

# CLOSING THE CIRCLE

Reducing Plastic Pollution and Promoting Green Businesses



# FULL CIRCLE

A RESOURCE GUIDE FOR THE CIRCULAR  
ECONOMY SPRINT SERIES



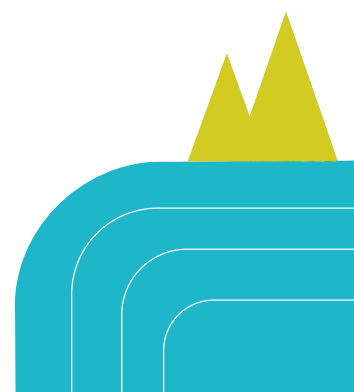
## SESSION 5

**Ways for Waste: Innovations and technology in  
solid waste management systems**

## CONTENTS

- 01** PLASTICS: ROOT OF PROGRESS AND PROBLEMS
- 02** SWITCHING THE GEARS IN DRIVING SUSTAINABLE  
SOLUTIONS TO PLASTIC WASTE
- 03** WHAT MAKES INNOVATIONS CIRCULAR?
- 04** KEY CONSIDERATIONS FOR CIRCULAR INNOVATIONS
- 05** CASE STUDIES: TECHNOLOGY AND INNOVATION

*This document is a resource material for ADB's Circular Economy Sprint Series entitled "Closing the Circle: Reducing Plastic Pollution and Promoting Green Businesses" held from September to November 2021.*



# WHAT IS A CIRCULAR ECONOMY?

The Circular Economy Sprint Series adopts the widely accepted definition of circular economy by the Ellen MacArthur Foundation (EMF). The EMF defines a circular economy as a system that:

**"redefines growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system."**

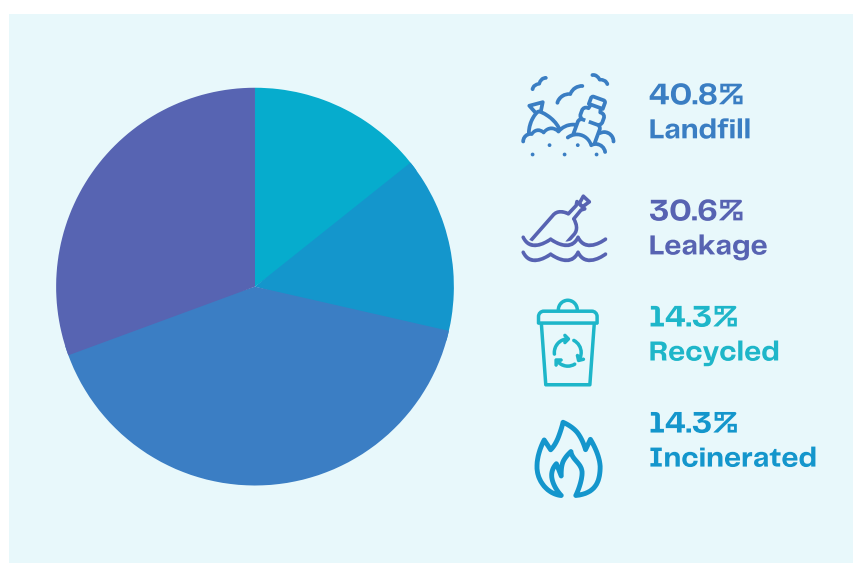
## 01 PLASTICS: ROOT OF PROGRESS AND PROBLEMS

The advancements in technology resulted in exponential progress across different sectors. New products are developed, new components are introduced to the system, and new materials are made. The invention of these materials has been a mark of progress. One of these materials is plastic.

Plastic set the precedent for the ideal material for a variety of uses required to advance technology and societies. Invented in the 19th century, the material is cheap, safe, and durable. Its properties became essential in catalyzing progress in different industries. However, the same properties that make it the preferred material also make it problematic.

**In 2013, manufacturers generated 78 million tons of plastic packaging globally.**

**It has been estimated that 14% of the plastic packaging is collected for recycling, another 14% is incinerated or used for energy, 40% ends up in the landfill, and 30% leaks into the environment.**


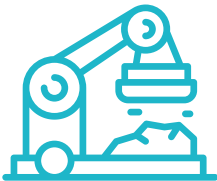
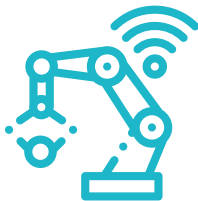


Source: Rethinking the Future of Plastics 2017 – Ellen MacArthur Foundation

## 02 SWITCHING THE GEARS IN DRIVING SUSTAINABLE SOLUTIONS TO PLASTIC WASTE

The growing plastic problem underscores the importance of shifting from a linear economy to a circular economy. This move requires a thorough understanding of the problem and matching the most effective solutions to what is applicable in the local context.

These solutions encompass existing circularity practices that could be scaled up or further maximized and new technologies and innovations.

CATEGORY	EXAMPLES	
 <b>Low-range technology</b>	Manual sorting and collection remain to be an integral part of the solid waste management system, especially for developing member countries. When done properly and with the support of enabling factors, low-range technological solutions are a key driver of circularity.	Kamikatsu, Japan's waste sorting facility, is a community-driven solution to the growing waste crisis. The residents are asked to sort the waste to 45 categories to increase recycling rates.  <a href="#">Learn more</a>
 <b>Mid-range technology</b>	Solutions derived from low range solutions powered by existing technologies to increase efficiency in solid waste management. These solutions are still highly reliant on significant human intervention in operations.	RecycleNation is a location-based app that aims to improve recycling knowledge and recycling rates in the United States.  <a href="#">Learn more</a>
 <b>High-range technology</b>	Innovations that are reliant on newly developed technologies to operate. These solutions can either solve the plastic problem from its roots (upstream innovation) or focus on dealing with the problem at the end of the value chain (downstream).	Apeel aims to reduce food waste while also lessening the amount of plastic used to prolong the shelf life of produce in supermarkets by coating fruits and vegetables with a spray made of organic substances.  <a href="#">Learn more</a>

## 03 WHAT MAKES INNOVATIONS CIRCULAR?

Source: *Circular economy indicators in relation to eco-innovation in European regions* by Smol et al (2017)

Technological advancements and innovations are often described as a path to sustainability. Such innovations must be viewed critically to check whether they are supporting the core principles of circularity or not. Below are guiding principles for eco-innovations:

### PRINCIPLES



**Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows**

Replace plastic with a material that is less resource intensive, extractive, and disruptive of the natural flow of finite resources.



**Optimise resource yields by circulating products, components and materials at the highest utility at all times in both technical and biological cycles**

Keep materials in the loop, may they be technological or biological. Circularity relies on regenerative practices and use of resources.



**Foster system effectiveness by revealing and designing out negative externalities**

Eco-innovations must show transparency on how its methods may have consequences to other parts of the value chain. Solving the plastic problem while creating another problem on a different field isn't circular.

## 04 KEY CONSIDERATIONS IN CIRCULAR INNOVATIONS

The following table identifies some of the factors that a financial institution must consider when supporting a circular initiative: **carbon footprint, resource use, waste generated, equitable and inclusive, and accessibility.**

CONSIDERATIONS		EXAMPLES
 <p><b>Carbon footprint</b></p>	<p>Circular innovations must have a minimal carbon footprint or be carbon neutral. This can be ensured by relying on renewable energy sources, regenerative use of resources, and supporting a sustainable value chain.</p>	<p>Apple targets to transition to use 100% renewable energy for the production of their products. If implemented well, this will avoid 15 million metric tons of carbon dioxide emission annually. <a href="#">Learn more</a></p>
 <p><b>Resource use</b></p>	<p>Solutions built on the foundation of circularity must efficiently use the finite amount of resources available while replenishing the stocks to ensure a sustained feedback loop.</p>	<p>Singapore takes community composting seriously by engaging restaurants, and even hotels, to fix the food waste problem. The compost is then used to regenerate greeneries in the community. <a href="#">Learn more</a></p>
 <p><b>Waste generated</b></p>	<p>Designing out waste is integral in a circular economy. The solution must produce minimal waste, which is processed to become a resource again.</p>	<p>Sprite changed their iconic green PET bottles into clear PET bottles to increase plastic collection and recycling rates. Colored plastics are difficult to recycle and has a lower economic value in the waste value chain. <a href="#">Learn more</a></p>
 <p><b>Equitable and inclusive</b></p>	<p>When designing programs and policies to accelerate the transition to a circular economy, anticipate their impact on the vulnerable sectors of the community (e.g., informal waste sector, women, children and youth). There is also potential to explore the role that vulnerable sectors can play as enablers of circularity.</p>	<p>Indonesia's Waste Bank is a decentralized effort to curb plastic waste. Thousands of Waste Banks are scattered in the country and are founded by communities, and the public and private sectors. <a href="#">Learn more</a></p>
 <p><b>Accessibility</b></p>	<p>Solutions must be accessible to the target audience in terms of logistics and price point. This is essential to increasing the adoption rate of the target sectors and individuals. Innovations must also be intuitive.</p>	<p><i>Wala Usik</i> in the Philippines is redesigning the sachet culture by mainstreaming refilling in grassroots communities and by building partnerships with the private sector in developing solutions that sustain both the local communities and the environment. <a href="#">Learn more</a></p>

# CASE STUDIES: TECHNOLOGY AND INNOVATION

## REDESIGNING THE SACHET CULTURE

### ***Banyan Nation (India)***

Plastic waste that ends up in landfills is no longer economically viable. Banyan Nation is bringing plastic waste back to the supply value chain through technological innovations and the integration of informal waste collectors into the formal system. The plastic waste collected is processed into plastic pellets that are at par with the virgin plastic quality. These plastic pellets are supplied to brands and companies to fulfill mainstream plastic packaging needs.

Click this [link](#) to learn more or visit [www.banyannation.com](http://www.banyannation.com)

## USING SEaweeds TO TURN THE TIDE AGAINST PLASTIC WASTE

### ***Ooho - England***

Single-use plastics are the go to packaging material for most daily commodities, from bottled waters to condiments. Ooho, a biodegradable and edible packaging made from seaweeds is changing the system's reliance to single-use plastics one pouch at a time. In the start-up's pilot run, they tapped 10 restaurants and served 46,000 sauce in edible pouches. It was also used in the 2019 London Marathon effectively eliminating more than 30,000 bottles and plastic cups.

Click this [link](#) to learn more or visit [www.notpla.com](http://www.notpla.com)

## AUTOMATING THE PLASTIC BATTLE VIA DEPOSIT-REFUND SYSTEM

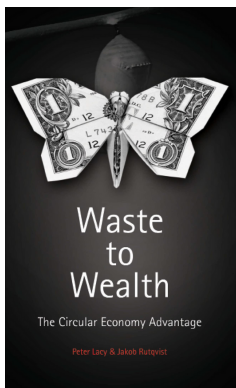
### ***Norway***

The deposit-refund system is one of the traditional methods in ensuring that manufacturers are responsible for the packaging that they use for their bottled products. The same system is now being used in Norway to combat the plastic crisis, with a technological twist, through reverse vending machines (RVMs). RVMs are strategically located in big establishments which makes it convenient for consumers to return used bottles as they shop for grocery items while small retailers manually accept and account for the returned bottles. For every bottle returned, the business owners earn a small commission. The program also improved businesses' foot traffic which could result in an increase in revenue generation.

Click this [link](#) to learn more or visit [www.theguardian.com](http://www.theguardian.com)

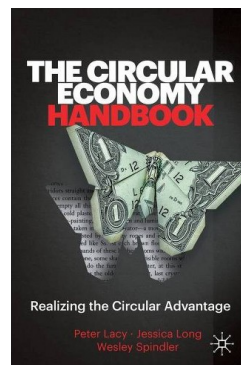
# NOW READING: CIRCULARITY TOP PICKS

## NOW READING



### ***Waste to Wealth: The Circular Economy Advantage***

The presents the advantages of the circular economy for tackling the current challenges against the backdrop of shrinking resources.



### ***The Circular Economy Handbook: Realizing the Circular Advantage***

This offers a practical view on how organizations can take transformative steps toward circularity and create new opportunities for sustainable prosperity.



### ***How to ban single-use plastics***

By Merrin Pearce

An article on the key considerations and actions an organization needs to factor in before announcing a plastic ban.  
[Read here](#)



### ***Breaking the Plastic Wave Pew Trusts Organization***

A modeling analysis describing actions needed to stop marine plastic waste.

[Access here](#)

# NOW BROWSING: CIRCULARITY IN ADB

## PAPERS AND GUIDEBOOKS

### **Municipality-led circular economy case studies**

C40 Cities

A collection of urban circularity case studies on five different CE categories.

Access [here](#)

### **Financing the circular economy**

*Ellen MacArthur Foundation*

Explores how CE supports value creation for financial institutions

Access [here](#)

### **Micro, Small, and Medium-sized Enterprises and their Role in achieving Sustainable Development Goals**

Highlights the importance of MSME engagement in hitting the Sustainable Development Goals

Access [here](#)

### **Financing Circularity: Demystifying Finance for Circular Economies**

*UN Environment Programme*

Outlines how financing can accelerate the transition to circular business models.

Access [here](#)

### **The Circularity Gap Report 2021**

*Circle Economy*

The connection of climate change and CE.

Access [here](#)

### **Breaking the Plastic Wave**

*Pew Trusts Organization*

A modeling analysis describing actions needed to stop marine plastic waste.

Access [here](#)

## ADB ARTICLES AND RESOURCES

**Blog:** [Five shifts can drive a circular economy for a sustainable plastic future](#) by Marianne Bigum and Anna Oposa

**ADB Policy Brief:** [Implementing a Green Recovery in Southeast Asia](#)

**Publication:** [Greening Markets: Market-Based Approaches for Environmental Management in Asia](#)

**ADB COVID-19 Policy Database:**  
[Green Recovery](#)

## ADB PROJECTS

People's Republic of China: [Green Circular Economy Zero Waste Cities](#)

Greater Mekong Subregion: [Climate Change and Environmental Sustainability Program](#)

Regional: [Promoting Action on Plastic Pollution from Source to Sea in Asia and the Pacific](#)

## RESOURCE GUIDE COMPILED BY:

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### DAVE ALBAO

**Dave** is currently leading the implementation of projects focused on reducing ocean plastic funded by USAID, GIZ, and the EU. Activities include advocating for zero-waste and circular enterprises, including micro businesses that are innovating to reduce single-use plastic waste from their operations.

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