

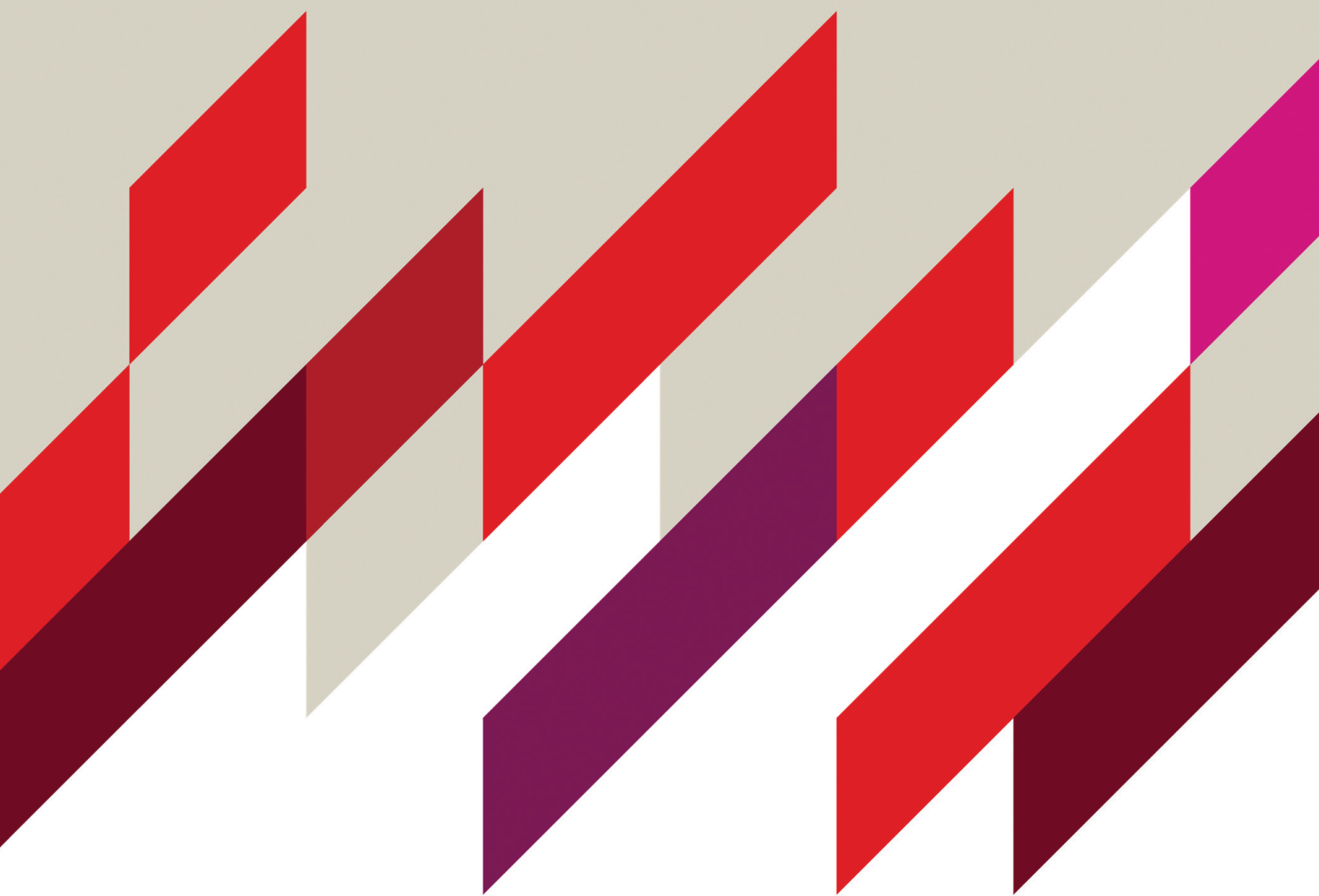


MACQUARIE
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BEST PRACTICE FOR DISMANTLING, RECYCLING, AND DISPOSAL OF OFFSHORE PETROLEUM STRUCTURES

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CENTRE FOR ENERGY AND NATURAL RESOURCES INNOVATION AND TRANSFORMATION



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Contents

ABBREVIATIONS	4
EXECUTIVE SUMMARY	6
1. INTRODUCTION	8
2. SCOPE OF REPORT	9
2.1 Objective of the Report	9
3. THE DECOMMISSIONING CHALLENGE	12
4. DECOMMISSIONING	15
4.1 International Legal Obligations	15
4.2 Australian Law	16
4.4. Recommendations.....	19
5. DISMANTLING AND PROCESSING OF WASTE	20
5.1 International Legal Obligations	20
5.2 Australian capacity and regulatory framework.....	21
5.5 Recommendations.....	30
6. RECYCLING AND DISPOSAL	30
6.1 International Legal Obligations	30
6.2 Australian capacity and regulatory framework.....	31
6.4 Recommendations.....	35
8. FUTURE CONSIDERATIONS	35
9. BIBLIOGRAPHY	37

ABBREVIATIONS

ACS	Australian Continental Shelf
AMC	Australian Marine Complex
boe	Barrels of oil equivalent
CTH	Commonwealth (of Australia)
COAG	Council of Australian Governments
CODA	Centre of Decommissioning Australia
D&D	Decommissioning & Disposal
D&R	Dismantling and recycling
DISR	Department of Industry, Science and Resources (Commonwealth). Known as DISER until July 2022.
DPRD	Dismantling, Processing, Recycling and Disposal
EPSDA	<i>Environmental Protection (Sea Dumping) Act 1981 (Cth)</i>
EU	European Union
FLNG	Floating liquified natural gas vessel
FPSO	Floating production, storage, and offloading vessel
FSO	Floating storage and offloading vessel
FSRU	Floating storage and regassification unit (vessel)
HWREIA	<i>Hazardous Waste (Regulation of Exports and Imports) Act 1989 (Cth)</i>
IAEA	International Atomic Energy Agency
kt	Kilotons
LC	London Convention
LCP	London Convention and 1991 Protocol
nm	nautical mile
NavAct	<i>Navigation Act 2012 (Cth)</i>
NCS	Norwegian Continental Shelf
NOPSEMA	National Offshore Petroleum and Environmental Management Authority
NORMs	Naturally Occurring Radioactive Materials

NWS	North West Shelf
OI&I	Offshore installations and infrastructure
OPGGSA	<i>Offshore Petroleum and Greenhouse Gas Storage Act 2006</i> (Cth)
OSIMU	Offshore industry mobile unit
PA	<i>Petroleum Act 1998</i> (UK)
PAA	<i>Petroleum Activities Act 1996</i> (Norway)
RWRA	<i>Recycling and Waste Reduction Act 2021</i> (Cth)
UK	United Kingdom
UKCS	UK Continental Shelf
UNCLOS	United Nations Convention on the Law of the Sea
WHS	Work health and safety

EXECUTIVE SUMMARY

Unlike the US, which is not a signatory to the *United Nations Convention on the Law of the Sea* or the *London Convention and Protocol*, Australia's international legal obligations and national legal framework establishes a responsibility to remove all offshore petroleum installations and infrastructure (OI&I) when no longer operational. Once OI&I is removed from its offshore location, it is taken onshore for dismantling, processing, recycling, and disposal (DPRD).

Whereas the offshore decommissioning and removal process has a relatively homogenous policy and established legal frameworks, the regulation of DPRD onshore is subject to incomplete Commonwealth legislation, varying state and territory legislation, and is lacking cohesion and fraught with regulatory gaps. Soon Australia will in earnest commence large scale DPRD of OI&I, with around 6,000 kilotons of petroleum OI&I expected. In addition, as other offshore energy assets such as wind turbines end their expected lifespan around 2050, additional DPRD demand will arise.

Focusing on onshore activities that follow the decommissioning (removal and bringing onshore) of OI&I, this report considers the current legal requirements and the legal framework for *onshore* DPRD, placing within an international context. In examining analogous jurisdictions (Norway and the UK), this report demonstrates that Australia's policy and regulatory framework does not represent best practice at present, and policy and regulatory reform is required.

To effect legal and policy reform for best practice in DPRD in Australia, the following recommendations have been made:

*Recommendation 1: Given the contradictory nature of the [Offshore Decommissioning Guidelines](#) which allow abandonment in situ where environmental outcomes are equal or better than removal (guidelines 4.16), compared to s472 the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) (OPGGSA) which requires complete removal, guideline 4.16 should be removed or amended to reflect the legal position articulated in OPGGSA.*

Recommendation 2: NOPSEMA must implement specific guidelines for preparing a decommissioning Environment Plan and Safety Case, given the likelihood of unknowns pertaining to the condition of the structures and installations, including requirements for a full inventory of hazardous materials from offshore structures to be provided to onshore DPRD facilities.

Recommendation 3: As part of the Decommissioning Road Map, the Commonwealth must designate and/or incentivise suitable locations for dismantling, processing, recycling, and disposal (DPRD) facilities in Australia to increase DPRD capacity, in conjunction with other industries' facility requirements.

Recommendation 4: Establish a harmonised regulatory framework for the dismantling and processing of offshore installations and infrastructure utilising the Hong Kong Convention Guidelines on dismantling and processing as the basis for the harmonised regulatory framework, and the adoption of appropriate industry standards and licencing.

Recommendation 5: Assess and apply existing Model Work Health and Safety (WHS) Codes of Practice and Regulations pertaining to DPRD activities and facilities in Australia, to identify gaps and establish new Regulations or a new Code of Practice if required.

Recommendation 6: Ensure the construction of quality purpose-built offshore energy installation dismantling facilities corresponding to the volume and location of materials to be removed. These must be collocated with port facilities to enable the movement of materials for transport to appropriate recycling facilities.

Recommendation 7: The Recycling and Waste Reduction Act 2021 requires comprehensive amendments to address recycling requirements from materials arising from offshore oil and gas decommissioning activities, including metal, concrete, and plastics.

Recommendation 8: The Offshore Petroleum and Greenhouse Gas Storage Act 2006 and associated Regulations must be amended, to require a titleholder to submit a decommissioning plan that stipulates how the titleholder will recycle and dispose of all material, and to require the domestic recycling and disposal waste.

1. INTRODUCTION

Like other mature offshore petroleum jurisdictions such as Norway and the UK, many Australian offshore petroleum fields, and the concomitant offshore installations and infrastructure (OI&I), have come to the end of their producing life. As Australia's offshore oil and gas OI&I ages, there is a necessity to remove existing oil and gas OI&I that must be done in accordance with Australia's international law obligations,¹ through a process is known as decommissioning, defined by the Australian Department of Industry, Science, and Resources (DISR) as

the removal or otherwise satisfactory dealing with in a safe and environmentally responsible manner, the structures, equipment, and property previously used to support petroleum activities in the offshore area.

In Australia, the requirement for removal and return onshore of these OI&I is set out in the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) (OPGGSA) and accompanied by detailed regulation. The decommissioning of offshore installations and infrastructure is a complex and multifaceted process encompassing the in-situ cutting, dismantling, lifting, and then transportation of a platform (Gordon and Paterson, 2020) to an onshore facility for DPRD.

However, in Australia the onshore dismantling, processing, recycling, and disposal (DPRD) of OI&I is insufficiently regulated, particularly since this is an evolving industry with little activity to date. However, as the volume of OI&I decommissioned and brought onshore for DPRD increases, insufficient infrastructure and concomitant regulation mean there is now a pressing need for both new facilities and legal reform.²

Where international obligations do not exist, or do not apply, then it is essential that these activities occur in accordance with best practice.³ Such best practice can only be determined through the assessment of analogous activities in analogous jurisdictions. To assess best practice, this study will consider and evaluate the legal requirements for DPRD of OI&I in comparable mature petroleum jurisdictions of Norway and the UK, as well as international law and/or guidance (such as conventions Australia is not currently a signatory to) that demonstrate best practice in DPRD. As such, this report provides guidance on the legal reform required to

¹ The international legal obligations and the legislation implementing these obligations into Australia's domestic legal framework is considered in section 4-6 of this report.

² Note that the dismantling of OI&I includes the processing of the materials into their like groups (e.g. hazardous waste) or raw materials (e.g. ferrous metal, concrete) ready for disposal or recycling.

³ As part of the Australian Government's regulatory reform agenda, the *Office of Best Practice Regulation* seeks to implement effective and fit-for-purpose regulation that minimises the administrative burden on businesses, whilst at the same time be fit-for-purpose and easily applied, encourage innovation and productivity, be specific and in proportion to the risk and often reviewed. As part of best practice, regulators should strive for continuous improvement; collaborate, engage, and build trust with those regulated, identify risks and changes within the sector, and respond to these in a manner that minimises impact on the regulated, but not at the expense of the activity being regulated.

attain a target of 100% Australian DPRD of decommissioned OI&I, and a target of 100% Australian recycling and disposal of decommissioned materials.

2. SCOPE OF REPORT

The oft referred to term ‘decommissioning’ involves two phases, as seen in figure 1 below. The technical term decommissioning is defined by DISR as the removal of the insitu OI&I from the production field, and the transport of the structure to suitable onshore facility. The second phase, also commonly called decommissioning but which is actually onshore post-decommissioning, is the process *after* the offshore decommissioning of the OI&I – the onshore dismantling of these installations, processing to sort materials and capture the hazardous components, recycling of as much of the material as possible, then disposing of the remaining unrecyclable and hazardous waste.

It is this second phase, onshore post-decommissioning, that is the scope of this study.

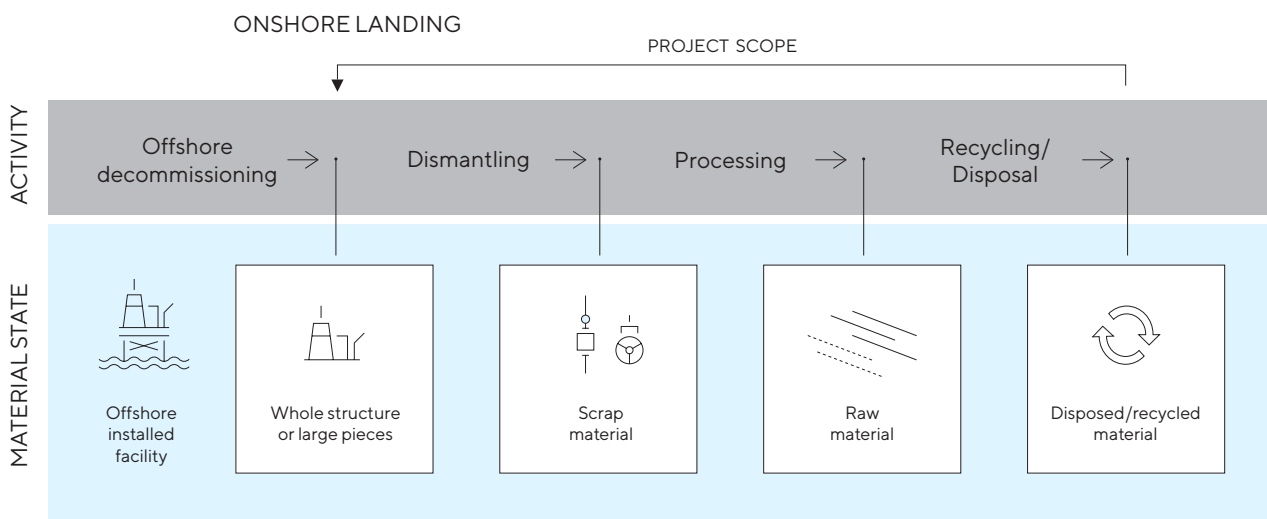


Figure 1: Decommissioning and waste management of offshore petroleum installations and infrastructure (OI&I) (Source: CODA, 2023c, p16).

2.1 Objective of the Report

Recognising the need for decommissioning, and the resultant DPRD of OI&I onshore, the **objective of this report** is to:

“identify and analyse best practice onshore facility requirements and regulation for the dismantling, processing recycling and disposal of offshore installations and infrastructure once decommissioned and returned to land.”

This report will not seek to repeat the studies and learnings of the Centre of Decommissioning Australia (CODA) (CODA 2023a, 2023b, and 2023c), but rather draw upon these findings to achieve its objective.

To achieve its objective, this report will:

1. Examine Australia's international legal obligations and domestic law pertaining to dismantling, processing, recycling and disposal of offshore oil and gas installations and infrastructure;
2. Identify any gaps in the existing legal framework for dismantling, processing, recycling and disposal of offshore oil and gas installations and infrastructure, and make recommendations for reform;
3. Analyse best practice for dismantling, processing, recycling and disposal of offshore oil and gas installations and infrastructure in mature jurisdictions and international legal instruments,
4. To make recommendations for best practice for dismantling, processing, recycling and disposal of offshore oil and gas installations and infrastructure in Australia.

This report will be confined to a consideration of OI&I located in Commonwealth waters, regulated under Commonwealth legislation, and the DPRD of these installations at onshore installations.

2.2 Best Practice in Context

In some jurisdictions, such as Australia and the UK, the decommissioning plan that is submitted by the licensee and approved by the regulator only encompasses the offshore decommissioning of OI&I, failing to also consider the DPRD of the removed offshore installations once they are onshore.

It is important to note that in some jurisdictions, (such as the UK and Norway) prior to decommissioning the titleholder is required to consider the extension of the life of the field, or to reuse or repurposing of the OI&I prior to removal. In poorly regulated jurisdictions, such 'recommissioning' may be fraught with possible 'loopholes' that allow a less than meticulous licensee to utilise such a requirement to obfuscate their legal obligations to decommission⁴ the OI&I.

Jurisdictions where reuse or repurposing occurs are generally those where the State requires licensees to utilise OI&I to maximise petroleum production prior to removal. In the UK this requirement is set out in the 'Maximising Economic Recovery' policy and enacted under S 9A of the *Petroleum Act 1998* (UK) (PA). In Norway such a requirement is known as *prudent*

⁴ Decommission in the sense of the DISR definition set out on page 8 of this report.

production requirements, articulated in the ten oil commandments,⁵ and enacted under s 4-2 of the Petroleum Activities Act 1996 (PAA) in Norway.⁶

In Australia, there are no such requirements due to policy decisions made in the 1990s and continue today that prioritise attracting international investment over government intervention in recovery.⁷ Furthermore, there is no legal capacity in the offshore petroleum legal framework for consideration of the legitimate reuse or repurposing of OI&I.

Therefore, activities and considerations that may occur prior to decommissioning (pre-decommissioning phase) are outside the scope of this report.

Once onshore, the OI&I require dismantling and processing,⁸ and the resultant materials set aside for either reuse, recycling, or disposal. It is important to remember that this process can often take place against the background of either imperfect or poor knowledge of the existence of such hazardous materials on the OI&I, primarily due to the age of the structure and modifications over the life of the structure, making DPRD complex and dangerous and requiring special facilities and equipment. In addition, there are a variety of offshore installations to be removed, including floating, tension leg, concrete structures, and floating production storage and offtake vessels.⁹

The Australian government has been clear in its intentions regarding decommissioning in Australia. At the opening of the 2023 *Decommissioning and Abandonment Summit*, The Honorable Madeline Kind MP Minister for Resources and Northern Australia stated: “We have a multi-billion-dollar opportunity before us, to establish a domestic decommissioning industry for offshore oil and gas infrastructure, right here in Australia. The government understands this and

⁵ On 14 June 1971, the Norwegian Parliament (Storting) adopted "the ten oil commandments", based on the Government's principled view, that the oil policy is developed with the aim of utilizing the natural resources on the Norwegian continental shelf in such a way that they benefit society as a whole. Although implemented in 1971, these ten oil commandments remain an important basis for the management of Norwegian petroleum activities. See <https://www.stortinget.no/no/Hva-skjer-pa-Stortinget/Nyhetsarkiv/Hva-skjer-nyheter/2020-2021/de-ti-oljebud-vedtatt-for-50-ar-siden/>

⁶ Maximising Economic Recovery (MER) strategy refers to the requirement in the wake of the *Wood Review* into oil and gas recovery and its regulation. The strategy seeks to maximise the economic recovery of petroleum from the United Kingdom Continental Shelf. For an excellent overview of MER see Judith Aldersley-Williams, *Maximising Economic Recovery: A New Approach* (Globe Business, London, 2023). In Norway, the concept of 'Prudent Production' requires all licence holders on the Norwegian Continental Shelf to maximise production over the life of a field, primarily through the periodic revision of the field development plan and using new technologies for petroleum recovery. In both instances this will often mean that the life of OI&I will be extended to accommodate extended extraction.

⁷ See Tina Hunter, 'Its time: petroleum policy change for sustainable development in the Australian offshore upstream petroleum sector' (2009) 2009 *Journal of Applied Law and Policy* 31-52.

⁸ According to CODA (CODA, 2023c, p15), processing includes decontamination, dismantling the structure into its component parts, and readying these parts for recycling or disposal.

⁹ For an excellent overview of structure types see Mohamed Abdallah El-Reedy, *Offshore Structures* 2020, p1-18.

have dedicated 4.5 million to establishing the roadmap”. Such commitment was reiterated with the release of the Decommissioning Roadmap in September 2023.¹⁰

2.3 Overview of report

For context, this report briefly considers the present state of decommissioning. To achieve its objective, the remainder of this report focusses on the DPRD of decommissioned OI&I: the *dismantling* of platforms, *processing* of dismantled materials into waste streams, the *recycling* of waste where possible, and the *disposal* of the remaining waste. It focusses on Commonwealth law, with reference to state law where required.

3. THE DECOMMISSIONING CHALLENGE

At present there are two primary offshore petroleum-producing areas in Australia: Bass Strait, where oil production commenced in 1969, and the Northwest Shelf (NWS), primarily a gas province (84% gas boe; Longley, et. al., 2003), commencing production in 1984.

Many of Australia’s OI&I are at or beyond retirement age, particularly those in Bass Strait, necessitating immediate decommissioning and DPRD. Others are approaching retirement age and will require decommissioning and DPRD within the next 20-30 years. According to the Centre of Decommissioning Australia (CODA), Australia’s decommissioning requirements will rapidly increase over the next 10 years, with almost 6,000 kilotons expected in the period after 2030. (CODA, 2023c).

Australia’s two petroleum production basins are geographically distant – around 2000km, with sailing times between these two production areas similar to sailing times from Singapore to Broome (CODA, 2023a). The geographical distribution and composition of Australia’s OI&I for DPRD is illustrated in figure 2, which also illustrates the volume of material presently offshore.

¹⁰ Department of Industry, Science and Resources, *Roadmap to establish an Australian decommissioning industry: Issues paper* (The Roadmap), September 2023 .

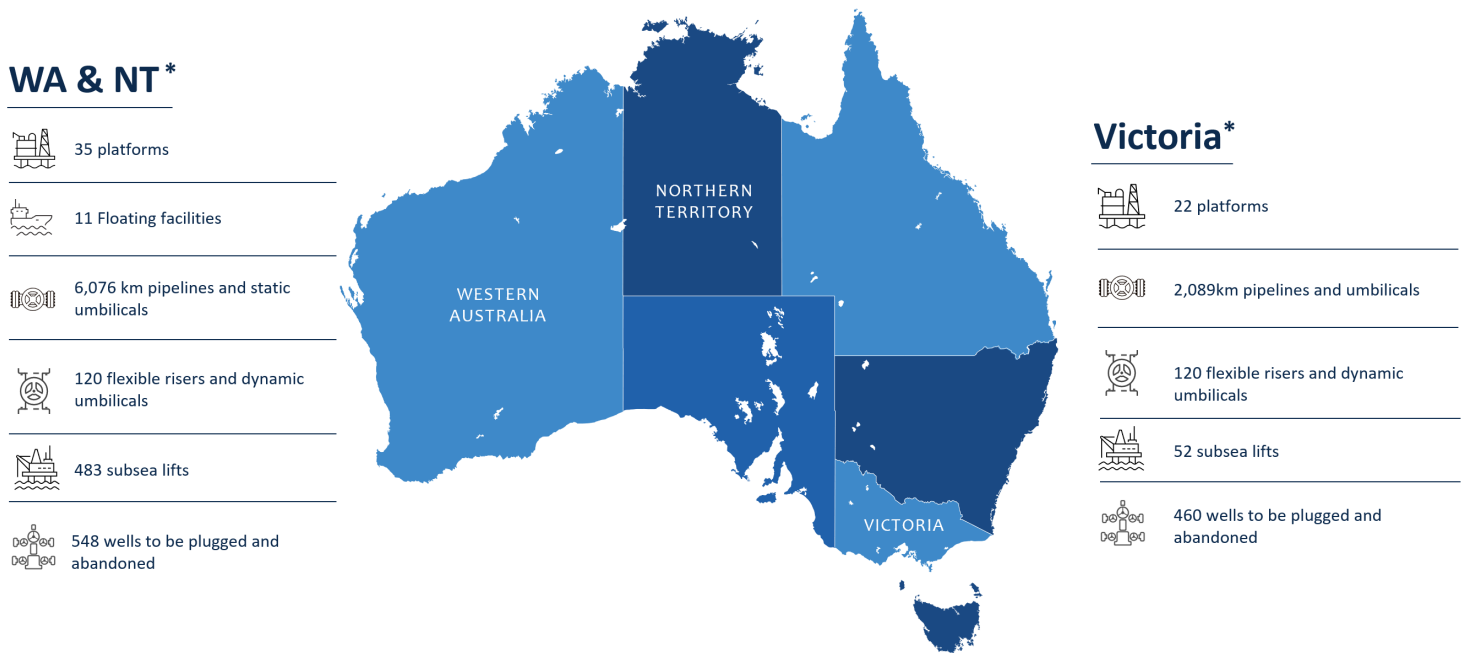


Figure 2: Geographical distribution and composition of Australia's offshore installations and infrastructure requiring decommissioning, dismantling and disposal (Source: [NOPSEMA](#))

CODA (2023a) estimates that the material recovered from Australia's OI&I will comprise:

- 62% ferrous metal (capable of being recycled);
- 1 - 1.5% non-ferrous metal;
- 24% concrete;
- 6 - 7% plastics;
- 1% hazardous metals and naturally occurring radioactive materials (NORMs).

A detailed examination of OI&I in Bass Strait (figure 3) and NWS (figure 4) below demonstrate the distribution of the fields and the pipelines connecting the fields.

Of the facilities to be D&D, Western Australia accounts for 89% of the total DPRD mass (>5,000kt) across the Northern Carnarvon Browse and Bonaparte basins, with Victoria accounting for the remaining 9% D&D mass. Furthermore, Western Australia accounts for 92% of pipeline mass and 100% of floating facilities. It is estimated that between 2023 and 2060 there will be around 70 installations and thousands of kilometres of infrastructure (pipelines, risers, umbilicals) requiring DPRD in-country.

BEST PRACTICE FOR DISMANTLING, RECYCLING, AND DISPOSAL OF OFFSHORE PETROLEUM STRUCTURES

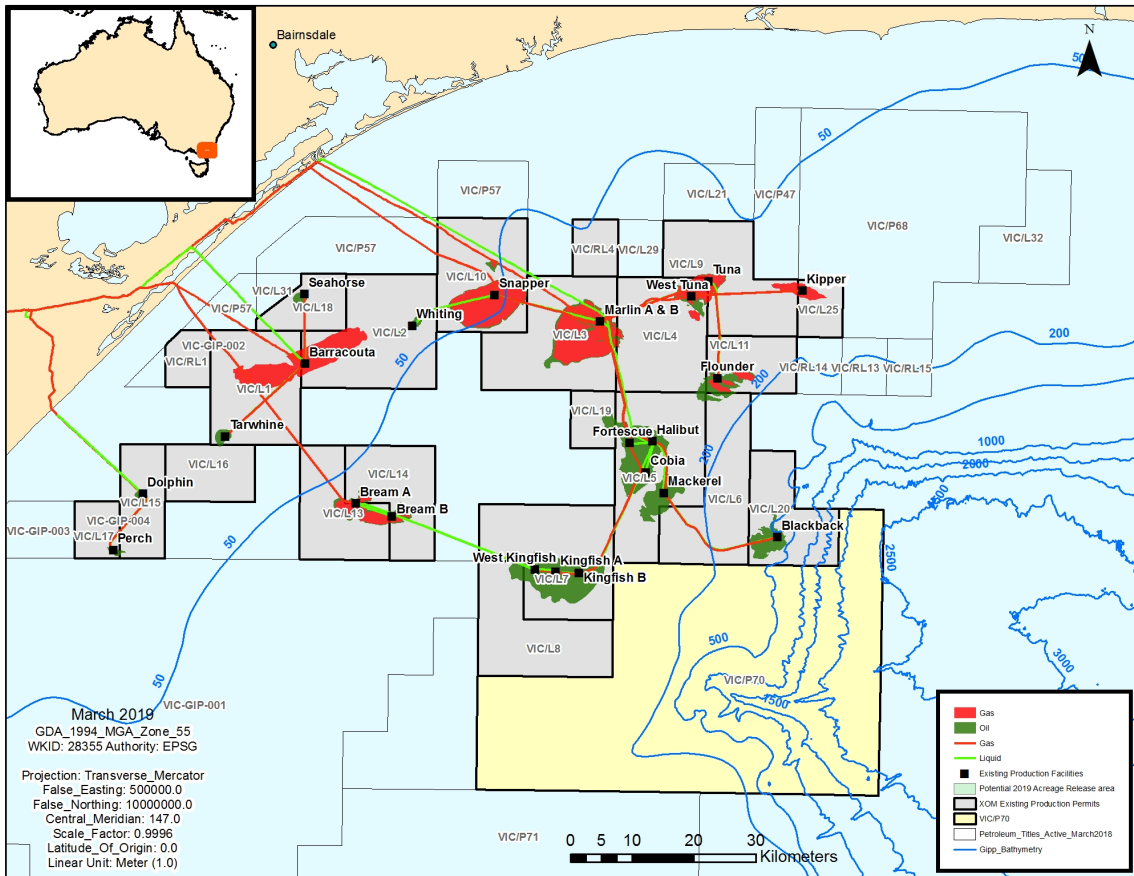


Figure 3: Offshore petroleum facilities in Bass Strait (Source: NOPSEMA)

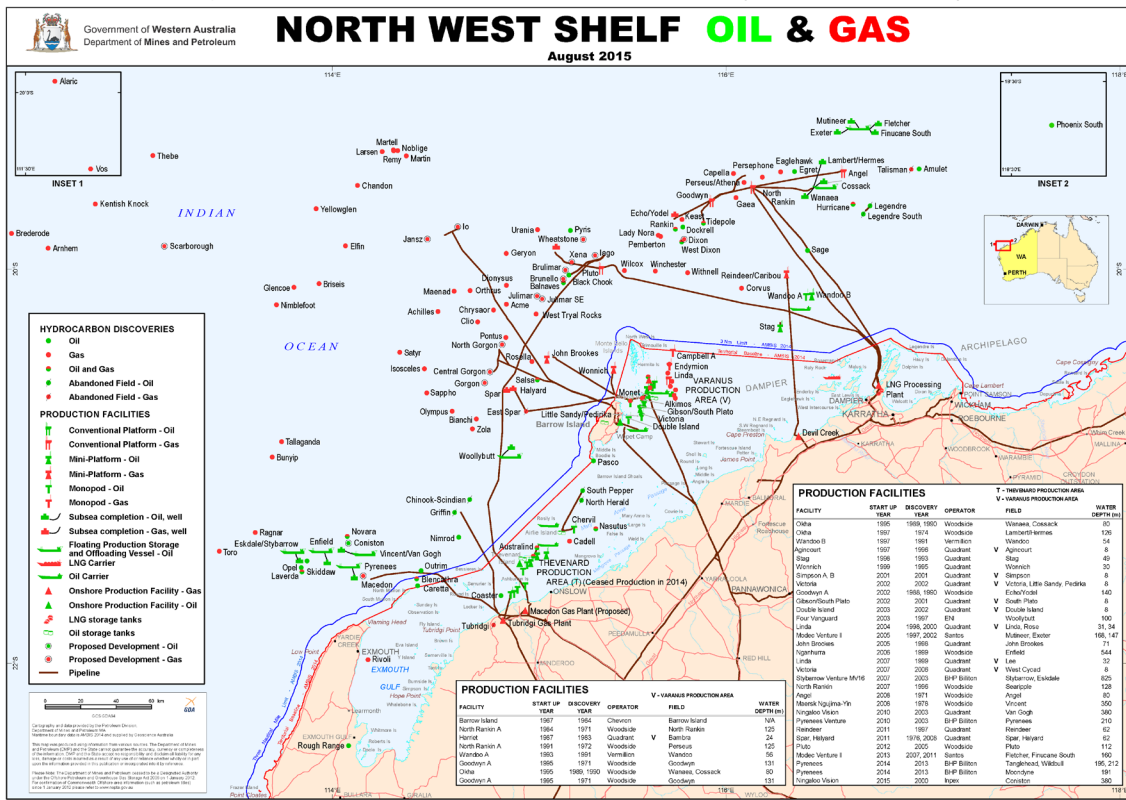


Figure 4: Offshore petroleum facilities on the North West Shelf, Western Australia as at 2015 (Source: Western Australian Department of Mines and Petroleum)

4. DECOMMISSIONING

4.1 International Legal Obligations

UNCLOS

The primary international legal instrument governing OI&I is the United Nations Convention on the Law of the Sea 1994 (UNCLOS). Australia is a signatory to UNCLOS, as are Norway and the UK, the countries utilised as comparator counties in this study. Therefore, Australia, Norway, and the UK are bound by the rights and obligations of the Convention, which are defined in table 1 below.

Table 1: Legal rights and obligations under the United Nations Convention on the Law of the Sea. Source: Compiled by Author

RIGHTS	OBLIGATIONS
Art. 193: The right of a sovereign state to exploit their natural resource	Art. 192 establishes a general obligation on states to protect and preserve the marine environment
Art. 60 exclusive right to construct, authorise and regulate the operation and use of artificial islands, installations, structures, and infrastructure required to enable that state to exploit the resources	Art. 208: signatory states must adopt laws and regulations to prevent, reduce, and control pollution in the marine environment from all activities that occur from artificial islands installations and structures in the jurisdiction, and must be no less effective than the international rules/standards as established.
	Article 210: general obligation for a signatory state to adopt laws and regulations to prevent, reduce, and control pollution of the marine environment from dumping, which is not permissible without the permission of the competent authorities.
	Art. 60 (3): duty to remove redundant offshore installations to ensure safety of navigation and to have due regard to fishing, the protection of the marine environment and the rights and duties of other states

London Convention and Protocol

The London Convention 1972 and its protocols¹¹ (LCP) form an international instrument that addresses and controls marine pollution arising from the *dumping* of waste. It covers the *deliberate* disposal at sea of waste and other matter from vessels, aircraft, and platforms.

Article 1 of the LC defines dumping as *any deliberate disposal of wastes or other metal from vessels, aircraft, platforms, or man-made structures at sea*. 'The sea' is defined in Art. 1(3) as all marine waters other than the internal waters of states. This means that the LC will also apply to

¹¹ Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1972)

the ‘**coastal waters**’ as decided under the *Offshore Constitutional Settlement 1980* and implemented under s6 of OPGGSA.

The LCP was the first convention to establish the global legal regime for the prevention, reduction, and control of pollution in the marine environment. It achieves this by:

- *Prohibiting* the dumping of certain hazardous materials unless the dumping is *authorised* under the LP Annexes and the 1996 Protocol.¹²
- Implementing the international law principles of *polluter pays* - Art. 3(1) of the LCP and the *precautionary principle* –Art. 3(1) of the LCP, and
- Stipulating that particular attention should be paid to opportunities to avoid dumping in favour of *environmentally preferable alternatives* – Art4(1.2) of the LCP.

IMO Resolution A.672 (16) - Guidelines

These Guidelines¹³ (IMO GL) establish a *general* requirement, although qualified, for the complete removal of OI&I. The best outcome should always be to remove an installation, with guidelines requiring:

- all installations weighing less than 4000 tons in air, standing in waters less than 75 m depth be completely removed; and
- Installations which intrude upon shipping lanes to be removed in their entirety.

4.2 Australian Law

Scope of Australian Law

Commonwealth law is the supreme law in Australia and applies to all offshore areas beyond 3nm. According to s109 of the Australian Constitution, where there is inconsistency between Commonwealth and state¹⁴ law, Commonwealth law will prevail *to the extent of the inconsistency*. This means that where the Commonwealth has no power to legislate, the states have a plenary power¹⁵ to legislate with respect to those matters.

It is important to note that unlike the application of LCP, the *Environmental Protection (Sea Dumping) Act 1981* (Cth) (EPSDA) does NOT include state waters or coastal waters (0-3nm from baseline), which are regulated by state/territory legislation.

Several Acts implement Australia’s international obligations regarding decommissioning, as outlined in table 2 below. [NOPSEMA Document A818951\(12/20\)](#) outlines the international law considerations when preparing for decommissioning, including the issues, impacts, and risks to

¹² 1996 Protocol to the Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972.

¹³ IMO Resolution A.672 Guidelines and Standards for the Removal of Offshore Installations and Structures on The Continental Shelf and in the Exclusive Economic Zone

¹⁴ The term ‘state’ is a broad term that includes the Australian states and territories. The term State refers to a nation-state.

¹⁵ Complete or absolute power.

be considered when preparing for decommissioning activities, and includes a consideration of material composition, contamination and contaminants, timeframes, relationship between infrastructure and regional ecological activity, and consideration of surrounding infrastructure.

Table 2: Implementation of International law obligations relating to decommissioning into Australian law.
Source: Compiled by Author

INTERNATIONAL INSTRUMENT	IMPLEMENTATION INTO COMMONWEALTH WATERS	IMPLEMENTATION INTO COASTAL/STATE WATERS
UNCLOS	<ul style="list-style-type: none"> • <i>Sea and Submerged Lands Act 1973</i> (Cth) (Maritime Boundaries) (SSLA) • <i>Offshore Petroleum and Greenhouse Gas Storage Act 2006</i> (Cth) (OPPGSA) 	<ul style="list-style-type: none"> • state 'Mirror Petroleum Legislation (eg <i>Petroleum (Submerged Lands) Act 1982</i> (WA)
LONDON CONVENTION AND PROTOCOL	<ul style="list-style-type: none"> • <i>Offshore Petroleum and Greenhouse Gas Storage Act 2006</i> (Cth) (OPGGSA) • <i>Environment Protection (Sea Dumping) Act</i> (Cth) (EPSDA)¹⁶ • <i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Cth) (EPBCA) 	<ul style="list-style-type: none"> • state 'Mirror Petroleum Legislation (eg <i>Petroleum (Submerged Lands) Act 1982</i> (WA) • state sea-dumping legislation (eg <i>Western Australian Marine (Sea Dumping) Act 1981</i> (WA)
IMO RES. A162/16	<ul style="list-style-type: none"> • <i>Offshore Petroleum and Greenhouse Gas Storage Act 2006</i> (Cth) (OPGGSA) • <i>Environment Protection (Sea Dumping) Act</i> (Cth) (EPSDA) • <i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Cth) (EPBCA) 	<ul style="list-style-type: none"> • state 'Mirror Petroleum Legislation (eg <i>Petroleum (Submerged Lands) Act 1982</i> (WA) • state sea-dumping legislation (eg <i>Western Australian Marine (Sea Dumping) Act 1981</i> (WA)

The US is a signatory to the London Convention but is *yet to ratify* it. Therefore LCP has not entered into force in the US and does not apply. Furthermore, the US is not a signatory to UNCLOS. As such, the US has NO obligations under UNCLOS or the London Convention and Protocol, enabling the US freely to engage in the *Rigs to Reef* program that allows OI&I to remain in situ and be turned into artificial reefs.

“Rigs to reef”, although touted by less than meticulous titleholders as an appropriate substitute for decommissioning, is not an option available to companies operating OI&I in Australia, given international law obligations outlined in tables 1 and 2 above.

The legal requirements for the removal of disused OI&I in Australia are set out in OPGGSA and the EPSDA and are summarised in table 3 below.

¹⁶ Note: s6 of the EPSDA stipulates that the Act applies both within and outside Australia and extends to every external territory.

Table 3: Australian legal requirements for decommissioning. Source: Compiled by Author.

ACTIVITY	OFFSHORE PETROLEUM AND GREENHOUSE GAS STORAGE ACT 2006	ENVIRONMENT PROTECTION (SEA DUMPING) ACT 1981
REMOVAL OF STRUCTURES	<ul style="list-style-type: none"> • General obligation to remove: S 572(3) of OPGGSA: at the end of the life of the field, a title holder is required to remove from the title area all structures, equipment, and other property that is no longer used in connexion with petroleum operations. • NOPSEMA principles to be applied when considering titleholders' compliance with section 572(3) requirements <i>unless alternative arrangements accepted in permissioning documents</i>: <ol style="list-style-type: none"> 1. Titleholders' field development plans are expected to consider how OI&I removal requirements will satisfy NOPSEMA for the purposes of section 270(1)(c) of the OPGGSA, 2. removal of OI&I is the base case for all offshore operations, 3. removal should be planned for and undertaken when OI&I are no longer used, and 4. titleholders, not contractors, are responsible for ensuring that approval, assurance, and oversight meet the OI&I removal requirements on titleholders. 	<ul style="list-style-type: none"> • S10A(1)(c) cannot dump controlled materials (includes platforms, installations, and infrastructure) unless permitted. • S 10E artificial reef placement not permitted without permit
LEAVE IN SITU	<ul style="list-style-type: none"> • DISR Decommissioning Guidelines: under GL4.16 options other than removal of all property may be considered 	<ul style="list-style-type: none"> • S 16 requirement not to dump (restoration of environment) if likely to cause obstruction, harm human or marine life, or interfere with exercise of sovereign rights • S 18 application for permit to dump structure at sea
PLACE AS ARTIFICIAL REEF IN ANOTHER LOCATION		<ul style="list-style-type: none"> • S 16 requirement not to dump (restoration of environment) if likely to cause obstruction, harm human or marine life, or interfere with exercise of sovereign rights • S 18 application for permit to dump structure at sea
RESTORATION OF ENVIRONMENT	<ul style="list-style-type: none"> • Part 6.4 Division 1: Restoration of the Environment (s 585) 	<ul style="list-style-type: none"> • S 16 Requirement – Restoration of the Environment

Regulatory analysis

As set out in table 3 above, Section 572 of the OPGGSA makes the *obligation to remove* very clear: all structures, equipment and property is to be removed.

However, section 4.16 of the DISR Decommissioning Guidelines 2022 ('the guidelines') state that options *other than complete removal* may be considered where the alternative decommissioning approach delivers equal or better environmental outcomes compared to complete removal, and meets all applicable requirements under the OPGGSA and regulation.¹⁷ This guidance contradicts the superior legal instrument (the OPGGSA), which does not provide an alternative to removal. Furthermore, the guidelines are not a binding legal instrument, instead providing mere guidance.

Like the installation of OI&I structures, the decommissioning process requires the preparation of an environment plan under the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (Cth) (OPGGS Env't Regs) and a 'safety case' under the *Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations 2009* (Cth) (OPGGS Safety Regs). The environment plan and safety case required to be submitted provide no additional guidelines for unknown or unexpected challenges.

Yet experiences in North Sea jurisdictions (UK, Norway) demonstrate that the environmental and safety challenges pertaining to decommissioning are unique, with many unknowns, such as corrosion and structural stress or weaknesses resulting from the structure being at sea for decades. The likely presence of unknowns needs to be factored into the various plans (safety, well management plan and environment plan) for decommissioning.

To protect both workers and the environment, it is essential that a complete inventory of substances and materials should accompany any OI&I sent onshore to a DPRD facility. This would align with the HKC guidelines which require ships sent for recycling to be surveyed for hazardous materials and to carry such an inventory of hazardous materials specific to that ship to the recycling shipyard.

4.4. Recommendations

Recommendation 1: Given the contradictory nature of the [Offshore Decommissioning Guidelines](#) which allow abandonment in situ where environmental outcomes are equal or better than removal (guidelines 4.16), compared to s472 the Offshore Petroleum and Greenhouse Gas Storage Act 2006 (Cth) (OPGGSA) which requires complete removal, guideline 4.16 should be removed or amended to reflect the legal position articulated in OPGGSA.

¹⁷ The Guidelines state at 4.16: 'Options other than removal of all property may be considered, where the alternative decommissioning approach delivers equal or better environmental outcomes compared to complete removal and meets all applicable requirements under the OPGGS Act and regulations, including well integrity and safety-related matters, and other applicable laws.'

Recommendation 2: NOPSEMA must implement specific guidelines for preparing a decommissioning Environment Plan and Safety Case, given the likelihood of unknowns pertaining to the condition of the structures and installations, including requirements for a full inventory of hazardous materials from offshore structures to be provided to onshore DPRD facilities.

5. DISMANTLING AND PROCESSING OF WASTE

When OI&I are decommissioned at sea, there is minimal dismantling, enough only to facilitate the removal of the structure. Once the structure is removed, it is brought onshore for complete dismantling, and processing.

The dismantling and processing of OI&I can result in hazardous waste, including radioactive substances, mercury, and oils, which must be treated properly in an appropriate DPRD facility to avoid risk to human health and the environment.

5.1 International Legal Obligations

Dismantling

The LCP applies to the dumping of waste offshore from OI&I during the dismantling process at sea. Once onshore, the dismantling and processing of OI&I are *not* covered under specific international legal instruments. However, the dismantling and processing of ships (and therefore FPSOs, FSOs, FLNGs, and FSRUs) are subject to the Hong Kong Convention 2013, which will enter into force on 26 June 2025. Australia is not a signatory to the Convention but is considering doing so.

Hazardous Waste

The dismantling and processing of OI&I can result in hazardous waste, including radioactive substances and mercury. Australia is signatory to several international conventions that protect human health, as summarised in table 4 below.

Table 4: International law obligations relating to onshore dismantling and processing. Source: Compiled by Author

POTENTIAL HARM	INTERNATIONAL INSTRUMENT	SCOPE
RADIOACTIVE SUBSTANCES	<ul style="list-style-type: none"> International Atomic Energy Agency Safety Standards: <i>Radiation Protection and Safety of Radiation Sources</i> <i>Storage of Radioactive Waste</i> <i>Management system for the Processing, Handling and Storage of Radioactive Waste</i> 	<ul style="list-style-type: none"> As a member of the IAEA, and a country with a nuclear reactor, Australia is required to implement IAEA standards regarding Radioactive waste and radiation.
MERCURY	<ul style="list-style-type: none"> <i>Minamata Convention on Mercury 2013</i> 	<ul style="list-style-type: none"> Convention's main objective is to protect human health and the environment from emissions and release of mercury and mercury compounds

5.2 Australian capacity and regulatory framework

Scope

Essential dismantling that takes place at sea is subject to Commonwealth law, regulated by OPPGSA and the Sea Dumping Act, as outlined in Table 3 above and discussed in section 4 above. Onshore dismantling and processing activities are regulated under state/territory law, as are some aspects of recycling and disposal. However, it is critical to understand that recycling and disposal are subject to Commonwealth Legislation: The *Commonwealth Hazardous Waste (Export and Import) Act 1989* (Cth) for the exportation of hazardous waste, and the *Waste Reduction and Recycling Act 2022* (Cth), for the recycling and disposal of waste.

Commonwealth law applicable to all jurisdictions will be the primary focus of this and the following sections.

The dismantling process deals with a variety of products, including production platforms and facilities, pipelines, wellheads, anchors, flexible flow lines and other lines, and oils and other wastes contained within the removed OI&I and released when decommissioned OI&I is cleaned.

As figures 5 and 6 below demonstrate, facilities for dismantling and processing such materials are located throughout Australia, requiring materials to be moved in and out of various state/territory jurisdictions.

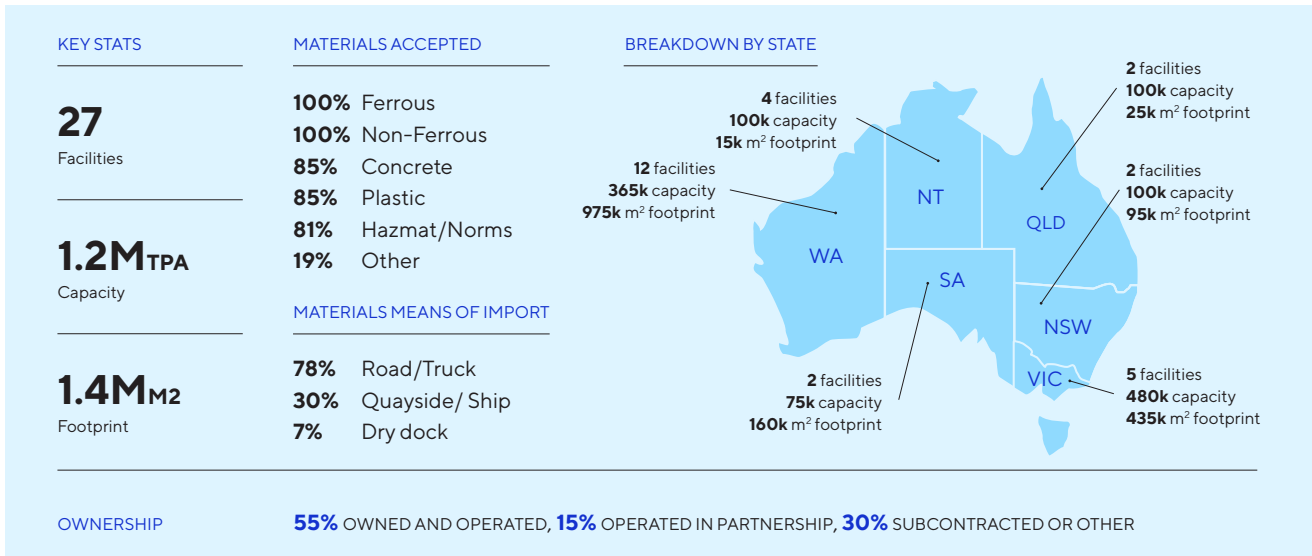


Figure 5: Snapshot of dismantling capacity in Australia, by state. Source: CODA, 2023c.

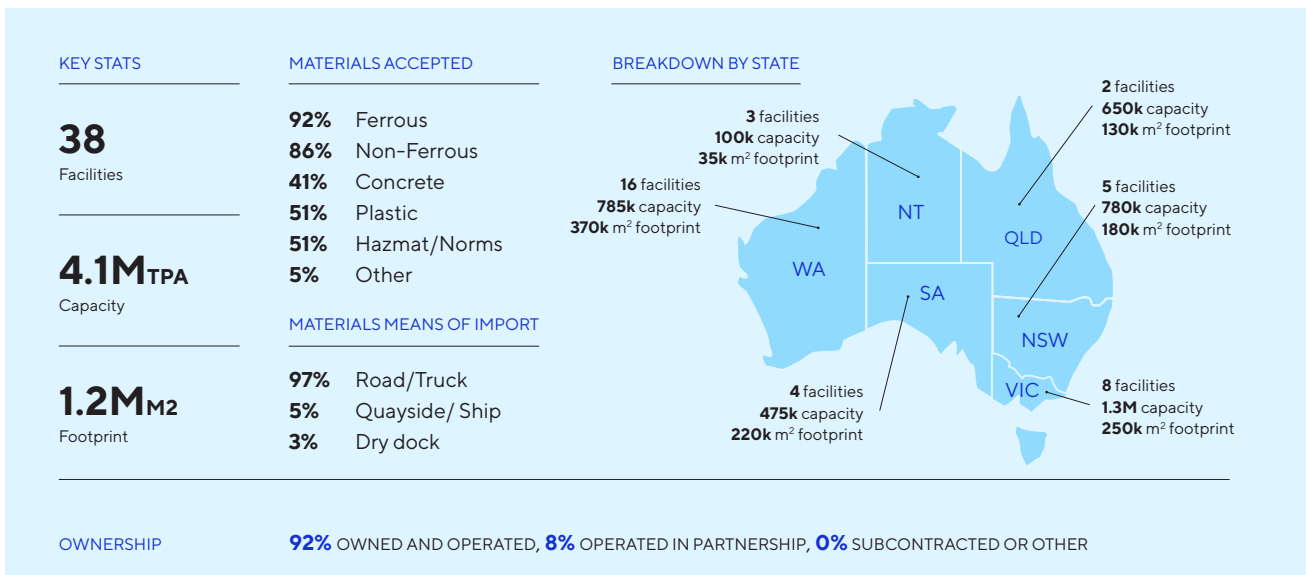


Figure 6: Snapshot of processing capacity in Australia, by state. Source: CODA, 2023c.

The above two figures clearly illustrate how each state has several facilities for dismantling and processing, with limited and varied capacity to undertake such activities.

What is clear from the above figures is that processing capacity is constrained by geography - a large amount of capacity exists on Australia’s east coast (especially NSW and Victoria). Although such infrastructure is close to the OI&I in Bass Strait, it is around 4000 km from the Northwest Shelf, thus presenting additional hurdles for the DPRD of OI&I from this region.

Australia's need for decommissioning in the next few decades is high and will place pressure on existing facilities. According to CODA (2023c) there is 5,700kt of OI&I requiring recycling and disposal (including pipelines). Of that, 89% of tonnage lies in Western Australia, and only 11% in Bass strait. Pipelines comprise 67% of these materials. The Western region is only capable of DPRD of 22-38% of the total volume, with greater capacity in southeast Australia (CODA, 2023c).

During dismantling and processing, many hazardous materials will be isolated. According to CODA (2023c) there are approximately 60,000 tons of hazardous materials, including naturally occurring radioactive materials (NORMs), to be disposed of after onshore dismantling and processing. These NORMs are regulated under the *Australian Radioactive Protection and Nuclear Safety Act 1998* (Cth).

The legal regime governing hazardous materials dismantling and processing is complex. Except for international conventions implemented into Commonwealth and State law, and the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) (EPBCA), which applies in all states to matters of environmental significance, the regulation of dismantling of hazardous materials onshore occurs at all levels of government. The Australian Government has a role in providing national leadership and coordination, ensuring that Australia's international obligations regarding waste are met. State governments have primary responsibility for regulating domestic waste management and are required to manage waste to protect the environment, secure public health, and safety outcomes, and to avoid the loss of public amenity.

All state governments have enacted comprehensive legislative and policy instruments to protect the environment and conserve natural resources, as summarised in table 5. The legislative scope includes laws relating to waste management, environment protection, the impact of waste operations on the environment, and waste reduction. From an environmental perspective, the limited scope of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBCA) means that state environmental legislation dominates the regulation of DPRD, with the EPBCA regulating activities that fall under the *Matters of National Significance* criteria set out in the Act.

Table 5: State and territory waste management and resource recovery legislation and strategies. Source: Compiled by author

STATE	LEGISLATION	STRATEGY
ACT	<ul style="list-style-type: none"> • <i>Environment Protection Act 1997</i> • <i>Clinical Waste Act 1990</i> • <i>Waste Minimisation Act 2001</i> • <i>Litter Act 2004</i> • <i>Dangerous Substances Act 1990</i> 	<ul style="list-style-type: none"> • ACT Waste management Strategy 2011-2025
NSW	<ul style="list-style-type: none"> • <i>Protection of the Environment Operations Act 1997</i> • <i>Protection of the Environment Operations (Waste) Regulations 2014</i> • <i>Waste Avoidance and Resource Recovery Act 2001</i> 	<ul style="list-style-type: none"> • <i>Waste and Sustainable Materials Strategy 2041</i>
NT	<ul style="list-style-type: none"> • <i>Waste Management and Pollution Control Act 1998</i> 	<ul style="list-style-type: none"> • <i>Northern Territory Circular Economy Strategy 2022-2027</i>
QLD	<ul style="list-style-type: none"> • <i>Waste Reduction and Recycling Act 2011</i> • <i>Environment Protection Act 1994</i> • <i>Environment Protection Regulation 2008</i> • <i>Environment Protection (Waste Management) Regulation 2000</i> 	<ul style="list-style-type: none"> • <i>Queensland's Waste Management and Resource Recovery Strategy</i>
SA	<ul style="list-style-type: none"> • <i>Environment Protection Act 1993</i> • <i>Zero Waste SA Act 2004</i> 	<ul style="list-style-type: none"> • <i>Environment Protection (Waste to Resources) Policy</i> • <i>Supporting the Circular Economy: South Australia's Waste Strategy 2020-2025</i>
TAS	<ul style="list-style-type: none"> • <i>Environmental Management and Pollution Control Act 1994</i> • <i>Environmental Management and Pollution Control (Waste Management) Regulations 2010</i> • <i>Environmental Management and Pollution Control (Controlled Waste Tracking) Regulations 2010</i> 	<ul style="list-style-type: none"> • <i>Tasmanian Waste and Resource Management Strategy</i>
VIC	<ul style="list-style-type: none"> • <i>Environment Protection Act 2017</i> • <i>Environment Protection Regulations 2021</i> • <i>Environment Protection (Industrial Waste Resource) Regulations 2009</i> • <i>Sustainability Victoria Act 2005</i> 	<ul style="list-style-type: none"> • <i>State-wide Waste and Resource Recovery Infrastructure Plan (SWRRIP)</i>
WA	<ul style="list-style-type: none"> • <i>Waste Avoidance and resource Recovery Act 2007</i> • <i>Waste Avoidance and Resource Recovery Levy Act 2007</i> • <i>Waste Avoidance and Resource Recovery Levy Regulations 2008</i> • <i>Environment Protection Act 1986</i> • <i>Environmental Protection (Controlled Waste) Regulations 2004</i> 	<ul style="list-style-type: none"> • <i>Waste Avoidance and Resource Recovery Strategy 2030</i>

The regulation of health and safety in dismantling and processing facilities occurs at state level. Since workplace health and safety is not an enumerated power under the Constitution, there is no capacity for the Commonwealth to directly regulate onshore health and safety in a manner analogous to the regulation of safety in Commonwealth Waters under the OPGGSA.¹⁸ Instead a national harmonised WHS system has been developed, with model acts and regulations replicated in each state. The harmonised WHS Regulations have extensive requirements for safety during construction. These regulations also apply to the demolition of structures and would therefore apply to the dismantling of offshore oil and gas infrastructure once it is brought onshore. In addition, harmonised WHS Codes of Practice exist for many industries and activities throughout Australia. Although there is no explicit WHS model for OI&I dismantling at present, it is likely that existing Regulations and/or Codes of Practice will cover activities that occur at DPRD facilities.

Experience in Australia and analogous jurisdictions demonstrates that workplace and worker safety is enhanced by using a sufficiently trained and experienced workforce. Other jurisdictions recognise the skill and experience of workers in the offshore petroleum industry, applying their knowledge of offshore installations to the DPRD of these installations at the end of life.

Analysis

Facilities and activities

As noted by CODA (2023c) and demonstrated in figures 5 and 6 above below, there is a lack of dismantling and processing capacity in Australia, which dominates recycling capacity. Whilst the OI&I is landed onshore in Australia, figure 7 below demonstrates that much of the DPRD capacity is currently abroad and therefore much of the material is exported. CODA identifies best practice as a 100% domestic dismantling processing, recycling, and disposal market, as identified in figure 7. However, the figure also demonstrates that, by CODA's own admission, such a scenario is a long way off (CODA, 2023c).

¹⁸ The regulation of health and safety offshore is by virtue of section 51(xxix) of the Constitution, the external affairs power (for a geographic area adjacent to sovereign Australian territory)

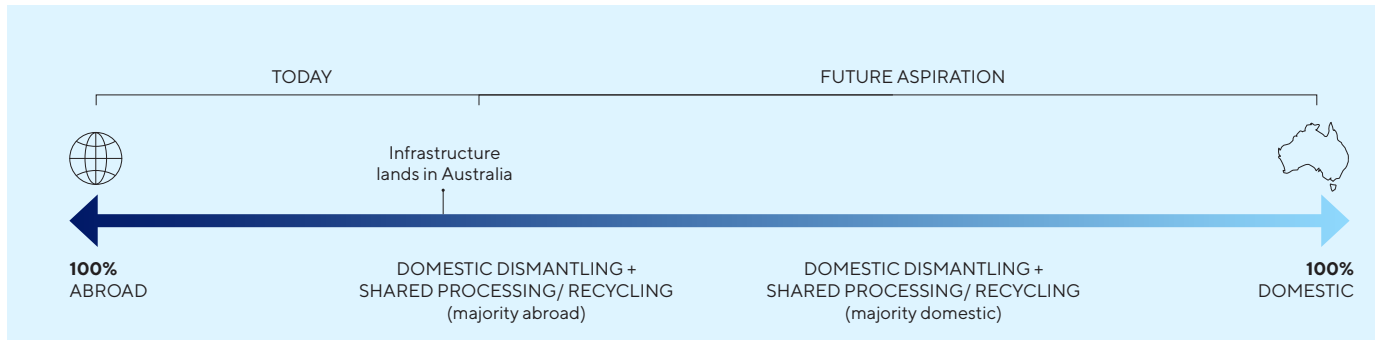


Figure 7: Disposal, processing, recycling, and disposal capacity present and future scenarios. Source: CODA, 2023c.

Capacity for DPRD in the Western region is less than one third of projected requirements. Yet almost 90% of the tonnage that requires DPRD is in the Western region, indicating a severe shortage of DPRD yardage. Primary facilities in the Western region for dismantling and processing are Ashworth in NW Western Australia, and the Australian Marine Complex at Henderson (AMC), near Perth. The Northern Territory has limited capacity for facilities due to water depth near shore, the dominance of gas processing plants at accessible port locations, and the development of the Middle Arm precinct for LNG and future carbon capture and storage activities.

According to the Port of Ashburton Master Plan, expansion of the Ashburton port is limited by other resource activities including supply base capability, petroleum exploration activities, general cargo, fuel storage and distribution, helicopter services, and LNG facilities. Port expansion plans do not include a DPRD facility space at this stage.¹⁹

The AMC at Henderson has attracted competing users, most notably the Australian Department of Defence as a future facility for submarine construction and maintenance for the new AUKUS program, and offshore wind commissioning, placing likely further pressure on existing facilities.

The CODA 2023c report, and figure 6 above from that report, highlights both the much larger capacity of the eastern states, but also the limited capacity. Due to likely Department of Defence requirements for an east coast submarine base for the AUKUS nuclear fleet, combined with the nearby Declared Area for offshore wind requiring facility commissioning, Port Kembla will have very limited capacity for decommissioning in the future. Other sites in Victoria and NSW are also likely to be severely constrained. Similarly, *TasPorts* has indicated that the deployment of offshore wind structures is likely to utilise much of the Bell Bay's port capacity, although it also recognised the interest from the oil and gas sector.²⁰

¹⁹ Port of Ashburton, *Port Master Plan 2050*, (2017) <https://www.pilbaraports.com.au/about-ppa/publications/forms-and-publications/forms-publications/strategy-plan/2020/june/port-of-ashburton-land-use-master-plan-2050>

²⁰ TasPorts, *Strong renewables interest in Port of Bell Bay* 22 August 2023 <https://www.tasports.com.au/news/strong-renewables-interest-in-port-of-bell-bay>.

In southern Australia, there is ample opportunity for DPRD in the former shipyards at Whyalla near the GFG Whyalla steel works, with laydown areas and deep (>10m) water access. The shipyard was the main construction shipyard for iron ore bulk carriers until the late 1970s. The close proximity to the Whyalla steelworks provides ample opportunity for recycling of ferrous metals, which is 62% of all materials (table 6). May 2021 saw the South Australian government call for Expressions of Interest to establish a common user facility (CUF) at nearby (16km) Port Bonython. There is also considerable interest in the establishment of hydrogen hubs at Whyalla and Bonython ports.

CODA's is yet to include these South Australian sites in its assessment of DPRD facilities (CODA, 2023c). Such exclusion may be attributable to the Western Australian focus of the assessment to date.

Overseas Experiences

In analogous overseas jurisdictions, pressure on existing facilities for onshore DPRD activities from OI&I decommissioning is not uncommon. As the North Sea matures and requires decommissioning, the UK has struggled to find appropriate locations for the volume of DPRD required as OI&I are decommissioned. To solve capacity issues, two UK brownfield sites are being converted for DPRD facilities:

1. Cromarty Firth – a relatively deep-water port with dry-dock facilities for repairing and fabricating oil platforms and has been used in recent years for the mooring of OI&I awaiting DPRD.
2. Ardersier Port - close to Cromarty Firth at the entrance of the Moray Firth. A former Shipyard where oil and gas asset fabrication were undertaken in 1960s-1980s. £300 million will be invested to transform Ardersier Port into a leading facility for the UK, encompassing dismantling, processing, and recycling areas for large OI&I assets in years to come.

In Norway existing yards that have to date been responsible for the construction and maintenance of platforms are now being utilised for dismantling and disposal. The largest of these yards are accumulated on the coast in and around the fjords of Stavanger, with Stord on the Bømafjord attractive due to its deep and narrow inlet enabling deep draft OI&I to be constructed/deconstructed there. Major companies such as Aker Solutions, Worley Rosenberg, and AF Gruppen have established large facilities in and around Stord for DPRD.

5.3 The need for clear and consistent regulation

A survey of practices in Australia, the UK, and Norway demonstrates the varied approaches to regulation, as well as the need for clear and consistent regulation by the Commonwealth and Australian states.

In examining the state legal framework for dismantling and processing, it is clear there are no uniform (or specific) Commonwealth or state regulatory requirements of laws that address the dismantling of OI&I. Yet the dismantling process of offshore vessels, which include FPSOs and FLNGs and of which platforms are analogous, has been recognised as posing serious hazards to workers and the environment due to hazards associated with dismantling and lifting of materials, hazardous waste, and other safety concerns arising from moving and transporting the materials.²¹

Recognising the hazardous nature of dismantling and breaking of large marine structures, a new international instrument, the Hong Kong Convention,²² has been established. Although yet to enter into force, the Hong Kong Convention applies to the dismantling and recycling of ships, including FPSOs, FLNGs and FSRUs. It was adopted to ensure that ships recycled at the end of their operational lives do not pose unnecessary risks to human health and safety, or to the environment. This Convention particularly addresses the issues concerning environmentally hazardous substances such as asbestos, heavy metals, and hydrocarbons, and concerns regarding the working and environmental conditions at ship recycling locations around the world.

Although the Hong Kong convention has not entered into force, it nonetheless has established comprehensive guidelines for the dismantling, processing, and recycling of ships ahead of its entry into force. These are the first comprehensive guidelines regarding recycling of ships and represent comprehensive guidelines for these activities.

An analogous mature petroleum province where similar dismantling and processing is occurring is the North Sea. Like Australia, Norway and the UK are in a mature phase for some production areas and are embarking on large volumes of dismantling. However, unlike Australia, both jurisdictions are unitary systems of government, meaning that there are no state jurisdictions that regulate, rather only national law, although Scotland has jurisdiction over its onshore environment in the UK.

Examination of UK law pertaining to D&P sees a regulatory structure (at national and Scottish level) similar to Australia, where a multitude of acts and regulations govern decommissioning, including the application of Scotland's environment laws onshore. These Scottish laws are stricter than the Environment Act of England and Wales, and have created a disparity in regulation between these jurisdictions,

In Norway, there has been the recognition that D&P of decommissioned structures represents a greater than ordinary risk. Therefore, aside from normal legislative instruments that apply to the workplaces, the Norwegian government has also established clear and legally enforceable guidelines for the dismantling and processing of **all OI&I**. In 2018, the Norwegian Maritime

²¹ IMO, Safe and environmentally sound recycling of ships (2020)
<https://www.imo.org/en/About/Conventions/Pages/The-Hong-Kong-International-Convention-for-the-Safe-and-Environmentally-Sound-Recycling-of-Ships.aspx>

²² Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009

Authority (NMA) established [new rules regarding the DPRD of ships and mobile offshore units, the Regulation Of The Dismantling Of Ships And Mobile Offshore Units 2018](#) (New Rules) based on the Hong Kong Convention, including the guidelines related to hazardous materials inventory, and also implemented *Regulation (EU) 1257/2013 on safe and sound ship recycling* (Ship Recycling Regulation) and Norway's obligations under the Basel Convention.

Critically, Norway's New DPRD Rules²³ adopt the HKC guidelines that have been developed and adopted for ship recycling to assist States in the early implementation of the Convention's technical standards. Norwegian safety and labour laws apply these guidelines for the DPRD of **both ships and petroleum platforms** (or mobile offshore units in Norway):²⁴

- [2011 Guidelines for the Development of the Ship Recycling Plan](#);
- [2012 Guidelines for Safe and Environmentally Sound Ship Recycling](#);
- [2012 Guidelines for the Authorization of Ship Recycling Facilities](#); and
- [2015 Guidelines for the development of the Inventory of the Hazardous Materials](#).

Preservation of Human Life

Best practice (and bitter experience such as decommissioning the Sinbad Platform where there were several near misses that could have resulted in fatalities) demonstrates that uniform, national law is best practice for health and safety, especially in hazardous industries. The development of national health and safety regulation for oil and gas activities in the UK and Norway, in the wake of Piper Alpha and Alexander Kielland respectively, demonstrate the importance of developing uniform legislation that applies equally to ALL jurisdictions for the same activity. Australia adopted the UK form of safety for offshore petroleum in the early 2000s, implementing the UK's safety case approach. However, the unique jurisdiction carve-up under the *Offshore Constitutional Settlement 1980* means that not all offshore decommissioning activities in State and Coastal Waters are regulated under OPGGSA and the safety case, falling under state jurisdiction.

As required by the Australian constitution, health, and safety regulation at state onshore DPRD facilities is regulated by state law, and not under a single, uniform national law. Great strides have occurred in the development of a model [WHS Acts, Regulations](#), and [Codes of Practice](#), and there are uniform expectations for process safety across the states arising from harmonisation of WHS practices. Examples of industry specific detail and best practice in Australia includes the regulation of construction.

²³ New rules adopted by the Norwegian Maritime Authority (NMA) in 2018 regarding the DPRD of ships and mobile offshore units: [Regulation Of The Dismantling Of Ships And Mobile Offshore Units 2018](#)

²⁴ Ibid.

5.5 Recommendations

Australia's clear lack of DPRD facilities has, and will continue to, hamper the dismantling and processing of decommissioned OI&I. There is a need for more facilities.

Recommendation 3: As part of the Decommissioning Road Map, the Commonwealth must designate and/or incentivise suitable locations for dismantling, processing, recycling, and disposal (DPRD) facilities in Australia to increase DPRD capacity, in conjunction with other industries' facility requirements.

The utilisation of dismantling and processing guidelines by the Norwegian Government represents best practice since it provides clear, uniform guidance for onshore facilities and operations. The adoption of guidelines could be undertaken through a harmonisation scheme akin to the *National Harmonised Regulatory Framework for Natural Gas from Coal Seams* adopted by the Standing Council on Energy and Resources (part of COAG) in 2013.

Recommendation 4: Establish a harmonised regulatory framework for the dismantling and processing of offshore installations and infrastructure utilising the Hong Kong Convention Guidelines on dismantling and processing as the basis for the harmonised regulatory framework, and the adoption of appropriate industry standards and licencing.

The regulatory gap analysis identified the need to assess the harmonised WHS system to ensure all DPRD activities are covered.

Recommendation 5: Assess and apply existing Model Work Health and Safety (WHS) Codes of Practice and Regulations pertaining to DPRD activities and facilities in Australia, to identify gaps and establish new Regulations or a new Code of Practice if required.

6. RECYCLING AND DISPOSAL

6.1 International Legal Obligations

At present there are no specific international waste recycling instruments. Rather, several instruments, the 1992 United Nations Framework Convention on Climate Change ('UNFCCC'); Kyoto Protocol; and the Paris Agreement, place a general obligation to reduce energy resource use and greenhouse gas emissions.

In terms of hazardous waste recycling and disposal, the Basel Convention addresses the general issue of the disposal of hazardous wastes, in doing so encourage the reuse and recycling of waste materials, especially metals and hazardous materials.

6.2 Australian capacity and regulatory framework

Scope

According to CODA (2023c) (see figure 8 below) Australia currently has 23 processing facilities with a capacity of 2.1mtpa, with much of this capacity in the eastern region.

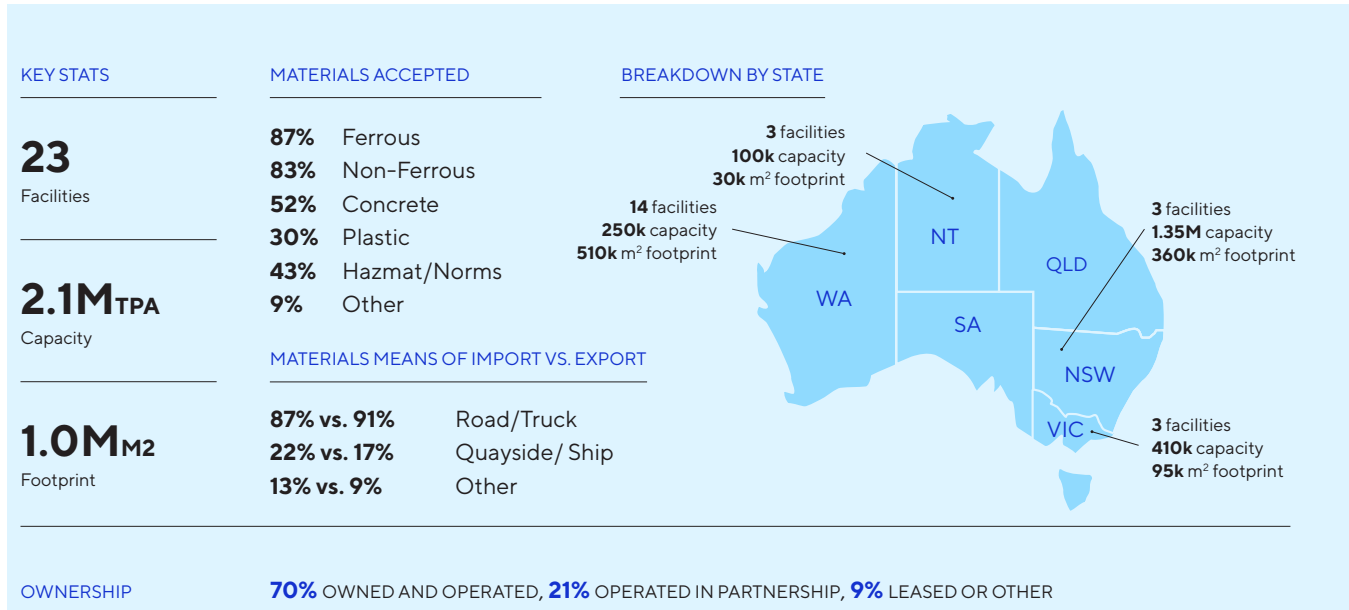


Figure 8: Processing capacity for recycling and disposal of decommissioned offshore installations and infrastructure in Australia. Source: CODA, 2023c.

Material inventory estimates by CODA (2023c) predict 5,700 kilotons (kt) of decommissioning material will require recycling and disposal. The breakdown of these materials, their amount and location, and recyclability, is illustrated in table 6 below.

Since the Basel and Minamata Conventions only apply to the export of hazardous waste export, this means in practice that there is little international law compelling Australia to recycle. Legislation addressing recycling will either be Commonwealth or state/territory, depending upon the location and activity being undertaken.

Table 6: Snapshot - Dismantled materials recycling and disposal in Australia Source: Compiled by author from data in CODA, 2023c.

MATERIAL	AMOUNT AND LOCATION	RECYCLABILITY AND DISPOSAL
TOTAL MATERIALS	<ul style="list-style-type: none"> • 5,700 kt of OI&I requiring recycling and disposal • 89% of R&D tonnage in Western Australia • 67% from pipelines 	<ul style="list-style-type: none"> • Processing capacity limited, especially in western region • Disposal dominated by processing capacity. • Considerable amount of recycling is exported. • Western region only capable for 22-38% of disposal capacity (but 89% of tonnage)
FERROUS METAL	<ul style="list-style-type: none"> • Steel 3,560 kt (62% of all waste) • 89% in Western Australia from three Basins (Northern Carnarvon, Browse and Bonaparte) • 9% Bass Strait (Gippsland) 	<ul style="list-style-type: none"> • Yes, capable of recycling. • Lack of regional capacity, especially in western region.
CONCRETE	<ul style="list-style-type: none"> • 1,390 kt of concrete (24% of all waste) 	<ul style="list-style-type: none"> • Yes, capable of disposal but lacks capacity especially in western region
PLASTICS	<ul style="list-style-type: none"> • Up to 400 kt 	<ul style="list-style-type: none"> • Some. Limited by facilities and capacity. • Previously primarily exported. Subject to changes to Basel Convention in 2019.
HAZARDOUS MATERIALS AND NATURALLY OCCURRING RADIOACTIVE MATERIALS (NORMS)	<ul style="list-style-type: none"> • Up to 60 kt 	<ul style="list-style-type: none"> • Some. Limited by facilities and capacity. • Primarily exported

Where recycling and disposal occur within Australia (in-country), it is regulated by Australian Commonwealth legislation. Such Commonwealth legislation applies to all Australian jurisdictions and must be incorporated into state legislation. State legislation prevails where there are gaps in Commonwealth legislation.²⁵ Decommissioned OI&I materials that require onshore recycling and waste disposal are subject to Commonwealth legislation, of which an overview is provided in table 7 below, State legislation is outlined in table 5 above.

²⁵ Under s51 of the Constitution, the Commonwealth has defined (or enumerated) areas that it can regulate. Waste and recycling are regulated under s51(xxix) (External Affairs) of the Australian Constitution since the regulated area is established through international conventions. By virtue of s109 of the Australian Constitution, any areas that are not enumerated, fall under the 'plenary' power of the states and territories.

Table 7: Commonwealth regulation of recycling and disposal of decommissioned offshore installations and infrastructure in Australia. Source: Compiled by author.

ACTIVITY	COMMONWEALTH ACT	INTERNATIONAL LAW IMPLEMENTED	SCOPE/OBJECT OF THE ACT
RECYCLING	<ul style="list-style-type: none"> <i>Recycling and Waste Reduction Act 2020 (Cth) (RWRA)</i> 	<ul style="list-style-type: none"> Climate Change Obligations 	<p>S5 - OBJECTS</p> <ul style="list-style-type: none"> Reduce the impact of products, waste from products and waste materials on human and environmental health; Reduce use of energy and water and reduce GHG emissions; realise community and economic benefits arising from taking responsibility for products, waste from products, and waste material; and develop circular economy. <p>ACHIEVED BY</p> <ul style="list-style-type: none"> regulating the export of waste material to promote its management in an environmentally sound way; encourage and regulate the reuse, remanufacture recycling and recovery of products and waste in an environmentally way; and encourage and regulate manufacturers, importers, distributors, designers to take responsibility for products by reducing or avoiding generation of waste, and managing products through their lifecycle
DISPOSAL – GENERAL	<ul style="list-style-type: none"> <i>Recycling and Waste Reduction Act 2020 (Cth)</i> 	<ul style="list-style-type: none"> Climate Change Obligations 	<ul style="list-style-type: none"> Chapter 2 regulates the export of waste, and may prohibit the export of regulated waste material unless complies with export conditions stipulated
DISPOSAL – HAZARDOUS MATERIALS	<ul style="list-style-type: none"> <i>Hazardous Waste (Regulation of Exports and Imports) Act 1989</i> 	<ul style="list-style-type: none"> Basel Convention 	<p>OBJECT OF THE ACT</p> <ul style="list-style-type: none"> Regulate the export, import and transit of hazardous waste to ensure such activities are managed in an environmentally sound manner so that humans and the environment (inside and outside) Australia are protected. <p>AIMS OF THE ACT</p> <ul style="list-style-type: none"> Give effect to the Basel convention. Give effect to agreements and arrangements set out in Article 11 of the Basel Convention

Gap Analysis

Australia has established the RWRA to reduce the impact of waste, realise community benefits, and develop a circular economy. Certainly, this law mandates the conditions required for the export of waste material, and a reading of the objects of the RWRA (as set out in table 7 above) indicate an aim of reducing waste and encouraging recycling and reuse in general.

Yet the recycling and reduction component of the RWRA, especially its application to decommissioned OI&I, is aspirational at best. Chapter 3 of the RWRA addresses *voluntary and co-regulatory* product stewardship schemes for products, and particularly pertains to product labelling and packaging. These schemes are undertaken in partnership with the states. Much of the legislative requirements are aimed at recyclability of packages, and to address packaging waste. Further scope, especially the RWRA's implementation at state level, pertains to domestic household bottle and plastics recycling. National requirements or standards for industry recycling, reuse, and disposal still have not been established.

The RWRA is the only Commonwealth legal instrument with the scope to address recycling and disposal of waste from the DPRD of OI&I. However, it does not regulate the volume and conditions pertaining to either at present. It fails to establish a legal requirement for the recycling of recyclable materials. Rather, the RWRA is silent on the issue of mandatory recycling, nor does it seek to impose targets.

This differs markedly to Norway, where an environment plan and a safety case is required for decommissioning, Norwegian title holders are required under petroleum legislation to prepare and submit a decommissioning plan. This plan includes, inter alia, a description of the effect of the disposal, alternatives for commercial and environmental aspects that could be undertaken to reduce discharge or emissions in conjunction with disposal, a requirement to remediate any damage or inconvenience, and disposal and recycling alternatives. After a mandatory public consultation plan regarding disposal and recycling options, the regulator (Norwegian Petroleum Directorate) selects the recycling and disposal pathway the titleholder must implement. The disposal pathway selection is based on a combination of factors, including the type of structure, materials present, DPRD capacity available at the time of decommissioning, and other unique requirements the structure might have.

The Norwegian process outlined above exemplifies best practice, as it ensures that recycling and disposal is integrated into the decommissioning planning and execution, rather than left as an afterthought.

Australia does not utilise such planning or state direction in DPRD activities. To regulate waste and recycling, Australia has established the RWRA to regulate non-hazardous waste material. This regulation applies to onshore DPRD. The regulation of the import, export, and transit of hazardous materials is regulated under the Commonwealth's *Hazardous Waste Regulation of Exports and Imports Act 1989* (HWREIA),

Both the HWREIA and the RWRA provide legal requirements for waste to be disposed of but fail to address the criteria of *when* waste can be exported. There are no criteria developed for exportability, or what the implementation of criteria for materials to be recycled and disposed of in Australia, since DPRD of OI&I is in its infancy and regulation to date does not encompass requirements for onshore DPRD of oil and gas OI&I.

6.4 Recommendations

Australia's clear lack of DPRD facilities has, and will continue to, hamper the dismantling and processing of decommissioned OI&I. After identifying appropriate locations for additional capacity, there is a need to commission and construct the requisite facilities.

Recommendation 6: Ensure the construction of quality purpose-built offshore energy installation dismantling facilities corresponding to the volume and location of materials to be removed. These must be collocated with port facilities to enable the movement of materials for transport to appropriate recycling facilities.

Australia's decommissioning legislation at present does not require the titleholder to recycle certain amounts or volumes of material (either in Australia or overseas), nor does it stipulate whether recycling must occur at all. Further, there is no requirement for the material to be recycled or disposed of in Australia.

Recommendation 7: The Recycling and Waste Reduction Act 2021 requires comprehensive amendments to address recycling requirements from materials arising from offshore oil and gas decommissioning activities, including metal, concrete, and plastics.

Recommendation 8: The Offshore Petroleum and Greenhouse Gas Storage Act 2006 and associated Regulations must be amended, to require a titleholder to submit a decommissioning plan that stipulates how the titleholder will recycle and dispose of all material, and to require the domestic recycling and disposal waste.

8. FUTURE CONSIDERATIONS

As Australia accelerates its decommissioning and DPRD of OI&I, and new forms of energy are installed offshore that will require future decommissioning and DPRD, Australia can establish best practice facilities and concomitant regulatory frameworks that will build a circular economy. In doing so, Australia will not only meet its international obligations, but establish a world-class safe and environmentally friendly industry that provides jobs and investment opportunities for Australians and Australia.

To establish a circular economy of excellence that provides many opportunities, there is a pressing need to identify, incentivise, and construct facilities to undertake DPRD. However, industry is unlikely to commit to such an undertaking without a sound and comprehensive legal framework that sets clear and consistent expectations for removal, delineates regulatory

responsibilities and harmonises regulatory requirements across jurisdictions to reduce regulatory burden and encourage cross-border DPRD activities.

To establish a policy and legal framework that creates jobs for Australian workers during and beyond the energy transition, the establishment and regulation of facilities, and national obligations for recycling and waste reduction, must be systematically considered and methodically established, not developed on an ad hoc basis.

Reform going forward also needs to consider that there are not just oil and gas facilities for DPRD, but also wind and other offshore energy generation installations and infrastructure. The Commonwealth's ***Roadmap to establish an Australian decommissioning industry for offshore oil and gas*** provides a unique opportunity to proactively establish an onshore DPRD industry, underpinned by a world-class best practice regulatory framework.

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