

# CLEAN ENERGY PRECINCTS:

How to seize the  
green export  
opportunity

2024+

# ABOUT THIS PUBLICATION

## Clean energy precincts: How to seize the green export opportunity (2024)

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*Clean energy precincts: How to seize the green export opportunity* continues CEDA's work exploring how Australia can accelerate the transition to net-zero emissions while supporting and engaging with affected workers and communities.

This report introduces a framework for governments to prioritise how, when and where they support the development of clean energy precincts, to help build new export markets that will contribute to the global energy transition.

Across all of its work, CEDA's purpose is to achieve sustainable long-term prosperity for all Australians.

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# Clean energy precincts:

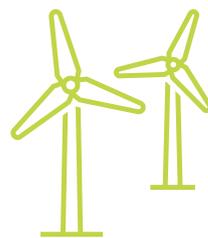
How to seize the green export opportunity

Governments should apply a consistent framework and clearly state their objectives when backing clean energy projects, to ensure support goes to those with the best chance of success.



## What are precincts?

“Innovation precincts” cluster businesses, industrial facilities, education providers and manufacturers together. They have been shown to help catalyse investment, job creation, collaboration, exports and innovation.



Establishing “**clean energy precincts**” that bring together businesses, institutions and organisations working towards a low-or-no emissions future can help seize our clean energy **export opportunities**.

Federal and state governments are already planning to spend

**\$8.3bn**

in funding for hydrogen development alone, much of which will support precincts.

The large amount of money involved means it is critical that resources are used effectively.



This report proposes a simple framework to prioritise government support for clean energy precincts. We classify this support into three categories:



1. Policies that **enable** the conditions for private investment in precincts;



2. Those that **guide** towards specific technological or economic outcomes; and



3. Those where governments **invest** directly in precincts.



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# EXECUTIVE SUMMARY

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*“Innovation precincts” cluster **businesses, industrial facilities, education providers and manufacturers together. They have been shown to help catalyse investment, job creation, collaboration, exports and innovation.***

Australia has many natural advantages in the transition to net-zero emissions. We have harnessed sun and wind to reduce emissions domestically. But we can make a much bigger contribution to the global transition by using these advantages, as well as our abundant land and critical minerals, to export clean energy and green hydrogen, iron, aluminium or ammonia.

As countries around the world pour billions of dollars into their own transitions, we must seize these export opportunities.

Establishing “clean energy precincts” that bring together businesses, institutions and organisations working towards a low-or-no emissions future can help.

“Innovation precincts” cluster businesses, industrial facilities, education providers and manufacturers together. They have been shown to help catalyse investment, job creation, collaboration, exports and innovation.

In Australia, clean energy shares many of the key characteristics of successful innovation precincts in a range of industries overseas, including strong local comparative advantages.

Shared use of energy infrastructure, pooling of skilled workers and access to low-cost renewable energy offer substantial advantages to developing clean energy opportunities in precincts. There is also potential to leverage existing infrastructure and skills to support communities and jobs in regions that are transitioning away from fossil-fuel-related industries.

Australia has opportunities for several large, industrial-scale clean energy hubs across all states and the Northern Territory. Federal and state governments are already on board, with \$8.3 billion in funding for hydrogen development alone, much of which will support precincts.

This funding is fragmented, however, with more than 30 federal and 50 state and territory programs providing hydrogen-specific support. The large amount of money involved means it is critical that resources are used effectively and precincts are set up for success. Governments cannot support every project proposal, with discipline needed to ensure support does not go to proposals that are unlikely to stack up economically.

At the same time, complex, fragmented and in some cases outdated planning and permitting processes are delaying progress, creating a barrier to development without delivering better environmental or community outcomes. The need to engage with many different agencies on complex precinct developments slows progress and makes it hard for proponents to know what each agency is responsible for.

Early, deep and active consultation will be essential not just to ensure the community is on board, but also to avoid developments that do not align with local strengths. Rather than supporting social licence, however, current planning and permitting systems can undermine it through fragmented requirements and repetitive consultation over minor changes.

This report proposes a simple framework to prioritise government support for clean energy precincts. We classify this support into three categories:



1. Policies that **enable** the conditions for private investment in precincts;



2. Those that **guide** towards specific technological or economic outcomes; and



3. Those where governments **invest** directly in precincts.

“

*The scale of support for clean energy internationally creates opportunities for Australian clean energy precincts, but also increases the risk that we will not be able to compete if we choose the wrong projects or technologies.*

All levels of government have important roles to play to *enable* and *guide* clean energy precincts. While private businesses may in some cases be able to seize commercial opportunities and take the lead in precinct development, governments are better placed to provide coordination, reforms to planning and shared infrastructure.

But governments are already going further and *investing* in specific precincts.

Government investment transfers or shares risk rather than removing it. The public needs to share in the benefits as well as the costs of support, so that the upsides of successful projects can offset the downsides of inevitable failures.

In such cases, clear objectives are necessary to underpin good governance and provide the best chance of success via:

- Deeper independent analysis of market opportunities by a body such as the Net Zero Economy Agency or Australian Renewable Energy Agency, to ensure the local area has a sustainable comparative advantage;
- A focus on innovation and emerging technologies, where social benefits and risks for private businesses are likely to be largest;
- Consolidation of the large number of funding programs available, to better coordinate support and make sure it flows to the best projects; and
- Regular evaluation and updating of policies, allowing for the possibility of failure.

Around the world, governments have announced more than \$US1.3 trillion worth of clean energy subsidies since 2020. The Federal Government rightly points out that “we don’t have to go dollar-for-dollar in our spending” compared with other nations, “but we can go toe-to-toe on the quality and impact of our policies.”

The scale of support for clean energy internationally creates opportunities for Australian clean energy precincts, but also increases the risk that we will not be able to compete if we choose the wrong projects or technologies. We need to remove barriers to development, engage communities and enable the best projects.

This requires an overarching framework to better target how and where governments support precincts.

# RECOMMENDATIONS

1

## **IMPLEMENT FRAMEWORK FOR GOVERNMENT SUPPORT**

Apply a consistent framework to government support for clean energy precincts, recognising that public *investment* in commercial projects requires deeper independent analysis of market opportunities than *enabling* or *guiding* development through coordination, provision of shared infrastructure, better planning and community engagement.

2

## **CLEAR PURPOSE FOR CLEAN ENERGY PRECINCTS**

Ensure all clean energy precinct proposals have a clearly articulated purpose, with time-bound, measurable objectives that enable transparency, monitoring and evaluation. Ongoing financial support should be explicitly linked to meeting these objectives.

3

## **APPOINT COORDINATION BODY**

Precinct proponents should appoint a coordination body. Coordination needs to be based on a shared understanding of precinct purpose, collaboration, alignment of interests and clear allocation of responsibilities.

4

## **ENGAGE WITH LOCAL COMMUNITIES**

Government and industry should engage deeply and early with local communities to assess local barriers and opportunities and build social licence.

5

## **REFORM PLANNING AND PERMITTING**

Cooperation across levels and departments of government is needed to update and simplify planning for clean energy precincts, while maintaining environmental and community protection.

- i. Governments should create single points of contact or lead agencies for permitting of precincts.
- ii. Governments may need to take a more active role in supporting approvals, particularly in areas where they have greater expertise and multiple parties are looking to develop a precinct.

# INTRODUCTION

The Federal Government has legislated to achieve net-zero greenhouse-gas emissions by 2050, with an interim goal to cut emissions by 43 per cent by 2030. Australia is not yet on track to meet this 2030 target, with skill shortages, a congested grid and community concerns holding back new renewable generation.<sup>1</sup>

Clean energy precincts, which bring together businesses, higher education and research institutions with a goal of having low-or-zero energy and process emissions, can help accelerate Australia's transition to net zero.

The much bigger opportunity for clean energy precincts, however, is the export of clean energy and green hydrogen iron, aluminium or ammonia.

Australian clean-energy exports have the potential to exceed \$300 billion per year by 2040<sup>2</sup> and use 80 per cent of Australian electricity generation by 2060.<sup>3</sup> While Australia accounts for just over one per cent of global emissions, it has the potential to replace about another seven per cent of global emissions through clean exports.<sup>4</sup> Australia's abundant renewable resources confer an advantage in clean, energy-intensive industrial exports that clean energy precincts can help us to seize.

Governments around Australia are already providing substantial funding for clean energy precincts, many of which have a strong export focus. Without careful planning, strong coordination and rigorous analysis of the potential for sustainable comparative advantage, however, there is a risk that we will not reap the full benefits (Box 1).

This report builds on analysis by the Climateworks Centre highlighting the enormous opportunities that Australia has in large, industrial-scale clean energy precincts.<sup>5</sup> We draw lessons from successful innovation precincts internationally and look at the roles that community, industry, educational institutions and governments need to play, illustrated by case studies from CEDA's member organisations.



1.

# AUSTRALIA HAS BIG OPPORTUNITIES FROM CLEAN ENERGY PRECINCTS



Innovation precincts (sometimes called clusters or hubs) bring together businesses, higher education and research institutions, as well as other public and private entities, to encourage collaboration on complementary economic activities.<sup>6</sup>

They offer cost efficiencies through sharing of infrastructure and facilities. They also attract and develop a pool of skilled workers who can share knowledge.<sup>7</sup> As the knowledge, capabilities and networks within the precinct develop, innovation, increased competitiveness and higher productivity can follow. International experience has shown this encourages investment, boosts wages and attracts yet more skilled workers, establishing a positive feedback loop.<sup>8</sup>

While innovation precincts can be newly built, clean energy precincts in existing industrial sites have potential to gain greater commercial advantage by leveraging existing infrastructure and zoning at end-of-life carbon-intensive industrial facilities.

Clean energy precincts also offer additional benefits unique to the net-zero transition. Shared use of large-scale infrastructure helps to offset the resource intensity of reducing emissions in the energy sector. Proximity between energy producers and heavy industry users can provide access to low-cost renewable energy, minimise efficiency losses from distant transmission, and in some cases support energy demand management and circular economy practices.<sup>9</sup>

Having research institutions and education providers nearby supports commercialisation of research and helps cultivate a pipeline of workers equipped with the skills demanded by industry.

“

*Proximity between energy producers and heavy industry users can provide access to low-cost renewable energy, minimise efficiency losses from distant transmission, and in some cases support energy demand management and circular economy practices.*

## BOX 1

### Industry policy is on the rise, with clean energy a big focus

Industry policy is back in favour with governments around the world. It generally aims to support a particular sector or technology using measures such as research and development grants, tax incentives, subsidies or trade policies.

Governments in the developed world are estimated to be deploying more than ten times as many such policies as they were each year in 2010-15.<sup>10</sup> The International Energy Agency says more than \$US1.3 trillion worth of clean energy subsidies have been announced since 2020.<sup>11</sup>

Examples include the United States' Inflation Reduction Act, which allocates \$US400 billion to \$US1 trillion over the coming decade in support of solar power, large-capacity batteries, hydrogen production and other forms of renewable energy.<sup>12</sup> Japan has earmarked ¥150 trillion for its Green Transformation Policy.<sup>13</sup>

But while proponents argue governments are uniquely positioned to address market failures and guide socially desirable outcomes, poorly designed programs can also encourage rent seeking from businesses or be influenced by politics or imperfect information.<sup>14</sup>

The IMF has recently concluded that industry policy is "only advisable when the social benefits can be clearly identified (for example, emissions reductions), knowledge spillovers from innovation in targeted sectors are strong, and sufficient administrative capacity is in place".<sup>15</sup>

Governments need to take strong action to combat the worst effects of climate change. But the immense scale of current funding heightens the risk of misallocation and demands high levels of scrutiny to ensure taxpayer dollars are used effectively.

The scale of support for clean energy internationally creates opportunities for Australian exports, but also increases the risk that we will not be able to compete if we choose the wrong projects or technologies, particularly those that are heavily subsidised globally.

Industrial-scale clean energy precincts provide an opportunity for investors to leverage our natural advantages and tap into rapidly accelerating demand for sustainable goods such as green metals, driven by the climate policies of key trading partners such as the EU, Japan and Germany.

Developing Australian export capacity can also increase global supply chain resilience by reducing reliance on China, which dominates the supply and processing of the critical minerals needed to produce clean energy.<sup>16</sup>

These precincts also provide opportunities to redeploy workers and infrastructure in regions that are transitioning away from fossil-fuel activity. Victoria's Latrobe Valley and the New South Wales Hunter Valley are two examples where clean energy activity is scaling up.

State and federal governments are already on board. The Federal Government has outlined seven priority areas for establishing regional hydrogen hubs, including projects in the NSW Hunter Valley, Kwinana in Western Australia, Townsville in Queensland, Bell Bay in Tasmania and Port Bonython in South Australia. More than \$500 million has been announced exclusively for these projects.<sup>17</sup>

Research by the ClimateWorks Centre has identified a further four prospective locations for precincts in southwest WA, the Latrobe Valley in Victoria, the Illawarra in NSW and Darwin.<sup>18</sup> Several states have also made place-based policy part of their strategic focus in the decade ahead, with clean energy often at the core.<sup>19</sup>

While there is no one-size-fits-all approach, many traits identified as important to the success of international precincts and observed in successful precincts in Australia (such as Case Study 1) align closely with the potential of clean energy precincts (Table 1).

One key lesson from successful innovation precincts is the importance of good coordination to facilitate and support innovation, productivity and global competitiveness.<sup>20</sup> Rather than driving activity from the top down, good coordination requires shared understanding of desired outcomes, collaboration of participants, alignment of interests and clear allocation of responsibilities.

TABLE 1

### Clean energy has many key factors that make precincts successful

Characteristics of successful precincts	Relevance for Australian clean energy precincts
<b>Market demand and economic potential for precinct output</b>	Growing demand for green commodities and low-carbon products.
<b>Coordination of resources</b>	The location-specific and concentrated nature of these precincts creates a focal point for coordinating resources and collaboration between the private and public sector.
<b>Leveraging comparative advantage</b>	Australia's natural sources of renewable power and critical minerals, as well as a highly educated workforce, are key advantages.
<b>Access to funding</b>	Increasing appetite for ethical and environmentally conscious investments, as well as initiatives like Australia's green bonds program and capacity investment scheme, can build on the strength of our capital markets to create financing opportunities.
<b>Existing industrial infrastructure</b>	Concentrated development can contribute to efficient, shared use of infrastructure, particularly for industrial regions transitioning from fossil-fuel-intensive processes.
<b>Accommodative regulation and zoning</b>	Using end-of-life sites that currently serve heavy industry could leverage community familiarity with such activities to secure favourable zoning arrangements.
<b>Barriers to entry and competition</b>	Cheap renewables and a long history of reliable trade partnerships will help export opportunities. However, high relative labour costs in Australia and significant fiscal support for green industry in other countries are challenges.

Sources: CEDA analysis based on success factors identified by Baily and Montalbano (2018); Urbis (2024) *From Potential to Performance: Australia's Path to Innovation Excellence*, <https://urbis.com.au/insights-news/driving-innovation-australias-path-to-prosperity/>



## CASE STUDY 1

### Tonsley innovation precinct

The Tonsley Innovation District in South Australia shows how well-executed precinct policy can support economic transition in Australia.

Situated on the former Mitsubishi Motors production facility, the district was born from a period of significant economic dislocation in South Australia.

As Mitsubishi closed its operations in 2008, there was much anxiety within the community about what the closure would mean for its 1000 workers.

The State Government purchased the site in 2010, and in the years since it has grown into a hub of economic activity, with 2000 workers, 8500 students, a network of local and global businesses, and campuses for Flinders University and TAFE SA.

Tonsley's transformation was not achieved overnight, and success was the result of concerted efforts by a number of motivated stakeholders.

Initially a shared project between the state's economic development agency and the state's urban renewal organisation, RenewalSA, it became clear early in the project that development would be better served by a single body, with the task falling to RenewalSA.

Central to guiding the direction of the precinct has been strong engagement between RenewalSA and the Tonsley community. This enabled leaders at RenewalSA to foster networking and collaboration among tenants, guide proponents toward relevant government support, build a shared sense of identity and deliver a framework for organic growth.

Co-locating Flinders University and TAFE SA onsite was also important to create a community and culture of innovation and knowledge spillovers. The presence of these institutions has strengthened the relationship between commercial tenants and educators, helping to cultivate skills development for in-demand areas. For example, BAE Systems and SAGE Automation run robotics workshops for students studying in the district.<sup>21</sup>

While looking to future industries is part of the fabric of Tonsley, leaning into existing local strengths has been crucial. For example, X-ray technology company Micro-X saw value in employing former automotive workers who understood lean manufacturing processes as it set up its operations in the district.

Beyond job creation and economic revitalisation, the precinct's success will enable it to repay the investment provided by the state government in the coming years.

## 2. ALL PARTICIPANTS NEED TO PLAY A ROLE

The success of a precinct depends on government, industry, education and the community acting collaboratively toward a shared goal (Table 2).<sup>22</sup> This is particularly true for clean energy precincts, which are also technically complex, have large capital requirements and bring environmental risks as well as opportunities.

Collaboration and a clearly articulated purpose are particularly important given the long lead time before a project reaches maturity. There should be metrics for success attached to relevant stages of the project life cycle. Clarity on these objectives should promote accountability between stakeholders and support robust forward-planning, investment decisions and management of community expectations.

TABLE 2

### Summary of key roles in clean energy precincts

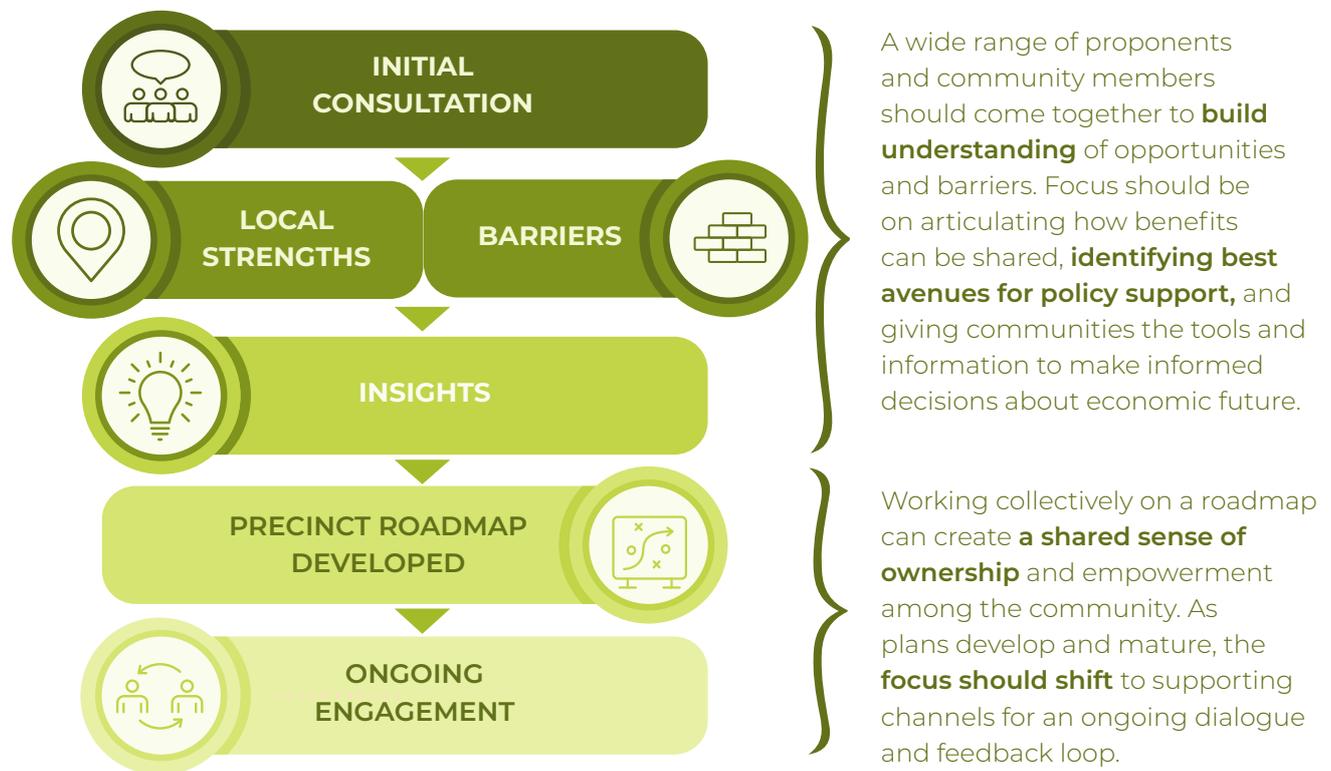
COMMUNITY	<ul style="list-style-type: none"> <li>• Engage in project consultation</li> <li>• Enable First Nations engagement</li> <li>• Identify opportunities and barriers to local precincts</li> <li>• Identify local comparative advantages and networks</li> <li>• Develop shared sense of ownership</li> </ul>	
GOVERNMENTS	<ul style="list-style-type: none"> <li>• Coordination to unlock benefits from innovation and skills</li> <li>• Supporting a pipeline of skills</li> <li>• Providing shared-use infrastructure</li> <li>• Fit-for-purpose planning and permitting</li> <li>• Creating a supportive business and regulatory environment</li> </ul>	
EDUCATION PROVIDERS	<ul style="list-style-type: none"> <li>• Early involvement as an 'anchor institution'</li> <li>• Developing courses and training that responds to industry need</li> <li>• Industry-relevant research and shared research facilities</li> </ul>	
BUSINESSES	<ul style="list-style-type: none"> <li>• Collaboration with other participants</li> <li>• Partnering in research to overcome technical challenges</li> <li>• Assessment of commercial opportunities</li> <li>• Matching opportunities to local comparative advantages</li> <li>• Investment in capital and skills</li> </ul>	

## Community must be at the forefront

Clean energy precincts are more than just the wires, concrete and steel that channel renewable energy and produce green exports. The communities they exist in provide the land and skills needed. Meaningful engagement and collaboration with communities is thus critical for both their social and economic success.

Economically sustainable transformations must start with a strong understanding of community needs, strengths and obstacles. While this is a prerequisite for achieving an enduring social licence, a bottom-up approach can also help proponents tap into local comparative advantages and networks. Effective, robust consultation between community members and industry can help identify the best ways for policy to support developing precincts. This approach is summarised in Figure 1, which has been developed through CEDA's broad consultation with potential precinct stakeholders.

**FIGURE 1**  
**Community engagement tree**



Source: CEDA analysis

The quality of engagement is critical to unlocking community support. Recent analysis suggests that as Australia's energy transition ramps up, community support for renewable projects may wane as waves of "prospecting" for generation or transmission opportunities lead to consultation fatigue.<sup>23</sup> Similarly, poorly designed economic strategies imposed without due regard for local strengths, preferences or needs risks disenfranchising regional communities and landholders.

We recommend that both governments and private-sector proponents engage early and deeply with local communities as precincts are established, to bring communities along. Quality consultation means that communities are partners in growth, equipped with the tools and opportunities to shape the direction of emerging precincts.



*New ventures need to provide for genuine participation and empowerment of First Nations communities, which can de-risk projects through leveraging local knowledge and integrating native title approvals within project development activities.*

## First Nations engagement

Respectful, genuine and ongoing engagement with First Nations community members must be prioritised as these precincts are developed. New ventures need to provide for genuine participation and empowerment of First Nations communities, which can de-risk projects through leveraging local knowledge and integrating native title approvals within project development activities.

An example is the East Kimberley Clean Energy Project, a green hydrogen and ammonia project for local use and export where the traditional owners of the land will be joint shareholders in the project development process.<sup>24</sup>

The Federal Government is currently preparing the First Nations Clean Energy Strategy, which will provide a platform for Indigenous communities to help shape Australia's energy transition strategy and identify best practice methods of consultation.<sup>25</sup> Existing work from the First Nations Clean Energy Network (2022) identifies the following best practice principles for clean energy projects:



• **ENGAGE RESPECTFULLY**



• **PRIORITISE CLEAR, ACCESSIBLE AND ACCURATE INFORMATION**



• **ENSURE CULTURAL HERITAGE IS PRESERVED AND PROTECTED**



• **PROTECT COUNTRY AND ENVIRONMENT**



• **BE A GOOD NEIGHBOUR**



• **ENSURE ECONOMIC BENEFITS ARE SHARED**



• **PROVIDE SOCIAL BENEFITS FOR COMMUNITY**



• **EMBED LAND STEWARDSHIP**



• **ENSURE CULTURAL COMPETENCY**



• **IMPLEMENT, MONITOR AND REPORT BACK<sup>26</sup>**

## CASE STUDY 2

### First Nations engagement at Lot Fourteen

Lot Fourteen is an innovation precinct proudly located on Kurna country in Adelaide. It is home to global tech companies and world-renowned research organisations in space, defence, cyber and creative industries, enabled by critical technologies.

From Lot Fourteen's establishment in 2017, engagement with First Nations Peoples has been built into the fabric of the innovation district via its governance and operations, business and workforce opportunities and infrastructure development.

A key objective of the Lot Fourteen Strategic Plan 2022-26 is that the district will work to advance the awareness, knowledge, preservation and teaching of First Nations cultures and languages and to facilitate economic business and employment outcomes for First Nations Peoples.

To support this, Lot Fourteen has a First Nations Reference Group, a cultural advisory committee that provides a First Nations voice on project delivery and operations at Lot Fourteen. Additionally, significant consultation and engagement through the Aboriginal Reference Group and appointment of an Aboriginal Ambassador has been instrumental in guiding the Tarrkarri – Centre for First Nations Cultures project.

The district's Public Realm Cultural, Spiritual and Ecological Layering Report has been developed with Kurna cultural advisors and endorsed by the Kurna Yerta Aboriginal Corporation. The Art and Cultures Advisory Group responsible for the Art and Cultures Plan includes First Nations membership and consults closely with Kurna representatives in relation to strategic commissioning opportunities.

First Nations economic participation objectives through the procurement process for Adelaide City Deal projects at Lot Fourteen, which represents \$753 million government investment, targets 1.4 per cent Aboriginal employment outcomes, and a minimum of 3 per cent contract value for Aboriginal businesses in the supply chain. Priority is given to local First Nations businesses, organisations and potential employees.

A strategic anchor organisation in the district, The Circle - First Nations Entrepreneur Hub is a partnership with the Australian Government and the South Australian Government, under the Adelaide City Deal. Supporting the South Australian Aboriginal Business Sector, the Circle provides tailored business support to drive business growth to more than 300 members.

### Governments can enable precincts

Research consistently finds that all levels of government play an important role in facilitating innovation precincts and supporting collaboration.<sup>27</sup> Benefits documented above from sharing of infrastructure, knowledge and skill spillovers enhance the potential for government support of precincts to offer greater benefits than support for individual projects. Government involvement can also create greater alignment and understanding of regulatory barriers to development and how these can be addressed.

But these roles need to be tailored to their strengths and complement those of other participants. Some key roles for governments in clean-energy precincts are:

- **Coordination:** As set out above, coordination of resources is an important factor in the success of innovation precincts. Governments do not necessarily need to be the primary coordinator, but can bring participants together and enable strategic planning. Coordination of community engagement can avoid disjointed and repetitive consultation on a project-by-project basis.
- **Capturing spillover benefits from innovation and skills:** In a well-functioning precinct, benefits from research, knowledge and skills accrue beyond individual firms. These broader benefits mean there can be a role for government to drive or incentivise collaboration, for example across industry, universities and communities.<sup>28</sup> Due to greater novelty, knowledge spillovers have been estimated to be 60 per cent greater for clean than high-emissions technologies.<sup>29</sup>
- **Providing shared-use infrastructure:** Governments can make catalytic infrastructure investments that benefit from big economies of scale, supporting progress where individual firms would not reap enough benefit to invest at an efficient scale.
- **Supporting a pipeline of skills:** There is already a shortage of clean energy skills. Governments must help workers to gain new skills and help people to transition from fossil-fuel energy jobs.<sup>30</sup>
- **Fit-for-purpose planning and permitting:** Cumbersome permitting processes can slow or stop precinct development.<sup>31</sup> In Barcelona, Spain, cooperation across all three levels of government was needed to overhaul outdated regulations to enable innovation districts.<sup>32</sup> Equally, important environmental and community concerns must be dealt with properly.<sup>33</sup> Australian planning processes are often highly complex, involving many agencies (Case studies 3 and 4). Governments may need to take a more active role in supporting approvals, particularly in areas where they have greater expertise and multiple parties are looking to develop a precinct (see Queensland example in LNG export discussion below).
- **Creating a supportive business and regulatory environment:** Regulatory and tax settings that enable investment and innovation, including consistent standards, reporting requirements and regulatory certainty, are important to achieve the greatest benefits. These include policies that provide incentives to reduce greenhouse gas emissions and contribute to global efforts to slow climate change.

Governments should avoid playing more commercial roles:

- **Funding capital costs:** Private companies are far better placed than governments to assess the risks and rewards from capital-intensive investment. Exploiting these may require complex joint ventures (as in the development of Australia's LNG export industry) and government may still need to play an important coordinating role, but commercial decisions that do not involve shared natural monopoly infrastructure are better left to the private sector.
- **Subsidies for clean energy exports:** Production subsidies for particular technologies or products in other countries make it harder for Australia to compete. Subsidising the same technologies will exacerbate global supply constraints, driving up costs and skill shortages. Subsidies are also an expensive way to cut emissions, compared with emissions pricing, due to the fiscal costs and promotion of over-consumption by reducing prices.<sup>33</sup> Projects should focus on sites with a sustainable comparative advantage rather than those that need government funding to compete.

<sup>i</sup> A recent example saw a Victorian government plan to create a facility to assemble offshore wind turbines at the Port of Hastings blocked in early 2024 under the Environment Protection and Biodiversity Conservation Act, due to unacceptable and unavoidable risks to vulnerable wetlands.

Australian governments are already doing a lot to support clean energy precincts. Programs targeting precinct development comprise a significant share of \$8.3 billion in federal, state and territory funding for hydrogen development. For example, the Federal Government has allocated \$1.5 billion for the Middle Arm Sustainable Development Precinct, \$514 million for the Regional Hydrogen Hubs Program, and \$100 million for Port of Newcastle's Clean Energy Precinct. At the state level, there has been \$230 million in funding allocated for Tasmania's green hydrogen hub, \$150 million for two hydrogen hubs in the Illawarra and Hunter regions of New South Wales, and \$72 million for a similar project in the Pilbara.<sup>34</sup>

Support is fragmented across many programs: there are 31 Commonwealth and more than 50 state and territory programs providing hydrogen-specific support.<sup>35</sup>

The Government's recently announced Future Made in Australia policy will consolidate these and other energy-related initiatives. Done well, this could help to improve the coordination between programs that is currently lacking.

A key challenge is ensuring that support goes to projects most likely to succeed in global markets. This requires coordination and targeting at a federal level, and not subsidising projects with little prospect of a sustainable comparative advantage. It is likely to mean not supporting similar projects in all states and territories, but rather choosing the best locations for prospective technologies.

Even in countries with strong institutions it has been hard to avoid diversion of subsidies to politically connected sectors. This was a factor in failures among subsidised US clean-tech firms between 2009 and 2011, such as the solar panel manufacturer Solyndra. Undue haste and lack of analytical skills among policymakers also contributed.<sup>36</sup>

Critically, the pace and scale of financial commitments to support precincts in Australia is not being matched by the planning reform or scrutiny needed to ensure success and long-term viability. We recommend a framework to prioritise government support for clean energy precincts in Chapter 3.

### CASE STUDY 3

#### **Lessons from the Moorebank Intermodal Precinct**

Moorebank in western Sydney is Australia's largest intermodal precinct – a hub connecting different modes of transport, including road, rail and links to port facilities.

The Australian Government's National Intermodal Corporation, which provided this case study, has been involved in developing the site, along with investment and development partner LOGOS and logistics and infrastructure company QUBE Holdings.

The site was developed in separate parcels subject to separate State Significant Development approvals. This meant many inconsistent conditions operated across the site. Furthermore, under the State Significant Development regime, minor changes from the initial planning approval were only approved following a rigorous modification process, even where there was no substantial impact beyond the site.

Requiring frequent rounds of community consultation for both minor and major modifications across the site has at times created confusion, frustration and consultation fatigue in the community. This can damage community support for the project. Each modification is also fairly resource intensive for both government agencies and the proponent.

The process became simpler once the precinct was covered by the NSW Transport and Infrastructure State Environmental Planning Policies (SEPP), which harmonised many planning conditions across the site.

The development could have been considerably simpler had it been covered by whole-of-precinct planning and permitting conditions from the outset.



#### CASE STUDY 4

### Complex processes can get in the way

The Port of Newcastle in NSW is proposing to regenerate 220 hectares of industrial land into a dedicated clean energy precinct. The precinct seeks to position the Hunter Valley as a leading production, storage and export hub for future clean energy products including hydrogen and green ammonia. The Port of Newcastle is currently the world's largest coal export port, and is seeking to diversify its trade over coming decades as global demand for coal declines.

The port offers several advantages, including access to power and water infrastructure, unused land, a deepwater shipping channel operating at 50 per cent of capacity, skilled people and educational institutions with the potential to support a "centre of excellence" for the new energy economy. It is working to form or strengthen relationships with a range of stakeholders on co-locating common-user, open-access and shared infrastructure across clean energy storage, transport and export facilities.

The port has received \$100 million in funding from the Federal Government for hydrogen readiness for domestic decarbonisation and export. Two of the six shortlisted projects for the Federal Government's \$2 billion Hydrogen Headstart Program are connected to the Port's Clean Energy Precinct. It has the potential to create 5800 jobs, new educational pathways and a \$4.2 billion boost to the economy of the Hunter Region.

But the port has had to consult with several different government agencies on permitting for the precinct. This has made it difficult to understand which agency is responsible for each aspect of the process. For example, both the Department of Planning and SafeWork NSW have responsibility for hazard regulation. Safety regulations have not kept up with new clean energy technologies, with a tendency to base new rules around old technologies even where the safety risks are significantly different.

Much of the proposed site has existing or previous industrial uses, including a landfill site and an area that had been approved for a new coal terminal. This has increased complexity because of the need to show that contamination will be properly controlled.

The lack of flexibility in the permitting process makes it harder to develop a new industry. Authorities want to provide approvals on a piecemeal and progressive basis, rather than assessing the whole project in a way that can capture cumulative effects and provide greater certainty to proponents.

Permitting uncertainty is seen as a big risk by the port's partners and potential customers. The unwieldy process has slowed progress and contributed to some loss of first mover advantage, particularly compared with other precincts overseas.

Australia could learn from countries that use a "one-stop shop" model to approve large developments. A more joined-up and efficient process reduces complexity and provides clear contact points for project proponents and the community.

## Industry development: Australia's LNG exports

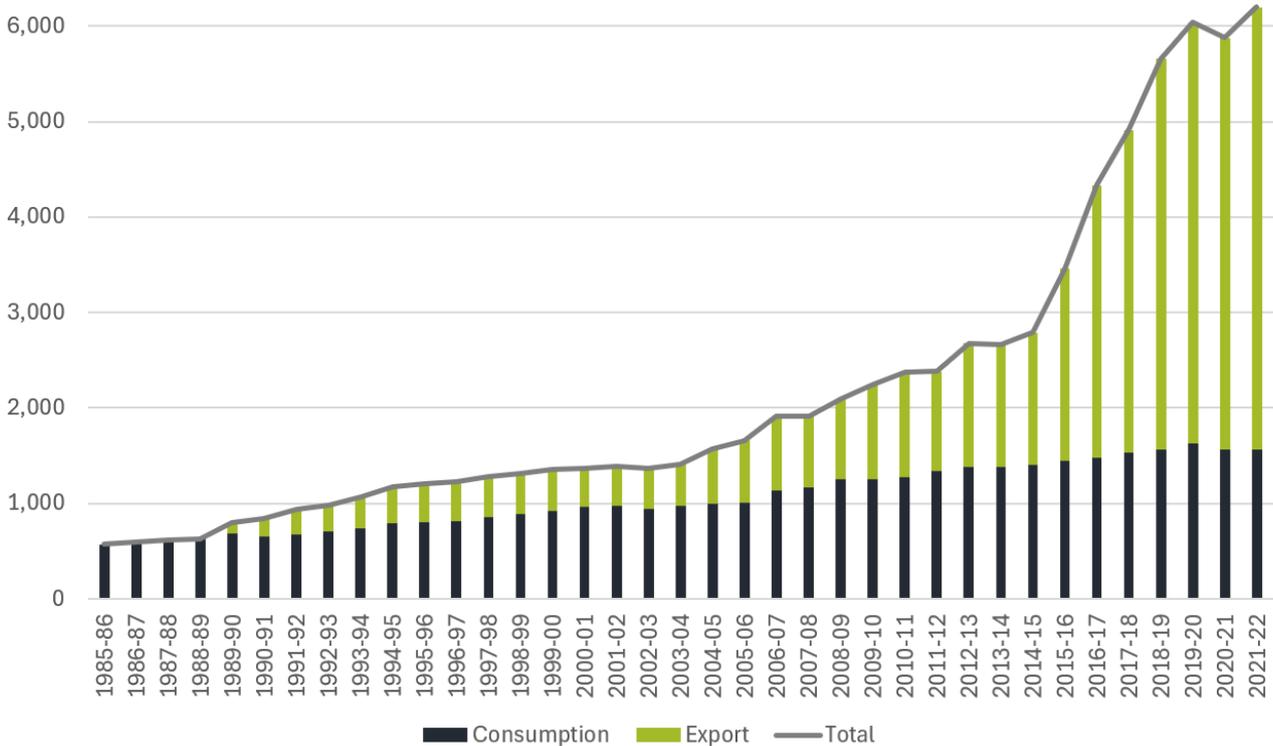
Over the past four decades, Australia's gas industry has transformed from serving the domestic market to becoming the world's second largest exporter of LNG.<sup>37</sup> This experience highlights how collaboration and coordination between government, industry and communities will be required to achieve similar success for clean energy precincts. While not all interventions were perfect (particularly with hindsight) there are important lessons about what is needed to develop a new, large-scale export industry.

Seizing the opportunities arising from surging demand for gas in the Asia Pacific required Australian governments to send clear signals to business expressing long-term policy support and a commitment to providing the enabling conditions needed to build this industry, including a significant focus on planning processes. The vast bulk of investment, however, came from private sources.

Other lessons for the development of clean energy precincts include the importance and challenge of maintaining social licence, as well as the potential benefits of greater coordination to avoid driving up costs through simultaneous major developments.<sup>38</sup>

FIGURE 2

### Australian natural gas consumption and exports (PJ)



Source: CEDA Analysis, Department of Climate Change, Energy, the Environment and Water (2023)

## **The role of government**

Grafton and Lambie (2014) identify that several policy interventions helped enable national export capability, including:

- The federal LNG Action Agenda adopted in 2000, which clarified greenhouse gas policy, streamlined project approvals, and instigated Federal Government participation in international commercial negotiations and marketing, along with favourable customs and import arrangements.
- The Major Project Facilitation Program, which assisted with government approvals and identification of existing government assistance programs for significant projects. It also aimed to coordinate Australian and state and territory government processes so that they operated in concert and without duplication.
- A strategic alliance announced in 2006 between the upstream oil and gas industry, and federal and state governments, to ensure production exceeded 50mtpa by 2015.

Coordination and support at the state level also played an important role.

In Western Australia, the North West Shelf Project was initially supported by the State Government with 20-year supply contracts for the domestic market, as well as funding contributions for 1200km of pipeline infrastructure.

Queensland's industry was nurtured in the early stages by legislated requirements in 2006 for electricity retailers to source 13 per cent of electricity from gas. Cronshaw and Grafton (2016) found the number of coal seam gas wells drilled per year quadrupled between 2004-05 and 2008-09 following the introduction of this legislation.

## **Planning and permitting**

Queensland's Coordinator-General played a major role in expediting LNG projects in Gladstone by simplifying planning processes. Support included expanding and modifying the Gladstone State Development Area (SDA) to include land on Curtis Island, which houses three LNG plants. The Coordinator-General also established the Callide Infrastructure Corridor SDA to facilitate the transportation of coal seam gas to the Gladstone SDA via multi-user underground transmission pipelines.<sup>39</sup>

The Coordinator-General also managed environmental assessments, community consultations and land access negotiations with the three major project

proponents. This minimised logistical impacts for individual landholders and allowed for efficiencies in the construction process.

### **Social licence issues**

Social licence for gas projects is a longstanding and complex issue. Approaches to securing community support vary by state and among project proponents.

Queensland implemented a Land Access Code, outlining both mandatory requirements and voluntary best practices for maintaining relations between industry and landholders. The state also established the GasFields Commission, an independent body to facilitate interaction and resolve conflicts between the gas industry and local communities.<sup>40</sup> With appropriate changes to regulation and flexibility in how developments were managed, Queensland was able to maintain public acceptance of unconventional gas extraction.<sup>41</sup>

In NSW, rural communities' concerns about water impacts and a lack of exposure to oil and gas developments in proposed development areas led to the State Government adopting a "go slow" approach that featured extended consultation requirements.<sup>42</sup> Gas exploration licences were suspended when community consultation was considered lacking.<sup>43</sup> The consequence was that regional and national benefits from development were missed, due to unresolved concerns about local costs and risks.

### **Universities and VET providers need to partner on research and training**

Education providers are often the "anchor institution" in innovation precincts and are an essential partner for clean energy precincts. Through industry placement programs, research partnerships and executive-level forums, education providers can enable technological advances and support the flow of talented researchers and students to commercial partners.

Strong relationships between precinct tenants and education providers can also help to develop courses and training that respond to industry needs. This is particularly critical given clean energy is already facing skills shortages.

TAFE Queensland has begun construction of a new Hydrogen and Renewable Energy Training Facility to serve the developing green hydrogen industry in Townsville.<sup>44</sup> An important aspect is co-location within the Regional Manufacturing Hub, enabling synergy between training and businesses.

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*Education providers are often the “anchor institution” in innovation precincts and are an essential partner for clean energy precincts.*

Shared research facilities can lead to innovative new practices and products and attract leading research talent. In Eindhoven in the Netherlands, Philips provided shared access to its R&D facilities for local researchers and even competitor companies to spur economic revitalisation. Since then, Eindhoven has become a hub of advanced machinery manufacturing.<sup>45</sup>

### **Businesses should invest and collaborate to build competitive advantage**

Businesses need to evaluate the commercial opportunities available to them and invest accordingly. Even under scenarios with substantial government support, the majority of capital investment for Australia to become a leader in clean energy exports is likely to come from the private sector.

Clean energy precincts adopt a "collaborate to compete" model, where participating businesses align their strategies and processes to achieve a competitive edge and seize new opportunities.

This year, Australia's two biggest mining companies BHP and Rio Tinto announced a collaboration with steelmaker Bluescope Steel at Port Kembla to overcome the technical challenges of green steel production.<sup>46</sup>

Reusing byproducts and using shared infrastructure can lower the cost base while reducing resource use through a more circular approach. In WA, the Kwinana energy hub hosts an estimated 178 exchanges of byproducts between 54 companies,<sup>47</sup> with the initial tenant, BP, scoping opportunities to supply green hydrogen to other participants in the Kwinana industrial area.<sup>48</sup>

Collaboration between businesses can raise concerns about anti-competitive behaviour. Two factors reduce this risk in industrial clean energy precincts: participants are generally pursuing complementary activities rather than being in direct competition; and where they supply competitive global markets for products such as green steel or ammonia, collaboration does not harm local consumers. This should be considered by the Federal Government's competition review, which has been directed to provide advice on issues raised by the net-zero transformation.



### 3.

## A FRAMEWORK TO PRIORITISE GOVERNMENT SUPPORT



Australian governments are increasingly recognising and supporting the potential of clean energy precincts, but there is no overarching framework to ensure support goes to the best projects in the best locations. Support from one level or department of government is often stymied by unnecessarily cumbersome planning processes imposed by another. We propose a simple framework to classify and prioritise how governments can support these developments.

### **Governments can enable, guide or invest in precinct development**

There are several ways governments can support clean energy precincts (Figure 3):

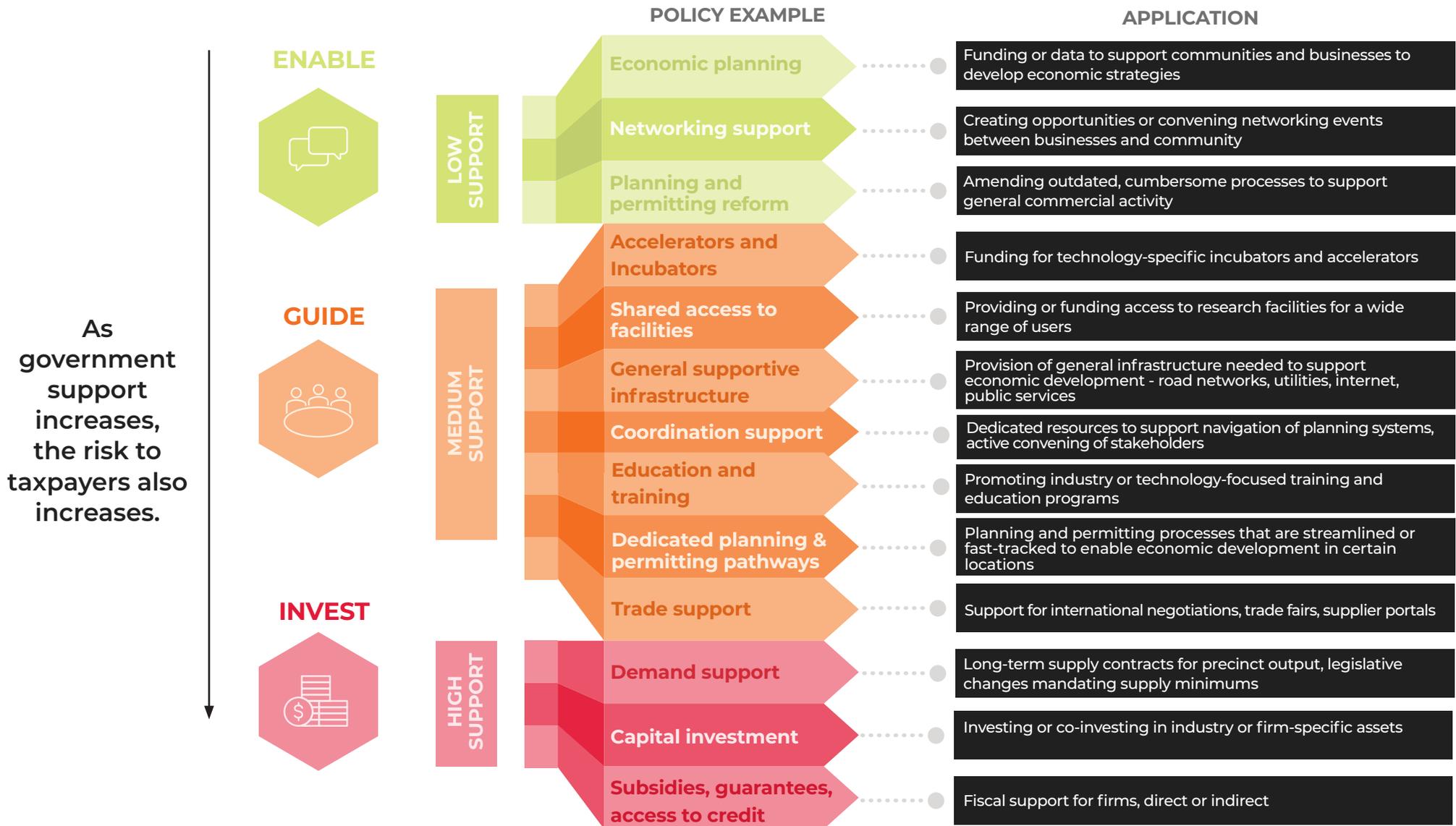
- Policies that **enable** support broad economic activity and focus on fostering the conditions for the private sector to establish precincts;
- Measures can **guide** proponents to a specific technological or economic outcome but are not firm-specific; and
- Where governments **invest**, they become an active partner in development, channeling significant fiscal or administrative resources toward specific precincts.

Good policy processes such as transparent cost-benefit analysis are critical at all stages of the framework, but they become more important the more support a government provides. For example, where governments move beyond **enabling** to **guiding** precincts, some measures, such as infrastructure provision, can be expensive if the wrong technologies or locations are chosen. There is a higher risk for the public when governments **invest** in precincts, as the adverse consequences of supporting projects without a sustainable comparative advantage increase. We recommend governments avoid investing in projects without first conducting rigorous analysis informed by thorough community consultation.

FIGURE 3

Policy support measures

# FRAMEWORK FOR GOVERNMENT SUPPORT CLEAN ENERGY PRECINCTS



Note: Risk in this context extends beyond financial and can also refer to potential for policies to promote rent-seeking or cause distortions from the most productive use of resources.

## Government investment transfers risk, rather than removing it

Greater government support transfers project risk toward the public, as it must be financed by debt, taxes or reduced spending elsewhere. Sharing risk can help projects to proceed, but governments and the public also need to share in the benefits of successful projects, to offset the costs of inevitable failures. Attaching conditions to government funding, such as a requirement for profit-sharing, is one way government investment can lead to transformation, rather than just subsidies or handouts.<sup>49</sup>

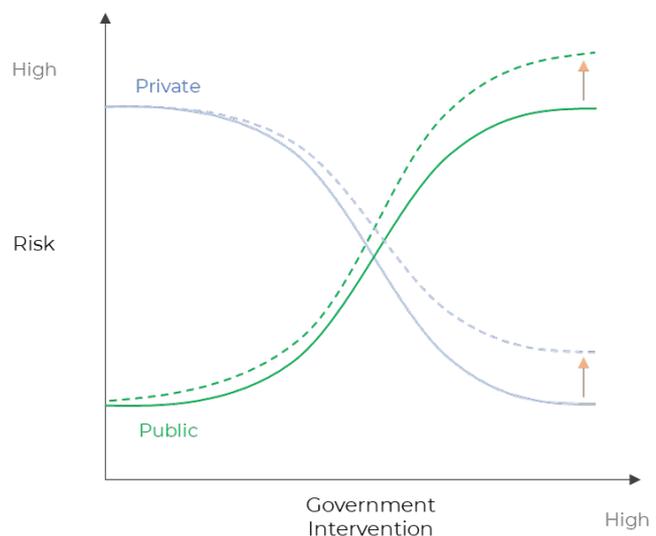
Targeted government investment is most likely to offer overall benefits when it supports new technologies, as benefits from research and innovation accrue beyond a single organisation. Targeted public support for research and development has the potential to better direct and “crowd in” private innovation.<sup>50</sup> For hydrogen, for example, international experience indicates targeted support is necessary because of the substantial uncertainty facing individual firms, but that it is important to allow knowledge to flow across firms and for newcomers to benefit from publicly funded research.<sup>51</sup>

There is also the potential for government action to raise the overall level of risk for all parties (Figure 4). Poorly designed or implemented interventions that see resources allocated away from their most productive use can cause long-term harm for local economic development.

Large-scale financial support without rigorous selection criteria can encourage rent-seeking or lead firms to expect ongoing support. This increases exposure to sovereign risk if government policy changes.

**FIGURE 4**

**Poorly designed interventions can raise the overall level of risk**



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*A lack of coordination and consistency between planning agencies and disjointed, overlapping interactions between different levels of government are well-known constraints for renewable energy projects, and have proven difficult to navigate for even the most sophisticated and well-resourced energy companies.*

Malaysia's failed BioValley precinct demonstrates how poorly executed policy can waste significant resources. Government officials attempted to coordinate all aspects of this biotechnology precinct from the top-down, without a strong understanding of the technologies involved, the demand for end products, or the capacity of local labour markets to supply workers. Despite the government channeling funding into the project, private sector partners shunned the opportunity, and BioValley failed.<sup>52</sup>

The shifting risk profile of different policy interventions means support from government needs to be highly targeted, situation-specific and informed by community engagement.

### **Governments should *enable* and *guide* precinct development**

Before committing to large-scale investments, governments should focus on policies that *enable* and *guide*, which target fundamental barriers to precinct development. AGL's experience with low-carbon industrial energy hubs underlines the importance of government support for education and training, enabling infrastructure, and simplified planning and permitting (Case study 5).

A lack of coordination and consistency between planning agencies and disjointed, overlapping interactions between different levels of government are well-known constraints for renewable energy projects, and have proven difficult to navigate for even the most sophisticated and well-resourced energy companies.<sup>53</sup>

Similarly, regulations that have not kept pace with emerging technologies frustrate the ability of business to understand the commercial potential of sites.<sup>54</sup> A lack of policy certainty has also undermined the confidence needed to assure international partners and spur investment in large-scale projects.<sup>55</sup>

These are areas where government is well-placed to provide support and should be the first targets of action. As highlighted in Case study 4, financial backing counts for little when fundamental challenges of site permitting go unresolved. As responsibility for planning falls predominantly on initial precinct proponents, inflexible processes can delay project commencement and the realisation of broader economic benefits.

Consistent with the Productivity Commission's findings for major projects, there is a need for reforms to improve strategic decision-making to consider

cumulative impacts, reduce regulatory overlap and duplication, and improve timeframes and coordination.<sup>56</sup>

For large-scale developments, a single point of contact or lead agency can better coordinate and facilitate approvals. We recommend that governments across different levels and departments cooperate to update and simplify planning for clean energy precincts, while maintaining environmental and community protection.

Governments should also play a key role in coordinating and leading community engagement. Quality consultation can help leverage local networks, understand infrastructure adequacy and assess planning-system constraints. This can help policymakers identify where further interventions can make the largest impact at least cost. Genuine engagement will help foster a shared sense of ownership among local communities that supports enduring social licence.

### **Government *investment* requires deeper analysis**

Where substantial government *investment* in precincts is considered, strong due diligence must be conducted to assess long-term commercial prospects. While the scope of this analysis will vary with the action being considered, it may include:

- Cost benefit analysis;<sup>ii</sup>
- Growth and market share estimates for precinct outputs;
- Comprehensive analysis of comparative advantage;
- Understanding the precinct's role in value chains;
- Analysis of the global competitive landscape; and
- Understanding governance capabilities.

For example, governments may choose to enable and guide a private sector-led clean energy precinct that seeks to export green ammonia, leaving commercial aspects around long-term competitiveness to project proponents. But where governments go further and choose to co-invest, there is a need to analyse independently future demand for ammonia and the potential for the precinct to have a sustainable comparative advantage in global markets.

Rationalising the large number of funding programs for clean energy precincts would make detailed

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*Governments should also play a key role in coordinating and leading community engagement. Quality consultation can help leverage local networks, understand infrastructure adequacy and assess planning-system constraints.*

<sup>ii</sup> Cost-benefit analysis is already required as part of regulatory impact analysis for major policy proposals, but in practice is not necessarily undertaken or released publicly.

analysis more feasible while reducing complexity and allowing competing projects to be directly compared. This has been the approach taken to ensure the best projects are funded under the \$2 billion Hydrogen Headstart program. The growing number of investment decisions taken by the Federal Government must be backed by sound and consistent analysis. Existing bodies such as the Net Zero Economy Agency (and proposed Authority) or Australian Renewable Energy Agency could be tasked with undertaking and publishing independent analysis of potential payoffs. Structured information sharing will be important to ensure consistency and help rank projects if the analysis is not undertaken by a single body.

### **Evaluation is important to monitor progress**

The long lead time for precinct maturity means policy evaluation and community feedback loops are essential. Evolving technologies, the agility of planning processes to respond to changing land-use requirements and shifting demand in global markets can all change the nature or extent of policy support required. Accepting that not all projects will succeed means that support must be periodically recalibrated<sup>57</sup>; the failure of governments to stop supporting unsuccessful technologies, projects or firms has undermined industry policy in the past.

A strong coordinating body within the precinct can play a valuable role in bringing stakeholders together to identify emerging challenges and opportunities, and communicating these effectively to policymakers. Evaluation of financial support that is targeted at specific sectors or technologies is particularly important given limited and mixed evidence of the effectiveness of such policies internationally, and the potential for digital technologies to make evaluation easier.<sup>58</sup>

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## CASE STUDY 5

### Renewable energy transformation at AGL

AGL is looking to establish low carbon industrial energy hubs to capture emerging opportunities in the green economy. Using existing infrastructure at three sites including the Hunter Valley in NSW, Torrens Island in South Australia and the Latrobe Valley in Victoria, AGL plans to bring together renewable energy production and attract investment in new industries<sup>59</sup> to support continued economic activity and community benefits, support decarbonisation technologies and domestic supply chains.

A lack of coordination, alignment and accessibility between policies, governments and agencies makes the execution of clean energy hubs more difficult.

Even for well-resourced businesses like AGL, navigating the myriad schemes, incentives and goals in place can be a challenge. Accessing government funding in piecemeal fashion, and cumbersome processes for engaging with planning and permitting agencies, can add costly delays.

This is compounded for potential co-locators at hubs, such as energy-focused startups, which have little experience in navigating these layers of bureaucracy.

To accelerate energy hub development, AGL sees a role for a single point of contact that can help translate high-level energy policy into action.

#### The economics of change heighten the role of government

AGL is exploring new applications for its sites that focus on integration in a mature circular economy, providing renewable energy with hub co-locators from a range of industries. There has been a high level of interest from small and large companies involved in renewable-powered manufacturing and materials recovery.

But repurposing near end-of-life energy infrastructure demands significant capital investments, which can be amplified by the nascent state of some green technologies. And investments in planning processes, site remediation and supporting infrastructure are unlikely to be matched by early-stage revenue streams.

High up-front costs coupled with uncertainty surrounding the mix of technologies that will help Australia decarbonise elevate these risks.

This can be mitigated by following successful measures from governments overseas, such as: providing re-training programs; continuity of policy commitment; and support for enabling infrastructure, underscored by strong community engagement and consultation.

### Conclusion

Clean energy precincts present significant opportunities for Australia to capture emerging green export markets. Knowledge spillovers, economies of scale through shared infrastructure, and circular practices such as reusing byproducts can help Australian industrial regions seize these opportunities.

Governments, industry and education institutions are already starting to embrace precincts. Yet at the



same time, complex, fragmented and in some cases outdated planning and permitting processes are delaying progress without necessarily delivering better environmental or community outcomes.

Governments should start to *enable* these projects through community consultation and removing barriers to precinct development. High quality consultation gives communities, including First Nations groups, the tools and opportunities to participate in and shape the growth of precincts.

All levels of government need to cooperate to update and simplify planning for clean energy precincts, while maintaining environmental and community protection. A key step to *guide* new precincts is the creation of single points of contact or lead agencies for permitting.

Governments are already making substantial *investments*. They must be accompanied by deeper, unbiased analysis to ensure public funds go to precincts with the greatest sustainable comparative advantage.

Developments should be underscored by a clearly articulated purpose that is understood and embraced by all tenants, with measurable objectives to allow evaluation and updating of priorities. A coordinating body is needed to support the evolving goals of the precinct, promote the development of internal and external networks and connect stakeholders to commercial or research partners.

With collaboration and coordinated action, Australia can embrace clean energy precincts and seize the green export opportunity.



# APPENDIX A: LIST OF ORGANISATIONS CONSULTED

Individual consultations	Workshop participants
AGL	AEMC
BP	AGL
City of Melbourne	ARUP
Climate Change Authority	Aurecon
Department of Climate Change, Energy, Environment and Water	BP
Department of Industry, Science and Resources	CEFC
Grok Ventures	Climateworks
Latrobe Valley Authority	DCCEEW
National Intermodal Corporation	EPA Victoria
Net Zero Economy Agency, Department of Prime Minister and Cabinet	ERM
Port of Newcastle	GHD
Queensland Department of Tourism, Innovation and Sport	Infrastructure Australia
Regional Development Australia (Sydney)	Infrastructure NSW
Renewal SA	KPMG
RMIT	Latrobe Valley Authority
SA Department of Industry, Innovation and Science	Lumea
SA Department of Premier and Cabinet	National Intermodal Corporation
Tivan	Port of Newcastle
University of Melbourne	PWC
Urbis	Stantec
WSP	Regional Development Australia (Sydney)
	TEH&CO
	University of Queensland
	University of Southern Queensland
	University of Tasmania
	Urbis
	Veolia
	WSP

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