

Innovating waste management to increase competitive advantage and deliver ESG excellence

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Presentation Outline



SDGs and Waste



SUSTAINABLE DEVELOPMENT GOALS						
Key: Green=direct link Yellow=indirect link						
	Access for all to basic waste collection services	Stopping uncontrolled dumping and open burning	Managing all waste properly, particularly hazardous waste	Reducing waste and creating recycling jobs	Halving food waste from markets, shops and homes and reduce food losses in the supply chain	Governance factors which underpin sustainable waste management
Goal 1: No Poverty	1.4					
Goal 2: Zero Hunger						
Goal 3: Good Health and Well-being						
Goal 4: Quality Education						
Goal 5: Gender Equality						
Goal 6: Clean Water and Sanitation		6.3				
Goal 7: Affordable and Clean Energy						
Goal 8: Decent Work and Economic Growth						
Goal 9: Industry, Innovation and Infrastructure						
Goal 10: Reduced Inequalities						
Goal 11: Sustainable Cities and Communities	11.1 11.6	11.6	11.6			
Goal 12: Responsible Consumption and Production			12.4	12.5	12.3	
Goal 13: Climate Action						
Goal 14: Life Below Water						
Goal 15: Life on Land						
Goal 16: Peace, Justice and Strong Institutions						
Goal 17: Partnerships for the Goals						

Adapted: WasteAid UK, 2017

ESG and Waste: Why bother?

69 of the world's richest 100 entities (157 of 200 richest entities) are corporations (Independent, 2018).

**Net Zero-emission
by 2050**

ENVIRONMENT

Resource use/efficiency
Pollution and GHG emissions
Climate change
Waste reduction/ management
....

**Social licence to
operate**

SOCIAL

Fair pay and wellbeing
Workplace health and safety
Community engagement
Responsible supply chain
....

ESG

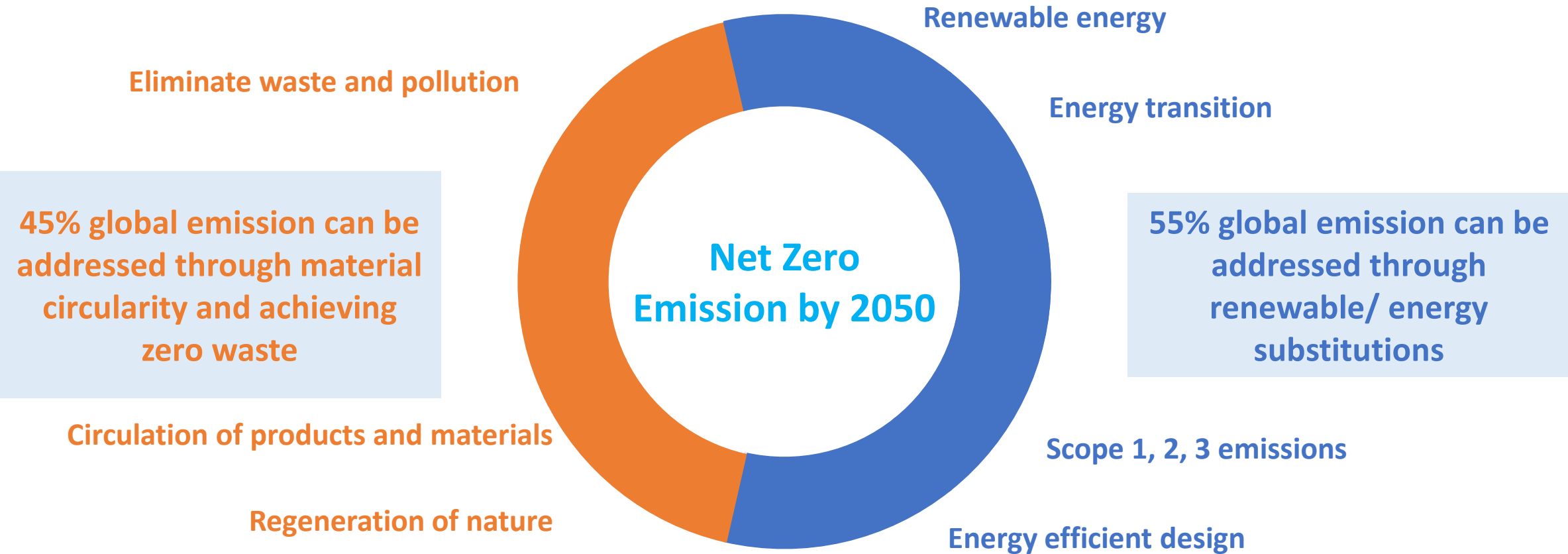
GOVERNANCE

Corporate governance
Financial disclosure
Regulatory/compliance
Ethical business practices
....

**Transparency and genuine
ethical practice**

ESG and Waste: Why bother?

Global Net Zero Emission Targets



Global Waste Crisis

Increasing waste generation

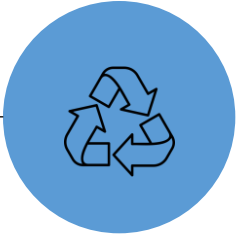
The world generates 2.01 billion metric tons of MSW and predicted to be 3.4B by 2050

Severe plastic pollution

Production has increased 20-fold since 1964 and expected to double by 2040. There will be more plastic in the ocean than fish by weight by 2050

Unreported e-Waste management

53.6 million metric tons of electronic waste and is expected to reach 74.7 million metric tons by 2030. 80% of e-waste remains unreported



Highly depended on landfill

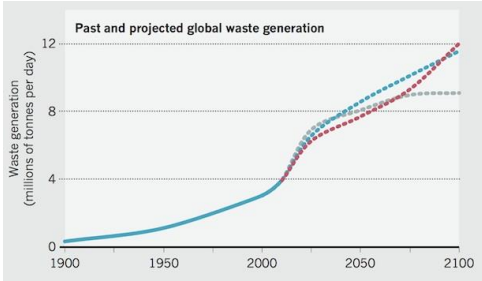
It manages about 85% of global waste and the 3rd largest emitter of methane after the USA and China.

Poor recycling/circularity rate

We recycle only 15% of the collected MSW, Global circularity rate in 2023 is 7.2%,

Health & environmental impact

It costs \$5.9 billion per year for health and env. damage in the L-M-I countries

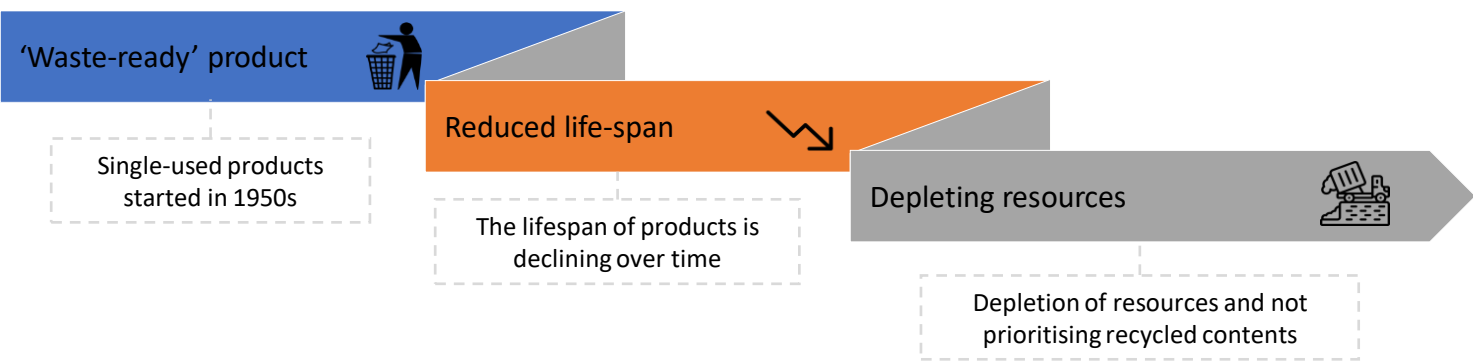


System Problems: Linear economy and linear urban metabolism

“Take-Make-Dispose” System



Planned Obsolescence



Waste in Aboriginal Community



National Environmental Science Program



Yarning (workshop) with the First Nation People in Western Australia (Whadjuk, Noongar Community)

Rapid shift in social value, cultural norms and priorities

	Pre-industrial era	Post-industrial era	
Scarcity-to-accessibility	Scarcity of resources: resourcefulness and frugality	Accessibility to resources	 
Needs-to-wants	Access to basic needs	Excess consumerism/ 'compulsory' consumption	 
Durability and quality	Durable and quality products	Disposable and throwaway lifestyle	 
Respect to nature	Harmony and stewardship to nature	Environmental degradation leading to environmental awareness	 

Innovation and Waste



A smartphone is millions of times more powerful than the Apollo 11 guidance computers.

Around 62 metals are used in Smart Phones and the majority of them have no effective replacement option (The Yale School of Forestry & Environmental Studies).



Waste Management is more than just throwing things away



1.37 billion smartphones (<17.4% recycle rate)

Material recovery:

- Gold: 0.034 grams
- Silver: 0.34 grams
- Copper: 15-20 grams
- Palladium, platinum, and nickel

Environmental Benefits:

- Carbon emissions: 14 kg
- Energy: 0.3 kWh
- Water: 100 litres

Social Benefits:

- A study by the European Commission found that recycling e-waste can create up to 200 times more jobs per unit of material processed compared to mining and primary production.



302.6 million units (<17.4% recycle rate)

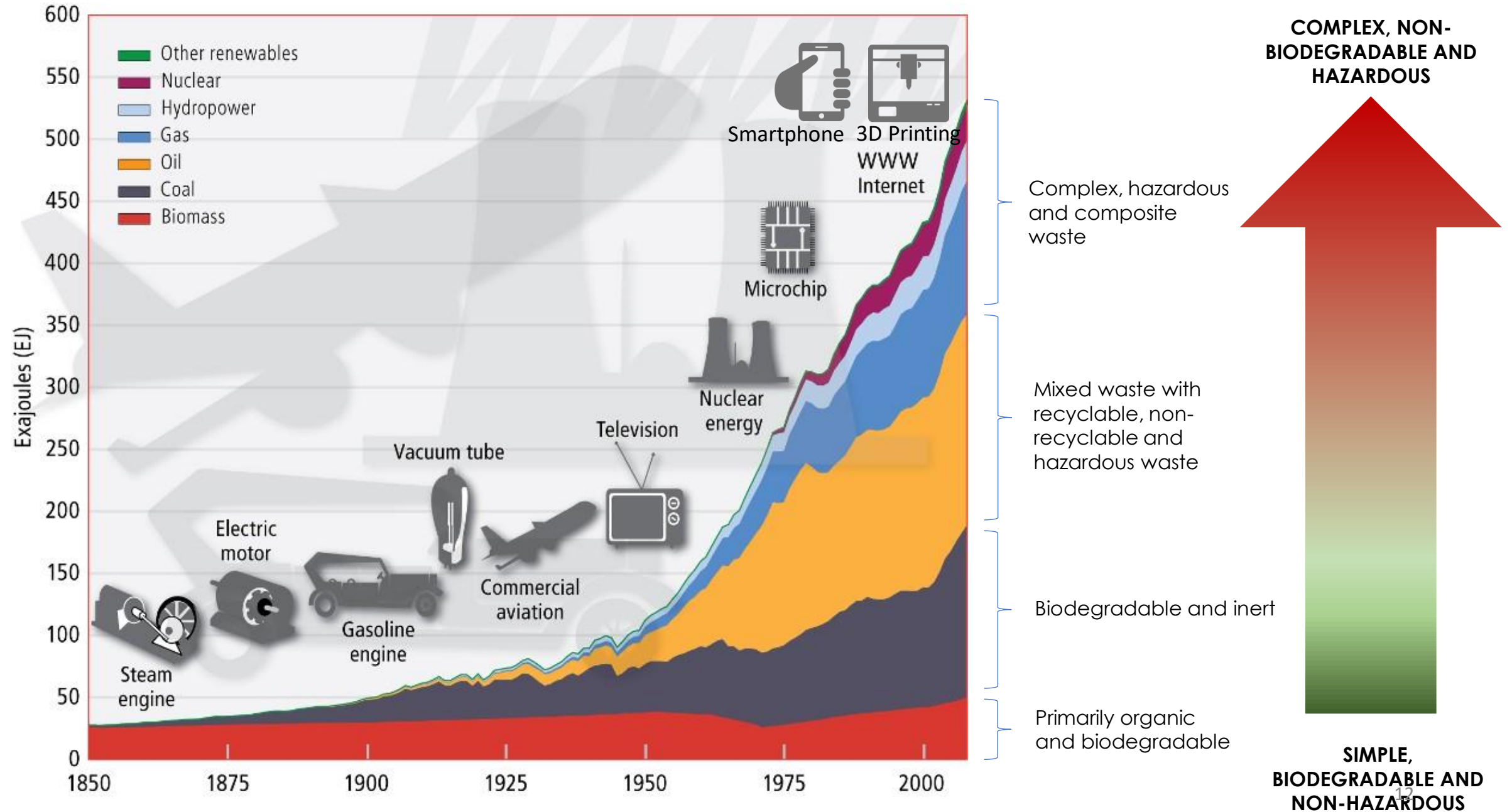
Material recovery:

- Aluminum: 400 grams
- Copper: 150-200 grams
- Plastic: 1.5 kg
- Glass: 50-100 gram
- Others: lithium, cobalt, and rare earth metals

Environmental Benefits:

- Carbon emissions: 20 kg
- Energy: 20 kWh
- Water: 240 liters

Innovation and Waste



A paradigm shift of the current waste management practices is needed, because:

PARADIGM SHIFT

A change from one way of thinking to another.



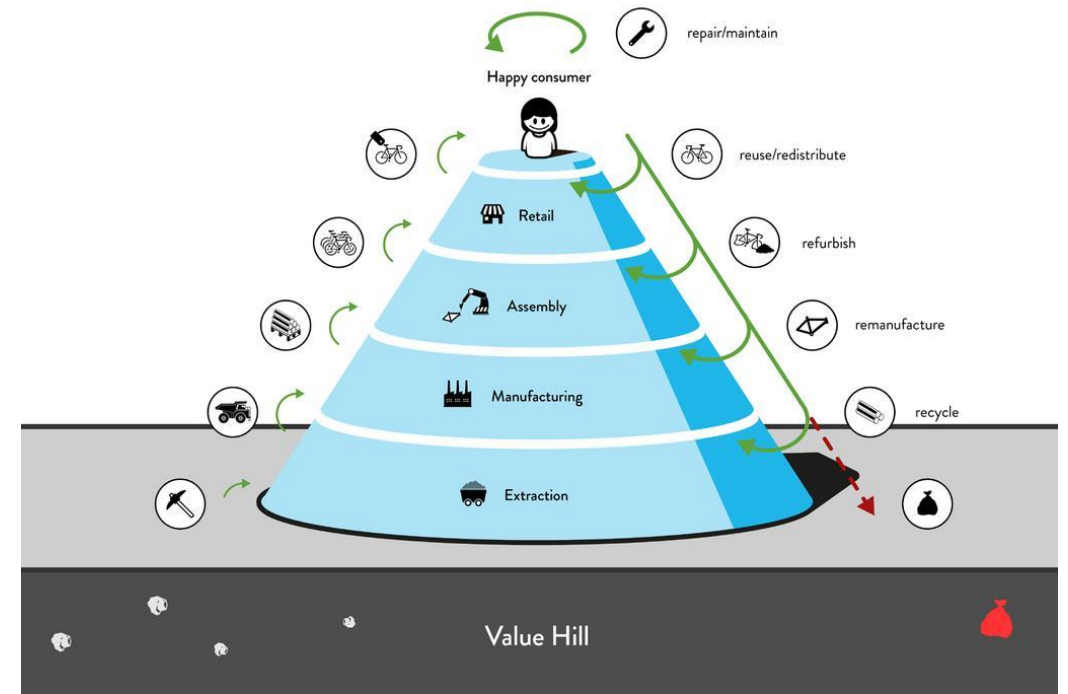
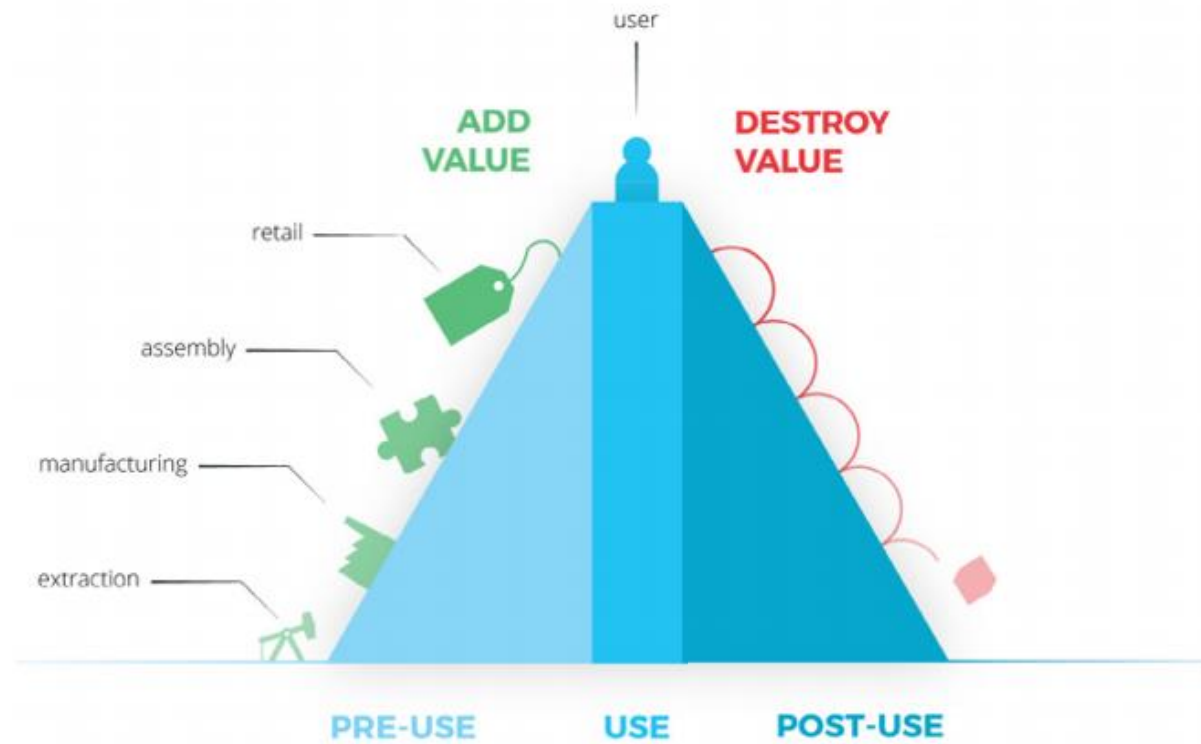
Waste is a **technological problem**, but it is also a **social and system problem**. In addition to the technological solutions, we also need **social technologies and system thinking** to solve this problem!

Emerging Zero-waste Concept and Practices



Adidas's new shoe using marine debris

The Value Hill Principle in a Zero Waste/Circular Economy System

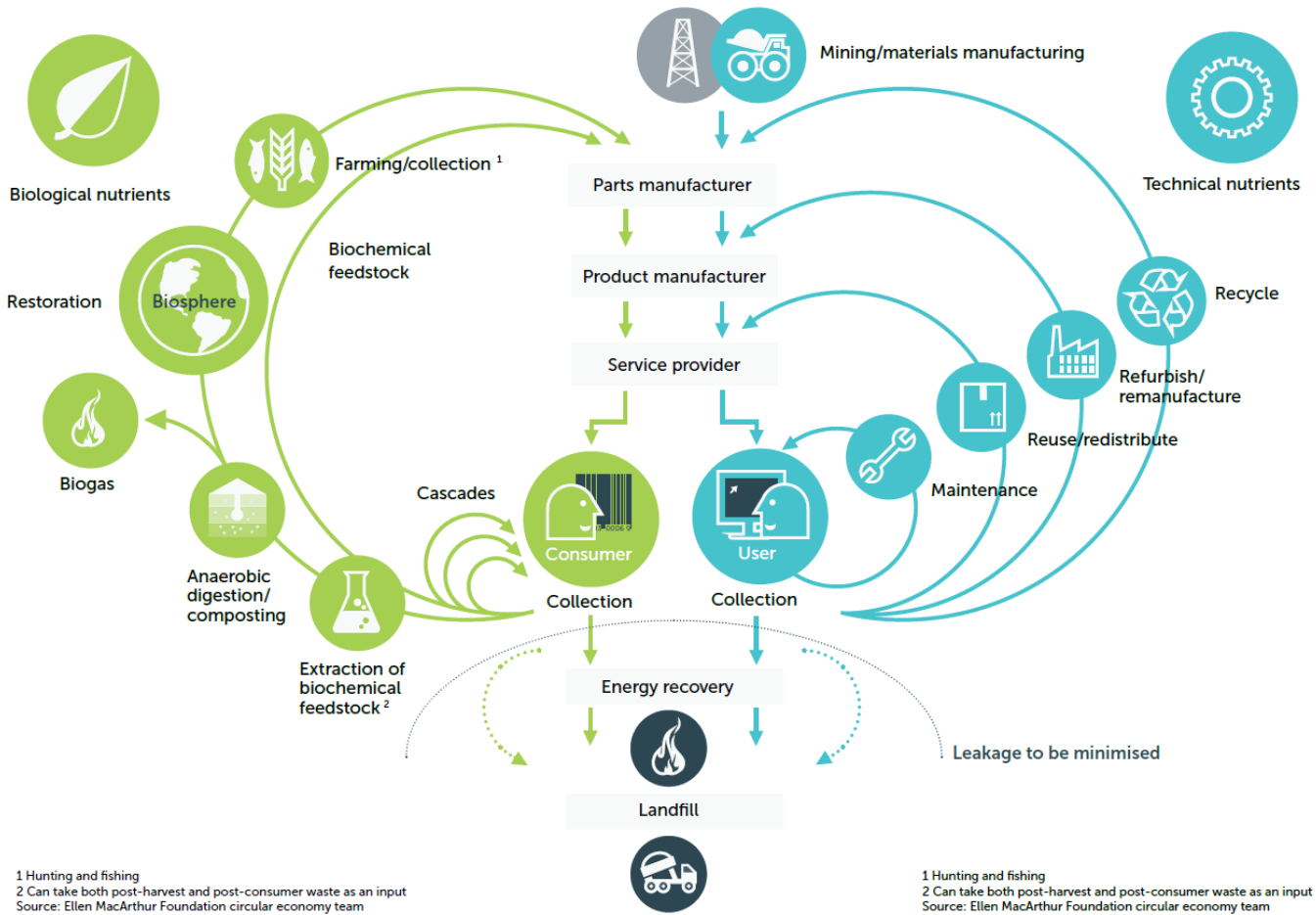
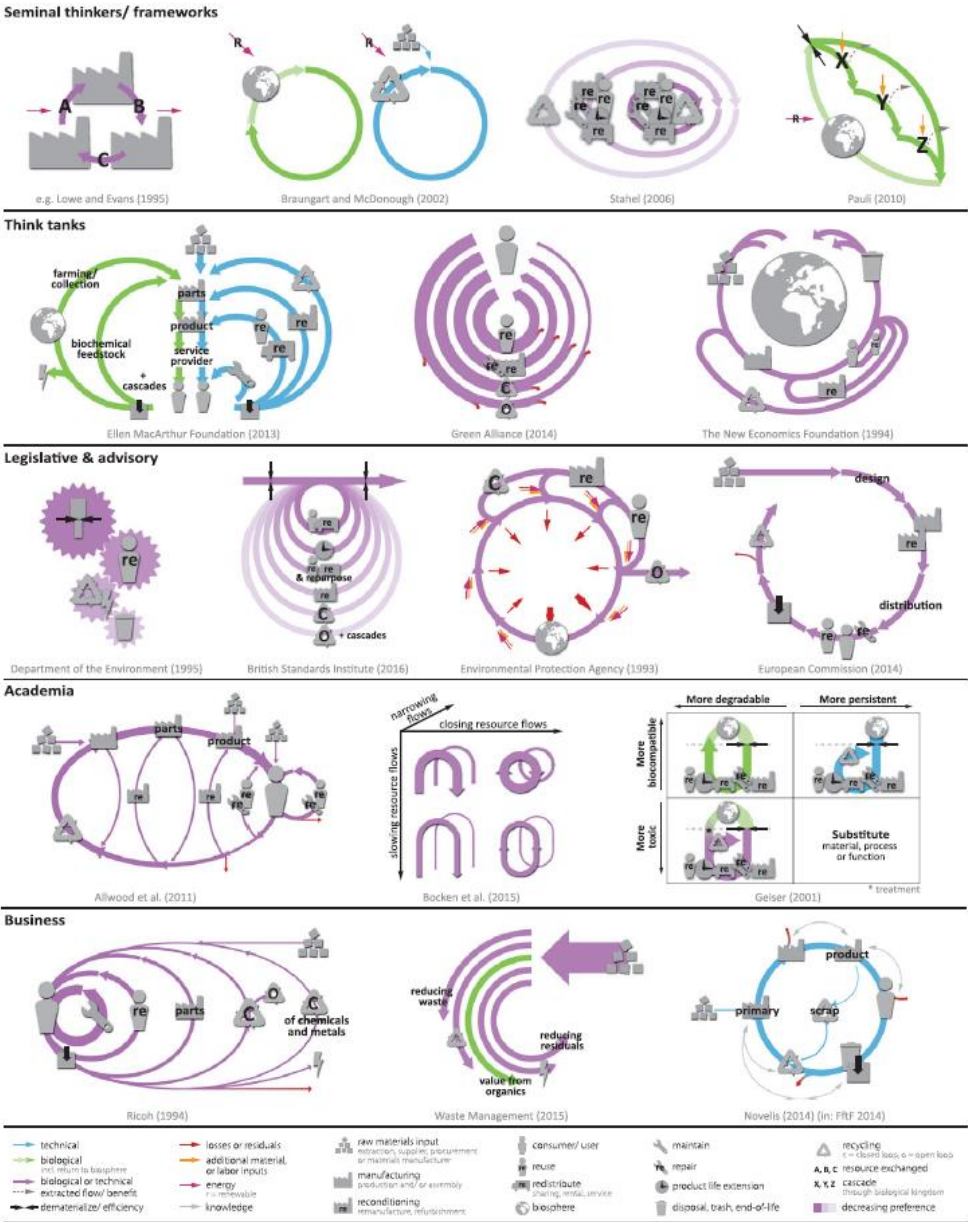


Zero Waste:

...designing and managing products and processes systematically to eliminate the waste and materials, conserve and recover all resources and not burn or bury them (ZWIA 2004).

‘Explicit Design for Reuse = Zero Waste’ (*Zero Waste Institute, 2011*)

The Circular Economy/Zero Waste Principles



Circular Economy and Zero Waste Business

Zero Waste Businesses

Circular Economy and Zero Waste in Businesses



Zero Landfill since 2005 and Incineration only 5%



Adidas's new shoe using marine debris



IKEA's Circular Design (L) Circular Service (Reuse/Refurbish-R)



Coca Cola's Reusable Packaging

Innovative Solutions: Transforming Problems into Opportunities



PLASTIC WASTE

Plastic waste is seen as a problem in every society



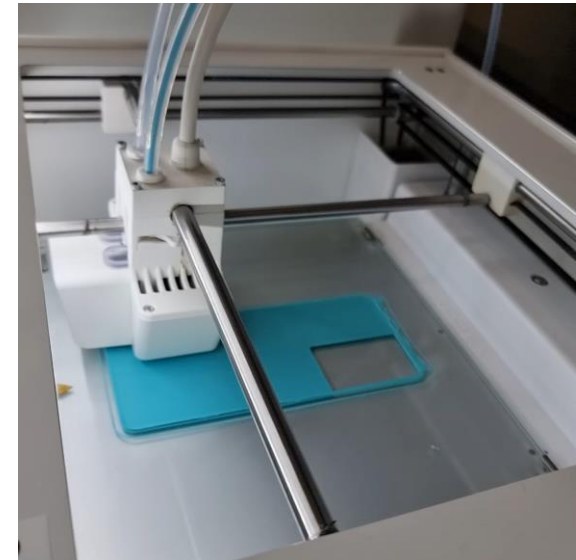
VALUE RETAIN

The value of the material is needed to retain within the supply chain system

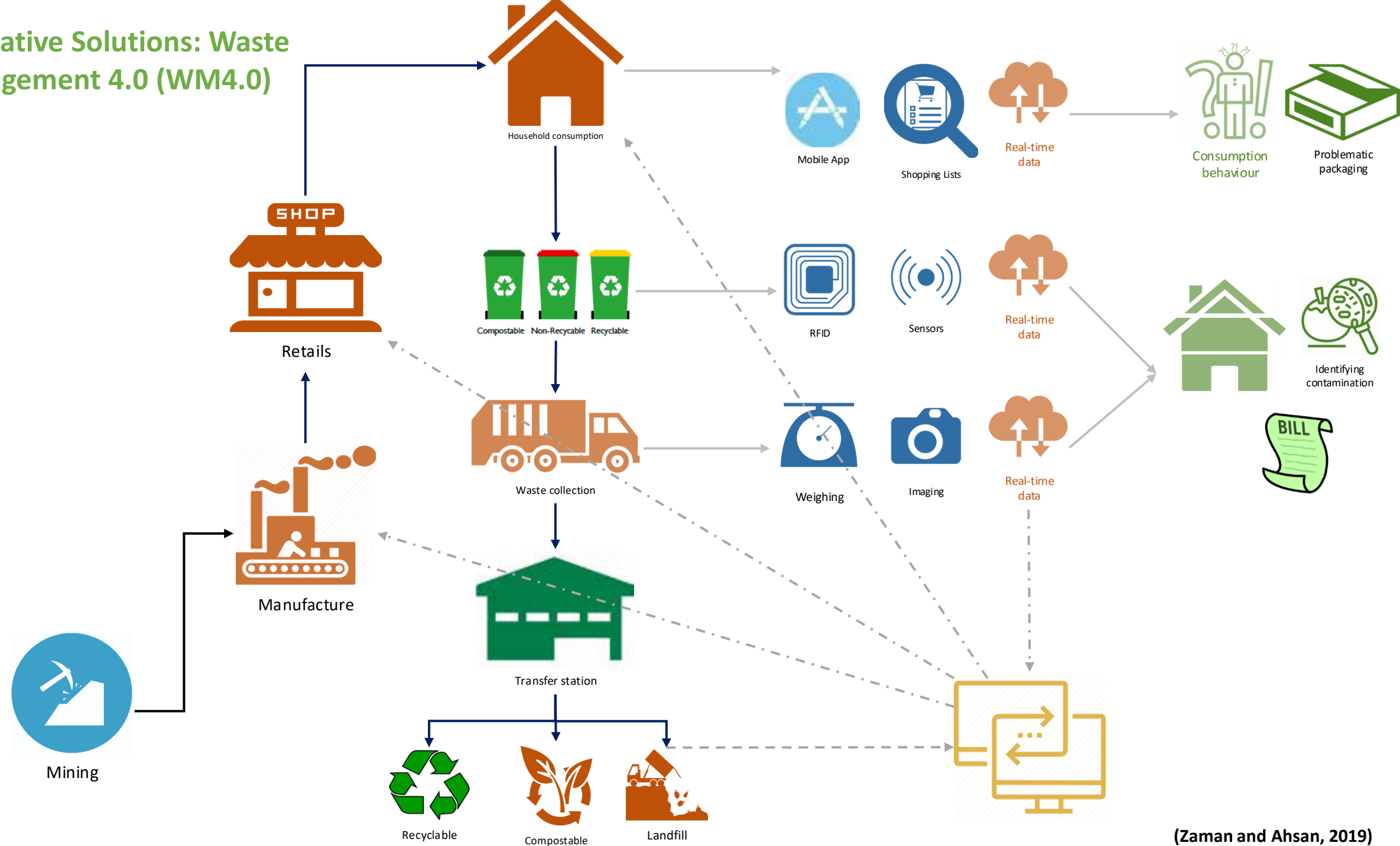


HIGH-VALUE PRODUCT

High-value products with recycled plastic would create employment and business opportunities for the local communities.



Innovative Solutions: Waste Management 4.0 (WM4.0)



Innovative Solutions: Integration of I4.0 in the Waste Management System

THE CITY OF CANNING PROJECT



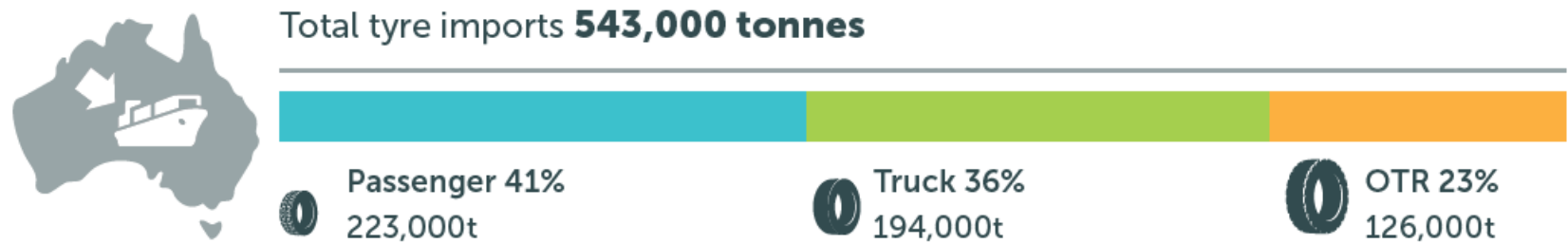
Integration of WM in the ESG Roadmap: OTR Tyre Waste

Challenges of the Off-the-Road-Tyres

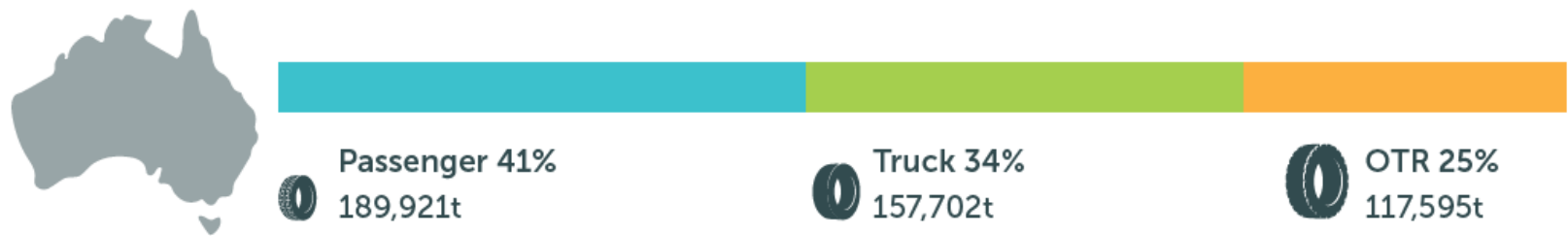


Integration of WM in the ESG Roadmap: OTR Tyre Waste

Australian tyre consumption 2018–19, by tyre group (tonnes)



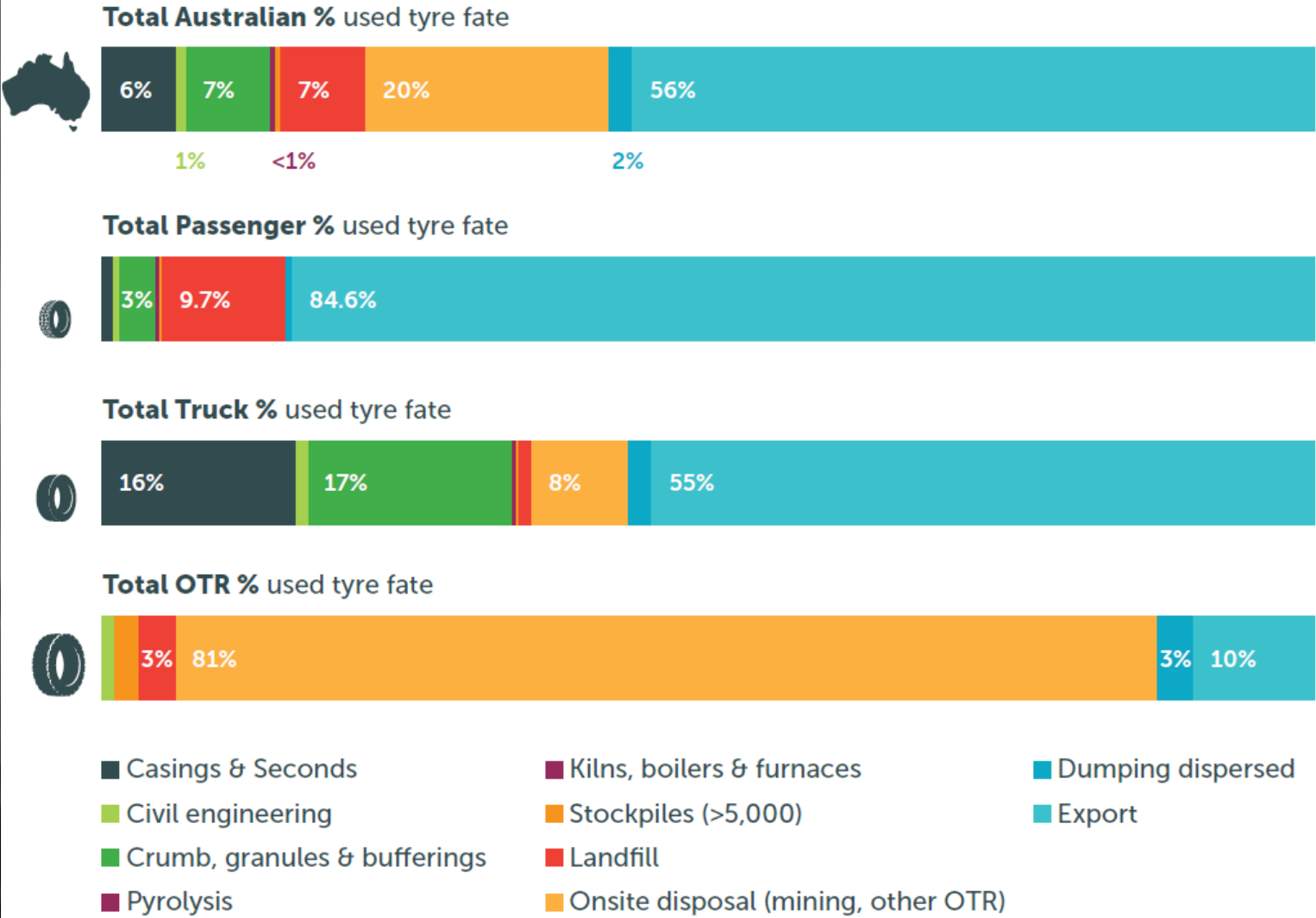
Australian tyres reaching end-of-life in 2018–19, by tyre group (tonnes)



OTR Tyre Waste: “Up to 245,000 tonnes are used and become waste each year” (TSA, 2023)

Integration of WM in the ESG Roadmap: OTR Tyre Waste

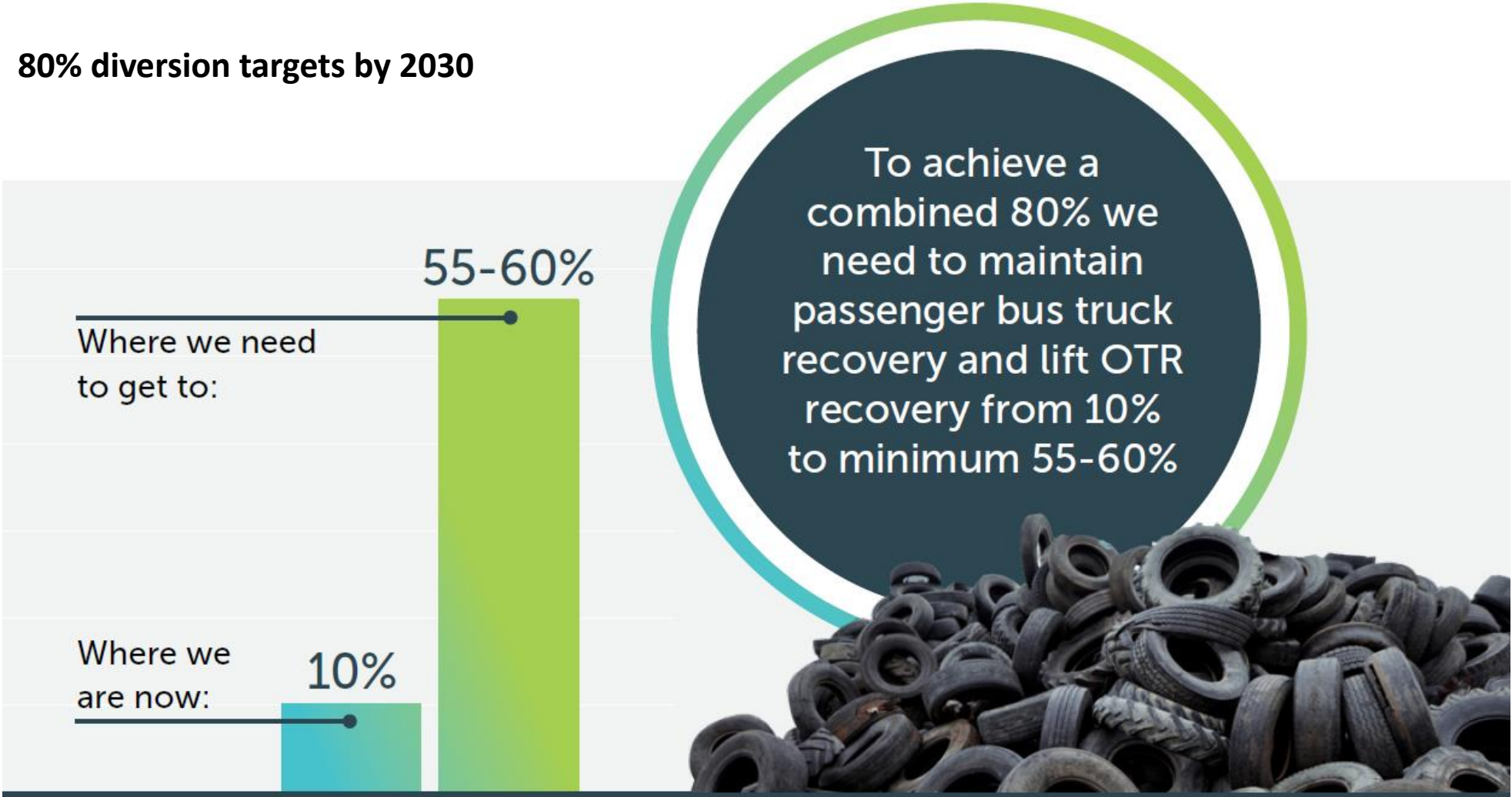
Fate of Australian used tyre (TSA participants and non-participants) by tyre group in 2018-19 (tonnes)



Integration of WM in the ESG Roadmap

National Waste Policy and State's Waste Strategies

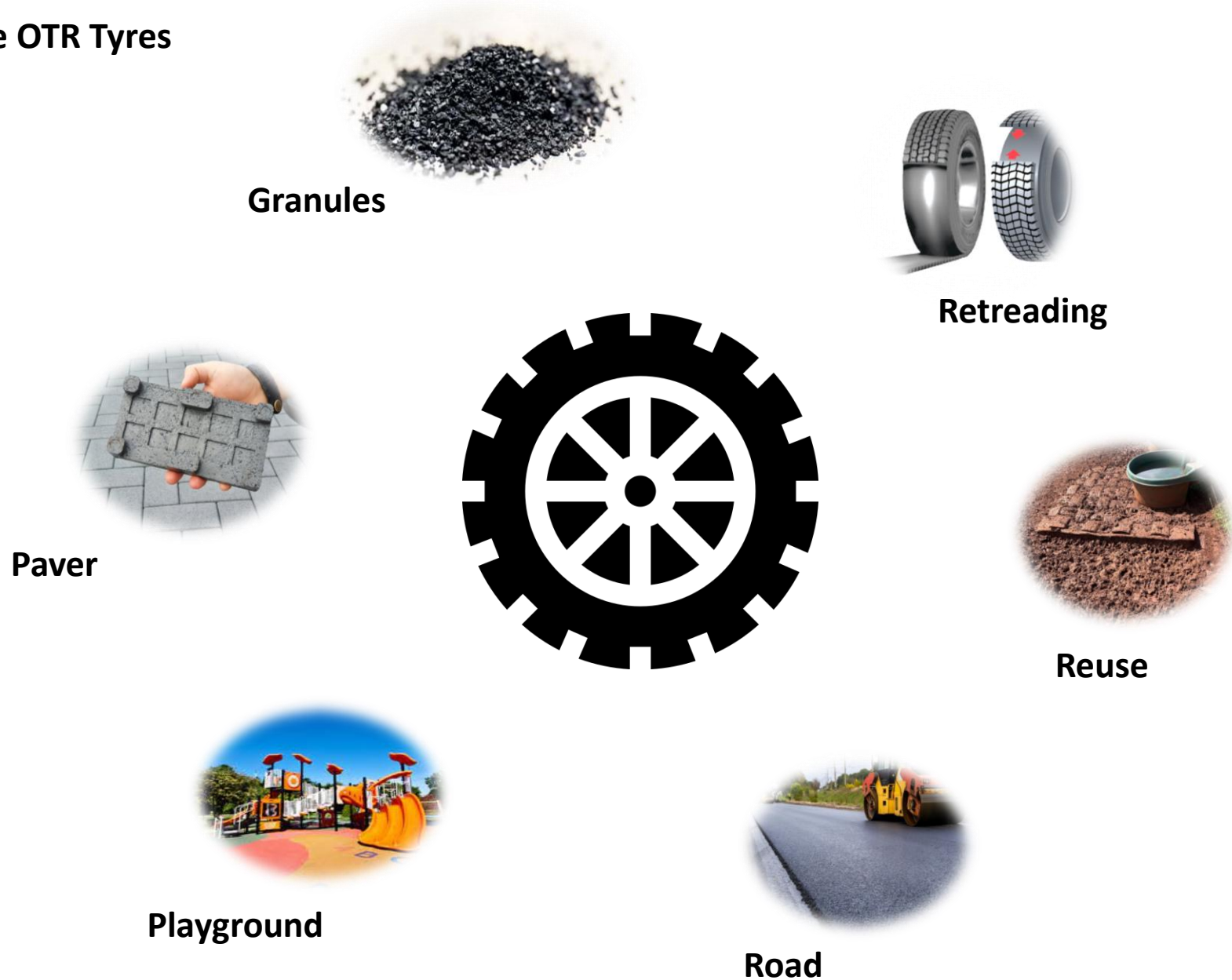
80% diversion targets by 2030



(TSA, 2023)

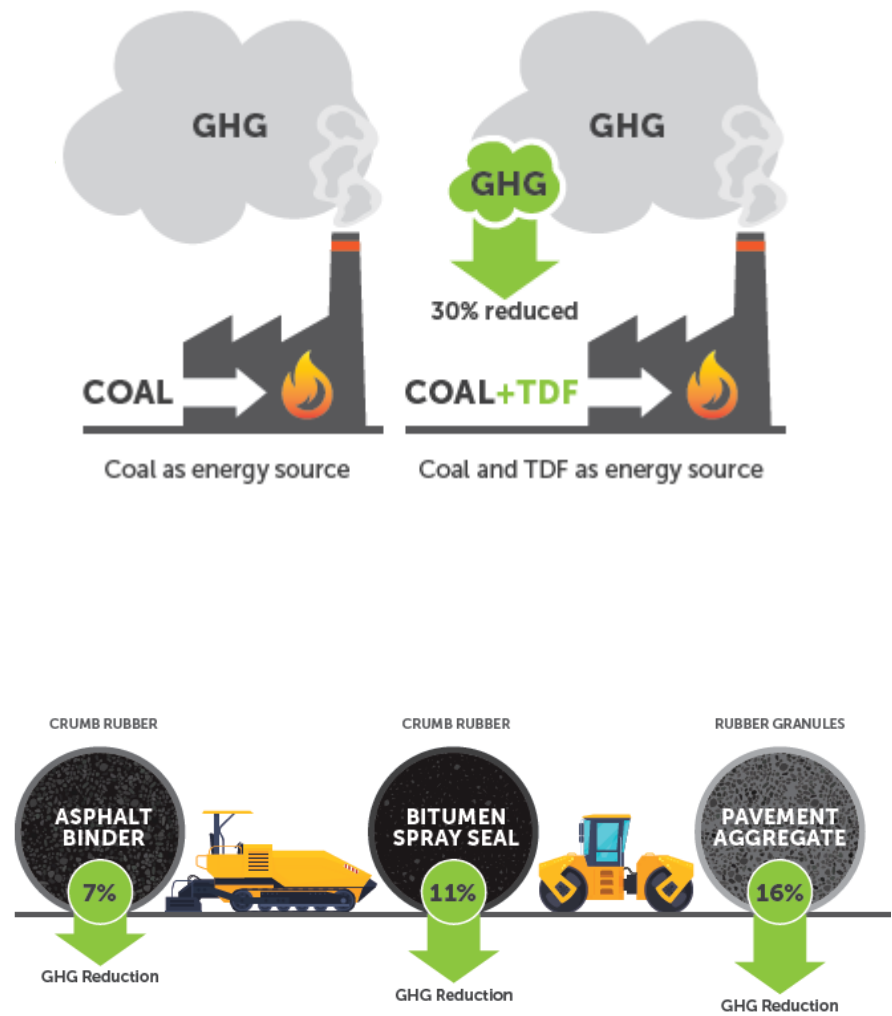
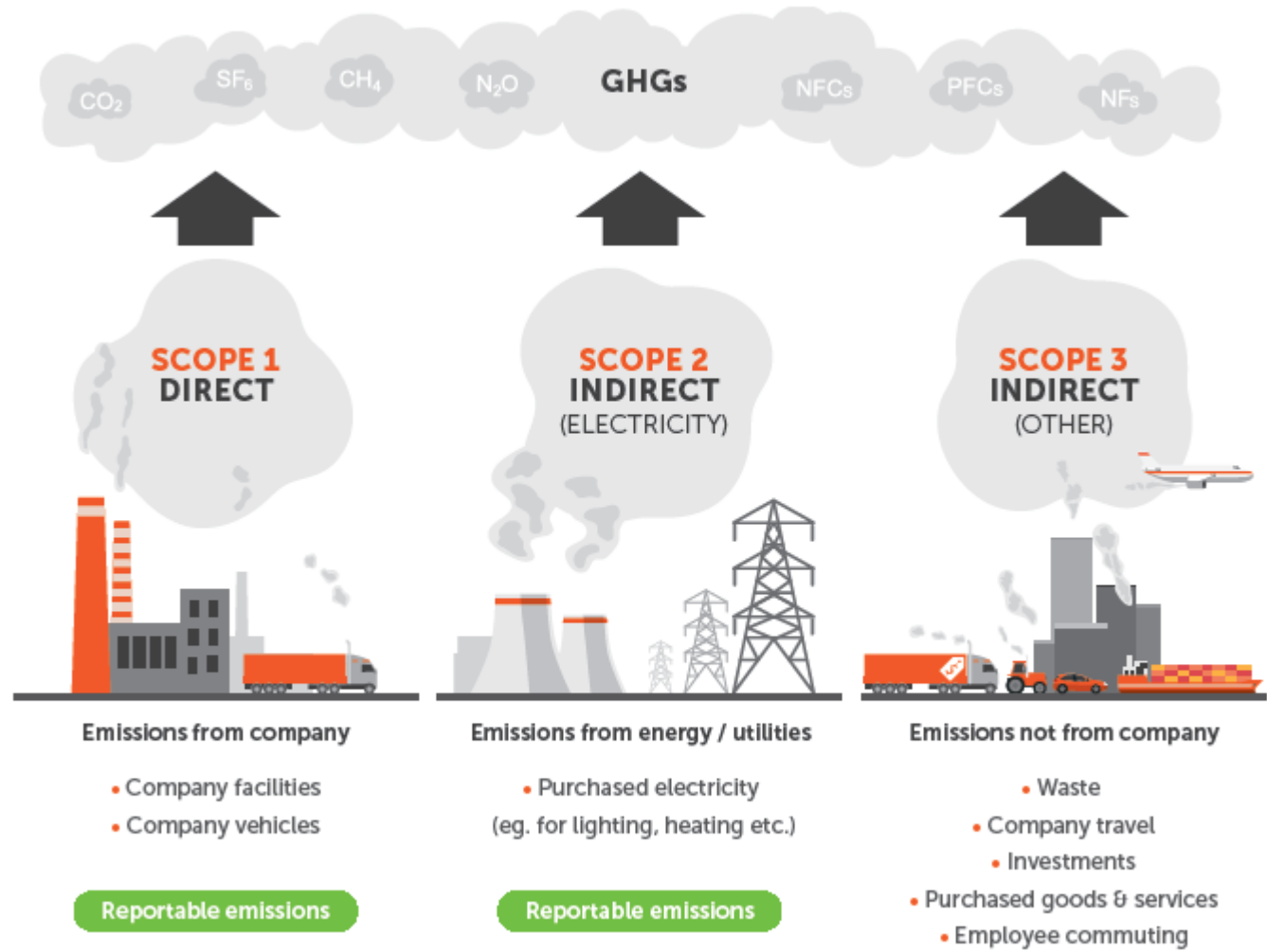
Integration of WM in the ESG Roadmap

Opportunities in the OTR Tyres



Integration of WM in the ESG Roadmap

Key benefits for the ESG reporting: Emission and Waste Reduction



Integration of WM in the ESG Roadmap

Key benefits for the ESG reporting: Resource Efficiency and Circularity



Retreading a truck tyre can increase its lifespan by up to 3 times and only requires 1/3 of the oil to manufacture it compared to a new truck tyre



68% less oil

It takes 83 litres of oil to make one average size truck tire, a retread only requires 26.5 litres.

Integration of WM in the ESG Roadmap

Key benefits for the ESG reporting: Partnership and Social Licence to Operate



Conclusion and Take-home Message:



Waste is a global problem, and corporations must shoulder responsibility for addressing waste issues, especially those originating from poor product design and the supply chain.



Embracing innovative approaches like zero waste and circular economy solutions is essential. Maintaining the "business as usual" approach is no longer sustainable in light of resource scarcity and its environmental impact.



The considerable benefits of zero waste, particularly in terms of resource circulation and its role in the global shift toward net-zero emissions, have yet to be fully recognized and are noticeably absent in ESG reporting.

Zero-Waste

Reconsidering Waste Management
for the Future

Atiq Zaman and Tahmina Ahsan

Routledge Studies in Waste Management and Policy

Thank you for your attention!
Any Question?

Email: atiq.zaman@curtin.edu.au
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