AUSTRALIAN PULP AND PAPER MANUFACTURING INDUSTRY SECTOR

IRC Skills Forecast and Proposed Schedule of Work

2017-2020

Prepared on behalf of Pulp and Paper Manufacturing IRC for the Australian Industry Skill Council

skillsimpact.com.au

IRC SKILLS FORECAST AND PROPOSED SCHEDULE OF WORK 2017-2020

Purpose

This Skills Forecast and Proposed Schedule of Work represents the latest industry intelligence and resulting work plan of the Pulp and Paper Industry Reference Committee (IRC). It was developed through research of national and industry data sources and ongoing input from IRC members and key stakeholders. The report is designed to provide the Australian Industry and Skills Council (AISC) on the four-year rolling National Schedule of training product development and review work.

This industry intelligence covers the following sections:

Sector Overview – examining the depth and breadth of the industry and identifying the macro environment that currently challenge and / or provide opportunities for the industry

Employment – reviewing the employment projections by the Department of Employment and outlining the current workforce profile and supply for the industry

Skills Outlook – identifying the key priority skills for the industry and how they can benefit from improvement or development of national skill standards

Training Product Review Work Plan – establishing the scope and timeframe of proposed training package development in line with industry priority skills

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CONTENT

EXECUTIVE SUMMARY

This report provides an overview of Skills Forecast and Proposed Schedule of Work for the Australian pulp and paper manufacturing industry sector. The report was commissioned to support the Australian Industry and Skills Committee (AISC) in developing the four-year rolling National Schedule of training product development and review work. The report is structured, as per AISC template, in four main sections as follows: sector overview, employment, skills outlook, and training product review plan. Methods of analysis include research of published national and industry data sources and input from Industry Reference Committee (IRC) members and key stakeholders.

The report draws attention that a key growth area for the sector is packaging as a growing number of products are subject to global trade due to a fast-growing global consumption and online shopping; and as environmentally friendly packaging solutions are being sought. In addition, the potential development of bioprocessing facilities for production of bio-plastics, bio-composites, green chemicals and other emerging uses for pulping residues and wood fibre could drive new markets and further changes in the pulp and paper products industry.

Further, the report describes the industry workforce. Consistent with many other industry sectors, the pulp and paper manufacturing workforce is aging with retirement age bein reached in high numbers. This trend creates significant challenges for employers – particularly in respect to their ability to attract people to the industry and train them.

Importantly, the report shows that employers will increasingly seek high level skills, both specific and non-specific to the industry, to support more demanding job functions in most workplaces. The industry responds to opportunities with improved processes for a broad range of chain of custody requirements including environmental sustainability, energy, water, air, waste, recycling, suppliers, workplace health and safety; implementation of advances in micro and nanotechnology for improving production and paper quality; investments in papermaking equipment and machinery as well as facilities to meed demand for Australian made recycled paper.The workforce needs to improve the job specific skills to support these higher efficiency targets, innovations and automation / digitisation.

Higher demands are also adding new functions to job roles to support broader processes and outcomes. Operational employees are increasingly required to undertake process and staff management, quality inspection, generation of information/reporting, process improvements, and technical maintenance. Similarly, higher level skills are required of specialist managers to support strategic developments and targets. Examples include strategic leadership and change management skills, marketing executive skills, developing investment project skills, global supply chain and logistics skills and other high level skills.

Summary of key points in each section

Sector overview

- The pulp and paper manufacturing industry can be described as having six sectors: pulp, paper and paperboard manufacturing; corrugated paperboard and paperboard container manufacturing; paper bag and other paper product manufacturing; paper stationery manufacturing; personal and family care product manufacturing; and paper product merchandising.

- The industry includes 717 manufacturing businesses employing 16,000 people; and 1,206 paper product wholesalers.

- In general, the sectors are characterised by a large number of small and medium-size producers with presence in local markets and a smaller number of large businesses which often are multinational companies and operate globally.

- Total sales turnover of the pulp and paper manufacturing sectors increased by 3.5 per cent (or $340 million) to $10,128 billion between 2013-14 and 2014-15.

- The industry is represented by a small number of peak organisations at the national level, who represent industry associations, employee associations and key industry service bodies.

- Key regulations for the industry include or are related to: the *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, *Illegal Logging Prohibition Act 2012*, *Regional Forest Agreement Act 2002*, *Competition and Consumer Act 2010*, and two voluntary forest certification schemes – Australian Forest Certification Scheme (AFCS) and Forest Stewardship Council Scheme (FSC).

- There are no regulated occupations[1], which are specific to the industry sector, except that by an industry requirement, operators who are involved in high risk activities must have licences to perform these work functions.

- Key macro forces which currently challenge and provide opportunities for the industry sectors include:

  - Changes in international markets, which affect the trade of wood fibre and paper products. The key global markets include the United States which is a major importer of paper and paperboard products, Asia and Latin America regions which experience an economic growth, and global producer countries such as South America which underwent a rapid expansion of capacity to produce bleached hardwood kraft.

  - Growing imports of paper and paperboard as well as converted paper products, particularly in the following market segments: household and sanitary paper and packaging and industrial paper.

  - Online shopping is playing a major role in the evolution of the paperboard packaging.

  - Global bio-processing developments involving residues from pulping process, which demonstrate potential for new products in niche markets – bio-plastics, bio-composites and green chemicals replacing inorganic and non-renewable chemicals – achieving greater resource utilisation and improved financial results for the industry

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[1] Regulated occupations have legal (or industry) requirements or restrictions to perform the work. Regulated occupations require a license from, or registration by, a professional association or occupational licensing authority.

Employment

- Employment is anticipated to reduce for all industry sectors in the coming years.

- About 20 per cent of the industry workforce is likely to retire over the next five years.

- A significant number of the workforce occupies roles specific to this industry including paper and wood processing machine operators and printing machine operators. Nevertheless, the sector also involves a range of other jobs that are typical to the manufacturing sector in general.

Skills outlook

- Priority skills in the pulp and paper manufacturing industry over the next four years, 2017-2020, are summarised in the following table:

PRIORITY SKILL	DRIVERS	TRAINING PACKAGE SOLUTION [2]
Skills in specialist paper making and pulping processes to meet compliace requirements	Requirement fof pulp and paper manufacturing sites to maintain WorkSafe Australia Major Hazard Facilities licences to operate.	Review of 41 units at AQF level 2, 3 and for operations within both pulping and paper making environments
Higher level coordination skills in specialist skills paper making and pulping operations	Increasing business targets for efficiency, productivity and competitiveness, which require leaders to drive significant culture change in order to achieve the results for businesses to grow and compete	Development of 6 new units at AQF level 5 or 6 for operations within both pulping and paper making environments
Skills in automated processes for recovered paper recycling and de-inking pulp	Growing demand for Australian made recycled office, printing, envelopes and stationery paper; Australia's only current recovered paper recycling and de-inking facility commissioned by Australian Paper in 2015.	Review of 23 units at AQF level 2, 3 and 4 Development of a minimum 8 new units at AQF levels 2, 3 and 4 in pulp and paper making operations
Skills to operate upgraded technology in converted paper manufacturing	Growing demand for paper products globally due to a fast global population growth and fast development of the online shopping industry which fuels the demand for packaging products; Recent investments in paper product manufacturing; Higher targets for efficiency,	Review of 8 units at AQF 2, 3 and 4 Development of a minimum 6 new units at AQF levels 2, 3,4 and 5 in pulp and paper making operations

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[2] For a full list or relevant qualifications and units of competencies refer to Attachment A.

PRIORITY SKILL	DRIVERS	TRAINING PACKAGE SOLUTION [2]
	productivity and innovation in paper product manufacturing.	
Paper product chain of custody skills at all occupational levels	Growing demand for Australian made certified paper and industry adherence to FSC and AFS for chain of custody; Growing corporate social responsibility and legislative requirements to continually improve safety and sustainability.	Review of 3 units at AQF level 3, 4 and 5 Development of 4 new units at AQF levels 3, 4 and 5 in pulp and paper making operations
Biorefining and Nanotechnology skills for paper manufacturing	Growing implementation of micro and nanotechnology in existing in existing paper making processes for improving production and paper quality.	Development of a minimum of 12 new units at AQF levels 2, 3, 4 and 5 within both a paper making and pulping environment
Bioenergy and co-generation skills	The efficient use of black liquor for the generation of heat and electricity is an opportunity for Australia. Cogeneration is increasingly used in the industry to produce steam for the mill (heat boilers) to operate processes. The steam is also used to produce electricity. Cogeneration increases the efficiency of a mill by reducing the consumption of electricity from the grid. Cogeneration of heat offers opportunities to reduce other impacts such as waste disposal costs.	Review of 8 units at AQF level 2, 3, and 4 to update specific skills and aspects as determined through industry consultation. Development of a minimum of 7 new units at the AQF level 2,3, and 4 in pulping and paper making operations

A. ADMINISTRATIVE INFORMATION

Name of Applicable Industry Reference Committee (IRC)	Pulp and Paper Manufacturing Industry Reference Committee (IRC)
Name of Applicable Skills Service Organisaiton (SSO)	Skills Impact Ltd.

B. SECTOR OVERVIEW

Sector Description

The pulp and paper manufacturing industry sector integrates the value chain of forests and wood resource utilisation through six industry sub-sectors:

- Pulp, paper and paperboard manufacturing
- Corrugated paperboard and paperboard container manufacturing
- Paper bag and other paper product manufacturing
- Paper stationery manufacturing
- Personal and family care manufacturing
- Paper product merchandising

The Training Package (*PPM Pulp and Paper Manufacturing*) currently provides good coverage of full job roles in the pulp, paper and paper manufacturing sub-sector. The other sub-sectors are not fully covered by the Training Package. In 2016, the sector included 713 manufacturing businesses employing 16,000 people and 1,206 paper product wholesalers[3,4].

The sector contribution to the Australian economy through its manufacturing component includes[5]:

- Total sales turnover increased by 3.5 per cent (or $340 million) to $10,128 billion between 2013-14 and 2014-15.
- Industry value added (IVA) decreased by 3.2 per cent (or $87 million) to $2.6 billion over the same period.
- Operating profit before tax (OPBT) decreased by 20.8 per cent (or $120 million) to $456 million.
- Employment decreased by 5.9 per cent (or 1,000 people) to 16,000 people at June 2015.

Relevant Training Package Qualifications

The Training Package for the pulp and paper manufacturing sector is PPM Pulp and Paper Manufacturing. PPM comprises 7 Qualifications and 80 units of competency.

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[3] ABS, 2017, Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016. [www] http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8165.0Jun%202012%20to%20Jun%202016?OpenDocument

[4] ABS, 2016, Australian Industry, 2014-15. [www] http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8155.02014-15?OpenDocument

[5] Ibid.

PPM QUALIFICATIONS
Qualification Level: Certificate II
Certificate II in Papermaking Operations
Certificate II in Pulping Operations
Qualification Level: Certificate III
Certificate III in Papermaking Operations
Certificate III in Pulping Operations
Qualification Level: Certificate IV
Certificate IV in Papermaking Operations
Certificate IV in Pulping Operations
Qualification Level: Certificate V
Diploma of Pulp and Paper Process Management

Sector Analysis

Sub-sector description and analysis of businesses involved

SUB-SECTOR NAME	PULP, PAPER AND PAPERBOARD MANUFACTURING
SCOPE OF WORK	This sector is comprised of companies that operate mills for the production of pulp, paper and paperboard (in rolls and sheets) from purchased woodchips or from recovered paper and a variety of other inputs such as clay, lime, dyes and chemical resins. Companies manufacture paper and paperboard from their own processed pulp, from purchased pulp or recovered paper There are four main grades of paper and paperboard: ▪ Newsprint ▪ Printing & communication papers ▪ Packaging & industrial papers ▪ Household & sanitary (tissue) Bulk paper and paperboard is supplied to paperboard packaging producers, paper product producers, printing and publishing industries, and overseas production.
PRODUCERS	The sector is dominated by seven major participants, including significant foreign ownership, large scale and multinational operations[6]:

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[6] Enterprises are listed according to their relative market share or significance in the sector

	▪ Visy Industries Pty Ltd - Pulp and Paper Division (Pratt Holdings Proprietary Limited) ▪ Paper Australia Pty Ltd (Nippon Paper Group) ▪ Norske Skog Industries Australia Limited (Norske Skog Industries ASA) ▪ Asaleo Care ▪ ABC Tissue ▪ Kimberly-Clark Australia ▪ Orora
GEOGRAPHICAL LOCATION	The sector is concentrated in Victoria and New South Wales. ▪ Paper Australia operates the Maryvale Mill in Victoria, the largest pulp and paper complex in Australia. ▪ Visy's Pulp and Paper Division operates seven paper mills, with three located in Victoria, three in New South Wales and one in Queensland. The primary mill is the Tumut Kraft Mill in New South Wales. ▪ Norske Skog Industries Australia operates the Albury mill in New South Wales) and Boyer mill in Tasmania.
AUTOMATION AND DIGITISATION	The sector features a high level of technological development and computerisation, including a high degree of integration across multiple processes and technologies (production lines) and online systems for efficient control of the supply chain logistics. A high level of capital investment has been undertaken to reduce the environmental impact of the sector over the past decade through solutions involving energy efficiency, water and chemical usage efficiency, and use of alternative raw materials. The sector has also invested in biomass power generators to supply energy to their mills.

SUB-SECTOR NAME	**CORRUGATED PAPERBOARD AND PAPERBOARD CONTAINER MANUFACTURING**
SCOPE OF WORK	In this sector, enterprises manufacture corrugated paperboard and containers from recycled and kraft paper or paperboard or corrugated paperboard. The product includes plain cardboard boxes and specialised packaging for various industrial and consumer goods.
PRODUCERS	The sector is dominated by few major players, profiled by large scale and multinational operations[7]: ▪ Visy Industries Pty Ltd - Packaging Division (Pratt Holdings Proprietary) ▪ Orora Limited ▪ Shute Bay Investments Pty Ltd (former Detmold Holdings Pty Ltd) ▪ Colorpack Limited NSW, VIC ▪ Oji Fibre Solutions ▪ Hannapak NSW ▪ Abaris VIC

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[7] Enterprises are listed according to their relative market share or significance in the sector

GEOGRAPHICAL LOCATION	Visy operates major corrugating facilities in Brisbane, Sydney, Melbourne, Wodonga, Adelaide and Perth.
	Orora produces high-quality recycled packaging paper at the Botany Mill, NSW.
AUTOMATION AND DIGITISATION	Operations are based on production lines supported by computerised machines and processes, including the latest printing techniques, through computer-aided design and computer aided manufacturing software (CAD/CAM)

SUB-SECTOR NAME	PAPER BAG AND OTHER PAPER PRODUCT MANUFACTURING
SCOPE OF WORK	Producers in this sector process paper rolls and sheets into a variety of bags, sack and paper packing goods that are sold to manufacturers of cement, food and other industries such as retail stores, cafes, restaurants.
PRODUCERS	This sector is dominated by three large players and more small size enterprises that produce for niche markets. **Major players in this sector[8]** ▪ Shute Bay Investments Pty Ltd (former Detmold Group) SA, VIC ▪ Orora Limited ▪ Pope Packaging
GEOGRAPHICAL LOCATION	Producers are located in the states with larger population and economic activity - NSW, VIC, QLD, and SA - and in the proximity of capital cities.
AUTOMATION AND DIGITISATION	Technological changes through adoption of new equipment and the computerisation of processes have been implemented in the sector, particularly by the larger businesses with a focus on efficiency of production.

SUB-SECTOR NAME	PAPER STATIONERY MANUFACTURING
SCOPE OF WORK	In this sector, producers manufacture bulk paper into a range of office, educational and personal paper stationery. The products include writing paper, filing paper products, print paper, paper label, paperboard games and toys. These products are sold to both specialist and generalist paper stationery wholesalers and retailers.
PRODUCERS	This sector is dominated by three large players and more small size enterprises that produce for niche markets.

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[8] Enterprises are listed according to their relative market share or significance in the sector

	Major players in this sector[9]
	• Paper Australia Pty Ltd (Nippon Paper Group) VIC • Labelmakers Group Pty LtdVIC, WA • Avery Dennison Australia Pty Ltd - Label and Packaging Materials Division (US Avery Dennison Corporation) SA
GEOGRAPHICAL LOCATION	Businesses are located in metropolitan areas, close to other manufacturing industries and retail outlets, in VIC, NSW, SA, WA and QLD.
AUTOMATION AND DIGITISATION	Technological changes through adoption of new equipment and the computerisation of processes have been implemented in the sector, particularly by the larger businesses with a focus on efficiency of production.

SUB-SECTOR NAME	**PERSONAL AND FAMILY PRODUCT MANUFACTURING**
SCOPE OF WORK	This sector includes producers that manufacture personal and family products including tissues, nappies, napkins, paper towels, and women's sanitary goods. These products are typically sold to grocery and paper product wholesalers or directly to retailers.
PRODUCERS	The sector is dominated by three large players with multinational operations and a small number of more small size operations that produce for niche markets. **Major players in this sector**[10] • Kimberly-Clark Australia (Kimberly-Clark Corporation) SA, NSW • Asaleo Care Limited (publicly-owned) VIC • ABC Tissue Products Pty Ltd NSW, WA • Unicharm Australasia Holding Pty Ltd (Unicharm Corporation, Japan) VIC • Encore Tissue Pty Ltd VIC
GEOGRAPHICAL LOCATION	The majority of sanitary paper establishments are situated in VIC, SA, and NSW
AUTOMATION AND DIGITISATION	Manufacturers and retailers are increasingly reviewing the best ways of providing products, information and services to the customers; are adapting to new ways of collaborative logistics (computerised inventory control systems, tracking and reporting technologies) and digital communication.

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[9] Ibid.

[10] Enterprises are listed according to their relative market share or significance in the sector

SUB-SECTOR NAME	PAPER PRODUCT MERCHANDISING
SCOPE OF WORK	This sector operates via two major channels: ▪ Retail and trade merchants selling to the public, DIY market and builders ▪ Wholesalers, manufacturers, importers and exporters Retail and trade merchants stock a broad range of local and imported paper and paperboard. Wholesalers, manufacturers, importers and exporters sell, import and/or export large volumes of bulk paper and paperboard as well as paper-based packaging, stationery and sanitary products that are distributed through the merchant sector or directly to the specialist industries.
PRODUCERS	The sector is highly fragmented comprising of many small-scale paper wholesalers that service narrow geographic or product markets and several large-scale vertically integrated paper companies that hold a dominant position in state or national markets. **Major players in this sector[11]** ▪ BJ Ball ▪ Corporate Express (CE) Australia (US Staples Inc) ▪ Kimberly-Clark Australia (US Kimberly-Clark Corporation) ▪ Paper Australia (Nippon Paper Group) ▪ Avery Dennison Australia Pty Ltd (US Avery Dennison Corporation) ▪ Asaleo Care ▪ Huhtamaki (Huhtamaki Group, Finland) ▪ Spicers ▪ KW Dogget Fine Paper
GEOGRAPHICAL LOCATION	Paper product merchants and wholesalers operate throughout Australia.
AUTOMATION AND DIGITISATION	Manufacturers and retailers are increasingly reviewing the best ways of providing products, information and services to the customers and adapting to new ways of collaborative logistics (computerised inventory control systems, tracking and reporting technologies) and digital communication.

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[11] Enterprises are listed according to their relative market share or significance in the sector

Relevant stakeholders

The pulp and paper manufacturing industry sector is represented at the national level by the following organisations:

INDUSTRY ASSOCIATIONS

Australian Forest Products Association

Australasian Pulp and Paper Industry Technical Association

Packaging Council of Australia

EMPLOYEE REPRESENTATIVE ORGANISATIONS

CFMEU Forestry and Furnishing Products Division

Australian Workers' Union (AWU)

INDUSTRY R&D SERVICES BODIES

Bioresource Processing Research Institute of Australia (BioPRIA)

Forest and Wood Products Australia Ltd

INDUSTRY SERVICES BODIES

ForestWorks

IndustryEdge

Industry and occupational regulations and standards

Industry Regulations

The pulp and paper manufacturing industry in Australia operates under regulations at both the federal and state government levels, which relate to environmental standards and industry's impact on forest resource depletion, water and the level of chemical pollution.

The Federal Government regulates the industry through the *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, the centrepiece of federal environmental legislation. Most investment proposals need to meet the EPBC Act requirements. In some cases, specific legislations are required to develop and operate a particular mill (i.e. the Penola Pulp Mill project was approved by the *Penola Pulp Mill Authorisation Act 2007*) or approved with conditions under the EPBC Act (i.e. the Federal Government approval of the Gunns Bell Bay pulp mill in 2007 came with a requirement that Gunns develop an environmental impact management plan).

The state and territory governments regulate the industry through the *Environmental Protection Act 1970* and regulations which differ between states and territories and are monitored by the state EPAs.

Other national legislations that directly or indirectly affect this industry include:

- *Illegal Logging Prohibition Act 2012*
- *Regional Forest Agreement Act 2002*

Industry producers and wholesalers are required to meet general workplace regulations and workplace health and safety regulations.

Wholesalers must also comply with the *Competition and Consumer Act 2010*, which covers relationships between all parties within the supply chain including wholesalers, manufacturers, retailers and consumers, and promotes fair trading among these parties.

In addition, the industry implements two voluntary forest certification schemes, Australian Forest Certification Scheme (AFCS) and Forest Stewardship Council Scheme (FSC), which typically require forest management practices more stringent than the legislations alone. Both schemes have forest management standards and chain-of-custody standards, of which the latter applies directly to this industry.

Regulated occupations in the industry

Regulated occupations have legal (or industry) requirements or restrictions to perform the work. Regulated occupations require a license from, or registration by, a professional association or occupational licensing authority.

The industry utilises a wide range of regulated occupations including plumbers, electricians, forklift drivers, crane drivers, mobile plant operators (dozers, tractors, bobcats, etc), heavy vehicle operators (medium and heavy rigid), dogmen, riggers, scaffolders, boiler operators, power plant operators and many more. This sectors has a number of activities for which high risk licences are required and operators must have licences to perform those work functions.

Challenges and opportunities in the sector

The Australian pulp and paper manufacturing sector operates in a macro environment shaped by a range of dynamic factors related to wood fibre, markets, trade, technology and environmental challenges. Issues and industry's opportunities for growth relating to these factors are discussed below.

FIBRE SUPPLY

Based on the National Plantation Inventory and domestic consumption of paper products, the nation's wood fibre resources appear to be more than sufficient to supply the fibre needs of the domestic paper manufacturing industry and the market over the next 15 years:

- Hardwood plantation pulplog production is forecast to increase from 4.4 million cubic meters in 2009-10 to about 13.5 million cubic meters per year during 2020-24, peaking at around 13.8 million cubic meters per year during 2030-34[12].
- Softwood pulplog production is forecast to increase from 4.6 million cubic meters in 2009-10 to about 5.6 million cubic meters per year during 2015-19, remaining at this level until the end of 2054[13].

Secondary fibre including residues from veneer production and recovered paper and paperboard also contributes to the wood fibre supply available to the industry and provides opportunities for export as well. Australia is one of a small number of nations already at the forefront of paper recovery and utilisation. Recovered paper is now a valuable resource in its own right and is the sole fibre source for many paper products. This is especially the case in packaging, but is increasingly important for printing and communication papers. Australia also exports recovered paper to the rapid

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[12] ABARES, 2013, Australia's' State of the Forests Report. [www] http://www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2013
[13] Ibid.

growth of the pulp and paper industry in Asia. Growing export volumes creates a market tension between domestic use and export.

Availability of forest resources is an important factor for the industry's future growth yet there are several other factors which determine whether available logs are harvested and how they are processed (see below).

MARKET AND TRADE

Generally, the supply of paper and paper products is driven by availability of pulp, costs of production, and market drivers. The market, particularly for packaging and industrial paper and printing and writing paper, is positively or negatively influenced by changes in the manufacturing sector in general, digital technology for communication, and conceptually by Australia's overall economy (GDP). The trade of wood fibre and paper products is also affected by changes in international markets, such as in the United States which is a major importer of paper and paperboard products and Asia and Latin American regions are experiencing economic growth, or global producer countries such as South America which underwent a rapid expansion of bleached hardwood kraft capacity.

The following provides a snapshot of the industry's recent economic activity based on ABARES[14]:

- ABARES projects that paper and paperboard consumption will increase by a 4.10 per cent in the next 33 years to 2049-50 if the value added by manufacturing increases by 5 per cent[15].

- Total paper and paperboard as well as recovered paper exports remained relatively constant over 2014-15 and 2015-16. New Zealand was Australia's largest export destination in value terms, accounting for 25 per cent of Australia's total paper and paperboard export value and 58 per cent of total value of converted paper products exports.

- The value of imports of paper and paperboard as well as converted paper products has grown over the last three years. In 2015–16 the value of imports increased by a 3.6 per cent or $77 million to $2.2 billion, primarily due to a 20 per cent increase in imports of household and sanitary paper and a 16 per cent increase in imports of packaging and industrial paper. Imports of other converted paper products also increased 14 per cent in 2015–16, reaching the highest level on record. The imports of printing and writing paper declined by a 7.7 per cent and newsprint declined by 9.7 per cent in 2015–16. In value terms, China and Indonesia are the the primary exporting countries of Australian paper and paperboard and converted paper products.

DIGITAL TECHNOLOGIES AND MARKET SHIFTS

Digital technologies have wide-reaching ramifications for the pulp and paper product manufacturing industry.

People are changing the ways in which they communicate, read media and books, and pay bills, with profound effects on the industry. The market shift from paper to digital consumption had led to significant falls in the trade of paper in Australia and other regions, particularly in North America and Europe, over the last five years. However, digital and electronic commerce is also playing a major role in the evolution of the packaging segments (paperboard inluding containerboard and boxboard),

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[14] ABARES, 2016, Australian forest and wood products statistics: March and June quarters 2016. [www] http://www.agriculture.gov.au/abares/forestsaustralia/australian-forest-and-wood-products-statistics

[15] ABARES, 2013, Preliminary long-term forecasts of wood product demand in Australia. [www] http://www.agriculture.gov.au/abares/forestsaustralia/publications

which benefit from increased online shopping. Currently, paper and paperboard accounts for roughly one third of global packaging materials, on a value basis.[16] Demand for packaging materials is driven by a growing global consumption including the following:

- Increasing industrial production in developing regions, underpinned by growing populations and improving living standards
- Increasing international trade of consumer goods
- Increased trading of food items, particularly fruits and vegetables
- Increased online shopping and 'item-specific' shipment of goods that increases the use of containerboard materials
- Increasing demand for retail ready packaging, that is flexible and includes a variety of corrugated containers and cartonboard products.

FUTURE MARKETS

Bioenergy, carbon offsets, and emerging uses for wood fibre such as bio-products are markets of the future. With their development, the relative competitiveness of different forest types and land uses could change, driving further changes in the pulp and paper products industry.

The focus has been on a group of bio-products that are primarily energy related. Kraft pulp mills involving large chemical plants are already burning by-product – the lignin and black liquor – to create energy for use in the mill. However, global developments sugest that significant and more valuable outputs than the creation of energy are yet to be realised from bio-processing facilities. Examples of current bio-processing developments involving residues from pulping process include products such as bio-plastics, bio-composites and green chemicals replacing inorganic and non-renewable chemicals.

Under certain policy conditions with a growing demand for bioenergy and products made of dissolving pulp and nanocellulosic fibres, the industry has the opportunity to develop into a producer for new, niche markets to achieve greater resource utilisation and improved financial results.

ENVIRONMENTAL

An obvious strategic threat to the pulp and paper industry is the continuing opposition – supposedly on environmental grounds – to the expansion prospects of the domestic manufacture, particularly of the pulp mills.[17]

FREE TRADE

Australia has signed free trade agreements with the USA, ASEAN, Korea, China and Japan. There is significant threat in these agreements for paper and paperboard manufacturers, (as opposed to importers), as they allow duty-free entry into Australia and eliminate costs by at least 5 per cent. [18]

While there are small concerns regarding the high-cost and relatively inefficient paper industry in the USA, the agreements with China and Korea have serious consequences for paper and paperboard manufacturers in Australia. This is especially so as the Chinese manufacturing base has expanded

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[16] IndustryEdge, 2016, Pulp & Paper Edge. Intelligence Report. Edition 135: October 2016

[17] IndustryEdge, 2016, Fifteen20. The Overview & 2020 Outlook for Australian and New Zealand paper, paperboard, paper product and fibre supplies markets.

[18] Ibid.

ahead of domestic demand and the surplus is being dumped at an alarming and often very cheap price, onto the international market.[19]

FUTURE INVESTMENT

Several development projects have been undertaken in the pulp and paper industry in recent years. As the examples below demonstrate, the investments are primarily value-adding to existing processes, or are in niches where competitive advantages are relatively certain. ABS and IndustryEdge estimates also show that Australia's annual imports of papermaking equipment and machinery have increased significantly over 2013 to 2016[20].

- A new paper-based packaging facility of Oji Fibre Solutions in Queensland, which will manufacture and supply corrugated packaging products to end use markets such as horticulture, dairy, meat, beverage, seafood, reseller and industrial sectors throughout Queensland, Northern New South Wales and Northern Territory
- A significant investment by ABC Tissue to expand its operations by building a second new tissue machine, renovate, and further integrate its manufacturing base in Australia. This development is expected to be completed in 2017, making ABC Tissue the largest tissue manufacturer in the region.
- Technology upgrades at Orora's Botany site and Asaleo Care
- The new wastepaper recycling and de-inking pulp plant of Australia Paper at Maryvale
- Re-development of Norske Skog's Boyer mill
- A new co-generation unit and automated guided vehicles in the warehouse at Kimberly Clark Australia

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[19] Ibid.

[20] IndustryEdge, 2016, Pulp & Paper Edge. Intelligence Report. Edition 135: October 2016

C. EMPLOYMENT

Employment Outlook

The Department of Employment projects[21] that the overall employment in the pulp and paper products industry will decline by 7.5 per cent over the five years from November 2015 to November 2020 (Table 3).

At the industry sector level, negative employment growth is anticipated across all sectors in the coming years. The largest drop in employment (33.9 per cent) is expected to occur in pulp, paper and paperboard manufacturing. A significant decline (7.5 per cent) is also expected in the paper and paperboard product manufacturing sectors and all other related producers.

Table 3: Department of Employment Industry Projections – five years to November 2020[22]

INDUSTRY SECTOR	EMPLOYMENT LEVEL	EMPLOYMENT PROJECTIONS		
	Nov 2015 ('000)	Nov 2020 ('000)	Growth ('000)	(%)
Pulp, Paper and Converted Paper Product (ndf.)	4.1	3.8	-0.3	-7.5
Pulp, Paper and Paperboard	2.4	1.6	-0.8	-33.9
Converted Paper Product	8.2	8.2	0.0	0.0
Corrugated Paperboard and Paperboard Container				
Paper Bag				
Paper Stationery				
Sanitary Paper Product				
Total	**14.7**	**13.6**	**-1.1**	**-7.5**

Description of Workforce Supply

The pulp and paper manufacturing industry sector is a significant employer of people in regional and remote areas. While regional, the sector workforce is getting older which is confronting the industry with challenges of an oncoming wave of retirement. Over 30 per cent of the sector workforce was aged 50 years and over in 2011 (see Figure 1). About 8 per cent of this group is expected to have retired or will retire from the workforce over the next five years together with an additional 20 per cent. The coming workforce retirement is likely to bring with it significant job vacancies across the sector and significant efforts from employers to replenish these skills.

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[21] Department's projections are based on the forecasts and projections set out in the Mid-Year Economic and Fiscal Outlook (MYEFO)

[22] Department of Employment, 2016, Industry Employment Projections – Five Years to November 2020. [www] http://lmip.gov.au/default.aspx?LMIP/EmploymentProjections
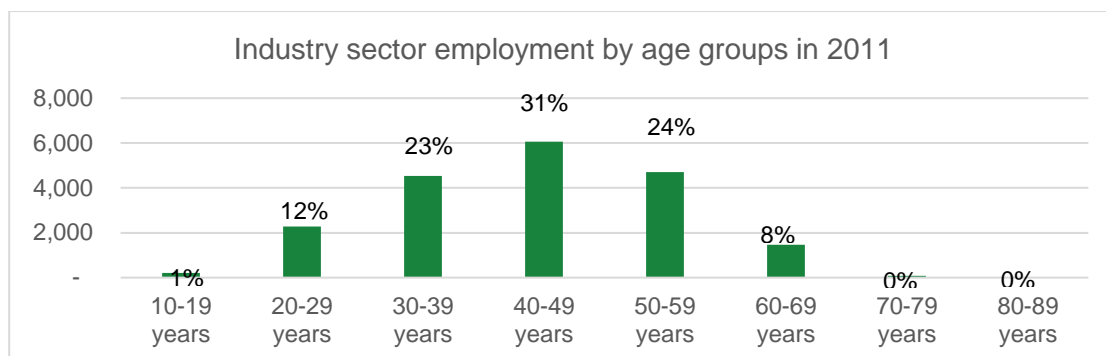
Figure 1: Industry sector employment by age groups in 2011[23]

Specifically, about 80 per cent of current employing occupations in the pulp and paper manufacturing industry sector include professions shown in Figure 2 below. It is clear that a significant proportion of the workforce occupies industry-specific roles including paper and wood processing machine operators and printing machine operators. Nevertheless, the sector involves also a range of other jobs that are typical to manufacturing sector in general.
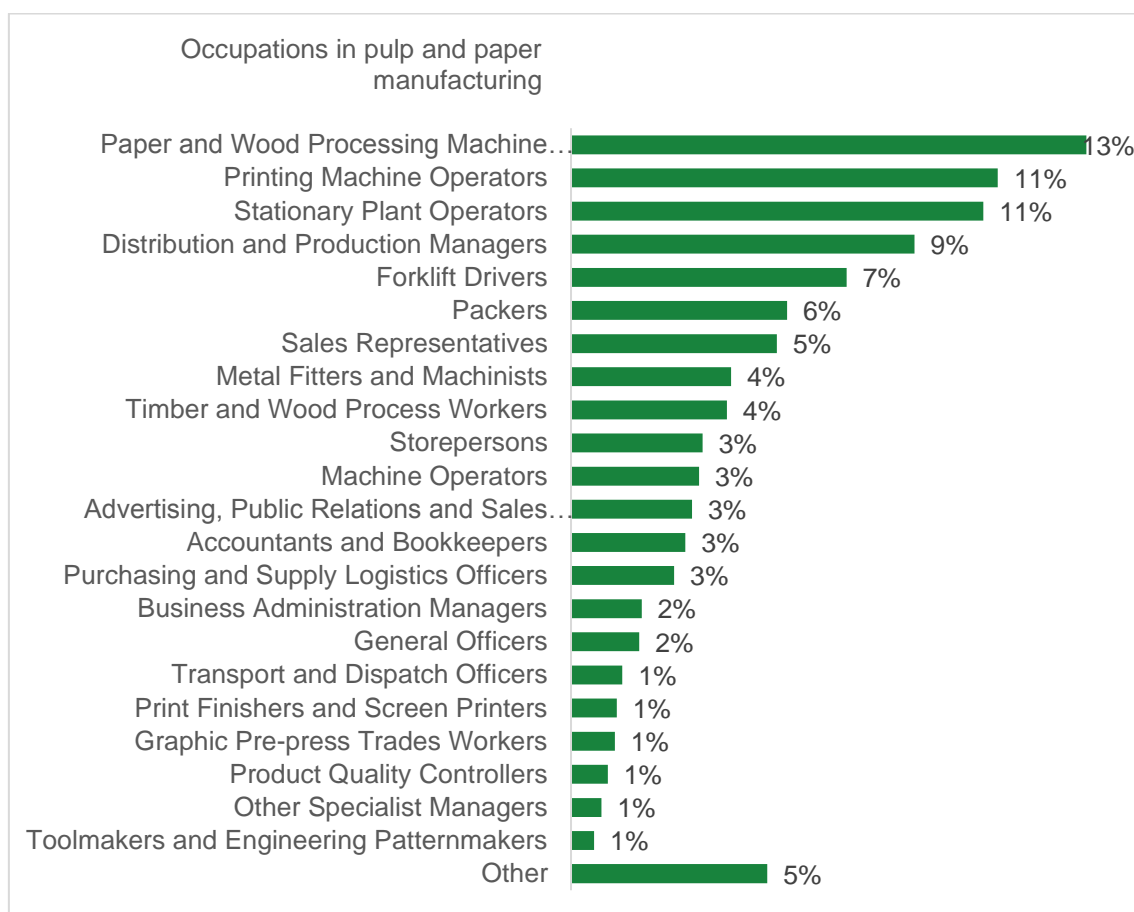
Figure 2: Occupations and their relative number in the pulp and paper manufacturing sector[24]

Most technical skills and the knowledge required in this industry sector are generally learnt after and not before employment commences. The learning occurs 'on the job' through workforce development

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[23] 2011 Census of Population and Housing

[24] Ibid.

activities provided by employers. Gaining pulp and paper products qualifications before employment is very rare amongst young people and other potential new entrants.

This means, that there is virtually and consistently no workforce supply for industry-specific professions. In these conditions, the responsibility for engaging and training young people and existing workers within the sector and in specialist training resides solely with employers.

To secure skilled employees or recruit for positions of a general manufacturing nature (i.e. including stationary plant operators, forklift drivers or fitter and machinists), employers need to compete in the labour market with other employers and industry sectors.

D. SKILLS OUTLOOK

Anticipating future skills needs in the pulp and paper manufacturing sector is crucial to prepare for and meet the new demands of forest resource sustainability, papermaking markets and sustainably-derived bioproducts in Australia. Leading indicators for the current and future skills needs in the sector include:

- Trends and / or estimates of workforce supply, skill shortages, employment growth or growing occupations

- Future changes in workplace and job design which are driven by innovation at the business and / or industry level as a result of economic, technological, social and environmental factors as well as introduction of new policies and legislations

This section identifies the priority skills needs in pulp and paper manufacturing over the next four years (2017-2020) through an analysis of new and estimated future demands placed upon the industry. The section focuses on the skill needs that can benefit from improvement or development of national skill standards as opposed to market adjustment mechanisms designed to balance the supply and demand for a skilled workforce.

Industry Priority Skills

The 2017-2020 outlook for skills needs and priorities in the pulp and paper manufacturing sector is shaped by a range of development trends and factors as outlined below.

Priority skill 1	Skill description
Skills in specialist paper making and pulping processes to meet compliace requirements	Knowledge about all workplace health and safety requirements relating to a range of specialist paper making and pulping processes
	Ability to implement workplace health and safety requirements relating to a range of specialist paper making and pulping processes
	Relevant occupations
	Pulp and Paper Machine Operators, Technicians, Production Specialists, Production Managers
	Drivers
	Many pulp and paper manufacturing sites are recognised by Worksafe Australia as Major Hazard Facilities and are required to comply with commonweath, state and territory workplace health and safety legislation, regulations and codes of practice in order to maintain their licence.
	Training package solutions
	Review of 41 units at AQF level 2, 3 and 4 in pulp and paper making operations to update specific skills and aspects as determined through industry consultation
	Development of 10 skill sets as follows:
	• Specialist Chemical recovery operator

- Specialist Coated paper processes operator

- Specialist Dry end operator

- Specialist Finishing and converting operator

- Specialist Electrical power generation operator

- Specialist Stock preparations operator

- Specialist Steam generation operator

- Specialist Waste paper operator

- Specialist Water services operator

- Specialist Wet end operator

Priority skill 2	**Skill description**
Higher level coordination skills in specialist paper making and pulping operations	Knowledge about all technical aspects of the paper making and pulping processes
	Ability to apply critical thinking processes to paper making and pulping rocesses for quality improvement
	Relevant occupations
	Pulp and Paper Machine Operators, Technicians, Production Specialists, Production Managers
	Drivers
	Increasing business targets for efficiency, productivity and competitiveness, which require leaders to drive significant culture change in order to achieve the results for businesses to grow and compete.
	Training package solutions
	Development of 6 new units at AQF level 5 and 6 for operations within both pulping and paper making environments as follows:
	• Lead and manage a team to participate in sustainability, quality and safety audits of pulping operations
	• Lead and manage a team to participate in sustainability, quality and safety audits of papermaking operations
	• Lead and manage a team to implement workplace processes in pulping operations
	• Lead and manage a team to implement workplace processes in papermaking operations
	• Identify specific hazards
	• Develop workplace policies
	The new units will be integrated as elective units in the specialisation area of Certificate IV and Diploma for Pulp and Paper Making operations.

Development of 2 skill sets as follows:

- Specialist Paper Maker

- Specialist Pulping Operator

Priority skill 3	Skill description

Skills in automated processes for recovered paper recycling and de-inking pulp

Ability to operate:

- The process of collecting and separating recovered paper from contaminants including plastic and metal

- Recovered paper pulping processes and technology

- De-inking pulp processes and technology

- Bleaching and mixing de-inked pulp with additional pulp manufactured from wood chips to strengthen it

- Paper making processes and technology from recycled pulp

Ability to manage pollutants from de-inking and bleaching processes

Ability to apply improved waste water treatment methods

Relevant occupations

Operators, Technicians, Production Specialists, Production Managers

Drivers

Growing demand for Australian made recycled office, printing, envelopes and stationery paper.

Australia's only current recovered paper recycling and de-inking facility commissioned by Australian Paper in 2015 for processing recovered office paper into recycled copy paper, envelope and printing paper

Training package solutions

Review of 23 units at AQF level 2, 3 and 4 in pulp and paper making operations to update specific skills and aspects as determined through industry consultation.

Development of at least 8 new units at AQF levels 2, 3, 4 and 5 within a paper making environment as follows:

- Understand paper recycling and de-inking processes

- Prepare and start up paper recycling and de-inking processes

- Monitor and control paper recycling and de-inking processes

- Shut down paper recycling and de-inking processes

- Troubleshoot and rectify paper recycling and de-inking processes

- Manage paper recycling and de-inking processes

- Manage pollutants from de-inking and bleaching processes

- Apply improved waste water treatment methods

The new units will be integrated as elective units in the specialists area in Certificate II, III, III, IV in Pulping Operations and Papermaking Operations and Diploma for Pulp and Paper Making Process Management .

Priority skill 4	Skill description
Skills to operate automated processes in converted paper manufacturing	Knowledge of, and ability to operate up-to-date processes and technologies in paperboard, paper bag, paper stationary including produced products such as envelopes, evercise books and speciality paper, and sanitary paper product manufacturing

Skill description

Knowledge of, and ability to operate up-to-date processes and technologies in paperboard, paper bag, paper stationary including produced products such as envelopes, evercise books and speciality paper, and sanitary paper product manufacturing

Relevant occupations

Paper Making Machine Operators, Technicians, Production Specialists, Production Managers

Drivers

Growing demand for paper products globally due to a fast global population growth, fast development of the online shopping industry which fuels the demand for packaging products, and increasing living standards in Asia, South America and Africa

Increasing targets for efficiency, productivity and innovation in paper product manufacturing

Recent investments in paper product manufacturing which are primarily for technology upgrade, value-adding to existing processes, or in niches where competitive advantages are relatively certain. Organsations need to upgrade skills of workers in line investment in new technology.

Training package solutions

- Review of 8 units at AQF level 2, 3 and 4 in pulp and papermaking operations to update specific skills and aspects as determined through industry consultation

- Development of at least 6 new units at AQF levels 2, 3 ,4 and 5 within a papermaking environment as follows:

- Understand converted paper manufacturing processes

- Prepare and start up converted paper manufacturing processes

- Monitor and control converted paper manufacturing processes

- Shut down converted paper manufacturing processes

- Troubleshoot and rectify converted paper manufacturing processes

- Manage converted paper manufacturing processes

- Manage innovative thinking and practice in the pulp and paper manufactured products industry

- Manage pulp and paper industry research

- Lead pulp and paper industry innovative thinking and practice

- Initiate and lead a pulp and paper industry innovation

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- The new units will be integrated as elective units in the specialisation area of AQF 2, 3 4 and 5 for pulping and papermaking processes.

Priority skill 4	Skill description
Paper product chain of custody skills at all occupational levels	Knowledge of and ability to interpret and implement AFS / FSC chain of custody standards

Ability to establish, implement and maintain a AFS/ FSC chain of custody system in relation to the broad range of requirements including environmental sustainability, energy, water, air, waste, recycling, suppliers, workplace health and safety

Ability to produce AFS / FSC chain of custody documentation and conduct calculations involved in standards

Ability to identify Critical Control Point (CCP)

Knowledge about the audit process flow and AFS / FSC chain of custody certification

Ability to source and evaluate suppliers

Relevant occupations

Pulp and paper Machine Operators, Technicians, Production Specialists, Production Managers

Drivers

Growing demand for Australian made certified paper and industry adherence to FSC and AFS for chain of custody which require ongoing compliance with relevant workplace health and safety legislation and regulations

Growing corporate social responsibility and legislative requirements to continually improve safety and sustainability culture and contribute to reducing work-related injuries and fatalities in the sector workplaces.

Training package solutions

Review of 3 units at AQF level 3, 4 and 5 in pulping and papermaking operations to update specific skills and aspects as determined through industry consultation

Development of 4 new units at AQF levels 3, 4 and 5 for operations within both pulping and paper making environments as follows:

- Work within in Chain of Custody processes

- Monitor Chain of Custody processes

- Audit Chain of Custody processes

- Manage Chain of Custody processes

The new units will be integrated as elective units in specialisatist areas of Certificate III, III, IV in Pulping and Papermaking Operations and Diploma of Pulp and Papermaking Process Management.

Priority skill 5	Skill description
Biorefining and nanotechnology skills for paper and nanofibre manufacturing	Knowledge of, and ability to implement to nanotechnology to produce nanofibre for a range of biomaterial applications bior

Skill description

Knowledge of, and ability to implement to nanotechnology to produce nanofibre for a range of biomaterial applications bior

Knowledge of, and ability to implement nanotechnology in a range of papermaking processes and production stages including wet end paper making, calendering, and coating of paper and packaging materials

Knowledge of and ability to apply processes and products achieved in other areas (nano-metals, micro-organisms, nano-filters, nano-ceramic and composite practices and products) to improve paper manufacturing

Relevant occupations

Operators, Technicians, Production Specialists, Production Managers

Drivers

Growing implementation of micro and nanotechnology in existing in existing paper making processes for improving production and paper quality. Examples include nanocoating allowing mills to produce higher, more consistent quality for paper; nanotechnology employed in the production of packaging materials for security, counterfeiting, safety and anti-microbial uses and in the production of antibacterial paper, tissue paper and newsprint.[25]

Training package solutions

Development of at least of 12 new units at AQF levels 2, 3 4 and 5 within both a paper making and pulping environment as follows:

- Understanding of nanotechnology processing

- Prepare and start up nanotechnology processes

- Monitor and control nanotechnology processes

- Shut down nanotechnology processes

- Troubleshoot and rectify nanotechnology processes

- Manage nanotechnology processes

The new units will be integrated as elective units in specialisatist areas in Certificate II, III, III, IV in Pulping and Papermaking Operations and Diploma for Pulp and Paper Process Management.

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[25] RISI, 2011, Three things you need to know about nanotechnology in papermaking. [www] http://technology.risiinfo.com/mills/global/three-things-you-need-know-about-nanotechnology-papermaking

Priority skill 6	**Skill description**
Bioenergy and co-generation skills	Ability to operate equipment to heat / convert biomass using automation and control systems, calculate and load biomass feedback for power generation / co-generation, ensure compliance with safety regulations, and perform routine maintenance to the mechanical and electrical equipment used in production
	Knowledge about technical aspects of a range of bioenergy conversion technologies including combustion, gasification and pyrolysis, the range of biomass resources suitable for bioenergy production, and combustion characteristics of biomass and thermodynamics
	Ability to connect bioenergy plants to heating and the electricity grid / electrical systems
	Ability to investigate and design bioenergy systems at a small or large scale
	Ability to apply environmental considerations including control, monitoring and testing of emissions (to air and water) and management of ash and other residues
	Relevant occupations
	Bioenergy / biomass plant operator, technicians, managers
	Drivers
	The efficient use of black liquor for the generation of heat and electricity is an opportunity for Australia. Cogeneration is increasingly used in the industry to produce steam for the mill (heat boilers) to operate processes. The steam is also used to produce electricity. Cogeneration increases the efficiency of a mill by reducing the consumption of electricity from the grid. Cogeneration of heat offers opportunities to reduce other impacts such as waste disposal costs.
	Training package solution
	Review of 8 units at AQF level 2, 3, and 4 to update specific skills and aspects as determined through industry consultation.
	Development of potentially 7 new units at the AQF level 2,3, and 4 in timber processing to cover the following:
	• Operate equipment to heat / convert biomass using automation and control systems
	• Calculate and load biomass feedback for power generation / co-generation
	• Apply compliance with safety and environmental regulations to bioenergy conversion technologies
	• Apply technical knowledge about a range of bioenergy conversion technologies

- Connect bioenergy plants to heating and the electricity grid

- Investigate and design bioenergy systems at a small or large scale

The new units will be integrated as elective units in the specialisation in Certificate II, III, and IV in Pulping and Papermaking Operations .

Additional Skills Development Priorities for the Industry

The following is an additional priority area for skills development in the pulp and paper manufacturing industry which do not necessarily involve improvement or development of national skill standards but other mechanisms and processes.

E. TRAINING PRODUCT REVIEW PLAN 2017-2020

The IRC Training Product Review Plan 2017-2020 for the Australian pulp and paper manufacturing industry sector is provided in Attachment A.

Time critical projects

The criteria used to outline time critical projects within the *PPM Pulp and Paper Manufacturing* include workplace safety issues, regulatory needs, and qualifications under *VET Student Loans* courses list, which can benefit from improvement or development of national skill standards.

No time critical issues were identified for the proposed projects in the training product review plan.

Interdependencies

No training pakages or IRCs interdependencies were identified for the proposed projects in the training product review plan.

F. IRC SIGNOFF

This Work Plan was agreed as the result of a properly constituted IRC decision.

Signed for and on behalf of the **(Name) IRC** by its appointed Chair

ATTACHMENT A

IRC Training Product Review Plan 2017-2020 for the Pulp and Paper Manufacturing Industry

Relevant training package: PPM Pulp and Paper Manufacturing

Contact details: Skills Impact Ltd., 559A Queensberry Street, North Melbourne VIC 3051

Date submitted to Department of Education and Training: <mark>28 April 2017</mark>

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2017	Skills in specialist paper making and pulping processes to meet compliace requirements	PPM30116- Certificate III in Pulping Operations PPM30216- Certificate III in Papermaking	**Chemical recovery operations** PPMREC210 Monitor and control chemical recovery operations PPMREC320 Prepare and start up chemical recovery operations PPMREC330 Co-ordinate and implement chemical recovery shutdowns PPMREC440 Troubleshoot and rectify chemical recovery operations **Coated paper processes** PPMCPP210 Monitor and control coated paper processes PPMCPP320 Prepare and start up coated paper processes PPMCPP330 Co-ordinate the shutdown of coated paper processes PPMCPP440 Troubleshoot and rectify coated paper processes **Dry end operations** PPMDEO210 Monitor and control dry end operations PPMDEO320 Prepare and start up dry end operations PPMDEO330 Co-ordinate and implement dry end shutdown

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			PPMDEO440 Troubleshoot and rectify dry end systems
			Finishing and converting
			PPMFCO210 Monitor, control and shut down finishing and converting operations
			PPMFCO320 Prepare and start up finishing and converting operations
			PPMFCO340 Troubleshoot and rectify finishing and converting systems
			Electrical power generation
			PPMEPG210 Monitor and control power generation system
			PPMEPG320 Manage a power generation system startup
			PPMEPG330 Co-ordinate power generation system shutdown
			PPMEPG440 Troubleshoot and rectify power generation system
			Pulping operations
			PPMPUL210 Monitor and control pulping operations
			PPMPUL320 Prepare and start up pulping system operations
			PPMPUL330 Co-ordinate and implement pulping plant shutdowns
			PPMPUL440 Troubleshoot and rectify pulping processes
			Stock preparations operations
			PPMSPR210 Monitor and control stock preparation systems
			PPMSPR320 Prepare and start up stock preparation system for production

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			PPMSPR330 Co-ordinate and implement stock preparation system shutdown
			PPMSPR440 Troubleshoot and rectify stock preparation systems
			Steam generation
			PPMSTM210 Monitor and control boiler operation
			PPMSTM320 Manage steam boiler startup
			PPMSTM330 Shut down and bank steam boiler
			PPMSTM440 Troubleshoot and rectify boiler plant systems
			Waste paper operations
			PPMWPO210 Monitor and control waste paper operations
			PPMWPO320 Prepare and start up waste paper operations
			PPMWPO330 Co-ordinate and implement waste paper shutdown
			PPMWPO440 Troubleshoot and rectify waste paper operations
			Water services
			PPMWAS210 Operate water systems
			PPMPUL330 Co-ordinate and implement pulping plant shutdowns
			PPMWAS340 Troubleshoot and rectify water systems
			Wet end operations
			PPMWEO210 Monitor and control wet end operations
			PPMWEO320 Prepare and start up wet end operations

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			PPMWEO330 Co-ordinate and implement wet end shutdown
2017	Higher level co-ordination skill in in specialist paper making and pulping operations	PPM40116- Certificate IV in Pulping Operations PPM50116- Diploma of Pulp and Paper Process Management	Lead and manage a team to participate in sustainability, quality and safety audits of pulping operations (**New**) Lead and manage a team to participate in sustainability, quality and safety audits of papermaking operations (**New**) Lead and manage a team to implement workplace processes in pulping operations (**New**) Lead and manage a team to implement workplace processes in papermaking operations (**New**) Identify specific hazards (**New**) Develop workplace policies (**New**) ***Total New*** ***6***
2017	Skills in recovered paper recycling and de-inking pulp processes and technology	PPM20216 Certificate II in Papermaking Operations PPM20216 Certificate II in Pulping Operations PPM30116 Certificate III in Papermaking Operations PPM30116 Certificate III in Pulping Operations PPM40216 Certificate IV in Papermaking Operations	PPMHWP250 Store and dispatch waste paper PPMHWP260 Receive waste paper PPMHWP270 Unload waste paper PPMPUL250 Store and distribute pulped product PPMCPR210 Prepare chemical products PPMREC210 Monitor and control chemical recovery operations PPMPUL210 Monitor and control pulping operations PPMWPO210 Monitor and control waste paper operations

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		PPM40116 Certificate IV in Pulping Operations	PPMCPR210 Prepare chemical products
			PPMPUL320 Prepare and start up pulping system operations
			PPMPUL330 Co-ordinate and implement pulping plant shutdowns
			PPMWPO320 Prepare and start up waste paper operations
			PPMWPO330 Co-ordinate and implement waste paper shutdown
			PPMPUL320 Prepare and start up pulping system operations
			PMREC320 Prepare and start up chemical recovery operations
			PPMREC330 Co-ordinate and implement chemical recovery plant shutdowns
			PPMPUL440 Troubleshoot and rectify pulping processes
			PPMWPO440 Troubleshoot and rectify waste paper operations
			PPMREC440 Troubleshoot and rectify chemical recovery operations
			Total Review *23*
			Understand paper recycling and de-inking processes (**New**)
			Prepare and start up paper recycling and de-inking processes (**New**)
			Monitor and control paper recycling and de-inking processes (**New**)
			Shut down paper recycling and de-inking processes (**New**)
			Troubleshoot and rectify paper recycling and de-inking processes (**New**)
			Manage paper recycling and de-inking processes (**New**)
			Manage pollutants from de-inking and bleaching processes (**New**)

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME	
			Apply improved waste water treatment methods (**New**)	
			Total New	*8*
2018	Skills in automated processes for recovered paper recycling and de-inking pulp	PPM20216- Certificate II in Papermaking Operations	PPMPRS210 Identify and rectify problems in the workplace	
		PPM20116- Certificate II in Pulping Operations	PPMPRV210 Operate ancillary equipment	
			PPMCSK310 Operate process control equipment	
		PPM30216- Certificate III in Papermaking Operations	PPMPRS320 Solve systemic problems in the workplace	
			PPMQAS430 Oversee quality assurance process	
		PPM30116- Certificate III in Pulping Operations	PPMNUM320 Measure and calculate routine workplace data	
			PPMPLN420 Plan a complex activity	
		PPM40216- Certificate IV in Papermaking Operations	PPMNUM430 Calculate and analyse production and financial performance	
			Total Review	*8*
		PPM40116- Certificate IV in Pulping Operations	Understand converted paper manufacturing processes (**New**)	
			Prepare and start up converted paper manufacturing processes (**New**)	
			Monitor and control converted paper manufacturing processes (**New**)	
			Shut down converted paper manufacturing processes (**New**)	
			Troubleshoot and rectify converted paper manufacturing processes (**New**)	
			Manage converted paper manufacturing processes (**New**)	
			Total New	*6*

IRC Skills Forecast and Proposed Schedule of Work 2017-2020

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2019	Paper product chain of custody skills at all occupational levels	PPM30216- Certificate III in Papermaking Operations PPM30116- Certificate III in Pulping Operations PPM40216- Certificate IV in Papermaking Operations PPM40116- Certificate IV in Pulping Operations PPM50116- Diploma of Pulp and Paper Process Management	PPMSUS510 Develop workplace policy and procedures for sustainability PPMENV210 Identify and monitor environmental discharges/emissions PPMENV320 Monitor and control environmental hazards *Total Review* **3** Work with Chain of Custody processes (**New**) Monitor Chain of Custody processes (**New**) Audit Chain of Custody processes (**New**) Manage Chain of Custody processes (New) Manage innovative thinking and practice in the pulp and paper manufactured products industry (New) Manage pulp and paper industry research (New) Lead pulp and paper industry innovative thinking and practice (New) Initiate and lead a pulp and paper industry innovation (New) *Total New* **8**
2020	Biorefining and nanotechnology skills for paper and nanofibre manufacturing	PPM20216- Certificate II in Papermaking Operations PPM20116- Certificate II in Pulping Operations	Understanding of nanotechnology processing for pulping operations (**New**) Prepare and start up nanotechnology processes for pulping operations (**New**)

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		PPM30216- Certificate III in Papermaking Operations	Monitor and control nanotechnology processes for pulping operations (**New**)
		PPM30116- Certificate III in Pulping Operations	Shut down nanotechnology processes for pulping operations (**New**)
			Troubleshoot and rectify nanotechnology processes for pulping operations (**New**)
		PPM40216- Certificate IV in Papermaking Operations	Manage nanotechnology processes for pulping operations (**New**)
		PPM40116- Certificate IV in Pulping Operations	Understanding of nanotechnology processing for paper making operations (**New**)
		PPM50116- Diploma of Pulp and Paper Process Management	Prepare and start up nanotechnology processes for paper making operations (**New**)
			Monitor and control nanotechnology processes for paper making operations (**New**)
			Shut down nanotechnology processes for paper making operations (**New**)
			Troubleshoot and rectify nanotechnology processes for paper making operations (**New**)
			Manage nanotechnology processes for paper making operations (**New**)
			Total New *12*
2020	Bioenergy and co-generation skills	PPM20216- Certificate II in Papermaking Operations	**Steam generation**
		PPM20116- Certificate II in Pulping Operations	PPMSTM210 Monitor and control boiler operation
			PPMSTM320 Manage steam boiler startup
			PPMSTM330 Shut down and bank steam boiler

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		PPM30216- Certificate III in Papermaking Operations	PPMSTM440 Troubleshoot and rectify boiler plant systems
			Electrical power generation
		PPM30116- Certificate III in Pulping Operations	PPMEPG210 Monitor and control power generation system
		PPM40216- Certificate IV in Papermaking Operations	PPMEPG320 Manage a power generation system startup
			PPMEPG330 Co-ordinate power generation system shutdown
		PPM40116- Certificate IV in Pulping Operations	PPMEPG440 Troubleshoot and rectify power generation system
			Biomanufacture/process/energy
		PPM50116- Diploma of Pulp and Paper Process Management	Monitor and control bioprocess systems (New)
			Manage bioprocess system startup (New)
			Co-ordinate bioprocess system shutdown (New)
			Troubleshoot and rectify bioprocess system system (New)
			Total New — *12*