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# Australian Construction and Demolition Waste Challenges and Opportunities



# Acknowledgement of Country

Engineers Australia acknowledges the traditional custodians of the country throughout Australia and recognises their continuing connection to land, waters and community.

We pay our respects to them and their cultures; and to elders both past and present and emerging.





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# Background



## 2009-12: Focus on C&D waste management

- Hyder Consulting, 2011 and Edge Environment 2011 developed reports related to C&D management for Department of Sustainability, Environment, Water, Population and Communities (Now Department of Agriculture, Water and the Environment)
- Beyond Waste Fund (EPA) funded our project “A Supply Chain Management Self Assessment Framework For Waste Minimisation For The Residential Sector”

## 2012-current: Emergence of Circular Economy, “Towards the circular economy” by McKinsey & Company

- Australia started to adopt circular economy principles, reuse, recycle, upcycle

## 2019/2020: Mixed focus on C&D management

- WA (Waste Authority) announced funding specific to C&D waste management (Up to AU\$10 million) e.g. Roads to Reuse pilot
- Vic provided support to expansion of major recycling facilities for C&D through Resource Recovery Infrastructure Fund (RRIF)

*“Less focus does not mean the problem has gone away, it is still there and in fact growing”*

# What is the problem?

- Rapid growth in construction activities in Australia in recent years has led to increased generation of (C&D) waste
- 20.4<sup>1</sup> Mt of C&D waste was generated across Australia during 2017-2018 (almost 43% of all waste)
- Failure to effectively manage C&D waste will have unintended economic, social, political and environmental repercussions<sup>2</sup>
- A holistic national approach is required to handle the growing issue of Construction and Demolition (C&D) waste management in Australia

1. Australian National Waste Report 2018. Department of the Environment and Energy

2. PARK, J. & TUCKER, R. 2017. Overcoming barriers to the reuse of construction waste material in Australia: a review of the literature. International Journal of Construction Management, 17, 228-237.

# Regulatory framework in Australia

- In Australia C&D waste management happens through three tiers of government: federal, state/territory, and local
- The federal government is not directly involved in regulating C&D waste
- State and territory: the majority of legislation occurs at state and territory government level. C&D waste management in each state/territory builds on the specific regulatory framework that prevails in that state
- This regulatory approach is the emergence of inconsistencies between jurisdictional regulations; it gives rise to barriers that impede effective C&D waste management activities<sup>1</sup>

1. Environment and Communications References Committee 2018. Never waste a crisis: the waste and recycling

# Policy Makers and Authorities- state level

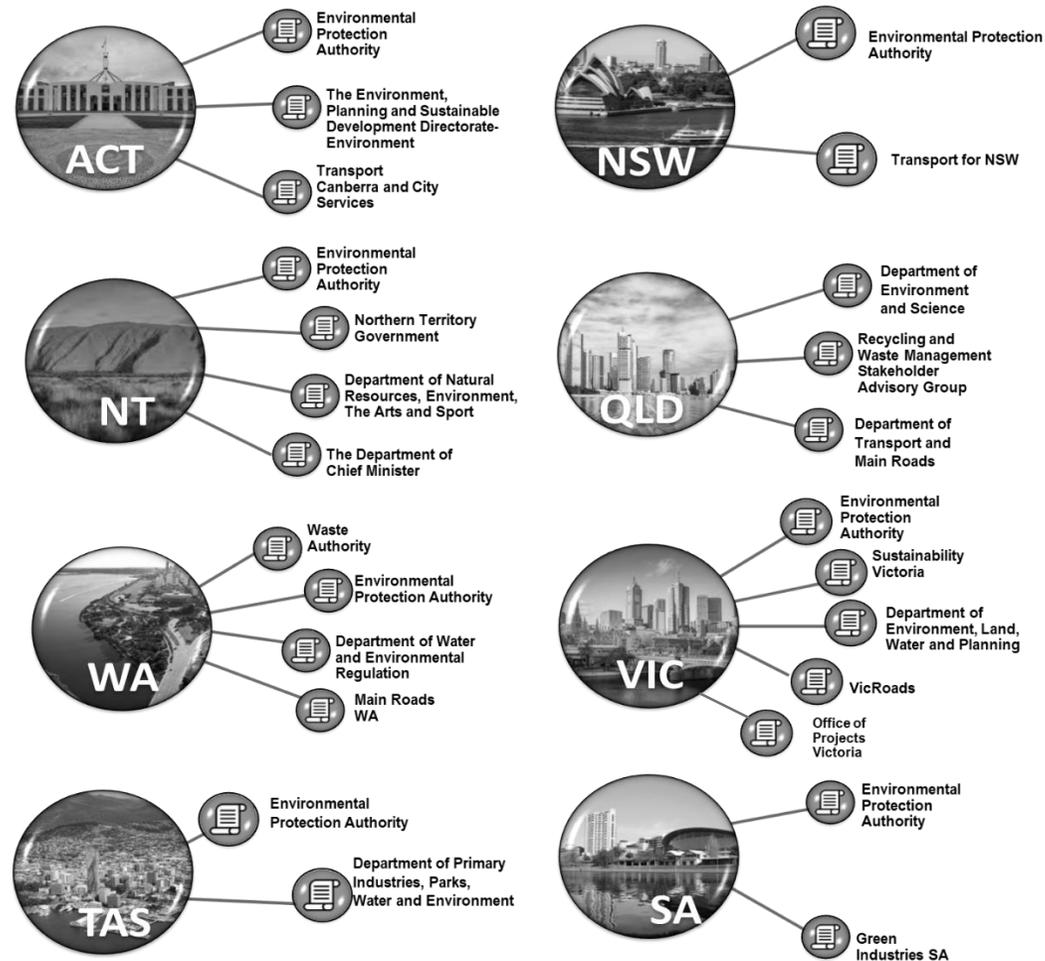


Figure 1: Agencies that contribute to C&D waste management legislation.

# Waste definition and classification



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- Although the National Waste Policy 2010<sup>1</sup> set an objective to develop a national definition of waste, to date there is no consistent definition for general waste or C&D waste specifically
- The practice of waste definition is excessively associated with classification of hazardous materials and determination on landfill levy liability
- The legal definitions of waste, as written into regulations, have generally developed independently within each jurisdiction
- Despite having general similarities between definitions of waste, each jurisdiction uses specific wording and practical applications

1. National Waste Policy. 2010. Department of the Environment and Energy

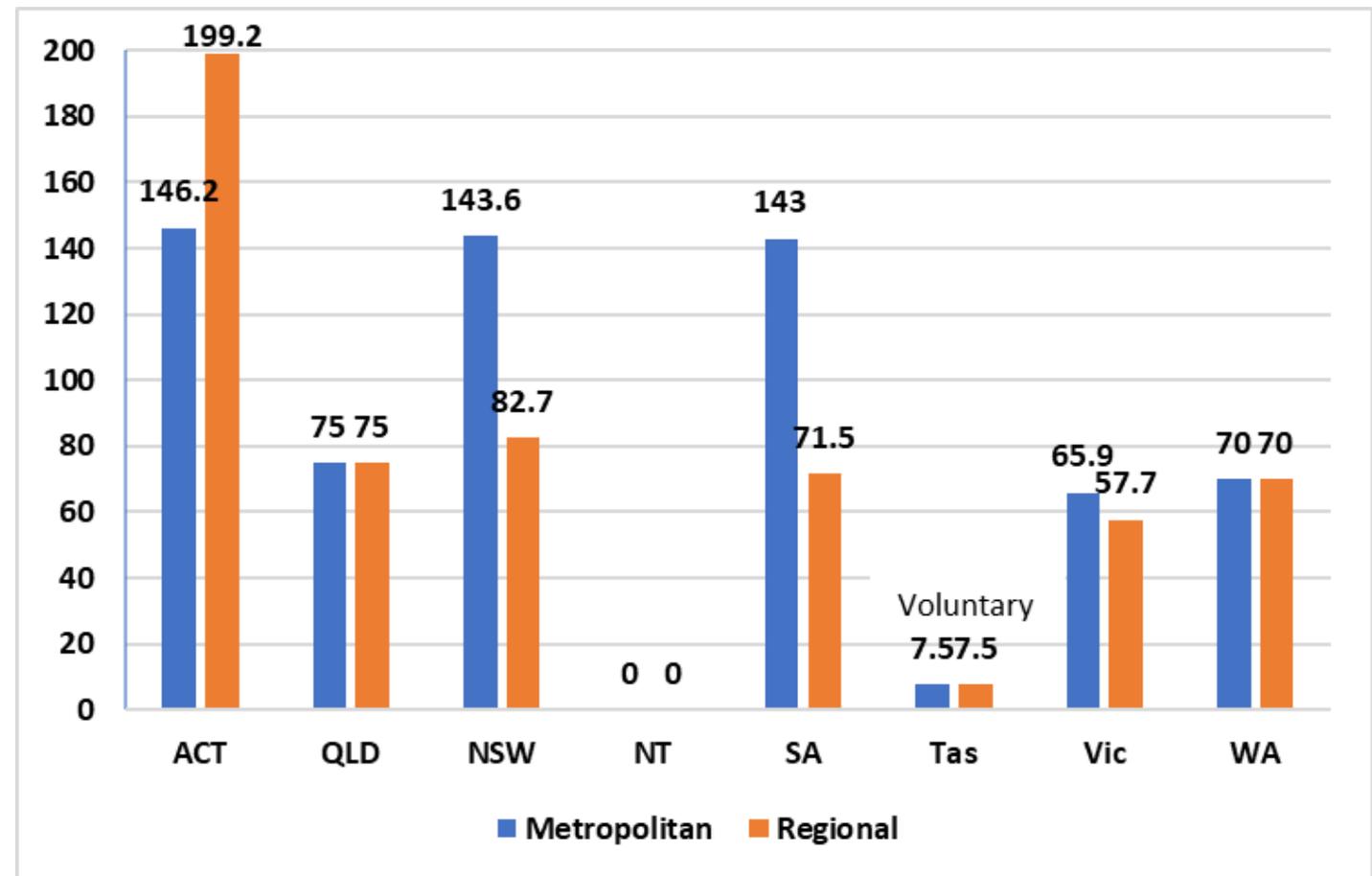
# Waste classification

- The way that waste is classified has a significant impact on many aspects of waste management
- The main functions of classification in jurisdiction are to manage hazardous waste and granting permit and licencing
- The National Waste Policy advocates a classification that is based on three main streams: C&D, C&I and MSW.
- Yet this classification has not been used in waste related regulations in some of jurisdictions and other criteria (e.g. properties and the level of risk they may impose) are used to classify waste

*C&I: commercial and industrial, MSW: municipal solid waste*

# Landfill levy

- Except for NT, each of Australia's other jurisdictions have introduced a landfill levy; however, levies are imposed in different ways



*Figure 2: Levy fees for C & D waste disposal in different Australia's jurisdictions.*

*Source: EPA in each jurisdiction.*

# Illegal waste dumping penalty fees

- Legislators have set different penalty fees for illegal waste dumping.
- The most severe penalty is being applied (corporates) in NSW, where offenders face up to \$5 million
- This is followed by the penalties in NT, Tas and ACT, which are \$2.86 million, \$1.59 million (+/5 year imprisonment) and \$1 million (+/7 year imprisonment), respectively.
- The next lowest penalty fees are charged in SA (up to \$30 K), WA (up to \$125 K), Qld (up to \$217 K) and Vic (775 \$K).



# Waste management targets



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- **Resource recovery and recycling targets:** ACT: 90% (2025), NSW: 80% (2021), Qld: 65% (2030), SA: 90% (2020), Tas: 40% (2025), Vic: 80% (2030) and WA: 75% (2020).
- NT does not have a current target for recycling and reduced landfilling.

# Waste data management system



- Waste data is critical to well-targeted and planned evidence-based waste projects and programs
- In some jurisdictions, reporting waste data is obligatory and more than one authority could be responsible for waste data collection
- Among the jurisdictions, only four states (NSW, Qld, SA and Vic) have developed and operated a central data management system

**NSW: Waste and Resource Reporting Portal (WARRP)**

**QLD, the Queensland Waste Data System (QWDS)**

**SA: the Zero Waste Environment User System (ZEUS)**

**VIC: Sustainability Victoria operates the Waste Data Portal (WDP)**

# Waste strategy document

- Most jurisdictions have a strategy document
- Despite not having statutory power, they guide efforts to improve waste management in different jurisdictions
- It guides government organisations and industries in improving waste management over the strategy period
- Currently, Tas does not have a current waste strategy document



*Waste strategy documents.*

# Consistent approach to define and measure C&D waste across different jurisdictions

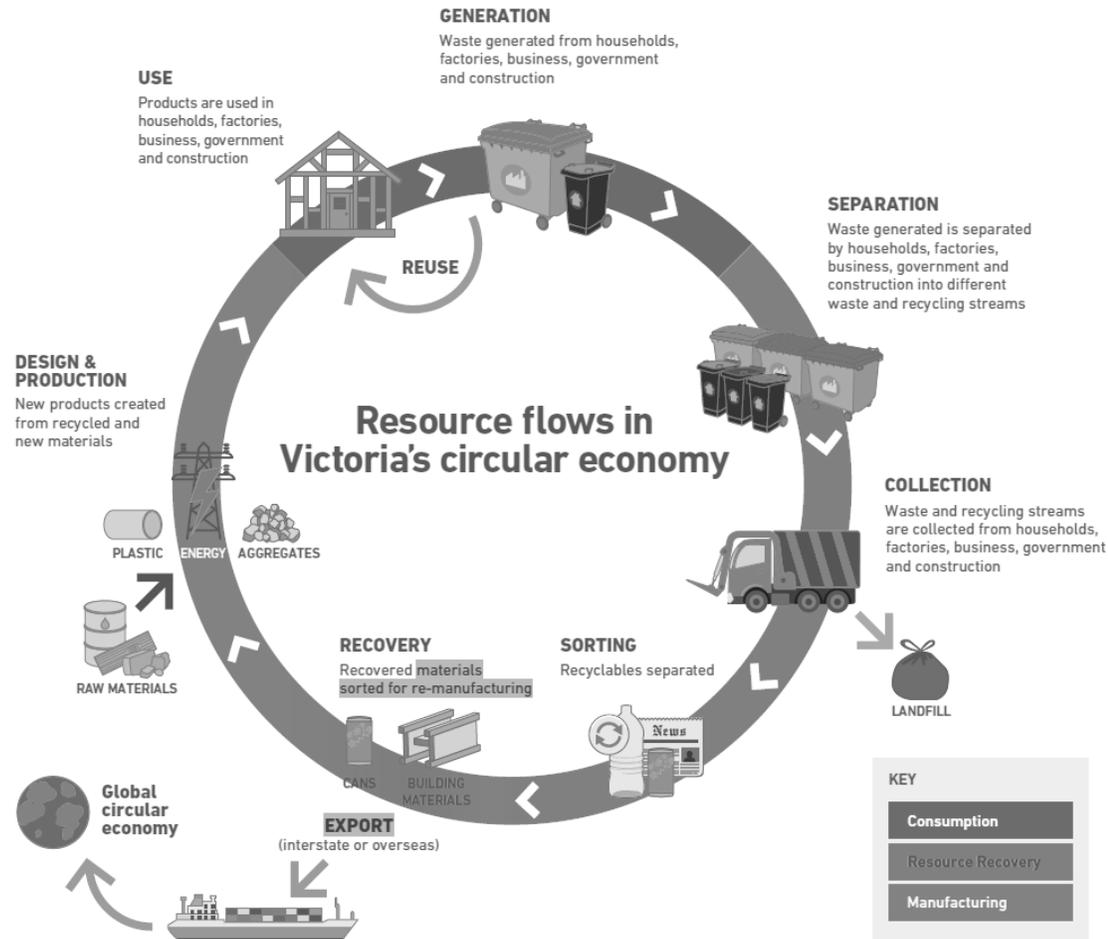
- In NWP 2018 the concept of “a waste is not always waste” is promoted in the “Waste as a Resource- the Circular Economy” section
- Qld, NSW and SA have adopted the NWP 2018 notion (waste as a resource).
- In Qld, the End of Waste (EOW) framework is proposed to promote resource recovery opportunities and aims to shift the common perception from “waste is always waste” to it being valued as a resource

# Development of marketplace

- The development of a market for salvaged and recycled waste materials has been frequently emphasised in different policies, strategies, waste management principles and guidelines in Australia



# Circular Economy/Cradle to Cradle

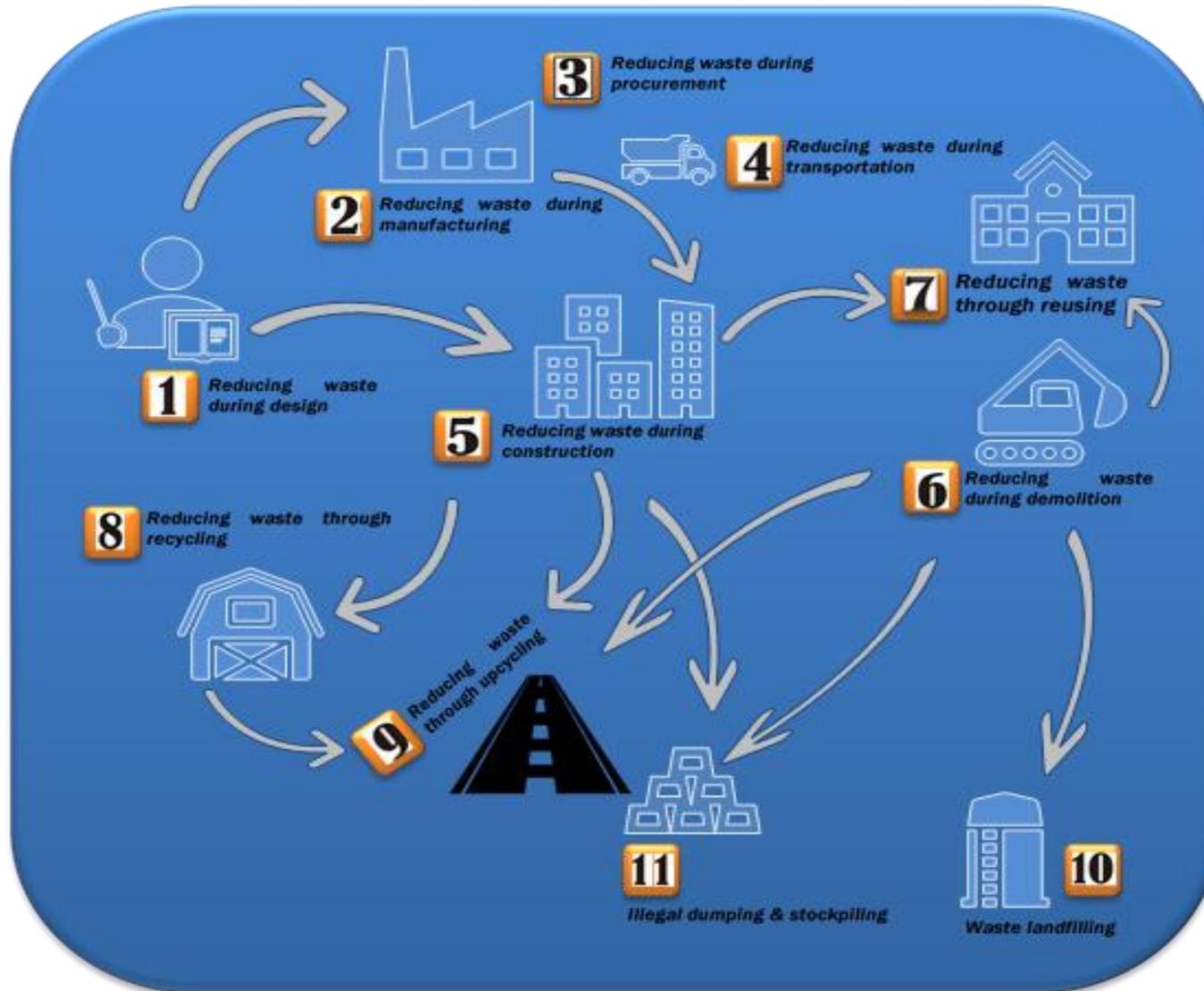


Sustainability Victoria, Statewide Waste and Resource Recovery Infrastructure Plan – Victoria 2015-44, p.47, 2015.

# Case studies using circular economy principles

- Bricks
- Timber
- Concrete
- Steel
- Glass

# Bricks LoWMoR model



# Opportunities to reduce brick waste disposal (LoWMoR) model

- Design appropriate landfill levy schemes to discourage brick waste landfilling
- Consider building standardisation to improve buildability and reduce the number of offcuts
- Supplier to provide more flexible “last pack” sizes i.e. a “fractional” pallet instead of a full pallet
- Use “Supply and Lay” model to eliminate brick leftover
- Develop an agreement where a contractor “sells back” the re-cycled waste from the original material supplier
- Ensure the bottom layers of bricks remain useable by preventing soil contamination

# Opportunities to reduce brick waste disposal (LoWMoR) model

- Store bricks in a stable flat area to avoid breakages from fall overs
- Determine a means for cutting bricks into half more accurately so that both halves can be used, and breakages avoided
- Take unwanted bricks back to brickyard for crushing and re-use in brick production; this can be also complemented by offering the customer leftover (full) bricks
- Include a clean-up payment in the scope of the bricklayer's subcontract to assist recycling and to discourage wasteful site practices
- Take brick left-overs away to use as aggregate or landscaping cover

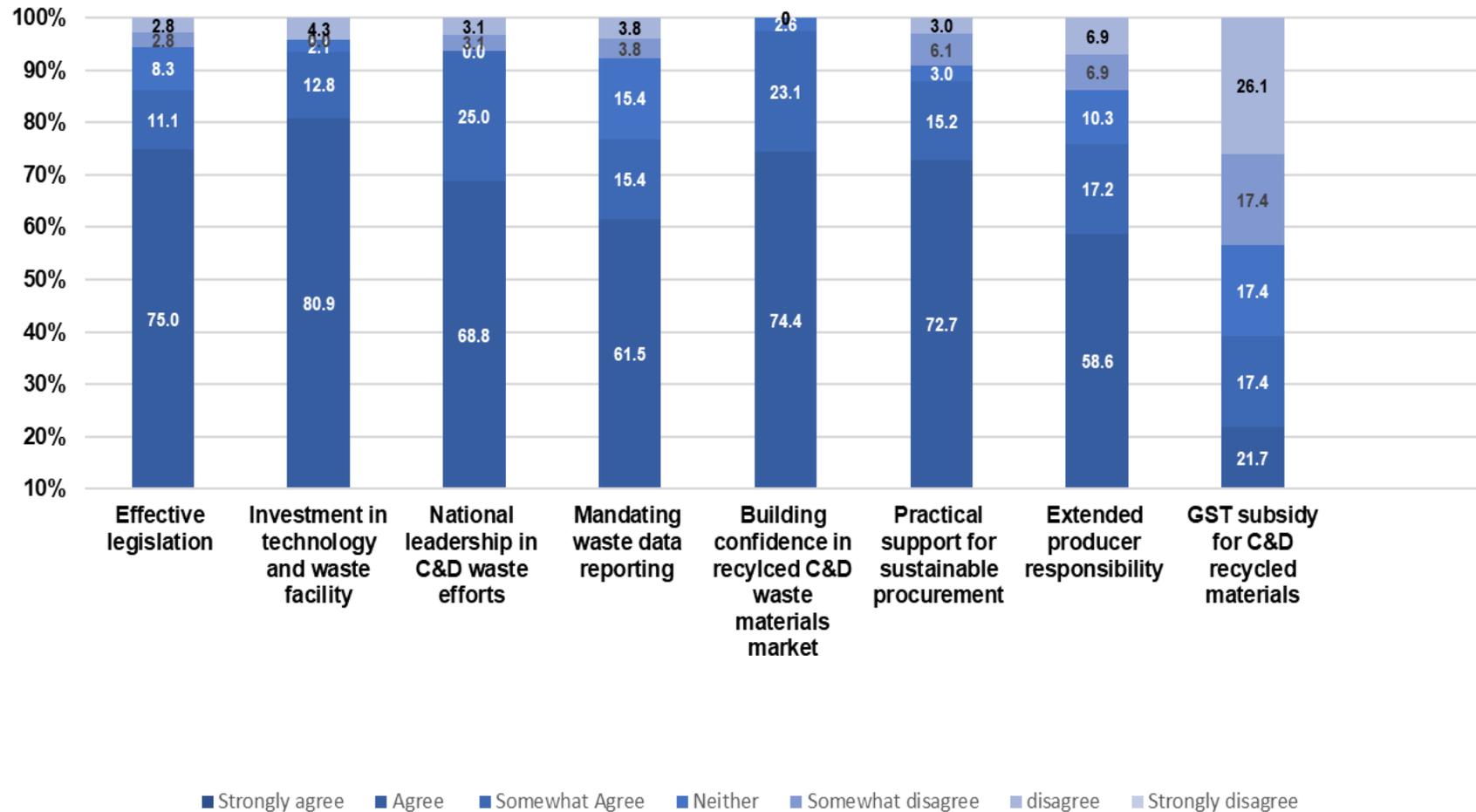
# Perception of Stakeholders

| Question                  | Distribution                 | (%)  |
|---------------------------|------------------------------|------|
| Field of activity         | Construction                 | 16   |
|                           | Demolition                   | 8    |
|                           | Landfill                     | 15   |
|                           | Legislation                  | 6    |
|                           | Industry association         | 6    |
|                           | Waste recovery               | 20   |
|                           | Waste delivery and transport | 10   |
|                           | Consultancy                  | 7    |
|                           | Manufacturing                | 4    |
|                           | R&D                          | 3    |
| Regulations & enforcement | 5                            |      |
| Experience                | <6 years                     | 43.1 |
|                           | 6–10 years                   | 13.7 |
|                           | 11–15 years                  | 16.7 |
|                           | >15 years                    | 26.5 |
| State/territory           | ACT                          | 1.8  |
|                           | NSW                          | 24.3 |
|                           | NT                           | 6.3  |
|                           | Qld                          | 16.2 |
|                           | Tas                          | 3.6  |
|                           | Vic                          | 30.6 |
|                           | WA                           | 17.1 |

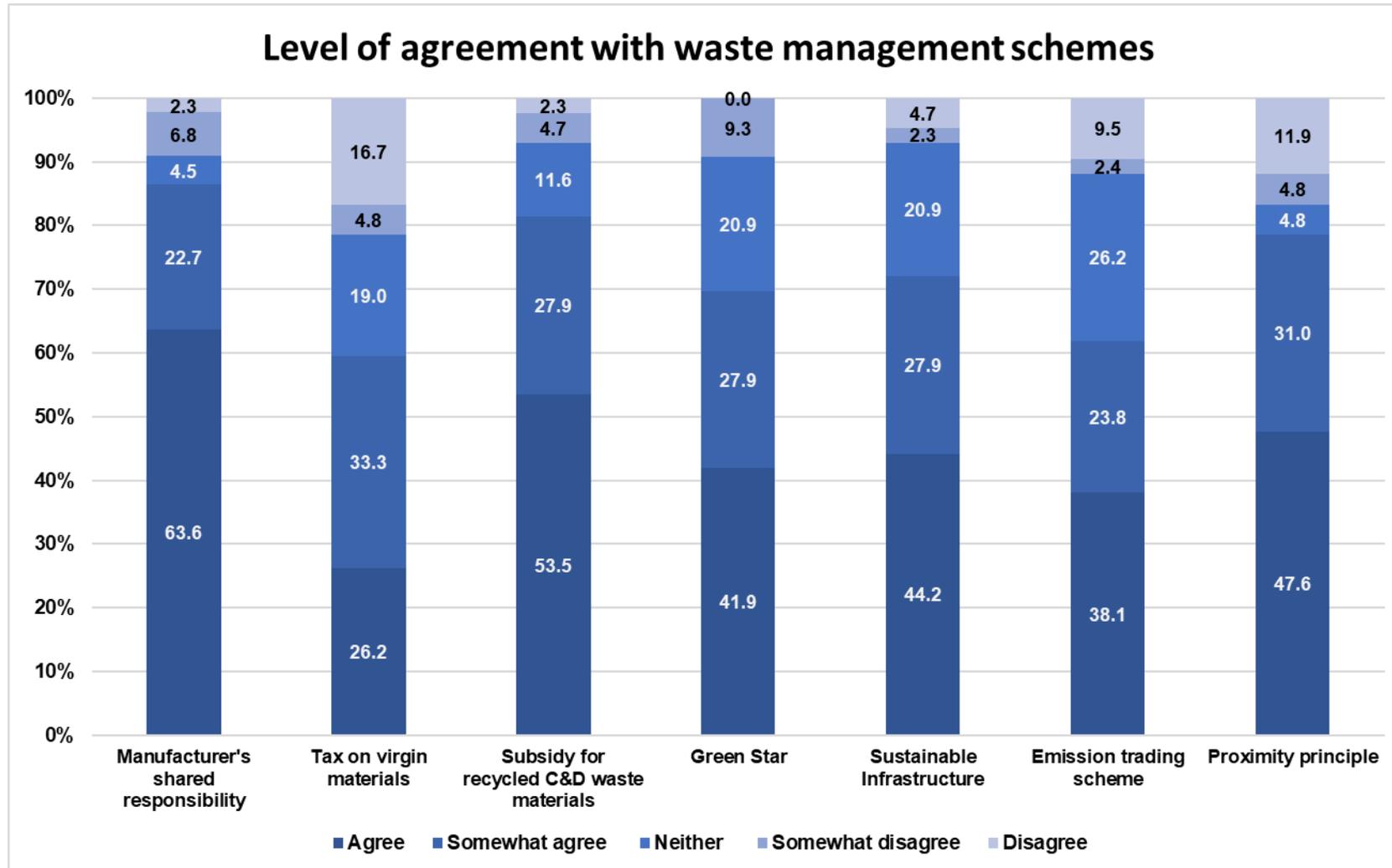
Sample size: 132  
July 2019- September  
2019

# Federal government role

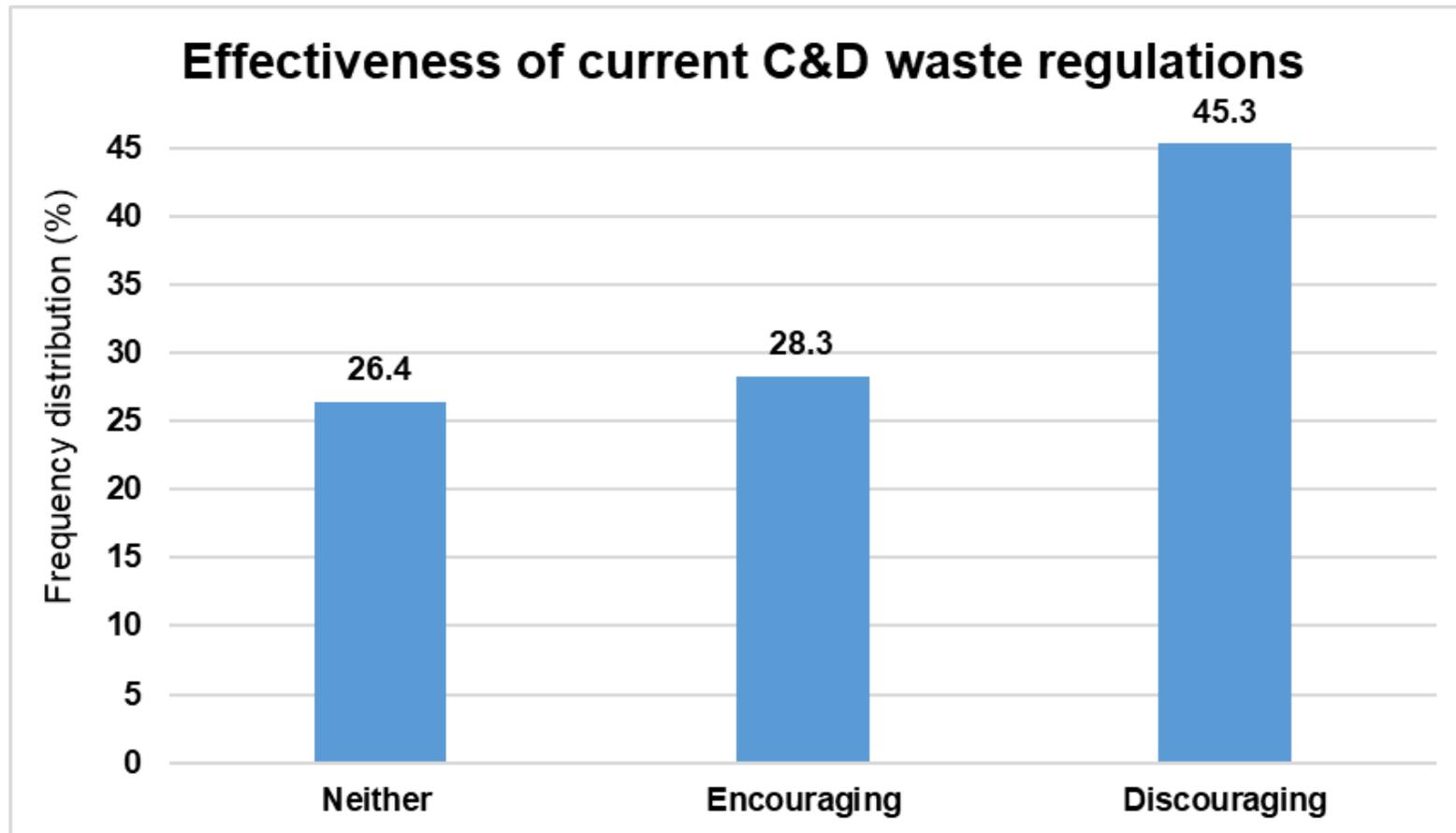
The Australian federal government role in C&D waste management



# Waste management schemes/strategies



# Effectiveness of current C&D waste regulations in motivating further recycling



# Recommendations



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1. Develop appropriate EPR and similar schemes for greater impact and compliance.
2. Support and promote design out waste practices through funding and education.
3. Invest in technologies and infrastructure to accommodate the growing quantity of C&D waste.
4. Provide a GST subsidy for building materials with recycled content.
5. Invest in attitudinal change through R&D programs, leading to raising C&D waste stakeholders' awareness.
6. Mandate GS and IS principles with respect to waste minimisation, or award construction projects that support and fulfil the existing GS and IS requirements.

# Recommendations

7. Support the development of an efficient and effective supply chain system.
8. Mandate sustainable procurements within the public sector.
9. Review existing waste regulations, policies and strategies to provide further support for the waste management and resource recovery industries.
10. Promote a cradle-to-cradle approach in the design and manufacture of construction materials.
11. Establish a marketplace that facilitates the trade of salvaged and recycled C&D waste material.
12. Mandate developing and keeping as-built and as-renovated plans, including a bill of quantities.



# NATIONAL CONSTRUCTION & DEMOLITION WASTE RESEARCH AND INDUSTRY PORTAL (NCDWRIP)



This research and industry portal that provides insights into the Australian Construction and Demolition (C&D) waste management. Established in 2020, NCDWRIP aims to connect the key stakeholders working in the area of the C&D waste stream, including government agencies, the design, and construction industry, waste management and resource recovery industry, professional associations, and academics.

Let's Chat! We'll reply as soon as we can

Q&A





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Core Partners: This research would not have been possible without the ongoing support of our core industry, government and research partners:



Roads &  
Maritime



Curtin University





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# Thank you

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