PRE-FEASIBILITY STUDY

Australian Silicon (AusSi) Study

Knowledge Sharing Report April 2026

Front cover: Asia Silicon's 100,000 t polycrystalline silicon facility in Xining, Qinghai Province, China (Asia Silicon is a consortium member of the Australian Silicon Study)

Purpose and scope of the report

This Knowledge Sharing Report presents a subset of key findings from the Australian Silicon Study (AusSi study), supported by the Australian Renewable Energy Agency (ARENA) under the Solar Sunshot program. The study has been undertaken in close collaboration with industry and research partners, including Bright Dimension, the Australian Centre for Advanced Photovoltaics (ACAP), GHD, ITP Renewables, Cyan Ventures, Solinno, Asia Silicon and Hualu Technologies.

The study examines the potential for establishing polysilicon production in Australia, with a focus on the Hunter Energy Hub in NSW. It analyses global market dynamics, supply chain constraints and Australia's strategic position, and evaluates the technical, economic and regulatory factors that influence project viability.

The report aims to provide a transparent, evidence-based assessment of key cost drivers, risks and enabling conditions, while highlighting areas of opportunity where Australia could play a role in emerging global diversified supply chains. It is intended to inform consideration by government, industry, research and broader stakeholder groups.

Disclaimer

How to cite this report

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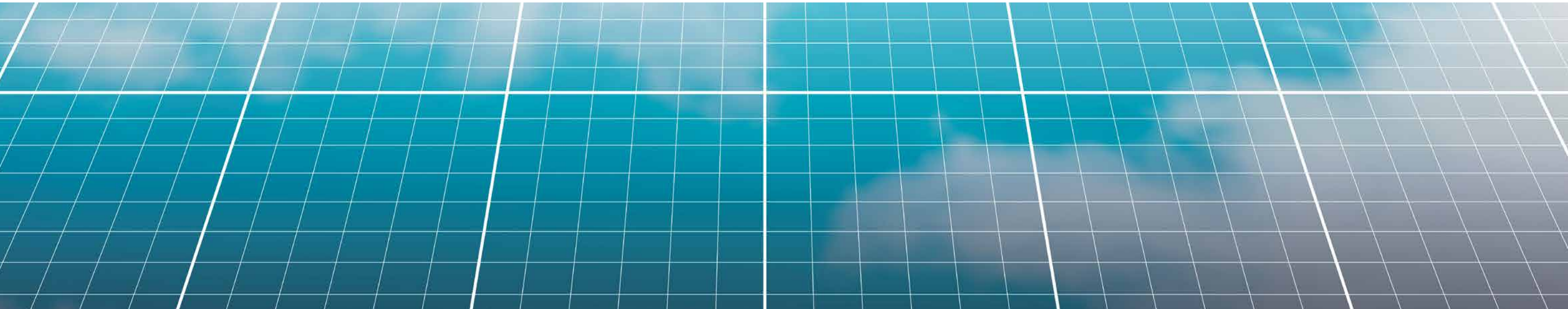


Leading entities

Contributing entities

Acknowledgements

We express our sincere appreciation for the contributions from this Study's Advisory Committee, Jenny Lu, Chris Reynolds, Mark Twidell, Mark Bonnar, Renate Egan, Tihu Wang, and Dan Sturrock. We also extend our gratitude for the contributions from Xiaohai Ding, Jane Callinan, Fred Qi, Nathan Chang, Simao Lin, Shaun Chau, Fraser Thompson, James Russell, Michael Vitiello, Shen Chen and Rose Shi. We are grateful for the photos of the polycrystalline silicon facility provided by Asia Silicon. This project received funding from the Australian Renewable Energy Agency (ARENA) as part of ARENA's Solar Sunshot Program.

1 Executive summary

The significance of the Australian Silicon Study: "Australia's biggest opportunity for growth and prosperity is the global shift to clean energy" according to the Australian Government[1]

For Australia to turn this opportunity into reality, the shift needs to be bold, decisive and starting now.

This study assesses the potential of a large-scale polycrystalline silicon processing plant at the Hunter Energy Hub in the context of the *Net Zero Transformation Stream* and the *Economic Resilience and Security Stream* formulated in the Treasury's Future Made in Australia (FMIA) National Interest Framework.[2] The development of polycrystalline silicon (poly-Si) plant helps Australia "capture more of the global solar manufacturing supply" as stated as target of the Solar Sunshot program by the Australian Government.[3]

A successful development of a poly-Si facility in Australia will deliver material benefits:

1 The facility addresses the risk of energy dependency, because Australia would be a significant participant in a globally diversified solar supply chain.

2 The facility provides a direct return in the form of new investment, new jobs, and new exports (the export of poly-Si would help replacing the diminishing export of LNG and coal in the future).

3 It delivers a long-term reward by reversing the trend of Australia's decline in manufacturing while at the same time increasing Australia's economic complexity and labour productivity. A large-scale state-of-the-art facility is the anchor industry necessary to create an ecosystem that will facilitate the rapid development of solar manufacturing up and down the value chain.

4 It offers a chance to retrain and transition the local workforce from fossil fuel-based industries to renewable energy-based sectors, and contribute to the economic diversification of the region with significant benefits for the local community and the whole economy.

The AusSi Study aims to contribute to a globally diversified solar supply chain by laying the foundations for the development of a large-scale polysilicon industry in Australia. If successful, such a facility could serve as a blueprint for other emerging, energy-intensive manufacturing industries.

[1] Minister for Climate Change Energy Chris Bowen and Treasurer Jim Chalmers, https://ministers.treasury.gov.au/ministers/jim-chalmers-2022/media-releases/budget-boosts-australias-transformation-renewables, viewed 12 Oct. 2024
[2] Treasury, "Future Made in Australia National Interest Framework", 14 May 2024
[3] Prime Minister Media Release, https://www.pm.gov.au/media/solar-sunshot-our-regions, 28 March 2024

Enabling a **FUTURE MADE IN AUSTRALIA**

Australia's future energy export opportunity

Net Zero Transformation Stream.

Australian renewable energy

Abundant land, prime solar and wind resources

Polysilicon facility

~2.7 TWh[1] of electricity to produce 50 kt of core solar module input material

High-value export

Adds 50 kt of ultra-pure polysilicon as a **new value-added export** to produce ~27 GW[2] of modules per year

Global decarbonisation

Enables clean solar energy for decades worldwide[3]

Energy delivered per 150 kt shipment[4]

Coal (thermal)

One-time energy

~1.2 TWh[5]

~2,300x

More energy potential per shipment[5]

Polysilicon

one shipment would produce >80GW PV modules[4]

~2,800 TWh[6]

2025
Australian thermal coal exports

200 Mt[7]

Exported per year

~500 TWh[5]

electricity generated per yearly export

VS

2030
Clean energy trade

50,000 t

per year in a single facility

Each year of 50kt production the facility enables

~940 TWh of solar generation

over a 25-year module lifetime[3]

¹ From this Study (assuming ~ 55 kWh/kg of poly-Si).
² Assuming 2025 average of 1.8g of poly-Si per Wp of solar.
³ Assumes 25 year lifetime; with 80% of initial power output warranted.
⁴ Assumes 150 kt tonne capacity (deadweight tonnage, DWT) for a large dry bulk vessel.
⁵ Typical coal-fired power plant efficiency of 35%, https://www.pcienergysolutions.com/2023/04/17/power-plant-efficiency-coal-natural-gas-nuclear-and-more/, viewed 22 April 2026.
⁶ Assuming solar module output of 1,500 kWh/kWp as global average.
⁷ https://www.industry.gov.au/publications/resources-and-energy-quarterly-december-2024#thermal-coal viewed 21 April 2026, (200 million tonnes 5,200 PJ eq.)

Enabling a FUTURE MADE IN AUSTRALIA

The key benefits of a 50,000 t polysilicon facility at the Hunter Energy Hub

Economic resilience and security stream.

1

Economic benefit

- Establishes a **$2.5–3.5 billion industrial investment** delivering **~$1.1 billion in annual economic value**.
- Creates **900 high-skilled, full-time jobs** and lifts Australia's economic complexity.
- Produces 50,000 t of polysilicon, **enabling 27 GW of solar modules**—exceeding national demand to build export revenue.

2

Economic resilience

- Reduces global risk by **addressing extreme supply concentration** of critical solar materials to improve supply chain resilience.
- Strengthens **Australia's industrial sovereignty** through domestic production for core component of main future energy source.
- Integrates Australia into a **globally diversified solar supply chain** with validated demand across six countries.

3

Jobs for local community transformation

- **Transitions experienced workers** from closing coal fired power stations into advanced clean-energy manufacturing.
- **Drives regional growth** by leveraging existing power, water, and transport infrastructure.
- Anchors a **new large-scale clean-energy industry**, stimulating long-term local development.

Executive summary

A structural shift in the global polysilicon market is creating a unique opportunity for Australia in a diversifying and rapidly expanding solar supply chain. The growing demand for non-Chinese poly-Si enables Australia to build a new, globally relevant and viable industry exporting a critical, processed mineral with a high embedded energy content.

Australia's latent opportunity

Solar is central to global decarbonisation and projected to remain one of the lowest cost generation technologies as electricity demand grows, with polycrystalline silicon (poly-Si) as a critical upstream input to the PV value chain.

The global poly-Si supply chain is highly concentrated (with ~ 95% of production in China), but sustainability, labour standards and supply chain resilience contribute to the desire of diversification driven by broader national efforts around the world.

Australia is well-positioned to contribute to the global supply chain diversification, leveraging its reputation as a trusted commodity exporter, existing metallurgical silicon capacity, and strong capabilities in IP development and large-scale chemical processing.

From day one, at least 90% of the 50,000 tonne poly-Si production would be export-oriented, aligning with Australia's role in global energy and resource markets and enabling participation in the rapidly expanding clean energy supply chains.

While based on established technology to reach scale, **polysilicon production in Australia could enable innovation in renewable integrated industrial systems**, low-carbon advanced manufacturing and future process development.

Supply chain constraints

Demand for non-Chinese poly-Si is growing rapidly as solar deployment scales and supply-chain localisation accelerates in many countries around the world.

Regions prioritising diversification and alignment with evolving labour, sustainability and regulatory standards, including the US, EU and India, are actively investing in domestic solar manufacturing capacity, yet upstream poly-Si capacity in these regions has proven challenging to scale relative to downstream cell and module expansions.

As a result, **a mismatch is emerging between downstream manufacturing growth and the availability of non-Chinese or compliant poly-Si supply**, with current and announced projects outside China falling short of projected demand leading to an estimated supply gap of ~240,000 t by 2035 and over 350,000 t by 2040.

An Australian poly-Si facility commencing production by early 2030's would be **well positioned to fill the emerging supply gap**, however, the planning, engineering, and funding processes must commence immediately to ensure the facility is operational in time.

The unique opportunity for Australia will not happen by chance but needs to be created. With the right enabling conditions in place, Australia can develop a viable poly-Si industry that generates substantial benefits for both local communities and the broader economy.

Conditions for viability

Poly-Si production is a highly energy intensive and complex chemical refining process of metallurgical silicon, with economic viability strongly influenced by market pricing, alongside access to low-cost electricity, capital costs and competitively priced input materials.

The AusSi Study reveals a high sensitivity to price assumptions, highlighting the importance of stable and sustainable pricing conditions for long-term industry development, as well as the role of low-cost renewable electricity in shaping competitiveness.

Success also depends on strong partnerships across the value chain, including access to technology and operational know-how typically provided through experienced technology partners, as well as downstream market channels, supported by Australia's position as a trusted supplier with transparent ownership and governance.

The Hunter Energy Hub considered as the possible location of the plant in this study brings together existing infrastructure, including grid connection, water access, transport links (road, rail and port) and industrial land, providing a suitable foundation for energy-intensive manufacturing opportunities

The site is undergoing a transition from thermal coal power generation to a diversified energy and industrial hub, situated within a renewable energy zone and a pipeline of generation and firming capacity.

The region also benefits from an established industrial workforce, experience with large-scale projects, and ongoing engagement between government and industry to support new economic activity.

Implications and next steps

The total economic benefit of the AusSi project to the Australia economy could exceed $1.1 billion annually with significant positive impact on the local community and wider Hunter region including 900 high-skilled full-time jobs.

Government support consistent with broad international experience, including capital support alongside production-based incentives, would enable **the poly-Si plant to operate within the financial KPI framework typical for this type of industry**.

A time-sensitive window exists for early participation, supported by current policy settings, including the Critical Minerals Strategy, Future Made in Australia, and rising demand for non-Chinese poly-Si, to strengthen resilient supply chains.

The retirement of coal-fired power generation creates an opportunity to repurpose existing infrastructure and catalyse new industrial activities and jobs.

Growing global demand for solar power means the first plant would be only the starting point, with subsequent Australian poly-Si facilities able to build on early learnings. **Australia can develop the domestic capability required for a fully viable poly-Si industry and has the potential to become a cost leader in non-Chinese poly-Si**, leveraging its long-standing expertise in heavy industrial operations.

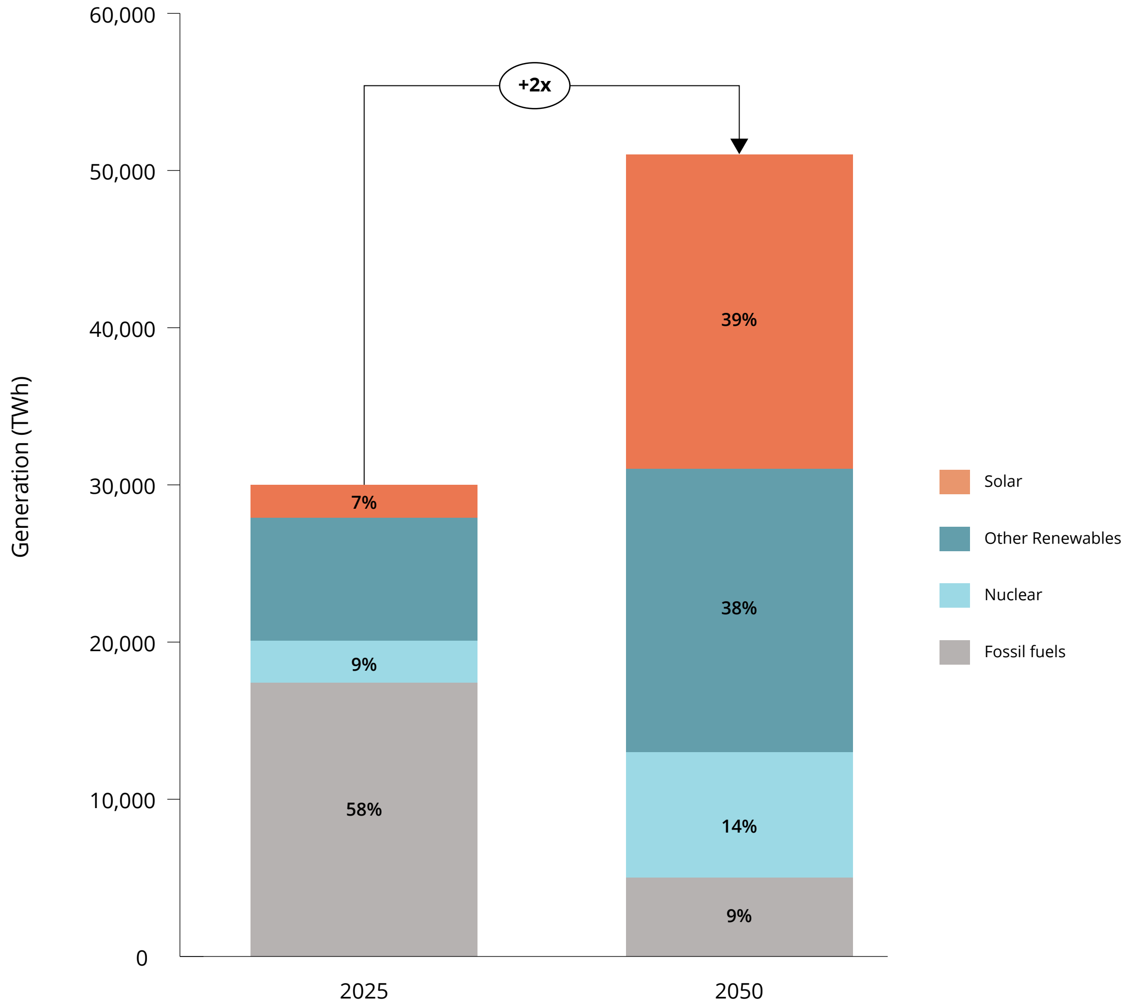
Whilst it is too early to make the financial decision on the full $ 2.5 – 3.5 billion dollar investment with the remaining uncertainties, the AusSi Study has shown that a credible pathway to building an export oriented, large-scale and economically viable poly-Si industry in Australia exists. **Keeping this optionality alive, by moving to the next development phase, is the main conclusion of the Australian Silicon Study.**

2 Australia’s latent opportunity & PV growth

Solar will be the critical energy infrastructure for the world

Electricity demand will double by 2050 with solar being the dominant generation source for decades to come.

World Energy Outlook from IEA: Stated Policies Scenario (TWh)



Source: IEA World Energy Outlook (2025), Net Zero Emissions by 2050 Scenario; IRENA (2025)

Solar is here to stay

Energy transition underway

Countries globally are accelerating the shift from fossil fuels to renewables. Solar is forecast to grow from 7% to 39% of generation by 2050, while coal declines from 38% to 8% and gas from 22% to 13% (IEA).

Driving global electrification

The result is unprecedented electricity demand as economies electrify transport, heating/cooling, and industrial processing, compounded by the data centre boom. Total generation is set to double by 2050, requiring massive new-build capacity.

Solar is the lowest cost form of electricity

In 2025, solar at ~$0.04/kWh (down 88% since 2010) compared $0.08/kWh for fossil fuels is the cheapest form of electricity, making it the cornerstone of new-build generation globally.

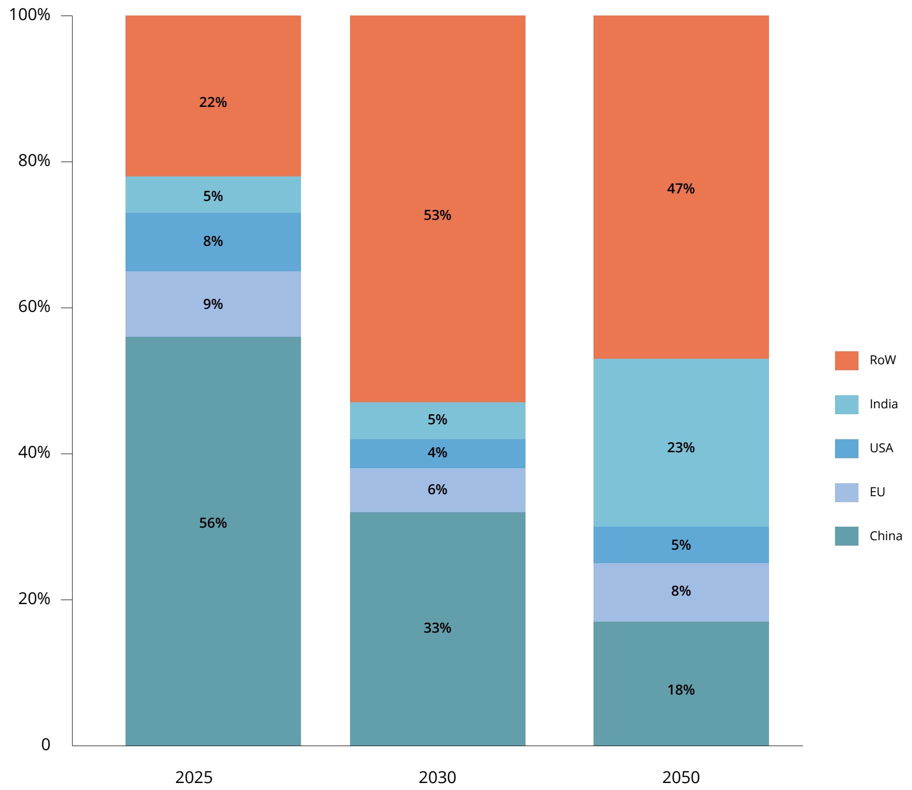
China has been the primary engine of global PV demand growth to date

but accelerating growth in other regions means China will not remain the dominating country for the deployment of solar power.

Global PV demand to date has been driven predominantly by China yet future growth is expected to be led by the rest of the world. By 2050 its share is expected to fall from 56% to 18%, emerging markets like India (5% → 23%) and the rest of the world (22% → 47%) become the primary drivers of demand expansion.

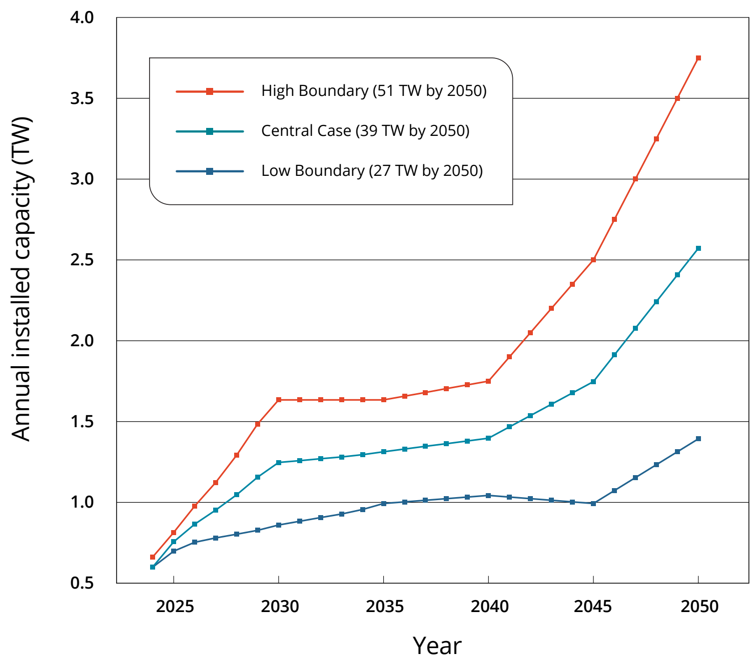
Emerging economies are beginning to leapfrog traditional grid infrastructure, moving directly towards decentralised solar and battery systems, driving a growing share of future demand.

Considering current trends and decarbonisation needs, the solar market is expected to grow to an annual demand of between 1.2 TW and 1.7 TW by 2030, with 1.9-2.7 million tonnes of poly-Si required for production, depending on technology advancement.



Regional shares reflect the central case scenario derived from this study, projecting ~1.2 TW of annual PV installations by 2030, rising to ~2.5 TW annually by 2050

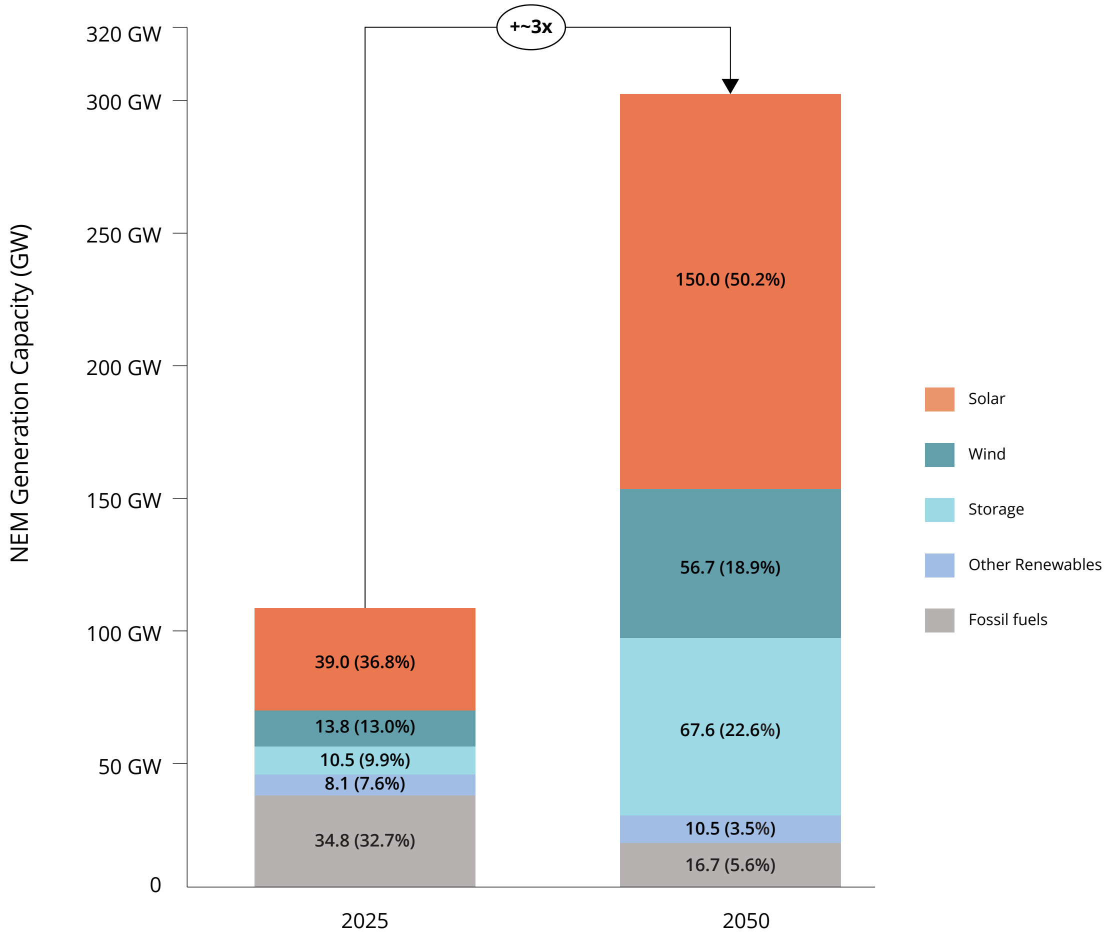
Sources: Bernreuter (2025), Bogdanov et al. (2021), CPIA (2025), PV Cell Tech (2025), this study.



Solar will be the main source of energy for Australia by 2050

Instead of LNG and coal, Australia will be exporting processed commodities with high embedded energy content, like Fe, Al, NH_3, and processed silicon.

2026 AEMO Draft Integrated System Plan (GW)



Source: IEA World Energy Outlook (2025), Net Zero Emissions by 2050 Scenario; IRENA (2025)

Australia's energy transition is accelerating

National targets locked in

Australia targets 82% renewables in the NEM by 2030, with economy-wide emissions 43% below 2005 levels by 2030, reducing further to 62–70% below 2005 by 2035.

Demand is set to nearly double

NEM consumption forecast to grow from 205 TWh today to 389 TWh by 2050, driven by electrification, population growth, and large new loads including data centres and hydrogen production.

Coal phase-out underway

Coal capacity falls from ~22% of the NEM in 2025 to 0% by 2050 under the ISP Step Change scenario. State and federal policies are accelerating closure timelines, with no new coal investment anticipated.

Declining technology costs underpin the transition

Grid-scale solar capital costs fell to $1,500/kW by 2025 and are forecast to fall a further 27% to $1,100/kW by 2030, while coal with CCS* has risen 53% to $11,700/kW over the same period.

* Carbon Capture and Storage

"Renewable energy connected by transmission and distribution, firmed with storage and backed up by gas, is the least-cost way to supply secure and reliable electricity to consumers through to 2050, as coal plants retire and while meeting government policies."

AEMO Draft 2026 ISP

Supply chain constraints tells the same story as other critical minerals

Polysilicon powers the solar value chain and continues to be one of the highest concentrated steps – a more diversified supply chain mitigating sovereign risks for many countries around the world has demand for poly-Si processed in Australia as a trusted, reliable trading partner.

Solar PV Value chain

Value chain step	Description	Global supply shares (%) (China / Rest of world)
QUARTZ	Quartz (SiO_2) is abundant globally and readily supports polysilicon production as the starting point of the silicon value chain. However, only a subset meets the high-purity requirements for applications such as crucibles used in ingot and wafer growth, which can introduce regional supply considerations.[1]	Geographically diverse
MG-Si	MG-Si is produced by reducing quartz at high temperatures in electric arc furnaces using carbon sources such as coal, charcoal or wood chips. This process separates silicon from oxygen and produces material with 98% - 99.8% purity required for solar and semiconductor applications. Australia currently produces around 50 kt/year of MG-Si, and there are plans to build ~150 kt/year of new capacity.	80%
POLY-SI	Polysilicon production is the most energy-intensive chemical purification step in the PV chain that transforms MG-Si into ultra-pure silicon (7N–9N*, electronic grade 2–3), with stringent control of impurities such as P, B, Fe, Cr, Ni, Cu and Zn. It is also one of the most geographically concentrated stages of the value chain with limited capacity operations outside China only available in US, Germany, Malaysia and Oman, driven by high capital intensity and strong sensitivity to electricity costs.	95%
INGOT & WAFERS	Ingot and wafer production involves melting poly-Si chunks in crucibles to pull monocrystalline ingots, which are subsequently processed through high-precision slicing into ultra-thin wafers (120-140 microns) for solar cell manufacturing. It is also one of the most concentrated stages of the value chain, driven by high capital costs, electricity requirements and limited access to specialised manufacturing know-how. There is a noticeable trend to increase production outside China and SEA yet only ~5 GW of wafers were produced by non-Chinese owned companies. There is currently one Australian active proponent for a 2 GW plant.	97%
SOLAR CELLS	Solar cell production is the most specialised step in the value chain. It involves converting wafers using semiconductor processing (chemical cleaning, doping, ultra-thin layer deposition, contact screen printing). Solar cell making is a rapidly evolving and growing industry driven by continued innovation and as such dependent and exposed to technology IP access. Still production has been rapidly diversifying outside China in the last couple of years with 37 GW capacity added in 2025.	85%
SOLAR MODULES	Module assembly converts finished cells into field-deployable panels. Cells are electrically interconnected, encapsulated in polymer layers, sandwiched between glass and a backsheet, framed in aluminium and fitted with a junction box. While less technically complex than cell making, module manufacturing is highly automated and scale-driven, with capacity rapidly expanding outside China. In 2025, 53 GW of new capacity was added in US and India alone.	80%

China ■ Rest of world ■

Sources: IEA, Special report on solar PV global supply chains. PV Tech research (Q1 2026)

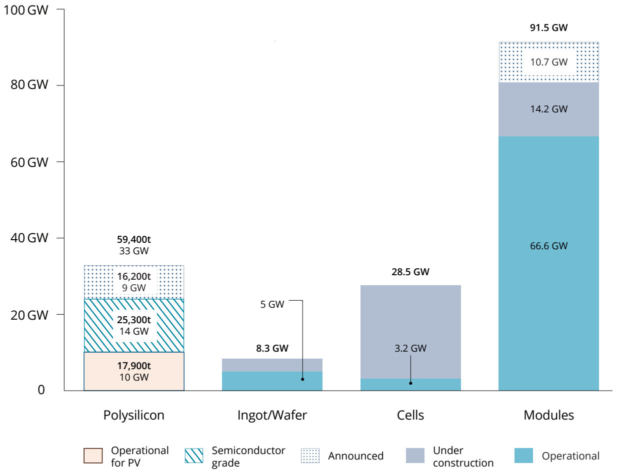
[1] High-purity quartz (HPQ), required for applications such as crucible manufacturing, is limited globally. Australia hosts prospective deposits, though public data on quality and scale remains limited.

*7N-9N means 99.99999% to 99.9999999%

Growing sovereign and supply chain risk

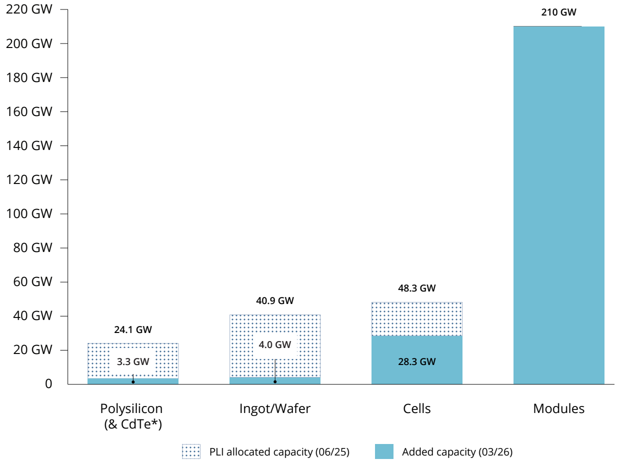
Emerging solar supply chains will remain dependent on Chinese polysilicon supply to support downstream growth unless a more diversified supply chain is established.

USA



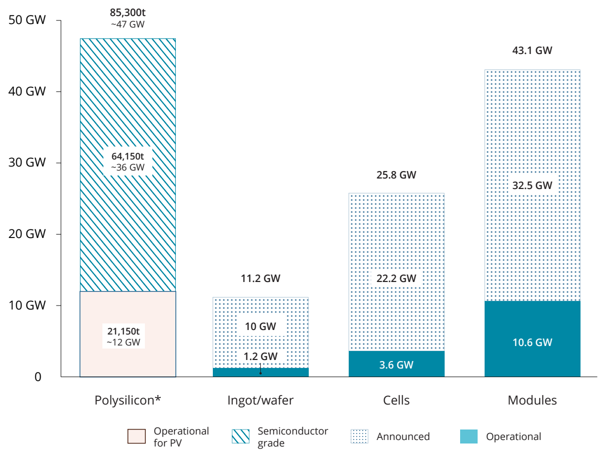
Source: SEIA (04/26); PV Tech research (Q1 2026). GW equivalents are calculated assuming 1.8 g /W of poly-Si

India



Source: IEEFA (2025); PV Tech research (Q1 2026); Gupta (2026)

EU



Source: PV Tech research (Q1 2026); SolarPower Europe (2025)

Sources:

Gupta (2026), SolarPower Europe (2025): Reshoring Solar Module Manufacturing to Europe: A Cost Gap Analysis and Policy Impact Simulation.

IEEFA (2025), Assessing the effectiveness of India's solar Production Linked Incentive scheme.

SEIA (04/2026), Solar and Storage Supply Chain Dashboard.

SolarPower Europe (2025): Reshoring Solar Module Manufacturing to Europe: A Cost Gap Analysis and Policy Impact Simulation.

Semiconductor Industry Association (2025), accessed 23 Apr 2026.

* Note that capacity figures are not directly comparable, as India's PLI categorises CdTe technology under the upstream segment, while SEIA treats it as a downstream or module-equivalent with 13 GW capacity in 2025.

[1] PV Tech research (Q1 2026). Assumed 1.8 g/W and 1.6 g/W for 2025 and 2030, respectively.

[2] Business AnalytIQ (04/2026) and Bernreuter (2026).

Polysilicon in China

Polysilicon capacity expanded dramatically in China between 2021 to 2023, resulting in prices to below $10/kg.

Since the price crash, there has been little further expansion in China and Chinese overcapacity in 2025 was roughly 3.5 million tonnes against ~1.2 million tonnes of demand, with very low utilisation rates, resulting in financial unsustainability for most producers and the plan to revert overcapacity.

Polysilicon outside China

In 2025, non-Chinese polysilicon capacity was ~199 kt in total of which ~1/3 was allocated to solar-grade (SG) PV (~69 kt). The vast majority of non-Chinese serves the electronic-grade (EG) markets.[1]

The 69 kt (38 GW) polysilicon production for the solar industry outside China is only a small fraction (~5%) of the 1.15 million tonnes (~638 GW) produced by China for the PV industry.

Non-Chinese SG poly-Si mainly came from Malaysia (27kt/15 GW), the US (18kt/10GW), and Germany (21kt/11.7 GW).[1]

Non-Chinese PV polysilicon supply remains structurally very scarce, raising prices to ~3-5x Chinese levels,[2] meaning that capacity existing in China is not suitable to meet the demand of the PV supply chain outside China.

Supply / demand dynamics

There has been a quick build of downstream manufacturing capacities for cells and modules, specifically in the EU, the US and India.

By 2030, a growing supply gap in polysilicon aligned with diversified and standards-based supply chains is expected to emerge and widen, reflecting the limited number of new large-scale projects under development outside China.

Even with announced expansions in the US, upstream polysilicon capacity is not expected to meet the requirements of downstream manufacturing, with more than 60% of input materials continuing to rely on existing global supply. New large-scale capacity remains limited, with one of the few new capacities located in the Middle East (100kt).

Australian PV manufacturing ecosystem is evolving

supported by coordinated government initiatives including the NRF, Future Made in Australia, and ARENA's Solar Sunshot program, which are catalysing investment across the PV value chain.

High Purity Quartz

(1) **Townsville, QLD (Lansdown Eco-Industrial Precinct)**

- Finalised feasibility study and progressing towards construction, with planned mining at
- Sugarbag Hill to supply high-quality quartz for downstream silicon production.

Metallurgical Silicon

(2) **Wellesley, WA**

- Established metallurgical silicon producer (~52,000 tonnes per year), currently the only operating domestic source exporting 85% their product.

(1) **Townsville, QLD (Lansdown Eco-Industrial Precinct)**

- Currently in the feasibility stage 150,000 t per year

Polysilicon Manufacturing

(3) **AusSi - Hunter Valley, NSW (Hunter Energy Hub)**

- Pre-feasibility study for a 50,000 t per year solar-grade polysilicon facility
- Supported by $1.3 million ARENA SunShot funding

(1) **Townsville, QLD (Lansdown Eco-Industrial Precinct)**

- Currently in the feasibility stage 100,000 t per year

Ingot and Wafer Manufacturing

(1) **Townsville, QLD (Lansdown Eco-Industrial Precinct)**

- Non-operational
- ARENA-funded feasibility study for a ~2 GW ingot pulling and wafering facility

Solar cell and equipment manufacturer

(5) **Kurnell, NSW**

- Pilot cell facility operational; scaling copper metallisation technology to 300 MW commercial production tool with ARENA support

Modules

(6) **Adelaide, SA**

- Only operating Australian module manufacturer
- Expanding toward ~180 MW per year with Sunshot support
- Historically ~160 MW nameplate capacity, with ~30 MW actual output in earlier years

(3) **Newcastle, NSW (Hunter Business Park, Black Hill)**

- 500 MW project in proposal and feasibility stage
- Targeting local assembly of modules

(4) **Southport, QLD**

- Solar module manufacturing project in feasibility stage

In the polysilicon sector, global net zero ambitions, industrial development objectives as well as sustainability and sovereign risk considerations are driving the emergence of differentiated supply segments

Provenance, traceability and compliance are now shaping market access, lowest cost is no longer enough if it compromises security or eligibility.

Australia is positioned favourably across key value drivers, including low risk, strong sustainability performance, quality and IP protection, infrastructure capability and competitive input costs*, relative to other regions actively expanding manufacturing capacity, including the US, EU, India, SEA and the Middle East.

United States

Tariffs
Section 301 (50-60%) on Chinese imports; AD/CVD (14-3,521%) on some SEA imports and India

Forced labour
UFLPA de facto ban on Xinjiang-origin materials incl. MG-Si and Poly-Si

Subsidies
IRA/FEOC rules disqualify projects with Chinese equity >25%

Result
Demand for Non-Chinese polysilicon

European Union (EU)

Tariffs
CBAM on embedded carbon (penalises coal-fired polysilicon)

Subsidies
Net Zero Industry Act providing regional subsidies and auction preferences

Procurement Standards
European corporates and governments are prioritising suppliers with transparent supply chains, low emissions, and verified labour practices.

Result
Premium on green polysilicon that would feed into green solar manufacturing

India

Tariffs
20% border duties on modules and cells (soon to include ingots and wafers)

Subsidies
PLI schemes reward locally made products according to the ALMM and non-Chinese sourcing

Japan

Corporate ESG Targets and Diplomacy
Japan has not introduced hard bans or tariffs but is aligning through corporate procurement standards and alliance diplomacy

Australia

Subsidies
Critical Minerals Strategy 2023-2030; Future Made in Australia (FMA) agenda incl. Solar Sunshot program; must meet external policy conditions (IRA, CBAM) to access premium markets

Sources: AusSi Study, confidential report; European Commission (2023); Reuters (2024); Ministry of Commerce & Industry (2025); Ministry of Heavy Industries (2023); Policy Circle Bureau (2024); Gupta (2022); Climate Council (2024); DISR (2023).

* Subject to policy settings and investment support mechanisms consistent with those observed internationally.

3 Feasibility and conditions for success

Australia has a potential role in diversified polysilicon supply chains, where a minimum sustainable price is achievable, subject to specific structural conditions

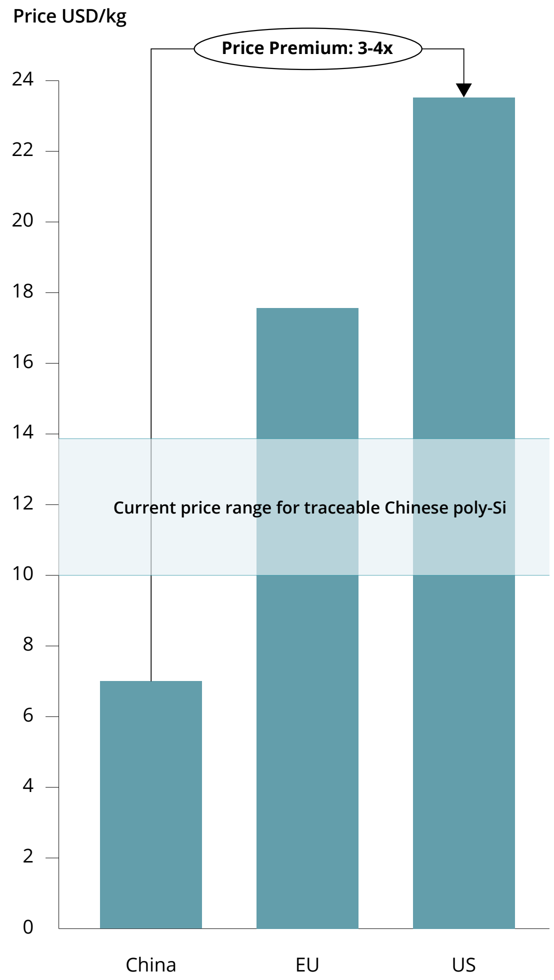
- Polysilicon prices are inherently cyclical and volatile, reflecting characteristics of capital-intensive commodity chemicals with periods of rapid capacity expansion followed by oversupply-driven price compression.
- Current global polysilicon prices are largely driven by high-volume supply, with 2025 levels hitting record lows (~USD 5/kg), and are hovering around USD 7/kg in 2026, below full production costs for many producers, limiting long-term sustainability.

Sources: Business AnalytIQ (01/2026) and Bernreuter (03/2026)

- Sustainable production requires pricing in the range of full cost recovery (e.g. ~USD 8–10/kg in leading producing regions in China), highlighting a structural gap between current prices and viable long-term operation.
- Certified, traceable Chinese poly-Si aligned with international procurement standards commands prices of USD 10–14/kg.
- Observed price differentiation in some regions (e.g. higher prices in the US and Europe) suggests that alternative value drivers beyond cost are already influencing pricing outcomes. The persistence of such price differentiation depends on a set of enabling conditions, including policy durability, limited availability of alternative supply, effective enforcement and continued demand growth of silicon-based PV deployment, which is expected in the near to medium term.
- The commercial viability of a poly-Si plant in Australia will directly depend on how much of a price premium its product might be able to achieve, and if this price premium is long-term. Based on discussions with potential downstream offtakers worldwide, the AusSi Study has concluded that potential pricing between Chinese traceable poly-Si and EU/US premium pricing is the appropriate pricing strategy for poly-Si produced in Australia.
- Downstream stakeholder engagement indicates encouraging interest in Australia as a supplier within diversified and trusted polysilicon supply chains. The AusSi Study has already secured 12 Letters of Support from 6 different countries and more are in discussion.
- **The supply gap of non-Chinese poly-Si from 2030 onwards combined with a long-term structural price premium underpin the value proposition for Australian made poly-Si.**

Polysilicon prices in US, Europe and China

US$/kg



Sources: Business AnalytIQ (01/2026)

3.1 Technology

Polysilicon production technologies have been characterised by incremental optimisation rather than disruption, with no evidence of a near-term technological shift away from silicon-based PV

Siemens-based production provides a proven pathway toward solar- and semiconductor-grade polysilicon, supporting higher-purity applications and reinforcing its role as a technological stepping stone within broader silicon value chains.

Polysilicon produced via the Siemens method remains the dominant pathway for high-purity silicon used in photovoltaic manufacturing and the semiconductor industry.

- In 2024, it accounted for ~90% of PV production and is projected to remain ~80% by 2030,
- Polysilicon production using Siemens method is energy-intensive and requires ~55 kWh/kg-Si equivalent to ~2.7 TWh electricity per year for a 50kt poly-Si facility.
- Efficiency improvements in polysilicon production are driven by scale and integration, including larger deposition reactor designs, improved gas ratios and higher heat recovery.

CVD reactors for the deposition of poly-Si

The only alternative production process at commercial scale is the Fluidised Bed Reactor process (FBR-granular silicon), which reduces water consumption by ~30% compared to Siemens, but requires ~3× higher steam consumption.

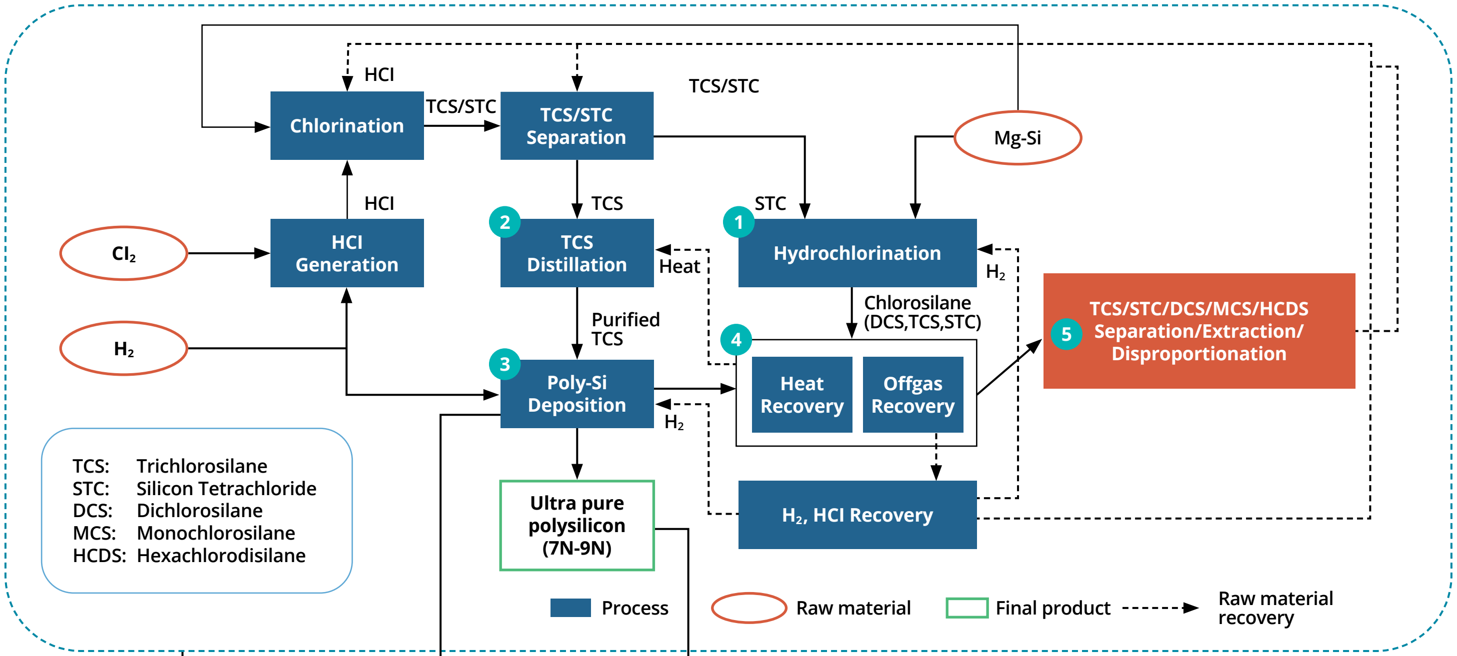
FBR is gaining share but is expected to reach only ~20% by 2030, reflecting a gradual rather than disruptive adoption due to several challenges:

- Operational and scale-up complexity, with difficulties in achieving stable, continuous production at scale
- Constrained technology access, requiring specialised know-how, tight process control, and subject to IP limitations that restrict broader deployment
- Product quality and application limitations, with typically lower purity material used as a complementary input, often blended with higher-purity Siemens polysilicon for wafer manufacturing

Sources: CPIA (2025), ITRPV (2025), AusSi Study, confidential report.

Polysilicon production is defined by ultra-high purity requirements and complex closed-loop chemical processing including heat and gas recovery

Silicon refining is the most capital- and energy-intensive step in the PV value chain.



1. **Hydrochlorination (STC → TCS conversion)**
2. **TCS Purification**
3. **Poly-Si CVD deposition (Siemens reactor, ~1050° C)**
4. **Heat and off-gas recovery**
5. **Chlorosilane separation and recycling loop**

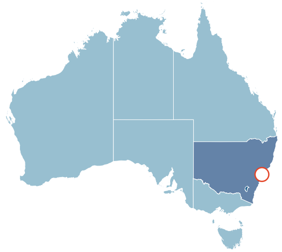
Poly-Si plant control room

CVD deposition reactors

Sources: AusSi Study, confidential report.

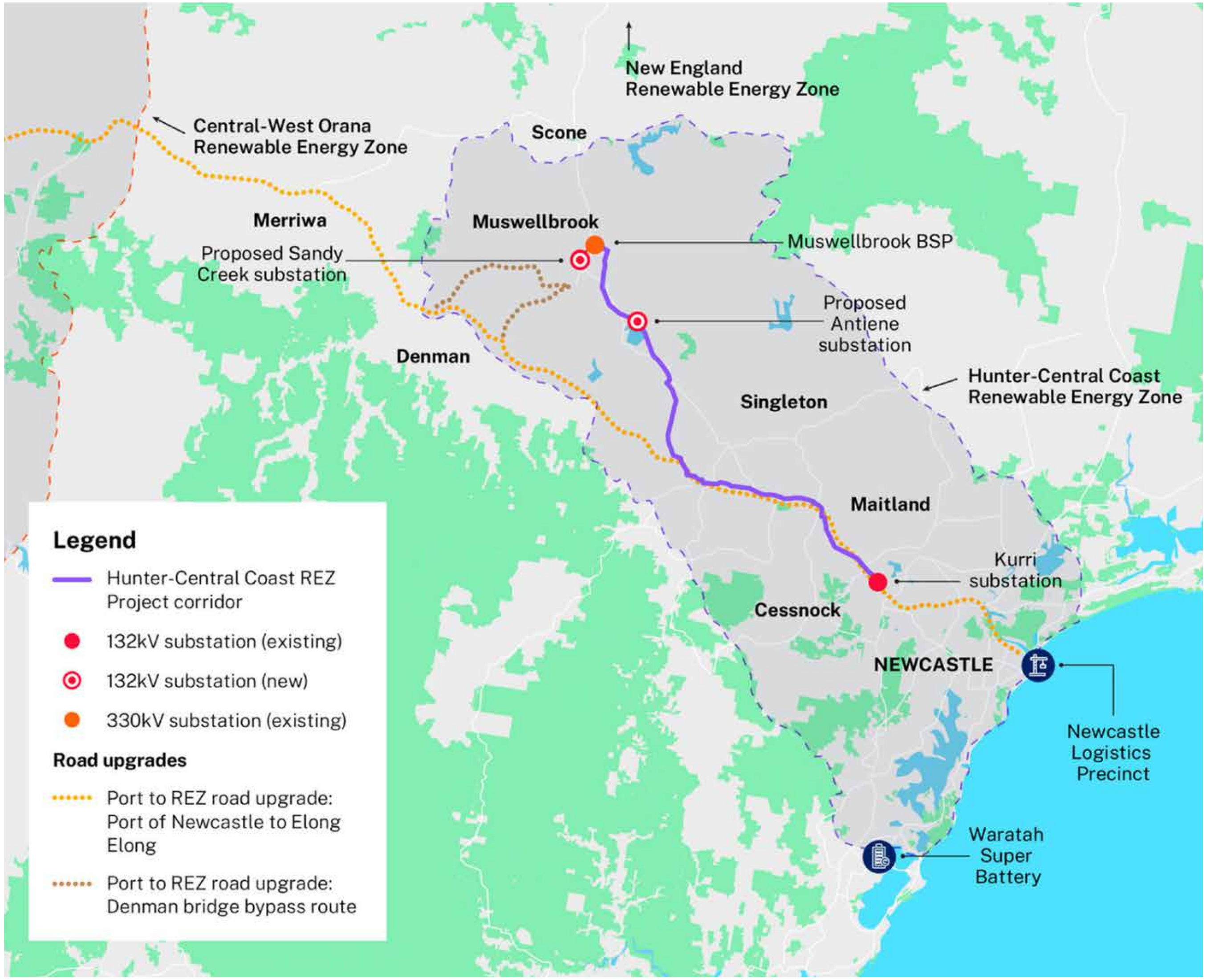
3.2 Hunter Energy Hub and regional development

50kt of polysilicon production located within the Hunter-Central Coast Renewable Energy Zone



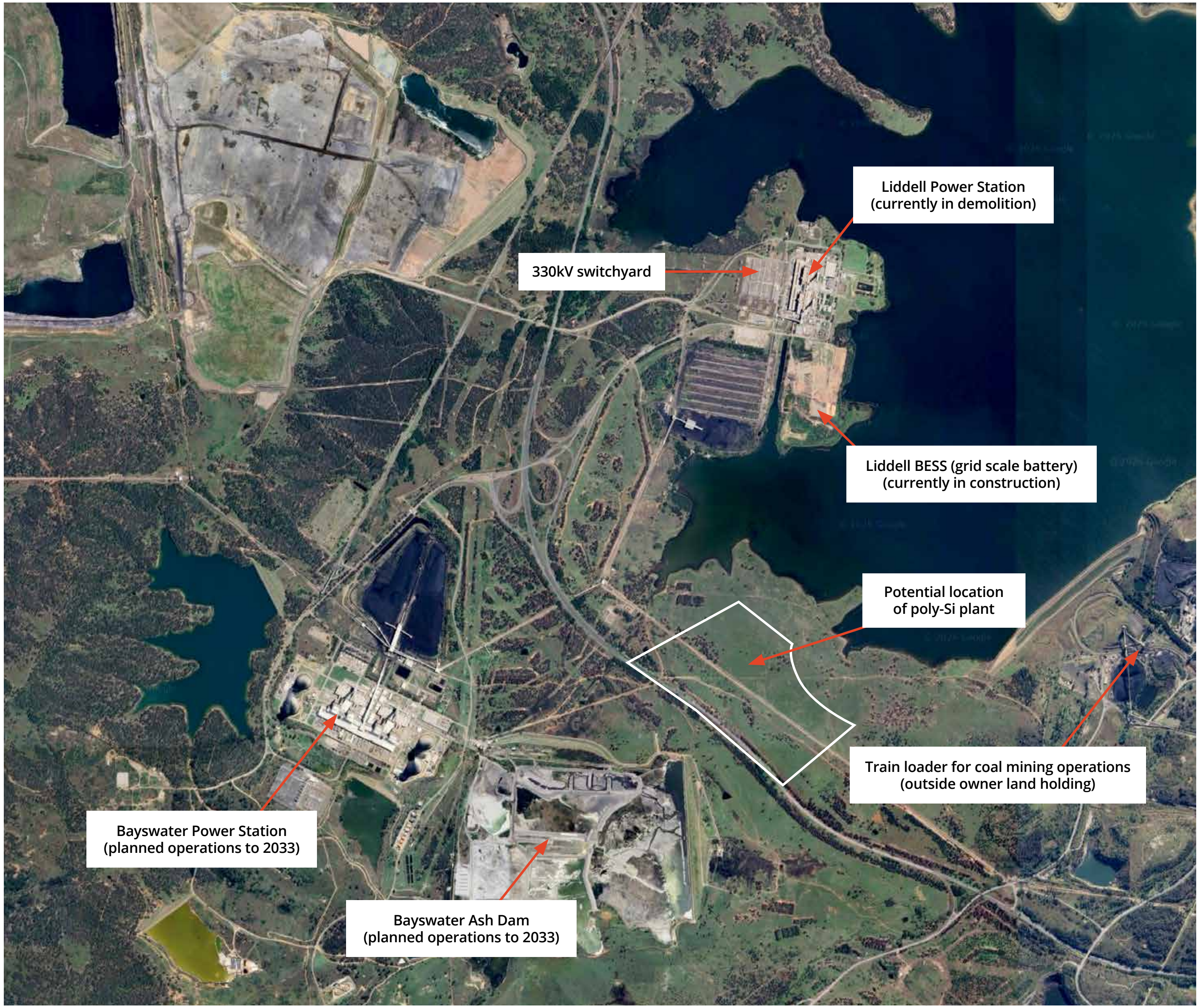
The Hunter region provides a strong foundation for energy-intensive manufacturing, with access to established grid infrastructure, power, water, transport networks and port facilities.

- The transformation of former coal-fired power station sites (e.g. Liddell and Bayswater) into an integrated industrial energy hub creates a unique opportunity to repurpose existing infrastructure for new industries.
- Favourable location with strong connectivity to major economic hubs: ~1 hour to Newcastle and ~2.5 hours to Sydney
- The region is part of a designated Renewable Energy Zone (REZ), with a substantial pipeline of renewable generation and firming capacity to support long-term decarbonised electricity supply.
- Strong market interest, with up to ~40 GW of proposed renewable and storage projects and over $100 billion in potential investment, reflects the scale and credibility of the region's energy transition.



Sources: EnergyCo NSW, Hunter-Central Coast REZ.

Hunter Energy Hub has outstanding infrastructure able to be repurposed



Advantageous grid connection

Strong position in the grid to ensure reliable electricity connections for a load of 300-350 MW delivering about 2.5-3 TWh of electricity per year.

Large scale water infrastructure

Existing site water infrastructure includes a river water pumping station as well as both fresh water and process water dams.

Over 6.2 GW NSW pipeline of renewables and firming

There is a large and growing pipeline of renewable and firming developments to competitively support Hunter Energy Hub.

Skilled industrial workforce

AGL employs ~500 full-time staff and ~500 contractors on site; over the next 10 years, 15,000 jobs will need to transition from mining operations.

Extensive logistic infrastructure

The Hunter Energy Hub has excellent rail and road infrastructure connecting the site to Newcastle as well as Sydney ports for import and export.

Longstanding relationships at all levels

AGL has a strong presence in the community; developing relationships with First Nations groups, local governments and communities.

Enabling conditions and regulatory considerations for polysilicon manufacturing in Australia

Polysilicon manufacturing can be safely and compliantly deployed in Australia, with established regulatory pathways and manageable risks, provided international process designs are adapted to local safety and environmental standards.

Enabling factors

Established industrial capability

The Hunter Energy Hub benefits from a highly skilled workforce experienced in operating and maintaining large-scale, safety-critical processing plants, with strong transferability to the requirements of polysilicon manufacturing.

Strong domestic input availability

Key inputs (salt, water, auxiliary chemicals) are available locally, supporting supply chain resilience

Integrated process design advantages

On-site chloralkali production and comprehensive chemical recovery systems achieve near-zero liquid waste discharge through high levels of material recovery and closed-loop process integration. This represents a significant improvement over conventional poly-Si plants that rely on purchased chemicals and generate substantial liquid waste streams.

Safety and environmental considerations*

In Australia high safety and environmental standards apply

Australia enforces stringent WHS and Major Hazard Facility (MHF) regulations, particularly for hazardous chemicals (e.g. chlorine, hydrogen, HCl, MG-Si,chlorosilanes)

Adaptation of international designs required

Existing Chinese and US process designs require modification to meet Australian safety and regulatory standards

Risks are well understood

Key hazards (chlorine, hydrogen, HF, HCl) are well understood in chemical industries and can be mitigated through

- Containment and monitoring systems
- Emergency response planning
- Established equipment controls

* Thorough analysis of regulatory framework has been carried out, more information is provided in Appendix

3.3 Economic viability of poly-Si industry

Economic assessment of a 50 kt polysilicon facility in Australia demonstrates a viable and competitive export-oriented opportunity

The proposed plant would produce 50,000 tonnes per year of solar grade poly-Si, sufficient to support approximately >27 GW of solar module production. Given its scale, ~5x Australia's current annual solar installation rate, the facility would be export oriented and able to support the development of a more diversified global solar supply chain.

The analysis assumed that between 5% and 10% of the Australian produced poly-Si could be allocated to the domestic market, based on expected downstream manufacturing capacity that may emerge in Australia over the coming years. The remaining production was therefore modelled as export oriented, supporting long term supply diversification for international customers.

Market validation

Support for Australian poly-Si was specifically expressed from downstream producers in 6 different countries including Australia indicating premium pricing under appropriate commercial conditions due to supply security, geopolitical resilience, strong labour and environmental laws, as well as long-term stable trade relationships. This support included Chinese manufacturers with a requirement for traceable poly-Si.

Engagement with over a dozen downstream manufacturers across multiple regions worldwide indicates a clear growing demand for diversified polysilicon supply.

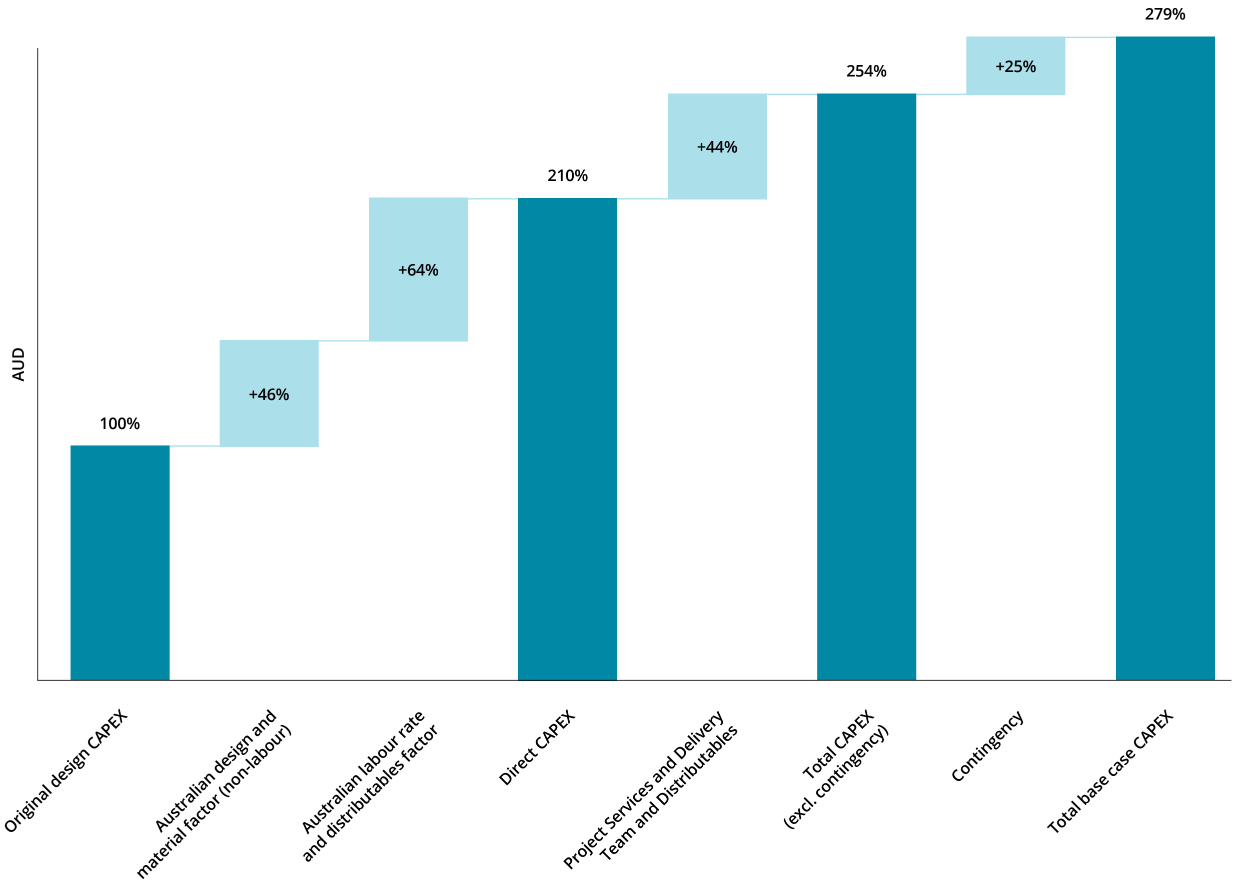
Interest is driven by a combination of supply chain diversification, alignment with evolving labour and sustainability standards, and long-term security of supply.

Discussions span ingot/wafer, cell and module manufacturers, leveraging contract manufacturing options to move Australian poly-Si through the supply chain and build diversified supply for downstream producers.

Building a poly-Si plant in Australia as a key strategic asset

The collaboration between the Australian and Chinese based consortium partners enabled the Study to access draft design and cost estimate for a state-of-the-art processing facility meeting Australian standards.

The study revealed that a 50,000 tonne facility is the smallest size to benefit from economies of scale at the same time ensuring a strong market pull for the volume produced. The total CAPEX estimate for the base case amounts to a value between $2.5 and 3.5 bn.



[1] Class 5 according to AACE International: Total Cost Management Framework
[2] Silicon to Solar Study (S2S) (2022)

CAPEX stack

- The original CAPEX estimate is based on a Chinese design represents the direct built costs for a state-of-the-art poly-Si facility.
- These base costs need to be adjusted on several levels to account for the actual build costs in Australia. There are four distinct cost adjustment for the Class 5[1] estimate for this Study

  1. Adjust design and material costs to Australian design standards,
  2. Adjust construction labour costs to local rates
  3. Adjust project services and delivery team costs for a first-of-a-kind project (FOAK) still leveraging support from China as effectively as possible to benefit from the experience of Chinese engineers building similar facilities.
  4. Adjust for the fact that a FOAK plant will need to account for a high contingency budget.

Overall, this study showed that the CAPEX uplift is a factor of 2-3x above the CAPEX in China, which is in line with results published in the Silicon to Solar Study.[2]

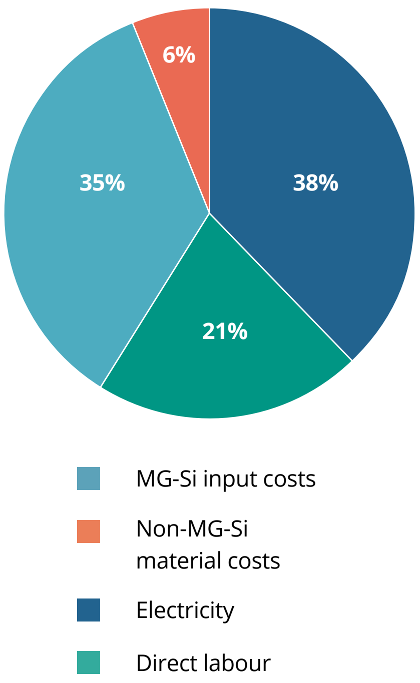
Regulatory framework

In the study we reviewed the regulatory framework guiding the construction and operation of the plant. No red flags have been discovered (see Attachment 7A).

Operating a 50,000 t poly-Si plant in Australia

Through the collaboration between the Australian and Chinese based consortium partners, we developed a detailed assessment of the OPEX requirements for a poly-Si plant at the Hunter Energy Hub.

The Techno-Economic Analysis (TEA)[1] in this Study showed that the direct Operating Expenditure (OPEX) are dominated by three key factors:



Main factors → and how to address them

Electricity (38%)

- Hunter Energy Hub's key advantage is its strong grid infrastructure, enabling the poly-Si plant to operate at a constant load of 300–350 MW.
- The facility will require approximately 2.5–3.0 TWh per annum, representing >1% of total NEM electricity supply.
- With limited operational flexibility (~20% load variation), securing firm energy supply will be a key challenge to be addressed during the Front-End-Engineering Design (FEED) phase.

- Electricity rates starting in 2030 are one of the main uncertainties in the financial assessment of the plant, because of continued price volatility on the NEM and increasing seasonal volatility, particularly from 2040 onwards.
- Potential on-site energy storage (e.g. 4 hours) can help mitigate intra-day price volatility. In parallel, the facility would need to develop operational modes that address seasonal fluctuations to mitigate worsening winter price hikes.[3]
- A broad sensitivity analysis and Monte-Carlo simulation[4] across a wide electricity range from $ 70 /MWh to $140 / MWh with varying degrees of on-site energy storage was carried out. Electricity costs have the biggest impact on the financial assessment after sales price and government support assumptions. Electricity rates are a key factor that needs to be addressed during FEED.

Procurement of MG-Si (35%)

- MG-Si with 99% purity is readily available in many countries, although 80% is smelted in China. In the TEA, we assessed several supply chain options for the material from domestic as well as international leading suppliers. Overall, the aspects of (a) traceability and (b) tariffs will play a major role in selecting preferred suppliers of MG-Si. Currently, Chinese MG-Si is subject to a 45.6% import tariff in Australia.[2]

- A long-term, reliable and cost-competitive supply for MG-Si will be one of the key success factors for the poly-Si plant.
- Building strong, multi-supplier strategy from non-Chinese sources will need to be established during FEED.
- Potential domestic supply could be an important step in developing a more integrated Australian solar supply chain.

Direct labour (21%)

- The plant will require a workforce of 800 –1,000 permanent employees.
- The facility would operate 24/7.
- The workforce needs to operate as a Major Hazardous Facility and require the necessary skilled workforce.

- The large-scale, industrial facility with stringent safety requirements would benefit from the existing workforce in the Upper Hunter and wider region, who are very familiar with operating similar hazardous industrial facilities.
- There is a strong overlap in skill-sets between the required workforce and workers from existing and former coal-fired power plants.
- For specialised roles (e.g. process engineers), targeted training will be required, ideally at operating plants with an experienced (e.g. Chinese) partner.
- Detailed training programs will need to be developed during the FEED phase.

[1] TEA analysis from the AusSi Study, confidential report.
[2] Australian Government Department of Industries, Science and Resources, https://www.industry.gov.au/sites/default/files/adc/public-record/2025-04/651_-_11_-_notice_-_adn_2025-024_-_findings_of_continuation_inquiry_651.pdf , viewed 11th July 2025.
[3] Electricity assumptions are based on ITP Renewable's OpenCEM model, https://cloud.opencem.au/, discussions with electricity retailers, internal analysis and engagement with similar projects.
[4] Monte-Carlo simulation refers to a probabilistic method that evaluates outcomes across a wide range of input assumptions to capture uncertainty; a detailed methodology and results will be published in a forthcoming peer-reviewed publication.

The commercial attractiveness of a poly-Si industry in context

The poly-Si facility, assessed through a comparative investment lens for a nascent asset class, can become commercially viable with the appropriate government support.

Assessment approach

There is limited public investment benchmarking data specific to upstream poly-Si production — particularly for greenfield developments in non-China jurisdictions. To ground investment feasibility in robust analysis, we adopt a comparative sectoral lens. This allows us to:

- Benchmark a poly-Si project against similar industrial assets;
- Translate global capital allocation logic into an Australian context;
- Understand the typical return thresholds, capital structures, and cost intensities that inform project bankability.

The key outcome from this exercise was to establish a set of target KPIs for a bankable poly-Si project. These become the reference points for assessing bankability, stress testing sensitivities, and designing viable project structures.

We prioritised five sectors:

- Lithium carbonate/hydroxide refining
- Titanium dioxide (chloride route)
- Graphite refining
- Aluminium smelting
- Ammonia (Haber–Bosch)

Target metrics

Based on our assessment of five comparable sectors, we define target metrics for the poly-Si industry in Australia:

- **IRR[1] (%): Target 20-30%.** Returns must clear this higher hurdle to compensate for CAPEX intensity and the uncertainty of selling into non-Chinese markets.
- **Payback Period: Target 5–7 years.** Paybacks will be longer than HPA/graphite due to poly-Si being capital intensive but need to be shortened relative to lithium to due to the price premium associated with non-Chinese poly-Si.
- **WACC[2] (%): Assume 8–10%**, consistent with capital-intensive refining sectors.
- **Capital Efficiency[3]: Aim for 0.2-0.3** (NPV to CAPEX ratio), driven by stronger revenue due to a price premium associated currently with non-Chinese poly-Si.
- **D/E Ratios[4]: Expect 50:50–60:40** Higher leverage will only be available with strong offtakes, low-cost power, and policy guarantees.

This framework reflects a broad generalisation, with individual investors applying their own strategic priorities and target metrics.

Commercial assessment outcomes

A wide range of financial scenarios has been analysed and a credible commercial pathway established, providing investors an acceptable return within the KPI landscape established, subject to government support.

For the base case, two types of government support are assumed:

- Up-front grant: $1-1.5 bn
- Production credits:[1] ~ $ 200 mil per year for 10 years

The government support will allow the poly-Si plant to operate within the financial KPI landscape typical for this type of industry. More importantly after the initial support the plant will become commercially viable.

The first poly-Si plant will establish a new energy-intensive energy export industry. With a globally growing solar industry and more demand for non-Chinese supply to build resilient supply chains, additional poly-Si plants will be able to leverage the learnings from the first plant and development of domestic capabilities to build and operate a fully economically viable poly-Si industry.

Australia has the opportunity to be a cost leader for non-Chinese poly-Si building on its long-term industrial knowhow of operating heavy industry in commodity sectors.

[1] IRR is Internal Rate of Return; [2] WACC is Weighted Average Cost of Capital; [3] Capital Efficiency is ratio of Net Present Value (NPV) over Capital Expenditure (CAPEX);
[4] D/E ration is debt to equity ratio; [5] Production Credits are set to USD 3/kg equivalent to US Inflation Reduction Act

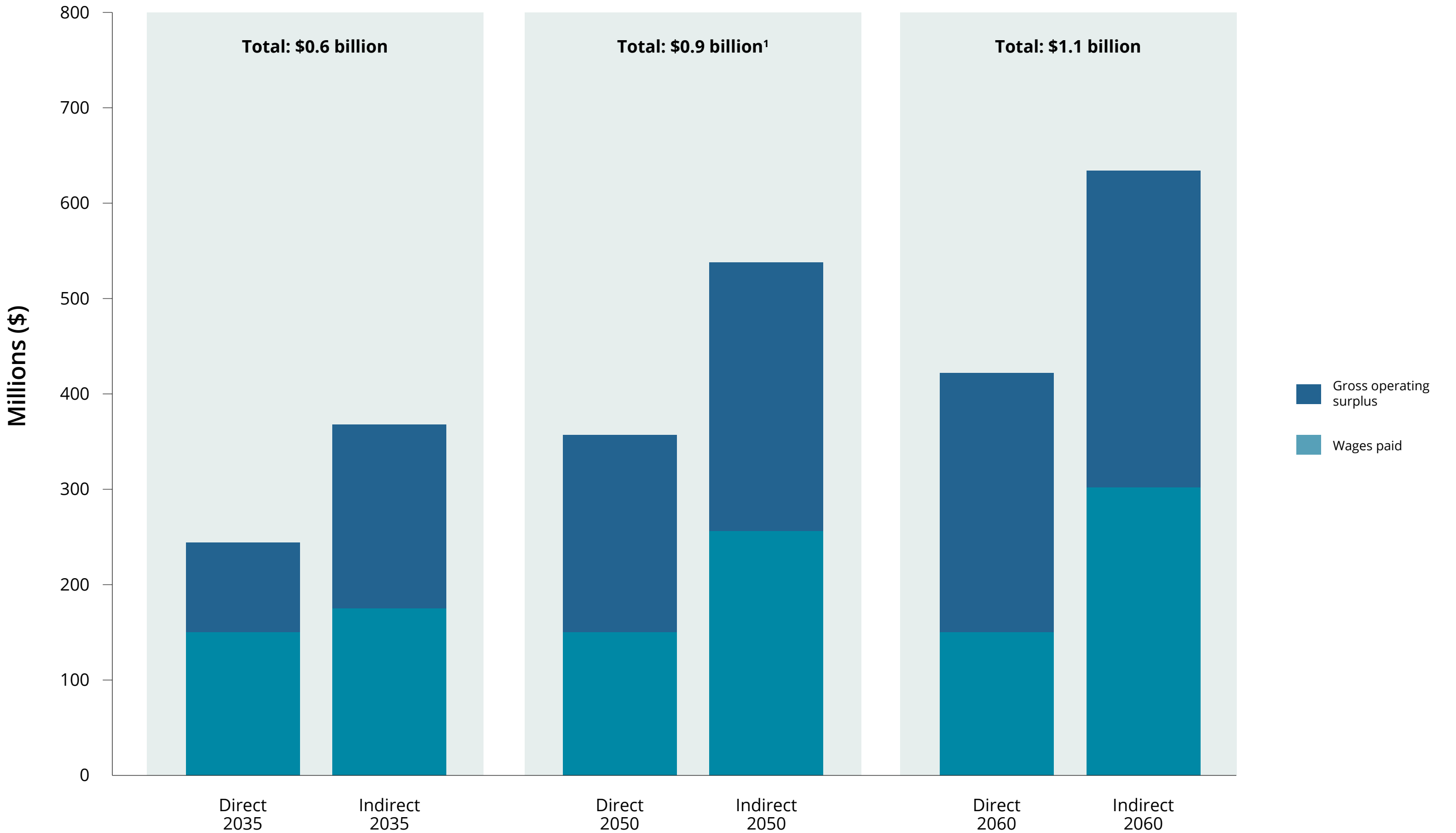
4 National and community benefits

A 50kt poly-Si facility in the Hunter could contribute over $1.1 billion annually to the Australian economy

The poly-Si plant would make substantial direct and indirect economic contributions, with significant additional unquantified benefits through supply chains and household spending.

Annual direct, indirect and total economic contribution of the AusSi project by year

$ million real (2027$), 2030, 2050 and 2060



[1] Numbers may not sum due to rounding

Note: All figures are presented in 2027 Australian dollar, the hypothetical year of commencement of construction, deflated at 2.5% per annum from nominal projections. Taxes on production (payroll tax, land tax, council rates) are not included due to data limitations, making this a conservative estimate.

Sources: AusSi Study, confidential report.

The AusSi project delivers substantial and growing economic value, increasing from ~$600 million in 2035 to >$1.1 billion annually by 2060, reflecting stable operations and expanding value chain activity.

- The direct economic contribution is measured as Gross Value Added (GVA), consistent with the national account framework (income approach) according to the Australian Bureau of Statistics.
- Economic benefits are driven by both wages (wages paid) and industrial output (gross value added), supporting 900+ job creation, income generation and broader business activity.
- Significant supply chain (indirect) impacts arise from procurement of MG-Si, electricity, transport and services, creating cascading economic activity across upstream sectors.
- Additional induced benefits from household spending further support jobs and economic output, though these are not included in the quantified results, meaning total impact is likely underestimated.

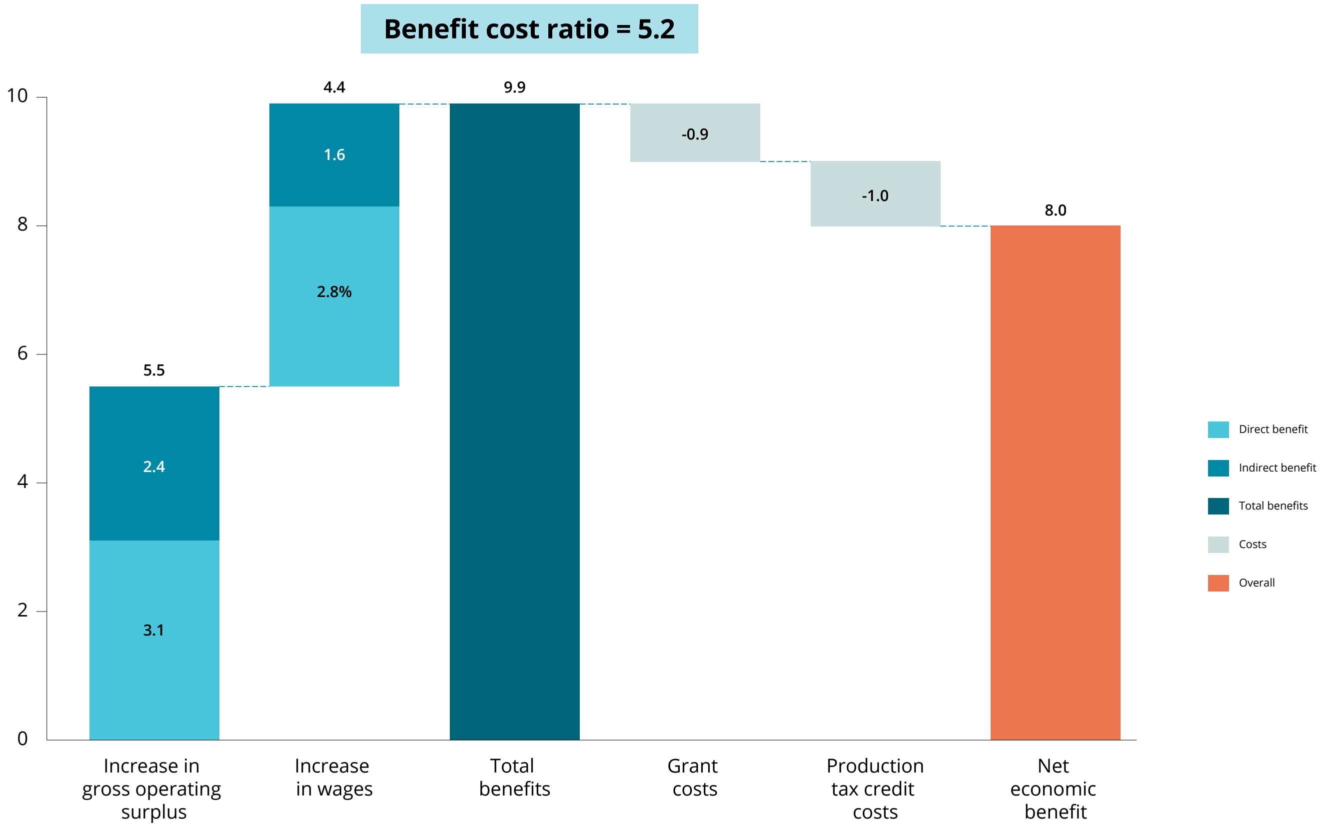
This facility acts as an industrial anchor, enabling domestic supply chain development, regional economic diversification and long-term employment and skills growth.

The poly-Si plant delivers an $8 billion net economic benefit to Australia, every $1 of government support returns $5.20

Even under conservative assumptions, the cost-benefit analysis shows that government support for the 50kt poly-Si facility generates a substantial positive return for the Australian economy over its operational life.

Net economic benefits of the AusSi project

NPV, in 2027$, $B AUD



Note: All figures are presented in 2027 Australian dollar, the hypothetical year of commencement of construction, deflated at 2.5% per annum from nominal projections and a discount rate of 7%. Taxes on production (payroll tax, land tax, council rates) are not included due to data limitations, making this a conservative estimate. Revenue, costs and employment assumptions (poly-Si sale prices and volumes by market) are derived from the AusSi financial model and are used to inform this analysis

Sources: AusSi Study, confidential report.

The AusSi facility generates $9.9 billion in present value economic benefits against $1.9 billion in government support costs, delivering a net economic benefit of $8.0 billion and a benefit-cost ratio of 5.2x.

- Total benefits of $9.9 billion (real 2027 dollars, discounted at 7%) comprise $4.0 billion of direct GVA from the facility and $5.9 billion of indirect GVA flowing through supply chains and induced household spending.
- Government costs comprise ~$ 0.9 billion capital grant (disbursed 2027 to 2029, discounted) and ~ $1.0 billion of production tax credits (discounted) paid over the first 10 years of operations (2030 to 2039).
- The 5.2x benefit cost ratio (BCR) remains strong even under conservative assumptions. Stripping out indirect supply chain effects entirely, the direct-only BCR is still 2.1x (NPV of $2.0 billion), meaning the investment delivers a positive return before any flow-on benefits are counted.

This analysis excludes a range of strategic benefits, including supply chain sovereignty, technology transfer, regional employment, and skills development, as well as corporate tax revenues (estimated at around $110 million per annum by 2050). The true economic case is therefore materially stronger than what is quantified here.

Community benefits

The development of a large-scale poly-Si facility at the Hunter Energy Hub on a retiring coal-power site represents a once-in-a-generation opportunity for regional renewal. By leveraging existing industrial land, transmission infrastructure, and a highly skilled workforce, the proposed plant can anchor a managed transition toward a diversified, future-focused clean-energy economy. The following slides summarise the key community, economic, and policy benefits expected to be realised through this development.

Workforce transition and employment opportunities

The poly-Si plant would create about 900 new jobs in the region. The project has the following benefits for the workforce transition and employment opportunities:

- **Creating new long-term jobs** in renewable energy, advanced manufacturing, and supporting industries
- Aiming to **retain and redeploy local skills** from coal mining and thermal power generation into emerging clean-energy sectors
- Expected to generate **construction-phase employment** across trades, engineering, logistics, and professional services
- Designed to provide **stable, future-oriented career pathways** for younger workers entering the regional labour market.

Local economy strengthening and economic diversification

The poly-Si plant is a large infrastructure investment with a broader positive impact on the local economy:

- Seeking to **reduce economic reliance on coal-based industries** by attracting a mix of industries such as solar manufacturing, battery recycling, and circular-economy enterprises
- Intended to **stimulate new private and public investment,** increasing regional economic activity
- Expected to **support local businesses** through increased demand for accommodation, catering, transport, maintenance, and professional services
- Aiming to position the region as a **national clean-energy and advanced-manufacturing hub**.

Local supply chain – sustaining and developing

The operation of the chemical processing silicon plant will lead to secondary positive effect on the local supply chain:

- Designed to **co-locate complementary industries**, enabling shared services, resource recovery, and circular-economy models
- Intended to **strengthen local manufacturing capability**, which may reduce reliance on imported components for renewable energy technologies
- Expected to **enhance logistics efficiency** by leveraging proximity to major transport corridors and the Port of Newcastle
- Encouraging **new supplier networks**, supporting SMEs and regional contractors

Education, training and skills development

The operation of the poly-Si plant will be able to leverage off the existing local workforce, who have operated heavy industry for decades. Nevertheless, the type of chemical processing facility will also require new expertise, which needs to be trained provide a list of benefits:

- The Hunter Energy Hub could enable partnerships with TAFEs, universities, and industry to **deliver new training pathways** in renewable energy, engineering, and advanced manufacturing
- The project can **support retraining and upskilling** for workers affected by mine and power station closures
- The development is expected to create **long-term workforce development programs** aligned with national clean-energy and manufacturing strategies
- It would enhance the region's reputation as a **skills and innovation centre**.

Broader benefits

Delivery of government policy & transition support

The development of a poly-Si plant will need to be integrated into the broader government policy and transition support:

- Providing alignment with federal and state priorities for **clean-energy investment, regional transition, and advanced manufacturing,**
- Intended to support government objectives under initiatives such as the **Solar Sunshot program**, the **Net Zero Plan**
- May serve as a **model for other transitioning regions** across Australia.

Broader community & social benefits

The decline of the coal-ming and power generation industry in the Hunter region has had profound impacts on the community. The development of the poly-Si plant can deliver broader community and social benefits:

- Intended to **strengthen community confidence** by demonstrating a clear pathway beyond coal-based industries
- Expected to support **local councils and community planning** through predictable long-term investment
- Aims to enhance the region's identity as a **leader in clean-energy innovation**.

Efficient use of existing infrastructure & industrial land

The Hunter Energy Hub is in the coal-mining and power generation region and locating the poly-Si plant there can provide the following benefits:

- Intended to **minimise environmental disturbance** by developing on already-industrialised land
- Expected to reduce project costs and timelines by leveraging **established grid connections and industrial zoning**
- May enable **faster deployment** of new energy and manufacturing projects.

Innovation, research & future-focused industry

The poly-Si plant will be state-of-the-art chemical processing plant, which will require continuous improvement. The technological improvement of the facility would lead to a range of benefits:

- Intended to attract **technology-driven companies** in solar, storage, recycling, and advanced materials
- Expected to foster **research and development partnerships** with universities and industry
- May position the region as a **national demonstration site** for industrial decarbonisation and circular-economy innovation
- Designed to encourage **entrepreneurship and new business creation**.

5 Risks and uncertainties

Key risks and mitigation pathways

Market risk

Demand for solar poly-Si could slow or substitutes could emerge

Solar is the lowest cost form of electricity generation and keeps extending its lead. Traditional nuclear and SMR may be part of the future energy mix, their deployment is too slow and expensive to make a material difference; solar poly-Si demand forecast to grow significantly between 2030 and 2060

LOW

Technology risk

Emerging purification or wafering technologies could reduce reliance on Siemens-based polysilicon production

The Siemens process is mature and globally deployed; higher solar cell efficiency technologies, and the semiconductor industry, require purity levels only the Siemens poly-Si can deliver

LOW

Operational risk

Limited local experience building and operating poly-Si plants at scale

Partnering with an experienced technology provider, combined with Australia's strong chemical engineering and process plant expertise, mitigates limited local experience in polysilicon-specific operations

LOW

Policy/trade

Changes in trade and industrial policy (UFLPA, CBAM, IRA, NZIA) could reduce demand-driven premiums for non-Chinese polysilicon

Energy systems and associated supply chains are increasingly treated as sovereign priorities, with the growth of solar driving policies to strengthen diversified and reliable supply chains among trusted partners

MEDIUM

Competition

Entry of new non-Chinese polysilicon producers could increase supply and compress price premiums

Limited planned capacity and high barriers to entry (capital, energy, compliance) support early-mover advantages, with Australia well-positioned due to its low sovereign risk and strong trade relationships

LOW

Work, health and safety

Polysilicon production involves hazardous chemicals (trichlorosilane, HCl) and high-temperature processes

Siemens process plants operate safely globally with established protocols; partnering with experienced technology licensors embeds proven safety systems from design stage; strong local pool of chemical/process engineering talent familiar with comparable hazardous operations

LOW

6 Implications and next steps

Study implications

Polysilicon represents a strategic, time-sensitive opportunity for Australia, requiring coordinated policy support to unlock a competitive industry.

Poly-Si process is a strategic imperative	• Solar is the lowest-cost form of new power generation, with its value further enhanced by declining energy storage costs.	• Solar will provide most of the electricity in Australia and many other nations.	• The geopolitical concentration of poly-Si processing represent a sovereign risk in energy supply and undermines a resilient supply chain for energy infrastructure.
Supply chain diversification will not happen by chance	• The silicon supply chain like for other critical minerals needs to be actively diversified and collaboratively managed.	• Diversifying the poly-Si processing capability is of paramount importance for solar energy unhampered by geopolitical volatility.	• Diversification will not happen without targeted intervention and coordination.
Australia has a credible opportunity	• Australia has the capability to build and operate a large-scale poly-Si plant.	• Australia's future access to an abundance of renewable energy will put it in a prime position to be a cost leader for poly-Si outside China.	• Australia's stable geopolitical position and its long-term role as a trusted trading partner make it an ideal supplier of poly-Si.
Project success factors	• The poly-Si facility of required scale will need secure long-term electricity rates below other nations to leverage its comparative advantage.	• The FOAK plant will require fast approvals and government support to derisk construction and operation of the facility.	• Australia can actively engage with trading partners to secure long-term favourable conditions for Australian made poly-Si.

Beyond the Australian poly-Si pre-feasibility study

The AusSi Study has demonstrated that at pre-feasibility level the project is technically and economically viable with government support noting the risks and assumptions outlined in this study. To progress the project to a Financial Investment Decision (FID), a Front-End Engineering and Design (FEED) study is needed, which would confirm the assumptions made throughout this study and mitigate the risks identified.

Critical next three steps

1

Taking the decision to move into the next development phase

Whilst it is too early to make the financial decision on the full $ 2.5-3.5 bn investment with the remaining uncertainties, the AusSi study has shown that a credible pathway to building an export oriented, large-scale and economically viable poly-Si industry in Australia exists. Keeping this optionality alive, by moving to the FEED phase, is the main conclusion of the Australian Silicon Study.

2

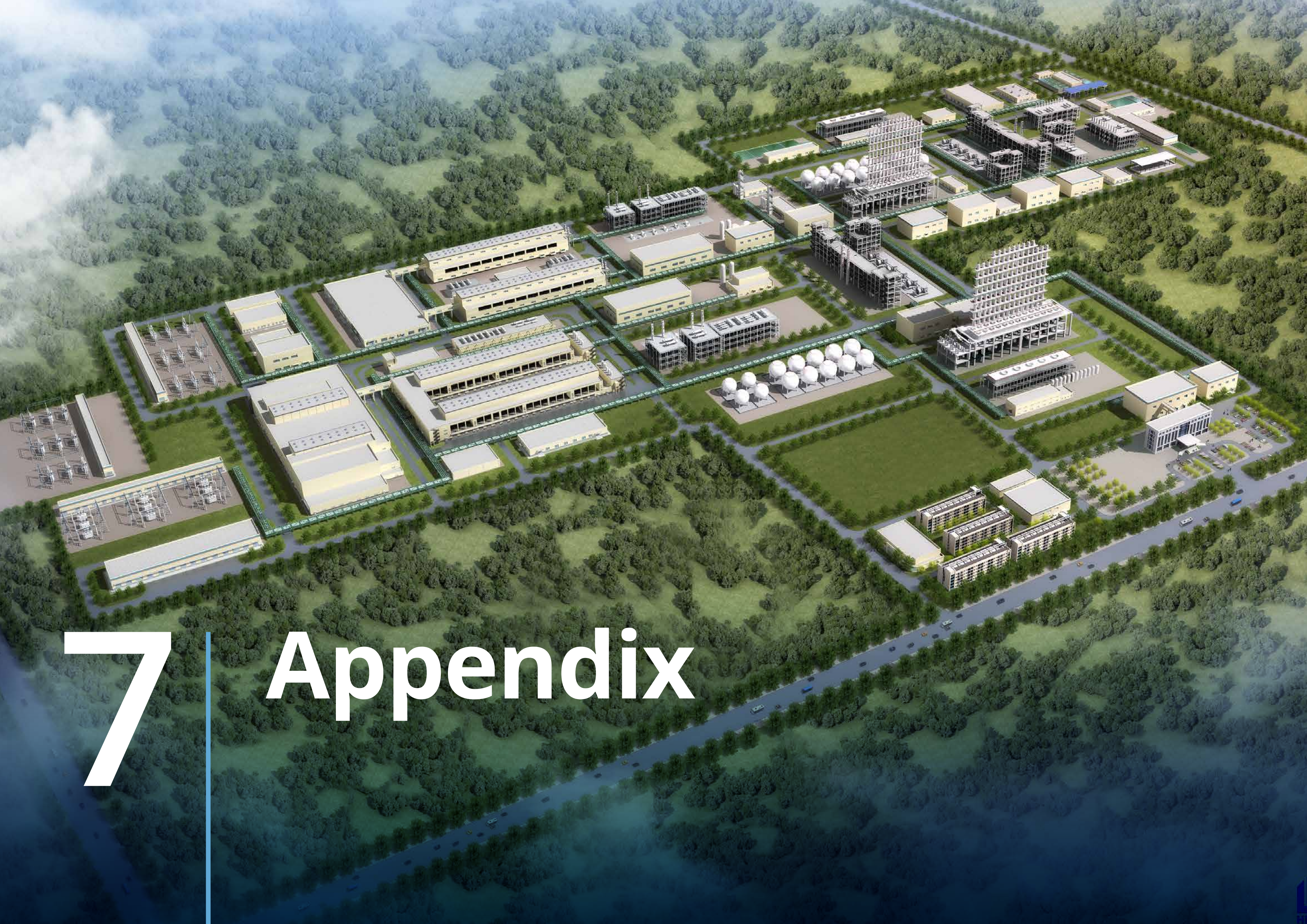
Funding of the next development phase

To move from a Class 5 to Class 3 cost budget and therefore move to a potential FID would require funding in the range of $20-30 mil when applying standard AACE estimates. Therefore, an ownership and funding structure for the development work needs to be developed as the second step.

3

Carrying out the FEED-Phase over a period of 18-24 months

The FEED study would define all elements of the project to ensure critical elements of construction and operation are understood and have feasible solutions. The engineering and basis of cost estimate will be developed to achieve a class 3 estimate (+30%/-20%, AACE guidelines) to increase the confidence level in the cost estimates. All major risks would be identified. Project approvals should also be commended during the feasibility study. The commercial feasibility part of the next phase would address the commercial assumptions made in this study particularly regarding offtake, procurement and electricity rates as well as financing structure including government support. This next phase would de-risk the project to the point that an FID is possible.



7 Appendix

Compliant construction and operation of a 50 kt polysilicon facility at the Hunter Energy Hub is absolutely possible subject to approvals

The plant is a large chemical processing facility which would need to adhere the regulatory framework during construction and operation.

Regulatory framework

A detailed review of the regulatory framework for the construction of the plant has not raised any red flags:

- The project would be characterised as development for the purpose of metal, mineral and extractive material processing, with a development cost of more than $30 million and would therefore meet the declaration of State Significant Development (SSD). The Department of Planning, Housing and Infrastructure (DPHI) would be the consent authority.
- An Environmental Impact Statement (EIS) would need to be prepared to support a Development Application (DA) to DPHI. The key risks to be addressed as part of the EIS would include impacts on biodiversity (specifically the Common Scaly-foot, Pygopus lepidopodus, and threatened Pink-tailed Legless Lizard, Aprasia parapulchella), air emissions (particularly silica releasing to atmosphere and risks to workers), hazards associated with chemical storage and use at the site, pollution from discharges to waterways, fire risks, as well as impacts to Aboriginal heritage and unexpected finds at the site.
- The relevant legislation for this project is the Environmental Planning and Assessment Act 1979 (EP&A Act) and the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) provides the framework for assessing environmental impacts and determining planning approvals for all development projects in NSW.

Permissibility and land use zoning

- Characterisation of the development in accordance with definitions included in the Standard Instrument - Principal Local Environmental Plan (Standard Instrument) and relevant planning instruments is critical to determining the permissibility and applicability of approval pathway for the project.
- The NSW Planning Circular – Land use characterisation (NSW Government 2021) states that a development is considered to be for a particular purpose if that purpose is the reason for which the development is to be undertaken or the end to which the development serves.
- The overall purpose of the project is for mineral processing and metallurgical works and is industry for the purposes of the Standard Instrument.
- As the project site is located within the Muswellbrook Local Government Area (LGA) it is subject to the provisions of Muswellbrook Local Environmental Plan (LEP) 2009. The site is zoned SP2 Infrastructure – Power Station under the LEP. Industry is prohibited within the SP2 zone, however Clause 7.11 of the LEP provides for the transition of activities at the Liddell–Bayswater Power Station site from coal fired power station operations to a broader range of employment generating activities, including industrial uses with development consent.

Major Hazard Facility

- Based on the Schedule 15 chemical thresholds under the Work Health and Safety Regulation 2017 (NSW), the facility will require Major Hazard Facility (MHF) registration due a number of key chemicals including:
  - Chlorine: Annual production far exceeds the 25-tonne threshold (500x threshold)
  - Hydrogen: Annual production of 1.4 kt far exceeds the 50-tonne threshold (30x threshold)
  - Hydrogen Chloride: Annual production exceeds the 250-tonne threshold for anhydrous HCl
  - Hydrofluoric acid: Annual requirement of 300 tons far exceeds the 50-tonne threshold for HF (if over 50% concentration)
- **Key MHF obligations** include the following:
  - Immediate notification to SafeWork NSW before commencing operations
  - Safety case outline submitted within 3 months of determination
  - Comprehensive safety case prepared within 2 years including:
    - Major incident identification and analysis
    - Safety management system implementation
    - Emergency response procedures
    - Control measures for risk elimination/minimisation
  - Safety assessment covering all operational aspects
  - Emergency planning in consultation with emergency services
  - Licensing application within 2 years of MHF determination
  - Worker consultation on safety systems and procedures

Regulatory requirements

- **Environment:** Environmental pollution management is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The facility will require an Environment Protection Licence (EPL) under the Protection of the Environment Operations Act 1997 as it involves chemical manufacturing activities.
- **Waste:** Waste Management regulated under the Protection of the Environment Operations (Waste) Regulation 2014, which sets out obligations that apply to waste managers, consigners, transporters and receivers dealing with waste generated by a development.
- **Heritage:** Heritage management under Section 86 of the National Parks and Wildlife Act 1974 (NPW Act) in which it is an offence to harm or desecrate an Aboriginal object or Aboriginal place.
- **Traffic:** Traffic activities are regulated by the Roads Act 1993 (Roads Act) that may impact on public roads in NSW. Consent is required from the relevant roads authority under Section 138 of the Roads Act for any work in, on or over a public road.
  - The main traffic generated by the project is expected to be:
    - Construction traffic
    - Up to approximately 13 semi-trailer movements per day during operation
    - Up to approximately 1100 personal vehicle movements per day during operation
  - A Traffic Impact Assessment would be required to be prepared to support the EIS for the project.
- **Water:** Water management is to adhere to the Water Management Act 2000 (WM Act). The Act’s main objective is to manage NSW water in a sustainable and integrated manner that will benefit today’s generations without compromising future generations’ ability to meet their needs.
- **Biodiversity:** The Biodiversity Conservation Act 2016 (BC Act) sets out the process for assessment by consent authorities when considering DAs and provides an assessment framework for threatened, endangered and critically endangered species, threatened ecological communities and areas of outstanding biodiversity value (AOBV) for a range of developments.

Glossary

AACE
Association for the Advancement of Cost Engineering

ABS
Australian Bureau of Statistics

AD
Anti-Dumping

ALMM
Approved List of Models and Manufacturers

AOBV
Areas of Outstanding Biodiversity Value

BC Act
Biodiversity Conservation Act 2016

BDAR
Biodiversity Development Assessment Report

CAPEX
Capital Expenditure

CBAM
Carbon Border Adjustment Mechanism

CPIA
Chinese PV Industry Association

CVD
Countervailing Duties or Chemical Vapour Deposition *depending on context*

DA
Development Approval

DCCEEW
Department of Climate Change, Energy, the Environment and Water

D/E Ratio
Debt to Equity Ratio

DPHI
Department of Planning, Housing and Infrastructure

DCS
Dichlorosilane

EIS
Environmental Impact Statement

EP&A Act
Environmental Planning and Assessment Act 1979

EP&A Regulation
Environmental Planning and Assessment Regulation 2021

EPC
Engineering Procurement Construction

EPL
Environment Protection Licence

ESG
Environment, Social and Governance

EU
European Union

FBR
Fluidised Bed Reactor

FEED
Front-End Engineering Design

FID
Financial Investment Decision

FOAK
First-of-a-kind

FEOC
Foreign Entity of Concern

FMIA
Future Made in Australia

HPA
High Purity Alumina

HPQ
High-Purity Quartz

HCDS
Hexachlorodisilane

IRA
Inflation Reduction Act

IRR
Internal Rate of Return

ITRPV
International Technology Roadmap for Photovoltaics

LEP
Local Environmental Plan

LGA
Local Government Area

MCS
Monochlorosilane

MG-Si
Metallurgical Silicon

MNES
Matters of national environmental significance

NEM
National Electricity Market

NPV
Net Present Value

NZIA
Net-Zero Industry Act

OPEX
Operating Expenditure

PLI
Production Linked Incentives in India

POEO Act
Protection of the Environment Operations Act 1997

Poly-Si
Polycrystalline silicon

PV
Photovoltaics

SEA
South-East Asia

SMR
Small Modular Reactor

SSD
State Significant Development

STC
Silicon tetrachloride

TCS
Trichlorosilane

TEA
Techno-Economic Analysis

TWh
Terawatt hour

WACC
Weighted Average Cost of Capital

WEF
World Economic Forum

WHS
Work Health and Safety

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