Australia: State of Quantum Ambitions at Scale–Aug 2025

Executive Summary:

Australia isn't circling the quantum conversation—it’s stepping straight into the center of it.

By mid-2025, the country will have gone from academic depth to national-scale delivery. At the core? A massive bet on the world’s first utility-scale, fault-tolerant quantum computer, led by PsiQuantum in Brisbane, backed by nearly A$940 million in government funding.

This isn’t exploratory. It’s directional. Australia is designing for scale: combining cutting-edge research, public-private alignment, and an emerging quantum workforce. The 2023 **National Quantum Strategy**, paired with initiatives like **Quantum Australia** and the **Critical Technologies Challenge Program (CTCP)**, is creating the structure needed to turn breakthroughs into national advantage.

National Strategy & Infrastructure: From Plan to Presence

Australia now has a national quantum strategy that does more than outline goals—it directs funding, programs, and execution. **National Quantum Strategy** (May 2023) focuses on translating research into economic, commercial, and national security value. Built on five pillars: thriving ecosystem, trusted tech, secure foundations, global leadership, and an adaptive workforce.

Major Investments

- A$18.4M for **Quantum Australia**: a coordination and innovation hub.
- A$230M+ in targeted quantum funding across 2023–2028 federal budgets.
- CTCP grants support cross-sector pilots in energy, transport, Indigenous health, and biosecurity.
- Combined, public investment nears A$893 million by early 2025.

And then there's **PsiQuantum**—Australia's boldest move yet.

Public / Private Collaboration & Academic Firepower

Australia’s academic quantum foundations are solid—and expanding.

ARC Centres of Excellence

- **EQUS** and **QUBIC** are pushing the boundaries of sensing, biocomputing, and systems integration.
- Strong pipelines between PhD research and industry application are forming—but not yet scaled.

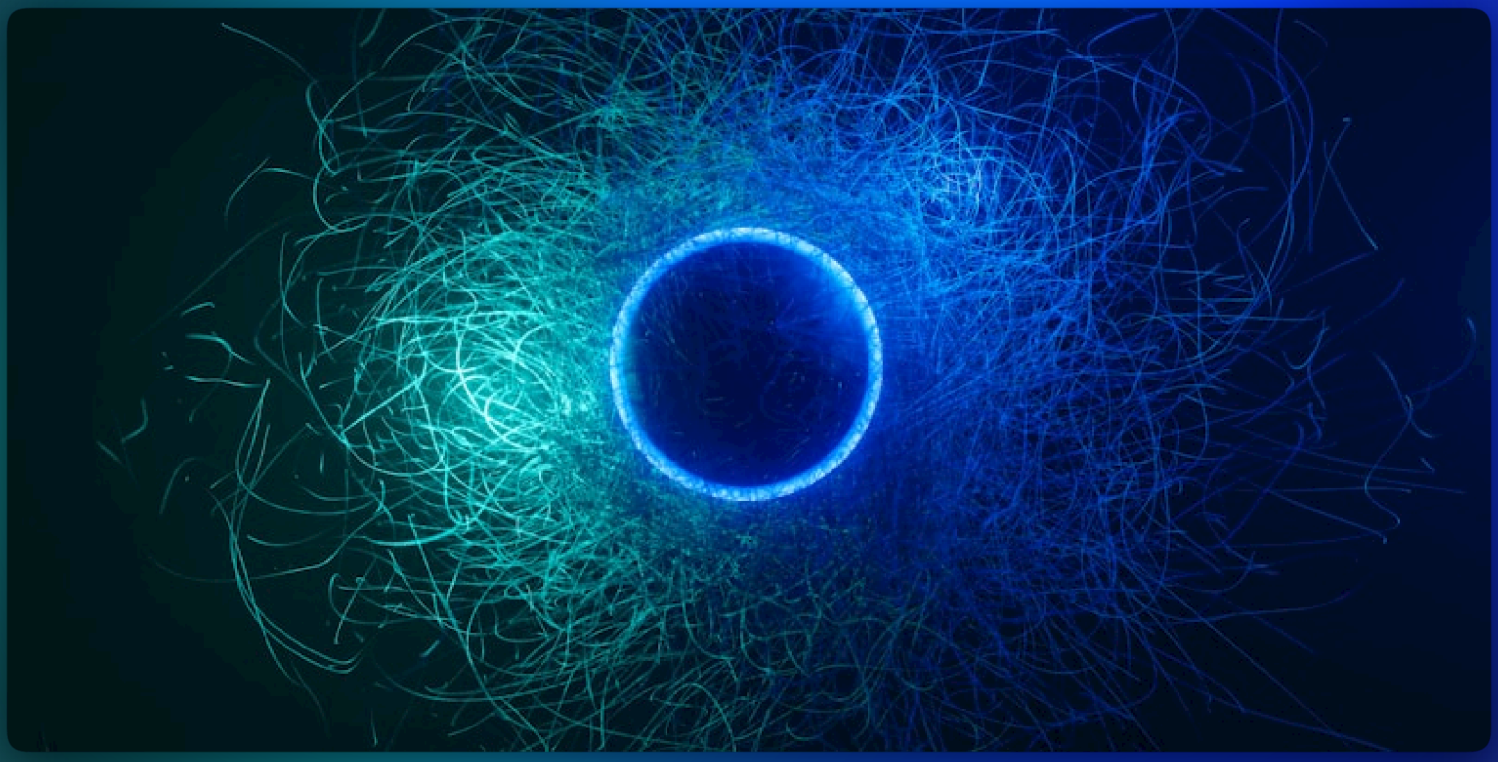
Silicon Quantum Computing (SQC)

- Founded by Prof. Michelle Simmons, SQC recently passed a fault-tolerant threshold with a 98.87% Grover’s algorithm success rate.
- The message: silicon qubits aren’t just viable—they’re competitive.

CSIRO + Quantum Brilliance

- Developed the first room-temperature diamond quantum processor integrated with HPC.

Applications span energy analytics, medical diagnostics, and edge ML tools.



International Ties & Hardware Strategy

Australia's approach to partnerships is innovative and engineering-led.

PsiQuantum

- Brisbane aims to build a one-million-qubit photonic system by 2027–28.
- Jointly funded by the federal and Queensland governments (~A$940M).
- The workforce plan includes 400 quantum engineers and university pipelines.
- If this succeeds, Australia won't just have a quantum computer—it will have a manufacturing footprint.

IonQ–Emergence Quantum (July 2025)

- Focused on ion-trap systems and control hardware.

Enhances Australia's diversity in quantum modalities and supports domestic supply chains.

G7 Alignment Without the Membership

Australia may not have a G7 seat, but its quantum investments speak the same language:

- **Tech sovereignty**
- **Cybersecurity readiness**
- **Quantum-safe infrastructure**
- **Workforce resilience**

Funding levels and industrial goals already match or exceed some G7 nations—Australia isn’t trailing, it’s pacing differently.

Opportunities & Friction Points

What's Working

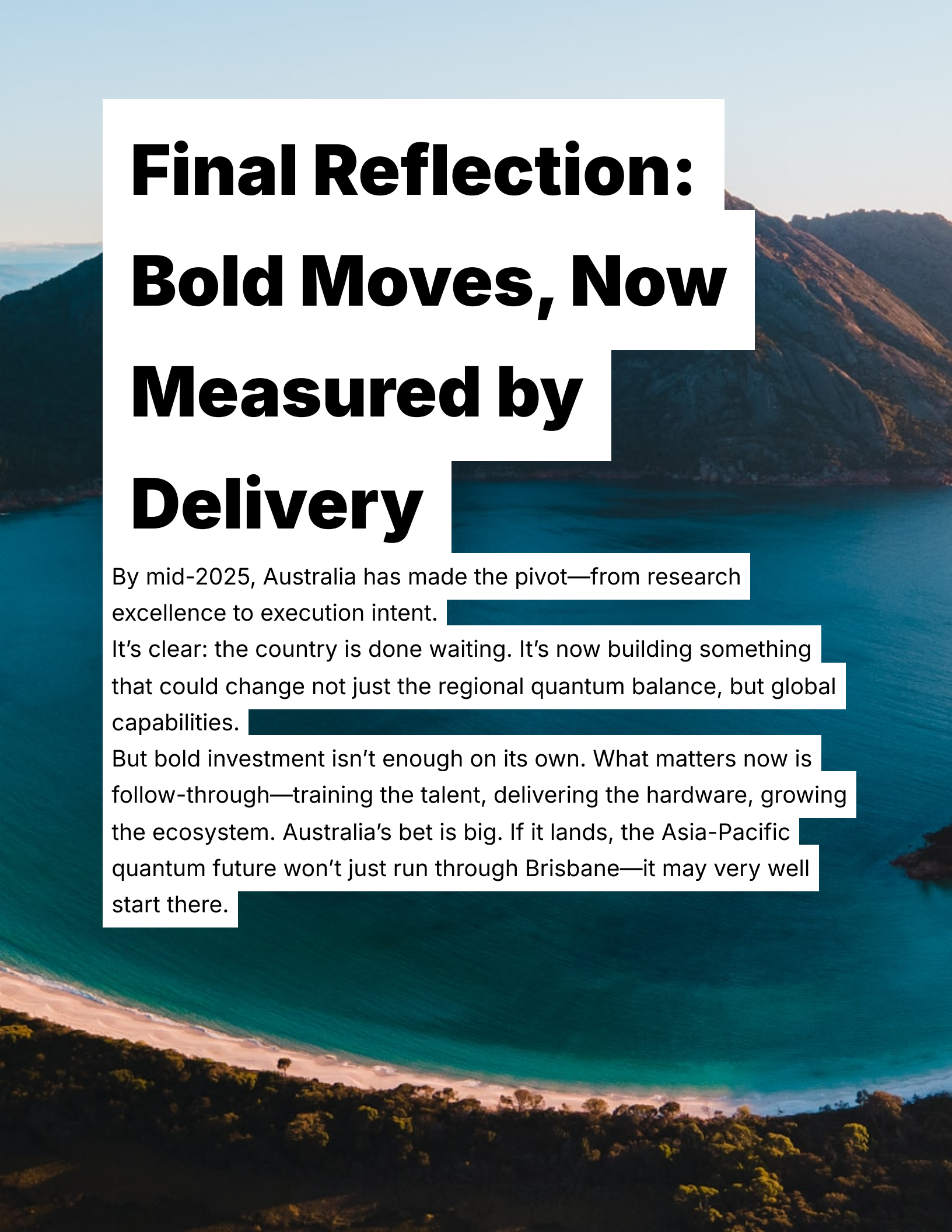
- **PsiQuantum** could push Australia into the global quantum elite
- Federal programs are finally backing research with real budget and planning.
- **SQC, CSIRO, and Quantum Brilliance** are proving that research can translate
- International collaborations are strengthening both capability and credibilit.y

What's Not There Yet

- The talent pool is too thin for the scale being targeted—fast-tracking skills is non-negotiable.
- Startups outside flagship projects are under-resourced.d
- Industry-wide awareness and readiness are still catching up
- Risk: flagship dependency without broader ecosystem maturity

Outlook for 2025 & Beyond: A High-Stakes Build

🛠️ **PsiQuantum Brisbane**: Operational target is late 2027. Success here could reset what's globally possible. 🤝 **IonQ–Emergence**: Could deliver modular ion-trap systems by the end of the decade. 📈 **National Reconstruction Fund + NGQGP**: Ongoing programs expected to support SME integration, supply chain resilience, and standards development into the 2030s.



Final Reflection: Bold Moves, Now Measured by Delivery

By mid-2025, Australia has made the pivot—from research excellence to execution intent.

It's clear: the country is done waiting. It's now building something that could change not just the regional quantum balance, but global capabilities.

But bold investment isn't enough on its own. What matters now is follow-through—training the talent, delivering the hardware, growing the ecosystem. Australia's bet is big. If it lands, the Asia-Pacific quantum future won't just run through Brisbane—it may very well start there.