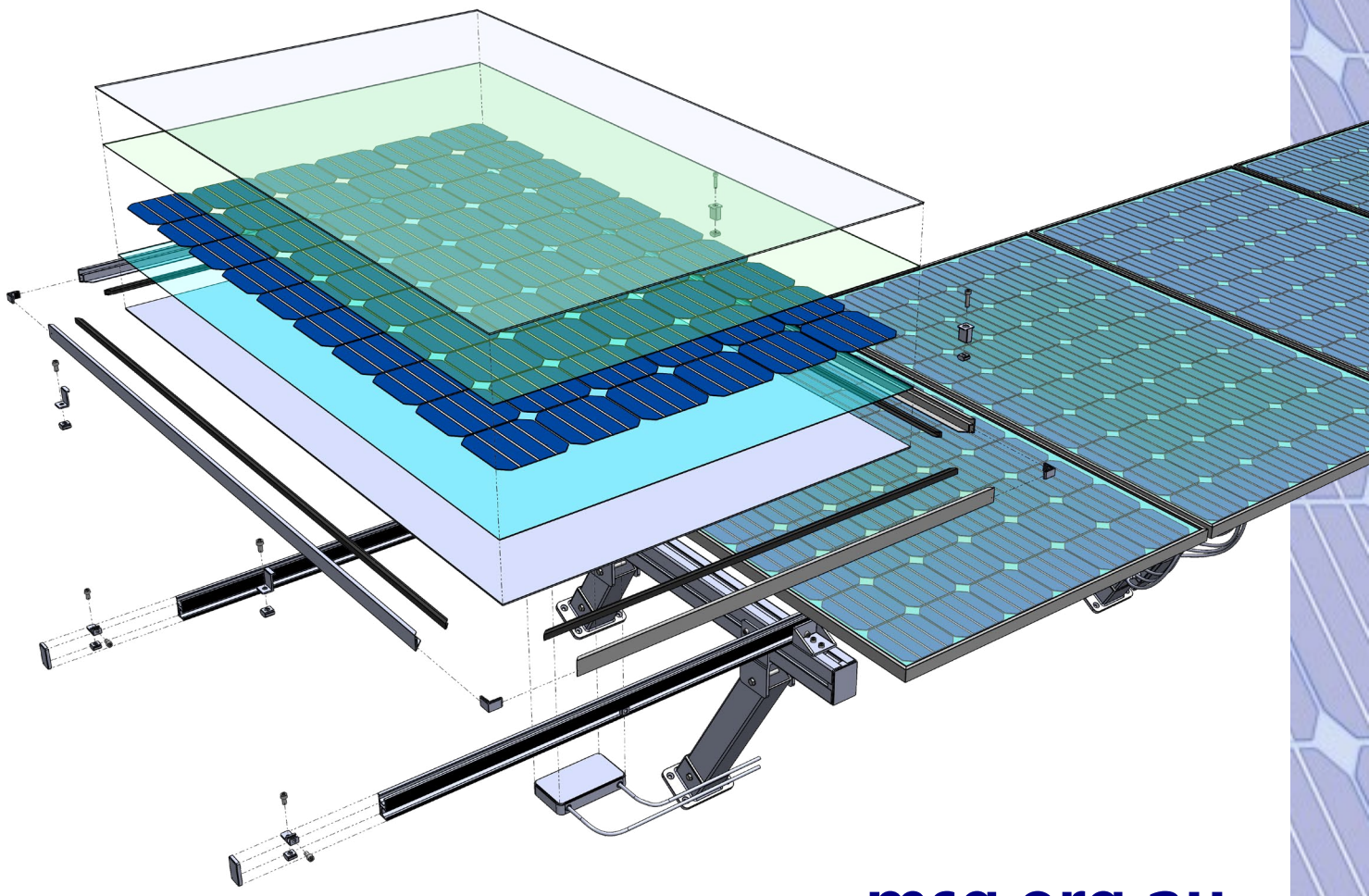
MANUFACTURING SKILLS QUEENSLAND

PRODUCTION KICK-STARTER GUIDE

SOLAR PANELS AND COMPONENT MANUFACTURING



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DISCLAIMER:

INTRODUCTION

The solar energy sector in Queensland is experiencing unprecedented growth, driven by increasing environmental awareness, government incentives, and technological advancements. Queensland is also harnessing its rich endowment of critical minerals to fuel the expansion of solar energy manufacturing.

As the state positions itself at the forefront of the renewable energy revolution, there is an opportunity for local manufacturing capabilities to support this growth whilst increasing Queensland's global supply chain and strengthening Australia's sovereign capability in the renewable energy sector.

By investing in domestic solar production, Queensland businesses can create sustainable economic value, capture greater portions of a value chain currently dominated by overseas producers, and secure long-term growth through ongoing maintenance and servicing. This strategic approach not only addresses immediate manufacturing needs but establishes Queensland as a key player in a sector poised to define Australia's industrial future.

This guide has been purposefully created to provide you—whether you're a new entrepreneur or an established manufacturer—with clear, practical information for entering or expanding in the solar energy manufacturing sector. As a Queensland business owner with ambitions in renewable energy, you'll find this resource filled with tailored insights and actionable guidance specifically designed for your journey.

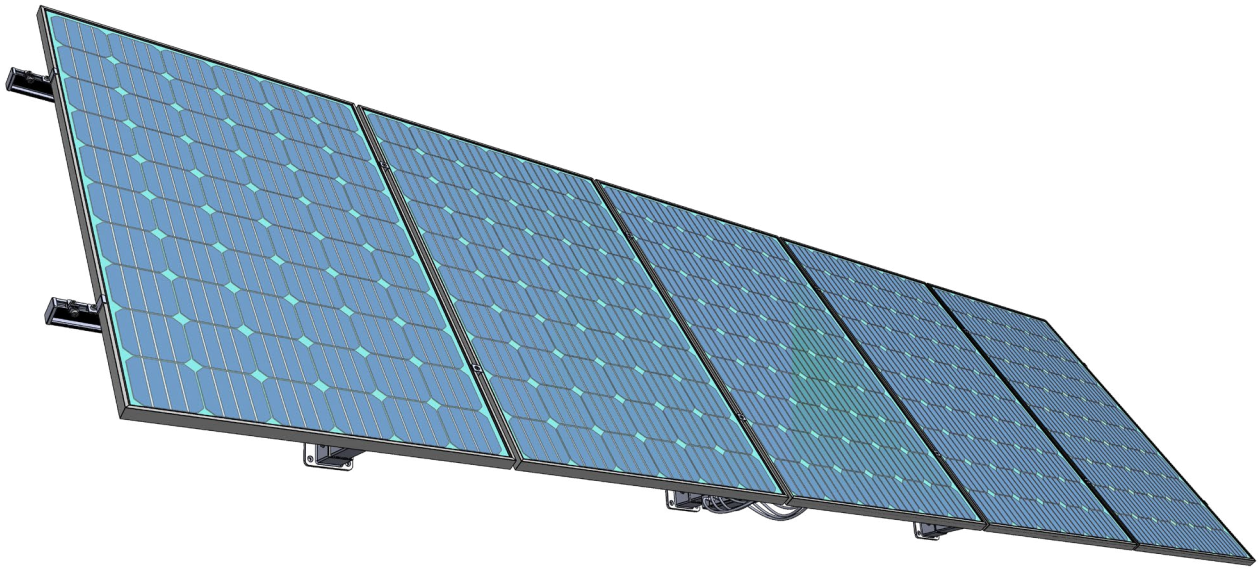
This guide has been developed independently of government directives or policy frameworks. It's designed to empower industry stakeholders, innovators, and manufacturers with practical insights and strategic tools grounded in market dynamics, technological trends, and supply chain realities. While it naturally complements broader sustainability goals, its recommendations are rooted in commercial viability and operational expertise.

Whether you're planning a full pivot into solar panel or component production or aiming to diversify your existing manufacturing capabilities to include a new value stream, this resource will help chart your course through the renewable energy landscape.

ABOUT
SOLAR PANELS

Solar panel production presents diverse manufacturing opportunities across several key components: high-purity silicon wafers (the fundamental building blocks requiring specialised refining and cutting processes), silver paste for electrical contacts, specialised glass with high transmissivity and durability specifications, Ethylene Vinyl Acetate (EVA) encapsulants, weatherproof backsheets, aluminium framing, and junction boxes with bypass diodes. Each component presents distinct manufacturing challenges and opportunities—from capital-intensive polysilicon refining to precision electronics assembly. The solar industry increasingly values material innovations that improve efficiency, reduce reliance on scarce resources, enhance durability, and simplify manufacturing—creating long-term opportunities for smarter, more sustainable production.

Manufacturers can position themselves at various points in this supply chain, from raw material processing to specific component production or complete panel assembly, with consideration for regional supply constraints, evolving efficiency standards, and increasing pressure for sustainability in manufacturing processes.



CRITICAL MINERALS

Solar panel manufacturing relies on several critical minerals that manufacturers should consider when exploring supply chain opportunities. Silicon forms the foundation of most solar cells, while copper provides essential electrical conductivity, aluminium creates lightweight frames, and silver enables efficient electron collection. For thin-film technologies, minerals like indium, gallium, tellurium, selenium, and cadmium play crucial roles in semiconductor layers.

Queensland offers promising supply chain possibilities for several of these materials, including silicon through Solquartz, copper at the Townsville Copper Refinery, aluminium through BlueScope Distribution, and local deposits of titanium dioxide, lead, and limited rare earth elements. Understanding these mineral requirements and regional availability patterns can help manufacturers identify strategic entry points in the solar supply chain, potentially focusing on components or technologies that align with Queensland's mineral strengths.

The critical minerals table (1) provides an overview of the essential raw materials required in the production of solar technologies, including photovoltaic cells, inverters, and energy storage systems. This information is beneficial for manufacturers and investors to assess availability of raw materials and their downstream supply chain. By understanding the minerals and their availability, stakeholders can make informed decisions that support innovation, sustainability, and long-term resilience to a new market.

Find out more *about critical minerals by accessing the Queensland Government's resources map.*

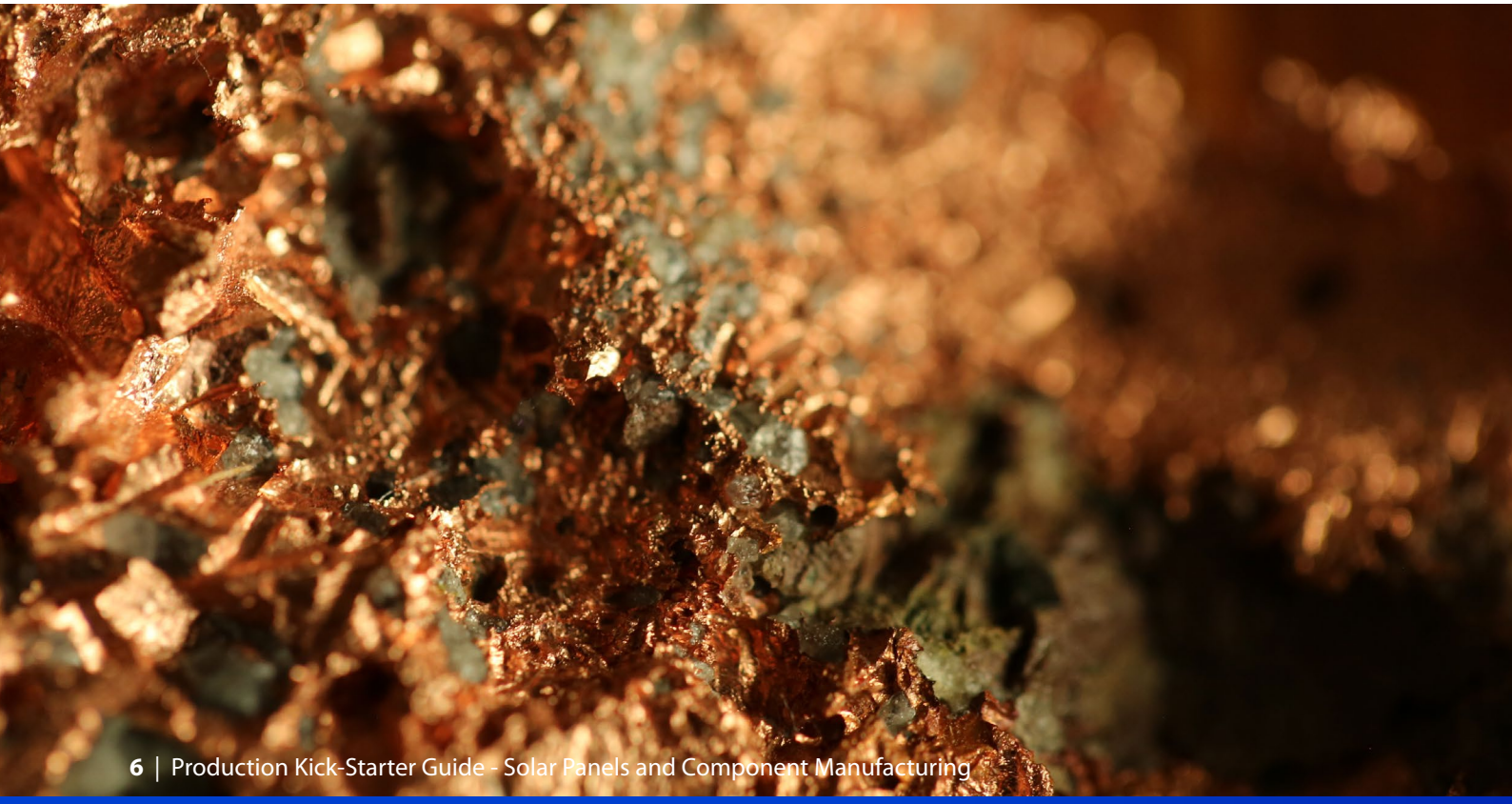


Table 1. Critical minerals

Element Symbol	Name	Description	Used In
Si	**SILICON**	Primary semiconductor material	~95% of all solar cells worldwide
Cu	**COPPER**	Highly conductive metal	Electrical wiring, connections, CIGS thin-film technology
Al	**ALUMINIUM**	Lightweight, corrosion-resistant metal	Solar panel frames, mounting systems
Ag	**SILVER**	Highest electrical conductivity of any element	Conductive paste for grid lines on solar cells
In	**INDIUM**	Soft, malleable metal	Thin-film solar cells, particularly CIGS technology
Ga	**GALLIUM**	Soft, silvery metal	CIGS thin-film cells, gallium arsenide (GaAs) high-efficiency cells
Te	**TELLURIUM**	Rare element	Cadmium telluride (CdTe) thin-film solar cells
Se	**SELENIUM**	Semiconductor element	CIGS thin-film solar cells for enhanced light absorption
Cd	**CADMIUM**	Toxic heavy metal	Cadmium telluride (CdTe) thin-film solar cells
Ti	**TITANIUM DIOXIDE**	White pigment compound	Dye-sensitised solar cells, anti-reflective coating on silicon cells
Pb	**LEAD**	Heavy, malleable metal	Solder connections, perovskite solar cells
REE	**RARE EARTH ELEMENTS**	Group of 17 elements with similar properties	Magnets for tracking systems and inverters

FIVE STEPS
TO THE SOLAR SUPPLY CHAIN

This guide presents five progressive steps for Queensland manufacturers to enter or expand in the solar panel supply chain. While each step builds upon the previous one, creating a pathway from current capabilities to successful industry participation, manufacturers can adapt the sequence to align with their specific circumstances and opportunities.

1

IDENTIFY YOUR GROWTH OPPORTUNITIES

Discover precisely where your business can flourish in the renewable energy landscape. This step reveals the specific growth potential within solar manufacturing and helps you target the most promising opportunities aligned with your unique business strengths and locality in relation to project development within the state.

2

EVALUATE YOUR BUSINESS

Transform your existing business capabilities into solar manufacturing strengths. Assess your current business maturity scale, including your current assets (systems, processes, structures), and identify what needs to change to successfully enter this lucrative market. This fundamental step ensures you're building on solid ground.

3

MASTER THE MARKET ENTRY REQUIREMENTS

Learn exactly what you need to bring your solar products to market successfully. From facilities and equipment specifications to licensing requirements, this step provides the details for establishing your production capabilities. Assisting you in the development of a detailed business plan to support the diversification and beneficial for future grant applications.

4

DEVELOP YOUR WORKFORCE STRATEGY

Build the team that will power your success. This step outlines the specific skills needed, staffing requirements, and available training resources to ensure you have the human capital necessary to excel in solar manufacturing.

5

LEVERAGE SUPPORT SYSTEMS

Access the comprehensive support network available to you. Throughout your journey, this step connects you with targeted programs, funding mechanisms, and industry resources specifically designed to accelerate your success in solar panel manufacturing.

STEP 1:

IDENTIFY YOUR GROWTH OPPORTUNITIES

Success in the renewable energy sector requires precision rather than breadth. This section guides you through identifying specific segments of the solar manufacturing supply chain where your business capabilities can create maximum value.

Renewable energy growth in Australia

Australia's renewable energy market is experiencing significant growth driven by government policies, technological advancements and consumer demand. According to the Australian Energy Market Operator (AEMO), renewable energy recently achieved a record 75.6% of total national energy generated in a half-hour period, with distributed photovoltaic (PV) systems accounting for 43%, grid-scale solar 19%, and wind 11%. Large grid-scale solar output increased 9% year-on-year, while distributed PV systems rose 18% from the previous record.

Queensland's solar revolution

Queensland leads Australia in solar adoption, creating a comprehensive ecosystem that's transforming the state's energy landscape. With over 780,000 homes and small businesses generating approximately 4,500 MW from rooftops, and more than 35 utility-scale solar farms producing over 2,900 MW, the Sunshine State has established itself as a renewable energy powerhouse.

The Queensland Government's commitment to net zero emissions by 2050 is accelerating growth through investments in renewable energy zones, battery storage initiatives and manufacturing incentives. Their comprehensive roadmap, due for completion by late 2025, aims to position Queensland as a global solar leader while maintaining competitiveness, supporting access to international capital, managing trade risks and unlocking private investment.

Conducting market analysis

A comprehensive market analysis provides essential intelligence for informed decision-making in solar manufacturing. When exploring Queensland's growing solar sector:

- Thoroughly examine the industry structure across residential, commercial and utility segments
- Analyse supply-demand dynamics to identify component shortages or import vulnerabilities
- Map the competitive landscape to discover quality or delivery gaps
- Assess where in the value chain your capabilities create maximum advantage
- Combine quantitative data with qualitative insights from customer interviews, supplier discussions, and industry reports to identify specific market opportunities that align with your manufacturing strengths.

To support your market analysis, consider reviewing:

- Reports published by the Clean Energy Council and the Queensland Renewable Energy Council
- Renewable energy forecasts by AEMO
- Market insights by Austade
- ARENA's knowledge bank
- Industry association databases that provide critical data on installation trends, policy developments, and emerging opportunities.

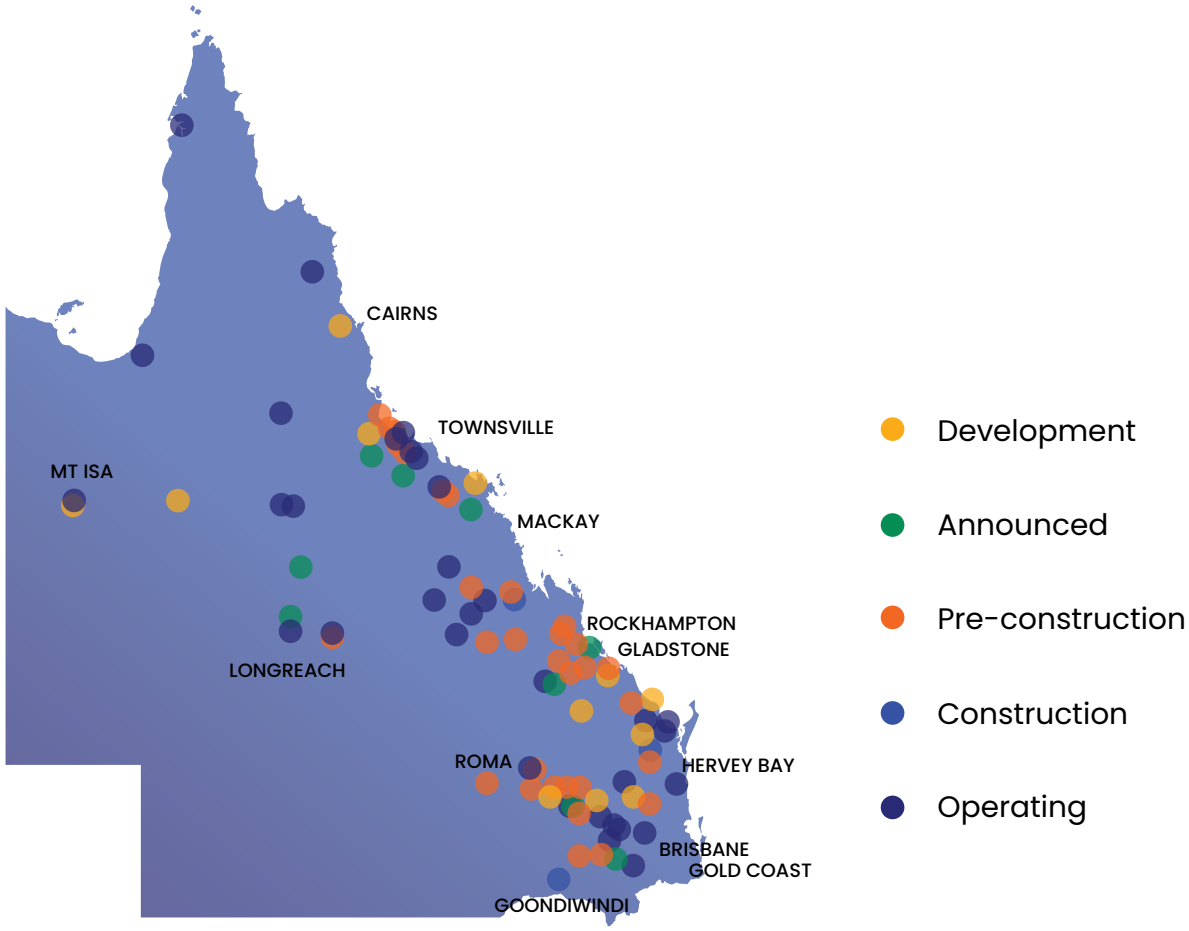


Figure 1: Queensland Solar Project Development Map

Understand the long-term opportunity

The solar industry presents opportunities extending beyond initial construction into long-term maintenance and end-of-life management. With solar components typically lasting 20-25 years, today's installations will require future service, upgrades and sustainable disposal or repurposing. This lifecycle creates a multi-decade horizon for manufacturing businesses to supply components, support operations, and develop recycling technologies.

As illustrated in Figure 1, Queensland's solar development is concentrated in several key regions. This map highlights current and planned utility-scale solar projects across the state, with larger circles indicating higher capacity installations. Note the significant clusters developing in North Queensland and along the southern corridor, representing both immediate supply opportunities and future maintenance needs.

Use this map to:

- Identify regions with high solar project density where local manufacturing could reduce logistics costs
- Recognise emerging development corridors that may drive future demand
- Consider proximity to your existing operations when targeting specific component opportunities
- Anticipate future maintenance and replacement markets based on installation timelines.

Assess market demand

Market assessment might include examining component growth patterns through Clean Energy Council data and AEMO forecasts. Manufacturers could consider which elements—such as cells, inverters, or mounting systems—are showing consistent demand increases. Comparing adoption across residential, commercial, and utility-scale sectors might reveal optimal target markets. Understanding how Queensland's renewable policies influence procurement priorities, especially for locally manufactured components, could provide valuable insights. Conversations with solar installers might also highlight components experiencing quality issues or delivery challenges.

Map the competitive landscape

Competitive analysis could involve developing an overview of local, interstate, and international manufacturers serving Queensland's market. For potential competitors, areas of interest might include production capacity, certifications, pricing, and delivery capabilities. Supply gaps where projects experience extended lead times or quality inconsistencies could represent opportunities. Industry exhibitions offer venues to observe competitor offerings, while reviewing recent large-scale installation tenders might illuminate competitive qualification standards companies should consider.

Define your competitive advantage

Manufacturers might benefit from matching their capabilities against identified market gaps. Existing expertise in areas like precision manufacturing, quality control, or specialised materials could create natural advantages for specific components. Queensland location potentially enables faster delivery, better service, or more responsive design adaptations compared to distant suppliers. Cost structure, automation level, or production scale might offer price advantages worth exploring. Developing clear value propositions that articulate benefits to Queensland solar projects could help focus market entry strategies.

Understanding the operating environment

An analysis framework like PESTLE (Political, Economic, Social, Technological, Environmental, Legal) can be helpful to understand the external factors affecting your potential entry into solar manufacturing. PESTLE provides a structured approach to evaluate market conditions, risks and opportunities. Consider using this or another business analysis framework that examines how government policies, economic trends, social attitudes, technological developments, environmental considerations, and legal requirements might impact your manufacturing venture. Different frameworks may better suit your specific decision-making process – from SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis for assessing internal and external factors, to Porter's Five Forces for competitive landscape evaluation, or scenario planning for future-proofing your strategy.

Use the market analysis template to get started

STEP 2:

EVALUATE YOUR BUSINESS

BUSINESS MATURITY OVERVIEW

After identifying specific solar manufacturing opportunities aligned with your business strengths, the next critical step is evaluating your operational readiness to pursue these opportunities.

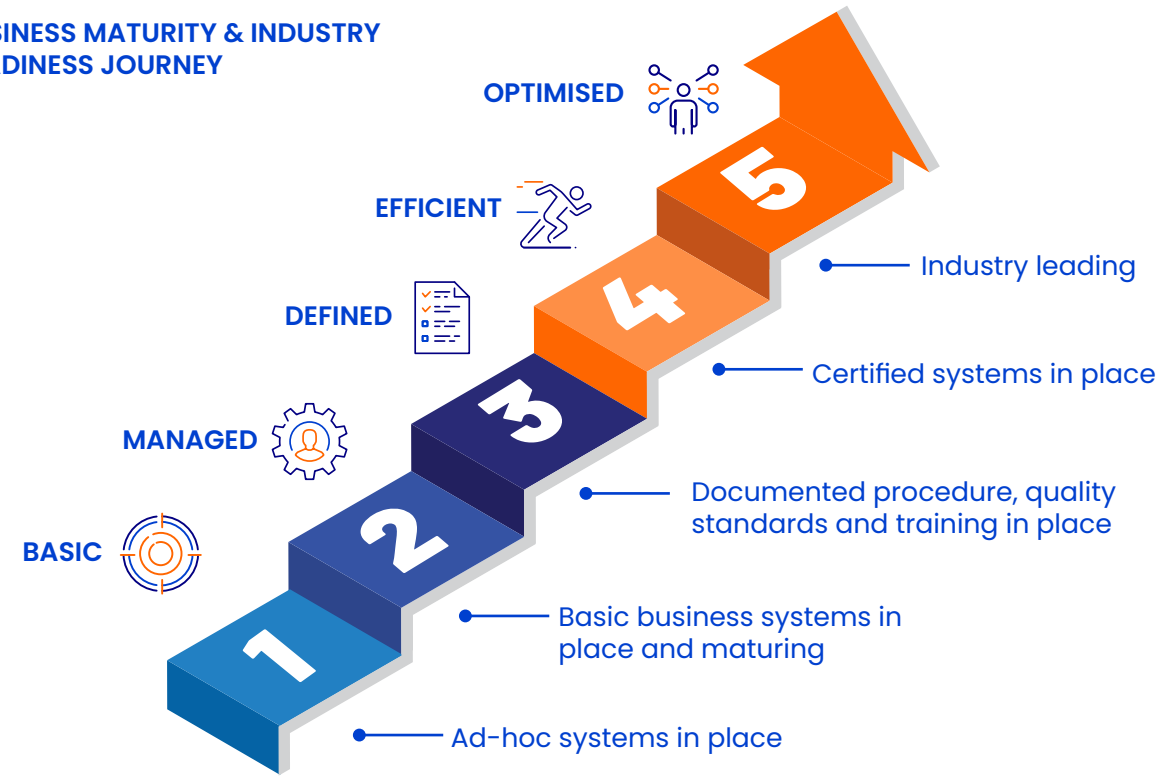
The business maturity framework provides a strategic pathway to assess your current capabilities against the specific requirements of your target market segment. By systematically evaluating your readiness in relation to your identified growth opportunities, you can pinpoint precise capability gaps, prioritise strategic improvements, and develop a focused implementation plan.

Why this matters:

- **Operational efficiency:** Streamlined processes reduce waste and improve productivity
- **Risk management:** Structured systems help mitigate operational and financial risks
- **Scalability:** Mature businesses can expand effectively with established systems
- **Competitive advantage:** Higher maturity enables faster adoption of new technologies.

The framework evaluates your business across three dimensions: operational foundations, sub-industry dynamics, and solar-specific requirements. This assessment creates a clear understanding of your current capabilities and develops an actionable pathway to successfully capitalise on solar manufacturing opportunities.

BUSINESS MATURITY & INDUSTRY READINESS JOURNEY



THE FIVE PHASES OF INDUSTRY READINESS

Table 2. Readiness phases

Phase	Key characteristics	Solar manufacturing example
1. BASIC	• Unpredictable processes • Reactive approaches • Minimal documentation • Success depends on individual efforts	Your manufacturing has little to no quality control systems and documentation needed for solar components, with significant gaps in environmental standards.
2. MANAGED	• Basic processes established • Some standardisation • Limited documentation exists • Basic forecasting and planning	Your processes show improved consistency with some standardised procedures that could adapt to solar production, but planning systems need expansion.
3. DEFINED	• Well-documented processes • Clear roles and responsibilities • Established training protocols • Consistent implementation	Your systematic approach and documentation would transfer well to solar requirements, with defined roles that could adapt to solar production workflows.
4. EFFICIENT	• Measured against performance targets • Focus on efficiency and effectiveness • Continuous monitoring systems • Responsive process adjustments	Your performance monitoring and data-driven targets would provide advantages when transitioning to solar manufacturing with its precise tolerances.
5. OPTIMISED	• Continuous improvement culture • Strategic supply chain management • Collaborative partnerships • Data-driven refinement	Your excellence in continuous improvement makes you ideally positioned for solar manufacturing, with supply chain capabilities that could rapidly develop specialised material partnerships.

MATURITY ASSESSMENT

Complete your assessment by identifying your current level (1-5) for each capability and documenting specific improvements needed to reach your target level. This creates a focused roadmap for building the robust business foundation essential for success in solar manufacturing.

MATURITY ASSESSMENT

Table 3. Maturity assessment

Business capabilities	1 – Basic	2 - Managed	3 - Defined	4 – Efficient	5 - Optimised
	Processes are unpredictable, inadequately controlled, and reactive. Success depends on individual efforts; there is little to no formal documentation or standardisation.	Basic processes are established and are repeatable. Some processes are standardised. Documentation has been created in some areas, but it may not be comprehensive or widely used.	Processes are well-documented, standardised, and integrated into the organisation. There is a clear understanding of roles and responsibilities. Training and communication standards have been established.	Processes are measured and controlled with appropriate targets set. There is a focus on efficiency and effectiveness, with continuous monitoring and adjustment.	Continuous improvement is embedded in the organisational culture and processes are optimised. Supply chains are well managed. Collaborations and partnerships form part of the business model.
Production systems	• Manual and/or basic production systems • Training is via demonstration • Minimal process documentation in place	• Some processes are automated • Core processes have basic documentation • Some IoT (Internet of Things) sensors in place	• Processes are automated • Core processes are standardised and documented • Training is formalised and documented • Integrate IoT sensors and devices across machinery and processes	• Processes are fully automated • Staff have personalised training plans • Processes are reviewed regularly for any deviation • Predictive maintenance using sensor data and analytics	• Robotics are integrated • AI and process control are standard • Digital twins used for process simulation and optimisation
Quality systems	• Quality control systems not in place • Quality standards are poorly documented • Limited customer service is offered • Customer satisfaction is not recorded	• Basic quality standards for core elements are documented • Limited historical quality data is available	• Quality standards and processes are established • The business is working towards ISO9001 certification • Staff are trained in quality standards • Historical quality data available and used as part of process improvement	• ISO9001 Quality Management Systems certification attained • Formal process and quality improvement system in place	• ISO 14001, ISO 45001, ISO 27001, ISO 50001, ISO 31000, ISO 22301, ISO 45001, ISO 17025 are attained as required (see Table 6 Quality/ Environmental licensing and certification requirements)
Data security	• Minimal data security in place • Most data is stored on local hard drives • Minimal data is part of any formal backup process or system	• Established data governance policies in place • Basic user access controls and authentication mechanisms in place • Regular data backups and secure storage	• Data interoperability standards implemented • Collecting and storing real-time operational data • Critical systems logged and monitored • Conduct basic employee training on cybersecurity hygiene	• Incident response and disaster recovery plans established • Regular audits and risk assessments performed	• Use advanced threat detection (e.g., anomaly detection, behavioural analytics)
Supply chain	• Customers identified by referrals and walk-ins • No overarching view of the supply chain is considered • Provides service to limited number of customers • Never applies for Tenders	• Basic supplier contacts are in place • Basic customer contracts are in place	• Supplier agreements are in place • Customer agreements are in place • Delivery standards are established • Selective tenders are applied for when time permits	• Forward planning includes customer forecasts as well as sales history • Supplier contracts include quality standards and improvements targets • Actively reviews tenders and tender writing is part of someone's role	• Innovation and continuous improvement programs are integrated into all areas of the business • Actively applies for, and is the successful applicant for, tenders
Logistics	• Ad-hoc transportation utilised	• Different carriers used depending on the destination: local, national or international	• High value customers are serviced by a single contract carrier	• Dedicated account manager assigned by the different courier companies used	• Single carrier company used for all local, national and international deliveries

MATURITY ASSESSMENT

Business capabilities	1 – Basics	2 - Managed	3 - Defined	4 – Efficient	5 - Optimised
Financial	• Basic spreadsheets used for production and inventory. • An online system used for financial and sales • Manual integration between sales and production data	• An online system used for financial and sales • Data is collected around critical production system	• An online system used for financial and sales • Limited integration of financial, forecasting, production and inventory systems (Enterprise Resource Planning (ERP))	• Semi-automated integration of data for analysis available	• Fully Integrated financial, forecasting, production, inventory and sales systems used (ERP) • Automatic analysis of trends and opportunities available
Value chain	• Product range and manufacturing techniques have changed little over time • Limited use of data and technology in decision making	• Key value add, elements of raw material quality, product manufacture and transportation are measured	• Targeted elements of the product life cycle are measured, and improvement programs implemented to reduce environmental impacts and increase recycling elements • Customer service channels are semi-automated	• Customer feedback is integrated into the product development cycle	• Contracts with customers and suppliers include KPI's and targets • Supplier and customer contracts include work in progress negotiations, batch sizes etc to improve overall efficiency for all parties
Environmental, Social, Governance (ESG)	• Minimum legal requirements for employment, safety and environmental requirements are met • No reporting required or implemented	• Basic Key Performance Indicators (KPIs) are in place monitoring required safety and environmental indicators • Staff surveys are in place to identify improvement areas • Preliminary sustainability reporting based on requests	• Improvement targets are in place for an increased range of safety and environmental indicators • Corporate standards in place relating to fair labour, diversity and ethics are monitored • Local community activities are supported and sponsored • Formal ESG policies and metrics established	• The company carbon footprint is monitored and reduction targets set • ESG principles are integrated into strategic planning • Sustainability is part of corporate reporting. • Company ESG statement in place	• External auditing is part of regular company ESG assessments • Industry-leading sustainability practices with verified certifications and supply chain integration
Business model	• Customers are supplied on an as ordered basis • Some alternative options to sell products beyond direct to customer are investigated	• 3 month plans are in place to cover forward orders • Financial planning is focused on cashflow and available capital	• A business plan is in place • 12-month forecasts are available for sales and production • Marketing plans are in place along with new product ideas	• Other market opportunities have been identified and are being explored • Alternative suppliers and production methods are being investigated	• Customer and suppliers are seen as collaborators, with relevant agreements in place and information is shared appropriately
Workforce planning	• Workforce planning is unstructured and reactive • Staffing decisions are made to meet immediate needs only • Limited or no forecasting or alignment with business objectives	• Basic workforce data is collected (e.g. headcount, turnover) • Some short-term planning exists, often around budgeting • Roles and responsibilities start to become clearer	• Workforce plans are aligned with medium-term business goals • Scenario planning and basic forecasting are introduced • HR works with managers to identify talent gaps and plan accordingly	• Workforce planning is proactive and integrated with long-term business strategy • Data-driven models guide recruitment, retention and development • Cross-functional collaboration ensures alignment across the business	• Workforce planning is continuous, predictive and dynamic • Plans adapt quickly to market, technology, or organisational shifts • Talent strategies are embedded in company culture, driving innovation and resilience

ACCESS A COMPLETED ASSESSMENT EXAMPLE

To help visualise what a finished assessment looks like, we've prepared an example for a hypothetical steel manufacturer entering solar panel support production. This detailed assessment shows how you might evaluate each capability area, identify specific gaps, and prioritise improvements to leverage existing metalworking expertise while addressing solar-specific requirements.

Download worked example and template

MAKING YOUR ROADMAP

After identifying your capability gaps, develop a strategic roadmap that addresses each business capability. It can be helpful to prioritise your roadmap improvements based on:

1. Impact on product quality and market entry readiness
2. Resource requirements (time, investment, expertise)
3. Alignment with your strategic business objectives

Build a practical timeline with clear milestones to guide the development of core business capabilities, laying the groundwork for a successful solar manufacturing operation. Use each stage as an opportunity to evaluate and strengthen your business maturity, drawing inspiration from the suggested capabilities. This is a flexible framework—expand or adapt it to suit your unique goals and context.

Production systems

- Design process flows that meet solar precision requirements and clean manufacturing standards
- Partner with equipment suppliers experienced in solar manufacturing for proper installation
- Implement testing stations for critical solar panel parameters (efficiency, durability, electrical safety)
- Incorporate digital monitoring for quality-critical production variables
- Create maintenance schedules that preserve clean manufacturing environments

Quality systems

- Implement testing protocols aligned with industry standards
- Establish monitoring systems for performance parameters and durability factors
- Develop traceability systems for materials and components
- Create documentation systems for certification requirements
- Build quality verification stations specific to solar component testing

.

Data security

- Implement protection for proprietary manufacturing techniques and efficiency improvements
- Establish secure protocols for design specifications and technical drawings
- Deploy systems for protecting intellectual property and innovation
- Create secure sharing mechanisms for supply chain collaboration
- Implement cybersecurity training focused on manufacturing systems

Supply chain

- Identify reliable suppliers with experience in solar-grade materials
- Establish connections with solar project developers and installers
- Develop inventory systems addressing solar-specific supply challenges
- Create supplier qualification programs for specialised materials
- Consider strategic partnerships to accelerate market entry and knowledge acquisition

Financial

- Estimate capital requirements for specialised equipment and facilities
- Research renewable energy incentives and manufacturing support programs
- Develop cost models specific to solar component production
- Create competitive pricing aligned with industry-standard metrics
- Implement financial tracking for efficiency improvements and yield rates

Value chain

- Map the complete lifecycle of solar products from raw materials to end-of-life
- Develop supplier relationships that enhance critical performance specifications
- Create systems for integrating customer feedback into product development
- Implement sustainability practices in product design and manufacturing
- Establish metrics for measuring environmental impact improvements

Environmental, Social, Governance (ESG)

- Develop solar-specific sustainability credentials and carbon reduction metrics
- Implement resource efficiency measures aligned with renewable energy values
- Create community engagement initiatives focused on clean energy education
- Establish transparent reporting on environmental performance
- Develop governance structures supporting innovation and sustainability

Workforce planning

- Implement training programs for solar-specific manufacturing requirements
- Develop skills in advanced manufacturing processes and quality assurance
- Create knowledge transfer systems to preserve specialised expertise
- Establish partnerships with training providers for tailored skill development
- Design career pathways supporting technical specialisation and growth

Read 'writing a business plan' for more information

STEP 3:

MARKET ENTRY REQUIREMENTS

The solar industry offers multiple entry points that align with different business strengths and objectives. Your selected pathway will influence your capital requirements, technical expertise needs, and market positioning.

Manufacturing pathways

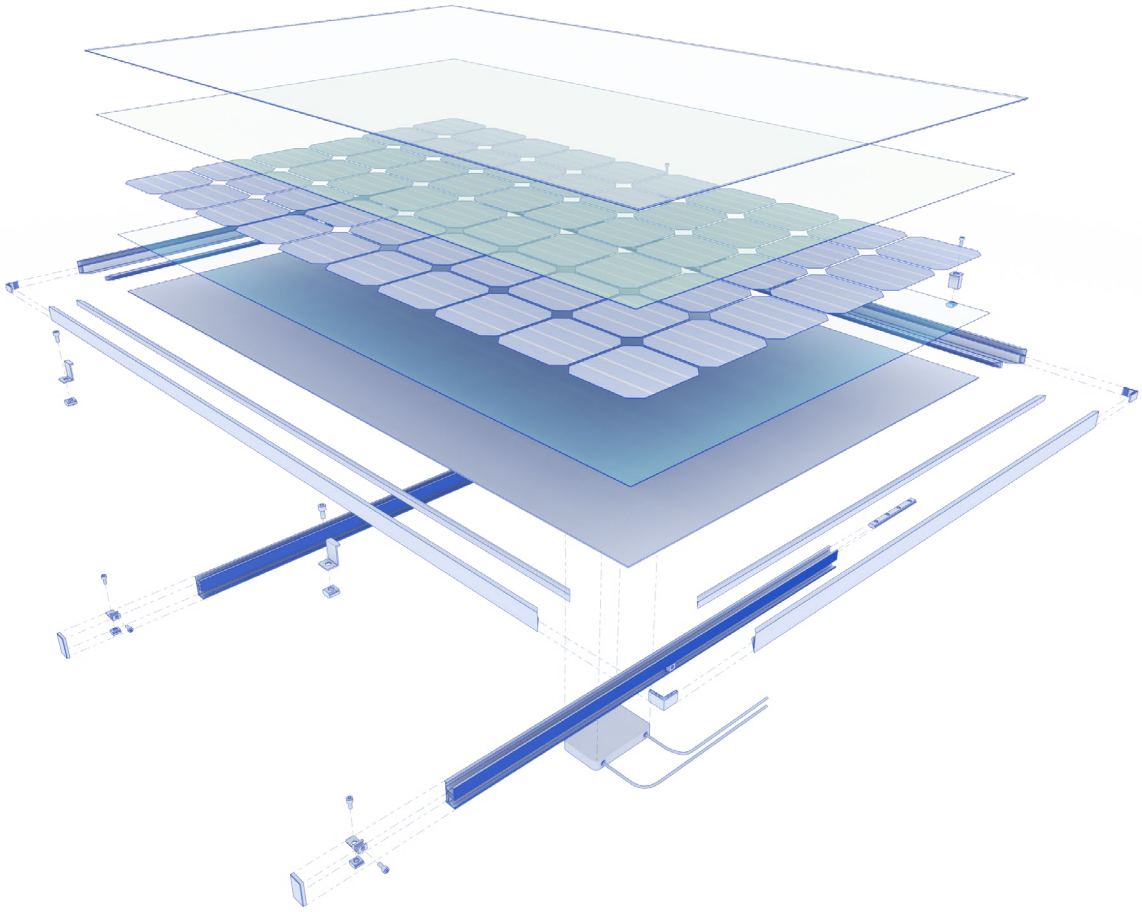
Consider these manufacturing approaches, each with distinct investment and capability requirements:

- Component supplier: Produce specific parts that integrate into larger assemblies. This pathway typically requires the lowest capital investment and allows for specialisation in areas where you have existing expertise or equipment advantages.
- Subcomponent assembler: Combine multiple parts into functional units. This middle-ground approach requires moderate technical knowledge and quality control systems but offers higher value-added opportunities and stronger customer relationships.
- System integrator: Assemble various components into finished products. This pathway leverages supply chain management strengths and requires less production equipment but demands comprehensive testing capabilities and broader industry knowledge.
- End-to-end manufacturer: Control the complete production process. While offering the highest potential margins and brand control, this approach requires substantial capital investment, extensive technical expertise, and rigorous quality management systems.

Strategic entry options

The solar supply chain presents diverse participation opportunities:

- Design and prototyping: Develop specialised designs, conduct materials research, or create prototypes with lower capital investment than manufacturing. This approach allows you to build expertise and intellectual property while establishing industry relationships.
- Component manufacturing: Focus on producing specific components that match your existing capabilities, offering a balanced approach to market entry with moderate investment requirements.
- Maintenance and support: Develop replacement parts, specialised tools, or aftermarket enhancements for the growing installed base of solar systems. This approach offers recurring revenue potential with typically lower technical barriers to entry.



Other entry considerations

Other market entry considerations might include:

- **Capability assessment:** What existing manufacturing expertise, equipment and processes can be leveraged? Where do capability gaps exist?
- **Quality requirements:** What quality assurance systems and testing protocols will be necessary? How do product reliability requirements compare to current operations?
- **Partnership opportunities:** Which components or processes might benefit from strategic collaborations? Where might external expertise complement internal capabilities?
- **Technology landscape:** How rapidly is innovation occurring in this sector? What systems will be needed to monitor and respond to technological advancements?
- **Regulatory framework:** Which industry standards and certification requirements apply? What is the timeline and cost associated with achieving compliance?

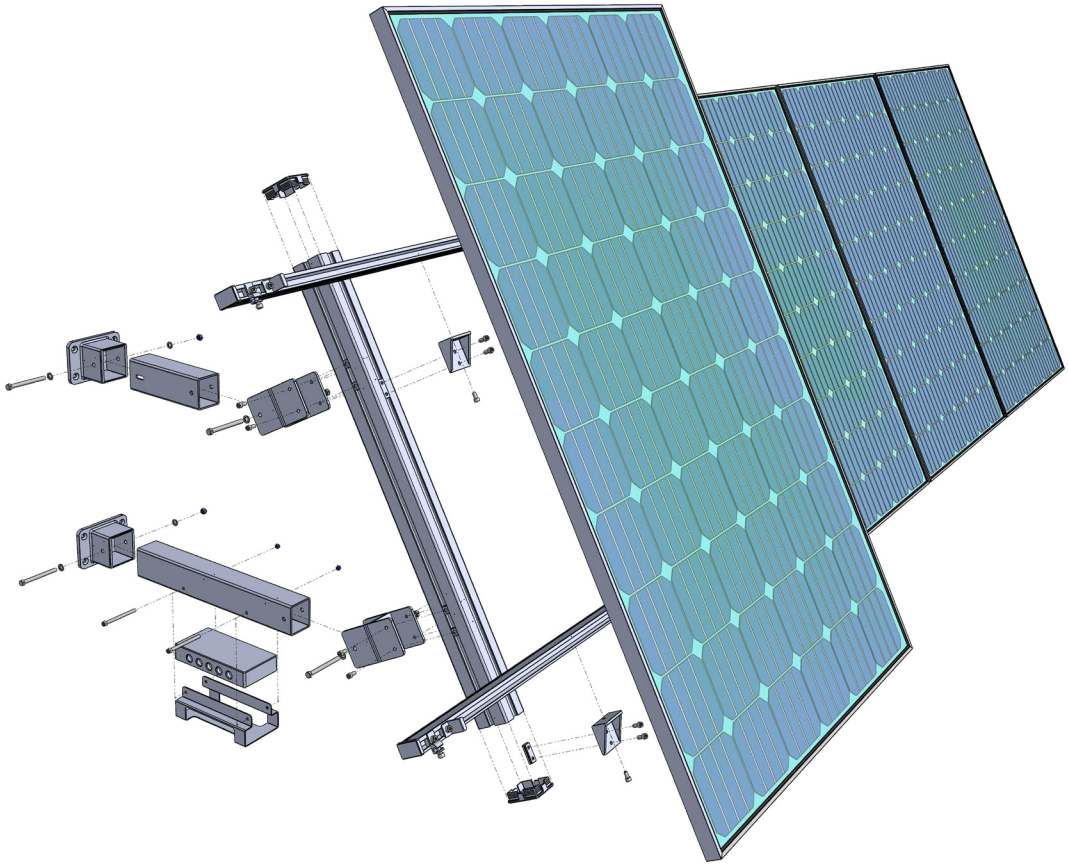
The Solar Farms Code of Practice

If you are particularly interested in commercial application or utility-scale projects, reviewing the Solar Farms Code of Practice 2024 is important. Understanding these installation and safety standards allows manufacturers to incorporate compliance features directly into component designs, reducing implementation costs for customers while positioning their products as premium solutions tailored to Australian conditions.

Read the Solar Farms Code of Practice

Solar Accreditation Australia complements the Code by outlining best practices for system design and installation, accreditation standards, and ongoing professional development.

Solar Accreditation Australia – Get Accredited



Entry strategy: component manufacturing

If you decide to enter the supply chain by manufacturing a component, consider components that align with your existing manufacturing strengths.

- **Structural elements:** clamps, support racks, posts, brackets
- **Electrical components:** junction boxes, wiring looms
- **Installation accessories:** cable clips, cob hooks, mounting hardware

Beyond conventional offerings, explore opportunities for innovation in your manufacturing space. Strategic research and development investments can yield novel solutions to unaddressed industry challenges. Consider pioneering unique materials, designs or manufacturing approaches that transform established components. Components offering enhanced durability, simplified installation, reduced environmental impact, or cost advantages will position your organisation as an industry innovator rather than merely a supplier, creating stronger market differentiation and value-added opportunities.

Finding alignment or opportunity

To determine your optimal entry point in the solar supply chain, conduct a thorough assessment of your current manufacturing capabilities against potential component opportunities. Examine your existing expertise in materials processing, precision engineering, electronics assembly, or structural fabrication to identify natural extensions into solar component manufacturing. To support this exploration a table of components has been provided.

Table 4. Components of a solar panel

Component	Materials	Manufacturing requirements	Specialist equipment required
Solar cells	Silicon (monocrystalline or polycrystalline), dopants (boron, phosphorus)	Clean room environment, silicon, doping equipment	Silicon ingot growers, wafer slicers, doping furnaces, anti-reflective coating machines
Glass cover	Tempered low-iron glass	Glass	Glass tempering furnaces, coating equipment for anti-reflective layers
Back sheets	Polymer composites (e.g., PVF, PET, EVA)	Polymer extrusion and lamination capabilities	Extrusion lines, lamination equipment
Frame	Aluminium or steel	Metal fabrication facilities	CNC machines, bending equipment, welding stations
Junction box	Plastic (e.g., PPO, PC), copper	Plastic injection moulding, PCB assembly	Injection moulding machines, PCB assembly lines
Encapsulant materials	EVA (Ethylene Vinyl Acetate) or POE (Polyolefin Elastomer)	Polymer processing facilities	Lamination equipment, curing ovens
Busbars and ribbons (interconnector)	Copper, silver, or aluminium	Metal handling facilities	Soldering and bending equipment
Anti-reflective coating	Silicon nitride, titanium dioxide	Vacuum deposition facilities	Plasma-enhanced chemical vapour deposition (PECVD) systems
Full manufacturing assembly	All materials listed above	Clean room, warehousing, lifting equipment	Framing machine, junction box plotter, foil and EVA cutter, automatic bussing and interconnecting, laminator, flexible stringer machine, solar panel tester
Brackets	Aluminium, galvanised steel, stainless steel	Metal fabrication capabilities	Stamping machines, metal cutting equipment, bending machines, drilling stations
Support frames	Aluminium, galvanised steel, structural steel	Metal fabrication and structural assembly	CNC machines, welding equipment, powder coating systems, heavy-duty cutting tools

Entry strategy:
Full manufacturing and assembly

Establishing a complete solar panel production facility requires substantial investment in equipment, facilities, and expertise. Before committing to full-scale manufacturing, carefully evaluate.

- **Capital requirements:** Full assembly operations demand significant upfront investment in specialised equipment including laminators, stringers, flash testers, and automation systems. Consider whether your financial resources align with these capital requirements. Some information on the equipment required is provided.
- **Technical expertise:** Solar manufacturing combines precision electronics, materials science, and quality control disciplines. Assess whether your existing technical team possesses relevant experience or requires substantial training and recruitment.
- **Production scale**: Full manufacturing becomes economically viable at specific production volumes. Determine if your target market can support the minimum efficient scale necessary to justify comprehensive manufacturing capabilities.
- **Facility specifications:** Solar production requires controlled environments including clean rooms for cell handling, specialised ventilation, and substantial floor space.
- **Supply chain integration:** Complete manufacturing necessitates reliable access to multiple components including cells, glass, encapsulants, backsheets, and junction boxes. Evaluate supplier relationships, lead times, and material quality assurance processes.
- **Certification pathway:** Full manufacturers must navigate comprehensive certification requirements. Consider the timeline and resources needed to achieve relevant International Electrotechnical Commission (IEC) certifications and local compliance standards.

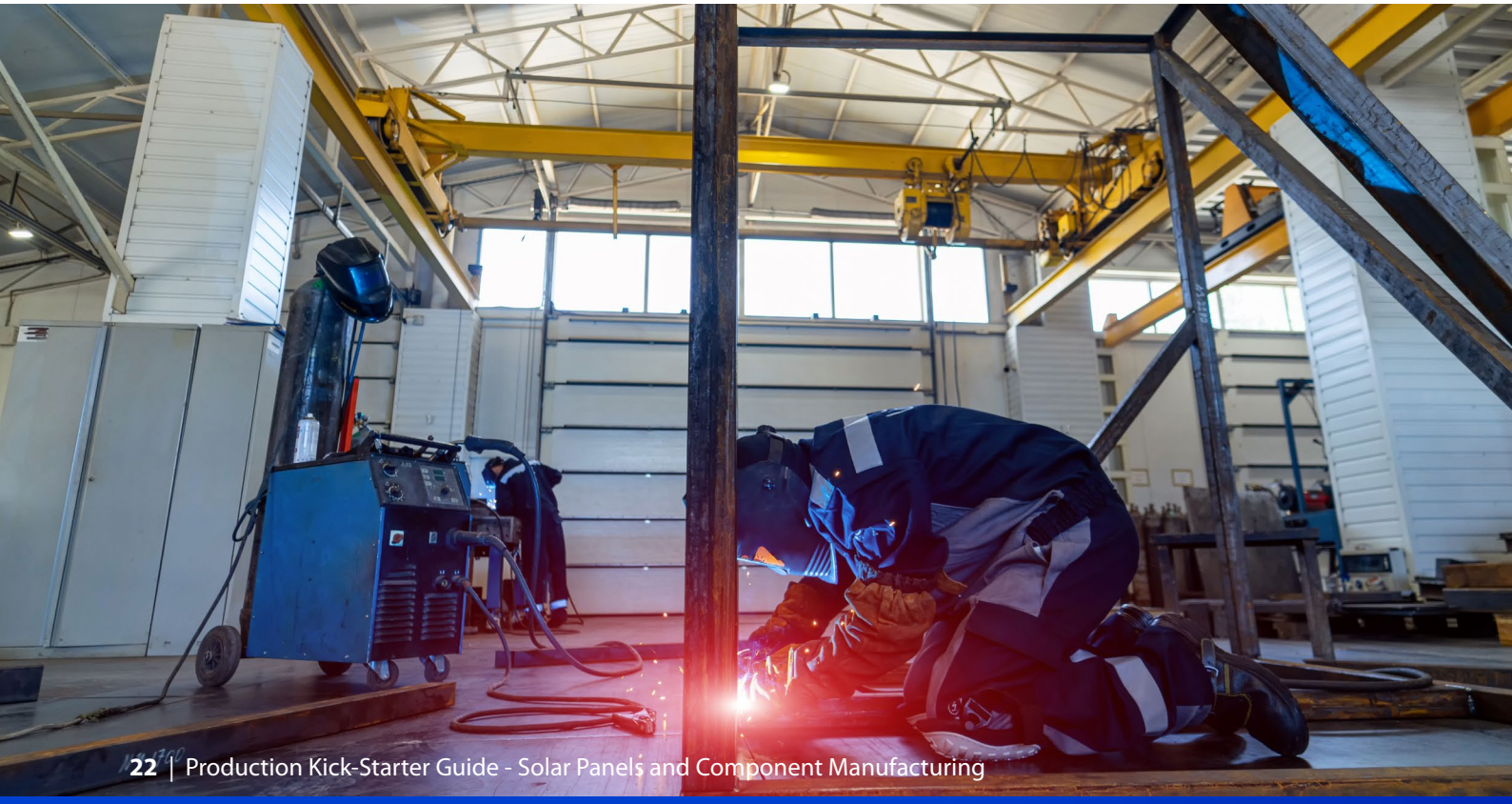


Table 5. Full assembly requirements

Component	Equipment required	Requirements
Full manufacturing assembly	Automated assembly lines	Hourly capacity: 400 pcs Working mode: Auto
	Solar Panel Layup Machine	Auto, for arranging solar cells
	Solar Panel Bussing Machine	For interconnection soldering
	Solar Panel Taping Machine	For applying fixing tape
	Solar Panel EL Tester	For defect detection
	Solar Panel Laminator	For panel lamination, electric and oil heating types available
	Solar Panel Insulation Tester	For hi-pot and grounding resistance testing
	Solar Panel IV Tester	Working mode: Semi/Auto
	Topcon, HJT, IBC, HBC, SUNPOWER Solar Panel Tester	Working mode: Auto/Semi

Product quality standards

Navigating the regulatory landscape is essential for market entry and reputation building in solar component manufacturing. Early engagement with certification processes is strongly recommended due to their complexity and timeframes. Electrical standards govern safety, reliability, and performance of photovoltaic products—serving as both compliance requirements and valuable market differentiators. Implementation requires comprehensive quality management systems with documented testing protocols and regular third-party verification. Consider engaging specialised certification consultants to streamline these critical processes and minimise compliance risks.

Table 6. Quality standards

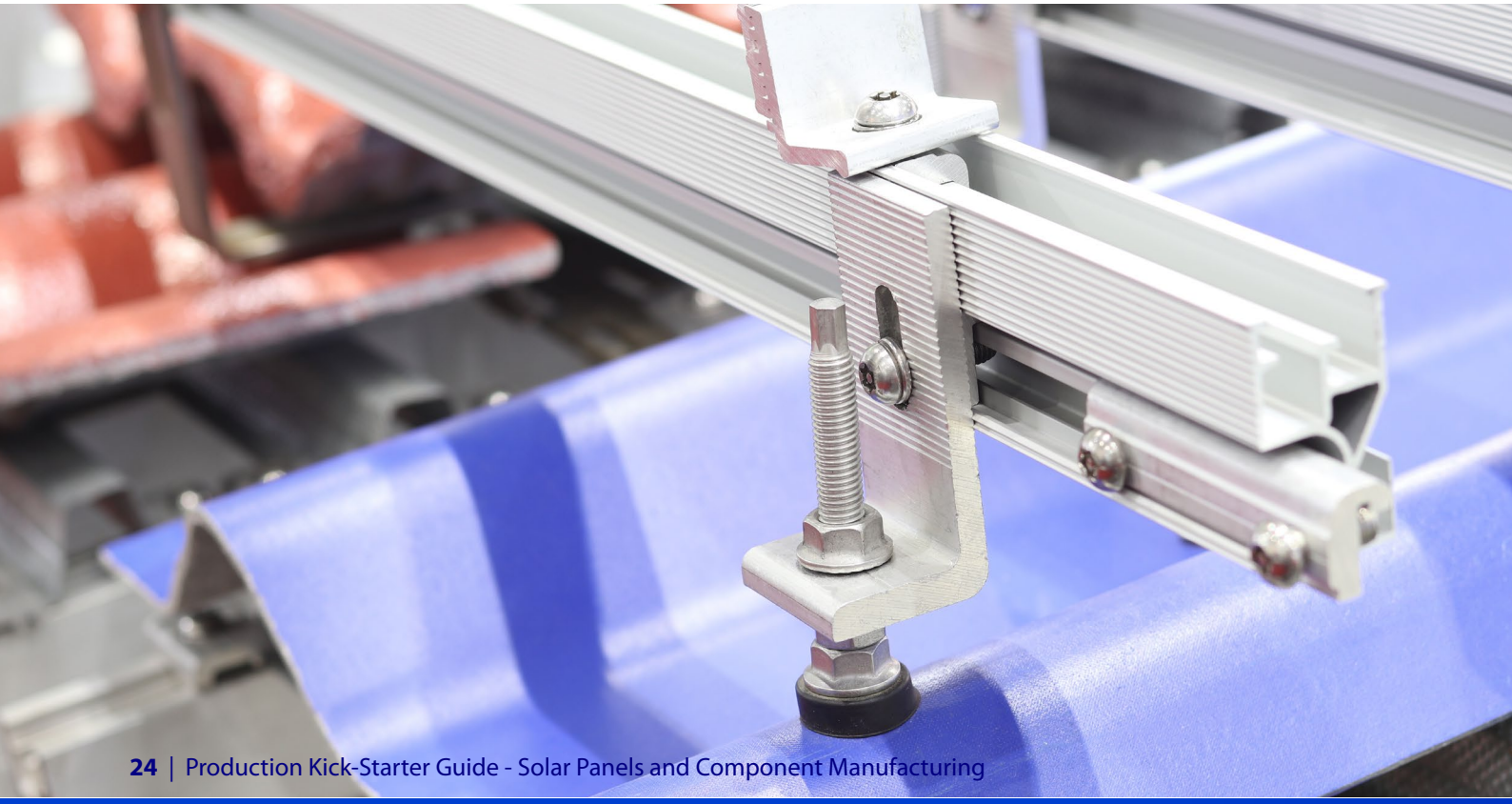
Component	Licensing and certifications required
Solar panels	IEC 61215: Terrestrial photovoltaic (PV) modules – Design qualification and type approval IEC 61730: Photovoltaic (PV) module safety qualification
Back sheets	IEC 62788: Measurement procedures for materials used in photovoltaic modules
Junction box	IEC 62790: Junction boxes for photovoltaic modules – Safety requirements and tests
Encapsulant	IEC 62788: Measurement procedures for materials used in photovoltaic modules – Part 1-6: Encapsulants
Busbars and ribbons	IEC 62790 (as part of junction box assembly)

Quality and environmental standards

Implementing recognised quality and environmental management systems delivers significant operational and competitive advantages. These frameworks ensure manufacturing consistency, enhance product reliability, and optimise business performance while demonstrating environmental responsibility. While certifications such as ISO 9001 and ISO 14001 may not be mandatory regulatory requirements, they increasingly serve as differentiators in competitive tender processes, particularly for government contracts. Early adoption of these standards positions manufacturers favourably in sustainability-focused markets and procurement frameworks.

Table 7. Quality and environmental standard

Component	Licensing and certifications required
Quality	ISO 9001: Quality Management Systems
Environmental	ISO 14001: Environmental Management Systems
Health and safety	ISO 45001: Occupational Health and Safety Management
Recycling	AS/NZS 5377 Certification – E-Waste Management Systems Certification



STEP 4:

DEVELOP YOUR WORKFORCE STRATEGY

Once you've determined your market entry strategy, developing a capable workforce becomes your next critical priority. Your workforce strategy should address both technical capabilities and organisational culture to drive innovation and operational excellence. Effective workforce planning creates clear career progression pathways, supporting talent retention and professional development. This approach fosters employee engagement while building the specialised expertise required for quality manufacturing.

Implementation approach

To build your workforce:

- Conduct a skills audit of your existing team to identify transferable capabilities
- Create a comprehensive skills matrix mapping required competencies against current capabilities
- Develop targeted training programs to address identified gaps
- Implement cross-skilling initiatives to enhance operational resilience
- Design recruitment strategies focused on critical technical roles

Workforce guidelines

Consider your requirements based on what you will be manufacturing:

- **Component manufacturing:** Initially leverage existing staff with strategic upskilling
- **Full assembly operations:** Scale your technical workforce based on production volume targets, ensuring appropriate balance between engineering expertise (electrical and mechanical) and skilled production technicians across all shifts.

Navigating an emerging industry

The industry will continue to evolve.
You should:

- be prepared to pioneer role definitions and job descriptions
- establish partnerships with training providers to develop tailored programs
- consider apprenticeship and trainee programs to build your talent pipeline
- document process knowledge to facilitate skills transfer as you scale

Skills development framework

Solar manufacturing requires a strategic blend of technical and transferable skills. Table 8 presents an overview of both technical skills (engineering, production, quality) and soft skills (leadership, communication, problem-solving) that form the foundation of a high-performing manufacturing operation.

When developing your workforce capability, consider both formal qualifications and practical experience. Table 9 maps relevant qualifications against key manufacturing roles, highlighting pathways from entry-level certificates through to advanced qualifications. This framework supports both recruitment planning and the development of internal career progression pathways.

By strategically aligning your workforce capabilities with your manufacturing requirements, you will build a team capable of delivering consistent quality while adapting to technological advancements and market evolution.

Table 8. Hard and soft skills

HARD TECHNICAL SKILLS	SOFT SKILLS
3D printing	Accountability
Assembly	Adaptability
Chemistry	Analysis and evaluation
Computations	Communication (written and oral)
Computer programming	Creativity and innovation
Computer systems	Critical thinking
Craft modelling techniques	Cultural awareness
Data collection and analysis	Ethics and integrity
Design	Leading teams
Digital modelling	Problem solving and decision-making
Drafting / Technical drawing	Professionalism
Electrical and electronic test instruments	Resilience
Financial management	Social and emotional intelligence
Hazard analysis	Team management
Machine operation	Teamwork and collaboration
Mathematics	Time management and efficiency
Metal fabrication	Stakeholder management
OH&S compliance	Strategic planning
Physics	
Production management	
Quality control and assurance	
Risk assessment and management	
Testing	
Welding techniques	
Wiring techniques	

Key roles in the solar manufacturing supply chain

Production functions

Core production roles include:

- Engineering (process, electrical, mechanical, chemical and polymer specialists)
- Technical operations (production technicians, CNC operators, coating specialists)
- Assembly functions (supervisors, operators, technicians).

Each position contributes specific expertise—from materials science and process optimisation to precision fabrication and quality control—creating an integrated production ecosystem. Table 9 provides detailed information on key production positions, their responsibilities, and essential competencies required for effective performance.

Quality and value chain functions

While production roles form the backbone of manufacturing operations, quality and value chain functions are essential for ensuring product integrity and market competitiveness. Key positions include Quality Assurance Specialists and Managers who develop testing protocols and implement quality management systems; Materials Engineers who focus on component durability and performance; and various Quality Inspectors who conduct specialised testing on specific components including junction boxes, glass covers, back sheets, and coatings. These roles require skills in statistical analysis, quality control procedures, testing methodologies, documentation, and regulatory compliance. Additionally, logistics coordination expertise is vital for maintaining efficient supply chain operations, inventory management, and timely material delivery.

Support functions

A successful solar manufacturing operation requires robust support functions that enable core production activities. Essential support roles include:

- Supply Chain Managers who oversee procurement and vendor relationships
- Health and Safety Officers who ensure regulatory compliance and risk management in chemical and electrical environments
- Environmental Compliance Specialists who monitor sustainability practices and emissions requirements
- R&D Engineers who drive technological innovation
- IT Support Specialists who maintain manufacturing systems and automation infrastructure
- Business Management Positions (HR, finance, sales and marketing) that provide organisational foundations

These roles collectively contribute expertise in regulatory compliance, business operations, technical innovation, and market development—all critical for long-term business sustainability and competitive positioning in the evolving solar manufacturing sector.

Table 9. Key roles

Position	Job overview	Key skills
PROCESS ENGINEER	Oversee and optimise manufacturing processes for solar cell production, focusing on efficiency and quality improvement. Collaborate with other teams to implement new technologies and processes.	Process optimisation, lean manufacturing principles, problem-solving, data analysis
ELECTRICAL ENGINEER	Design and maintain electrical systems for solar cell production, ensuring optimal performance and energy efficiency. Develop testing procedures for quality control.	Circuit design, power systems knowledge, troubleshooting, AutoCAD proficiency
PRODUCTION TECHNICIAN	Operate and maintain equipment for solar cell, glass cover, busbar, and ribbon production, ensuring smooth operation, quality control, routine maintenance, and efficient handling of materials.	Equipment operation, basic maintenance, quality control, safety procedures, material handling
POLYMER ENGINEER	Develop and optimise polymer-based back sheets for solar panels, focusing on durability, insulation, and weather resistance. Collaborate with R&D to improve material properties.	Polymer science, material testing, process optimisation, research and development
PRODUCTION OPERATOR	Operate machinery for back sheet and encapsulant production and application, ensuring proper material handling, consistent processing, and continuous monitoring of production quality.	Equipment operation, material handling, quality monitoring, safety procedures
CHEMICAL ENGINEER	Develop and optimise encapsulant materials for solar panels, focusing on transparency, durability, and adhesion properties. Collaborate with R&D to improve material performance.	Polymer chemistry, material testing, process optimisation, research and development
MAINTENANCE TECHNICIAN	Perform preventive maintenance and repairs on production equipment across all departments. Troubleshoot mechanical and electrical issues to minimise downtime.	Equipment maintenance, troubleshooting, mechanical and electrical skills, safety procedures
MECHANICAL ENGINEER	Design and optimise solar panel frames for durability, ease of installation, and cost-effectiveness. Collaborate with production team to improve manufacturing processes.	CAD/CAM software, structural analysis, design for manufacturability, project management
CNC OPERATOR	Program and operate CNC machines for solar panel frame production, ensuring precision and efficiency. Perform routine maintenance and troubleshooting.	CNC programming, blueprint reading, precision measurement, troubleshooting

Position	Job overview	Key skills
WELDER	Perform welding operations for solar panel frame assembly, ensuring strong and durable connections. Follow precise specifications and maintain quality standards.	Welding techniques, blueprint reading, quality control, safety procedures
CHEMICAL ENGINEER (COATINGS)	Develop and optimise anti-reflective coatings for solar panels, focusing on light transmission and durability. Collaborate with R&D to improve coating performance.	Thin film technology, material testing, process optimisation, research and development
COATING TECHNICIAN	Operate coating equipment and maintain coating processes, ensuring uniform application and quality. Monitor and adjust coating parameters as needed.	Coating equipment operation, process control, quality monitoring, troubleshooting
ELECTRICAL ENGINEER (JUNCTION BOXES)	Design and optimise junction boxes for solar panels, focusing on electrical performance, safety, and reliability. Collaborate with suppliers and production team.	Circuit design, power systems knowledge, thermal management, prototyping
PRODUCTION MANAGER	Oversee the entire solar panel production process, coordinating between different departments and ensuring overall efficiency and quality. Implement process improvements and manage production schedules.	Production management, lean manufacturing, team leadership, strategic planning
ASSEMBLY LINE SUPERVISOR	Supervise assembly line operations, ensuring efficient workflow and adherence to quality standards. Coordinate with other departments and troubleshoot production issues.	Team leadership, process optimisation, quality control, problem-solving
ASSEMBLY LINE OPERATOR	Perform various assembly tasks in the solar panel production line, following precise procedures and maintaining quality standards. Operate assembly equipment and perform basic troubleshooting.	Manual dexterity, attention to detail, basic equipment operation, quality awareness
ASSEMBLY TECHNICIAN	Assemble and test junction boxes, ensuring proper connections and sealing. Follow precise assembly procedures and maintain quality standards.	Electronic assembly, Soldering, Quality control, Attention to detail

Transferable skills for solar manufacturing

Successful solar manufacturing requires a strategic blend of technical expertise and interpersonal capabilities. Table 10 identifies key transferable skills that support effective performance across various solar manufacturing roles. Hard technical skills—ranging from engineering disciplines and manufacturing processes to quality systems and technical operations—provide the foundation for production excellence. Complementary soft skills enhance workforce effectiveness by enabling collaboration, problem-solving, and continuous improvement. When assessing your existing workforce capabilities or planning recruitment strategies, consider both skill categories as essential components of a high-performing manufacturing team.

Educational pathways for solar manufacturing

The solar manufacturing sector draws upon diverse educational backgrounds and qualification levels to build a competent workforce. Table 10 maps recognised qualifications that align with solar manufacturing roles, organised by level of specialisation. Higher-level qualifications provide advanced technical knowledge and design capabilities, while apprenticeship and trade certifications deliver practical skills directly applicable to production and installation processes. Entry-level qualifications offer foundational knowledge for those beginning their solar manufacturing career journey. When developing workforce capabilities, consider these educational pathways as frameworks for both recruitment criteria and professional development planning for existing staff.

Contact MSQ for workforce planning support

Table 10. Aligned qualifications

ASSOCIATED QUALIFICATION	KEY LINKS
HIGHER LEVEL	
Advanced Diploma of Electrical - Engineering	Includes specific unit UEERE0061 for designing grid-connected photovoltaic power supply systems.
Certificate IV in Electrical - Renewable Energy	Contains unit UEERE0070 for fault-finding and repairing grid-connected photovoltaic power supply systems.
Master of Engineering Technology (Renewable Power)	Focuses on renewable power technologies, potentially including solar, which may offer knowledge of solar energy systems.
Graduate Certificate in Sustainable Energy	Directly addresses sustainable energy technologies, with potential application to solar power systems.
Bachelor of Advanced Engineering	Provides a broad engineering foundation with potential application to renewable energy systems.
Bachelor of Engineering	May offer specialisations in electrical or renewable energy engineering.
Certificate IV in Electrical - Instrumentation	Offers skills in electrical systems and instrumentation that may be useful for solar panel installation and monitoring.
Certificate IV in Industrial Automation and Control	May be relevant for automating and controlling solar panel systems and integration with smart grids.
Certificate III in Instrumentation and Control	Could provide skills for installing and maintaining monitoring and control systems for solar installations.
APPRENTICESHIP/TRADE	
Certificate III in Electrotechnology Electrician	Includes unit UEERE0081 for installing photovoltaic systems to power conversion equipment, providing core skills for solar panel installation.
Certificate III in Electrical Fitting	Offers essential electrical skills directly applied to solar panel installation and maintenance.
Certificate III in Glass and Glazing	May have relevance for handling and installing glass components of solar panels.
Certificate III in Engineering – Mechanical	Skills associated with this qualification could apply to mechanical trade work that may support solar installations, including fitting, assembly, installation, and maintenance of equipment.
Certificate III in Engineering - Fabrication	Skills associated with this qualification might apply to fabrication work that could be related to solar, including metal fabrication, structural steel erection, and sheet metal work.
Certificate III in Engineering – Industrial Electrician	This qualification provides competencies that may be applicable to selecting, installing, and maintaining electrical systems in various environments.
Certificate III in Engineering – Production Systems	This qualification provides engineering and manufacturing skills that could potentially support solar production, distribution, and quality control.
ENTRY LEVEL	
Cert II in Autonomous Technologies	Offers entry-level foundations skills for electronic design, programming, or industrial design.
Certificate II in Sustainable Energy (Career Start)	Provides basic skills and knowledge required to gain an entry level position in manufacturing or maintenance.
Certificate III in Engineering Technical	This qualification equips individuals with technical skills that could potentially support a range of engineering tasks in solar manufacturing and related industries.

STEP 5:

LEVERAGE SUPPORT SYSTEMS

No business succeeds in isolation, particularly in a technical and rapidly evolving field like solar manufacturing. Queensland offers a robust ecosystem of support specifically designed to help manufacturers navigate the challenges of entering and thriving in the renewable energy sector. This final step is about strategically connecting with the resources that can amplify your efforts, reduce barriers, and accelerate your journey toward manufacturing success. From government grants and innovation partnerships to industry associations and specialised training programs, knowing where to find support—and how to effectively utilise it—can dramatically improve your competitive position.

Government support

Queensland Government

- Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development: Provides strategic direction, funding programs and technical expertise for manufacturers.
- Regional Manufacturing Hubs: Nine hubs across Queensland (Bundaberg, Cairns, Gladstone, Gold Coast, Mackay, Rockhampton, Sunshine Coast, Toowoomba, and Townsville) offering localised support including process optimisation, skills advancement and business opportunity identification.
- Critical Minerals Queensland: Townsville-based office supporting the critical minerals strategy, connecting industry, investors and community to advance exploration, processing and manufacturing of renewable technologies.
- Department of Trade, Employment and Training: Coordinates workforce development initiatives, apprenticeship programs and vocational education pathways.
- Trade and Investment Queensland: Facilitates export market access, provides market intelligence and supports investment attraction for manufacturing expansion.
- Department of State Development, Infrastructure and Planning: Administers the Industry Partnership Program and facilitates major manufacturing investments and infrastructure development.
- Department of Customer Services, Open Data and Small and Family Business: Offers streamlined access to government services, licensing and regulatory information through Business Queensland.
- Department of State Development, Infrastructure and Planning: Administers the Industry Partnership Program and facilitates major manufacturing investments and infrastructure development.

Australian Government

- AusIndustry: Delivers R&D tax incentives, commercialisation grants and energy efficiency support for manufacturers.
- Workforce Australia: Provides recruitment assistance, wage subsidies and workforce planning services through the Department of Employment and Workplace Relations.

Grants and funding

The Queensland Government offers multiple grant programs specifically tailored to support manufacturers. These funding mechanisms address critical barriers to market entry and growth by offsetting capital costs, supporting innovation, and building manufacturing capabilities. For all grant programs, manufacturers should:

- Engage early with relevant departments or regional hubs to discuss project suitability
- Develop comprehensive business cases demonstrating return on investment
- Clearly articulate job creation and regional economic benefits
- Consider timing applications to align with business investment cycles

Current grant information, application guidelines and submission deadlines are available via the Business Queensland platform.

For Business Queensland information:

Grants | Business Queensland Grants Finder

For Australian Government Grants:

Current Grant Opportunity List: GrantConnect

For Australian Renewable Agency:

Funding Opportunities - Australian Renewable Energy Agency (ARENA)

Skills and training

Manufacturing Skills Queensland (MSQ) is an independent industry-led organisation established to address the specific workforce development needs of Queensland's manufacturing sector, including emerging industries like solar component manufacturing.

- Targeted and subsidised training programs
- Workforce planning assistance
- Skills development initiatives
- Subsidised mentor training for experienced workers
- Talent attraction and retention strategies

MSQ works collaboratively with industry, unions, training providers and government to align workforce capabilities with emerging technologies and market demands, positioning Queensland manufacturers at the forefront of renewable energy component production.

Energy sector support

Smart Energy Council

> smartenergy.org.au

The Smart Energy Council supports manufacturers by advocating for pro-renewable policies, facilitating global trade opportunities, and connecting them with industry partners. Through working groups, technical guidance, and events, it helps manufacturers innovate, scale, and thrive in the clean energy economy.

Queensland Clean Energy Council

> qrec.org.au

Queensland Clean Energy Council (QREC) supports manufacturers to tap into clean energy supply chains, stay informed on regulatory changes, and access resources.

Solar Accreditation Australia

> saaustralia.com.au

Solar Accreditation Australia supports manufacturers by ensuring technical standards and accreditation for renewable energy systems, helping maintain quality and compliance across the industry.

Clean Energy Council

> cleanenergycouncil.org.au

The Clean Energy Council supports manufacturers by advocating for policies that drive demand for renewable technologies, setting rigorous industry standards to ensure product quality and safety, and fostering connections across the clean energy supply chain through its extensive membership network.

Australian Renewables Academy

> australianrenewablesacademy.com.au

The Australian Renewables Academy (ARA) is a national workforce initiative designed to accelerate Australia's transition to clean energy by equipping communities, manufacturers, and industries with the skills they need to thrive. It focuses on building local capability, supporting regional supply chains, and delivering accredited training programs tailored to the renewable energy sector.

The Decarbonisation Hub – University Research and Development

> decarb-hub.org

Engaging with the Queensland Decarbonisation Hub offers manufacturers a strategic pathway to future-proof their operations by connecting with cutting-edge research and policy development. Through collaboration with universities, government, and industry leaders, manufacturers can access tailored support for transitioning to cleaner processes, upskilling their workforce, and unlocking funding opportunities.

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SOLAR MANUFACTURING ENTRY CHECKLIST

1. Identify growth opportunities

- [ ] Analyse Queensland solar market demand and project locations
- [ ] Map competitive landscape to identify supply gaps
- [ ] Assess where your capabilities align with market needs
- [ ] Define your competitive advantage and value proposition
- [ ] Consider lifecycle opportunities (initial production through to recycling)

2. Evaluate your business

- [ ] Assess current maturity level (1-5) in key capability areas:
  - Production systems
  - Quality systems
  - Supply chain
  - ESG readiness
- [ ] Identify critical gaps requiring improvement
- [ ] Create timeline with milestones for capability development
- [ ] Design process flows meeting solar manufacturing requirements
- [ ] Develop protection strategies for intellectual property

3. Market entry requirements

- [ ] Select optimal entry strategy:
  - Component supplier
  - Subcomponent assembler
  - System integrator
  - End-to-end manufacturer
- [ ] List specialised equipment required for chosen pathway
- [ ] Review facility requirements (space, clean environments)
- [ ] Identify applicable quality standards and certifications
- [ ] Plan certification timeline and resource allocation

4. Workforce wtrategy

- [ ] Audit existing team skills and identify transferable capabilities
- [ ] Create skills matrix mapping required competencies
- [ ] Define key roles needed (i.e., engineering, production, quality)
- [ ] Develop targeted training programs for identified gaps
- [ ] Establish partnerships with relevant training providers

5. Leverage support systems

- [ ] Contact your Queensland Regional Manufacturing Hub for support
- [ ] Explore funding and grant opportunities
- [ ] Join key industry associations:
  - Smart Energy Council
  - Queensland Renewable Energy Council
  - Clean Energy Council
- [ ] Connect with Manufacturing Skills Queensland (MSQ) for workforce development support

CONTACT US

Manufacturing Skills Queensland (MSQ) is building a sustainably skilled workforce for a future-proofed manufacturing industry.

For more information on work experience programs in manufacturing or any other query on manufacturing skills, please contact us at:

P: 1800 677 000

E: msq.org.au/contact

W: msq.org.au

MANUFACTURING SKILLS QUEENSLAND