MANUFACTURING SKILLS QUEENSLAND

M11

MANUFACTURING IN THE

RENEWABLES INDUSTRIES

Understanding the Renewables Industry in Queensland

The Renewables Manufacturing industry in Queensland represents a growing and innovative component of Australia's manufacturing sector. This industry combines advanced manufacturing technologies with sustainable practices to support the transition to clean energy production. The sector demonstrates Queensland's capability to develop and produce renewable energy components and systems for domestic and international markets.

SOLAR MANUFACTURING IN QUEENSLAND

Queensland's solar manufacturing sector integrates precision engineering with automated production systems. Manufacturers produce a comprehensive range of products including solar panels, inverters, mounting systems and energy storage solutions. Many manufacturers specialise in custom solar installations, with particular emphasis on residential and commercial applications. The commercial solar sector serves diverse market segments including large-scale solar farms, industrial installations, and agricultural applications. Queensland manufacturers have developed particular expertise in producing solar components that meet the specific requirements of Australia's harsh climate, including high temperature tolerance and cyclone resistance ratings.

WIND ENERGY MANUFACTURING IN QUEENSLAND

The wind energy manufacturing sector encompasses specialised production activities focusing on turbine components and support systems. Component manufacturing forms a substantial segment, with manufacturers producing structural elements, electrical systems, and maintenance equipment suited to Queensland's diverse geographical conditions.

Specialised manufacturing includes composite blade production, tower assembly, and control system integration. These subsectors combine advanced manufacturing techniques with rigorous quality control, particularly in areas such as structural integrity and performance optimisation.

Battery and Energy Storage Manufacturing

The battery and energy storage manufacturing sector produces critical components for renewable energy systems. This includes lithium-ion batteries, battery management systems, and integrated storage solutions. The sector demonstrates Queensland's capability to support the entire renewable energy supply chain, from component production to system integration.

Hydrogen and Emerging Technologies

Queensland's renewable manufacturing sector is expanding into hydrogen production systems and other emerging technologies. This includes electrolyser manufacturing, fuel cell components, and specialised storage solutions. The sector showcases Queensland's commitment to developing future energy technologies.

Manufacturing Support Industries

The industry is supported by a network of specialised facilities including metal fabrication workshops, electronic component manufacturers, and testing laboratories. Component suppliers and technical service providers form an integral part of the supply chain, often developing custom solutions for specific manufacturing requirements.

Skills and Workforce

The industry depends on a highly skilled workforce including electrical engineers, mechanical technicians, and automation specialists. Production supervisors and quality control specialists play crucial roles in maintaining manufacturing standards and efficiency. The sector actively collaborates with training institutions and universities to develop and maintain these essential skills.

Manufacturing Locations

Manufacturing facilities are strategically positioned throughout Queensland, with significant concentrations in Brisbane's industrial precincts and regional manufacturing hubs. The Gladstone and Townsville regions have developed specialised manufacturing capabilities, often focused on particular renewable technologies or production techniques.

Sustainable Practices

Sustainability is fundamental to the sector. Manufacturers implement energy-efficient processes, circular material use strategies, and comprehensive recycling programs. Advanced manufacturing processes are becoming standard, reflecting both environmental priorities and workplace safety requirements.

The industry provides significant employment opportunities and contributes to Queensland's transition to renewable energy while supporting related sectors such as construction, mining, and energy industries.

Pumped hydroelectric facility to generate power by leveraging gravity and water turbines.

Bagasse is a dry fibre byproduct of sugarcane can be used as biofuel. Bagasse is a residue from sugar and rum industries.

A biochemist analysing bio-fuel samples.

Project engineers overseeing the operational reliability of wind turbines.

Maintenance technicians performing routine inspections of wind turbines.

Solar farm installation technician checking operational performance of solar panels.

Images in this document have been supplied by Manufacturing Skills Queensland and industry partners. Additional images have been sourced through Adobe Stock or generated using Adobe and Google AI software. Design layout by Liveworm, Queensland College of Art and Design, Griffith University.

Career Stories
Chief Executive Officer

I serve as CEO of a company specialising in hydraulically actuated bolt tensioning equipment. Our primary operation is based in Crestmead, where we manufacture steel components with resources delivered directly to our worksite for processing.

Our core business focus is metal manufacturing and engineering, with additional involvement in transport and machinery sectors. We specialise in producing bolt tensioning equipment, which fundamentally defines our operation. The technology we develop has unique patented features and is exported internationally. Looking ahead, the transition from fossil-fuelled power stations to new technology gas/hydrogen and nuclear stations presents favourable opportunities for our technology's continued growth and profile.

From an industry perspective, we see strong diversity across ethnic backgrounds, with positive representation across gender and social backgrounds. We maintain a neutral stance on net zero emissions targets and sustainable development goals.

My personal journey is quite unique, as the business is founded upon my inventions and subsequent product developments. My role involves handling various inputs from purchasing, production, sales, and legal documentation that come to my desk in many formats. I deal with these issues as they arise. Before entering the industry, I had reasonably extensive manufacturing knowledge, and my involvement evolved naturally from working with large machinery.

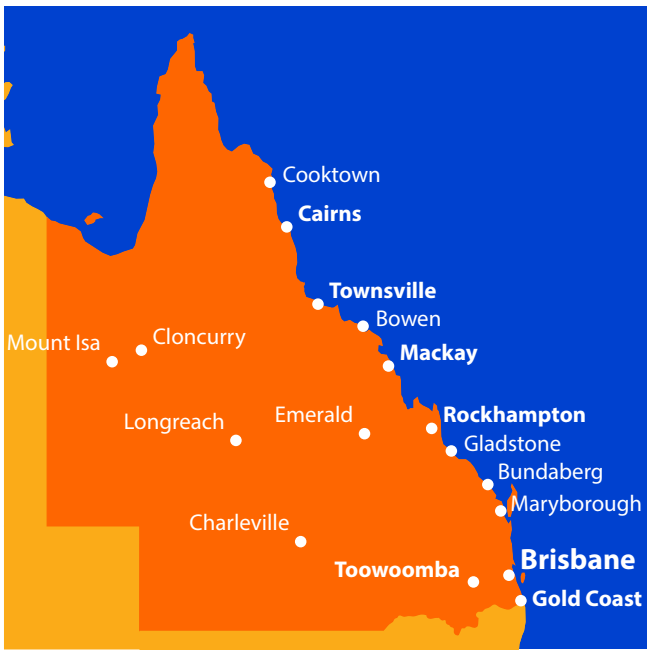
I brought a capacity for innovation to my role, and through my work, I've gained particular exposure to hydraulic power applications. The most challenging aspect of my position is resource management, including staff, while the most rewarding part is seeing my products being used in major installations. In this role, I've developed key skills in leadership, adaptability/flexibility, and creative thinking.

For students considering a similar career path, I recommend studying Business, Design, Engineering, and Mathematics at the general level. In terms of applied subjects, Business Studies, Engineering Skills, Industrial Technology Skills, and Information & Communication Technology would be beneficial.

My advice to Year 10 students considering a career in manufacturing is to take on some vocational training to aid in deciding if this is the career of choice.

"The technology we develop has unique patented features and is exported internationally."

Industry Map



FINDING INDUSTRY NEAR YOU

Want to see what Industry is around you? Here's how to do it on Google Maps!

Start by going to:

maps.google.com

Quick tip: Sign in if you want to save places for later!

Begin finding Pathways to Industry by typing what you're looking for using the knowledge you have, and include where you want to find it, for example:

"wind farm regional QLD"

For this specific industry here are some terms to try:

- Solar energy farms/facilities
- Solar technology engineering
- Wind turbine components
- Wind farms/power
- Renewable energy equipment manufacturer
- Hydro power/energy
- Hydro energy engineering

Use terms like "facility" or "plant" to find actual manufacturers

Look near existing solar farms and wind farms as manufacturers often cluster nearby

Include "engineering" and "technology" for equipment manufacturers

Some general search tips:

- Always include both "QLD" and "Queensland" in separate searches
- Add your postcode or "near me" to find stuff nearby
- Moving around the map? Click "search this area" to find new places
- Want to see how big a place is? Switch to Satellite View!
- Use Street View to get a closer look
- Found something interesting? Save it to your lists

Don't forget to check regular Google Search too! Sometimes you'll find different results there.

EXTENDING YOUR INDUSTRY KNOWLEDGE ONLINE

Here are some useful web search queries to find out more about this industry:

- solar cell efficiency advances
- wind turbine optimization
- energy storage innovations
- photovoltaic technology
- concentrated solar power
- smart grid integration
- offshore wind technology
- hydropower technology projects
- renewable hydrogen systems
- energy harvesting innovation

EXPLORING INDUSTRY PATHWAYS ONLINE

Search for manufacturing jobs in Queensland using platforms like Seek, Indeed, and LinkedIn. Filter results by location and experience level to find opportunities ranging from production line work to engineering roles. Use specific keywords like "advanced manufacturing careers" to discover industry trends and requirements.

seek.com.au

au.indeed.com

linkedin.com

Industry Pathways

In Queensland, an industry training pathway blends secondary school education with hands-on vocational training, allowing students to gain practical skills and qualifications while completing their high school certificate.

These pathways often involve partnerships between schools, TAFEs (Technical and Further Education), and industry, providing students with apprenticeships, traineeships, or work experience in their chosen field.

This combination of classroom learning, and real-world experience gives students a head start in their careers and helps them transition smoothly into the workforce or further tertiary education.

What does an industry training pathway look like?

The four education and training levels serve as a general guide and represent the most common educational and/or entry-level requirements for these roles.

LEVEL 1

Typically requires skills equivalent to the completion of Year 10, a Senior Secondary Certificate of Education, or a Certificate I or II. Australian Apprenticeships may be available at this level.

LEVEL 2

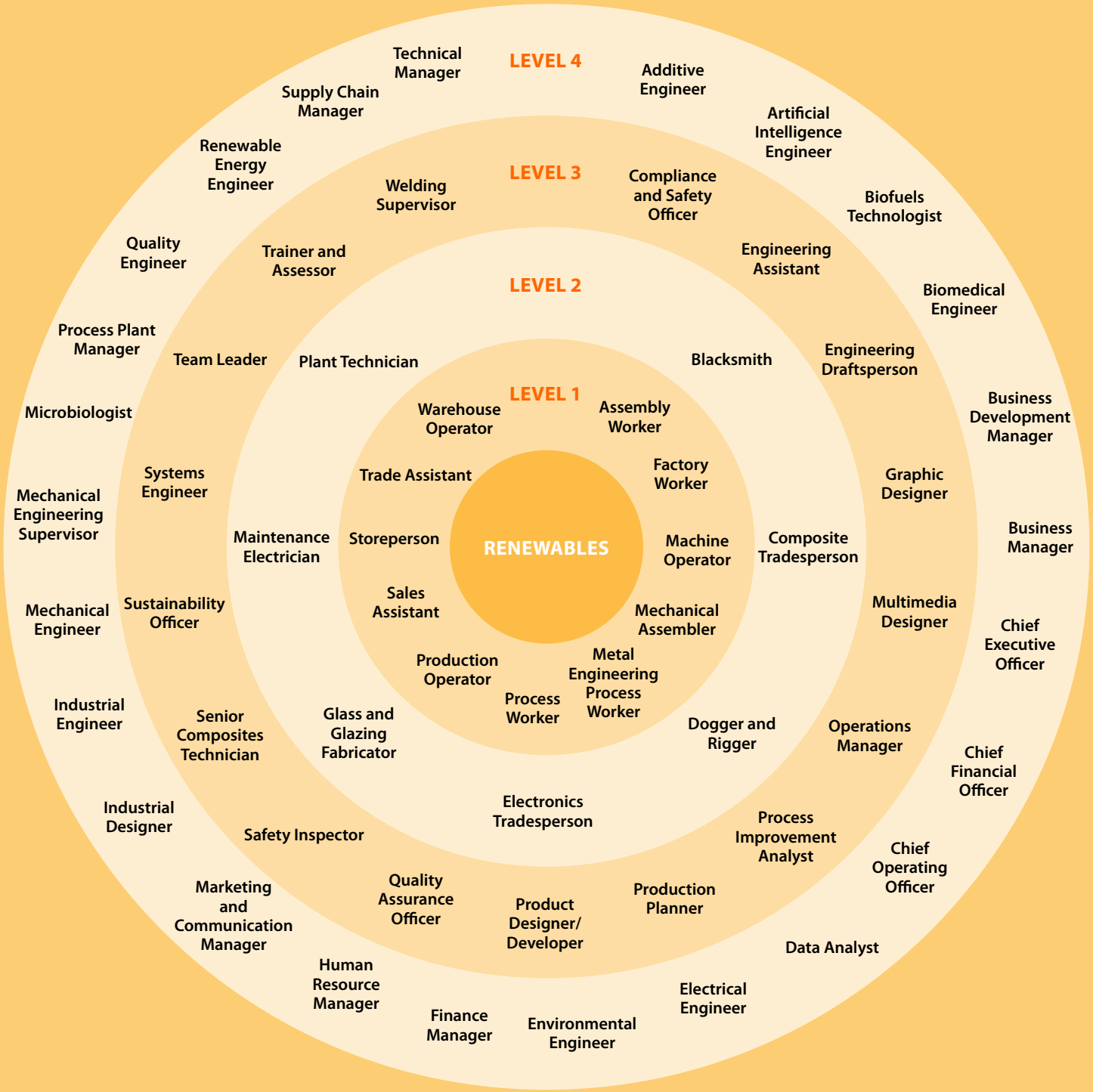
Typically requires skills equivalent to a Certificate III or IV, or at least three years of relevant experience. Australian Apprenticeships may also be available at this level.

LEVEL 3

Typically demands a level of expertise equivalent to a Diploma or Advanced Diploma, often gained through TAFEs or Registered Training Organisations. Some universities also offer programs at this level.

LEVEL 4

Typically requires qualifications equivalent to a Bachelor's Degree or higher. This level of education is usually pursued at a university.



CORE INDUSTRIES

- Aerospace and Defence
- Chemicals, Hydrocarbons and Refining
- Food and Beverage
- Furniture and Other Products
- Meat and Seafood Processing
- General Manufacturing and Engineering
- Pharmaceutical and Medical Technology
- Polymers, Plastic and Rubber
- Printing and Graphic Arts
- Pulp, Paper and Packaging
- Renewables
- Textiles, Clothing and Footwear
- Timber and Wood
- Transport Equipment and Machinery

SUPPORTING INDUSTRIES

- Laboratory Operations
- Process Plant Operations
- Sustainable Operations

For further information, visit:

manufacturingmatters.com.au/careers

Industry Pathways - Leading Teams

Leading a team is about more than just managing tasks; it's about inspiring, motivating, and guiding a group of individuals towards a shared goal. A good team leader fosters a collaborative and supportive environment where everyone feels valued and empowered to contribute their best.

ROLE OF A TEAM LEADER

- Setting a Vision: Clearly define goals and objectives, and communicate them effectively to the team.
- Providing Direction: Guide the team's efforts, ensuring everyone understands their roles and responsibilities.
- Motivating and Inspiring: Encourage and support team members, recognising their achievements and fostering a positive work environment.
- Facilitating Collaboration: Promote teamwork, open communication, and constructive conflict resolution.
- Delegating Effectively: Assign tasks based on individual strengths and skills, empowering team members to take ownership.
- Monitoring Progress: Track the team's performance, providing feedback and making adjustments as needed.
- Developing Individuals: Support the growth and development of team members through mentoring, coaching, and training opportunities.

QUALITIES AND ATTRIBUTES OF A GOOD TEAM LEADER

- Strong Communication Skills: Clearly and effectively convey information, actively listen to team members, and provide constructive feedback.
- Integrity and Trustworthiness: Act with honesty and ethical principles, building trust and respect among team members.
- Emotional Intelligence: Understand and manage their own emotions and those of others, fostering empathy and positive relationships.
- Decisiveness: Make informed and timely decisions, even in challenging situations.
- Accountability: Take responsibility for the team's performance, both successes and failures.
- Problem-Solving Skills: Identify and analyse challenges, develop creative solutions, and guide the team through obstacles.
- Adaptability: Adjust to changing circumstances, embrace new ideas, and remain flexible in their approach.

JOB TITLE

Industry roles where qualities of leadership, effective communication and specialist knowledge are valued.

- Chief Executive Officer
- Chief Operating Officer
- Chief Financial Officer
- Process Plant Manager
- Technical Manager
- Supply Chain Manager
- Human Resource Manager
- Finance Manager
- Marketing and Communication Manager
- Business Manager
- Business Development Manager
- Mechanical Engineering Supervisor
- Operations Manager
- Team Leader
- Production Planner
- Safety Inspector
- Welding Supervisor

For further information, visit:

manufacturingmatters.com.au/careers/

Industry Pathways - On the Tools

Jobs involving hands-on work with technology are increasingly common, blending technical expertise with manual dexterity and problem-solving skills. These roles often involve building, repairing, installing, or maintaining technological equipment and systems.

QUALITIES NEEDED FOR THESE ROLES:

- Manual Dexterity: Skilled and precise use of hands and tools to manipulate small components and perform intricate tasks.
- Technical Knowledge: Understanding of the technology they work with, including its principles, operation, and maintenance.
- Problem-Solving Skills: Ability to diagnose issues, identify solutions, and apply critical thinking to resolve technical challenges.
- Attention to Detail: Accuracy and precision in their work, ensuring that equipment is assembled and functioning correctly.
- Patience and Persistence: Ability to work through complex tasks methodically and remain focused, even when facing setbacks.
- Communication Skills: Clearly explain technical issues to colleagues or clients and work effectively in a team.
- Physical Stamina: May involve lifting, bending, and standing for extended periods.
- Up-to-date Knowledge: A willingness to learn and stay current with rapidly evolving technologies.
- Adaptability: Adjust to changing circumstances, embrace new ideas, and remain flexible in their approach.

JOB TITLE

Industry roles that can be considered 'on the tools' which requires different levels of training and specialist knowledge.

- Mechanical Engineer
- Electrical Engineer
- Industrial Engineer
- Renewable Energy Engineer
- Biofuels Technologist
- Quality Engineer
- Artificial Intelligence Engineer
- Additive Engineer
- Data Analyst
- Environmental Engineer
- Senior Composites Technician
- Sustainability Officer
- Process Improvement Analyst
- Quality Assurance Officer
- Product Designer/Developer
- Engineering Draftsperson
- Engineering Assistant
- Systems Engineer
- Compliance and Safety Officer
- Electronics Tradesperson
- Composite Tradesperson
- Glass and Glazing Fabricator
- Dogger and Rigger
- Maintenance Electrician (manufacturing)
- Plant Technician
- Process Worker
- Machine Operator
- Assembly Worker
- Production Operator
- Metal Engineering Process Worker
- Mechanical Assembler

For further information, visit:

manufacturingmatters.com.au/careers/

Future Industry

FUTURE TRENDS AND INNOVATION

The future of Queensland's Renewables Manufacturing industry aligns with Australia's national economic priorities, particularly in clean energy production, advanced manufacturing, and technology integration. These changes support the Queensland Energy and Jobs Plan goals of strengthening domestic manufacturing capabilities and developing renewable energy manufacturing hubs.

KEY TRENDS INCLUDE:

Advanced Manufacturing Systems: Integration of artificial intelligence and smart factory technologies in renewable component production, enabling higher precision manufacturing and quality control. This includes advanced robotics systems for solar panel assembly and wind turbine component manufacturing.

Energy Storage Technologies: Development of new battery technologies and storage solutions, aligned with the growing demand for reliable renewable energy systems. This includes advanced battery manufacturing capabilities and hydrogen storage solutions.

Automated Production Systems: Implementation of fully automated production lines and quality control systems in renewable component manufacturing, supported by industry-specific digital skills training programs.

Circular Manufacturing: Adoption of closed-loop manufacturing processes, including end-of-life recycling programs for solar panels and wind turbine components, and water recycling systems.

FUTURE ROLES IN THE INDUSTRY

Leadership Roles:

- Renewable Technology Production Manager: Oversees advanced manufacturing operations
- Smart Factory Director: Leads automated production implementation
- Sustainability and Recycling Manager: Coordinates circular economy initiatives
- Workforce Development Leader: Implements advanced manufacturing training

Technical Roles:

- Renewable Systems Specialist: Maintains advanced production equipment
- Automation Systems Technician: Programs robotic assembly systems
- Energy Storage Specialist: Develops new battery technologies
- Robotics Integration Engineer: Services automated production systems
- Industry 4.0 Implementation Specialist: Supports digital transformation

FUTURE SKILLS FOCUS

Emerging skills requirements across all levels include:

- Digital systems operation and data analysis
- Automated manufacturing systems management
- Circular economy principles and practices
- Advanced materials handling and testing
- Cross-disciplinary project coordination

These emerging roles emphasise the integration of advanced manufacturing technologies and sustainable production processes. The industry offers new career pathways through technical training programs and micro-credentials, with particular focus on developing digital manufacturing skills in renewable energy production roles.

Other Resources

For further information, visit:

MANUFACTURING MATTERS

manufacturingmatters.com.au

MANUFACTURING SKILLS QUEENSLAND

msq.org.au

QUEENSLAND STATE GOVERNMENT

Department of State Development, Infrastructure and Planning

statedevelopment.qld.gov.au/industry/critical-industry-support/industry-roadmaps

Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development

nrmmrrd.qld.gov.au/manufacturing

BUSINESS QUEENSLAND

business.qld.gov.au/industries

REGIONAL DEVELOPMENT AUSTRALIA

rdabrisbane.org.au

FUTURE MADE IN AUSTRALIA

futuremadeinaustralia.gov.au

AUSTRALIA RENEWABLE ENERGY AGENCY (ARENA)

arena.gov.au

RENEWABLE ENERGY INDUSTRY ASSOCIATIONS

business.qld.gov.au

Other Core Industries to Discover

Check out these other core manufacturing industries to understand the similarities and differences between them!

M1 Aerospace and Defence
M2 Chemicals, Hydrocarbons and Refining
M3 Food and Beverage
M4 Furniture and Other Products
M5 Meat and Seafood Processing
M6 General Manufacturing and Engineering
M7 Pharmaceutical and Medical Technology
M8 Polymers, Plastic and Rubber
M9 Printing and Graphic Arts
M10 Pulp, Paper and Packaging
M11 Renewables
M12 Textiles, Clothing and Footwear
M13 Timber and Wood
M14 Transport Equipment and Machinery