

Investigating Innovative Waste Economies: redrawing the circular economy



Beds of the Future: pathways to sustainable bedding

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Introduction – research context and aims

‘Beds of the Future’ forms one of the case studies for the ARC Discovery Project, ‘Investigating innovative waste economies: Redrawing the circular economy’.

Bedding, and mattresses in particular, present a significant challenge for circular economy transitions, due to the complexity of materials involved and the costs of end of life collection and management, primarily born by local government. The research was undertaken in collaboration with the [Australian Bedding Stewardship Council \(ABSC\)](#) which facilitated participation by fifteen organisations, including manufacturers and material suppliers, retailers, waste managers and materials recyclers.

Research design and methods

Stage 1: Interviews and site visits were undertaken to identify current challenges and future aspirations of participating organisations. Interview transcripts were then analysed to further unpack challenges, innovations, incentives and future visions. These were then captured visually in a graphic ‘map’ depicting the challenges ‘beds of today’ and the aspirations for ‘beds of the future’ (the ‘Pipe Dream’).

Stage 2: Participants from Stage 1 were invited to join an online interactive workshop called ‘Beds of the Future’ which aimed to highlight common concerns and shared ambitions, generate visions for beds of the future and foster new collaborations to transition to a sustainable bedding system in Australia.

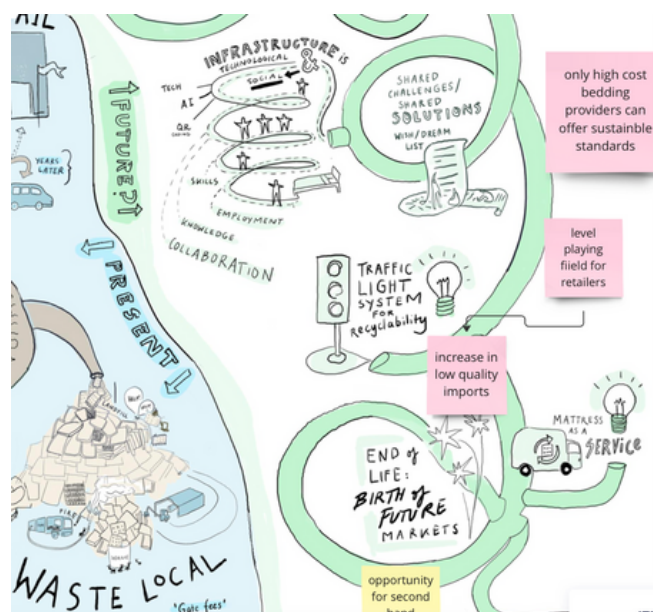


Figure 1. Section of graphic map used in interactive workshop.

The graphic map from Stage 1 was used to prompt discussions around material challenges, collaborations, business models across the supply chain, and incentives and disincentives for change. Proposed solutions were documented and grouped under overarching strategies.

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Research findings

Key challenges for managing end of life bedding currently include the number and complexity of materials types used in mattresses, the presence of chemical contaminants such as antimicrobials, fire retardants and dyes, and the lack of information about the materials used in different types of mattresses entering the waste stream.



Figure 2. End of life mattresses showing pocket springs and mechanised shredding.

ABSC connects waste managers and retailers with businesses and social enterprises for the collection and disassembly of mattresses and recovery of recyclable components by ABSC certified recyclers (Figure 3). However, it seeks to expand its research and development initiatives to develop more effective longer-term solutions, including change in the design of mattress and the materials used.

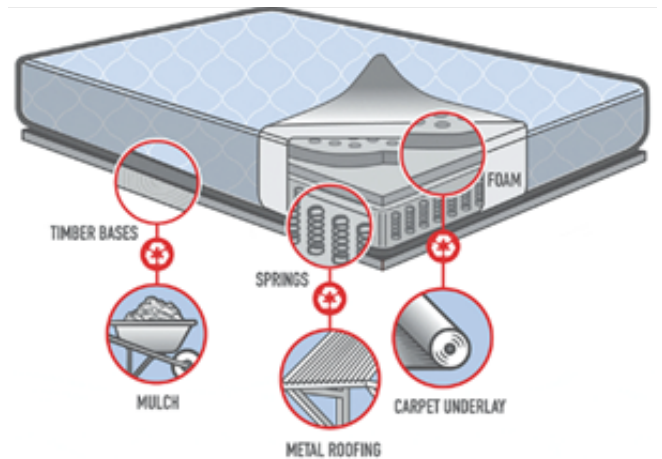


Figure 3. ABSC certified mattress recycling.

Longer-term solutions include bedding design for longer product life, certified standards for component materials and associated labelling, design for disassembly and replacement of fabric layers.

Increasing costs of logistics associated with end of life bedding recovery suggest that new business models and/or regulatory oversight may be required to shift this responsibility from local governments to manufacturers.

Five overarching strategies were identified by research participants for transitioning to more sustainable and more circular bedding systems. No one strategy can achieve the goal of sustainable bedding in isolation. Some focus on improved management of current bedding design and component materials while others address the design of sustainable bedding systems for the future.



- (i) Transitioning end of life management
 - Coordinate more efficient collection logistics for end of life bedding
 - Implement bans on mattresses in landfill
 - Improve separation of component materials and identify end markets for non-metal components
 - Develop facilities for recycling standard foam types in Australia
- (ii) Transitioning materials
 - Eliminate toxic substances, non-recyclable material components and contaminants that compromise materials recycling
 - Adopt a national certification standard that aligns with international schemes for sustainable bedding materials
 - Simplify and standardise the materials used in bedding and label products for material components
- iii) Transitioning bedding design



Figure 4. Modular design by Social Living

- Design for disassembly
- Modular design facilitating replacement and sterilisation of soft layers for hygienic reuse (Figure 4)
- Design mattress using a single material type

- (iv) Transitioning public awareness and social norms
 - Public education and awareness campaigns promoting responsible consumption and disposal choices.
 - Nationally accredited star ratings to facilitate consumer choice for sustainable products.
- (v) Transitioning business models for bedding provision
 - Introduce extended producer responsibility where manufacturers take responsibility for end of life management and reverse logistics of collection
 - Develop mattress product service systems where the producer retains ownership of the materials and the consumer rents bedding as a service

Facilitating collaborative solutions

The ABSC is already advancing many of the strategies identified and actively brokers relationships up and down the supply chain that bring producers together with retailers, waste managers and materials recyclers. The research supports these initiatives by identifying transition pathways that maximise the synergies between the various strategies, encourage participation from a broader range of stakeholders, and provide an evidence base for funding support.



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This case study is a part of a federally-funded ARC Discovery research project led by Western Sydney University in collaboration with University of Technology Sydney (UTS) and Monash University titled Investigating Innovative Waste Economies: redrawing the circular economy.

This research project explores cases of economic and social innovation in 3 key waste streams: organics, single use plastics and bedding. A key focus of the study is understanding exactly how more circular practices are created.

https://www.westernsydney.edu.au/ics/projects/investigating_innovative_waste_economies_redrawing_the_circular_economy

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Find out more at

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