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 and Skill Committee

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 Committee (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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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 to the fact that a key growth area for the sector is packaging. A growing number of products are subject to global trade due to fast-growing global consumption and online shopping; and environmentally friendly packaging solutions are being sought. In addition, the potential development of bioprocessing facilities for production of bioplastics, biocomposites, 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 ageing, with retirement age being 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 meet 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-sized producers with presence in local markets, and a smaller number of large businesses, which are often 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 Agreements 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] that 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 that 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 following: the United States, which is a major importer of paper and paperboard products; Asia and Latin American regions, which experienced an economic growth; and global producer regions 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 paperboard packaging
  - global bioprocessing developments involving residues from the pulping process, which demonstrate potential for new products in niche markets – bioplastics, biocomposites and green chemicals replacing inorganic and non-renewable chemicals – achieving greater resource utilisation and improved financial results for the industry.

[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 papermaking and pulping processes to meet compliance requirements	Requirement of pulp and paper manufacturing sites to maintain Safe Work Australia Major Hazard Facilities licences to operate.	Develop 10 skill sets and review 40 units in relation to both pulp and papermaking operations.
Higher level co-ordination skills in specialist skills papermaking 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.	Develop two skill sets and six new units for operations within both pulping and papermaking environments.
Skills in automated processes for recovered paper recycling and de-inking pulp	Growing demand for Australian-made recycled office, printing, envelope and stationery paper. Australia's only current recovered paper recycling and de-inking facility commissioned by Australian Paper in 2015.	Develop eight new units in relation to pulp and papermaking operations. Review of five units.
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.	Develop 10 new units in relation to pulp and papermaking operations. Review of eight units.

[2] For a full list or relevant qualifications and units of competencies, refer to the IRC Training Product Review Plan at the end of this document

PRIORITY SKILL	DRIVERS	TRAINING PACKAGE SOLUTION[2]
	Higher targets for efficiency, 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.	Develop four new units in relation to pulp and papermaking operations. Review of three units.
Bioenergy and co-generation skills	The efficient use of black liquor for the generation of heat and electricity is an opportunity for Australia. Co-generation 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. Co-generation increases the efficiency of a mill by reducing the consumption of electricity from the grid. Co-generation of heat offers opportunities to reduce other impacts such as waste disposal costs.	Develop six new units in relation to pulping and papermaking 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]

The sector contribution to the Australian economy through its manufacturing component includes the following.[4]

- 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.

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

ABS, 2016, 'Australian Industry, 2014–15', <*http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8155.02014-15?OpenDocument*>

[4] 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 from recovered paper. There are four main grades of paper and paperboard: ▪ newsprint ▪ printing and communication papers ▪ packaging and industrial papers ▪ household and 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:[5]

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

	▪ Visy Industries Pty Ltd – Pulp and Paper Division (Pratt Holdings Pty Ltd) ▪ Paper Australia Pty Ltd (Nippon Paper Group) ▪ Norske Skog Industries Australia Limited (Norske Skog Industries ASA) ▪ Asaleo Care ▪ ABC Tissue ▪ Kimberly Clark Australia ▪ Orora Limited.
GEOGRAPHICAL LOCATION	The sector is concentrated in Victoria and New South Wales. ▪ Australian Paper 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 the 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, large-scale and multinational operations:[6] ▪ Visy Industries Pty Ltd – Packaging Division (Pratt Holdings Pty Ltd) ▪ Orora Limited ▪ Shute Bay Investments Pty Ltd (former Detmold Holdings Pty Ltd) ▪ Colorpack Limited NSW, VIC ▪ Oji Fibre Solutions ▪ Hannapak NSW ▪ Abaris VIC.

[6] 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 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 and restaurants.
PRODUCERS	This sector is dominated by three large players and more small-sized enterprises that produce for niche markets. **Major players in this sector**[7] ▪ Shute Bay Investments Pty Ltd (former Detmold Group) SA, VIC ▪ Orora Limited ▪ Pope Packaging.
GEOGRAPHICAL LOCATION	Producers are located in the states with larger populations 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 labels, 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-sized enterprises that produce for niche markets.

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

	Major players in this sector[8] ▪ Australian Paper Pty Ltd (Nippon Paper Group), VIC ▪ Labelmakers Group Pty Ltd, VIC, 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-sized operations that produce for niche markets. **Major players in this sector**[9] ▪ 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. They are also adapting to new ways of collaborative logistics (computerised inventory control systems, tracking and reporting technologies) and digital communication.

[8] ABS, 2016, 'Australian Industry, 2014–15', *<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8155.02014-15?OpenDocument>*

[9] 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, the 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[10]** ▪ BJ Ball ▪ Corporate Express (CE) Australia (US Staples Inc) ▪ Kimberly Clark Australia (US Kimberly Clark Corporation) ▪ Australian Paper (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.

[10] 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

EMPLOYEES ASSOCIATIONS

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 Agreements 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 the 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.[11]
- 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.[12]

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

[11] ABARES, 2013, 'Australia's' State of the Forests Report', <*http://www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2013*>

[12] ABS, 2016, 'Australian Industry, 2014–15', <*http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8155.02014-15?OpenDocument*>

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 that 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, by 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; Asia and Latin American regions that are experiencing economic growth; or global producer regions 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.[13]

- ABARES projects that paper and paperboard consumption will increase by 4.10 per cent in the next 33 years to 2049–50 if the value added by manufacturing increases by 5 per cent.[14]
- 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 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 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, including containerboard and

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

[14] ABARES, 2013, 'Preliminary long-term forecasts of wood product demand in Australia', <*http://www.agriculture.gov.au/abares/forestsaustralia/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_lwpdad9abfe00420130503_11a.xml*>

boxboard), which benefit from increased online shopping. Currently, paper and paperboard accounts for roughly one-third of global packaging materials, on a value basis.[15] 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 bioproducts 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 bioproducts 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 bioprocessing facilities. Examples of current bioprocessing developments involving residues from the pulping process include products such as bioplastics, biocomposites and green chemicals replacing inorganic and non-renewable chemicals. Specifically, Norske Skog Paper Mills Australia and joint venture partner Circa Group have built the FC5 Biochemical Prototype Plant to research, develop and commercialise cellulose-based biochemical products for export to the pharmaceutical and agrichemical markets.

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.

The aim initially is to develop career pathways at the higher education level to support research and trials currently occuring in this sector. As this techonology is more widely adopted it is expected that emerging skills and roles in the application of this technology will be defined.

ENVIRONMENTAL

An obvious strategic threat to the pulp and paper industry is the continuing opposition – supposedly on environmental grounds – to the expansion prospects of domestic manufacture, particularly of the pulp mills.[16]

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. [17]

[15] IndustryEdge, 2016, 'Pulp and Paper Edge Intelligence Report', Edition 135: October 2016
[16] IndustryEdge, 2016, 'Fifteen20: The Overview and 2020 Outlook for Australian and New Zealand paper, paperboard, paper product and fibre supplies markets'
[17] Ibid.

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 ahead of domestic demand and the surplus is being dumped at an alarming and often very cheap price, onto the international market.[18]

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.[19] Projects include:

- 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 Australian 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.

[18] Ibid.

[19] IndustryEdge, 2016, 'Pulp and Paper Edge Intelligence Report', Edition 135: October 2016

C. EMPLOYMENT

Employment Outlook

The Department of Employment projects 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[20] (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[21]

INDUSTRY SECTOR	EMPLOYMENT LEVEL	EMPLOYMENT PROJECTIONS		
	Nov 2015	Nov 2020	Growth	
	('000)	('000)	('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**

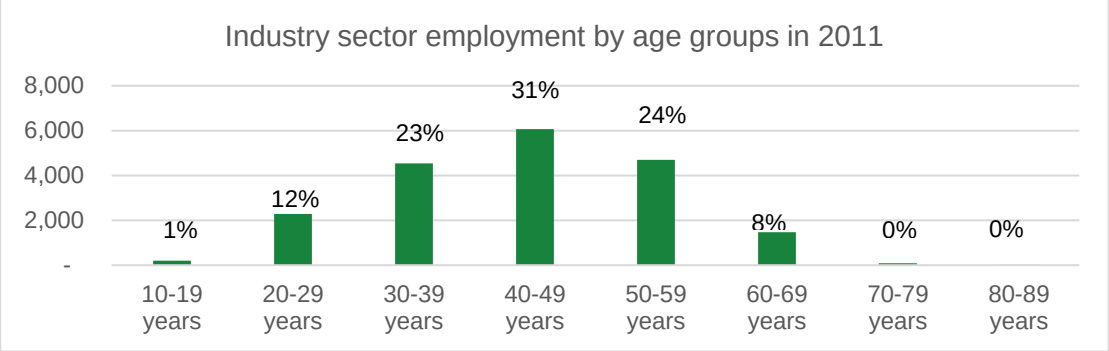
Description of Workforce Supply

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 presenting the industry with the 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 since then; 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.

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

[21] Department of Employment, 2016, 'Industry Employment Projections – Five Years to November 2020', <*http://lmip.gov.au/default.aspx?LMIP/EmploymentProjections*>

Figure 1: Industry sector employment by age groups in 2011[22]



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 also involves a range of other jobs that are typical to the manufacturing sector in general.

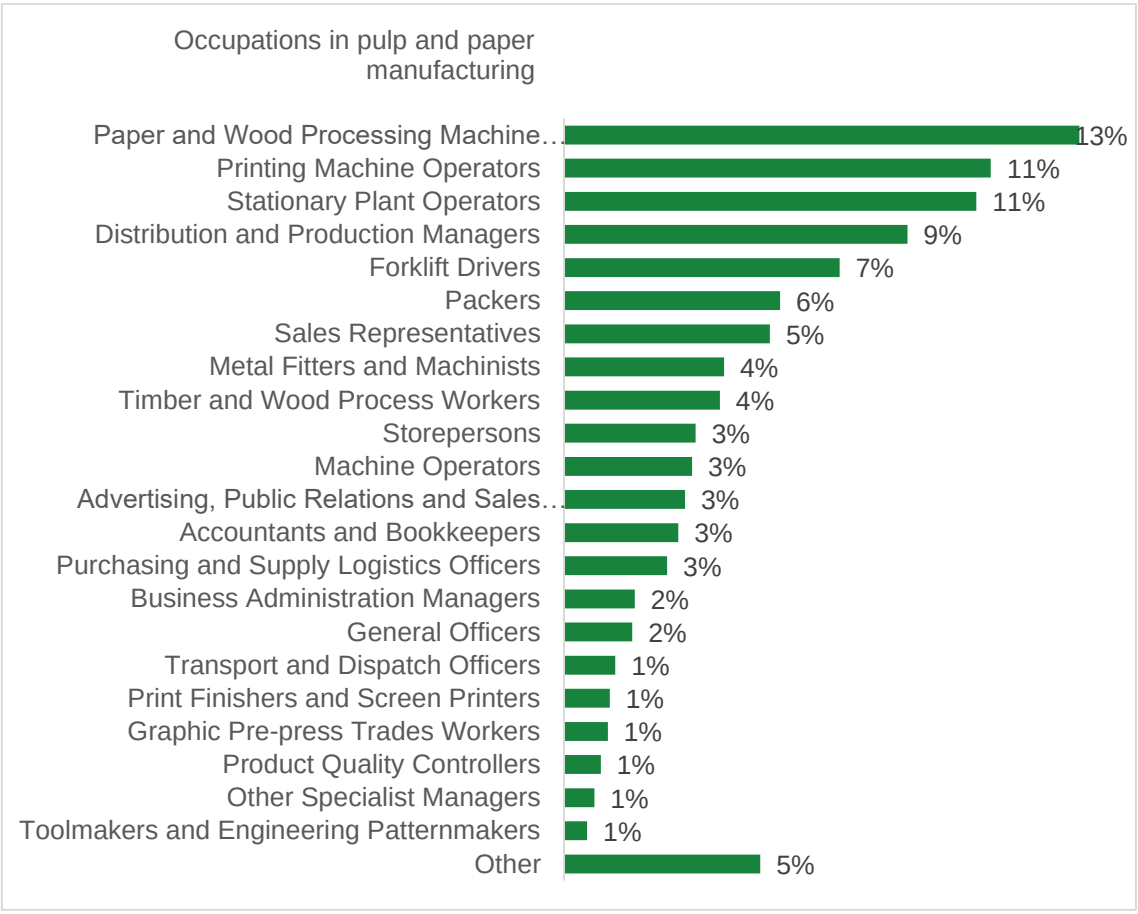


Figure 2: Occupations and their relative number in the pulp and paper manufacturing sector[23]

[22] 2011 Census of Population and Housing
[23] Ibid.

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 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 fitters 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.

The industry expects that the priority skill projects identified in this section will be undertaken over 2017 and 2018 so that the skills can be developed and available before 2020. Refer to the IRC Training Product Review Plan 2017–2020 at the end of this report for the proposed schedule of priority skill projects, and units to be checked for currency and possibly reviewed as part of the four-year cycle.

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 papermaking and pulping processes to meet compliance requirements	Knowledge about all workplace health and safety requirements relating to a range of specialist papermaking and pulping processes. Ability to implement workplace health and safety requirements relating to a range of specialist papermaking 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 Safe Work Australia as Major Hazard Facilities and are required to comply with Commonwealth, state and territory workplace health and safety legislation, regulations and codes of practice in order to maintain their licence. **Training package solutions**

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.

Review of 40 units at AQF levels 2, 3 and 4 in pulp and papermaking operations to update specific skills and aspects as determined through industry consultation.

Priority skill 2

Higher level co-ordination skills in specialist papermaking and pulping operations

Skill description

Knowledge about all technical aspects of the papermaking and pulping processes.

Ability to apply critical thinking processes to papermaking and pulping processes 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 two skill sets as follows:

- Specialist paper maker
- Specialist pulping operator.

Development of six new units at AQF levels 5 and 6 for operations within both pulping and papermaking environments as follows:

- Lead and manage a team to participate in sustainability, quality and safety audits of pulping operations

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- 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 in Pulping Operations and Diploma in Papermaking Operations.

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 • papermaking 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, envelope 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** Development of up to eight new units at AQF levels 2, 3, 4 and 5 within a papermaking 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 specialist area in Certificates II, III, and IV in Pulping Operations and Papermaking Operations, and Diplomas in Pulping Operations and Paper Process Management.

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

Priority skill 4

Skills to operate automated processes in converted paper 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, books and speciality paper, and sanitary paper product manufacturing.

Relevant occupations

Papermaking machine operators, technicians, production specialists, production managers.

Drivers

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, 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. Organisations need to upgrade skills of workers in-line with investment in new technology.

Training package solutions

Development of up to ten 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.

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.

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

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 an AFS/FSC chain of custody system in relation to the broad range of requirements including environmental sustainability, energy, water, air, waste, recycling, suppliers, and 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**

Development of up to four new units at AQF levels 3, 4 and 5 for operations within both pulping and papermaking 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 specialist areas of Certificates II, III, and IV in Pulping Operations and Papermaking Operations and Diploma of Pulp and Paper Process Management.

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

Priority skill 5	**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. Co-generation 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. Co-generation increases the efficiency of a mill by reducing the consumption of electricity from the grid. Co-generation of heat offers opportunities to reduce other impacts such as waste disposal costs.

Training package solution

Development of up to seven new units at AQF levels 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 Certificates II, III, and IV in Pulping Operations and Papermaking Operations.

Review of eight units at AQF levels 2, 3 and 4 to update specific skills and aspects as determined through industry consultation.

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 Training Package* 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 packages or IRC interdependencies were identified for the proposed projects in the training product review plan.

Current projects

There are no current projects in the *PPM Pulp and Paper Manufacturing Training Package.*

F. IRC SIGNOFF

This IRC Skills Forecast and Proposed Schedule of Work was agreed as the result of a properly constituted IRC decision.

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

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(Signature of Chair)

Adele Elice-Invaso

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(Print Name of Chair)

27/04/2017_____

(Date)

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: 28 April 2017

YEAR	PRIORITY SKILLS	QUALIFICATION CODE AND NAME	UNIT OF COMPETENCY CODE AND NAME
2017	Skills in specialist papermaking and pulping processes to meet compliance requirements	Development of ten 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	Review of the following units of competency: **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

YEAR	PRIORITY SKILLS	QUALIFICATION CODE AND NAME	UNIT OF COMPETENCY CODE AND NAME
		• Specialist waste paper operator • Specialist water services operator • Specialist wet end operator.	PPMDEO320 Prepare and start up dry end operations PPMDEO330 Co-ordinate and implement dry end shutdown PPMDEO440 Troubleshoot and rectify dry end systems **Finishing and converting** PPMFCO210 Monitor, control and shutdown 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

YEAR	PRIORITY SKILLS	QUALIFICATION CODE AND NAME	UNIT OF COMPETENCY CODE AND NAME
			PPMSPR320 Prepare and start up stock preparation system for production 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 PPMWAS340 Troubleshoot and rectify water systems **Wet end operations** PPMWEO210 Monitor and control wet end operations

YEAR	PRIORITY SKILLS	QUALIFICATION CODE AND NAME	UNIT OF COMPETENCY CODE AND NAME
			PPMWEO320 Prepare and start up wet end operations PPMWEO330 Co-ordinate and implement wet end shutdown ***Total for review 40***
2017	Higher level co-ordination skill in in specialist papermaking and pulping operations	Development of two skill sets as follows: • Specialist paper maker • Specialist pulping operator.	Development of the following new units of competency: PPMXXXXXX Lead and manage a team to participate in sustainability, quality and safety audits of pulping operations PPMXXXXXX Lead and manage a team to participate in sustainability, quality and safety audits of papermaking operations PPMXXXXXX Lead and manage a team to implement workplace processes in pulping operations PPMXXXXXX Lead and manage a team to implement workplace processes in papermaking operations PPMXXXXXX Identify specific hazards PPMXXXXXX Develop workplace policies ***Total new units 6*** There are no related units in the existing PPM. Therefore, no units will need to be reviewed. ***Total for review 0***
2017	Skills in automated processes for recovered paper recycling and de-inking pulp		Development of the following new units of competency: PPMXXXXXX Understand paper recycling and de-inking processes

YEAR	PRIORITY SKILLS	QUALIFICATION CODE AND NAME	UNIT OF COMPETENCY CODE AND NAME
			PPMXXXXXX Prepare and start up paper recycling and de-inking processes PPMXXXXXX Monitor and control paper recycling and de-inking processes PPMXXXXXX Shut down paper recycling and de-inking processes PPMXXXXXX Troubleshoot and rectify paper recycling and de-inking processes PPMXXXXXX Manage paper recycling and de-inking processes PPMXXXXXX Manage pollutants from de-inking and bleaching processes PPMXXXXXX Apply improved waste water treatment methods ***Total new units 8*** Review of the following units of competency: PPMHWP250 Store and dispatch waste paper PPMHWP260 Receive waste paper PPMHWP270 Unload waste paper PPMPUL250 Store and distribute pulped product PPMCPR210 Prepare chemical products ***Total for review 5***
2017	Skills to operate automated processes in converted paper manufacturing		Development of the following new units of competency: PPMXXXXXX Understand converted paper manufacturing processes

YEAR	PRIORITY SKILLS	QUALIFICATION CODE AND NAME	UNIT OF COMPETENCY CODE AND NAME
			PPMXXXXXX Prepare and start up converted paper manufacturing processes PPMXXXXXX Monitor and control converted paper manufacturing processes PPMXXXXXX Shut down converted paper manufacturing processes PPMXXXXXX Troubleshoot and rectify converted paper manufacturing processes PPMXXXXXX Manage converted paper manufacturing processes PPMXXXXXX Manage innovative thinking and practice in the pulp and paper manufactured products industry PPMXXXXXX Manage pulp and paper industry research PPMXXXXXX Lead pulp and paper industry innovative thinking and practice PPMXXXXXX Initiate and lead a pulp and paper industry innovation ***Total new units 10*** Review of the following units of competency: PPMPRS210 Identify and rectify problems in the workplace PPMPRV210 Operate ancillary equipment PPMCSK310 Operate process control equipment PPMPRS320 Solve systemic problems in the workplace PPMQAS430 Oversee quality assurance process

YEAR	PRIORITY SKILLS	QUALIFICATION CODE AND NAME	UNIT OF COMPETENCY CODE AND NAME
			PPMNUM320 Measure and calculate routine workplace data PPMPLN420 Plan a complex activity PPMNUM430 Calculate and analyse production and financial performance ***Total for review 8***
2017	Paper product chain of custody skills at all occupational levels		Development of the following new units of competency: PPMXXXXXX Work with Chain of Custody processes PPMXXXXXX Monitor Chain of Custody processes PPMXXXXXX Audit Chain of Custody processes PPMXXXXXX Manage Chain of Custody processes ***Total new units 4*** Review of the following units of competency: PPMSUS510 Develop workplace policy and procedures for sustainability PPMENV210 Identify and monitor environmental discharges/emissions PPMENV320 Monitor and control environmental hazards ***Total for review 3***
2018	Bioenergy and co-generation skills	PPM20216 Certificate II in Papermaking Operations PPM20116 Certificate II in Pulping Operations	Development of the following new units of competency: PPMXXXXXX Operate equipment to heat/convert biomass using automation and control systems

YEAR	PRIORITY SKILLS	QUALIFICATION CODE AND NAME	UNIT OF COMPETENCY CODE AND NAME
		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	PPMXXXXXX Calculate and load biomass feedback for power generation/co-generation PPMXXXXXX Apply compliance with safety and environmental regulations to bioenergy conversion technologies PPMXXXXXX Apply technical knowledge about a range of bioenergy conversion technologies PPMXXXXXX Connect bioenergy plants to heating and the electricity grid PPMXXXXXX Investigate and design bioenergy systems at a small or large scale ***Total new units 6*** Review of the steam generation and electrical power generation units of competency was undertaken as part of the *Skills in specialist papermaking and pulping processes to meet compliance requirements* project ***Total for review 0***

Proposed PPM units to be checked for currency and possibly reviewed as part of the four-year cycle

YEAR	SPECIALISATION	QUALIFICATION CODE AND NAME	UNIT OF COMPETENCY CODE AND NAME
2019	WHS, quality and sustainability	PPM20216 Certificate II in Papermaking Operations PPM20116 Certificate II in Pulping Operations	PPMWHS210 Participate in WHS processes PPMWHS310 Contribute to WHS processes PPMWHS320 Maintain WHS processes

Proposed PPM units to be checked for currency and possibly reviewed as part of the four-year cycle			
YEAR	SPECIALISATION	QUALIFICATION CODE AND NAME	UNIT OF COMPETENCY CODE AND NAME
		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	PPMWHS410 Identify, assess and control WHS risk in own work PPMWHS420 Manage WHS processes PPMSUS210 Apply sustainable work practices/policies PPMQAS210 Apply basic quality practices PPMQAS420 Co-ordinate in-process quality assurance

Proposed PPM units to be checked for currency and possibly reviewed as part of the four-year cycle			
YEAR	SPECIALISATION	QUALIFICATION CODE AND NAME	UNIT OF COMPETENCY CODE AND NAME
	Primary resource operations, warehousing, and dispatch	PPM20216 Certificate II in Papermaking Operations PPM20116 Certificate II in Pulping Operations 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	PPMRES210 Prepare and operate the woodchip production system PPMRES250 Distribute woodchips PPMRES260 Receive materials PPMRES270 Unload materials PPMRES340 Troubleshoot and rectify primary resource operations PPMWAR250 Store product PPMWAR255 Prepare and dispatch product PPMWAR280 Warehouse product packaging PPMNUM210 Estimate and calculate basic data PPMREL210'Contribute to effective working relationships PPMWEO440 Troubleshoot and rectify wet end systems PPMMHV210 Operate overhead crane PPMPLN210 Plan and undertake a routine task PPMPRM210 Undertake operator level preventative maintenance PPMPRM220 Perform lubrication PPMPRV320 Co-ordinate and direct clothing changes