MONASH University

MONASH BUSINESS SCHOOL

Sparking the Circular Economy in Melbourne's Manufacturing Industry

FINAL REPORT

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INTRODUCTION

Monash University, in partnership with the South East Melbourne Manufacturers Alliance (SEMMA), and funded by Sustainability Victoria, is supporting Circular Economy (CE) adoption in South East Melbourne's four manufacturing sub-sectors (i.e., plastics, textiles, general engineering, and food). Through the project, we aimmed to:

- OBJECTIVE 1: Establish the extent of relevant CE practices (waste prevention, reuse, remanufacture, and upcycling) being implemented by businesses and their tier-one suppliers across four manufacturing sub-sectors in South East Melbourne and how effective they are in delivering CE outcomes.
- OBJECTIVE 2: Identify and develop practical approaches for manufacturing businesses to adopt CE strategies and practices, where their implementation will lead to a reduction of waste by up to 20% in their operations and tier-one suppliers.
- OBJECTIVE 3: Identify potential barriers and challenges to adopting these new approaches and identify how these can be overcome through education, training, mentoring, and other support services for businesses and their tier-one suppliers.

This report presents the activities and outcomes of the project's three phases and concludes with the overall project outcome.

- PHASE 1: Explore CE adoption in the state of Victoria
- PHASE 2: Co-design strategies for CE adoption
- PHASE 3: Conduct seminars and workshops to help businesses adopt CE
- Overall project outcome and conclusion

ACKNOWLEDGMENTS

The project is completed in a partnership between a team in the Monash Business School, Monash University, and the South East Melbourne Manufacturers Alliance (SEMMA).

The project is funded jointly by Sustainability Victoria and Monash Business School.

We are very appreciative of the availability and insights of Victoria's leading CE businesses, who participated in this project. We are also grateful for the support provided in completing this project by the local councils in South East and East Melbourne and the South East Business Network (SEBN).

PHASE 1 EXPLORE CIRCULAR ECONOMY ADOPTION IN THE STATE OF VICTORIA

Phase 1 was aimed at:

- OBJECTIVE 1: Establishing the extent of relevant CE practices (waste prevention, reuse, remanufacture, and upcycling) being implemented by businesses and their tier-one suppliers across four manufacturing sub-sectors in South East Melbourne and how effective they are in delivering CE outcomes.

This section presents the findings of Phase 1 of the project. We identified leading and celebrated CE businesses in Victoria and undertook in-depth interviews to explore their experiences and outcomes. Here, we present those initial findings that establish the extent and experience of CE strategies and practices implemented by businesses across four manufacturing sub-sectors (i.e., plastics, textiles, general engineering, and food).

The interview sample represents 25 leading CE adopters who generously volunteered their time to share their knowledge, primarily representing the four industry types targeted by the project. These participating CE leaders are characterised in Table 1. We have categorised each business as either:

i. A business with CE built-in from inception

ii. Businesses using 'waste' as a resource

iii. Adoption of CE into a linear business model

The summary of Phase 1 focuses on the dominant themes that emerged across the interviews. These themes have created a central narrative, though it is important to note that greater levels of nuance and insight were used as the foundation for the seminars and workshops in the project's later phases. Central narrative signals were:

- Drivers for CE adoption
- Benefits of adopting CE strategies and practices
- Critical success factors for effective CE implementation
- Barriers and challenges to the implementation and spread of CE
- Key learnings for others' adoption of CE strategies and practices

We will briefly elaborate on each of these signal points in the central CE narrative.

TABLE 1: LEADING CIRCULAR ECONOMY BUSINESSES

Company	Interviewee	Industry	Business operation CE built into
CE built-in from inception			
– A.BCH	Founder	Textile	A circular fashion label
– Biersal Brewery	Founder	Food	Brewing operation
– BuildFit	Founder	Manufacture/Construction	Validating waste into public infrastructure
– Close the Loop	Founder	Sustainable/CE solutions	Manage take-back, recovery, and reuse programs
– Grainstone	Founder	Food	Advanced food ingredients
– Precious Plastic Melbourne	Founder	Plastics	Machines for repurposing/recycling plastic waste, manufacturing products from recycled plastic
– Retub	Founder	Plastics	Single-use plastic reduction
– Smart Recycling	Founder	Recycling and Pallets	Transforms waste into pallets and building products
– BXB Technologies	Founder	CE park	Proposed CE park in Hastings
– Textile Recyclers Australia Pty Ltd	Founder	Textile	Upcycling and recycling of clothes.
– Unpackaged Eco	Founder	Cleaning and personal care products	Zero waste shopping
– Upparel	Founder	Textile	Clothes and textile upcycling
Businesses using 'waste' as a resource			
– Casafico	Managing Director	Building materials	Waste processed into building products
– Egans Asset Management	Founder	Furniture	Sustainable office workstations/furniture
– IM Group	General Manager	Automotive/Mechatronics	Remanufactured automotive mechatronics components
– Interface	Sustainability Manager	Textile	Reentry carpet take back program provides EOFL (End of First Life) solutions through reuse and reprocessing into new products
– Road Maintenance Pty Ltd	Owner/ Managing Director	Road construction	Using plastic waste and old tyres for road construction
Adoption of CE into a linear business model			
– Arrow MPS	Founder	Mechanical	Machines developed for circular solutions
– Busy Bee Brushware	Sales & Office Manager	Brushware	Manufacturing of industrial brush-ware.
– Fortress Resistors	Managing Director	Electronics	Design and manufacture of power resistors
– Integra Systems	Commercial Director	Engineering	Product Development & Manufacturing
– Jardan	Operations Manager & IT Manager	Furniture	Furniture manufacturing
– Sensient Technologies	Director of Operations	Food	A developer of food colouring and flavours
– Successful Endeavours	Founder	Electronics/Design	Design and manufacture of electronics
– WE-EF Lighting	Head of Operations & Sustainability Ambassador	Electronics	Manufacture high-quality lighting

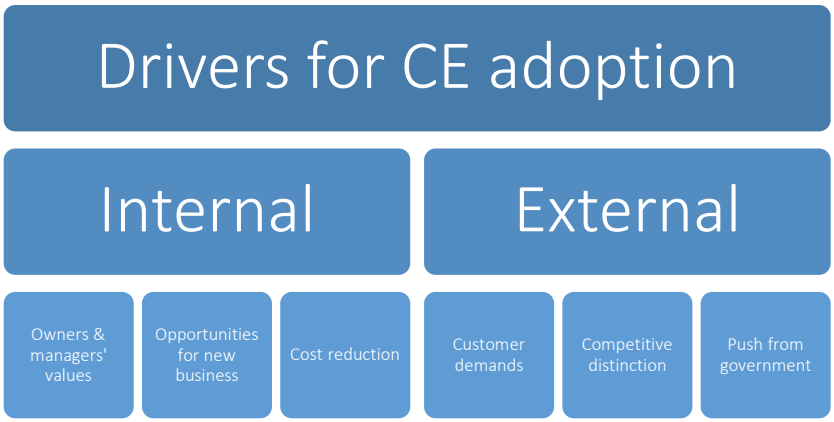
The majority of these leading CE businesses are also celebrated within the project website, as key examples and as case studies (www.theCEjourney.org.au).

CENTRAL CIRCULAR ECONOMY ADOPTION AND EXPERIENCE NARRATIVE

In this part, the central narrative is presented. For each, the key themes are presented in a figurative format, with a selection of exemplary quotes.

1. Drivers for Adopting CE Strategies and Practices

The key drivers for adopting CE strategies and practices could be divided into internal and external motivation, with the internal drivers (from within the business and leadership team) dominating.



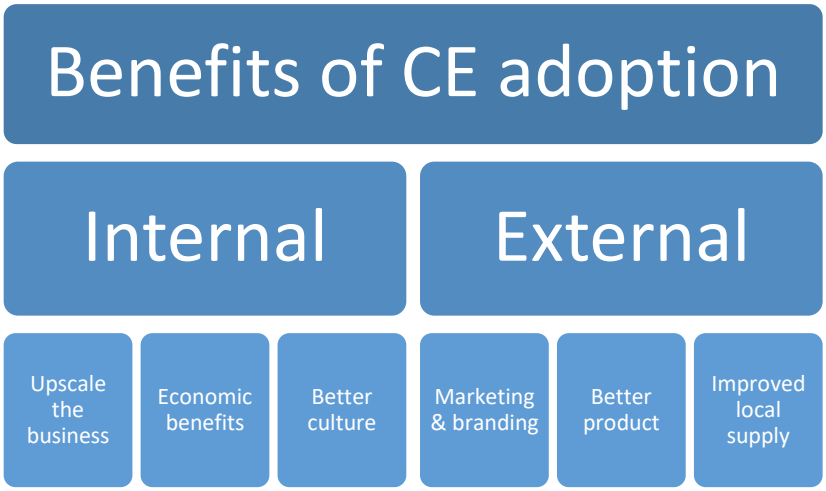
"We've started it because we genuinely want to make a difference"

"Historically, it's been about cost control. Now, it's being driven by our customer base"

"The circular economy has always been driven by values from the ground up"

2. Benefits of Adopting CE Practices into Business Operations

Participants noted many benefits of adopting CE strategies and practices. These are grouped under benefits internal to the company and external stakeholders.



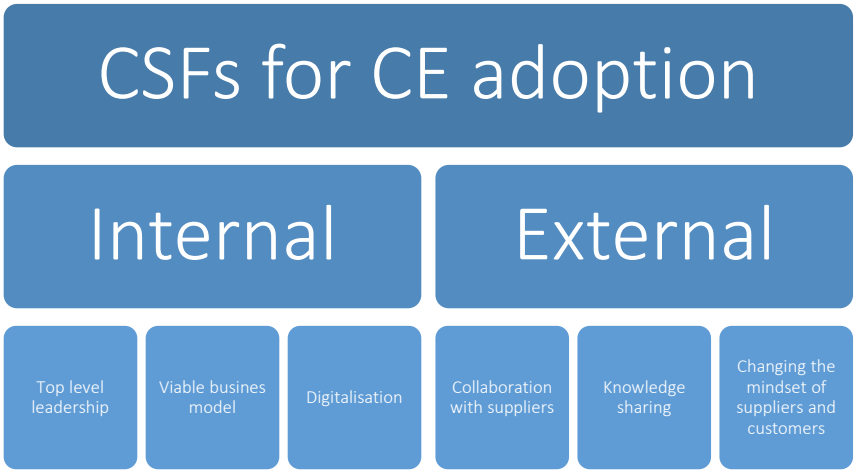
"It's certainly got a benefit for the people that work here, understanding that they are in that environment"

"We're not just telling a story, we're telling a story and creating a value proposition, which is a marketing exercise as well"

"Keep the price the same and just have the ultimate product, which is pretty much what we've done"

3. Critical Success Factors for Effective Implementation of CE

The critical success factors (CSFs) for successful CE implementation, scaling, and spreading were also categorised into internal and external aspects.

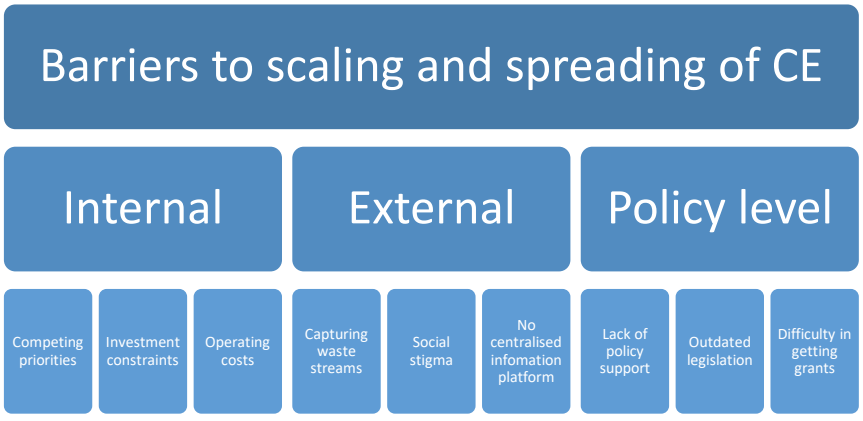


"To truly make an impact, we have to demonstrate that sustainability equals success, both environmental impact and commercial success"

"This is where we see circular economy as being very much a collaborative initiative. We cannot develop a circular economy model for our products alone"

4. Barriers or Challenges to Scaling and Spreading of CE

While being CE leaders, many of the businesses still faced barriers or challenges to the adoption, scaling, and spreading of CE. These were categorised as internal, external, and policy-level attributes.



"Probably because we want to improve the profitability of the business, efficiency of business. Those sorts of things are important to the moment, given we've been through a couple of really difficult years"

"The stigma is, if it's recycled, it must be poor quality. That is nonsense, and it should not stop procurement"

"There's a lack of leadership in terms of circular economy. The legislation is not there"

5. Learnings Shared by the Leading Businesses in Adopting CE

Below are the learnings shared by the interviewees with other businesses looking to start their circular journey.

- Update Process Vision: Each business producing a product should build Circularity, including repurposing or recycling into the product.
- Extend Circularity to the Supply Chain Level: Redesign the business model - Take a systems approach and build Circularity into the whole supply chain.
- Be part of the CE value chain: Ensure that there is financial viability to the business model. It is crucial for businesses to be profitable to sustain the idea that will create a CE.
- Ensure Visibility: Be transparent and genuine in what you do in the CE space. Demonstrate to others what you do.
- Communicate Your Understanding of CE Value Creation: Help people understand the value of what they are contributing to as a part of the CE space.
- Be an Active Contributor to CE Ecosystem: Create networks of like-minded communities. Engage with others in collaboration and knowledge mobilisation on best practices in CE.

PHASE 1 CONCLUSION

Victoria is the home of a number of leading CE businesses. While the number is small, these businesses are great models of what can be achieved, and their experiences provide both insights and guidance for other businesses about to start the CE journey.

The participant leaders were at different maturity levels on their circular journey. Circular start-ups and companies that have transformed their traditional linear business models into circular models demonstrate mature CE strategies, and others were on the journey to Circularity.

The central narrative demonstrates that the leading CE efforts are driven by leaders' values and passionate customers, while top-down policy facilitation is just starting to emerge. While each of the leading CE businesses has faced some barriers and challenges, they have largely overcome these to provide a range of benefits to their supply chain participants and their communities.

While celebrating the success of the leading CE businesses, the narrative provides valuable insights for those about to start their circular journey. The narrative is not the path, though it sensitises businesses to key considerations for the first steps along the path. These findings informed the project's subsequent phases in developing seminars and workshops to promote awareness and capability to adopt CE strategies in manufacturing businesses in Southeast Melbourne through seminars and workshops.

PHASE 2 CO-DESIGN STRATEGIES FOR CIRCULAR ECONOMY ADOPTION

Building on the empirical findings of Phase 1, Phase 2 was primarily aimed at:

- OBJECTIVE 2: Identify and develop practical approaches for manufacturing businesses to adopt CE strategies and practices, where their implementation will lead to a reduction of waste by up to 20% in their operations and tier-one suppliers.
- OBJECTIVE 3: Identify potential barriers and challenges to adopting these new approaches and identify how these can be overcome through education, training, mentoring, and other support services for businesses and their tier-one suppliers.

This section presents a summary of activities conducted in Phase 2 on the following topics.

- Further gathering of data from businesses and local government authorities
- Use interviews as the starting point to understand barriers to CE implementation
- Discussions with the project's international and local partners on their feedback
- Public Seminar on starting the CE journey
- Three co-design workshops

We will briefly elaborate on each of these activities and their outcomes that served the project's final phase, which focused on helping the manufacturers adopt CE practices.

ACTIVITIES CONDUCTED UNDER PHASE 2 AND THE OUTCOMES

This part presents conducted activities and their outcomes under each topic.

1. Further Gathering of Data

- Further on-site interviews with three previously interviewed leading CE businesses and tours of their facilities were conducted. This in-depth investigation is part of an academic article for a special issue of *The International Journal of Logistics Management* that was submitted in May 2022 and published online in November 2022:

  De Vass, T., Nand, A. A., Bhattacharya, A., Prajogo, D., Croy, G., Sohal, A., & Rotaru, K. (online). Transitioning to a circular economy: Lessons from the wood industry. *The International Journal of Logistics Management*. https://doi.org/10.1108/IJLM-04-2022-0200

- Additional data was gathered through interviews with staff from seven partnering local government authorities. Data were used to developing an article for the *Accounting, Auditing and Accountability Journal*, submitted in December 2022:

  Rotaru, K., De Vass, T., Croy, G., Sohal, A., Prajogo, D., Bhattacharya, A., & Nand, A. A. (under review). Local governments' use of accounting technologies to facilitate a circular transition: Learnings from Melbourne, Australia. *Accounting, Auditing & Accountability Journal*.

- Combining the 25 leading CE business interviews with those of local governments have provided us with an extensive understanding of the extent of relevant CE practices being implemented by businesses and their tier-one suppliers across four manufacturing sub-sectors in South East Melbourne, and how effective they are in delivering CE outcomes to further achieve Objective 1, the primary goal of Phase 1.

2. Understanding Challenges and Barriers to CE Implementation

- Interviews with leading CE businesses and local government officials helped identify potential barriers and challenges to adopting CE practices.
- These interviews also provided a starting point for how to overcome the barriers and challenges to facilitate businesses' identification and development of practical approaches to adopting CE strategies and practices.

3. Discussions with Project's International and Local Partners

- Regular discussions via Zoom with our two international partners helped us gain their feedback

  Professor Prasanta Dey (Aston University, UK)

  Professor Andre Nijhof and Ms Diane Zandee (Nyenrode Business University, The Netherlands).
- We have established a relationship with a Federation University research team and held two Zoom meetings. The Federation University team shared their findings from a recently completed national survey examining CE status amongst Australian SMEs. They complement our interview findings to add value to developing our Phase 3 activities.

4. Public Seminar on Starting the CE Journey

- A highly successful Public Seminar was held on Wednesday, the 9th of March 2022, entitled "Starting the journey to being part of circular economy".

  The Seminar had 69 attendances (115 registrations)

  The seminar was lead by Professor Amrik Sohal from the team. Key speakers at the seminar were:

  - Travis Hatton (Sustainability Victoria)
  - Gavin Smith (Robert Bosch Australia)
  - Angela Stubbs (Kingston City Council)
  - Cameron McKenzie (ASPIRE)
  - Steve Morriss (Close the Loop)

5. Co-Design Workshops

- Three co-design workshops were held to gain feedback from businesses (including leading CE businesses), local government officials, and academics to gain insights to develop strategies for the Phase 3 seminars and workshops to help businesses adopt CE. Below are the details of the conducted co-design workshops:

  1) 24th March, 2022 - workshop held at the Kingston City Council Offices (19 attendees)
  2) 25th March, 2022 – workshop held at the Mornington Peninsula Shire Council offices (27 attendees)
  3) 29th March 2022 – workshop held at the City of Greater Dandenong offices (22 attendees)

PHASE 2 CONCLUSION

Through various project activities (interviews conducted with 25 leading CE businesses and officials of local governments, discussions with international experts from the Netherlands and the UK, the public seminar, three co-design workshops, continued collaboration with local government and Federation University colleagues), we identified and developed practical approaches for manufacturing businesses to adopt CE strategies and practices (Objective 2), which will also overcome probable barriers and challenges (Objective 3). Findings informed the Phase 3 seminars and workshops.

PHASE 3 CIRCULAR ECONOMY ADOPTION SEMINARS AND WORKSHOPS

While Phase 2 formulated strategies to help businesses overcome barriers to adopting CE practices, Phase 3 was primarily aimed at delivering those strategies to businesses:

- OBJECTIVE 3: Identify potential barriers and challenges to adopting these new approaches and identify how these can be overcome through education, training, mentoring, and other support services for businesses and their tier-one suppliers.

This section summarises activities conducted for four manufacturing sub-sectors in Phase 3, under two key methods, and creating public awareness about CE.

- Online seminars targeted at each of the four manufacturing sub-sectors
- Four in-person workshops for manufacturers on the adoption of CE practices
- Public web-based platform to create awareness of CE.

The activities and outcomes of the project's final phase are elaborated below.

PHASE 3 ACTIVITIES AND OUTCOMES

Conducted seminars and workshops and their outcomes and the details of the web-based platform promoting CE are presented in this section.

1. Seminars

- Public online seminars were held to raise awareness of CE and its applicability to the four targeted manufacturing sub-sectors:
    1) Food sector seminar was held on 12th May 2022 (17 attendees)
    2) Textile sector seminar was held on 13th May 2022 (13 attendees)
    3) General manufacturing sector seminar was held on 16th May 2022 (16 attendees)
    4) Plastics sector seminar was held on 17th May 2022 (10 attendees)
- The seminars were complemented by video cases of leading CE business experiences.

2. Workshops

- Four in-person workshops were held to identify, prioritise, and plan for adopting CE practices, and subsequently reduce waste. Each of these workshops were hosted in partnership with local government agancies:
    1) City of Kingston, workshop held on 26th May 2022 (10 attendees)
    2) City of Frankston, workshop held on 27th May 2022 (11 attendees)
    3) City of Monash, workshop held on 1st June 2022 (12 attendees)
    4) City of Greater Dandenong, workshop held on 2nd June 2022 (11 attendees)
- Ms Diane Zandee (Nyenrode Business University, The Netherlands) visited for ten days (23rd of May to 3rd of June) to co-facilitate these workshops and provided valuable practical insights and examples into how the CE has been implemented in the Netherlands.
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3. Public Website

- The public asynchronous web-based platform was created using the compiled exemplary CE vignettes, cases, seminars, and workshop resources.

  Website address: https://thecejourney.org.au/
- This website provides excellent information sources for businesses looking to adopt CE.

PHASE 3 CONCLUSION

The objective of Phase 3 was to help manufacturers adopt CE practices through education, training, mentoring, and other support services. Online seminars targeted on each of the four manufacturing sub-sectors were conducted to help manufacturers identify CE opportunities, and four subsequent in-person workshops helped manufacturers develop strategies and implement actionable practices for CE adoption.

Practical approaches devised by the workshop participants are:

- Creating a local network of first CE adopters
- Changing to recycled supplies
- Investigating the availability of local suppliers
- Tell the story – this is the journey we are taking and invite suppliers and customers to come along
- Redesigning and standardising products
- Using sharing platforms to match waste to resources (e.g., ASPIRE)
- Educating staff – promoting CE at the workplace – changing behaviours
- Encourage a culture of waste reduction
- Reduce carbon emissions from the factory (using targeted measures)
- Reduce plastic packaging – move to biodegradable packaging
- Reuse packaging
- Simple self-assessment on their circular endeavours and opportunities to provoke thinking
- Start measuring waste – soon as you start measuring, action will follow
- Pass on used pallets to a pallet recycler
- Use emerging technologies
- Collect and use rainwater/ reuse water
- Introduce solar panels
- Use 3D printing to produce plastic product
- Use wood chips and look for hemp alternatives
- Reconsider reusing egg cartons (practised in the Netherlands)

The key challenge faced at this stage is the time-poorness of SME business leaders to participate in in-person workshops.

Published web-based platform is a great information source to create CE awareness.

PROJECT OUTCOME & CONCLUSION

The project concluded successfully, creating a significant impact and achieving anticipated outcomes.

The workshop participant survey reveal significant outcomes as below.

Questions 1-6 were on a 1-5 scale, from 1 = no more/greater/additional..., to 5 = a lot more/greater/additional.... Question 7 was asked as a percentage:

1. Due to attending the workshop, how much more aware are you of what circular economy is? = 4.13
2. Due to attending the workshop, should the circular economy be of greater strategic importance in your business? = 4.21
3. Due to attending this workshop do you have greater capacity to implement circular economy practices? = 3.87
4. Due to attending this workshop, are you going to further investigate circular economy practices? = 4.40
5. Due to attending this workshop, are you going to implement further circular economy practices? = 4.13
6. Due to attending this workshop, do you have further circular economy connections? = 4.13
7. Due to attending this workshop, and the subsequent adoption of circular economy practices, how much do you anticipate reducing your business's waste by? = **29.09%**

The table demonstrates the external engagement throughout the project duration.

Project Month	Key engagement events occurring during the month	Monthly Engagements	Monthly New Engagements	Cumulative New Engagements	Cumulative Engagements
October		0	0	0	0
November	Survey	35	35	35	35
December	Interviews and survey	20	13	48	55
January	Interviews	18	13	61	73
February	Meetings	4	4	65	77
March	Seminar and co-design workshops	127	115	180	204
April	Seminar	24	23	203	228
May	Seminars and workshops	83	62	265	311
June	Workshops	33	23	288	344

Overall, it can be concluded that the three key objectives of the project are successfully delivered, with promoting CE practices among manufacturing organisations in South East suburbs of Melbourne, in addition to capturing supplementary benefits such as journal publications, local government engagement and the promotion of CE concept among the wider population.

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PARTICIPATING LEADING CIRCULAR ECONOMY BUSINESSES

A.BCH

ARROW Machines | Parts | Service

Biersal Brewery & Beerhall

BuildFit

Busy Bee BRUSHWARE

BXB TECHNOLOGIES

casafico

Close the Loop

EGANS WISE OFFICE FURNITURE PROGRAM

FORTRESS RESISTORS

GRAINSTONE

IM Group innovative mechatronics

Integra Systems Make your vision real

Interface

JARDAN

Precious Plastic Melbourne

retub reuse. retub.

RM Road Maintenance P/L

SENSIENT

SMART RECYCLING

successful ENDEAVOURS

Textile Recyclers Australia Pty Ltd.

UNPACKAGED

UPPAREL

we-ef

PROJECT PARTNER

SEMMA SOUTH EAST MELBOURNE MANUFACTURERS ALLIANCE

PARTICIPATING LOCAL GOVERNMENT AGENCIES

City of Casey

Frankston City

City of GLEN EIRA

Greater Dandenong City of Opportunity

Hume City Council

City of Kingston

Knox City Council

City of Monash

Mornington Peninsula Shire

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