



Below is a summary of your responses

Introduction. This survey has been distributed by PwC on behalf of the Queensland Department of Energy and Public Works. This survey seeks to gather stakeholder input regarding resilience and local content targets in Queensland's renewable energy supply chain.

As part of the Queensland Energy and Jobs Plan, the Government has highlighted a commitment to growing Queensland's renewable energy supply chain. This is being explored through the lenses of ensuring supply chain resilience and setting local content targets to drive local benefits.

We invite you to provide your input on how Government can:

- Ensure supply chain resiliency in responding to supply chain shocks which may occur during Queensland's renewable energy transition
- Set optimal Local Content Targets to develop renewable energy supply chains and improve investment certainty.

This survey contains 36 questions and will take approximately 10-15 minutes to complete. This survey will close **COB Tuesday 7 June**.

If a question is not applicable to you, please answer 'N/A'.

*Information collected in this survey will be held and analysed by PwC for the duration of our engagement. While the link provided and your response is unique to your business or organisation, your responses will be treated confidentially and data utilised will be done so on an aggregated and de-identified basis. Any data collected will be utilised in accordance with the terms of our engagement and in accordance with relevant privacy principles.*

If you are having trouble accessing the survey or wish to forward to your colleagues,

please contact PwC staff (Michael Carsley, michael.carsley@au.pwc.com).

Thank you

Q1. Which of the following groups do you represent?

- Government Agency
  - GOC
  - Peak Body
  - Developer
  - Engineering
  - Procurement
  - Construction
  - Supplier
  - OEM / Manufacturer
  - Assembler
  - Other
- 

Q2. Which of the following sectors does your business primarily provide or plan to provide components or services to?

- Solar PV Wind
- Farms
- Battery storage (BESS)
- Network infrastructure
- Hydrogen
- Pumped Hydro Energy Storage
- None of the above

Q3. Does your business have any current or planned projects in Queensland?

**N/A**

- Yes
- No

Q4. Does your business have any operations or workforce based in Queensland?

- Yes
- No

Q5. Does your business have plans to establish operations or workforce in Queensland? **N/A**

- Yes
- No

**Q6. Supply chain resilience refers to the exposure to and resilience in responding to supply chain shocks which may occur during Queensland's renewable energy transition.**

Q7. Does your business or industry have a response plan to supply chain shocks (initial interruption) or challenges (ongoing interruption)? E.g. natural disaster response plan, supply shortage response plan

- Yes
- No
- Other

**Q8. The following supply chain vulnerabilities have been identified for Queensland's renewable energy transition. For each vulnerability, select which you consider to be the most significant risk (or add your own), and explain your selection.**

## Q8.1. Vulnerability 1: Sourcing and supply of goods and services

- Supply shortages - Available supply of componentry will be constrained as a result of growing global demand
- Exposure to unplanned cost escalations - Local and Global demand and a growing cost base for acquisition of componentry will drive cost escalations
- Country of origin (market concentration) - Impacts on source markets that are highly concentrated can create challenges for supply chains
- Other

Q8.1.1. Explain why you have selected the above risk as most impactful for sourcing and supply of goods.

The shortage of specific imported “technology” components such as solar panels may force local manufacturers supplying the locally fabricated supporting steelwork structures to reduce their production output. This could be due to a lack of alternative sources of the imported components. As a result, local manufacturing capacity may be underutilized, leading to decreased productivity. In this example It is important for the global supply chains to be transparent to allow substitute solar panels to be used in the projects. There is little risk of the local steel supply chains failing to deliver the supporting steelwork on these projects as there is more than enough production capacity and local manufacturers. Any overseas supply shortage particularly from Asia is the major risk to failure of the projects.

## Q8.2. Vulnerability 2: Warehousing of supplied componentry

- Storage challenges - Lack of appropriate storage solutions will lead to under or over capacity commitments
- Inventory management - Insufficient Inventory planning for componentry will result in poor warehousing effectiveness
- Other

Q8.2.1. Explain why you have selected the above risk as most impactful for warehousing of supplied componentry.

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Lack of storage solutions or poor warehousing effectiveness is not a concern for local manufacturers as the steelwork is fabricated at the required rate and supplied directly to site to be assembled and erected immediately on arrival. The alternative imported steelwork arrives by ship in large deliveries which must be stored on arrival prior to being separated into sections and then delivered to site. This creates a considerable risk where sufficient warehousing may not be available for the imported steelwork.

Q8.3. Vulnerability 3: Transportation of manufactured goods (componentry)

- Network capability - Insufficient network capability to support added volume of goods will be put under strain
- Infrastructure capacity - Inadequate logistics infrastructure capacity can lead to delay or non-delivery of goods
- Other

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Q8.3.1. Explain why you have selected the above risk as most impactful for transportation of manufactured goods.

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Delay in transport of specific imported “technology “components such as solar panels can delay the overall project. It is important to have more than one supplier of these components so that the supporting steelwork supplied by the local steel supply chain is not delayed due to the imported components not arriving in Australia on time.

Q8.4. Vulnerability 4: Assembly and storage of manufactured goods

- Plant failure - Mechanical and electrical equipment failures in manufacturing facilities will reduce output
- Storage challenges - Lack of appropriate storage solutions will lead to under or over capacity commitments
- Other

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N/A. Assembly and storage of locally manufactured goods is not a concern as the goods are distributed to site in bulk without the need for storage off-site.

Q8.4.1. Explain why you have selected the above risk as most impactful for assembly and storage of manufactured goods

Q8.5. Vulnerability 5: Transportation of assembled goods

- Network capacity - Large and cumbersome items cannot be delivered to the customer
- Scheduling - Without a schedule effective utilisation of the transport carriers be reduced
- Other

Q8.5.1. Explain why you have selected the above risk as most impactful for transportation of assembled goods

The transportation of assembled goods is of little risk for the Australian steel supply chain as separate components are delivered to site and the assembly of the modules then occurs on site. The greatest risk occurs when global supply chains ship assembled goods (modules) from overseas suppliers. The environmental damage caused by increased greenhouse gases and air pollution through long distance shipping of overseas assembled goods to Australia must be considered when assessing this source of supply.

These ships are powered by fossil fuels which emit significant amounts of greenhouse gases, including carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). CO<sub>2</sub> is a major contributor to climate change, while CH<sub>4</sub> and N<sub>2</sub>O are potent greenhouse gases. The burning of fossil fuels for shipping contributes to the overall carbon footprint and exacerbates climate change. Cargo ships typically use heavy fuel oils that contain high levels of sulfur. The combustion of these fuels releases sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), and particulate matter (PM) into the atmosphere, leading to air pollution. These pollutants can have adverse effects on human health and contribute to smog formation and respiratory problems.

Q8.6. Vulnerability 6: Through life support

- Asset maintenance investment - Lack of investment in asset maintenance results in sub-optimal asset performance and lifecycle
- Workforce shortages - Shortage of skilled labour required to source, manufacture, deliver and maintain renewable energy technology will be delayed
- Other

Q8.6.1. Explain why you have selected the above risk as most impactful for through life

## support

Overseas manufacturers of infrastructure for renewable energy projects produce a “one size fits all” solution without designing to suit local conditions where the infrastructure is built. This can lead to a below specification result for some locations.

Examples of below specification occurs where the strength, chemical composition or corrosion protection of the steelwork does not satisfy the requirements of Australian standards leading to premature failure of the steelwork and possible safety issues. The quality and traceability of steel is dependent on a number of parties in the supply chain. If any link in this chain is broken, the ability to ascertain compliance is compromised. The Australian Steel institute’s ‘Steel Verification Protocol’ establishes a methodology to ascertain compliance. As with the majority of construction products, structural steel intended for the Australian marketplace must meet the requirements of Australian Standards to provide durable fit for purpose structures and satisfy the duty of care established under Workplace Health and Safety legislation.

Q9. In the event of a significant supply chain disruption, rate the impact of the following supply chain risks on your business / industry?

	Low	Medium	High
Supply shortages - Available supply of componentry will be constrained as a result of growing global demand	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exposure to unplanned cost escalations - Local and Global demand and a growing cost base for acquisition of componentry will drive cost escalations	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Country of origin (market concentration) - Impacts on source markets that are	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

highly concentrated can create challenges for supply chains

Low	Medium	High	C	C
Storage challenges - Lack of appropriate storage solutions will lead to under or over capacity commitments	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Inventory management - Insufficient Inventory planning for componentry will result in poor warehousing effectiveness	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Network capability - Insufficient network capability to support added volume of goods will be put under strain	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Infrastructure capacity - Inadequate logistics infrastructure capacity can lead to delay or non-delivery of goods	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Plant failure - Mechanical and electrical equipment failures in manufacturing facilities will reduce output	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Storage challenges - Lack of appropriate storage solutions will lead to under or over capacity commitments	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Network capacity - Large and cumbersome items cannot be delivered to the customer	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Scheduling - Without a schedule effective utilisation of the transport carriers be reduced	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Asset maintenance investment - Lack of investment in asset maintenance results in sub-optimal asset performance and lifecycle	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Workforce shortages - Shortage of skilled labour required to source, manufacture, deliver and maintain renewable energy technology will be delayed	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	



Q10. Considering the responses you have rated highest in the above questions, how long would it take your business / industry to recover from the disruption (and adapt to the new supply chain conditions)?

- Less than 12 months  
 12 - 24 months  
 2 - 3 years  
 3 - 5 years  
 5+ years  
 N/A

Q11. Considering your answers, what could your business / industry be doing differently to address supply chain shocks over the next decade, to limit disruptions?

Closer and earlier engagement of the local steel industry with project proponents and government is needed. The government must ensure that this occurs.

Q12. What could Government be doing differently to support your business / industry in addressing enduring supply chain shocks over the next decade, as relevant to Queensland's energy transition?

The government should be ensuring that technology and other components for renewable energy projects are manufactured locally to reduce the reliance on overseas supply of these components.

Q13. Are there other considerations that have not being mentioned above, in reference to supply chain vulnerabilities that your business / industry has observed?

The fabricated steelwork required for renewable energy projects includes a mixture of components that are readily available in Australia and those that haven't been sourced locally for many years. The sheer scale of the demand and the extended timeframe over which it is required mean that this energy transition provides a unique opportunity to develop advanced manufacturing capability in several areas of strategic importance for future energy security. These opportunities include but are not limited to:

- Onshore wind tower fabrication;
- Offshore wind tower fabrication;
- Production of large diameter tube suitable for manufacturing of torque tubes for solar cell tracking and support frame structures;
- High voltage transmission tower fabrication.

The local steel producers, steel product manufacturers and fabricators have the crude steel supply and underpinning production capabilities to make these products, but largely lack the specialised large scale

automated capacity that is typically required to produce cost efficiently. This capacity can readily be created in a relatively short time via targeted investment in dedicated plant and equipment. The key to driving the required capital investment is the existence of firm local participation targets for supply of renewable energy infrastructure, which are set at a level sufficiently high enough to ensure manufacturing economies of scale are achieved.

**Q14. As part of the Queensland Energy and Jobs Plan, the Government is committed to setting local content targets to drive local benefits.**

*Action 3.4 (a) Release local content targets to develop renewable energy supply chains and outline relevant policy mechanisms to improve investment certainty.*

**In this context, local content targets might seek to specify the proportion of renewable energy project costs that must be incurred in Queensland, including value associated with development and construction, financing, land acquisition, transport and logistics and labour.**

Q14. What limitations would your business / industry face in sourcing / supplying goods to meet Local Content targets (noting existing agreements already in place under Buy Queensland)? Select all that apply.

- Cost premium of local content compared to imported content
- Quality of local content compared to imported content
- Lack of local content
- Inability to deliver sufficient scale
- Inability to deliver to required project timeframes
- Other

Q15. Considering the type of renewable energy projects your business / industry develops, what approximate percentage is currently incurred in Queensland?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Percentage of project costs incurred in QLD



Q16. Considering the level of project costs incurred in Queensland, what type of costs do

these relate to and / or in which part of the project cycle are costs incurred?

The costs relate to the supply and fabrication of structural steelwork. The costs are incurred towards the middle of the project cycle.

Q17. In implementing a local content target for renewable energy projects, how should the target/requirement be applied to derive the most benefit to Queensland and your business / industry?

- Percentage of total project costs that must be incurred in Queensland
- Percentage of hours worked across the project in Queensland
- Percentage of cost of specific assets/subcomponents
- Other

Key points to consider to deliver the most benefit to Queensland and the local steel supply chain:

- **'Contestable' Australian content** to be identified and reported separately (e.g. steel). Content that must be local by its very nature including activities such as, civil works (e.g. earth-moving), logistics contracts, accommodation, etc., should not be labeled 'Contestable'.
- Sub-Contract component build phase, Site construction phase and operations phase to be identified and **reported separately**.
- **Accountability and consequences** for non-compliance to be clearly outlined and enforced.
- The concept of **'Full, Fair and Reasonable'** as noted in both federal and state government documents should be redefined and more rigorously tested throughout the project reporting process. Examples of lack of opportunity and design to foreign standards and materials have been commonplace.
- Projects should be designed conforming to all relevant **Australian Standards** and with no preferential treatment to offshore suppliers.
- Procurement Plans to be made public, **full transparency** to be adopted, giving due consideration to any 'commercial in confidence' areas. However this has been used as a 'smoke screen' in the past and must be closely monitored as this is a key element in establishing accountability.
- Queensland local content plans should be linked with federal government plans and the plans of other state governments.
- **Detailed progress reports** (suggest quarterly) should be the responsibility of the responsible Queensland Minister and coordinated through an independent body.
- Conduct a **post-project review** of each project including identified areas of improvement from both Industry's and proponents' perspectives. Importance should be given to skills and job creation and value-added benefit to Queensland Industry.

Q18. Considering your answer to the above question, to what specific items should

local content targets be applied?

- Technology-specific (e.g. costs or hours worked over the life of a wind farm development)
- Component-specific (e.g. costs or hours incurred for wind turbine rotors)
- Project phase-specific (e.g. costs or hours incurred over the operations and maintenance phase of a project)
- Other

Costs or hours should not be a measure of local content targets. Local content targets for structural steel should be the number of tonnes of locally produced steel provided by the local steel supply chain.

The following provides a guide on the amount of steel in various renewable energy projects:

**Wind:**

- It is estimated that each 1 MW generated by an onshore wind tower requires 124 tonnes of steel for the tower, hold-down bolts, foundation cage, and concrete foundation reinforcing bar. For offshore wind, the metric is 190 tonnes of steel per MW generated.

**Solar:**

- The steel components include a foundation pile (normally a hot rolled channel or column), torque tube (octagonal, square or tubular hollow section), frames or Rails for PV panels and Brackets.
- Typically, about 45 tonnes of steel are required for each 1 MW of solar energy generated.

**Water:**

- Hydro projects require large diameter steel liner pipes, penstock, related fabrications, tunnel reinforcement, and foundations.
- It is estimated that each 1 MW of hydro power will require 161 tonnes of steel.

**Transmission:**

- Each 1000 kms of transmission line typically requires 2500 towers at 30 tonnes steel per tower for the actual lattice tower and the concrete foundation reinforcing bar.

Q19. In implementing local content targets for renewable energy projects, would you see benefit in setting location-specific targets to certain regions or Manufacturing Precincts? Explain your answer

- Yes, location-specific Local Content Targets should be implemented
- No, location-specific Local Content Targets should not be implemented

Q20. Explain your answer to the above question

The following points will assist in engaging and supporting location specific local content supply.

- **Skills development / job creation** / Traineeship and Apprenticeship creation.
- Concept of '**Value for Money**' should look beyond 'least cost'. Consideration should be given to whole-of-life costs, including maintenance, quality and ongoing domestic supplier relationships. This may be more expensive in regional areas.
- Identifying Queensland companies that the investors will **partner** with and who will provide inputs into the build and construction phases of the projects.
- Analyze major project components and demonstrate how these components will **match the project requirements** with the capacity, competency and capabilities of the Queensland steel supply chain.
- **Assist Queensland companies** to improve their capability and capacity in line with proponents future requirements.
- Facilitate **technology transfer**

Q21. If local content targets are implemented for your business / industry, how can Queensland Government support businesses in meeting local content targets? Select all that apply.

- Raising awareness of local manufacturers and capabilities
- Ensuring adequate scale and pipeline of local manufacturing facilities
- Capital support such as loans
- Tax incentives
- Other

Q22. In implementing local content targets to your industry, should targets be applied as a mandatory requirements or as a preference in procurement?

- Local Content as a mandatory requirement
- Local Content as a preference to procurement
- Other

With local content as a mandatory requirement it is essential that certification to Steel Sustainability Australia (SSA) (<https://www.steelsustainability.com.au/>) as a pre-qualification be compulsory for all companies providing fabricated steelwork, cold-formed steel and steel reinforcing for Queensland renewable energy projects. The SSA program engages the entire steel value chain by certifying downstream steel businesses such as fabricators, roll formers, and reinforcing processors, and verifying upstream steel producers against best practice environmental, social and governance (ESG) indicators aligned to the Principles supporting the Green Building Council of Australia's (GBCA) Responsible Product Framework.

Q23. When considering the application of local content targets in Queensland, what project-type should they be applied to? Select all that apply.

- GOC projects
- Government-funded projects
- Projects withing Queensland's Renewable Energy Zones (or other defined precincts)
- Across all renewable energy projects in Queensland
- Other

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