



CENTRE OF
DECOMMISSIONING
AUSTRALIA

Skills Review for the Australian Oil and Gas Decommissioning Industry

Public Study

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Acknowledgements of Country

We would like to acknowledge the Traditional Owners of the lands and waters upon which we conduct our business here in Western Australia, the Whadjuk people of the Noongar Nation.

We pay our respects to their Elders past and present. We thank them for their continued strength, wisdom and for their ongoing custodianship of our lands, coastlines and ecosystems since time immemorial.

We also extend our respects to all other First Nations people, their future generations and their continuing connection to country – both land and sea.

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Study Background

Australia's oil and gas industry has been an important driver of the economy for over six decades. Australia makes a valuable contribution to the world's global oil and gas supply with the production and export of liquefied natural gas (LNG), crude oil and condensate. For the last several years, Australia has been the world's largest LNG producer. As Australia's oil and gas industry continues to mature, many of its producing assets are approaching the end of their operational life expectancy. Australia's decommissioning endeavours are starting to ramp up and activity is expected to span several decades. There is an imperative that the industry proactively develops strategies and capabilities in anticipation of this upcoming wave of work.

This report was produced by Deloitte for the Centre of Decommissioning Australia (CODA) to develop a deeper understanding of the current and future skills and capabilities critical to the decommissioning industry in Australia. This study lays the foundations for a cohesive strategy and path forward to develop a domestic decommissioning workforce equipped to meet the anticipated future demand.

To achieve this objective, a multi-faceted approach to this study was undertaken. This included a comprehensive literature review and detailed consultation program consisting of 24 one-to-one consultations and three focus groups. Oil and gas title holders, service providers, supporting organisations, industry groups, public sector agencies and / or regulatory bodies, international experts, and academia and other research-focused organisations were engaged throughout this process. An Industry Insights Survey was also distributed, receiving 46 responses in total, to garner additional qualitative and quantitative insights from a larger cohort of stakeholders within the above mentioned stakeholder groups.

Key Themes Identified:

A number of critical themes were identified, which were collated under four distinct, yet interrelated categories:

- 1 Strength of Australian Oil and Gas Industry:** There is a strong commitment to learn and prepare for what is expected in the near future; a willingness to collaborate and connect to enable best practice approaches and strategies; the ability to leverage existing skills and resources to ensure organisations build on existing capabilities; and a strong desire for innovation to better the industry overall.
- 2 Context & Preparedness:** Decommissioning is a growing industry, with increased demand projected due to a large number of facilities approaching end-of-life over the next few decades. The industry's preparedness however is varied, based on the type of activity, due to a number of interweaving factors.
- 3 Workforce Challenges & Opportunities:** Anticipated demand for decommissioning activity in the future may put pressure on existing workforce capability, particularly given the limited local experience to draw from. Critical capability and skills required in decommissioning and the gaps have been identified.
- 4 Planning & Regulatory Considerations:** There is a willingness to meaningfully connect and collaborate, however innate competitiveness, the vast complexities associated with decommissioning work and decentralised capability is currently impeding attempts at effective cooperation.

Opportunities to Move Forward

To best support the decommissioning industry to meet anticipated demand in the medium to long-term, 11 targeted opportunities to move the industry forward in a sustainable and meaningful manner were identified. Of these, this study concluded that there are six opportunities that are of high importance and urgency. Further detail surrounding all the opportunities can be found in section 4.

1. Develop a consolidated view of upcoming decommissioning activity to enable more effective planning, data management and execution of activities
2. Bring the sector together for more industry-wide education, training, networking and solutioning
3. Determine a detailed view of critical capabilities and workforce management requirements against projected demand
4. Build local capability in critical gap areas to better manage upcoming demand in Australia
5. Drive rapid and impactful change through accelerated collaboration
6. Redesign work based on workforce planning and supply considerations



1. Introduction

This section introduces the oil and gas industry in Australia and the expected challenges faced by its workforce. It delves into the context and background behind the study and the approach taken to meet its objectives.

1.1 OIL AND GAS INDUSTRY

Australia's oil and gas sector contributes significantly to its economic prosperity. Australia is home to a world-leading LNG industry which produces over 20% of total global LNG demand. However, many of the country's oil assets have been in operation for many decades and have reached the end of their economic and producing life and will need to be decommissioned in the next few decades.¹ At the same time, the emerging offshore renewables sector is making strides, earmarked to play a key role in Australia's shift towards greener energy. As an example, the government's \$20 billion 'Rewiring the Nation' plan has set aside \$1.5 billion to foster growth of offshore wind farm projects.²

The oil and gas industry has experienced cycles of growth and decline driven by macroeconomic factors including geopolitics, trade, economic, fiscal and policy settings. The global pandemic also played a significant role in energy demand destruction, soon followed by the dispute between Russia and Ukraine which disrupted energy trade flows leading to record high gas and LNG prices. Rising interest in renewable energy and the move towards lower emissions has also influenced the industry and will change it even more as the world strives to achieve net zero targets.^{3,4}

Australia, in response to climate change, has committed to the Paris Agreement with the aim of achieving net zero emissions by 2050. It is predicted that many oil and gas companies will diversify their focus towards broader energy sectors, prioritising investments in low-carbon sources. Artificial intelligence (AI) and disruptive technologies are projected to become more mainstream, leading to an increased demand for analytical, software development, and digital skills, thus requiring staff re-skilling and up-skilling.^{5,6,7,8}

The advent of AI and new technologies will likely increase workforce demands in the oil and gas sector, as well as related industries, both nationally and globally. Approximately 10.3 million new jobs are expected worldwide and 194,000 jobs in Australia by 2050. Australia's oil and gas industry directly employs nearly 19,000 people, primarily made up of highly qualified specialists, with less than half of the workforce comprising medium-level specialists.^{9,10,11}

Like other sectors, the oil and gas industry grapples with attracting and retaining talent, due to several factors such as shifting perspectives on climate change and evolving workforce values. Skill shortages are further exacerbated by a significant proportion of the workforce nearing retirement and a lack of suitably qualified candidates from educational institutions.^{12,13,14}

As the industry transitions towards cleaner energy, the composition of roles will continue to evolve. Individuals with limited specialisation may face challenges securing comparable wage positions, as most clean energy roles demand post-secondary education. Highly skilled individuals like engineers may find skill transfers and retraining more beneficial.^{11,15}

Australia has the opportunity to lead in overseeing the final stages of the asset lifecycle as the industry matures and decommissioning activities increase. This requires strategic preparation to anticipate and address the necessary workforce skills and capabilities to support various processes domestically.

1.2 OBJECTIVES OF THE STUDY

Australia's oil and gas industry is facing an impending wave of decommissioning activities as numerous aging assets and infrastructure approach their end of operational life.^{16,17} Expected to span over the next half-century, proactive strategies are needed to prepare for this upcoming phase.^{18,19}



This study aimed to identify and understand skill and capability gaps required for safe and efficient decommissioning projects, both onshore and offshore, using insights from local, national, and international stakeholders to understand the current and future state of decommissioning activity in Australia. The insights will guide the development of a strategy to enhance these skills and capabilities, preparing a competent workforce for anticipated future industry demands.

The study:

- Identifies current and future capabilities of the workforce to execute decommissioning work safely and efficiently with consideration for the whole decommissioning lifecycle.
- Describes the skill requirements of identified capabilities.
- Presents a qualitative assessment of the current Australian workforce market, including identification of existing skills across relevant industry sectors.
- Conducted a gap analysis based on above outcomes.
- Proposes solutions or strategies to bridge identified gaps.

1.3 STUDY APPROACH AND METHODOLOGY

To achieve the study objectives, a comprehensive and multi-faceted approach was adopted that included an extensive literature review and consultation with industry stakeholders.

As part of the literature review, insights and perspectives from mature decommissioning jurisdictions such as the UK and Norway were studied. Current National, State and Territory legislative frameworks, policies, and practices, and International Conventions were also examined to assess their potential implications on decommissioning activities.

The stakeholder consultation included one to one consultation and focus group sessions. To support this, an Industry Insights Survey was also conducted, with 46 responses. The study was conducted over a duration of two months (July to September 2023).

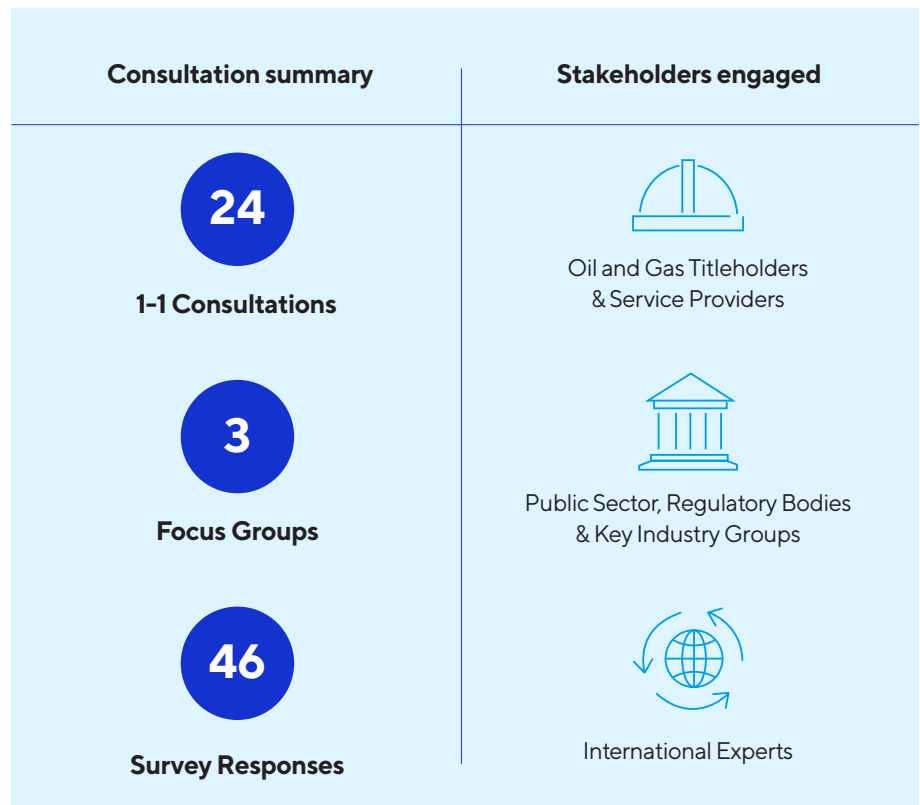


Figure 1 | Study approach and consultation summary

2. Overview of decommissioning industry and landscape

This section introduces the decommissioning landscape in Australia and highlights the activities required across the decommissioning lifecycle.

2.1 DECOMMISSIONING LANDSCAPE IN AUSTRALIA

Decommissioning, the safe and environmentally responsible addressing or removal of offshore oil and gas infrastructure, is an unavoidable phase in petroleum projects. Decommissioning in Australia is expected to cost up to USD \$40.5 billion over the next 50 years, with approximately 136 fixed facilities anticipated to enter the decommissioning phase in the next decade.²⁰

Oil and gas wells are typically plugged and abandoned after their production life. An estimated 100 offshore development wells have been permanently abandoned out of the 890 drilled in Australia before 2015. This number is projected to rise to over 440 by 2026, presenting complex, costly and substantial environmental, safety and well-integrity risks.²¹

Australia is still in its early stages of the decommissioning lifecycle compared to more mature international regions. A few large scale decommissioning projects have been completed but more clarity on the approach and relevant skills to effectively undertake this challenge is required. There is significant near term offshore decommissioning activity across Western Australia's Northwest Shelf as well as in the Bass Strait off the coast of Victoria, while onshore there is a large volume of work being planned for Chevron's WA Oil operations on Barrow Island along with ongoing plug and abandonment work across most Australian states and the Northern Territory.

Decommissioning in Australia is governed by various legal and regulatory requirements, including international conventions. Enhancements have been made to Australia's decommissioning legislative and regulatory framework following the Northern Endeavour project, reflecting a commitment to address decommissioning complexities.²⁴

The UK North Sea leads in decommissioning, contributing to 41% and 78% of the global and European needs respectively.²⁵ The region has made significant strides in enhancing the forecasting accuracy of decommissioning activities, implementing the Supply Chain Action Plans (SCAPs) which facilitate cooperation with suppliers early in projects.

Decommissioning in Australia requires balancing industry best practices with local challenges such as geographical remoteness, limited offshore projects, and unique marine environments. These factors increase decommissioning complexity and costs, necessitating innovative methods, equipment, and skills.¹⁹

Workforce readiness is another concern, with the increasing decommissioning work likely generating demand for new specialists. Australia is projected to require around 500 specialists for decommissioning projects, prompting companies to consider reskilling and upskilling strategies.¹¹

Transferability in oil and gas skills across the industry lifecycle, including decommissioning, is notable. However, the challenge lies in ensuring the availability of personnel with the appropriate skills, capabilities, and mindset, as decommissioning entails different potential health and safety risks.^{26,27}

The rise in decommissioning activities will also create job opportunities throughout the supply chain. However, the Australian supply chain needs the tools, facilities, vessels, and skilled workforce for offshore decommissioning.¹⁹ Importing specialised vessels, equipment, and skilled labourers would be costly, potentially directing a sizable proportion of construction investment outside of Australia. Despite the oil and gas workforce comprising various qualified specialists, finding personnel with expertise in pipeline and platform decommissioning is a challenge. Thus, Australia's industry must explore feasible solutions from economic, societal, and environmental perspectives.

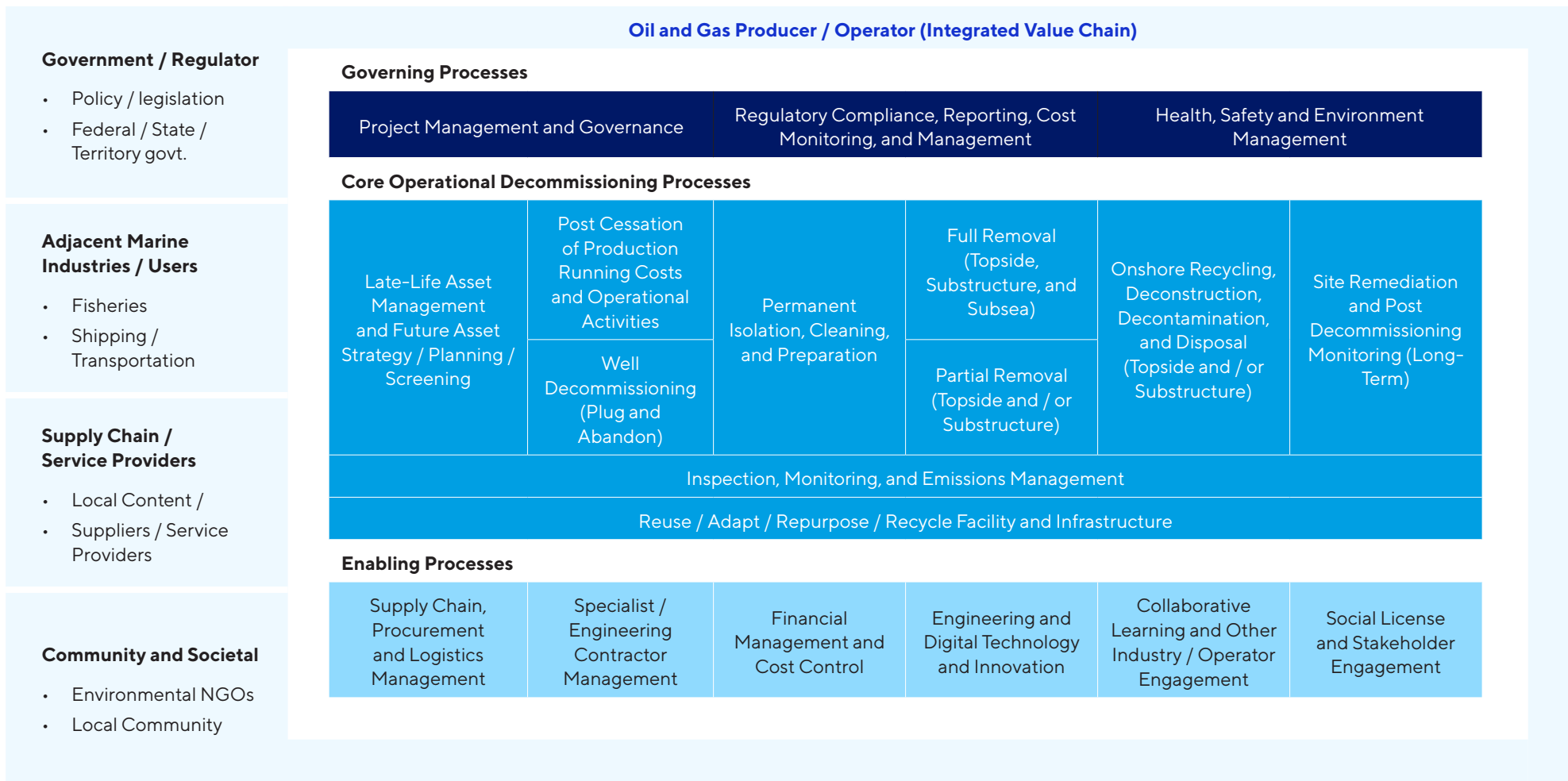


Figure 2 | Deloitte’s decommissioning framework* - A functional overview of required capabilities

For the purposes of this study, Deloitte’s decommissioning framework was leveraged, which is aligned to the OEUK’s work breakdown structure for offshore activity. Specific activities related to onshore decommissioning were also examined.

*Reference: Based on [Decommissioning Work Breakdown Structure Guidelines: \(oeuk.org.uk\)](https://www.oeluk.org.uk)

3. Skills review study insights

This section considers the insights and themes identified during the study across categories such as decommissioning context and preparedness for the future in Australia, workforce challenges and opportunities, critical capabilities and skills and planning and regulatory considerations.

3.1 STRENGTHS OF THE DECOMMISSIONING INDUSTRY IN AUSTRALIA

Notable areas of strength identified through this consultation program includes a commitment to learn and prepare for what is expected to come in the near future, a willingness to collaborate and connect to enable best practice approaches and strategies, an ability to leverage existing skills and resources to ensure organisations aren't starting from scratch, and a desire for innovation and shared learning to better prepare and support the industry overall.



Commitment to learn and prepare

There was an overall sense of commitment to learning and ensuring greater preparedness for the wave of decommissioning activity expected in Australia over the next ten years and beyond.

This commitment extended to the consultations conducted with international experts and stakeholders who demonstrated a strong willingness to share insights and learnings to support Australia's decommissioning efforts. Overall, there is a sense that decommissioning is an opportunity area locally and internationally where the willingness to learn is strong.



A willingness to further connect and collaborate

A willingness to engage in consultations, the candid nature of responses and interest in furthering discussions for the betterment of industry preparedness was clearly evident.



Ability to leverage existing skills and talent

It is commonly perceived that the Australian oil and gas sector has many of the existing skills and capabilities required to support decommissioning activity and there is confidence that these resources will be able to be leveraged to support decommissioning.

A key area of focus articulated was the need to shift mindsets to support these activities. It was also highlighted that the workforce need to be educated in understanding the specific technical nuances, as well as safety and environmental considerations that need to be considered to support decommissioning.

Overall, leveraging these existing skills and talent provides a strong opportunity to build the necessary local experience required to support decommissioning demand over the next few decades.



Desire for innovation

Consulted stakeholders demonstrated a commitment to innovation and continuous improvement through a focus on developing processes, technologies, and ways of working that are going to better the industry to plan for and deliver on decommissioning activities.

Whilst there was a strong consensus for ensuring simplicity and clear planning, there is also an opportunity to further enhance effectiveness of decommissioning activity through collaboration within industry on research and trialling technologies that can improve Plug and Abandonment (P&A), waste management, recycling and disposal.

Figure 3 | Key areas of strength

3.2 DECOMMISSIONING CONTEXT AND PREPAREDNESS FOR THE FUTURE

Decommissioning is a growing industry, with a projected increase in demand due to a number of assets approaching end-of-life over the next few decades. This section explores insights gathered during the course of the study regarding Australia's preparedness for the future.

Overview of key findings from the study:

1. Decommissioning in Australia is in a nascent stage and will continue to mature over the next 10 years
2. The level of preparation across Australia is varied, depending on the type of activity, with most industry bodies believing they are 'starting to prepare'
3. Although improving rapidly, the degree of uncertainty surrounding decommissioning volume, timing, and approach is deterring the industry from acting more proactively
4. There is a perception that focus on decommissioning activity is limited due to a lack of financial incentive for the industry, particularly for operating organisations
5. The complexity of Australia's geographical position and timing of activity will impact accessibility to required infrastructure
6. There is a need to consider the suitability and availability of ports, land, infrastructure and workforce to manage upcoming decommissioning activity
7. There is a need to view the sector as an 'integrated ecosystem' and to work harmoniously to build the capability needed for the future

1. Decommissioning in Australia is in a nascent stage and will continue to mature over the next 10 years

While oil and gas extraction occurs in over 95 countries, decommissioning experience is limited globally, except in the US, UK, and Norway. With 70% of the world's oil and gas sourced from mature regions through ageing infrastructure nearing their economic limit, decommissioning is set to become a global issue with demand expected to grow over the next 10 years.

Decommissioning in Australia has been limited and reactive to date. Some title holders have clear decommissioning plans, while others are in early production stages and decades away from decommissioning their assets, resulting in varied preparedness levels. The decommissioning industry in Australia is projected to see short bursts of activity over the next five to ten years, which will then stabilise over a 10-year horizon.

For decommissioning to be successful, it needs to be seen as standalone with dedicated talent, rather than an adjunct to other services. At present, decommissioning is viewed as a cost only and lacks broader business buy-in. To mature, decommissioning must be viewed as an integral part of the oil and gas value chain and an area of critical importance to the organisation and its license to operate.



Additionally, factors crucial to supporting the decommissioning industry growth include clear planning and indication of expected work volume, clarity on regulations and policies that affect decommissioning, ongoing research on lessons learnt from more mature decommissioning projects/regions, environmental research, infrastructure availability, and building a sovereign, sustainable, and coordinated capability in downstream waste management.

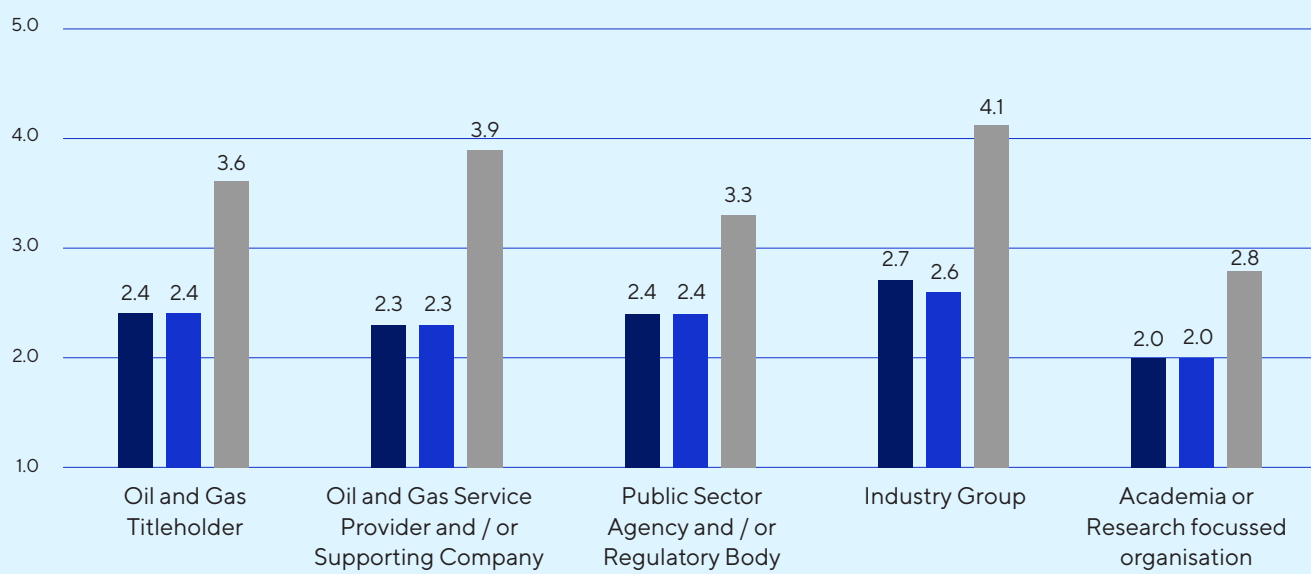
2. The level of preparation across Australia is varied, depending on the type of activity, with most industry bodies believing they are ‘starting to prepare’

Preparedness for decommissioning in Australia varies, largely depending on the types of activities undertaken. Some title holders are well-prepared or moderately prepared due to their construction expertise, while others lack exposure. For instance, some title holders excel at well abandonment but lack experience in offshore pipeline removal, possibly due to limited opportunities in Australia for such activities.

Stakeholders are starting to recognise the need for planning and deepening their understanding of potential future outcomes and effects of decommissioning. Compared to the Asia Pacific, Australia is ahead in future planning from a regulatory perspective, which is driving progress. Conversely, countries like Malaysia are seeing reduced investment due to a lack of decommissioning mandates, with regulators perceived as not doing enough to encourage work in the region. This contrasts with Australia, where regulatory bodies require all title holders to plan for decommissioning five years prior to predicted cessation of production.

The energy industry’s transition to renewables and alternative power generation is increasing expectations on title holders to invest further in decommissioning activities, prompting them to consider more effective and sustainable approaches.

Decommissioning Preparedness in Australia (values in means)



- How prepared do you think Australia is to manage the decommissioning activity projected over the next 10+years?
- How prepared do you think Australia’s workforce is to contribute to the execution of the decommissioning activity projected over the next 10+ years?
- How prepared is your organisation to deliver its respective work in the decommissioning activity projected over the next 10+ years?

Note: Key for ratings:
1. Not at all prepared;
2. Starting to prepare;
3. Moderately prepared;
4. Well prepared; and
5. Very well prepared.

Figure 4I Decommissioning Preparedness in Australia



Survey results indicate that respondents deemed the level of preparedness overall in Australia to manage decommissioning activity over the next 10+ years to be an average of 2.4 out of 5 for all industry participants. Survey results indicate that the preparedness of Australia's existing workforce (in their ability to contribute to decommissioning activities over the next 10+ years) also stands at an average of 2.4 out of 5. This is in line with the overarching insight that decommissioning in Australia is at a nascent stage and is yet to mature as an industry.

The level of preparedness across industry participants varies as seen above in the survey results; academia least prepared (average of 2.8 out of 5), followed by public sector agency / regulatory bodies (3.3 out of 5); and industry groups (i.e., not for profit independent organisations) most prepared (with an average of 4.1 out of 5).

3. Although improving rapidly, the degree of uncertainty surrounding decommissioning volume, timing, and approach is deterring the industry from acting more proactively

While the decommissioning knowledge base in Australia is improving, supply chain constraints and overall uncertainty create challenges, deterring proactive action in the industry. Uncertainty regarding timeline, volume, approach, and expected work influences the necessary commitment and investment for successful decommissioning projects. A rapid increase in decommissioning activity would require specialist rigs, vessels, and relevant capability in Australia.

Industry players aim to keep costs low given that decommissioning lacks return on investment. However, environmental factors make it difficult to forecast costs until site inspections are conducted. Similarly, the size and segmentation of Australia's asset portfolio, crucial for determining initial decommissioning investment, is not readily known.

A stable connection to the industry's supply chain ensures sourcing of specialist capabilities, skill sets, and infrastructure for decommissioning projects, and allows continuity of work. However, scarce infrastructure and limited access to skills will drive costs and delivery constraints.

Investments in Australia's supply chain can reduce perceived risk and improve certainty, strengthening forward planning and avoiding overlapping schedules. Australia can learn from jurisdictions like the UK, where title holders are required to disclose spare capacity, allowing other title holders to leverage that capacity.

4. There is a perception that focus on decommissioning activity is limited due to a lack of financial incentive for the industry, particularly for operating organisations

Consultations revealed that limited financial incentives, particularly for title holders, have led to decommissioning work being continually delayed or de-prioritised. Decommissioning is often seen as an 'additional cost' to the organisation, resulting in a lack of financial investment towards projects and proactive cost planning.

A mindset shift may be needed in the industry to move away from a focus purely based on return on investment and profitability. This could involve reframing the narrative to include benefits of decommissioning, such as improved social license, environmental benefits, opportunities to repurpose assets for renewable energy production, increased community engagement, and other communal advantages.

There may also be benefit in changing how decommissioning projects are financed from the outset. Currently, lump sum payments are favoured as they are seen as the lowest risk option for title holders. Developing and maturing project management capabilities to manage risk effectively over a longer term may increase viability for decommissioning projects to be taken up by smaller title holders, spreading the demand more evenly in the future.



5. The complexity of Australia’s geographical position and timing of activity will impact accessibility to required infrastructure

The Australian decommissioning industry relies heavily on internationally based infrastructure like rigs and vessels from more mature jurisdictions such as the North Sea. These assets, also used for other oil and gas projects, have limited availability, leading to intense competition and necessitating effective planning by title holders.

Demand for this infrastructure is expected to rise with an increased focus on offshore wind and other adjacent industries. This necessitates multi-year or decade-long planning, which the industry is currently not well prepared for. While regulators mandate planning for decommissioning activities five years prior to production cessation, limitations on the availability of some larger offshore assets will remain a long-term challenge.

These challenges provide opportunities for title holders to be more considered and strategic in their use of limited infrastructure. The capacity constrained Australian supply chain will need optimisation to support decommissioning activities effectively. For example, there’s potential for more targeted use of heavy lift vessels and exploration of alternative or innovative methods like rig-less technology for smaller tasks. Collaborative multi-user campaigns can also be beneficial, particularly if negotiations are handled collaboratively during the tendering process.

6. There is a need to consider the suitability and availability of ports, land, infrastructure and workforce to manage upcoming decommissioning activity

The decommissioning industry in Australia is hindered by inadequate equipment and infrastructure, such as ports and reception facilities equipped to handle offshore materials and equipment. Australia’s vast geography and remote locations make it difficult to develop additional infrastructure, especially as decommissioning activity increases across the country. The situation is further complicated by competition from adjacent industries, particularly offshore wind construction, and a push for green energy. Offshore wind operators often book port facilities years in advance, creating challenges for decommissioning projects.

Shallow waters and dynamic coastal landscapes also limit port accessibility. Decommissioning activities require significant onshore space for large infrastructure and numerous land-based assets, including transportation and storage facilities. Understanding current and future activity volumes will help port authorities plan for decommissioning and justify investment in infrastructure improvements.

Australia has an opportunity to enhance its port capabilities due to recent development projects. There is a need to focus on infrastructure development to create end-to-end coordination in demolition, recycling, storage, and disposal of assets. This lack of infrastructure hampers Australia’s position as a leader in decommissioning. Dedicated decommissioning yards should be established to handle hazardous materials, with an emphasis on technical proficiency and strategic capabilities. Redirecting materials from landfills to alternative uses will reduce environmental impact and uphold Australia’s reputation as an environmentally responsible nation.

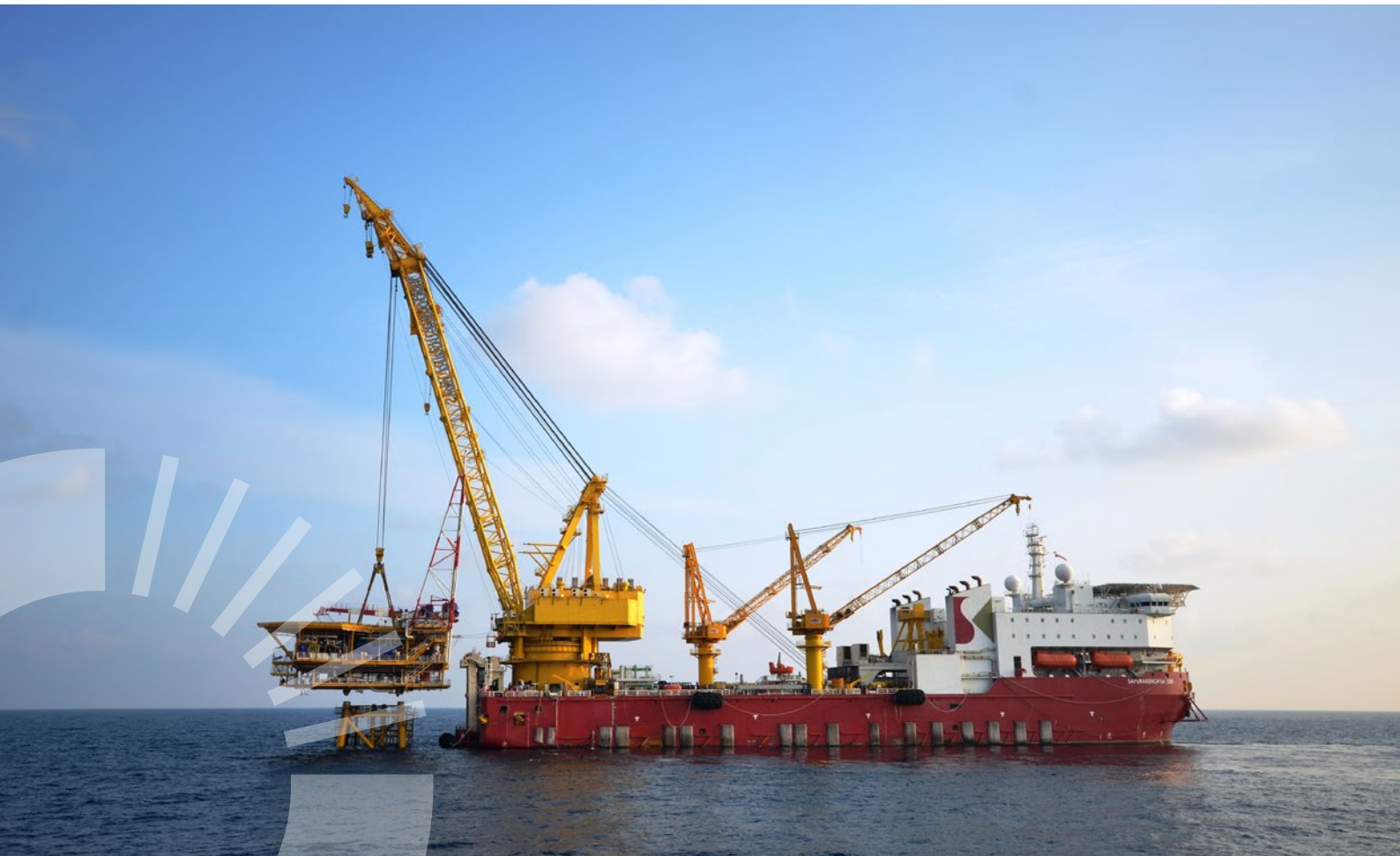
7. There is a need to view the sector as an ‘integrated ecosystem’ and to work harmoniously to build the capability needed for the future

Australia’s potential to lead global decommissioning efforts depends on a holistic approach from stakeholders including government, regulatory bodies, industry, and researchers. The competitive nature of the industry has limited collaboration and progress. A fragmented landscape with numerous specialist companies creates confusion and inhibits growth. The sector needs cohesive collaboration and knowledge sharing for uniform capability development.

Understanding Australia’s asset portfolio size and complexity is crucial for efficient future demand management. Combining infrastructure and clarifying contract models will create an efficient supply chain, ensuring necessary skills are available at the right times and places, reducing reliance on overseas markets.

Workforce development is another vital aspect. With the growth of other industries, including new projects in mining and renewables, retaining talent in decommissioning is challenging. Creating synergies with these industries can make decommissioning more attractive and provide sustainable career paths. This could include reskilling initiatives and temporary transitions between industries during demand fluctuations.

Industry bodies need to improve engagement to facilitate better outcomes. There have been reports of service providers being excluded from tender lists, leading to a lack of diversity in thought, experience, and expertise in discussions. This gap hampers successful project establishment and undermines cooperative relationship development, which are vital for overall sector maturity.



3.3 WORKFORCE CHALLENGES AND OPPORTUNITIES IDENTIFIED IN THE AUSTRALIAN LANDSCAPE

Anticipated demand for decommissioning activity might put pressure on existing workforce's capabilities, particularly given limited local experience to draw from within the industry. This section explores the insights gathered during the study on challenges and opportunities for the workforce.

Overview of key workforce challenges and opportunities identified from the study:

1. While most capabilities and skills relevant for decommissioning may already exist within the industry, it is anticipated that demand may not be met by the existing workforce
2. Limited exposure to real-world decommissioning projects in Australia has led to limited local experience, but presents an opportunity to build expertise, as well as new innovative ways of working within the industry
3. The appeal of working in green energy, renewables or adjacent industries, or industries outside of oil and gas, may create talent movement, which can create ongoing resourcing challenges for decommissioning
4. Ambiguity is leading to additional challenges in attracting and retaining a sustainable decommissioning workforce in Australia
5. There is an opportunity to learn from experiences and expertise in other jurisdictions, whilst building a workforce that is capable of responding to the unique challenges of the Australian operating environment
6. The industry has the opportunity to adopt new ways of working, as well as engage with research and innovation whilst learning from tried and tested practices, to optimise and enable local decommissioning activity
7. The duality of production and decommissioning occurring simultaneously within the Australian oil and gas industry presents an opportunity to leverage these transferable skills and capabilities
8. A mindset shift, with a greater emphasis on the unique challenges of decommissioning in Australia including health, safety and environment, which will be critical for workforce preparedness
9. Whole of industry accountability is necessary to build decommissioning skills and capabilities of the future through fit-for purpose training and education

1. While most capabilities and skills relevant for decommissioning may already exist within the industry, it is anticipated that demand may not be met by the existing workforce

A significant challenge for the decommissioning industry is sourcing talent with the right capabilities. Demand for expertise in contract management, engineering support, and onsite administration is rising, alongside noticeable skill gaps in cost planning and waste and hazardous substance management. While such skills exist in Australia, title holders often rely on more mature regions like the North Sea to fill vacancies. Decommissioning frequently uses a 'hub and spoke' model, drawing in overseas talent on short contracts.



One-on-one consultations and verbatim responses to the Industry Survey highlighted several challenges including:

- An aging oil and gas workforce with few new entrants to replenish it. As quoted by an academic or research-focused organisation,

“We have an aging petroleum and drilling sector, with less people coming into it and there may be a gap.”

- While specialist skills such as Radiation Technicians, Well P&A Technicians, and Structural Engineers can be found in deconstruction, the supply may not meet demand levels. As stated by a public sector agency or regulatory body,

“You do have skill shortages...it’s to do with the volume of your skilled people rather than the skills being there.”

- Long-term skill and knowledge continuity is also a concern. Clear documentation and knowledge transfer around the state of assets, and effective handovers between different teams are critical for long-term sustainability.

2. Limited exposure to real-world decommissioning projects in Australia has led to limited local experience, but presents an opportunity to build expertise, as well as new innovative ways of working within the industry

Australia’s decommissioning industry faces a shortage of experienced personnel due to limited opportunities for full-scale projects. Most have only completed ‘desktop decommissioning’ exercises. This lack of experience hampers the development of local expertise and investment in local supply chains, crucial for overall capability development.

While some operators can leverage international experience from full-scale projects, many smaller title holders cannot. The aging workforce in the oil and gas industry poses a challenge that requires strategic planning for skills retention and capability development. As stated by an oil and gas service provider,

“We have many capabilities right now – Senior Engineers in O&G in semi-retirement that we can tap in-to now, however there is a cliff – if we don’t train the new engineers this will be a challenge”.

According to the Industry Insights Survey, organisations are developing full-scale decommissioning experience in several ways:

- Hiring decommissioning experts from other geographies
- Engaging with global businesses for partnerships and learning opportunities
- Long-term career planning, such as employees taking on decommissioning roles in the USA/UK to build capability
- Exchange programs with Australian staff working on UK projects, and vice versa
- Leveraging experienced professionals to support projects and develop inexperienced contractors’ skills
- Transferring key personnel with full-scale experience from other regions
- Partnering with international companies for skill transfer in new technology
- Building relationships with universities for research and capability development.



3. The appeal of working in green energy, renewables or adjacent industries, or industries outside of oil and gas, may create talent movement, which can create ongoing resourcing challenges for decommissioning

A common issue raised was the challenge for the decommissioning industry to compete with emerging renewable energy sectors, particularly offshore wind projects. The allure of green energy sectors creates a competitive labour market. Several factors contribute to this:

- Decommissioning is perceived as less exciting and technically challenging compared to oil and gas installation projects.
- High labour costs lead to tight margins in Australian decommissioning projects.
- Green energy careers may be more appealing than traditional oil and gas careers or careers in decommissioning.
- The term 'Decommissioning' carries a negative connotation and fails to capture the positive aspects of the work. The significant "circular economy" purpose to decommissioning should be more prominently promoted to address this perception.
- Climate change activism has created a stigma around the oil and gas industry, painting it as dirty.

To address this, a rebranding of the industry may be necessary to highlight the benefits of working in decommissioning. The focus should not be limited to Australian projects but also include broader sustainable career opportunities, leadership growth, international mobility, and other appealing factors. As cost and environmental concerns increase, the collective benefits of the industry need to be clearly communicated to retain professionals amid the green energy push. To attract younger talent, proactive engagement with universities is needed for effective industry promotion that appeals to emerging talent.

4. Ambiguity is leading to additional challenges in attracting and retaining a sustainable decommissioning workforce in Australia

The uncertain nature and unclear timelines of decommissioning projects in Australia, along with short project durations, is putting pressure on the sector's ability to attract and retain skilled staff like Engineers, Multi-skilled Operators, Radiation Technicians, and Plug and Abandonment (P&A) Technicians. This uncertainty, compounded by limited understanding of resource and effort requirements, hampers proactive planning, making it challenging to find and retain qualified personnel.

To appeal to a younger workforce, the sector needs to showcase that decommissioning offers meaningful and long-term career paths in Australia. As one oil and gas service provider noted, "Engineers are generally in their late 20s, getting married...then resigning in 6 months after working offshore. We need to make the industry attractive for the workforce."

The emerging generation seeks stability, posing challenges for a predominantly remote or offshore workforce. Creative solutions might be needed to rethink approaches like FIFO (Fly-In Fly-Out) work arrangements to balance lifestyle needs with remote work demands.

Greater visibility is also needed regarding the variety of roles available in the sector, highlighting the opportunity for innovative solutions and meaningful careers in areas like Marine Science and Innovation. This will help build confidence in the sector's current pipeline of work and potential for career growth.



5. There is an opportunity to learn from experiences and expertise in other jurisdictions, whilst building a workforce that is capable of responding to the unique challenges of the Australian operating environment

Australia's limited decommissioning experience underscores the need for partnerships with more mature title holders, institutions, and regions to enhance local capability through knowledge sharing. This is particularly crucial for service providers, as title holders often request insights from past decommissioning projects during the tendering process. These partnerships offer practical, real-world learnings that can be applied within the Australian context, helping to identify areas where Australia may lag or have a competitive advantage. Larger organisations with extensive networks could facilitate these partnerships, especially for smaller title holders.

Moreover, there should be a greater focus on developing local partnerships with universities, colleges, vocational education and training providers, and research institutes. As one research-focused organisation suggested, "We need to collaborate with the Australian Maritime College [part of the University of Tasmania] for sourcing and developing skills such as boat masters, dive masters, and vessel crew". By learning from international best practices while maturing its domestic capability, Australia can better respond to unique challenges.

For instance, Australia's offshore technicians operate at varying water depths. Coupled with unique marine life on platforms, differing salinity, sea currents, and diverse weather conditions, Australia's operational environment is distinct from regions like the North Sea or Gulf of Mexico. Awareness of these unique scenarios and the additional risks they pose is crucial for the industry.

6. The industry has the opportunity to adopt new ways of working, as well as engage with research and innovation whilst learning from tried and tested practices, to optimise and enable local decommissioning activity

As Australia's decommissioning industry matures, it presents an opportunity to adopt new work methods, such as transitioning from the traditional FIFO model to alternate working arrangements more suited to modern ways of working including increased focus on the significant opportunities for digital and automation in decommissioning. Consultations also highlighted the potential for increased 'workforce exchange' across industries, facilitating the transition of workers from other sectors into decommissioning and vice versa.

Innovative technologies can extend Australia's reach and create synergies with adjacent industries. Effective recycling of deconstruction materials and by-products could enhance circular economy practices. While there's a focus on new technologies for well abandonment, waste management, and recycling, thorough preparation remains crucial for successful decommissioning.

Furthermore, the industry has the opportunity to view decommissioning through a decarbonisation lens, prompting an increased focus on sustainability. This requires industry collaboration and could impact various factors, including workforce attractiveness, policy and regulation, and environmental and safety considerations.

7. The duality of production and decommissioning occurring simultaneously within the Australian Oil & Gas industry presents an opportunity to leverage these transferable skills and capabilities

While the oil and gas industry possesses many of the skills and capabilities necessary for decommissioning, they may not be available in the volumes required to support all industries simultaneously. However, the industry agrees that these capabilities exist and can be leveraged from other sectors such as offshore wind, construction,



and mining. Supply chain and logistics sectors are additional sources to address skill shortages. While the necessary skills exist in Australia's workforce, nuanced training is required to prepare talent for the unique challenges of decommissioning work, especially concerning Work Health and Safety (WHS) in managing hazardous materials like naturally-occurring radioactive materials (NORMs) and mercury.

Certain roles, like project managers and decommissioning supervisors, are challenging to transition from other industries due to increased risk management requirements. They need a focus on the unique decommissioning risks and, understanding how to effectively complete decommissioning while maintaining operations.

Given Australia's stringent marine regulations compared to other jurisdictions, adopting international best practices is not straight forward and requires specific local knowledge. Greater emphasis should be placed on interpreting Australia's regulations to facilitate appropriate work completion and achieve desired outcomes.

8. A mindset shift, with a greater emphasis on the unique challenges of decommissioning in Australia including health, safety and environment, which will be critical for workforce preparedness

Apart from capability building, a mindset shift is necessary to incorporate situational awareness and specific health and safety considerations within the decommissioning industry. While decommissioning has similarities with development and installation work, the workforce needs to be prepared for the level of planning required for success in the industry. For example, structural engineers experienced with later-life assets are highly valued for their understanding of integrity issues related to aging assets and corresponding health and safety risks.

Australia's National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) has reported an increase in incidents due to inadequate risk assessments involving stored energy, exclusion zones, line of fire, and incorrect equipment use. Therefore, integrating broader awareness training into decommissioning curriculums is essential, especially in hazard management and General Safety Awareness (GSAs). Including safety and hazard awareness modules in existing courses can ensure worker safety and provide necessary industry knowledge.

A perception shift is also needed regarding decommissioning, both internally and externally. Despite the 'dirty trade' label, it's important to highlight the industry's focus on research, innovation, long-term presence, and community benefits associated with environmental stewardship and conservation.

9. Whole of industry accountability is necessary to build decommissioning skills and capabilities of the future through fit-for purpose training and education

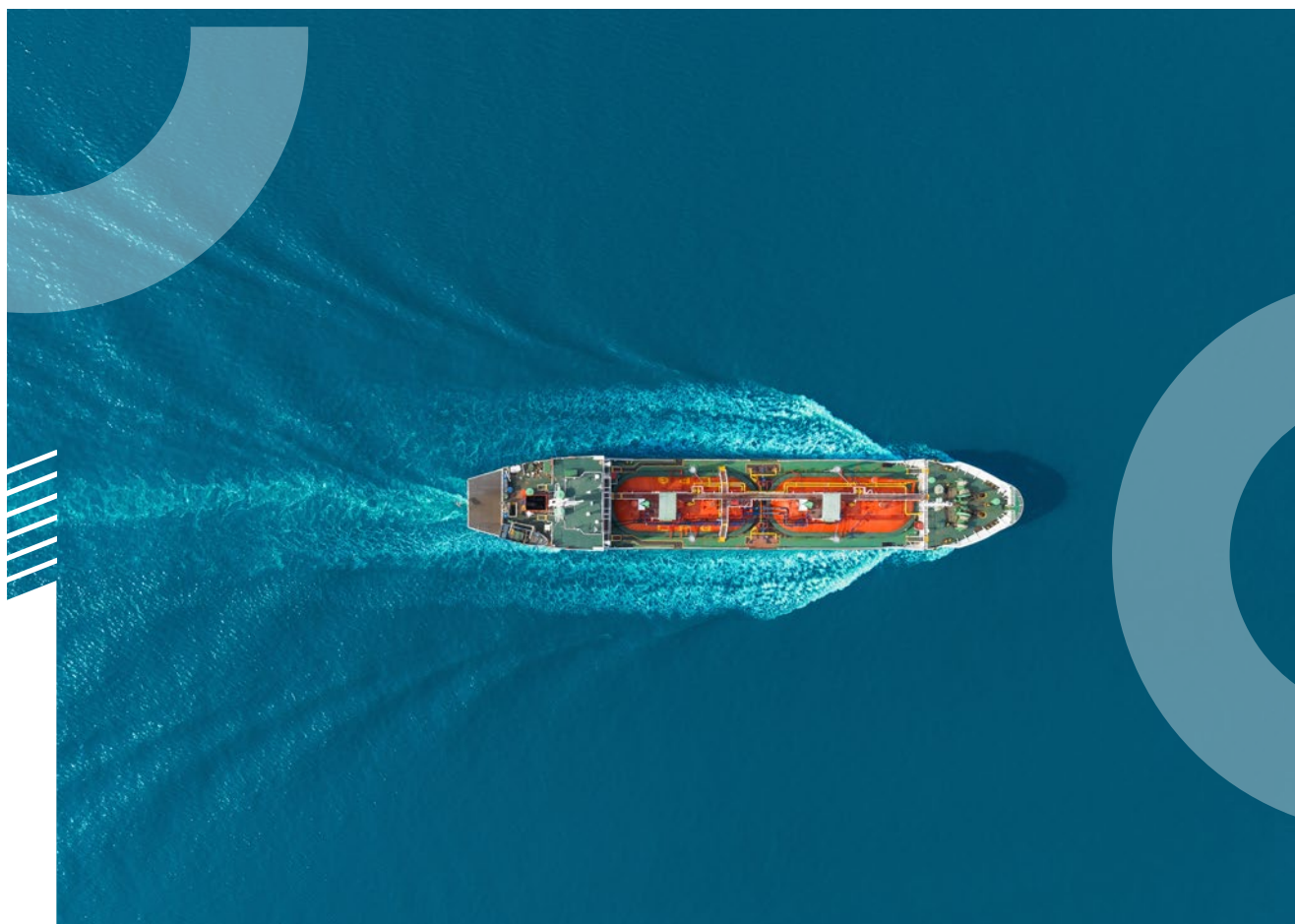
All industry participants have a responsibility to foster skills and capabilities for future decommissioning demands in Australia. This includes collaborating closely with educational institutions like universities, TAFEs, and other Vocational Education and Training (VET) providers. Educational pathways into the industry are currently limited and often focus on new asset construction, rather than decommissioning's emphasis on old asset deconstruction.

VET providers can support industry-specific training through bespoke packages, while early engagement with universities can help cultivate the next generation of talent. However, competition for space within university curricula makes it challenging to incorporate complex decommissioning approaches. Possible solutions include incorporating decommissioning into final year projects, introducing front-end modules, or micro-credentialing.

Industry Insights Survey respondents suggested various initiatives to develop decommissioning skills and capabilities:

- Traditional core trade apprenticeships
- Cross-pollination between projects
- Project management/cost control training programs
- Workforce re-skilling for smooth transitions from operations to decommissioning
- Supervision of student projects
- Bringing in industry expertise for experience in decommissioning projects
- Supporting initiatives to drive capability development
- Identifying Australian researchers with sufficient qualifications and resources for decommissioning needs
- Making the decommissioning/recycling industry a sustainable career choice
- Exploring a licensing regime for companies and workers in decommissioning
- Investigating regulatory levers to ensure competence and experience on high-risk jobs.

The newly funded National Jobs and Skills Councils (JSCs), including a New Energy Working Group, will further inform how to operationalise changes across the sector for uniform capability growth. JSCs will identify sector skills and workforce needs, map career pathways, develop vocational education and training products, and provide intelligence on industry issues.



3.4 CRITICAL CAPABILITIES AND SKILLS REQUIRED IN THE DECOMMISSIONING INDUSTRY

The assessment of decommissioning skills and capabilities in Australia reveals a mixed landscape with both significant gaps and well-covered areas. Technical skills, such as engineering and operational skills for pipeline and facility management, and asset integrity are adequately covered due to the ability to source these capabilities from the traditional oil and gas industry. However, significant gaps have been observed in areas like recycling, decontamination, and waste management, decommissioning program planning and reporting, and specific technical skills for topside/substructure/subsea preparation and removal.

The lack of recycling practices and infrastructure across industries, combined with the absence of recognition of 'decommissioning as an industry,' hinders the development of these essential capabilities. The gaps in recycling and waste management require immediate attention to ensure long-term sustainability and support decommissioning activities.

Similarly, there is a need to upskill the workforce on decommissioning nuances for safe and efficient practices. Proactive measures are needed to attract and retain the workforce, taking into consideration factors like working conditions, health and safety management, and remuneration.

As ambiguity around decommissioning practices, approaches, and timeline subsides and the industry's regulatory landscape simplifies, it is expected that capability development will become a priority. The results highlight the need for targeted skill development, focusing on awareness of the decommissioning context and its nuances, and cultivating the appropriate mindset. Addressing these gaps is crucial in preparing for the future requirements and challenges of decommissioning efforts in Australia.

In the following sections, please refer to the following keys for ratings:

- Importance (How important is this capability to support decommissioning activity in Australia?): 1: Not at all important; 2: Somewhat important; 3: Important; 4: Fairly important; 5: Very important
- Current Strength (What is the current level of strength of capability to support decommissioning?): 1: No strength; 2: Limited strength; 3: Moderate strength; 4: Fair strength; 5: High strength
- Future strength (What is the required future level of strength of capability to support decommissioning activity – i.e., over the next ten years in Australia?): 1: No strength; 2: Limited strength; 3: Moderate strength; 4: Fair strength; 5: High strength
- Scarcity (How readily are we able to source this capability from the market in Australia?): 1: No availability; 2: Limited Availability; 3: Moderate availability; 4: Fair availability; 5: High availability



A summary of capabilities ranked from most to least important, emphasising both the current state capability strength and the necessary enhancement to meet future operational requirements. Furthermore, the table and figure below delineate the scarcity of resources in delivering the required capabilities.

Capability Importance Ranking	Capability Title	Scarcity Ranking	Strength Gap Ranking
1	Environment Management	8 th	6 th
2	Health and Safety Management	12 th	10 th
3	Plug and Abandonment Related Technical Skills	4 th	7 th
4	Regulatory Compliance Management	6 th	5 th
5	Recycling, Decontamination, and Waste Management (including Hazardous material)	1 st	1 st
6	Decommissioning Program Planning and Reporting	2 nd	3 rd
7	Stakeholder Management and Consultation	5 th	2 nd
8	Engineering, Technical and Operational Skills to support Topside/ Substructure/ Subsea Preparation, Removal	3 rd	4 th
9	Engineering, Technical and Operational Skills for Pipeline and Facility Management	10 th	11 th
10	Asset Integrity Management (Inspection and Maintenance)	9 th	12 th
11	Industrial Relations Management	11 th	9 th
12	Logistics and Facilities Management	7 th	8 th

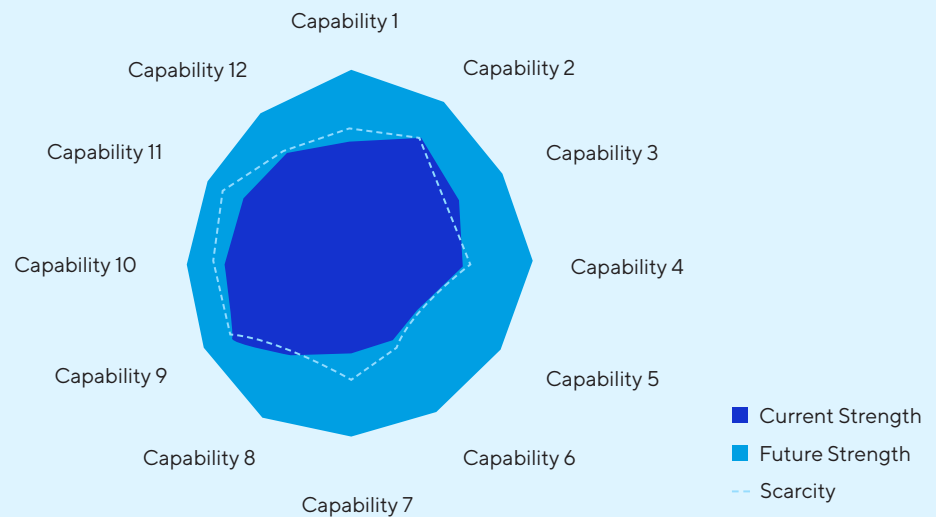


Figure 5
Overview of Survey Results
(Capability Strength Analysis
and Resource Scarcity)

The figure above highlights the overall perceptions of current strength and future strength of each of the 12 identified capabilities. It is evident that greater strength is required across all capabilities to support future decommissioning activity. The gap between current and future strength for each capability area highlights where focused effort is required to support decommissioning activity in Australia. Also, as evident in the table and figure above, the capability with the highest scarcity in the market is Recycling, Decontamination, and Waste Management (including Hazardous material).



3.4.1 CAPABILITIES AND SKILLS IN DETAIL

All figures in the section below indicate the average ratings for current strength of capability and future strength of capability from respondents of each surveyed group. The length of the bar indicates the gap between current and future strength requires, therefore the larger the bar the greater the gap perceived by the survey respondents. An overall average gap in strength across all surveyed groups is provided in dark blue. As noted above, in the following section, please refer to the following keys for ratings:

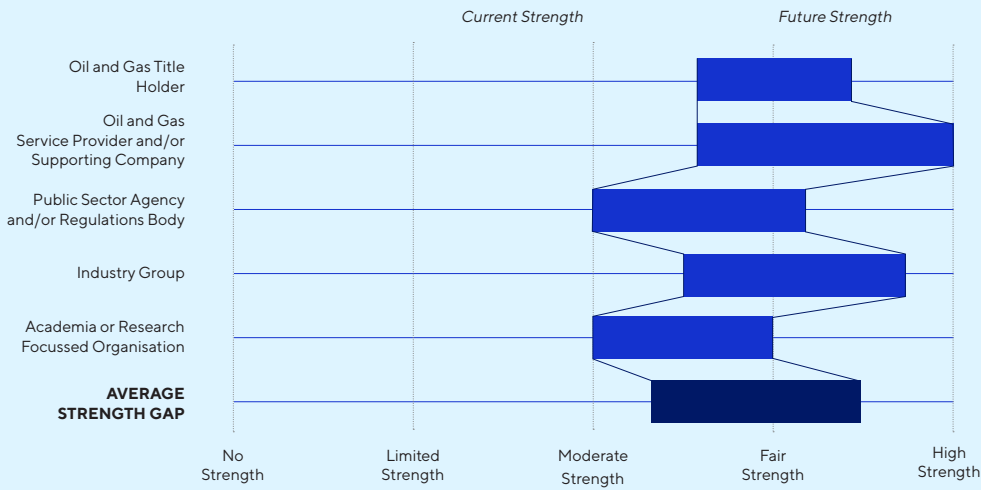
- Importance (How important is this capability to support decommissioning activity in Australia?): 1: Not at all important; 2: Somewhat important; 3: Important; 4: Fairly important; 5: Very important
- Current Strength (What is the current level of strength of capability to support decommissioning?): 1: No strength; 2: Limited strength; 3: Moderate strength; 4: Fair strength; 5: High strength
- Future strength (What is the required future level of strength of capability to support decommissioning activity – i.e., over the next ten years in Australia?): 1: No strength; 2: Limited strength; 3: Moderate strength; 4: Fair strength; 5: High strength

1. Environment Management

As the lifecycle of an oil and gas project needs to be planned in a safe and environmentally responsible way, the following skills have been identified as crucial:

- a) Environment Management:** As per NOPSEMA's expectations, Environment Managers need to assess decommissioning's environmental impacts, develop plans to lower risks to "As Low As Reasonably Practicable" (ALARP), outline implementation strategies etc. Another focus of the role is to evaluate options like retaining subsea infrastructure for natural system regeneration. Regular engagement with stakeholders and government bodies (e.g., Department of Water and Environmental Regulation, Environmental Protection Authority, Department of Fisheries) is vital as part of this role.
- b) Marine Management:** Marine management plays a crucial role in habitat restoration and understanding the impact of decommissioning on the marine environment. Marine Scientists assess oil field debris effects on marine life and ocean health, plus invasive species status. They also analyse ecological options like partial removal, 'rigs-to-reef,' and artificial reefs. Collaboration with Waste, Health and Safety, and Environmental Management is vital to evaluate pollutant leakage risks during and after decommissioning.
- c) Remotely Operated Vehicle (ROV) Operations:** Primarily needed in later decommissioning stages like Site Remediation and Post-decommissioning Monitoring, this capability examines offshore structure condition, surveys pipelines, and monitors remaining infrastructure to minimise environmental risks to an 'As Low As Reasonably Practicable' (ALARP) level.

Capability Strength Gap



Capability Resource Scarcity

Moderate availability of skilled resources, lacking mostly site remediation and post-decommissioning monitoring resources.

Capability Priority

All groups of survey respondents rated this capability as highly important.

Capability Strength Insights

- Currently the average capability level in this area falls within the range of moderate to fair.
- All surveyed respondents uniformly agreed to develop this capability, focussing on the site remediation and post-decommissioning monitoring skills.

Figure 6 | Environment Management Survey Results

Interpretation

The perceived level of importance for Environment Management was deemed to be high across the surveyed stakeholder groups.

Current capability was deemed to be moderate in this space, with moderate to high capability uplift required for most stakeholder groups, with the highest deemed for service providers and industry groups.

Skills scarcity was also deemed to be moderate for most groups, with the most scarcity seen in public sector and academic bodies. This potentially can be attributed to limited focus and funding for PhD students and researchers to contribute to environmental and marine life studies. Enhanced research and development (R&D) in these areas will be critical to understanding how the oil and gas and adjacent industries manage operations in future in an environmentally conscious and considered manner. R&D efforts typically also contribute to new technologies and innovation to support the industry to preserve the environment during operational and decommissioning activity.

2. Health and Safety Management

The oil and gas industry is high-risk due to offshore living, equipment hazards, and toxic materials. Work Health and Safety (WHS) is crucial, especially during decommissioning with corrosion and an inexperienced workforce. This capability identifies hazards, assesses risks, and submits safety cases to reduce risks. WHS assessment must also expand to toxic waste complexities.

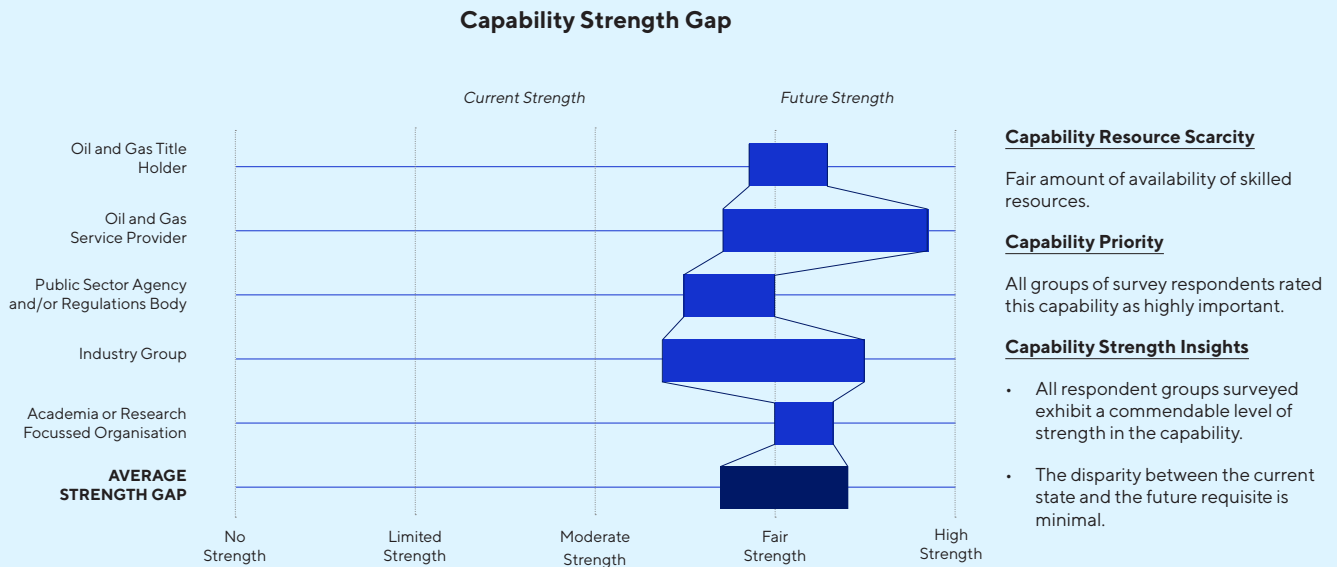


Figure 71 Health and Safety Management Survey Results

Interpretation

The perceived level of importance of effective Health and Safety Management was deemed to be high across the industry, with the highest concluded for service providers and the lowest for academia and or research-focussed organisations (potentially due to their proximity to on-the-ground operations).

Current capability in this space was seen to be moderate, with skill development required primarily by service providers.

Moderate to low skills scarcity was noted, with the highest concern of scarcity of skills rated by public sector / regulatory agencies. This could reflect increasing maturity of the industry and compliance demands in this area.



3. Plug and Abandonment Related Technical Skills

Well Engineering stands as a vital capability imperative to decommissioning efforts, playing a pivotal role in devising and executing the safe and reliable process of well plugging and abandonment. Through meticulous data analysis and modelling, Well Engineers possess the ability to discern the optimal approach for decommissioning various types of wells, including subsea and platform wells. Access to comprehensive historical records and data pertaining to a well becomes a cornerstone in ensuring the efficacy of the plugging and abandonment process.

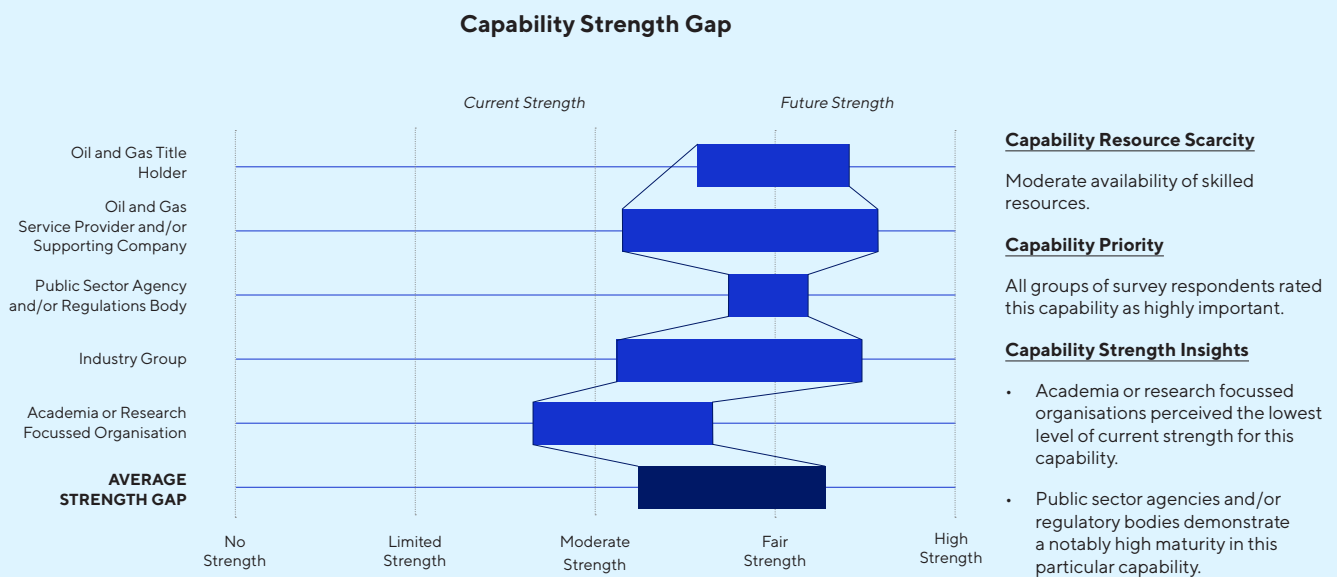


Figure 8 | Plug and Abandonment Related Technical Skills Survey Results

Interpretation

Plug and Abandonment capability in Australia was seen to be of high importance across the industry, with perceived current capability strength seen to be moderate in comparison. The highest current capability was seen for public sector agencies and or regulatory bodies (potentially alluding to the strong regulatory environment in Australia for this capability) and the least capability for academia or research-focussed organisations (potentially due to the lack of publicly available data in terms of Australia’s future pipeline of work required in this space).

Marginal capability uplift from current capability will be required to meet future demand. This may be because of current maturity in skillset, given most decommissioning projects in Australia so far have undertaken/ are prepared to undertake P&A activity.

Scarcity however was seen to be moderate for most stakeholder groups, with the highest noted for service providers and academic bodies.

4. Regulatory Compliance Management

Regulatory Compliance Management is pivotal in navigating the intricate international, Commonwealth, State/Territory, and local regulations governing the oil and gas industry. This capability ensures adherence to laws encompassing various aspects, including environment, heritage, native title, Industrial Relations, Work Health and Safety, and offshore operations.

Success hinges on Regulatory Compliance Managers remaining updated on regulatory changes and actively collaborating with government bodies like NOPSEMA, Department of Climate Change, Energy, the Environment and Water (Commonwealth), Department of Water and Environmental Regulation (WA), Department of Mines and Petroleum (WA), and Environmental Protection Authority (WA).

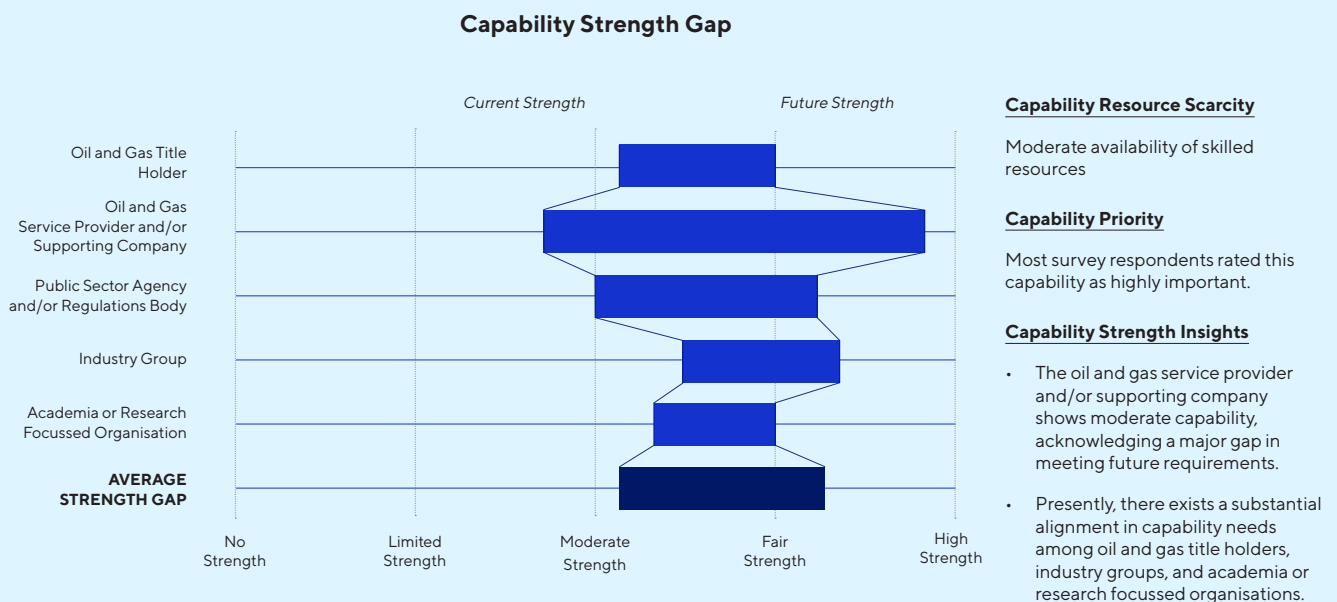


Figure 9 | Regulatory Compliance Management Survey Results

Interpretation

Regulatory Compliance and Management was seen to be of highest importance for service providers, public sector agencies and or regulatory bodies and title holders, with academia and research-focussed organisations and industry groups viewing this capability of less importance in comparison.

Current perceived strength for this capability was rated to be moderate to low overall, with service providers holding the least capability and industry groups the highest. However, service providers also indicated the highest future strength required, which may suggest a significant capability uplift requirement to meet this objective. All other stakeholder groups noted capability uplift would be required overall, however marginal compared to service providers in this instance.

Highest scarcity was observed by service providers (in line with current strength), with lower scarcity rated by industry groups.



5. Recycling, Decontamination and Waste Management (Including Hazardous Material)

To support Recycling, Decontamination and Waste Management, the following skills have been identified as critical. They are:

a) Management & Coordination of Waste:

Waste Managers and Waste Management Specialists play a pivotal role in orchestrating a comprehensive array of waste management activities. This encompasses strategic planning for waste identification, segregation, and storage, coupled with the implementation of waste reduction strategies, efficient treatment processes, responsible recycling, proper disposal, and continuous monitoring and reporting. Their expertise extends to the meticulous management of hazardous materials, a critical aspect for maintaining environmental compliance and ensuring worker safety. Decontamination procedures, overseen by Waste Managers, are vital in neutralising accumulated contaminants on assets, safeguarding both the workforce and the environment. Furthermore, Waste Management contributes to the circular economy vision by minimising waste generation at its source.

However, the current waste disposal landscape in Australia presents challenges due to insufficient facilities for managing hazardous materials such as NORMs, radioactive materials, asbestos, lead paint, mercury, and marine growth. The preference for localised waste management and limited disposal options intensifies costs and necessitates meticulous planning. Collaborative efforts within the supply chain are essential to coordinate activities among stakeholders, while taking into account yard availability and capacity, ensuring efficient waste management despite these challenges.

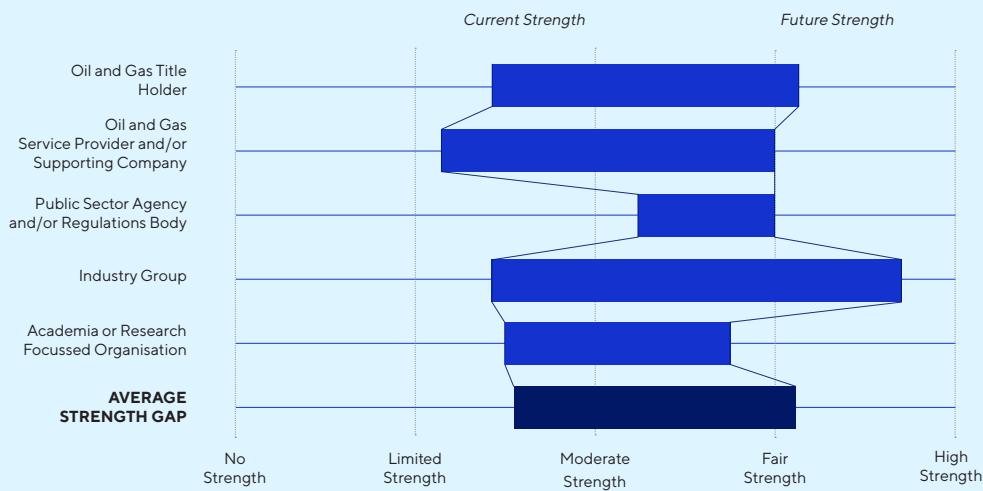
b) Management & Coordination of Demolition Operations (Onshore only):

Building a proficient and capable workforce to oversee onshore demolition operations, which involve the intricate task of dismantling and disassembling substantial oil and gas related materials. This includes a comprehensive understanding of operating heavy machinery like dozers and hydraulic sheers, essential tools for effectively separating, breaking, and dismantling these structures.

c) Management & Coordination of Recycling & Disposal:

The critical capability of analysing and assessing various options for re-use, recycling, and disposal of assets based on regulatory requirements plays a pivotal role. This capability is closely tied to the concept of a circular economy, where the focus is on maintaining materials within a continuous cycle through re-use, recycling, and disposal processes. The importance of this capability was emphasized during consultations, highlighting the valuable insights that can be gained from the Salvage Industry's practices in breaking down materials during decommissioning and reintroducing them into the circular economy. Strengthening these capabilities would result in more cost-efficient decommissioning activities.

Capability Strength Gap



Capability Resource Scarcity

Survey participants rated this capability as the most scarce concerning available resources for its execution.

Capability Priority

All groups of survey respondents rated this capability as highly important.

Capability Strength Insights

- Survey respondents identified this capability as the most prominent gap for meeting future state requirements.
- Current state capability maturity is spearheaded by public sector agencies and/or regulatory bodies.

Figure 10 | Recycling, Decontamination and Waste Management (Including Hazardous Material) Survey Results

Interpretation

Effective Recycling, Decontamination and Waste Management capability was seen to be of high importance across the industry, most notably by public sector agencies / regulatory bodies and academia / research-focussed organisations.

However, significant variance was noted in perceived capability strength currently between public sector / regulatory bodies versus all other stakeholder groups. This may indicate that regulatory bodies in particular are leading the charge in terms of understanding the legislative and regulatory requirements in this space, however overall capability on the ground (especially for service providers) is lacking.

Future strength required for this capability was seen to be of high importance again across the industry, most notable by industry groups.

Scarcity unsurprisingly was ranked moderate - low for most stakeholder groups, with lowest for service providers and academia.

6. Decommissioning Program Planning and Reporting

While program planning, reporting and its associated skills are available across industries in Australia, talent with experience in decommissioning specific program planning is limited. The program planning capability includes effective management of costs including Cessation of Production (COP) running cost and overall end to end financial management with cost buffer, risk management, identification of dependencies, stakeholder alignment (including internal and external teams), reporting and ensuring overall project efficiency. According to current regulations (ISO 55001 Asset Management), title holders are required to plan through the entire lifecycle of an asset at the start (from installation to operation to decommissioning), making the project planning capability critical.

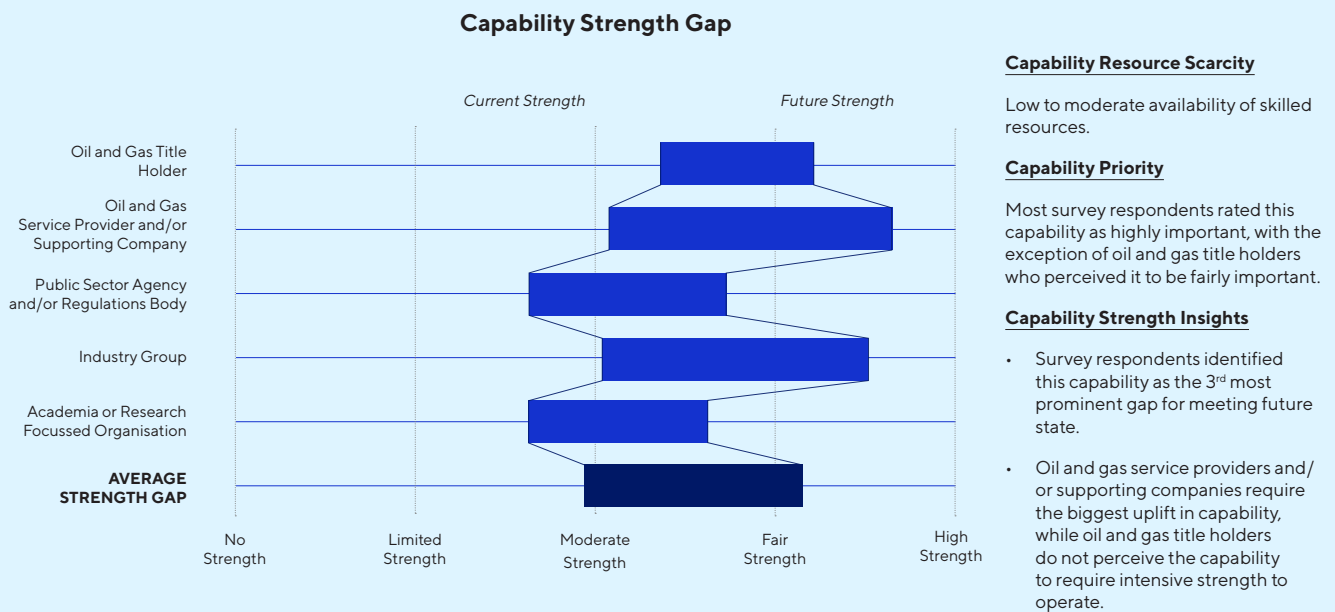


Figure 11 | Decommissioning Program Planning and Reporting Survey Results

Interpretation

Similar to the capability Asset Integrity management, decommissioning program planning is deemed most important by public sector agencies / regulatory bodies, with title holders viewing the capability as least important. Overall, the importance of this capability is deemed to be moderate – high across all stakeholder groups.

Current strength for this capability was largely perceived to be low across stakeholder groups surveyed, with significant capability uplift required across the industry to build future strength. This is critical for service providers given their role in the decommissioning process (and the gap between future and current strength is the largest).

Skills scarcity was largely seen to be moderate to low across stakeholder groups, with highest scarcity of capability seen for service providers. Concerted efforts such as training, education and access to lessons learnt in more mature areas/ projects may be beneficial in building this capability.

7. Stakeholder Management and Consultation

Given the ambiguity in the emerging decommissioning industry, it is critical to collaborate and engage with local community, contractors, and the broader industry stakeholders to help shape the industry. Stakeholder partnerships can help raise awareness on decommissioning, highlight the important contributions it makes to the environment, and help establish opportunities to source and attract the next generation of talent to decommissioning. Early and continuous engagement with the community is critical to contribute towards the overall industry success.

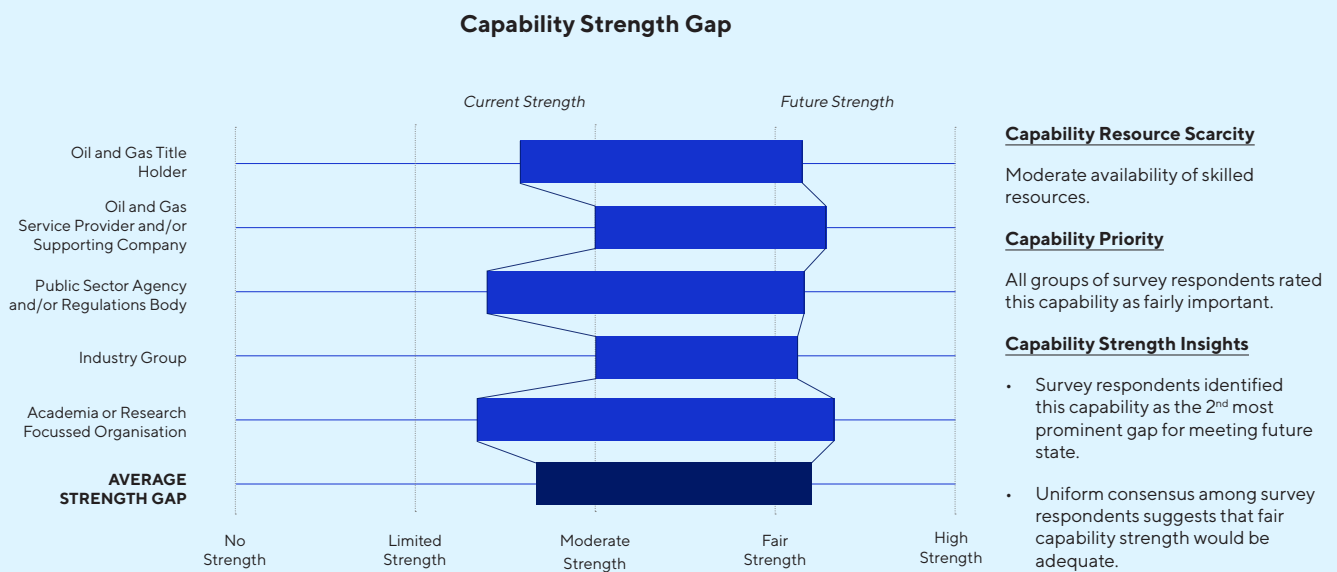


Figure 12 | Stakeholder Management and Consultation Survey Results

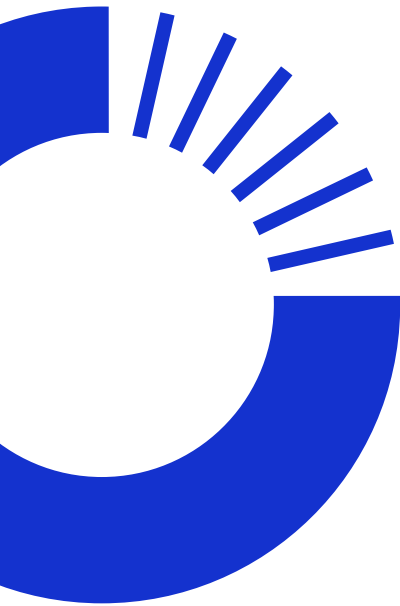
Interpretation

The perceived level of importance concluded for Stakeholder Management and Consultation was seen to be high across the stakeholder groups surveyed.

Current capability was marked as moderate for service providers and industry groups, and low for all remaining stakeholder groups. Perceived future strength required was consistently high across the industry, with significant uplift required from current capability.

Highest scarcity was seen for title holder and public sector/ regulatory bodies (potentially due to lack of engagement across industry to be ready for success).





8. Engineering, Technical and Operational Skills to Support Topside/ Substructure/ Subsea Preparation, Removal

To support Topside/ Substructure/ Subsea Preparation and Removal, the following skills have been identified as critical. They are:

a) Structural Engineering:

This capability supports safe removal of assets from both offshore and onshore operations (in conjunction with Removal Engineer described below); including topsides structural analysis, jacket structural analysis, analysis of pipeline and risers, and preparing for the removal of assets by installing and securing lift points.

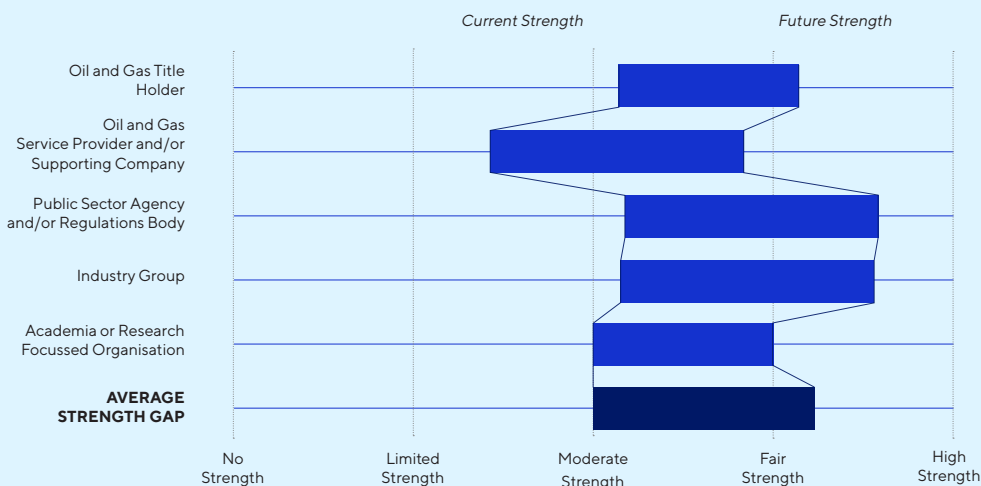
b) Removal Engineering:

The focus of this capability is to supervise removal activities (for pipelines, bundles, cable and riser), prepare removal methods, select equipment for the hook-down of platforms etc. This capability is tasked with selecting the best method for removal of assets such as single-lift, reverse installation or piece-small removal. Removal Engineers and Structural Engineers work closely to prepare for the lifting and removal of assets.

c) Management & Coordination of Dismantling Operations:

This capability focuses on the dismantling activities involved in offshore and onshore operations; including securing and cleaning of platforms and pipelines, and disconnecting equipment and modules. Given the risks and possible negative impact of dismantling activities on the environment, this role also requires environmental awareness. Based on the regulatory requirements, dismantling managers need to ensure that assets are dismantled by competent staff with access to all available information in order to eliminate / minimise risks to health and safety.

Capability Strength Gap



Capability Resource Scarcity

Moderate availability of skilled resources

Capability Priority

All groups of survey respondents rated this capability as fairly important.

Capability Strength Insights

- Survey respondents unanimously concurred that the current market holds a moderate capability strength but anticipates a need for at least a fair strength in the future.
- The oil and gas service provider and/or supporting company respondents indicated the most significant shift in capability required between current and future state.

Figure 13 | Engineering, Technical and Operational Skills to Support Topside/ Substructure/ Subsea Preparation, Removal Survey Results

Interpretation

The level of importance deemed for the capability Engineering, Technical and Operational Skills to support Topside/ Substructure/ Subsea Preparation and Removal was perceived to be fairly high across all stakeholder groups.

Perceived current capability strength was deemed to be moderate to low. Moderate capability uplift was deemed to be required to meet future demand for most stakeholder groups, with the strength of current versus future capability largely correlating for stakeholder groups surveyed.

9. Engineering, Technical and Operational Skills for Pipeline and Facility Management

To support Pipeline and Facility Management, the following skills have been identified as critical. They are:

a) Mechanical Engineering:

This capability is mainly required to support permanent isolation and cleaning of facilities and pipelines (in both offshore and onshore operations). Activities involved in pipeline cleaning include draining, flushing, purging and venting and pipeline permanent isolation includes de-energising, venting and draining. As this helps free platforms of hydrocarbons, close collaboration is required between mechanical engineers performing pipeline and facility management activities and specialists supporting waste management.

b) Other technical and trade skills:

This capability (general technical and fabrication skills) is required across many decommissioning stages and activities; and includes roles such as welding and boiler-making. While these skills are transferable from the broader oil and gas industry, mining as well as construction industry, nuances of decommissioning such as higher safety and risk awareness need to be considered.

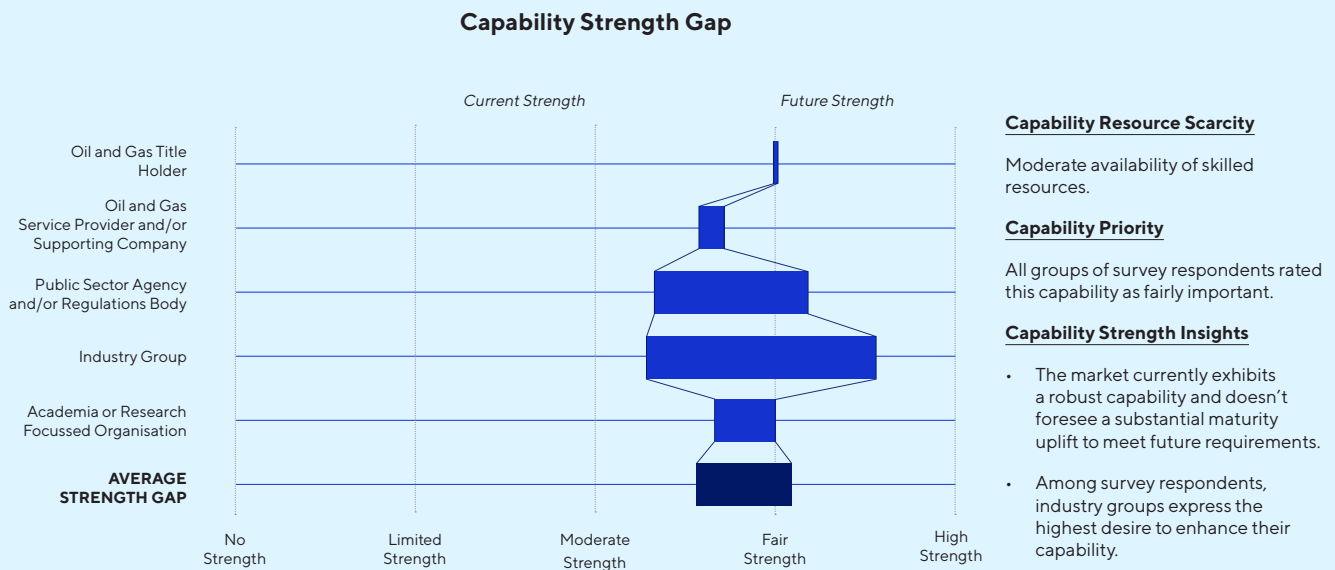


Figure 14 | Engineering, Technical and Operational Skills for Pipeline and Facility Management Survey Results

Interpretation

The perceived level of importance deemed for Engineering, Technical and Operational Skills for Pipeline and Facility Management was largely seen to be high across the industry, with slightly lower importance perceived by service providers.

Current strength of capability in this space was largely rated to be moderate, with the least capability deemed for industry groups and public sector agencies and or regulatory bodies, and the highest for title holders. Moderate capability uplift was also seen to be required from some stakeholder groups, namely industry groups, followed by public sector and or regulatory bodies, with all other stakeholder groups largely remaining consistent.

Skills scarcity was also viewed to be moderate for most stakeholder groups, with the most scarcity deemed for service providers (potentially due to their proximity to the work).

10. Asset Integrity Management (Inspection and Maintenance)

Asset integrity management is concerned with conducting technical audits, assessing facilities, monitoring the integrity of assets, detecting potential defects or corruptions before failure, and identification of related hazards. There is an obligation for ensuring that the integrity of assets is sustained by regular inspections and maintenance. By ensuring that assets remain in a good condition, the risk of decommissioning activities to people, infrastructure and equipment will be reduced; and projects can be carried out safely, reducing environmental risk and lowering the overall cost of decommissioning. This capability is also focused on preparing and designing a maintenance strategy showing how the removal of assets can be accomplished.

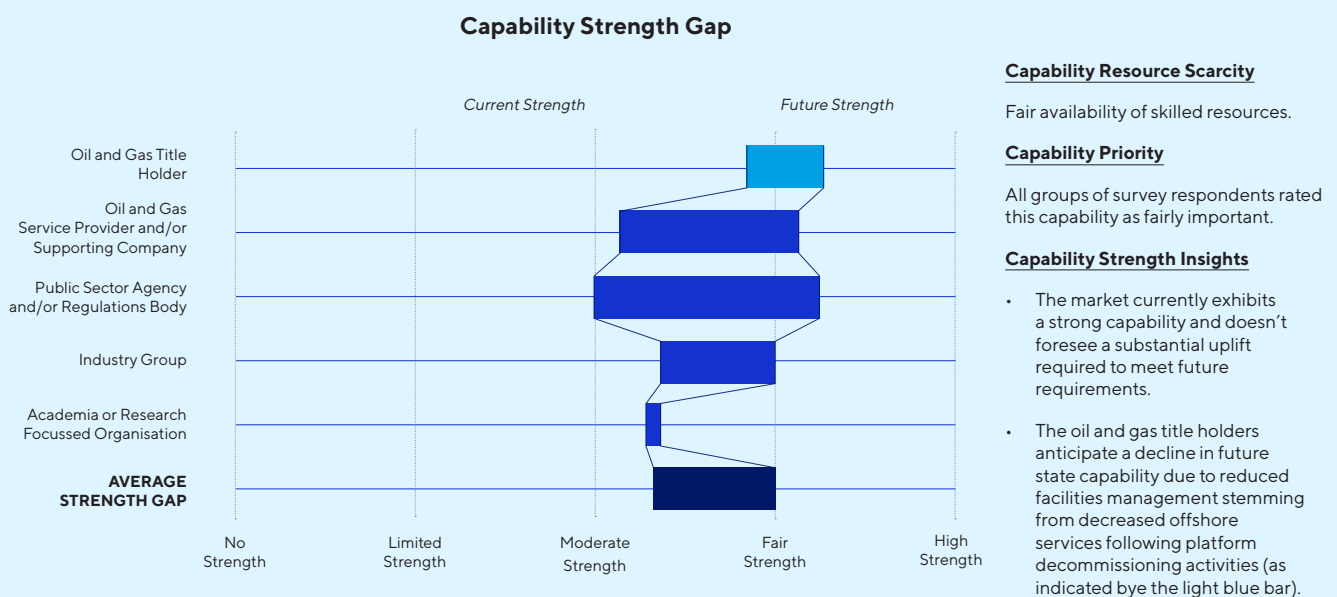


Figure 15 | Survey rating of the Importance, Current Strength, Future Strength and Scarcity of the Skills Associated with Asset Integrity Management

Interpretation

It was concluded that public sector agencies and or regulatory bodies viewed Asset Integrity Management as of highest importance when compared with other stakeholder groups surveyed. This was closely followed by industry groups, then equal third for service providers and academia/ research-focussed organisations. Title holders subsequently viewed this to be of least importance in comparison likely because they have these skills in house and are more familiar with their application to decommissioning, however all stakeholder groups largely deemed this capability to be of moderate to high importance.

Current capability in this area was largely seen to be moderate. However, title holders have significantly more capability in this area, potentially informing the reason for them to view this capability with lower importance.

Capability uplift will be required for most stakeholder groups except for title holders, for whom interestingly the future required strength is projected to decrease over time.

Skills scarcity was similarly seen to be largely moderate to high, correlating with current perceived capability strength.



11. Industrial Relations Management

Proficiency in Industrial Relations (IR) is essential throughout both offshore and onshore decommissioning phases, serving as a means to navigate the intricacies of the industrial relations framework. These intricacies become especially pronounced when dealing with international teams and contractors. Moreover, the competition for talent from other sectors including mining and renewable energy may adversely affect the appeal of decommissioning as a career path.

The application of IR capabilities can play a pivotal role in enhancing talent attraction efforts. This involves offering competitive compensation packages, closely monitoring the conditions stipulated by the Fair Work Act to seamlessly transition casual employees into part-time or full-time roles and engaging in consultations and negotiations with pertinent governmental bodies, unions, and employer associations. These discussions encompass a wide array of topics, ranging from employment terms and work hours to scheduling, rostered days off (RDOs), rest and recuperation (R&R), the right of entry, implementing substantial workplace changes, and addressing matters that bear an impact on the safety and well-being of the workforce.

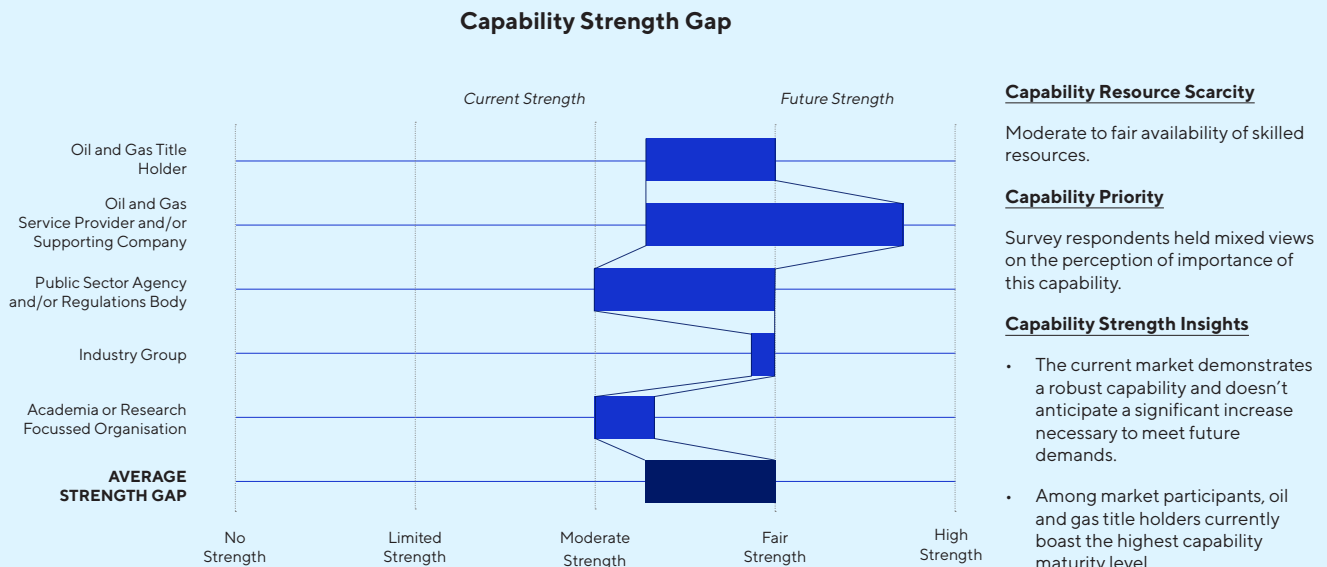


Figure 16 I Industrial Relations Management Survey Results

Interpretation

The perceived level of importance for Industrial Relations Management in Decommissioning in Australia significantly varied based on which stakeholder group was surveyed. This was viewed to be of highest importance for public sector agencies and or regulatory bodies (potentially due to the complex regulatory environment and the need for clarity and consistency in this space), and the least for academia or research-focussed organisations (potentially due to their distance from on-the-ground operations and therefore industrial relations-related requirements).

Current capability was seen to be moderate for most stakeholder groups, with the highest capability concluded for industry groups (potentially due to their closeness to on-the-ground operations). Moderate capability uplift was also seen to be required by most, however with the highest deemed for service providers (potentially alluding to the requirement to enable sustainable working environments to retain talent in decommissioning in the future).

Skills scarcity was also seen to be moderate to low across all stakeholder groups, with the highest scarcity seen for public sector agencies and academic bodies.



12. Logistics and Facilities Management

To support Logistics and Facilities Management, the following skills have been identified as critical. They are:

a) Management of Procurement, Supply Chain & Logistics:

Effective management of Procurement, Supply Chain, and Logistics plays a pivotal role in guaranteeing the availability of necessary materials and resources to successfully execute decommissioning activities. This capability revolves around meticulous planning to ensure the timely presence of vessels, equipment, and machinery, as well as the streamlined movement of goods, services, logistical information, and supply chain operations from their origin to the project site.

Procurement and Supply Chain Managers assume a crucial role in strategising to secure the essential vessels and equipment required for different decommissioning tasks. This entails accounting for the extended lead times associated with acquiring these resources. Furthermore, this competency extends to evaluating costs and determining the appropriateness of various vessel types, including Platform Supply Vessels (PSV), Heavy Lift Vessels (HLV), Rig or Light Well Intervention (LWI) vessels, Well Intervention Vessel (WIV), Dive Support Vessel (DSV), and Subsea Construction Vessel / Construction Support Vessel (CSV) at different phases of a decommissioning project.

b) Management & Coordination of Facilities:

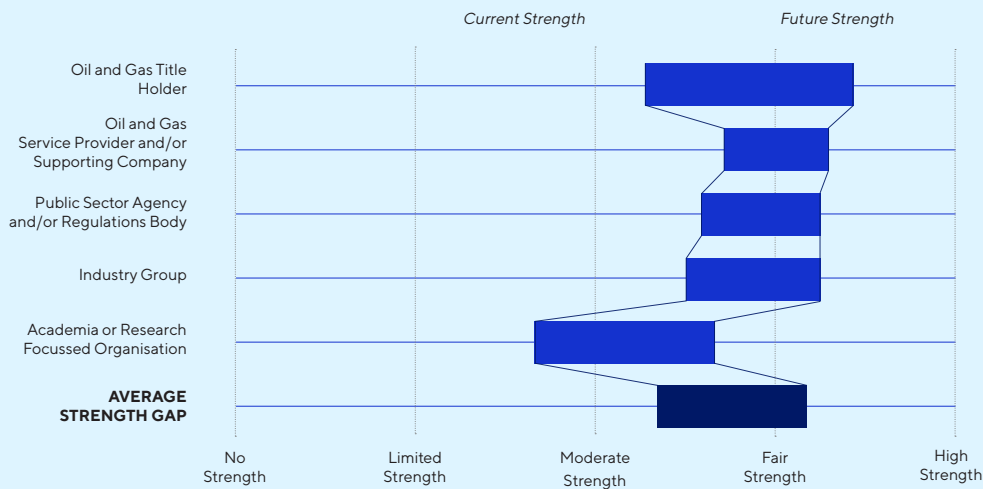
The primary focus of this capability includes overseeing the daily operations of both offshore and onshore facilities. Facilities Managers hold the responsibility of establishing an environment that is conducive to productivity and well-being for all on-site personnel. This involves the efficient administration of essential services such as catering, general upkeep and maintenance of accommodations, cleaning, and the proper disposal of waste materials.

A central aspect for Facilities Managers revolves around ensuring the provision of a secure and hazard-free setting. In collaboration with Workplace Health and Safety (WHS) Managers, Facilities Managers undertake the task of pinpointing potential hazards, evaluating associated risks, and subsequently implementing measures designed to effectively control these recognised risks.

c) Management & Coordination of Vessel Operations:

In addition to the acquisition of equipment like vessels, an essential component of vessel operations involves assembling a skilled vessel crew to facilitate various stages and tasks within the decommissioning process. The successful execution of offshore decommissioning operations hinges on the expertise and proficiencies of this Vessel Crew.

Capability Strength Gap



Capability Resource Scarcity

Moderate to fair availability of skilled resources.

Capability Priority

Survey respondents held mixed views on the perception of importance of this capability.

Capability Strength Insights

- Excluding academia or research focussed organisations, survey respondents unanimously agreed that the present market maintains a moderate to fair capability strength, requiring a minor enhancement to meet future requirements.
- However, academia or research focussed organisations significantly lag in their capability strength.

Figure 17 | Logistics and Facilities Management Survey Results

Interpretation

Although seen to be moderate to high overall, the importance of Logistics and Facilities Management varies based on stakeholder group, with the highest importance deemed for public sector agencies and or regulatory bodies, then industry groups, then title holders with service providers and academia or researched-focussed organisations equally deeming this capability of least importance in comparison.

Current capability for most stakeholder groups was largely deemed to be moderate, however with significant variance for academia or research-focussed organisations. This largely seemed to correlate with future capability strength required in this space.

Skills scarcity was most prevalent in academic or research-focussed organisations and title holder groups, and industry groups with the least scarcity. While the capability is adequate to meet current demand for organisations closer to on-the-ground activity (service providers and title holders), an overall capability uplift will be required to meet future demand.

3.5 PLANNING AND REGULATORY CONSIDERATIONS

There is willingness to meaningfully connect and to collaborate, however innate competitiveness, the vast complexities associated with decommissioning work and decentralised capability is currently impeding any attempts at effective cooperation. This section unpacks insights identified during the study in line with planning and regulatory considerations.

Key findings from the study:

1. There is a need to work more closely across the sector to create sustainable strategies to effectively meet future demand
2. Consultation needs to be early, considered and able to take into account wide-ranging challenges beyond the bottom line
3. The ways in which decommissioning is viewed both from a regulatory and recruitment perspective will need to shift to enable sustainable work environments
4. The impacts of decommissioning on adjacent industries needs to be considered and well planned
5. Stewardship in regulation and policy, specific to decommissioning industry, will help build a clear and aligned legislative environment

1. There is a need to work more closely across the sector to create sustainable strategies to effectively meet future demand

During consultations, a call for increased intra-industry collaboration was prominent, yet competition obstructs this. One sentiment expressed was a perceived 'smoke screen' around coordination within the sector (Public Sector Agency and/or Regulatory Body). Collaboration seems to only occur in areas perceived as not critical to a company's competitive advantage (with the classic example being safety, where companies all work together). To support sustainable future planning, industry stakeholders should cooperate more effectively, centralising capabilities and coordinating critical infrastructure decisions.

There are regulatory complexities to navigate at local, state, and federal levels, highlighting the need for centralised capability: "...ability to process hazardous waste and pre-approvals for everything so its straightforward..." (Public Sector Agency and/or Regulatory Body).

Decommissioning economics presents a significant challenge to collaboration, especially between organisations and government due to differing ROI perspectives. Private companies focused on shareholder may not align with government's posture about what's best for the great good and ensuring a strong regulatory framework. More efficient cooperation methods are needed, potentially facilitated by an independent body like CODA. International forums and working groups geared towards decommissioning can support this cooperation.

There have been some notable successes including, innovative cutting tools and decontamination methods for pipelines. However, a multi-disciplinary approach is required to tackle complex industry challenges through well-designed solutions. Broad engagement, including NGOs, environmental and community groups, is essential for maintaining ESG focus in these discussions.



2. Consultation needs to be early, considered and able to take into account wide-ranging challenges beyond the bottom line

Addressing the complexities of decommissioning projects requires a shift from a compliance-centric approach to one incorporating diverse opinions and experiences, especially given the socio-psychological factors now in play in the workforce. A systemic, multidisciplinary approach is needed, as highlighted by an academic or research-focused organisation.

Transparent, early, and balanced stakeholder engagement is key, considering all parties from community constituents and NGOs to company executives. This ensures that collaboration goes beyond industry priorities to include broader ESG considerations. Effective consultation helps assess risks and impacts and manage them to be ‘as low as reasonably practicable’ (ALARP).

The Federal Court’s recent consultation requirement increase poses the risk of efficiency overshadowing comprehensiveness, driven by the perception of decommissioning as a low-ROI activity. The technical workforce must be educated on marketing the industry beyond profit, prioritising community needs during key decisions.

A consensus was noted on improving engagement with First Nations communities for decommissioning works. While project-specific consultation is mandated, broader collaboration methods should be explored. Consideration of First Nations’ perspectives on their traditional lands and sea, as well as their custodianship rights, should be integral to planning. Similarly, consultation strategies for regional and remote communities should be developed to ensure they benefit from decommissioning work, either through economic opportunities or increased resources and assets.

3. The ways in which decommissioning is viewed both from a regulatory and recruitment perspective will need to shift to enable sustainable work environments

The decommissioning industry must adapt both regulatory and recruitment strategies to foster more sustainable work environments. Consultations suggested that integrating regulations across onshore and offshore, local, state, and federal jurisdictions could simplify the operating environment. The sector should reassess the extent of ‘friendly collaboration’ allowed without violating antitrust laws to enable more effective planning through shared knowledge and best practices. Australia’s regulatory framework also needs refining to support efficient work completion by title holders. Suggestions included improving pay structures and rewards systems to attract skilled personnel, thereby enhancing efficiency.

To enhance sector capability, oil and gas recruitment should adopt localised approaches. Providing employment opportunities in local communities supports their economies and builds relationships with those directly impacted by decommissioning works.

Potential strategies include recruiting from local Traditional Owner groups in remote and regional areas, capitalising on their extensive local knowledge for the benefit of decommissioning activities and community betterment. Reducing reliance on FIFO staffing models may lower operating costs, freeing up budget for additional incentives. Larger corporations could offer coaching, mentoring, or job shadowing opportunities to local workers to develop required skills and capabilities.



4. The impacts of decommissioning on adjacent industries needs to be considered and well planned

The downstream impacts of decommissioning work, both immediate and long-term, need careful management, especially concerning adjacent industries like fisheries. This requires adopting an adaptive, balanced approach to understanding implications, involving communication, forward planning, decision-making based on each region's environmental and situational needs, and efficient risk identification and management among stakeholders.

Environmental Plans necessitate title holders to detail their planned activities as well as the broader environmental and community factors, acceptable impact levels, and risks. This calls for closer collaboration with local authorities, environmental organisations, tourism bodies, and fisheries to manage expectations and incorporate diverse perspectives into overall planning. Comprehensive scientific research and environmental assessments can help balance marine health and decommissioning value/ROI.

Findings from decommissioning research will have broader applicability outside the industry, including marine renewables and power cable/sub-sea pipeline installation. The industry should therefore be open to cross-collaborative efforts to support overall capability development.

5. Stewardship in regulation and policy, specific to decommissioning industry, will help build a clear and aligned legislative environment

Consultations indicated that regulation-focused skills are transferable to decommissioning from similar or related industries. However, effectively familiarising regulators with decommissioning-specific issues is crucial to reduce industry complexity and establish a clear, aligned legislative environment for title holders. Waste Management, a highly regulated area where Australia currently lags due to insufficient sovereign capability, was highlighted. Inconsistent legislation interpretation was identified as a contributing factor.

While regulators are improving their expertise in this area (e.g., through developing 'Inspector' capabilities), more concerted efforts are needed to guide progress by devising and implementing fit-for-purpose decommissioning regulation. Establishing a consistent regulatory environment will maintain Australia's attractiveness for decommissioning activity and enhance its sustainability through a steady supply of work facilitated by consistent rules, regulations, and standards for title holders.

4. Opportunities to move forward

This section identifies eleven recommendations and opportunities for Australia's decommissioning industry to consider.

Key opportunities:

1. Develop a consolidated view of upcoming decommissioning activity in Australia over the next 10 years to enable deeper, more thorough and more effective planning and data management.
2. Bring the sector together for industry-wide education, learning, networking and solutioning of common challenges and needs to be addressed (i.e., State, Territory and Federal government, industry bodies, title holders, service providers across the value chain, research institutions, universities and other education and training organisations and unions).
3. Determine a detailed view of critical capabilities and workforce management requirements against projected demand through detailed workforce planning and supply / demand profiling across the industry; locally as well as for expected international activity.
4. Build local capability in identified areas of critical gaps to prepare for the effective management of decommissioning activity in Australia over the next 10 years.
5. Leverage international expertise from within the oil and gas industry (i.e., from title holders, service providers, regulatory bodies, industry bodies, universities and research institutions) to enrich and learn from networks to support decommissioning activity in Australia.
6. Engage talent and expertise from adjacent and emerging industries, including offshore wind, renewables and green energy, as well as broader industries, like fisheries, manufacturing, mining, construction, salvage, waste and recycling, to deliver decommissioning activity in Australia.
7. Re-imagine and re-brand decommissioning, locally and in collaboration with broader international networks, to promote positive social, environmental and circular economy outcomes as well as to attract and retain talent within the industry.
8. Address key workforce considerations, including working conditions, health and safety management and industrial relations and socio-psychological workplace risk factors, to attract and engage the current and future decommissioning workforce.
9. Drive change via purposeful collaboration in the industry for deliberate and intentional action.
10. Prepare local communities and stakeholder groups to support decommissioning activity through place-based engagement and solutioning.
11. Augment work design based on emerging workforce planning and supply considerations to effectively manage decommissioning activity in Australia over the next 10 years

Key stakeholders required

1. Independent body (CODA)
2. Title holders
3. Government bodies
4. Regulatory bodies

1. Develop a consolidated view of upcoming decommissioning activity in Australia over the next 10 years to enable deeper, more thorough and more effective planning and data management.

A more granular, interpretable, forward-looking plan of decommissioning activities, approach, volume and pipeline is required to support decommissioning activities in Australia. A more-thorough lens will support effective planning across industry bodies (e.g., title holders and service providers) and build clarity around skillset and capabilities required in the next decade. This will additionally support the attraction and development of talent, align contracting models, and planning with IR and any other regulations.

Similarly, access to a more-granular work plan will assist in providing deeper clarity on infrastructure and resource requirements (e.g., size requirements of facilities, and where in the supply chain these can be sourced effectively), community engagement (e.g., local stakeholder engagement and collaboration points to best support local economies), engagement with adjacent industries (e.g., creating synergies with fisheries, renewables, offshore wind etc.) to ease local talent constraints and meet future demand; among other areas.

An independent industry body could play a vital role in facilitating effective collaboration between industry players and support building an intentional point of view to support the industry's future.

2. Bring the sector together for industry-wide education, learning, networking and solutioning of common challenges and needs to be addressed (i.e., State, Territory and Federal government, industry bodies, title holders, service providers across the value chain, research institutions, universities and other education and training organisations and unions).

Key stakeholders required

1. Independent body (CODA)
2. Government bodies
3. Title holders
4. Service providers
5. Regulatory bodies
6. Educational / research Institutions
7. Unions

The decommissioning landscape is at a critical junction, with effective industry collaboration key to overall success. All industry bodies must work more closely to challenge long-held roadblocks and begin to collectively discover solutions the industry needs (e.g., industries requiring common capabilities and skillsets should work in closer collaboration to better attract, develop and share talent), as well as manage availability of the organisation's limited infrastructure and resources (e.g., sub-contracting vessels by title holder to other title holders / service providers).

A more collaborative approach will enable open dialogue to discuss common challenges and complexities of the industry, as well as begin to enable symbiotic relationships in and between industry bodies. An independent body as an unbiased intermediary could facilitate progress in this respect by enabling connectivity and healthy collaboration.

Collective engagement of different industry bodies will also see the enhanced sharing of information, including lessons learnt from past experiences, given each decommissioning project will vary depending on the life of the asset and its environmental impacts. Given the challenge of executing decommissioning projects on aging assets due to limited publicly available data; a data repository, similar to the National Repository developed in the UK, could be developed to house data surrounding Australia's asset portfolio, including data on previous projects undertaken and specific lessons learnt, to better inform preparedness. For more information, please refer to (<https://www.nstauthority.co.uk/data-and-insights/data/uk-national-data-repository/>).

3. Determine a detailed view of critical capabilities and workforce management requirements against projected demand through detailed workforce planning and supply / demand profiling across the industry; locally as well as for expected international activity.

Key stakeholders required

1. Independent body (CODA)
2. Title holders
3. Service providers
4. Government bodies
5. Regulatory bodies

A granular, more-consolidated view of upcoming decommissioning activity in Australia (See Opportunity 1), will feed into the development of a workforce strategy for the broader industry to provide a detailed, deeper understanding of critical capabilities required to deliver decommissioning projects. Strategic workforce planning incorporates a view of workforce supply and demand, within and across industries, as well as local versus international availability. It understands variables and factors that influence workforce availability and accounts for scenarios considering workforce volume. This view will help industry bodies plan around current and emerging capabilities and skill sets, for example, title holders and service providers could develop, recruit or source talent based on immediate needs; universities / educational / training bodies could identify emerging needs and enable capability build; and government / regulatory bodies could enable industry players via supportive policies, such as facilitating international talent sourcing via visa assist, among other initiatives. It was noted that Norway is mandating workforce supply information be made publicly available, to support workforce career pathways, while also preventing shortages among industry players. Australia could undertake a similar initiative to build transparency across the oil and gas and adjacent industries, to support the development of uniform progress overall.

4. Build local capability in identified areas of critical gaps to prepare for the effective management of decommissioning activity in Australia over the next 10 years.

Key stakeholders required

1. Educational / research Institutions
2. Title holders
3. Service providers
4. Government bodies
5. Regulatory bodies
6. Independent body (CODA)
7. Unions

To support decommissioning in Australia over the next decade, it will be critical to build local capability based on identified gaps (e.g., project management, environmental science and marine biology, waste management, recycling management etc). Capability build over a short, medium and long term could be supported through a combination of approaches, including but not limited to:

- a) Upskilling of the existing workforce through on-the-job learning, apprenticeship opportunities for traditional core trades and specialised training for nuanced roles. Bringing expertise from overseas should also be considered, with the trained workforce continuing to develop local talent over time as change champions.
- b) Fostering knowledge transfer from experienced supply chain members to enhance local capability and collaborating within the industry (through forums, conferences, working groups etc) to share best practice approaches.
- c) Developing specialist VET / TAFE courses or certifications (with a focus on micro-credentialling) to address the lack of expertise and building competence and experience. It was noted that the current educational pathways into the industry are onerous and only allow for specific entry points which limit the talent pipeline. Training packages should be developed with a variety of entry points in mind to enable continuous diversity to help build expertise in identified capability gaps (e.g., increased focus on WHS, increased focus on the environment and conservation etc).
- d) Developing initiatives to empower regional and Indigenous communities through place-based initiatives.
- e) Integrating decommissioning as a career option in schools and universities by developing foundational understanding through entry-level learning and encouraging holistic approaches to skill development. Relationships and partnerships should be built with universities to support research into nascent capabilities.



Place-based, localised solutioning will help build accessibility to localised talent pools, as well as support new and sustainable career pathways into the industry to meet future demand in decommissioning activity in Australia in the medium to long-term.

Additionally, the oil and gas sector should consider implementing more deliberate and targeted strategies to attract and retain more women into critical roles by creating flexible work arrangements, unbiased promotions, strong leadership commitment, and targeted recruitment efforts. There is an opportunity for Australian skills policies to also continue to promote a greater enrolment of women into key trades, engineering, and management courses. Combined initiatives at a national sector and government-wide level, as well as within each organisation internally, will assist to ensure STEM initiatives and opportunities for women in the industry can help bridge this gap and promote greater gender diversity.

5. Leverage international expertise from within the oil and gas industry (i.e., from title holders, service providers, regulatory bodies, industry bodies, universities and research institutions) to enrich and learn from networks to support decommissioning activity in Australia.

Key stakeholders required

1. Independent body (CODA)
2. Title holders
3. Service providers
4. Government bodies
5. Regulatory bodies
6. International agencies
7. Educational / research Institution

Australia's decommissioning landscape could be further enhanced through continued learning and market insights between jurisdictions with both mature regions (e.g., North Sea, UK, Scandinavia etc) and recently developed regions. Developing partnerships with more mature regions will allow Australia to leverage international expertise on local decommissioning campaigns and activities, as well as learn from previous experiences and efficient and effective ways of working. To support development of local talent through learning from international experts, a cross-pollination initiative could be arranged by co-locating teams across projects.

Alongside capability and skill development, collaboration with international expertise could provide exposure to different regulatory frameworks, safety standards and operational practices that could benefit Australia's maturing industry, as well as enrich research capabilities, and encourage broader perspective on successful strategies and methodologies.

6. Engage talent and expertise from adjacent and emerging industries, including offshore wind, renewables and green energy, as well as broader industries, like fisheries, manufacturing, mining, construction, salvage, waste and recycling, to deliver decommissioning activity in Australia.

Key stakeholders required

1. Title holders
2. Service providers
3. Government bodies
4. Educational / research Institutions
5. Independent body (CODA)

There is an expected increase in the growth industries such as renewables, green energy and offshore wind. With these industries requiring the same or similar capabilities and skillsets as decommissioning, it is likely that there will be higher demand for workers with such expertise. A recently commissioned study found that more than 60 per cent of skills and roles in the offshore oil and gas industry had high or good overlap with skills needed for offshore wind. A further 31 per cent of roles have a partial overlap.²⁸ By collaborating and collectively investing in capabilities, skills and talent attraction, retention and development alongside other industries, the workforce will have sustainable career pathways that encourages talent to pursue cross-disciplinary capabilities and skillsets, resulting in mutual benefits for all industries involved.

Similarities across infrastructure and technology required for specialist decommissioning activities (e.g., waste management, decontamination, recycling, disposal etc) could similarly be leveraged from similar or adjacent industries (e.g., salvage, mining, construction) to help build the shared strength of the sector as a whole. Recycling of materials is becoming common practice in overseas jurisdictions for use within decommissioning. Norway, for example, recycles as much as 98 per cent of steel from offshore decommissioning to build structures like offshore wind turbines due to its high quality and continued suitability for offshore use.²⁸

This collaboration and knowledge sharing across industries can create significant opportunities for Australia to improve the efficiency and effectiveness of its offshore decommissioning services industry to meet future demand and ensure that as much of the anticipated future expenditure supports Australian businesses and Australian jobs.

The worker – technology interface is critical to ensuring Australia’s decommissioning activities are managed as effectively as possible in future. There is an opportunity for Australia to deliberately focus on planning for and developing workforce capability to engage with and utilise new and emerging technologies that can support decommissioning activity.

7. Re-imagine and re-brand decommissioning, locally and in collaboration with broader international networks, to promote positive social, environmental and circular economy outcomes as well as to attract and retain talent within the industry.

Key stakeholders required

1. Independent body (CODA)
2. Government bodies
3. Title holders
4. Service providers
5. Regulatory bodies
6. International agencies
7. Educational / research Institutions
8. Unions

There is an opportunity for the industry to ‘re-brand’ itself to be more closely aligned to environmental sustainability and conservation. This is particularly important to capture the interest of the younger or emerging workforces that are evidently more environmental and sustainability conscious. Additionally, at a surface level, decommissioning activity is perceived to be less interesting or ‘exciting’ work. It is opportune to enhance the attractiveness of the industry through highlighting the benefits, opportunities and alignment to decarbonisation, green energy and environmental management and conservation. Re-positioning and branding the industry will assist to maintain a sustainable replenishment pipeline of emerging talent to sustain the industry’s ageing workforce and capability continuation in the future.

Aside from re-branding decommissioning, the industry needs to make concerted efforts to market decommissioning more effectively through highlighting the number of long-term, impactful career opportunities available to new entrants, whether working internationally, prioritising environmental stewardship, or moving across different segments of the industry (i.e., from operations to leadership). A way to better support this could be to host more frequent education and awareness talks, forums and information sessions at universities, TAFE and VET institutions to disseminate a revised narrative and raise awareness about the industry’s strong future.

8. Address key workforce considerations, including working conditions, health and safety management and industrial relations and socio-psychological workplace risk factors, to attract and engage the current and future decommissioning workforce.

Key stakeholders required

1. Title holders
2. Service providers
3. Government bodies
4. Regulatory bodies
5. International agencies
6. Independent body (CODA)
7. Unions

To assist talent retention efforts, the industry will need to re-evaluate how workers are rewarded to build better lived experiences to keep them in the industry. Post-COVID, a number of priorities for the modern worker have shifted, with a need to work more closely to home as well as an increased need to derive meaning from their work. The industry could look to examples like Norway, taking the time to decommission assets piece-by-piece, to help build a 9-to-5 onshore work culture, rather than a reliance on FIFO working arrangements, while integrating broader wellbeing and increasing flexibility. Lessons can also be learnt from the Defence industry, developing community-focussed working environment for the workforce and their families through ‘Defence Family Liaison Officers’. Innovative ways of working will help manage key industrial relations challenges, enable better lifestyle and career pathways for the workforce and improve employee value proposition to retain competent talent in the industry.

As decommissioning is a cost-constrained environment, it is likely the workforce will not be remunerated as well as some other adjacent industries, which might be a potential deterrent in attracting and retaining talent. Workforce considerations like appropriate remuneration and reward are hence important considerations to develop strategies to set the industry up for success.

Key stakeholders required

1. Independent body (CODA)
2. Title holders
3. Service providers
4. Government bodies
5. Regulatory bodies
6. International agencies
7. Educational / research Institutions
8. Unions

Key stakeholders required

1. Title holders
2. Service providers
3. Government bodies
4. Regulatory bodies
5. Educational / research Institutions
6. Independent body (CODA)
7. Unions

9. Drive change via purposeful collaboration in the industry for deliberate and intentional action.

Collaboration across industry bodies, whether government, title holders, service organisations or research and training bodies, needs to be deliberate and intentional to make rapid and impactful change across the sector. An independent body like CODA may be best placed to facilitate such collaboration, due to the complex avenues through which change will need to be generated. For example, collaboration with educational institutions can enable and maintain fit-for-purpose degrees and courses to facilitate diverse career pathways into the industry. This will ensure that there is cross-industry focus and accountability on attracting and developing talent, to serve multiple and interconnected industries because of the largely transferable skills and similar talent demands across adjacent industries and sectors like offshore wind and renewable energy. Another example of intentional initiative to support greater collaboration in the sector, includes exchange programs with more mature regions to immediately uplift workforce capability and facilitate the sharing of lessons learnt from international jurisdictions to benefit organisations in the short to medium terms before significant acceleration of demand in the near future.

10. Prepare local communities and stakeholder groups to support decommissioning activity through place-based engagement and solutioning.

Intentional and meaningful engagement through place-based solutioning will best equip local communities for the future of decommissioning in Australia. To maintain a continuous connection with diverse perspectives and expertise, the industry must engage local communities for effective strategies. This involves expanding stakeholder mapping, incorporating various voices, and creating pathways for minority groups like women in engineering and Indigenous communities.

For partnerships to be effective, they must be focused on two-way knowledge sharing - with the industry learning from local bodies to gain pluralistic perspectives to commonly held challenges affecting industry maturity, and local communities benefiting through increased investment, whether direct or indirect. Specific areas that may benefit from increased localised perspectives, include, onshore land management (e.g., through engaging local Indigenous Ranger groups to better understand best-fit approaches aligned to local conditions, and marine conservation (e.g., through engaging with local fisheries to gain deeper understanding of local biodiversity and the fragile ecosystems that may be impacted through decommissioning activity).

Partnerships of this kind will also need to focus on community building, especially in areas previously reliant on industry for the sustainability of their local economy. Title holders should maintain connection to ESG (especially governance) considerations to maintain the lifeblood of these communities in the long-term, as industry transitions from oil and gas to other available opportunities. Denmark's M.A.R.S program, as referenced to previously, is a good example of maintaining close connection to local communities through the provision of direct employment opportunities. Eligibility could include a vast number of entrants, whether disengaged youth, local Traditional Owners, or other minoritised or disadvantaged groups to maintain meaningful and profitable opportunities for local community members.

The opportunity to engage and develop the local Indigenous workforces, particularly within regional communities across Australia where oil and gas operations are evident and decommissioning activity is upcoming is enticing, as a way of engaging and building local talent. Investing in developing local populations will assist to provide work opportunities to people and families that will help them to thrive and gain meaningful employment opportunities as well as build the local economy and

sense of place in these communities. The wealth of knowledge and connection to land and sea with Indigenous populations residing on Australian coastal waters has been underutilised and the opportunity to engage and leverage this expertise in meaningful and respectful ways will benefit the industry and development of local communities.

11. Augment work design based on emerging workforce planning and supply considerations to effectively manage decommissioning activity in Australia over the next 10 years

Key stakeholders required

1. Title holders
2. Service providers
3. Government bodies
4. Regulatory bodies
5. Educational / research Institutions
6. Independent body (CODA)
7. Unions

To enable future-fit working environments that continue to attract and retain the right talent, decommissioning work will need to be re-designed to make the work better for humans, and humans better at their work. Talent sourcing and development strategies may need to be re-evaluated to suit the future needs of the industry, whether through:

- Building additional capabilities not currently captured through existing strategies
- Buying capability from outside of the industry through increased salary and remuneration arrangements where possible
- Borrowing capability from adjacent industries either in the short, medium or longer-term to meet critical capability gaps
- Exploring how technology and 'digital talent' can be used to automate or augment work to decrease manual and repetitive tasks, enhance human-centred capability, reduce safety risks and make work more purposeful for critical talent.

Optimal and efficient work re-design will enable cohesive, comfortable and collaborative working environments that enable increased development and innovation to push the industry forward in the right direction.



Key opportunities for the decommissioning industry in Australia

High Impact – High Priority (HI-HP)	1	Develop a consolidated view of upcoming decommissioning activity in Australia (across the next 10 years) to enable deeper, thorough and more effective planning and data management
	2	Bring the sector together for industry-wide education, learning, networking and solutioning of common challenges and needs to be addressed (i.e., State, Territory and Federal Government, industry bodies, title holders, service providers across the value chain, research, education and training organisations and unions)
	3	Determine a detailed view of critical capabilities and workforce management requirements against projected demand through detailed workforce planning and supply / demand profiling across the industry (locally as well as line of sight of expected international activity)
	4	Build local capability in identified areas of critical gaps to prepare us for management of decommissioning activity in Australia over the next 10 years
	5	Leverage international expertise from within the oil and gas industry (title holders, service providers, regulatory bodies, industry bodies, universities and research institutions), to learn, enrich networks and support decommissioning activity in Australia
	6	Engage talent and expertise from adjacent and emerging industries (including mining, construction, offshore wind and renewables etc) as well as broader industries (e.g., fisheries, manufacturing, salvage, waste and recycling) to deliver decommissioning activity in Australia
	7	Re-imagine and re-brand decommissioning (locally and in collaboration with the broader international network) to promote positive social, environmental and circular economy outcomes as well as attract and retain talent within the industry
	8	Address key workforce considerations (including working conditions, health and safety management and industrial relations factors as well as psychosocial workplace risk factors) to attract and engage the current and future decommissioning workforce
HI-HP	9	Drive change via purposeful collaboration in the industry for deliberate and intentional action
	10	Prepare local communities and stakeholder groups to support decommissioning activity and build local economies
HI-HP	11	Redesign work based on emerging workforce planning and supply considerations to effectively manage decommissioning activity in Australia over the next 10 years

Prioritisation Matrix

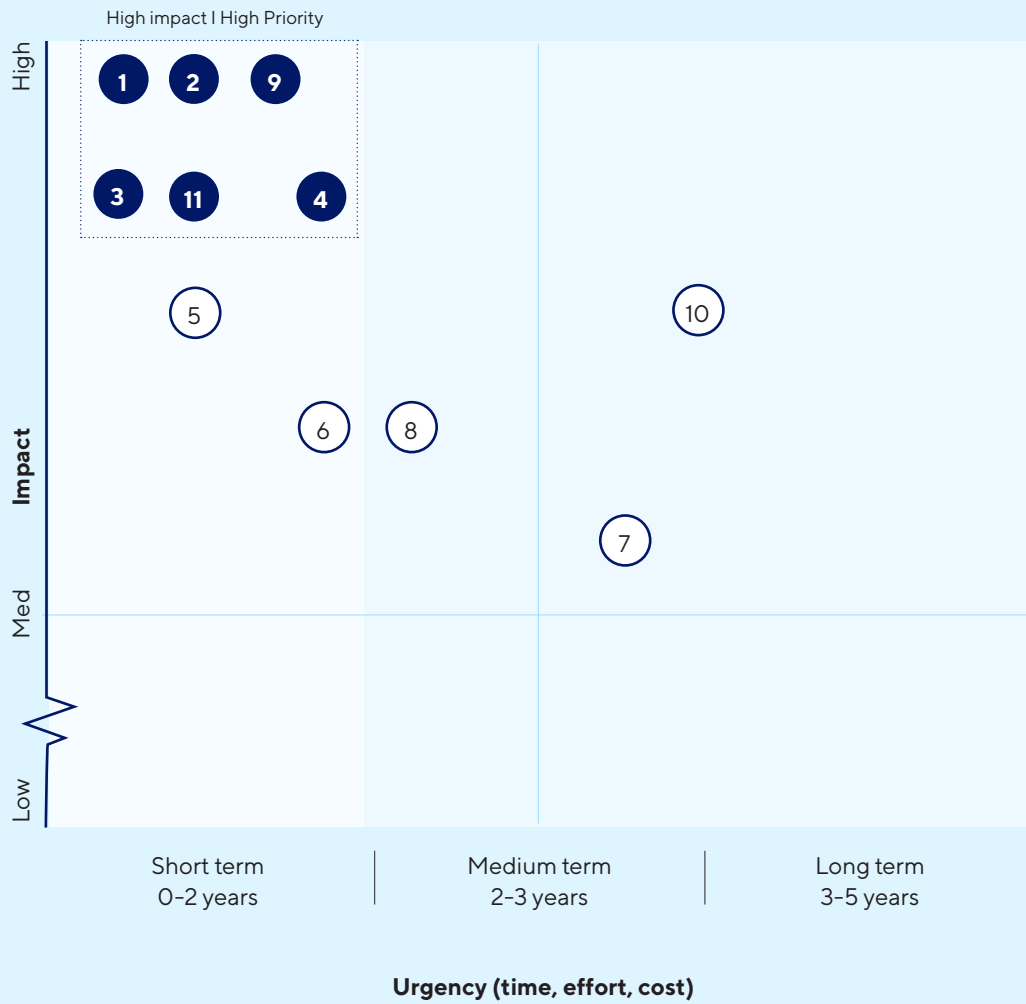


Figure 18 | Prioritisation Matrix



High-level roadmap view of key opportunities to move forward for the decommissioning industry in Australia over the next five years

Opportunities to Move Forward	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
1. Develop a consolidated view of upcoming decommissioning activity in Australia (across the next 10 years) to enable deeper, thorough and more effective planning and data management	~12 months					
2. Bring the sector together for industry-wide education, learning, networking and solutioning of common challenges and needs to be addressed (i.e., state, territory and federal government, industry bodies, title holders, service providers across the value chain, research, education and training organisations and unions)		~2.5 years				
3. Determine a detailed view of critical capabilities and workforce management requirements against projected demand through detailed workforce planning and supply / demand profiling across the industry (locally as well as line of sight of expected international activity)	~18 months					
4. Build local capability in identified areas of critical gaps to prepare us for management of decommissioning activity in Australia over the next 10 years			~2 years			
5. Leverage international expertise from within the oil and gas industry (title holders, service providers, regulatory bodies, industry bodies, universities and research institutions), to learn, enrich networks and support decommissioning activity in Australia		~18 months				
6. Engage talent and expertise from adjacent and emerging industries (including mining, construction, offshore wind and renewables etc) as well as broader industries (e.g., fisheries, manufacturing, salvage, waste and recycling) to deliver decommissioning activity in Australia			~2 years			
7. Re-imagine and re-brand decommissioning (locally and in collaboration with the broader international network) to promote positive social, environmental and economic outcomes as well as attract and retain talent within the industry				~3 years		
8. Address key workforce considerations (including working conditions, health and safety management, remuneration and industrial relations factors as well as psychosocial risk factors) to attract and engage the current and future decommissioning workforce			~2 years			
9. Drive change via purposeful collaboration in the industry for deliberate and intentional action	~18 months					
10. Prepare local communities and stakeholder groups to support decommissioning activity and build local economies				~3 years		
11. Redesign work based on emerging workforce planning and supply considerations to effectively manage decommissioning activity in Australia over the next 10 years		~2.5 years				

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