

Scaling Australian Climate Tech

Accelerating commercialisation,
internationalisation and scale.



Acknowledgements

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Supporters

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Foreward - Harry Guinness - Greenhouse

Greenhouse operates at the intersection between climate tech founders and an ecosystem that supports their growth. Co-founded by the pioneering early-stage climate tech VC, Investible, we now manage Australia's largest dedicated climate tech hub, with over 600 members united in their commitment to climate action. From this hub, we lead a series of initiatives aimed at enhancing founder capabilities and connecting them with top advisors and mentors.

Yet, when it came to finding research that specifically addressed the factors driving successful Australian climate hardware companies to scale, we found ourselves at a loss. Why was there no comprehensive playbook for our ecosystem to help inform how we support scaling of companies in this vital technology cluster? Where could we turn for insights?

Rather than discovering a body of research, Greenhouse unexpectedly became a key contributor in creating it, and we are immensely grateful for that opportunity.

Supporting this important research, led by UTS and Made for Scale, was a privilege. It allowed our team to dive deep into the scaling challenges faced by many of Australia's leading climate tech founders. Hearing firsthand about their struggles has been both educational for us and invaluable in refining, and validating, our theory of change.

We hope you find the report insightful. In the coming months, we will explore ways to implement the key recommendations. We encourage you to do the same.

**Why was there no
playbook to help
support scaling of
companies in this vital
technology cluster?**



Harry Guinness
Head of Net Zero
Greenhouse

Foreward - Dr Jarrod Ormiston - UTS

Governments, corporations, investors, researchers, and communities are gaining a better understanding of the urgency of addressing climate change and related environmental challenges.

Climate technologies will be pivotal in mitigating the impact of climate change and creating new jobs as we transition to a more sustainable future. Unfortunately, the pace with which we are accelerating the development and adoption of climate technologies does not match the urgent need for change.

Compared to startups developing other types of technology, climate tech startups face longer lead times, higher capital needs, and more complex market dynamics, all of which slow the scaling process. This report aims to unpack these challenges by listening to the experience of Australian climate tech startups and scale ups.

The Transdisciplinary School at UTS, Greenhouse, and Made For Scale are uniquely positioned to lead this research due to our shared commitment to sustainability and innovation.

Through this report, we aim to take a step towards providing a clearer roadmap for how all stakeholders within the climate tech ecosystem can support the pace of commercialisation and internationalisation of climate tech startups.

Our recommendations for founders, support organisations, policymakers, and investors are a call to action to help promote a more flourishing climate tech sector in Australia.

We aim to take a step towards a clearer roadmap for all stakeholder within the climate tech ecosystem



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Summary of Key Findings and Recommendations

The Challenge of Scaling Hard-Tech

Climate tech companies, especially those focusing on hardware or material science, face longer times to scale, higher capital requirements, and greater market risk compared to their software counterparts. The scaling of hard-tech climate innovations is critical for Australia's decarbonisation goals but faces significant barriers at various stages of growth.

Five Valleys of Death in Climate Tech

Drawing on global frameworks, the report identifies five key stages—referred to as "valleys of death"—where Australian climate tech startups struggle to scale.

- Few Climate technologies spin out from labs or universities to commercial start-up due to financing and technical risk. (V1)
- Climate tech companies (CTCs) face challenges in developing market-ready products that are integrated into existing, often rigid, industry and value chains. (V2)
- CTCs are often navigating complex market dynamics and conservative industries that are constrained by incumbent systems. (V3)
- Moving from prototype to commercial scale production and operations is capital-intensive, requiring a shift from equity to debt or infrastructure funding. (V4)
- Many Australian CTCs must internationalise early on to achieve scale economies, due to the small domestic market, adding complexity and risk. (V5)

Funding Gaps

Australian climate tech startups face a significant funding gap, particularly for hard-tech solutions at the commercialisation and scale-up stages. Most of the funding at this stage has been led by or comes from international investors, and the domestic investment ecosystem needs further development to support the 3-4x more climate startups transitioning to scale in the immediate future.

Recommendation 1: Adopt Sector-Specific Scaling Programs

Customised Support for Hard-Tech:

Climate hard-tech companies face distinct challenges compared to software firms, such as deep integration in customer value chains, long lead times and higher capital intensity. Support programs should be designed specifically with hard-tech sectors in mind like storage, ag & food, biosphere and circular economy. This can include dedicated accelerators, programs, spaces and peer networks that address their unique challenges and constraints.

Leverage Sector-Specific Knowledge:

Build deep knowledge centres within specific climate tech verticals, allowing founders to access expertise and resources tailored to their sector (e.g., storage, biosphere, mobility). These hubs should facilitate collaboration between founders, strategic partners, and investors with deep expertise in the field.

Summary of Key Findings & Recommendations

Recommendation 2: Encourage Earlier Internationalisation

International Market Focus: Given Australia's relatively small domestic market, many climate tech companies must expand internationally early to achieve economies of scale.

Government trade programs like Austrade, along with global networks of Australian founders, can be leveraged to provide access to new markets.

International Customer Acquisition:

Target markets with strong demand-side incentives or regulatory frameworks that favour climate tech adoption, such as Europe or parts of the U.S., where decarbonisation policies are driving rapid market growth.

Strategic partnerships with multinational corporations or international investors can also help Australian companies grow beyond local limitations.

Recommendation 3: Develop Blended Financing Models

Expand Funding Options Beyond Equity:

Scaling hard-tech requires substantial capital for production and scale-up. A blended finance approach, combining equity with non-recourse debt (such as CAPEX financing), can better suit the needs of climate hard-tech companies.

Government funds and private investors should collaborate to offer diverse financing structures that address both short-term and long-term requirements.

Encourage More Patient Capital:

Investors, including government funds, should focus on patient capital sources to match the extended timeframes needed for hard-tech to scale. This could involve access and stimulus for more infrastructure investors, international climate-focused funds, government-backed investment funds, and industry-focused funds.

Recommendation 4: Focus on Strategic Corporate Partnerships

Leverage Corporate Venture Capital:

Australian climate tech companies can benefit from partnering with CVCs that provide not only capital but also access to industry knowledge, customer networks, technical validation and distribution channels. This approach can significantly reduce the time to market. In many cases, large industrial customers who also invest in climate tech help de-risk the business by providing critical feedback and early-stage funding, valuable for science-based or capital-intensive climate scale ups.

Summary of Key Findings & Recommendations

Recommendation 5: Incentivise Demand-Side Market Adoption

Government-Led Demand Stimuli:

Government procurement policies and demand-side incentives (such as subsidies or tax credits for businesses adopting climate tech) can help drive early adoption of Australian climate technologies. This approach will provide proof points for private sector buyers and investors.

Regulatory Alignment with Climate

Goals: Clear, long-term regulatory frameworks that support decarbonisation (e.g., carbon pricing, renewable mandates, storage, waste) can provide the certainty needed for industries to invest in new climate technologies.

Recommendation 6: Prioritise Market-Led Innovation Strategies

Market-Pull over Tech-Push

Strategies: Climate tech founders should focus on understanding customers needs, constraints and market dynamics early in the product development process.

Technologies that reduce perceived risk or change or substantial cost savings for customers will scale faster.

Founders should work on fitting their products into existing systems and develop solutions that reduce change requirements for customers wherever possible for faster adoption.

Retrofit Existing Supply Chains:

Companies can scale more efficiently by designing technologies that retrofit into existing production or supply chains, reducing the capital required to build new infrastructure. This approach allows for faster adoption and scalability, particularly when internationalising.

Recommendation 7: Enhance Strategic Operational Capabilities

Build Manufacturing and Supply Chain

Expertise: Hard-tech companies often struggle with moving from prototype to mass production. Developing strong operational capabilities, especially in manufacturing and supply chain management, is critical for scaling. Support organisations should connect founders with operations experts who can help to scale operations.

Focus on Unit Economics Early: Hard-tech companies should develop clear understanding of their unit economics and the scale at which production becomes profitable. By focusing on key operational metrics such as production costs and capacity utilisation, companies can better plan their growth path and demonstrate profitability potential to investors.

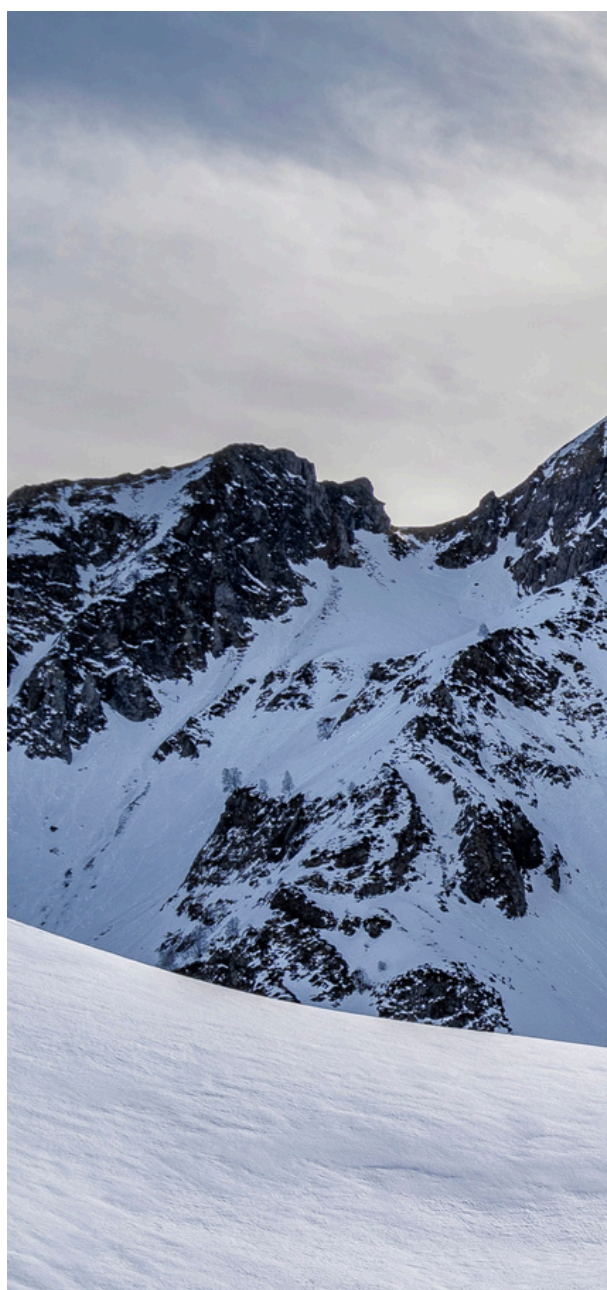
Section I: Research Context

1.1 Snail-scaling Climate Tech

Scaling up is the exception, not the rule. It's rare for any new company, let alone those based on new to the world technologies. On average, approximately 8% to 12% of companies, young or old, are considered "high-growth" (OECD, 2007). Further, research shows even fewer new firms (less than 3%) shall ever grow beyond a few million dollars in sales and keep scaling (Deutsch, 2017; Harnish, 2013). Innovation aside, scale ups create more new jobs, are more productive, and attract magnitudes more funding and investment than startups. scale ups are, therefore, good for employees, the economy, and investors.

Climate technologies (climate tech) are often viewed as harder to scale than other technologies in that they are viewed as "slower", with longer time to value and "riskier", with more potential "valleys of death". Experts say we have already invented many of the innovations and core technologies needed today to take massive steps towards our climate goals. Yet rapid scaling of new climate technologies is far from guaranteed. (McKinsey, 2023) Acceleration is a highly coveted word when it comes to scaling climate tech. Yet there are many constraints and risks faced by climate tech startups. As such, they can often seem messier than

other startups. Nobody wants to see startups fail or even simply survive. However, the consequences of not scaling climate tech or scaling at a snail's pace has larger, negative implications. 'Snail-scaling' climate tech leads to potentially irreversible damage to the world and life as we know it. (Shelton, 2023)



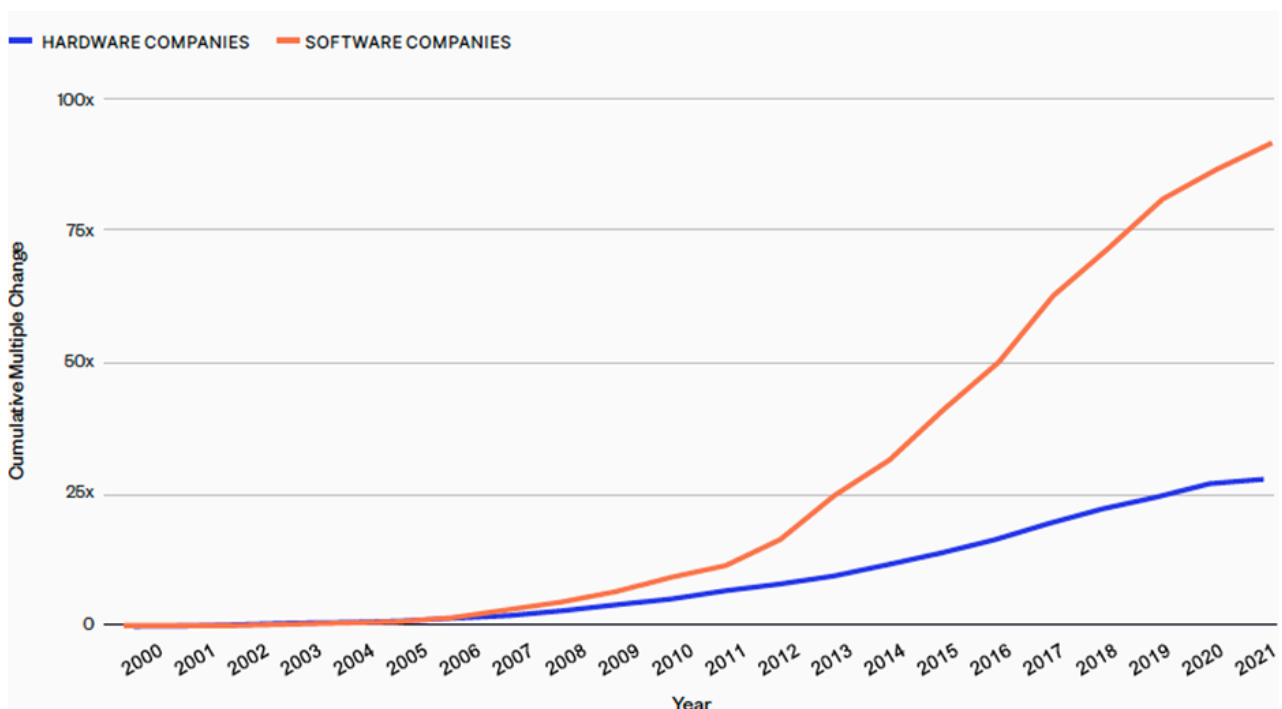
1.2 Differences Between Hardware and Software

While software has a role to play, innovation involving tangible technologies and physical products, such as devices, hardware, systems and science, is a must-have if we are to transition to a more sustainable world. Software alone will not achieve climate goals. Yet most climate tech companies (CTCs) founded since 2000 are software firms. Their numbers are rising exponentially - outstripping hardware 4:1 in key tech hubs globally (Endeavour Report, 2023). Quoting Sarah Nolet, Managing Partner at Tenacious Ventures, “You can’t eat software.”

Generally, hardware growth pathways are longer and more capital-intensive. Why? First, hardware tends to have longer product development times, with more steps in the development process to ensure fitness for purpose within commercial reality. While many software companies started with a few developers and a couple of desks and computers, the view is that more capital and support is required over longer timeframes when it comes to hard-tech. In this context, the development processes of hardware technologies offering solutions to climate problems more closely emulate sectors such as medical tech than software and digital technologies (Alexander & Clarkson, 2002).

Software companies have proliferated faster than hardware companies in climate tech

Change in the Number of Climate Tech Companies since 2000



Source: Endeavour Insight 2022

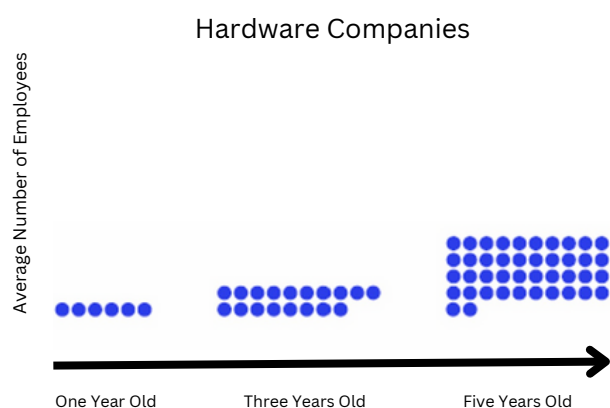
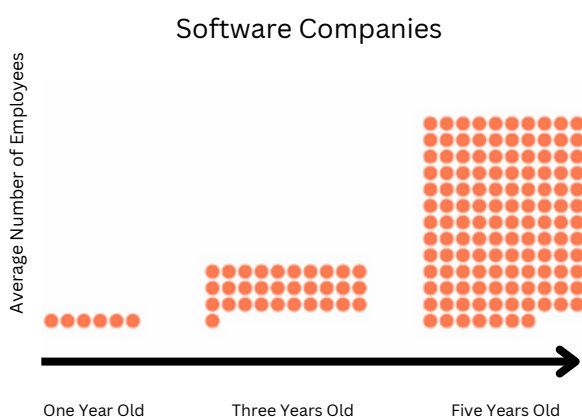
Australia’s tech startup industry has grown up on software, not hardware. Among Australia’s most valuable tech companies founded since 1990, only 15% are based on hardware technologies (Airtree, 2024). After three decades of growing up with digital startup success stories such as Atlassian, Canva, Deputy and Safety Culture, there are patterns and benchmarks for what good looks like. Playbooks exist for the commercialisation of ecommerce, payments, data and SaaS business models. For these startups, equity-based funding (i.e. Seed, Series A, B, C) is paired to well-trodden product and market milestones and stages.

Experienced founders and tech investors know the pathway to scale digital technologies, and there are several publications providing leading indicators of returns. These signals and known pathways help to reduce the risk of funding.

For example, research has shown that if a digitalised firm’s sales haven’t grown beyond a few million in revenue by year 5; the chances are high it never will (Deutsch, 2017). However, by year 5, most climate hard-tech companies are still in the startup phase, potentially at first pilots or possibly even pre-commercialisation.

At the start of the scaling process in digitalised or software firms, capacity building usually means hiring more specialist leaders and implementing more processes and systems. Digitalised firms tend to scale people and revenue incrementally and at early growth stages. Whereas revenue and staff levels tend to stay flatter for longer in hardware tech startups, until the scale stage when there is a rise in new job creation and investment dollars.

Comparative Development Timelines of Climate Tech Companies by Business Model



For hardware companies, to move from the lab bench to business ready for commercialisation, often requires first establishing production and supply chain capability. It follows that building production capacity requires a sizable initial capital investment ahead of initial sales revenues and cashflow. As such, the path to commercialisation and growth in climate hard-tech is seen as longer and riskier.

Differences in the growth pathways raises the question of how suitable existing growth methodologies and strategies are for climate hard-tech startups. As most climate tech startups are relatively young, “what good looks like” in terms of their growth paths and the suitability of existing frameworks, is less known. Attempts to start understanding growth pathways in climate tech have commenced, an example being Climate Bricks (climatebricks.com). Examining innovation and commercialisation methods in other hardware-led industries such as nano-tech, med-tech, bio-tech, chem-tech or even mobility and aerospace innovation, may be more directly transferrable to climate tech than software.

Annual financing must increase 6x to USD\$8T per year every year until 2030.

1.3 Funding Climate Tech

Funding and investment for climate tech startups is often heavily debated as insufficient to achieve climate goals.

Only 1% of global GDP, or about \$1.3 trillion, was spent in 2022 on funding climate technologies, 50% of this public sector driven. (Climate Policy Initiative, 2023). The causal link between funding and growth is indisputable (Duruflé, 2017, Deutsche, 2017) it follows a prioritization and re-distribution of global spending is recommended.

According to the IPCC report (2023), annual financing must increase six-fold to almost USD \$8 trillion per year, every year, until 2030 to align with achieving the -1.5 degrees reduction in temperature recommended by scientists to stabilize climate change. Increases in global funding have been mostly driven by a handful of large (mega- and giga) rounds in electrification and energy (Net Zero Insights, 2024).

Non-recourse debt and project funding sourced from banks, insurance and infrastructure investors are the dominant source of this funding. Investments in startups at early stage - Series A and B - dropped 30%, demonstrating a massive funding gap for climate tech startups entering this phase across both debt and equity.

Funding Sources

Debt is currently the major source of funding for climate tech. Equity and grants trailed debt at only 28% and 5% respectively in 2022 (Climate Policy Initiative, 2023). The Climate Policy Initiative report (2023) on the global landscape of climate finance shows that project debt financing represented 44% and balance sheet debt represented 40% of total debt funding in 2022.

Debt offers a non-dilutive funding option for climate tech companies with more mature technologies, operating in more mature markets, such as energy and electrified vehicles. Debt funders seek low technical risk and higher predictability of future cashflows to cover repayments than equity generally, making it less suited to early-stage climate tech businesses. Particularly first-of-a-kind (FOAK) technologies yet to demonstrate commercialisation potential.

Traditional sources of tech startup funding are equity - business angels and venture capital (VC) – who traditionally invest in software, data, finance and other digitalized technologies.

Venture funding for climate tech is on the rise in 2024 globally, however it represents a minute proportion of overall venture funding, approximating 2% (Pitchbook Data, 2024).

One rationale is the different risk profiles, capital requirements and investment horizons of traditional tech investment funds, which are built on return horizons of 7-10 years (Airtree, 2024).

However, climate specialist VC funds tend to have a higher tolerance for technical risk among climate tech startups and focus on a broad range of climate technologies. Pitchbook data shows that 2022 was the peak year for climate tech funding at USD\$18.7 billion, while 2023 took a nose-dive with signs of a bounce-back in the first half of 2024 (Pitchbook Data, 2024, Net Zero report, 2024).



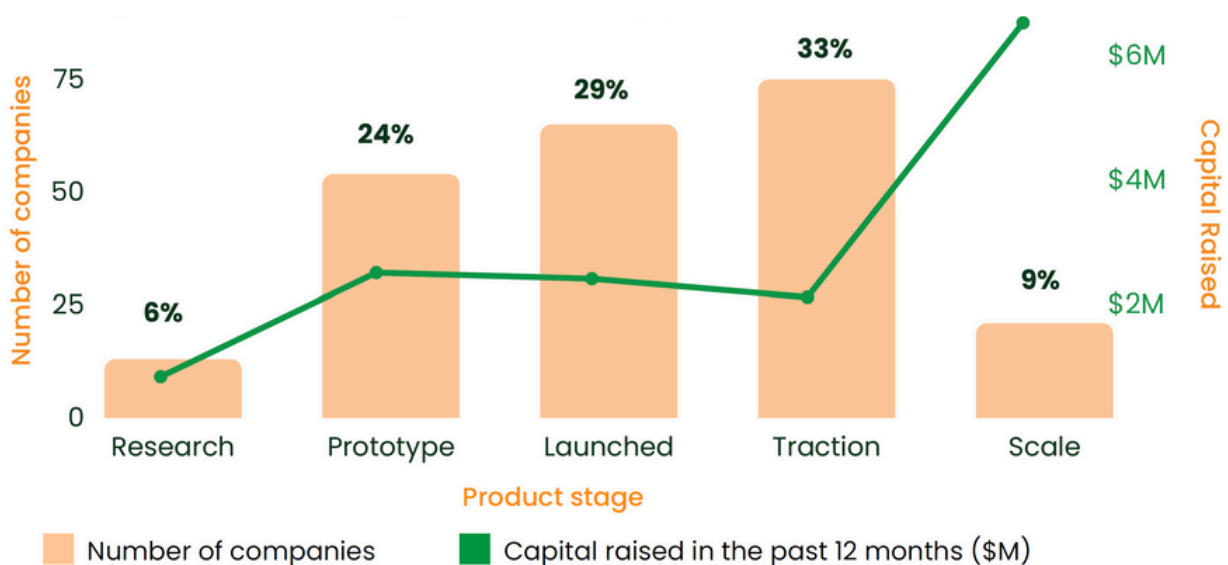
Funding Climate Tech in Australia

In Australia, climate tech startups raised AUD\$553 million in funding in 2023, and AUD\$125 million in the past 12 months, according to Climate Salad's Annual Industry Report, (2024) representing only 0.03% of Australia's GDP. Even if that figure doubles by the end of 2024, it significantly trails the global average. Most domestic investment in the past 12 months (AUD\$61 mill) going into Food & Ag Tech (40%) while the remaining investment sourced internationally is broader in sector distribution. Australian climate tech companies are still young. 77% of climate tech startups launched in the last 5 years (Climate Salad, 2023).

Renewables and biosphere are the most mature in terms of stage, with built environment, mobility, ag & food and circular economy next to transition from commercial traction to scale. (Climate Salad, 2024)

A massive increase and adequate distribution of capital across different sectors is necessary to fund the 3.5x increase in Australian climate tech startups that are imminently transitioning to scale. To date, no mega-rounds have been secured by private Australian climate tech startups. In 2024, clean tech startup Hysata raised the largest Series B in Australian climate tech history at USD \$111 million behind its high-efficiency electrolyser technology.

Climate tech companies by product stage and capital raised in the past 12 months



Source: Climate Salad 2023 Australian Climate Tech Industry Survey n = 228

1.4 Research Questions

What will it take to accelerate growth and scale in Australian climate tech startups?

Our first priority was to deeply understand the unique challenges and constraints faced by today's Australian climate tech startups during their scaling and commercialisation journey.

By unique challenges and constraints, we refer to common challenges and factors that influence growth and scale among many climate tech startups. Not the challenges and constraints that are known to influence the transition from startup to scale-up more generally.

For example, the direct relationship between funding and growth is known. Access to networks and influence of founder education and experience are well documented. The share of funding to female founders or founders from diverse backgrounds is low in Climate tech startups. It is also low in startups generally. Our focus was less concerned with restating these common factors, constraints and challenges present generally among technology startups.

While planning this research, our early preparatory conversations and literature review highlighted an important distinction and research gap

among climate tech startups offering hardware and material science technologies. As such, we chose to focus on startups and scale ups with physical or tangible products and/or process innovations, which we refer to as climate hard-tech.

Within this context we refined our research question:

How do Australian climate *hard-tech* startups accelerate commercialisation, internationalisation and scale?

We do not infer the research findings are totally irrelevant to software or digitalised climate tech startups. However, we do concur with Linton (1986) that the type of technology innovation is influential to the market strategies that drive market adoption and growth.

Section 2: Valleys of Death

Valley 1 Go to Startup

Not enough spinouts from universities. Few climate tech innovations successfully transition from university labs to commercial startups due to funding and high technical risks.

Valley 2 Go to Product

Harder to perfect their entry-point product-market fit. Climate tech companies face challenges in developing market-ready products that integrate into existing, often rigid, industry systems.

Valley 3 Go to Market

Demonstrating full-scale commercial value.

Climate tech solutions often require navigating complex, conservative industries that are constrained and slow to adopt new technologies.

Valley 4 Go to Scale

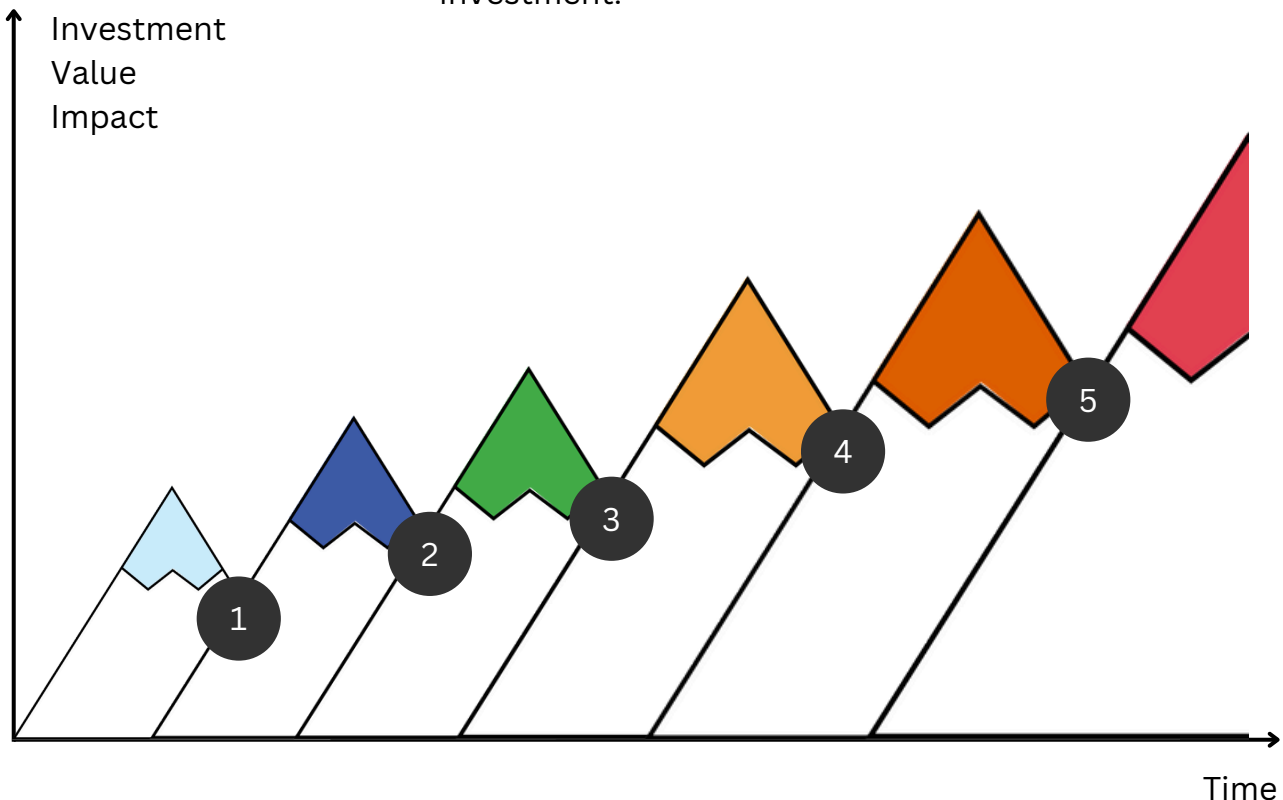
Proving scalability and profitability for funding.

Moving from prototype to mass production and scaling operations is capital-intensive, requiring a shift from equity-based funding to debt or infrastructure investment.

Valley 5 Go Global

Reaching economies of scale via early internationalisation.

Many Australian climate tech companies must scale internationally earlier on due to failure to reach economies of scale within the small domestic market, adding complexity and risk.



Source: Adapted based on Wang & Ye (2020)

Section 2: Valleys of Death

Scaling climate tech is constrained by four ‘valleys of death’, according to Wang & Ye (2020) of Third Derivative, a climate tech accelerator and investor. We compared Wang & Ye’s framework to the journey and ‘near-death’ experiences of Australian founders to validate the framework and inform our findings. This led us to propose a fifth valley of death applicable to Australian climate tech startups.

2.1 Go to Startup

Valley 1 - Not enough spinouts from universities

Investors wanting to support such early-stage technologies must perform significantly more diligence than for mature technologies, yet the amount invested is much smaller, and the risk is greater. Climate tech researchers are less motivated to take on the enormous risk of being startup entrepreneurs without the support of capital.

Overcoming this valley requires governments, philanthropy or universities to step in with funding and support to address the risk and effort for founders to spin out new technologies and high-level technical expertise from the lab to a business.



2.2 Go to Product

Valley 2 - Harder to perfect their entry-point product-market fit

Many CTCs operate in an industry first established without sustainability goals in mind. Yet climate tech startups don't function in isolation. They are deeply integrated into existing value chains and markets. During the early stages of product development and iteration, founders must navigate complex systems. A complex web of regulation, embedded supply chains, legacy infrastructure investments, existing processes, and incumbent competition.

Industrial and corporate standards in these sectors are typically high. Climate tech startups must develop a product at Go-to-market stage that meets or exceeds the standard specifications and requirements of the existing system. Not an easy task for young, lean companies. For example, standards placed on wind and solar energy providers for them to supply and connect to the energy grid.

Contributing to the extended time spent in this stage is that *product innovation* requires an associated level of *process innovation* in CTCs. Therefore, iterations to one will inevitably require changes to another and this slows the product-market fit finding process.

Overcoming this valley requires a systems-level approach and deep understanding of market dynamics early on in CTC founders. Software is a more “independent” technology which might begin as a stand-alone product before deep integrations are required. During this stage, experimentation methodologies and go-to-market playbooks adopted by pure digital technologies may be less applicable.



2.3 Go to Market

Valley 3 - Demonstrating full-scale commercial value

The industries and value chains climate tech operate within vary widely, and therefore it is difficult to generalise regarding the “best way” to scale. Climate tech startups with business to business (B2B) models are often selling to corporate or industrial companies. Key stakeholders and decision-makers tend to be in conservative roles within these types of customers. These are not the corporate innovation, sustainability departments or commercial teams focused on growth and impact initiatives and goals. Rather, they tend to be highly systemised engineering and/or technical teams focussed on ensuring the company’s high standards of quality and output can be reliably met.

Adopting new climate technologies that involve significant changes or risk to the customer or the established value chain is likely to slow down adoption as it takes time for value chains to reach a level of readiness or maturity (Hakim & Agenbroad, 2020, Linton, 1986).

People often refer to this valley as “death by pilots,” in other words, the structural challenges of working within incumbents value chains and big businesses long and comparably risk-averse development cycles.

To overcome this valley, climate tech companies need to demonstrate very high-value proof points to customers within complex, established systems.

Due to the level of system change required and the newness of climate technologies, startups end up supporting more components in the value chain (i.e., they are vertically integrated). They take on more effort and risk at an early stage as they engage in more elements—from component technologies, end-product development, new distribution processes and market education. Therefore, Climate tech startups need deep pockets and long runways to meet the high standards of corporate or industrial clients.

The flip side is, value improvements that are orders of magnitude beyond the status quo, act as a potential “defensible moat” once embedded with a customer.

Climate tech companies are potentially more difficult to replace than easily integrated or largely independent software systems. CTCs can begin letting go parts of the value chain considered “non-core” activities to new actors or suppliers as the market matures and new value chain partners enter.

2.4 Go to Scale

Valley 4 - Proving scalability and profitability for funding

Scaling up climate hard tech can be orders of magnitude more capital-intensive than scaling software and other digital technologies. Go to Scale stage funding requires proving scalability and potential profitability for returns and many Go to Scale hard-tech CTCs do not fit the current risk, return, or horizon profiles of traditional early-stage tech investors.

Capital-intensive industries and products are typically funded by debt or infrastructure investors, who are not your typical early-stage tech investors. Traditional debt lenders need to see a line of sight to predictable, stable cash flows. Renewable energy projects today as an example, have more stable, predictable cashflows from long-term fixed-price contracts; however, not all climate tech sectors do.

Australian climate tech companies at commercialisation and scale stages are under scrutiny to prove scalability and that economies of scale (lowering of unit costs) are achievable. For some, this may be challenging based on the Australian market alone given its size.

There is more growth funding available outside Australia than inside. Yet, addressing this valley of death requires not only access to more capital but different capital. Access for Australian CTCs to more diverse financing types is required. New financing structures that fit the longer return horizons (often referred to as patient capital) and different funding requirements (e.g. production facility, equipment, working capital for staff, sales & marketing) of climate hard-tech startups at growth stage





2.5 Go Global

Valley 5 - Reaching economies of scale via early internationalisation

Our fifth valley of death, specifically additive for Australian CTCs, centres on internationalisation. Early internationalisation has been linked to high growth and acceleration among startups generally. Although Valley 4 and Valley 5 could be swapped depending on the growth pathways of certain climate tech business models. Some founders told us they simply can't reach economies of scale in Australia as the number of customers is limited or the policies are not yet in place to drive market adoption and/or scale production. This means Australian companies are less able to compete on unit costs or meet customer expectations on quantity and price. A potential consequence is they are less able to demonstrate scalability and potential for profitability to secure funding at Valley 4.

Climate tech startups can address this valley through early internationalisation. For example, securing a large customer, investor or partner outside Australia. Leveraging founder and investor networks or Austrade networks and landing pads in international markets.

Planning for market expansion and international replication may be a first-order priority ahead of Go to Scale stage for some Australian CTCs. With early internationalisation as a goal, decisions regarding business model, products and how to supply and sell to customers may also be refined. Establishing proof-points of international replication, international customer value and competitive unit costs early lowers perceived risk for all stakeholders.

Section 3: Key Findings and Recommendations

3.1 For Founders

The ‘playbook’ to transform from lab to fab is still being written.

At a firm level, a more market-led approach is required. Diving deep into the actors or key players in the customer’s industry and value chain. Understanding the relationships between them and how those forces act on their ability to adopt your new tech. Building new pathways, playbooks and strategies based not on well-trodden software paths but with the unique challenges and opportunities of climate hard-tech in mind.

Founders should adopt a market-led approach.

At the forefront of this is a deep understanding of market dynamics and systems in which customers operate in and the level of change or risk perceived by customers to adopt new climate tech offerings. Compressing precious time developing products without consideration for the context of the system and commercial realities in which customers must operate. E.g. availability and costs of inputs such as renewable energy, sunk costs in existing infrastructure and other system dependencies.

Prioritise market-pull over technology-push.

Consider how much change and risk is

perceived by customer’s within their value chain if they were to adopt your technology. When change and risk is perceived as high, the market strategy is likely to be more of a “tech-push” than a “market-pull”.

When customer change or perceived risk is LOW (Market Pull) CTCs should focus on being an easy, effective substitution. When customer perceived risk or change is HIGH (Tech Push) CTCs should be delivering more value by an order of magnitude of improvement vs. status quo. (Linton, 2003)

In a tech-push scenario, then the value uplift or benefit from your product must be orders of magnitude (think 10 - 20 times) beyond their current status quo or whoever you’re replacing. (Linton, 2003) A tech-push scenario without enough value uplift will likely result in a slower, riskier pathway to commercialisation. Settle in and prepare for the road to be longer.

For example, organic waste collection for biomass requires clients to be trained on using a new bin for food waste. Beyond this, the rest of the process, is unchanged. (Substitution strategy) Whereas, introducing a new tech and process to massively improve the efficiency of energy consumption by industrial customers must deliver orders of magnitude more value in energy cost savings versus the status quo. (Value Uplift Strategy).

Go beyond green

Value uplift includes sustainability benefits – the so-called “green cheque” or “green credentials”. Green benefits help many corporate customers meet ESG or decarbonisation goals and offer a social “license to operate”. However, green benefits alone are often insufficient to address a tech-push strategy in unregulated markets. Research from the energy sector has shown there is a gap between corporate statements regarding commitments to sustainability and corporate actions (Feeney et al. 2024). It follows, market adoption requires additional valuable benefits or cost improvements beyond green credentials in a -push scenario.

Follow the market pull

Go where the pull is strongest, for example in markets where regulation or demand-side incentives are already positively driving customers and industry wide change. For example, demand-side incentives and Government targets in the UK helped drive market-pull from commercial property managers for Australian solar innovator, Allume Energy.

When change and risk is perceived as high, the market strategy is likely to be more of a “tech-push” than a “market-pull”

Source: Linton (2003)

Deeply map market dynamics

Climate technologies are heavily influenced by market dynamics and the nature relationships between different forces and factors that determine market behaviour. Supply and demand forces, competitive forces, regulatory changes, consumer trends, economic conditions all affect customers capabilities and motivation to adopt new technologies. For example, even though your ideal customer would like to buy from you they may not be able to due to their contract process, lack of clear regulation or power of incumbent suppliers. Understanding these forces today, how they may constrain or accelerate customer adoption or evolve in future is key. For example;

- How do startup target customers contract and buy today?
- What could incumbent suppliers do to defend their position and how deep are their pockets?
- How will today’s regulation and politics of the day likely effect current demand and supply?

Interviewee Power Quotes

[Tech-Push Strategies] As founders didn't put enough effort in to make it 10 times better. Which I think is just as important as always trying to really clearly articulate the vision and the mission and what you do, simply, which I think is really hard for a lot of energy based startups out there, like they're terrible at doing it.

[Follow the Market-Pull] Whereas retail, there was a consumer pull for more sustainable products on shelves in stores, and we could validate. And we can demand a higher unit price at a higher margin on those products and that drove the decision to invest.

[Market dynamics] It was already clear to me that the right way of doing plant-based meat was actually working with meat companies. [sic] and that was something really quite strategic there because we figured that the the battle lines were being drawn between the meat industry and the vegans and we were thinking well, that's not going to end good.

[Market dynamics] We completely missed the understanding the dynamics of the actual market, how it operates, and how our customers like to transact .

[Beyond Green Benefits] I think that naivety was what enabled that confidence. Why would this not work? We think we can deliver the technology. Of course, everyone is gonna get behind it. And of course, it's gonna make money cause we're delivering inherent value and the value is so physical and demonstrable, and that will just happen. So it was absolutely a build it, and they will come confidence.

Level up strategic finance and operational capabilities

Climate tech founders come from diverse experiences and backgrounds. Many of them have technical or science backgrounds, less industry or management backgrounds. Securing access to strategic financial capabilities, such as those required to deeply understand the production costs and utilisation, unit economics, capacity, capital investment, and returns to scale, should be emphasised. Access to smart people in operations who can help build manufacturing capabilities, streamline processes, and manufacture cost-effectively becomes critical to scaling production or innovative processes.

Seek out fellow hardware founders & operators

All founders can benefit from advice and networks, learning from founders/operators who have been through the stage ahead. Australia has now built a solid ecosystem of successful software and digital technologies entrepreneurs. However, ensuring climate hard-tech founders and leadership also have access to experienced founders/operators within hard-tech sectors is critical to avoiding mistakes and accelerating the learning curve. Deep tech investors

Our experience investing in agtech echoes the findings in this research. Founders need to deeply understand market dynamics and prioritize a market led approach early on.



Sarah Nolet
Managing Partner
Tenacious Ventures

with extensive relationships and networks in these markets are one potential source. Industry associations may be another. Access through Austrade to mature, international climate tech hubs and international industry networks are others.

Pursue strategic investors

Pursue strategic investors (e.g. Corporate or Industry Fund of Funds VCs) at growth stage funding who are natural partners or customers. They will have greater technical capabilities to conduct due diligence and provide good feedback to improve product offering. If their customers are your customers, they may offer good early access or beta testing to customers who would otherwise not engage with new companies and technologies.

Early internationalisation

Replicating in other markets may be a pre-requisite for scale for some climate businesses. It can assist with finding growth stage funding and achieving economies of scale. Rather than wait for the domestic market to regulate or mature, focusing on markets with acceleration of policies, regulation or customer opportunities.

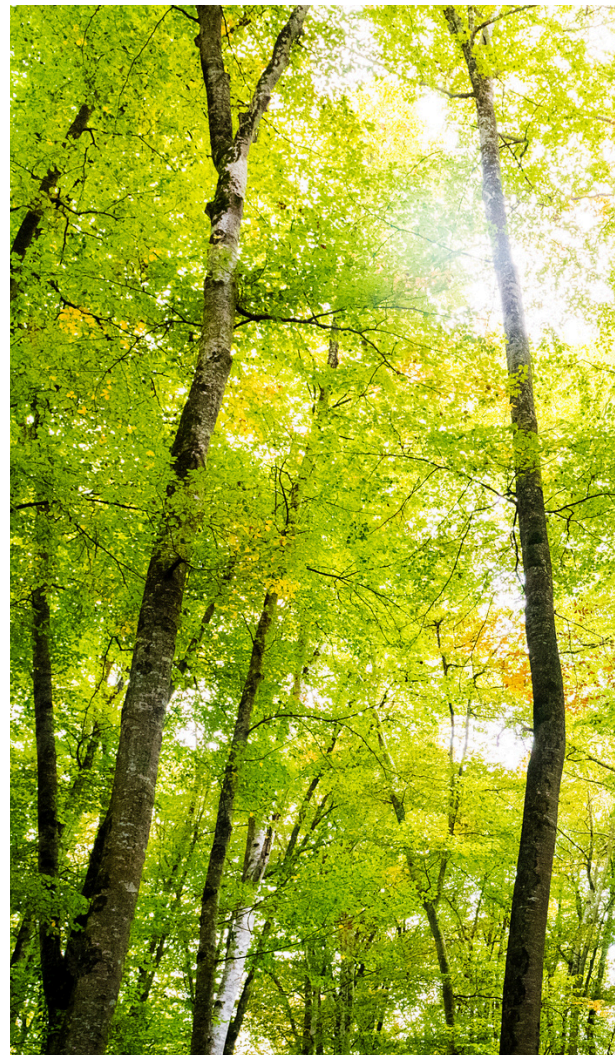
Consider how your product or process innovation can be adapted or more easily replicated in international markets considering the customer value chains today in your target market.

For example, alternative protein is produced into existing meat products such as burgers and sausages, which any existing burger or sausage manufacturer can easily produce.

In this case, supply-side replication and internationalisation can be de-risked and accelerated.

International replication and scalability are not a given in hard-tech and need to be planned early.

Going Global programs like those run by Climate Salad and Government bodies such as Austrade are good sources of intel and connections. Along with other climate tech founders and networks of Australian startups who have gone before you.



Interviewee Power Quotes

[Internationalisation] We're we're hardware company, so I can't pick my thing up in a suitcase and take it there. We have a big infrastructure play. And so it doesn't make sense to be in the US right now. But Australia has to recognize that it is a dead end when it comes to funding.

[Internationalisation] It felt like we were from a sales point of view starting largely from scratch and had to completely rethink how we're approaching the market. What types of customers we were going after. Build a really strong timeline because it's sort of a 12 month cycle to get through the pipeline.

[Achieving Scale in Australia] So, very much in the scaling up phase, we're no longer a startup. We have over 100 megawatt of our product on the ground. But that's not success in Australia. If you actually want to have an impact as a technology in [sic] the market, then we need to be in the tens or hundreds of gigawatts.

[Internationalisation] We having a strict product that worked in Australia. We knew that there was differences in voltage and we kind of [sic] scoped them out technically. But there was a significant gap in our understanding. When we brought it to our first customer to show they pointed out some really key areas where it was completely incompatible with the US grid.

3.2 For Investors

Our research finds many challenges faced by climate tech startups when it comes to funding hard tech at commercialization and scale stages.

Most equity dollars (tech venture capital's so-called "dry powder") are not flowing to Australian climate tech companies. Australian CTCs are raising from a handful of specialist climate investors and corporate venture capital, largely led or sourced from overseas investors.

Mind the Funding Gap

Our sample climate tech companies raised AUD \$855 million in capital over their lifetimes, which were 8 years on average.

70% of climate tech companies received funding from equity investors, whereas only 12.5% from debt, such as asset-based loans from banks. Debt did not appear to be top of the consideration set during our interviews with founders. In some cases where non-dilutive, debt-financing was utilised, it was under terms deemed as too onerous and subsequently swapped out for equity.

At commercialisation and scale-up stage, dilutive equity funding was provided by specialist VCs, with 29% of companies in our sample raising

70% of companies received Government grants and in 20% of companies, grants were the only source of funding aside from founder's capital.

capital from deep-tech and climate tech-focused funds. Among Australian specialist VCs, a substantial number of them were partnered with Australian Government investment agencies.

Strategic Investors are closing the gap

By far, the biggest investors in our sample of Australian climate tech startups are corporate venture capital funds (42%). Investment funds sourced from large corporates or industrial companies both in Australia and offshore exceeded specialist venture capital and debt in their share of companies funded.

Traditional or general tech VCs funding tech were shareholders in less than 9% of companies and did not lead a growth-stage round.

For matching founders and investors, it follows building relationships that can lead to warm introductions to international investors and corporates are critical to overcoming the Go to Scale valley of death.

Grants are critical, yet uncompetitive

The Australian and State Governments offer funding via grants, investment partnering with a few Australian VCs and through their own agencies (see Climate Action Australia's website for a good list). Investing at all stages from early research to commercialisation and scale through industry focused bodies like the Australian Renewable Energy Agency (ARENA) and Clean Energy Finance Corporation (CEFC). As well as broadly via deep-tech venture capital funds such as Main Sequence, Southern Cross Ventures and the Artesian SA Government Fund.

Australian government grants, including the National Reconstruction Fund announced in 2023 is viewed largely positively. However it is considered small in size when compared with international equivalent schemes from European, USA, or India counter parts.

Diverse funding

After funding the capacity required to supply to customers, there was little capital leftover to invest in commercialisation resources for sales,

marketing, distribution and international expansion.

During our interviews, many founders called for more diverse funding options, recognising the different capital requirements in their business models. For example, separation of capital expenditure funding (CAPEX) such as via non-recourse asset-based financing schemes to fund manufacturing facilities, equipment, or the installation of hardware (for example solar panels).

New funding models are slow to emerge in Australia. Stimulation and investment from Government in blended financing structures or partnering with more specialist funds offering both equity and non-recourse debt financing options may help accelerate the maturity of the investment ecosystem for climate tech. Addressing current levels of technical and market risk would help to attract funding providers to Australian companies in the sector.

International strategic investors good for Australian climate tech

Most growth stage funding in our sample was sourced internationally with rounds led by strategic investors. Strategic investors, namely corporate venture capital (CVC) or industry ‘fund of funds’, understand hard-tech horizons and can assess technical and market risk with deep in-house technical knowledge. They also have access to end customers for early testing and seeding of products and are deeply embedded the market, understanding the current dynamics and constraints of existing systems.

Partnering with strategic investors has led to scale among our sample. Rather than the startup trying to do and fund everything themselves in a vertically integrated way, partnership involved the corporate handling more of the value chain (e.g. distribution, customer testing, sales or even production).

In this way, bringing in the right strategic investor could lower the effort, risk, and capital required to commercialise. However, the trade-off may be a longer time to get to initial commercialisation due to reliance on sourcing the right strategic partner or investor.

Summary of recommendations for funding and investors:

- **Proactively stimulate more specialist Climate tech funding** sources and diverse funding types.
- **Build early relationships with international strategic investors**, such as corporate venture capital or industry ‘fund of funds’ (e.g. EIF)
- **Blended financing structures** to separate CAPEX (equipment, assets) from OPEX (operational) funding.
- **Avoid pressuring hard-tech CTCs to scale pre-maturely** before deeply understanding market dynamics, and potential for international replication and/or scale economies.
- **Alongside capital, support CTCs with access to expertise and capability building** in strategic financing and operations and commercialisation at Go to Market and Scale stage.

By far, the biggest investors in our sample of Australian CTCs at growth stage are corporate venture capital.

Interviewee Power Quotes

[Patient Capital] Our clients think in 25 year blocks which is completely different than even how the Australian VC market thinks, you know, in terms of their fund, their funds only have a 5 or 10 year life, you know, our customers are there for 25.

[Financial support] The R & D Grant has been exceptionally important to us. As part of our model, we wouldn't operate if we couldn't be leaning on that, I think, is fair to say.

[Funding for Hard-tech] Problem is that **no one wants to invest in a hardware business**, and particularly in this country. It's incredibly difficult.

[Different Capital required] It's scary. Yeah, it takes a long time for product development. So you're having to invest a lot of capital upfront before you can actually start generating revenue off the back of it. You can't even deploy a product. It's not that you can't test the market with a hardware product that hasn't been designed and manufactured yet.

[Corporate Venture Capital and Partnership] You could have given me 300 million dollars, and I couldn't have done what they've done. It's just a big corporation with all stuff.

3.3 Policymakers and Government

While policy makers in Australia have taken steps in the right direction, more funding and support are needed in specific areas.

Founders in our sample highly valued Government supported funding schemes. Examples mentioned include the R&D tax incentive and Electronic Vehicle taxation credits. While the former subsidizes and partially funds early-stage innovation, the later provides Go to Market, Go to Scale demand-side stimulation to help drive market adoption bringing down unit costs in the hope of leading to scale economies.

With 70% of climate tech companies in our sample benefiting from one or more Government grant, they play a critical role in supporting Australian climate tech to commercialise and scale.

Clear goals and regulation

Regulation is seen as the most effective form of Government support according to founders. Regulation to progress climate goals is effective in accelerating demand-side transition, including consumers, governments and businesses,

Clear goal setting coupled with policy and regulation in priority

decarbonisation sectors is viewed as highly effective for accelerating market adoption. Some startups in our sample “followed the regulation” to international markets where demand was accelerated (e.g. UK renewable energy for housing schemes).

Bi-partisan agreement

However, bi-partisan alignment is needed to overcome “short-termism” from changing Governments and boost confidence among corporate customers to undertake long-range projects. Climate technologies often require significant change within customers, their market and industry. Undertaking long-range planning can encourage new investments or developments required to fully adopt new climate technologies. Narrowing the gap between corporate climate commitments and actual action.

In renewables, bi-partisan and enterprise alignment on long-term goals, government regulation on energy supply, diverse funding in the form of debt infrastructure and project-based financing, transparent pricing and known revenue models all have helped to unlock eventual scale.

However the tailwinds propelling renewables to scale are less present in other climate tech sectors today. For example, while financing and funding

to climate tech startups is increasing, the funds are not evenly distributed to all sectors. Government policies and demand-side incentives heavily favour some sectors (e.g. advanced manufacturing, renewables) over others. This is not necessarily problematic, provided the sector's entire system is considered with strategies to unlock first-order constraints from the outset. (e.g. funding and grants for advanced manufacturing without appropriate infrastructure planning or energy to fuel manufacturing facilities.)

Government delivering proof points

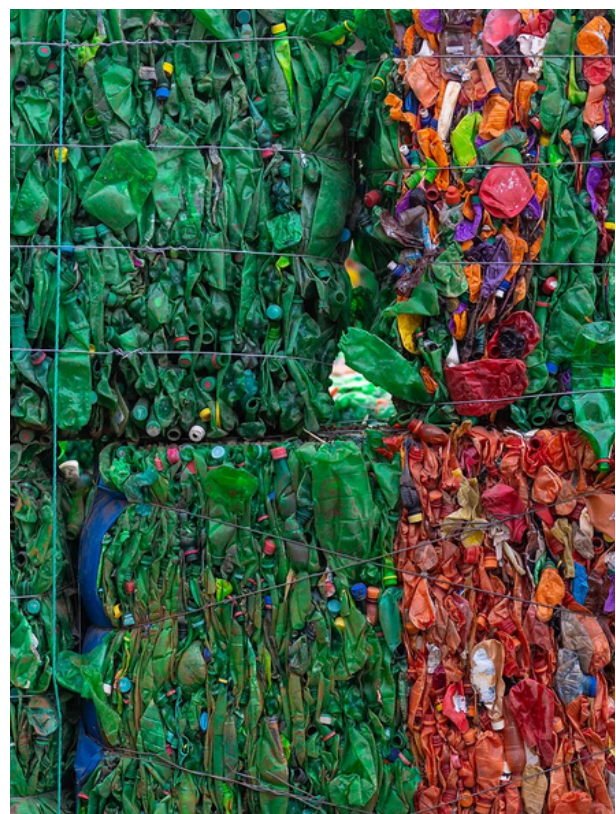
As the biggest buyers in the economy, Governments always have a role to play in leading the charge when it comes to procurement and implementation. This, in turn, helps Australian climate tech companies achieve economies of scale and demonstrate large-scale proof points to international customers.

Calls for Proposal and funding for Support Programs implemented through Government agencies, Accelerators, Incubators, Climate tech hubs, and Industry associations, distributed more evenly to address current ecosystem weaknesses in Valleys 3, 4 and 5 are urgently needed to avoid the next wave of climate tech startups to build scale stage capabilities to thrive.

More competitive grants and other financing stimulation schemes that provide less dilutive, non-recourse financing for supply-side production, manufacturing, and international export/distribution will help more climate tech companies reach economies of scale.

Improved capabilities and capacity

With increased demand comes a constraint around supply. Several founders found existing national or state infrastructure insufficient for their production needs and made urgent calls for acceleration in quantum of renewable energy supply as a production input.



Interviewee Power Quotes

[Government as Customers] Just buy it. Put it on your Department of Defense or your schools or, I don't know, make demand for us and underwrite supply. That's what the US have done. I think it's brilliant, guaranteed offtake to a degree just gives businesses slight peace of mind and helps you get to economies of scale.

[Infrastructure for manufacturing] Because the grid, the industrial sights are not set up to handle this level of manufacturing or and the process, the mechanism to get these sites connected is so slow. It does not support business continuity in any way, shape or form.

[Long-range government policy] It stops people investing in the industry and then makes it difficult to commit to long term contracts when you don't understand where that market's going. [sic] So if I'm building the mega factory of industrial like scale, that's going to help me help Australia get to net zero. That's obviously going to take years of financing and CAPEX, etc. But if the net zero target changing, it's not going to help. So I'd say policy certainty at a sort of macro level is one of the biggest issues that the industries faced over the years. If not the biggest issue.

3.4 Support Organisations

While it is earlier days in the Australian Climate tech sector when it comes to ecosystem support organisations, a lot has been achieved in a short time span with a handful of organisations.

Many of our interviewees mentioned they had participated in one or more programs provided by accelerators, incubators, universities, associations or tech hubs in the startup ecosystem. As the quantum of climate technologies at commercialisation and scale stage increases 3.5-fold in the next few years, the scale and focus of these will also need to level-up.

More Programs Addressing Climate Tech's Five Valleys

Support organisations can do better to adapt and tailor their programs to the growth paths and specific needs of Climate hard-tech companies. Avoiding over-reliance on frameworks and programs developed predominantly for growth pathways of digital technologies and software startups. For example, providing longer-range programs, physical lab space and peer support groups for founders and leadership of hard-tech scale ups support founders facing similar hard-tech challenges.

The role of market dynamics is often underplayed or understood too late despite it being highly influential to overcoming the valley of death as early as the Go to Product stage. More diligence and validation around market dynamics may be emphasised in preparation for funding programs. Incorporating more system-level thinking and market-led approaches before commercialisation.

“Since Energy Lab launched, we have seen our climate startup ecosystem mature. There are a number of Aussie clean energy tech companies that have experienced challenges scaling.”



Megan Fisher
Managing Director
EnergyLab

Sector and Tech Focus - Less is more

Climate tech is a broader, more diverse area encompassing different types of technologies, revenue models, industries, clients, value chains, markets and systems. Given the early influence of systems on climate tech's success, support organisations should focus on fewer areas they support, doubling down and addressing the different stages of scaling and associated valleys of death.

The saying “jack of all trades, master of none”, comes to mind. Building knowledge centres and expert relationships through access to both local and global operators, advisors, content, investors and relevant corporate and industrial relationships etc.... within their key focus areas. This may include attending international industry trade shows, joining international consortiums or developing fund of fund models to elevate connectedness, funding and access to international networks in their sector (e.g. Food waste, Ag Tech, Energy). An example is EnergyLab with their early focus predominantly on energy and clean tech or examples of organisations who do this globally is the international energy ecosystem builder New Energy Nexus (NEP).

With deeper sector intelligence, support organisations may be in a better position to advise and influence

emerging Government policy, incentives & regulations in the key focus markets, to achieve breakthroughs in regulation, policy and bipartisan alignment, should they see this as a future industry role.

Examples of Ecosystem Supporter Strategies

- **Align programs and investments** in ecosystem specific to addressing valleys of death at scale-up stage.
- **Focus efforts, support programs and investments** to type of tech and sector to more effectively address Valleys of death challenges and unlock opportunities.
- **Advocate to replicate successful demand-side incentives** across sectors ready to commercialise and scale.
- **Lead or support efforts to progress policy and regulation** in priority sectors.
- Work with Government and international agencies on co-investment schemes in priority sectors.
- **Build networks and access** to large-scale strategic / industry investors such as corporate funds, industry funds or mega-funds within and beyond Australia.
- **Build awareness and connection** between startups with diverse funding sources i.e. sources for capex including debt, project financing and infrastructure.

3.5 Go to Market - Strategies to accelerate scale

It's still early days for Australian climate tech scale ups. Even so, we can observe some interesting market strategies or "plays" emerging. Go to Market strategies depend on the type of technologies and the level of change or risk perceived by customers. (Linton, 2003). Examples of go to market strategies and pathway plays observed that "worked" according to our sample are outlined below.

Strategy 1: Technology Platform + Strategic Partnership

Some climate tech scale ups in our sample chose to focus on the core technology, taking a platform approach. Rather than taking on everything from technology to solution or product development, production, distribution and sales in a fully vertically integrated approach. Applying their technologies to different types of customers and industries, they sought to partner with an incumbent supplier in each market with similar customers to manage the production, distribution and sales parts of the value chain. The partners selected could benefit strategically from access to the technology. This reduced initial capital costs to a fraction of competitors's and accelerated access to customers via an established trusted customer

relationship. The result was a less capital-intensive and less risky pathway. However, time to scale was still considered long, indicating a trade-off between speed and risk/capital in this play.

Strategy 2: First Strategic Investor as Corporate Customer or Partner

Many of the scale-up founders we interviewed had a large corporate or industrial customer who was also a strategic investor. In all cases where growth stage funds were raised, they came from a strategic investor. Sometimes, the investment came first, followed by the investor becoming a customer. Other times, the investor was a customer first. Either way, this play opened doors to end-customers and provided deep technical and market capabilities accelerating end-customer adoption.

Strategy 3: Be the Low-to-No Risk Replacement

This play adopted by some scale ups (e.g. circular economy and ag & food tech sector) demonstrated the acceleration that comes from the market-pull strategy. Designing a product to fit an existing customer process or value chain and replacing a supplier with a better, more sustainable option that solves a pre-existing problem (such as waste removal or reducing the cost of goods).

This substitution play delivers a cost-competitive solution and comes with sustainability benefits reducing carbon emissions.

Strategy 4: Retro-fit To Existing Supply Chain

This play is where a new technology or product is designed so that it can be supplied by an existing producer in the value chain without the need to build new production facilities to increase production capacity (as customers grow) or when entering new geographical markets. This makes supplying products to large customers (go to market, go to scale) less capital-intensive and accelerates internationalisation (go global). An example of this is alternative protein markets starting with burgers which can be produced by any meat production facility in the world and stood up in less than a day.

Strategy 5: Follow the Market-Pull

This play prioritizes market-pull over technology-push market strategies to accelerate commercialization and scale. scale ups who expanded internationally early often followed a customer, investor or government policies positively acting on demand for their product in an international market. As a result, many of these scale ups were able to accelerate the proportion of international customers and revenue versus domestic

Australian sources and economies of scale, reducing financial and market risk at go-to-market and go-global stages. Examples of this would be prioritizing internationalization in markets with existing regulation supportive of demand-side market adoption.

Strategy 6: Multiple Revenue Stream Horizons

This play became important to climate tech startups where there was a long time to value. Meaning where the chosen revenue model took a long time or multiple years to come to fruition. For example, products and business models built around atmospheric carbon removal and subsequent revenue from carbon markets. It takes time to build the supply side in this model delaying time to value and revenue realisation by years.

As such, some CTCs developed additional services or products to offer their customers with shorter time to value thereby reducing financial risk in the short-term, while still playing the longer game. For example, charging removal fees for collection of food waste ahead of converting and selling biomass to energy or protein as feedstock for animals.

Interviewee Power Quotes

[Scale up stage support] I think a bit of mentorship and training in the very early days would have been really good. Because fundamentally, a lot of the answers you sort of got yourself but you probably just need someone who can talk it through with you.

[Scale up stage support] Financial literacy requirements of climate tech founders in hardware and supply chain knowledge is just far greater than in a SaaS company. And there are things that need to be understood deeply.

[Hard-tech startup support] You know we've had opportunity to engage with incubators and things like that in a startup phase, and we are just ducks out of water. It's just not right for us.

[Access to production expertise] Was it easy to find a partner who could, you know, basically manufacture this new innovative product? I'd say it's an area where Australia's manufacturers can almost specialize in that, compared to say a low cost region. Because that's where they can provide value.

[Access to commercialisation expertise] In our particular case the science guys really don't have too many business bones in them, and we're not trying to tell them what to do. They do their stuff. We just make sure that what they're doing fits with what is possible to commercialise what they're developing..

Section 4: Conclusions and Outlook

Today there is no one “playbook” for rapidly scaling climate hard-tech startups.

Every startup's eventual path to growth is unique and there is no one “best way” to scale. However, commonalities are observable in their constraints, wins, risks, social and market challenges. We have attempted to summarise the acceleration strategies used by experienced climate tech scale ups in this work so that they may be shared and learnt from.

Vulnerabilities described in the five valleys of death may be addressed through the strategies we have outlined in this research.

At a firm level, founders can accelerate market adoption through strategies outlined such as prioritising market-push over tech-pull. Planning for scale is important including timings and strategies to achieve competitive unit costs or scale economies including (if required) early internationalisation.

Different funding models and more growth stage funding for Australian climate tech startups is imperative.

New financing structures, such as multiple or blended funding models (debt + equity) are more suitable to the risk profiles and return horizons of hard-tech companies. These are beginning to emerge in Australia, and should be elevated. However more and diverse funding should be sought and encouraged to invest in Australian startups to accelerate this.

Strategic investors are important and influential to filling the growth funding gap. They demonstrate potential to reduce risk, taking on more jobs in the Go to Market and Go to Scale stages, provide funding and technical expertise, and access to customers.

New Government funding via Australia’s National Reconstruction Fund (NRF) and rising global funding (such as stimulated by US Inflation Reduction Act) may act as a catalyst to unlock the necessary rise in funding provided there is more even distribution to hard-tech companies.



Australian Climate Tech 2.0 Reboot

The quantum of Australian climate tech companies approaching commercialisation and scale will increase three to four fold in the next few years.

The scaling of hard-tech climate innovations critical for Australia's decarbonisation goals represent an innovation opportunity set to dominate the next decades of global priorities and growth. To build thriving climate hard-tech businesses, addressing the five valleys of death is not the responsibility of founders alone.

The Australian climate tech ecosystem is still emerging. As such, funding, expertise, policy and support programs "as is" are likely to be insufficient in the short-term to accelerate commercialisation and scale.

A reboot or re-set on the current strategy is needed to plan sufficient support and achieve the next level of growth and ecosystem development.

Rapidly developing and implementing sectoral strategies with more "hard-tech friendly" financing, policies and support can help take a meaningful step up towards a low-carbon economy and a safer, more sustainable future.



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Methodology and Sampling

Our qualitative research was in the form of semi-structured interviews with founders in Australian climate tech companies. The interview protocol included a range of open-ended questions that examined different methods and practices used by founders as they scale their companies.

We recorded the interviews and analysed their transcripts, coding thematic patterns. After comparing patterns between all four researchers, we developed themes and produced the findings and recommendations in this report.

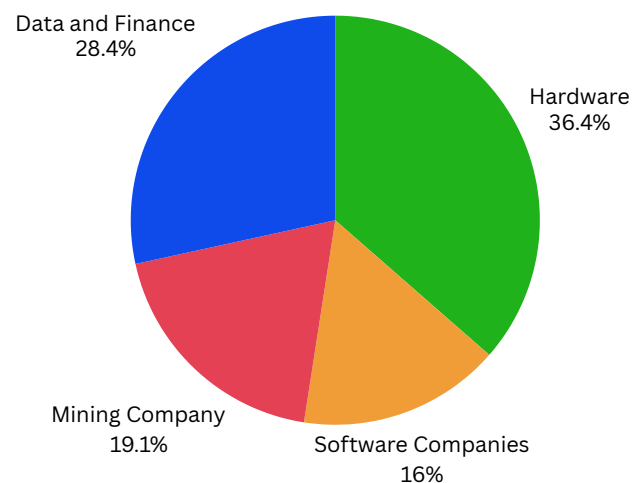
We sourced our sample of founders from company databases and networks in the startup ecosystem including co-working spaces, accelerators, incubators, investors, government departments and hubs with access to climate tech companies.

We started with the HolonIQ Climate Tech Company Database, which contains applicants to the HolonIQ Climate Tech Awards, as well as a broader general database of climate tech companies in Australia. Then added to this by speaking with startup support organisations (e.g. co-working spaces, accelerators, startup hubs) and investors in the climate tech ecosystem.

Desk research including visiting the websites of each company to validate they were still operational and met the HolonIQ Climate Tech Classification Framework. We also used data from HolonIQ's database, Crunchbase.com and company websites to estimate their potential stage (scale-up or commercialised). From HolonIQ's initial list and referrals, we also removed;

- software and digitalised CTCs, (including data, software, finance technologies),
- mining companies and
- companies not founded in Australia.

Australian Climate tech Companies



Source: HolonIQ Climate tech Database Australia HQ

We were left with 82 potential Australian climate hard-tech companies. Invitations to participate in the research were done via email by the research team. An interview protocol was used to guide semi-structured interviews. Interviews were conducted on a one-on-one basis with our expert climate hard-tech founders, lasting approximately 60-90 mins long. During the interviews, we were able to validate and classify the company's stage.

We defined scale-up as:

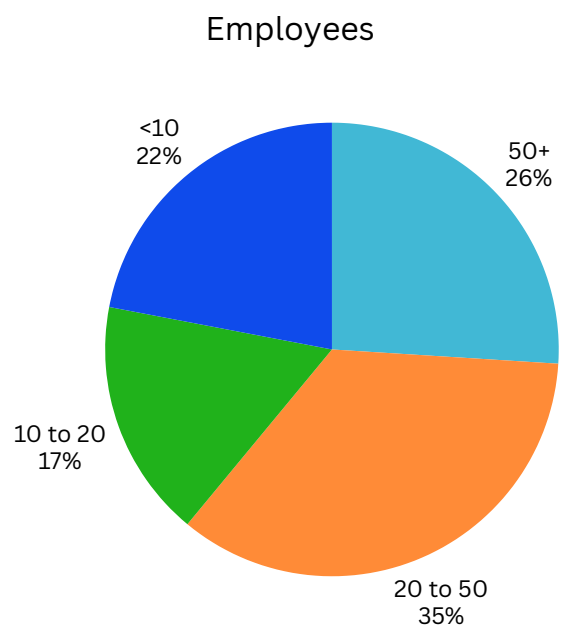
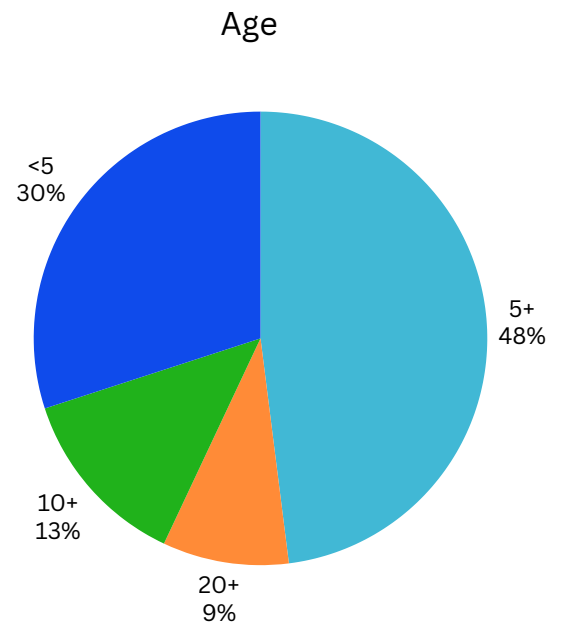
- Beyond revenue with repeatable sales (intermediate stage)
- Growing sales >20% year on year,
- Ambitious for scale and pursuing economies of scale.

We defined internationalisation as:

- >5% customers and/or revenue outside of Australia

We classified companies with less than 3 years of high growth as at commercialisation and those with 3 or more as scale ups. On this definition, we further qualified the interviews identifying 3 which were pre-commercialisation. Were left with 20 CTCs at either commercialisation or scale-up stage included for analysis.

Research Sample Age and Size



Source: UTS Scaling Australian Climate Tech interviews n=23

Thank you.

For more information or feedback on the conclusions of this study, please contact the authors directly.

