Source: NCVER (2011)

Reviews, upgrades and developments in components of the training packages

RTO support

ForestWorks conducts a range of professional development activities for the Training Provider Network which supports the forest and timber products industry. In July 2010 the Training Provider Network workshop covered a wide range of areas to support trainers in their training delivery and maintain currency in the continuous improvement environment of the VET sector. Sessions were facilitated to cover sustainability skills, assessment strategies and tools, an industry update, tertiary sector directions, and workforce development.

Training providers are consulted in the development of developing competency units, resources, and provide advice in the continuous improvement process of training package development. ForestWorks Industry Skills Council (ISC) supports training providers to continue to be active and responsive contributors to enterprise efforts in workforce development. Training providers have specific expertise in design and delivery of workplace education and training which is utilised for workforce development.

An RTO is able to provide training delivery only when a business case for training delivery exists. This requires consistent demand and volume of students, with costs able to be recovered to maintain viability.

Therefore to achieve economies of scale a critical mass of trainees is required. This is the key argument for a business case for any training provider, to deliver viable training. This can be challenging to achieve, particularly where regional communities, high cost equipment and highly sector-specific skills are required.

ForestWorks liaises with industry to increase the uptake of training for the workforce. Some of the strategies include:

- Promoting the benefits of having a formally trained workforce to increase productivity and flexibility;
- Working with training providers to provide flexible training solutions for enterprises; and
- Using existing networks and associations to facilitate training solutions across enterprises and the training provider network

Section Four: Future directions for endorsed components of training packages

Responding to industry's emerging workforce priorities

ForestWorks' close relationship with the seven sectors of the industry is formalised through the Skills and Employment Council (SEC) structure of sector advisory groups. These groups provide the national mechanism for feedback, review and validation for both training packages. This structure allows for widespread input during the process of development and review as well as an industry supported sign-off process.

During the past year ForestWorks has made significant inroads in upgrading training packages and facilitating workforce development for the forest, wood, paper and timber products industry. The Skills for Sustainability project enabled a review of the training package to ensure that units and qualifications support industry's imperative of sustaining its resource and conserving energy. This review covered every qualification and unit of competency in both training packages to ensure that skill gaps and emerging skills needs were supported. A holistic approach was taken in all continuous improvement projects undertaken during this time to encompass a sustainability review component.

Workforce and industry skills development - applying lessons learnt in pockets of good practice regionally

Workforce development for the forest and timber products industry focuses on:

- Training for a job outcome
- Skills assessment and recognition to equip workers in a structural change environment

Workforce development is a deliberate strategy that draws together the policies and practices that contribute to creating an efficient, highly skilled workforce (Government of South Australia, n.d.). Although education and training are significant parts of developing a skilled workforce, a workforce development approach recognises there is a far broader range of policies, systems and structures which, when used together, can create and sustain the workforce.

Skills and labour shortages

Many labour and skills shortages could be avoided with a planned approach to recruiting and developing workers at the enterprise level. Generally industry workforce development needs can be influenced by various factors including industry and regional structures, business size, workplace conditions, and the mobility of workers, all of which can contribute to labour market imbalances. ForestWorks fosters relationships between RTOs, DEEWR, STAs and other government agencies to develop learning communities that ensure high levels of skills, including literacy, numeracy and problem-solving skills, to meet workplace demands. These relationships also address barriers to people participating in learning and work. This has a social and economic benefit for the local community as well as for industry and the national economy.

Barriers to productivity

Productivity is the key concern for enterprises. Training delivery that takes workers offsite will generally be unsuitable in the forest and timber products industry. For enterprises operating in regional and remote areas, access to training can be difficult and may require significant downtime for travel to the training site. Solutions that involve the adaption of workplaces and work activities are often preferred over structured training programs. In the past, offsite learning has best been utilised for workers from high risk environments and also in greenfield sites where specific labour skills are required in large numbers (such as mechanical harvesters required in the Green Triangle area) (ForestWorks, 2010e).

Strategies for embedding training packages in workplace culture

ForestWorks is participating in a newly created National Training and Skills Development panel within the industry. This panel is a collaboration between a national company, unions and the ISC and will be responsible for fostering

both industry-based skills and essential skills. Essential skills have been defined as skills that enable people to engage effectively and safely in work and are attained with relevant LLN skills to support current and emerging workplace and community demands. The panel will seek to harness the productivity potential of investment in skills and the alignment of training with other business priorities.

Workforce priorities addressed by the training package

During the past year a significant amount of development has occurred in both training packages. The Pulp and Paper Manufacturing Industry Training Package has been completely reviewed. The new package was endorsed in January 2011 and addresses significant changes in the industry including the introduction of new technologies and processes, changes to the way work is organised and structured and addressing emerging skill needs for new mills and mill components being planned and constructed. Skills for sustainability implicit in the package have been made explicit in line with the four environmental sustainability priorities identified by industry.

Outcomes of the following continuous improvement projects have resulted in the review of the Forest and Forest Products Training Package:

- Skills for Sustainability
- Timber Truss and Frame
- Technology
- Qualifications and pathways within the tertiary sector

Skills for Sustainability

The forest and timber products industry is in a unique position in that our industry offsets carbon emissions that Australia produces through the storage of carbon in growing wood. ForestWorks' response to government policy initiatives led to an extensive review of all units and qualifications in terms of safety and sustainability. Carbon capture, environmental resource management, and energy and material efficiency are factors across all sectors of the industry, as is the use of biomass technologies to produce electrical energy for communities.

Working in accordance with the industry priorities of adaptation, mitigation and bioenergy (COAG, 2009) existing units and qualifications, as well as emerging job roles, were assessed in relation to four environmental sustainability themes:

- maximising carbon capture and storage (via plantation development, management of native forests, timber milling and timber product manufacturing, fire salvage, waste to landfill/recycling)
- renewable energy and biomass (via forest and mill residues, wood and wood wastes)
- environmental resource management and services (via procurement, water and land management, waste reduction, reducing the impact of logging on the environment, timber preservation practices, bio-security)
- energy and material efficiency (via water use and management, using energy generated from wood waste to power timber drying kilns, plantations, timber milling and timber product manufacturing, fire salvage, waste to landfill/recycling, processing waste)

Identification of environmentally sustainable emerging skills and skills gaps (via consultation with industry, enterprise and VET networks) determined that a number of higher level skills needs were emerging with the need for a science-oriented higher level qualification within the training package to be developed. The skills and knowledge achieved through this qualification could be applied to various supervisory/management roles within the industry with a particular focus on environmental sustainability within a workplace. Industry consultation resulted in 28 new units of competency at the higher level and a new qualification of Advanced Diploma of Forest Industry Sustainability.

The outcome of all continuous improvement projects with skills for sustainability as a focus resulted in:

FPI05 Forest and Forest Products Training Package

- A new advanced diploma qualification to address the emerging need for managers in the industry to develop and implement systems and processes related to sustainability priorities and to provide skill pathways to higher education
- Existing qualifications revised to reflect emerging environmental sustainability work practices and requirements, particularly in light of the new units developed
- A range of new units of competency addressing emerging skill needs for sustainability priorities

- Revised units of competency with a changed outcome
- Existing units of competency revised with enhanced range statements to identify environmental protection measures, enhance OHS variables, and highlight and explicitly reference sustainability skills (which resulted in a number of new units)

FPP10 Pulp and Paper Manufacturing Training Package

- New qualifications to support significantly changing job roles with the introduction of new technologies and processes, and changes to the way work is organised and structured. The new qualifications were reviewed to reflect emerging environmental sustainability work practices and requirements, particularly in light of new units developed
- A new diploma to address the emerging need for managers to develop and implement systems and processes related to sustainability priorities
- New units of competency with sustainability skills highlighted and explicitly referenced
- Imported units that directly that support sustainability objectives

The timber truss and frame sector

In recognition of the need to promote career pathways, attract new entrants and train existing workers in the timber truss and frame sector, the National Truss and Frame Working Group was formed. This working group comprised employer and employee representatives and industry associations and responded to industry workforce development requirements to develop a new qualification framework. The framework has multiple entry and exit points to emphasise a workplace's ability to design meaningful qualifications around which it can develop its workforce.

The working group discussed issues related to career pathways in the sector, especially focusing on the existing qualifications for job roles from the factory floor to occupations in estimating and detailing. The industry was very keen to be involved in improving pathways for the sector and agreed that the previous qualification structure did not match this sector's occupation profile and skill needs.

Technology

Enterprises are increasingly introducing new technologies in order to achieve a competitive advantage. Technology has also been introduced to improve workplace safety, minimise waste, better use resources and improve products. Increasingly computer-based equipment is being installed in process plants and used in forest management. The technology is becoming more complex with robotics, GPS tracking, micro chips used to track logs to ensure chain of custody certification. Workers continue to need new skills in order to interact with and operate computer equipment and interpret computer-generated instructions.

As the industry embraces sustainability principles, a more advanced level of reporting is required. Environmental management systems will become more prevalent, in particular carbon inventory and reporting systems. Compliance requirements for certification schemes will also demand higher LLN skills from workers at all levels of the industry.

Qualifications and pathways within the tertiary sector

The introduction of the Advanced Diploma of Forest Industry Sustainability recognises the emerging needs of the industry to provide pathways and links to the higher education sector via graduate certificate or degree programs in forestry or environmental science. The advanced diploma provides a pathway to higher education programs such as the new Graduate Certificate in Timber (Processing and Building) offered by the Centre for Sustainable Architecture with Wood, University of Tasmania. This program focuses strongly on the requirements of sustainable construction and production practice, especially practice relevant to Australian conditions.

From November 2009 an extensive review of the diploma level units was undertaken in close negotiation with industry and higher education institutions. This review has strengthened the pathways for the VET-trained technical forester and the university-qualified forester roles. The case for endorsement contains the amended diploma level units, as well as the new qualification – Advanced Diploma of Forest Industry Sustainability.

Skill standard review process

The following projects will be scoped to establish priorities and timelines for the Continuous Improvement Plan over the next three-year review cycle.

Forest Growing and Management and Harvesting and Haulage:

- Forest operations
- Tree felling
- Fire management operations
- Four-wheel driving
- Fire operations
- Fatigue management
- Log truck driver skill set

Sawmilling and Processing:

- New and emerging technology
- Restructuring the exiting saw doctoring and wood machining qualifications and examining the need for higher level qualifications
- Timber treatment skill set

Wood Panel and Board Production, Timber Merchandising and Timber Manufactured Products:

- Timber and timber products
- Knowledge of systems, standards and legislation relevant to wholesaling, importing and exporting timber and timber products

Pulp and Paper Manufacturing:

- Skills for development of policies, policies and systems in response to industry sustainability imperatives

Implementing training package upgrades

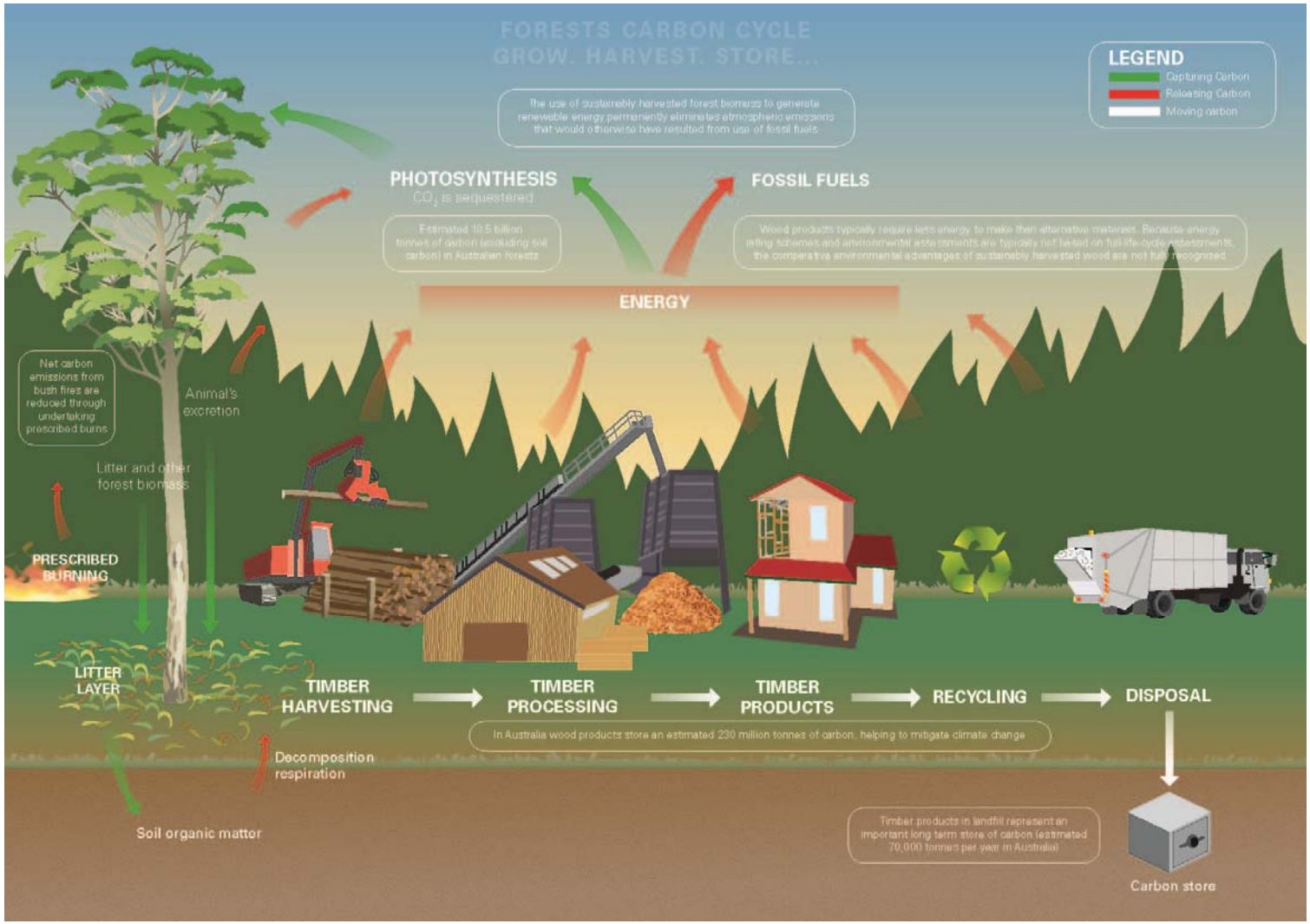
Moving both the timber truss and frame qualifications and the sustainability agenda forward will be a key priority for workforce development. The approach to implementation will include:

- RTOs being fully briefed on implementation of the reviewed training packages through the Training Provider Network meetings where sustainability will be an ongoing and important agenda item
- Provider resource development and success stories shared via the Training Provider Network and via the e-newsletter and the ForestWorks website
- Industry case studies of improved business productivity to be disseminated via the e-newsletter, website and conferences
- Global sustainability research and innovations to be communicated by ForestWorks to a range of industry and Training Provider Network stakeholders via the ForestWorks network. In 2010 this communication included ForestWorks support of industry contribution at the United Nations Framework Convention on Climate Change in Cancun, Mexico and this support will continue at the next conference in Johannesburg, South Africa in 2011.

Appendix I

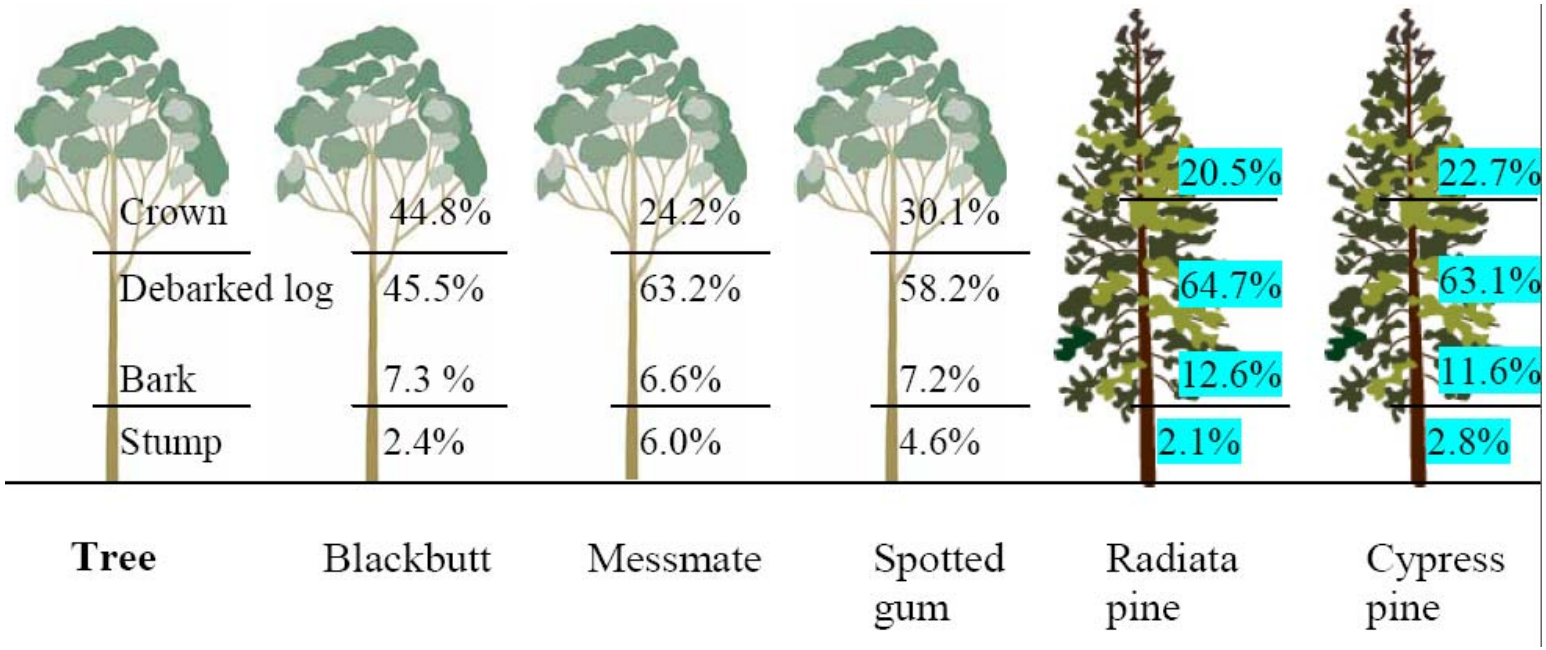
The forest, wood, paper and timber products industry in the low-carbon economy

Forest carbon cycle: grow – harvest/regrow – store



Source: NSW Department of Primary Industries (2009)

Proportion of carbon in the different tree components

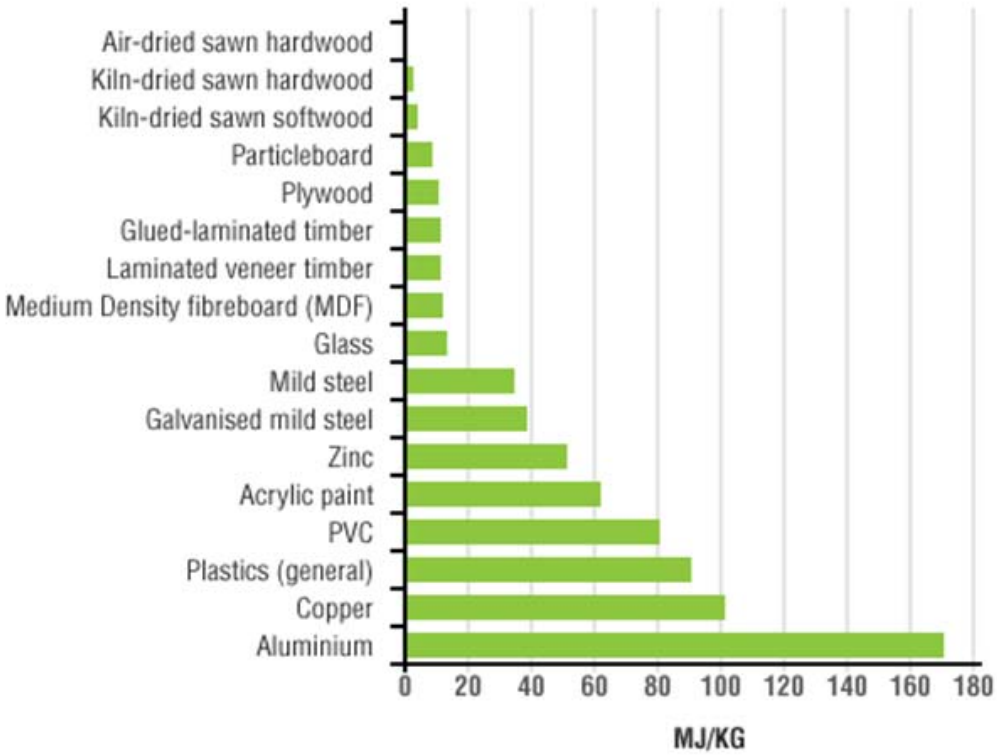


Other carbon facts

- Carbon makes up 50% of the tree's dry weight
- The tree absorbs 3.66 tonnes of CO_2 for each tonne of carbon stored
- Younger forests sequester carbon at a higher rate
- Carbon is released as tree components decay
- Forest fire is a contributor to greenhouse gas emissions
- The world's forests and soil store more than one trillion tonnes of carbon – twice as much as in the atmosphere
- Australia's native forests, timber plantations and wood products are **net absorbers** of greenhouse gases, sequestering 56.5 million tonnes of carbon dioxide in 2005, **reducing** Australia's total greenhouse gas emissions by nearly 10% (Wood. Naturally Better, 2011a)

Source: Ximenes (2010)

Process energy requirements for some common building materials



Source: Wood. Naturally Better (2011b)

Facts about carbon in wood products in service

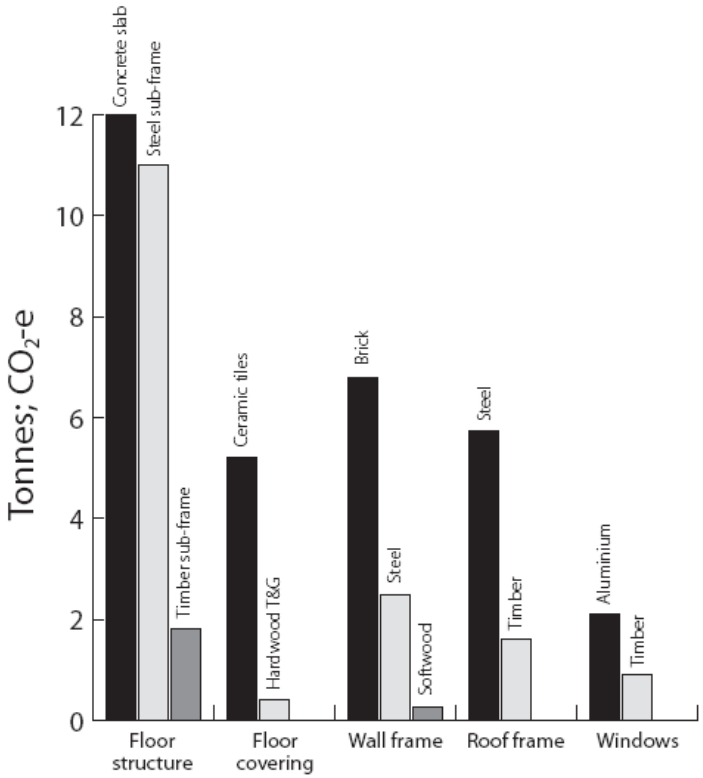
- Each cubic meter of timber in a building sequesters between 250kg and 300kg of atmospheric carbon. This is equivalent to 0.9 to 1 tonne of CO_2
- Thus $1m^3$ of timber used in building avoids up to another 1 tonne of CO_2 emissions generated by more energy-intensive alternatives.

Facts about carbon in wood products in landfills

- Carbon loss from forest products in landfills:
    - Solid wood 0-18%
    - Composite materials 2-20%
    - Newspapers, magazines 0-21%
    - Office paper 10-90%
- A high percentage of carbon in wood products in landfills is stored for indefinite periods

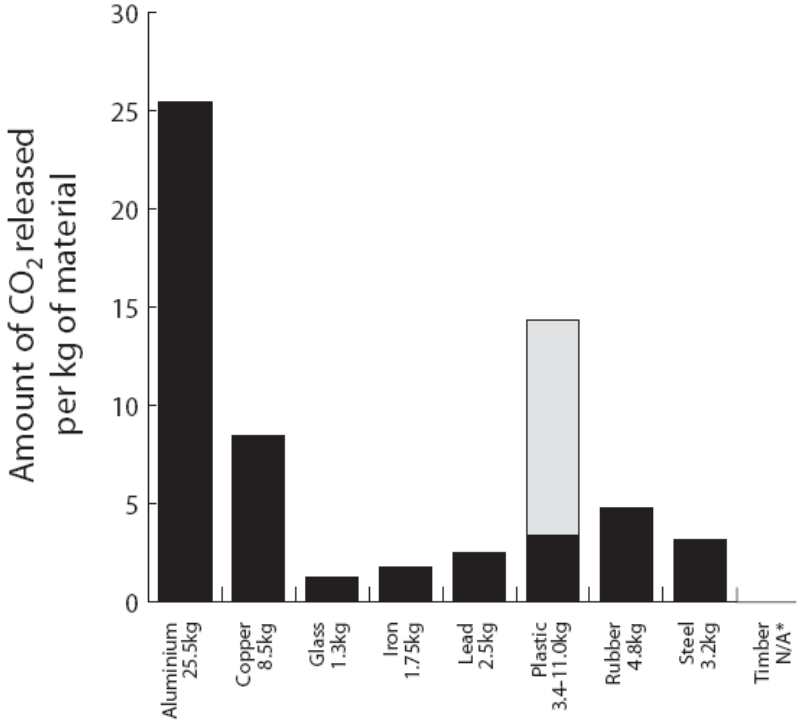
Source: Ximenes (2010)

Greenhouse gases emitted in the manufacture of building materials used in a range of construction components for a single-storey house in Sydney, Australia



Source: NSW Department of Primary Industries (2008)

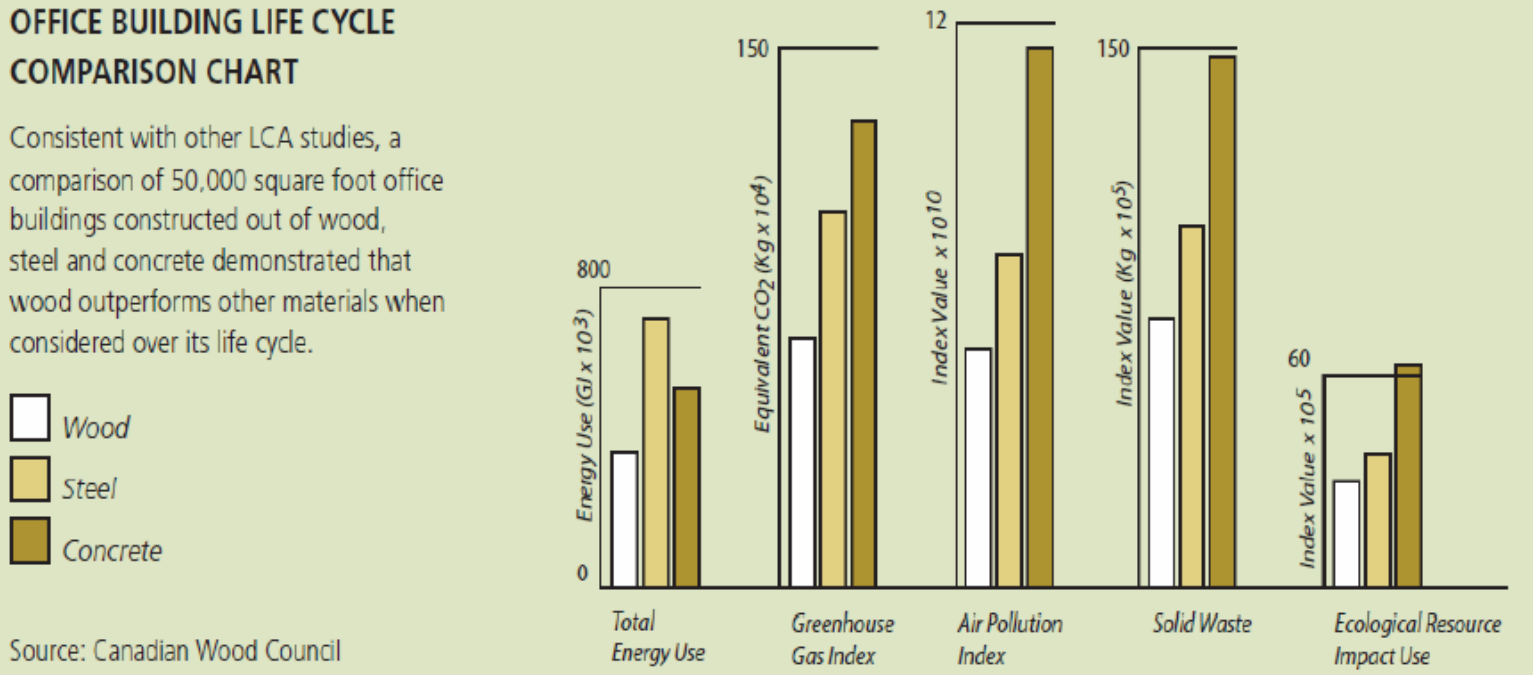
Amount of CO_2 released during manufacture of different materials



**Timber contains stored carbon dioxide from the atmosphere. Although some carbon dioxide is released during the milling of timber, the net effect is that 8.3kg of carbon dioxide is actually absorbed during both the growth and processing of timber and no carbon dioxide is produced.*

Source: NSW Department of Primary Industries (2008)

Life Cycle Analysis (LCA) comparison between wood steel and concrete used in office buildings

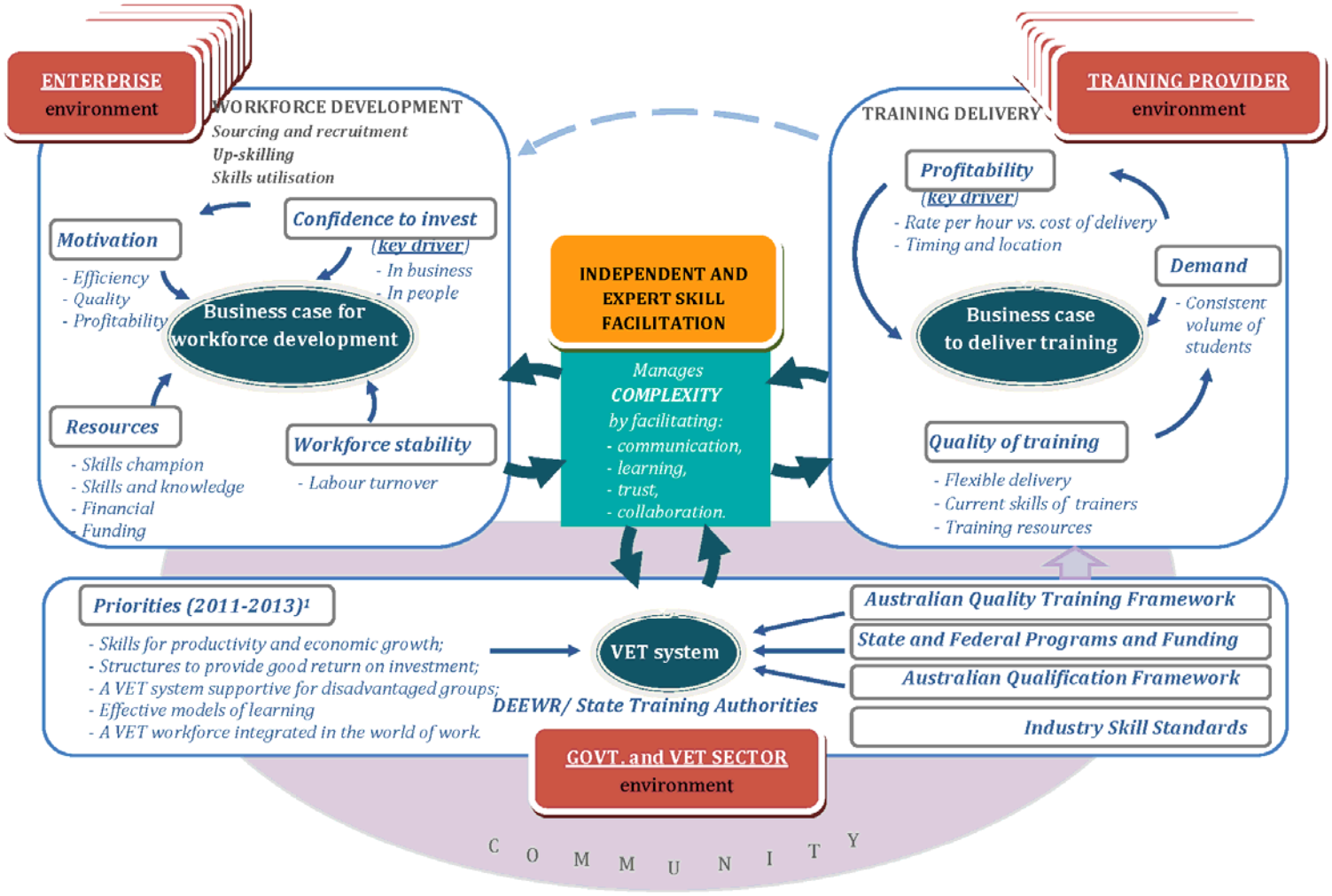


Key findings from Forest Wood Products Australia/RMIT LCA study

- Substituting steel framing in construction systems with timber reduces CO_2e by 10 tonnes
- Substituting brick cladding with timber reduces CO_2e by 7 tonnes
- Substituting concrete slab with timber reduces CO_2e by 3 tonnes
- Using timber, the greenhouse gas emissions avoided is equivalent to up to 8-26 years of greenhouse gas emissions from heating/cooling
- Timber-framed houses achieve up to 16% reduction in resource depletion (non-renewable minerals and fossil fuels) when compared to steel, while weatherboard house achieve up to 12% reduction when compared to brick
- Timber-framed houses produce 10-29% lower photochemical oxidation (smog) when compared to steel
- Timber houses 'use' more water and land (via forests)

Source: Mitchell (2010)

The framework of forest and timber products industry skill ecosystem for sustainable workforce development



1 Source: NCVER, 2010, National research priorities for tertiary education and training: 2011-13. Available at: http://www.ncver.edu.au/publications/2271.html

Source: ForestWorks (2010b)

Appendix II

Case studies

Case Study 1: Meeting the need for creating a sustainable future for business and employees - the case of Hyne

With origins dating back to 1882, Hyne is Australia's largest privately owned timber company and a leading example of a forest industry business that has successfully combined longevity with profitability and sustainability.

Hyne's management recognises that the challenges faced by the industry today – resource availability, technological advancement, regulations, markets, products and social expectations – are not new and have changed continuously throughout the company's history.

Hyne attributes its success in addressing these challenges to a number of factors, including:

- Continuous assessment of the business environment and a systematic approach to planning and forecasting to address issues before they arise.
- The active encouragement of a working environment that values continuous improvement.
- Respectful engagement with all stakeholders so issues can be explicitly identified, not merely assumed. Among many other positive outcomes, stakeholder engagement provided the catalyst for Hyne's move away from the truss and frame sector and into softwood plantations in 2007.
- Investment in people to assist the business to adapt to opportunities as they arise. This investment has included developing a full skills matrix and training plans for workers that focus on extensive and intensive training rather than short-term, pressure-driven training fixes.
- Incorporation of new technologies with appropriate and timely training so that workers are confident to embrace change and apply their skills and knowledge.
- Commitment to a safe workplace with superior conditions that attracts and retains workers who are focussed on achieving high performances and quality outputs.

Hyne's General Manager, Julie George says, 'Changes are not new. Companies have to embrace them and need to have the right strategies and mindsets to take the opportunities'.

Case Study 2: Industry snap shot – Carter Holt Harvey Mill at Myrtleford

Sustainability has been a part of work practices for many generations of workers in the forest and timber products industry. The continuous replanting and harvesting of forests has enabled the industry to meet the needs of Australians in our most recent history.

In 2010 ForestWorks worked with the Carter Holt Harvey mill workers in Myrtleford, Victoria to assess the implications of sustainability for the business. Focussing on the question, 'How does sustainability relate to jobs at the Myrtleford mill', ForestWorks worked with Myrtleford's RTO manager and the local training team to map the plant's jobs against four categories of sustainability.

- Maximising carbon capture
- Wood for renewable energy
- Environmental resource management and services
- Energy and material efficiency

Due to the embedded nature of sustainability within the industry, it was found there was little need to create new skill standards. It was identified that extra training would allow the existing workforce to not only operate the plant but also become more technically proficient in environmental awareness.

Formal skills recognition will provide a well deserved acknowledgement of the sustainable work practices already embedded within the forest, wood, paper and timber products industry.

Case study 3: Travelling 4500 kilometres along a new career path

A new career path has taken Mark Blackwell more than 4500 kilometres from redundancy at a Tasmanian sawmill to Gove Peninsula, northeast of Arnhem Land, where job as Operations Manager is to train Gumatj employees in sustainable forest management and timber processing.

Mark and his partner were two of the many workers left without a job after the Tonganah softwood sawmill at Scottsdale closed in 2008. Unable to find alternative work in Scottsdale and after persevering and broadening his approach, Mark was engaged by ForestWorks to provide training services to an indigenous community as part of a ForestWorks supported Indigenous forestry project.

Through his relationship with ForestWorks, Mark took a position at the Gumatj Aboriginal Corporation at Gove, 600 kilometres east of Darwin. The timber project is a joint initiative with Forestry Tasmania and is about sustainably harvesting and processing timber from the estate of the Gumatj people.

Mark works closely with small groups of Indigenous workers to develop their skills in timber harvesting, sawmilling and processing. The sawn timber is used to construct cyclone-proof buildings in the community with surplus timber used in a pilot furniture manufacturing operation.

Ultimately, he wants to see the ongoing production of high grade timber, flooring, decking and cladding. ‘My longer term goal is to help Gunyangara and all Gumatj outstations become a self-sufficient community’, he says.

Case study 4: The Skills Enhancement and Training (SET) Project in Tasmania

The SET project has been a four-year research and development program to enhance skills and training, and develop career pathways in the forest, wood, paper and timber products industry. While the project was carried out across the Tasmanian industry, it was designed to deliver benefits to the forest industry nationally.

The major benefit of this work was the provision of professional and expert support and advice to enterprises, training providers and a wide range of other stakeholders. This enhanced the level of knowledge, engagement, trust and partnership between the Tasmanian forest industry enterprises and local and national service providers including RTOs, Australian Apprenticeship Centres, Group Training Organisations and Job Services Australia. This increased positive skill, training, career and employment outcomes for the forest industry.

The project created a learning platform and provided access to a range of skill development activities leading to more qualifications for workers across the forest industry. The best practice models and lessons learnt regarding a sustainable industry-based skill ecosystem will be of ongoing benefit to industry.

Appendix III

Training package stocktake

TRAINING PACKAGE	FOREST AND FOREST PRODUCTS – FPI05			
Brief summary of change	Industry imperatives/rationale for change	Date submitted to NQC secretariat	Date endorsed by NQC or ISC	Date made public through NTIS
VERSION 3		*28/02/2011*		
Addition of Advanced Diploma of Forest Industry Sustainability	Emerging needs for managers in the industry to develop and implement systems and processes related to sustainability priorities of the industry and to provide skill pathways to higher education			
Addition of 24 new units of competency	Units developed to cover existing skill gaps and emerging needs to address sustainability priorities for the industry			
Significant revision of 4 existing units of competency to become new units	Extensive revision addressed skills for sustainability and changed outcome of unit			
Revision of 134 units of competency	Revision of units to ensure skills for sustainability are explicitly referenced in line with industry priorities			
VERSION 2.1			*12/12/2010*	*12/12/2010*
Revision of 115 revised units of competency	Revision of units to ensure skills for sustainability are explicitly referenced in line with industry priorities			
Revision of 10 Machine Operator units of competency	Machine operator units to update standard practices regarding attachments			
Revision of FPI30910 Certificate III in Timber Truss and Frame Design and Manufacture packaging rule	Minor text edit to provide clarification			
VERSION 2		*24/9/2010*	*19/10/2010*	*19/10/2010*
Outcomes of this project include 6 new qualifications and 9 new units of competency that provide pathways for career progression from production assistant through both design and production pathways in the timber truss and frame sector.	Enhanced timber truss and frame sector to reflect current workflow and promote workforce development and career progression.			
Revision of 4 Chainsaw units to address industry imperatives.	Addresses technology advancements, safety issues and skills for sustainability including environmental protection and productive use of cut material and residue.			
Revision of seven diploma units to add underpinning knowledge regarding hydrology, botany and ecology.	Addresses new technology and facilitates pathway for Forester training by reflecting modern forestry techniques and technologies knowledge.			
VERSION 1.2				
Addition of 10 Skill Sets for Machine Operators to cover the operation of: crawler/dozer, skidder, loader, forwarder, feller buncher, boom delimber, excavator, mechanical processor, single grip harvester, heavy production mobile chipper. Revision and renumbering of operator units of competency aligned to Machine Operator Skill Sets.	To align to licensing requirements in some States and Territories To achieve consistency across units.	*ISC Upgrade*	29/04/10	29/04/10
Addition of Log Truck Driver descriptor to FPI30205 Certificate III in Harvesting and Haulage	In response to industry demand for a job-specific qualification descriptor for Log Truck Drivers	*ISC Upgrade*	29/04/10	29/04/10
Addition of 3 Imported units to elective bank for FPI30205 Certificate III in Harvesting and Haulage (Log Truck Driver) TLID107C Shift materials safely using manual handling methods TLIE207C Estimate/calculate mass, area and quantify dimensions TLIH107D Interpret road maps and navigate pre-determined routes	To facilitate the insertion of a Log Truck Driver descriptor for FPI30205	*ISC Upgrade*	29/04/10	29/04/10
Addition of 1 imported unit to Group C Elective units in FPI20205 Certificate II in Harvesting and Haulage and FPI30205 Certificate III in	To provide a more appropriate unit without an industry pre-requisite	*ISC Upgrade*	29/04/10	29/04/10

TRAINING PACKAGE	FOREST AND FOREST PRODUCTS – FPI05			
Brief summary of change	Industry imperatives/rationale for change	Date submitted to NQC secretariat	Date endorsed by NQC or ISC	Date made public through NTIS
Harvesting and Haulage TLID3307C Operate a vehicle-mounted loading crane to				
Revision of imported units in each of 18 qualifications	Changes in line to parent training packages	*ISC Upgrade*	29/04/10	29/04/10
VERSION 1.1				
Revision of imported units	Changes in line to parent training packages	*ISC Upgrade*	*12/10/09*	*12/10/09*
Addition of 1 imported unit in all Certificate II qualifications – TLILIC108A Licence to operate a forklift	To enable national licensing requirements to be met	*ISC Upgrade*	*12/10/09*	*12/10/09*
Addition of 3 imported units at Certificate IV level to enable the delivery of TAA Skills Sets.	To maintain competence of trainers in the workplace.	*ISC Upgrade*	*12/10/09*	*12/10/09*
Addition of imported units from health package equivalent to Level 2 & 3 workplace first aid certificates.	To provide a training framework for enterprises to train and support First Aid Officers within the workplace.			
Addition of 1 unit in Certificate III in Harvesting and Haulage – HLTFA302A Provide first aid in remote situation	Industry determined need	*ISC Upgrade*	*12/10/09*	*12/10/09*
Revision of to Certificate I in Forest and Forest Products packaging rules to allow selection of units from AQF levels I or II from other nationally endorsed training packages	Offer increased flexibility for the qualification	*ISC Upgrade*	*12/10/09*	*12/10/09*
Employability Skills Qualification Summaries added to all qualifications	In line with training package and NQC requirements	*ISC Upgrade*	*12/10/09*	*12/10/09*
Revision and renumbering of 4 units – FPICOT2204A to FPICOT2204B FPICOT2206A to FPICOT2206B FPICOT2221A to FPICOT2221B FPIHAR2201A to FPIHAR2201B	Required Skills and Knowledge and Range Statements tightened, more detailed Evidence Guide	*ISC Upgrade*	*12/10/09*	*12/10/09*
TRAINING PACKAGE	PULP AND PAPER MANUFACTURING INDUSTRY – FPP10			
FPP10 Version 1		*23/12/2010*	*14/01/2011*	*TBA*
7 new qualifications	Enterprises have a framework which increases application and flexibility within qualifications that more accurately reflect the actual skills required by the workforce, both now and into the future. It articulates current technology and accommodates the evolving and emerging needs of a diverse and changing industry. In line with Government initiatives sustainability skills have been embedded within the competency units			
80 new units of competency				
VERSION 1.1				
Update of imported units	Changes to parent training packages	*ISC Upgrade*	*15/02/10*	*15/02/10*
Update to Qualifications	To address anomalies between unit titles in qualifications and the unit title listing	*ISC Upgrade*	*15/02/10*	*15/02/10*
Employability Skills Qualification Summaries added to all qualifications	In line with training package and NQC requirements	*ISC Upgrade*	*15/02/10*	*15/02/10*

Appendix IV

Scope of each industry sector

The forest, wood, paper and timber products industry is divided into seven sectors, specifically those in the resources sectors (Forest Growing and Management, Harvesting and Haulage), those in the processing sectors (Sawmilling and Processing), in the manufacturing sectors (Wood Panel and Board Production, Timber Product Manufacturing, Pulp and Paper Manufacturing) and in the market and services sector (Timber Merchandising).

Forest Growing and Management
Hardwood plantation companies
Softwood plantation companies
Forest departments
Forest conservation and recreation
Farm forestry enterprises
Plantation establishment and management companies
Nurseries
Related enterprises, suppliers, support and services associated with this sector include: forest services; mulch, compost, animal bedding producers; farm forestry support enterprises, forestry and farm planning services; forestry equipment and machinery suppliers

Harvesting and Haulage
Hardwood falling contractors
Softwood falling contractors
Any company identified that participates in the felling and haulage of trees.
Haulage contractors
Bush-based maintenance services
In field wood chipping
Full time logging road building/maintenance contractors
Related enterprises, suppliers, support and services associated particularly with this sector include: harvesting machinery suppliers; forestry road construction contractors

Sawmilling and Processing
Hardwood saw mills
Softwood saw mills
Wood chip mills
Timber treatment plants
Maintenance contractors
Related enterprises, suppliers, support and services associated particularly with this sector include: timber preservation equipment and research; timber processing equipment suppliers including chipping, debarking, sawing, sorting, drying, transporting equipment; transport services; packing, strapping and stapling equipment suppliers

Timber Products Manufacturing
Truss and frame operations (roof, floor and wall)
Timber machining operations
Door, door frames, window, window frames and decorative timber products manufacturers
Furniture manufacturers
Poles/Pylons producers
Sleeper producers
Wood recyclers (manufacturers of high value products from reclaimed wood),
Related enterprises, suppliers, support and services associated particularly with this sector include: machinery and related manufacturing products equipment suppliers; handles and dowels suppliers; hardware and building materials suppliers; truss and wall frame equipment suppliers; woodworking machinery suppliers

Wood Panel and Board Production
Laminated and joined timber flooring manufacturers
MDF enterprises
Particle board enterprises
Rotary peeling
Other board enterprises
Panel and veneer manufacturing enterprises
Companies producing laminated products
Related enterprises, suppliers, support and services associated particularly with this sector include: adhesives and chemicals

Pulp and Paper Manufacturing
Pulping and paper manufacturing enterprises (including recycling)
Fine paper manufacturing enterprises
Tissue manufacturing enterprises
Newsprint manufacturing enterprises
Card and corrugated board manufacturing enterprises

Timber Merchandising
Timber trade and retail outlets
Timber wholesalers
Import and export companies that deal with timber and timber related products
Timber recycling depots
Related enterprises, suppliers, support and services associated particularly with this sector include: marketing services

Related employment common across all industry sectors
Transport services
Equipment maintenance services
Companies that deal with industry standards
Green electricity
Companies that deal with safety equipment
Companies that provide safety related services
Companies that deal with abrasives
Companies that deal with adhesives
Companies that deal with timber design
Consultants
Companies that deal with ducting and dust control
Forest products research / research and development
Laboratory services
Education and training
Engineering and technical support

Source: ForestWorks (2006)

Appendix V

Methodology

The development of this Industry Skills Scan has been accomplished through an ongoing process of data collection, evidence gathering, peer testing, reviewing and validating information.

The information has been gathered throughout the year via all of ForestWorks' industry engagement activities as outlined in the ForestWorks ISC annual business plan. This provides a wide range of contact points, consultation and communication with industry and training experts across Australia and all industry sectors.

Systematic research of media sources and other relevant publications, as well as a careful analysis of the accessed data, was also used in the data collection and presentation process.

The information is assembled into a comprehensive document over the December and January period and sent to a wide range of individuals for comment and validation.

This report is circulated to the Skills and Employment Council members, including state and territory-based industry advisory bodies, State Training Authorities, RTOs and other interested industry stakeholders, including the New Zealand Forestry Industry Training and Education Body.

In 2011, ForestWorks will continue to operate its standard data collection and consultation processes in order to have access to information and industry intelligence regarding the progress of existing and proposed industrial developments and the needs that arise from them. These processes include work by:

- Skills and Employment Council
- Industry Training Advisory Committees in each state and in the Northern Territory and others such as the Stimulate Training Demand Working Group, the Frame and Truss Working Group and the Industry Pathfinders (Flexible Traineeship) National Working Group
- Pulp & Paper Industry Skills Development Unit
- Engagement with industry associations and enterprises
- Industry journals and websites to develop research ideas and scans
- Collection of data, research and analysis
- Enterprise visits
- Public and industry media

Feedback

Feedback can be made at any time to:

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This report is an ongoing annual opportunity to ensure industry directions and emerging issues are conveyed to government. This advice goes to assist the implementation of strategies to support industry critical skills and training issues.

List of abbreviations

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
AFS	Australian Forestry Standard
CIP	Continuous Improvement Plan
COAG	Council of Australian Governments
DAFF	Department of Agriculture, Fisheries and Forestry
DEEWR	Department of Education, Employment and Workplace Relations
FAO	Food and Agriculture Organization of the United Nations
FSC	Forest Stewardship Council
GIS	Geographic Information System
GPS	Global Positioning System
ISC	Industry Skills Council
JSA	Job Services Australia
LCA	Life Cycle Analysis
LLN	Language, Literacy and Numeracy
NCVER	National Centre for Vocational Education Research
OHS	Occupational Health and Safety
PEFC	Programme for the Endorsement of Forest Certification Schemes
RTO	Registered Training Organisation
SEC	Skills and Employment Council
SET project	Skills Enhancement and Training project
STA	State Training Authority
UNECE	United Nations Economic Commission for Europe
VET	Vocational Education and Training

Relevant industry organisations

Appita Inc
Australian Forest Contractors Assoc. Ltd
Australian Forest Growers
Australian Plantation Products & Paper Industry Council (A3P)
Australian Workers Union
Cabinet Makers Association
CFMEU – Forestry and Furnishing Products Division
Engineered Wood Products Association of Australasia (EWPAA)
Food Fibre and Timber Industries Training Council
Forest & Wood Products Australia (FWPA)
Forest Industries Association of Tasmania
Forest Industries Federation WA (FIFWA)
Forest Industry Council (Southern NSW) Inc.
Forest Products Commission WA
Forests and Forest Industry Council of Tasmania
Frame & Truss Manufacturers Association
Furnishing Industry Association of Australia
The Institute of Foresters Australia
National Association of Forest Industries (NAFI)
Pulp and Paper Industry Skills Development Unit
Primary Industries Training Advisory Council NT
Tasmanian Forest Contractors Association
Timber Communities Australia Ltd (TCA)
Timber & Building Materials Association (Aust) Ltd
Timber Merchants Association (Vic)
Timber Queensland Ltd
Victorian Forest Contractors Association (VFCA)
Victorian Association of Forest Industries (VAFI)
Windows and Doors Industry Council (WADIC)

Appendix VI

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