Food in the Circular Economy

Vocational Training Edition

GREEN AND SUSTAINABLE FOOD EDUCATORS

MMC Mediterranean Management Centre

An Introduction

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General Learning Objective
Learners will understand how the principles of the circular economy can be applied in the food and hospitality sectors, gaining practical skills to minimize waste, reuse materials, and make food-related work more sustainable.

Specific Learning Outcomes
By the end of this module, participants will be able to:
Describe the main concepts of linear and circular economies.
Identify key sources of food waste in workplaces (kitchen, catering, restaurant, or food production).
Apply circular economy practices in daily operations (e.g., portion control, composting, reusing leftovers, sustainable purchasing).
Evaluate the economic and environmental benefits of circular practices.
Develop a simple action plan to make their workplace more sustainable.

Duration 3 hours (including demonstration and group activity)

Teaching and Learning Methods

- Guided discussion and brainstorming
- Real workplace examples and short videos
- Small group problem-solving activities
- Role play or simulation exercises
- Quiz and peer feedback

Initial Assessment: Pre-Test (Knowledge Check)

Purpose: Identify learners' initial understanding and workplace experience with food waste and sustainability.

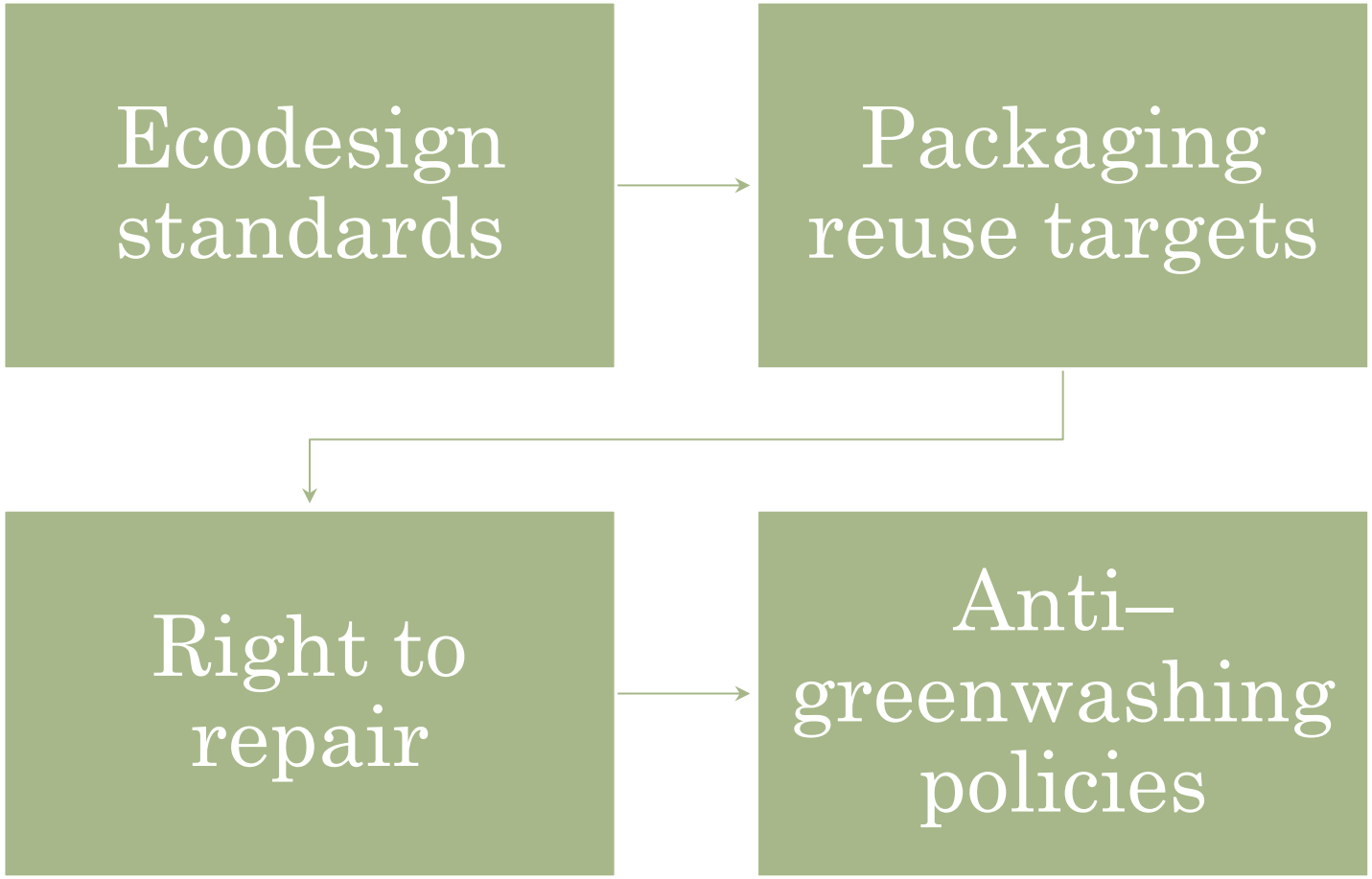
Format: 8 short questions (mix of multiple choice and open-ended).
Duration: 10 minutes

What is a Circular Economy?

- Model for **production & consumption**
- Focused on **reuse, repair, recycle**
- Extends product life cycles
- Reduces waste to a minimum

Why Switch to Circular Economy?

EU Circular Actions



Brainstorming

🧠 Identify waste sources in your environment
(Use group discussion – kitchen, storage, packaging, etc.)

What is a Circular Economy?

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What is Food Waste?

- Edible food discarded or unused
- Happens **from farm to fork**
- Includes **storage, transport, cooking, leftovers**

Global Food Waste Facts

- **1/3 of global food lost** yearly (~2.5B tonnes)
- If a country → 3rd largest GHG emitter
- Could feed **3 billion people**
- Huge impact on **climate & nutrition**

Where Food Gets Lost

Developing countries: post-harvest, transport, storage
Developed countries: retail, households, over-ordering

The Circular Economy & Food

Turn food by-products into **fertilizers, bioenergy, textiles**

Reduce landfill waste

Regenerate ecosystems

3 Principles of Circular Economy

Eliminate waste & pollution

Circulate products & materials

Regenerate nature

Eliminate Waste & Pollution

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- Prevent surpluses early
- Optimize logistics
- Design smart packaging
- Educate consumers

Circulate Products & Materials

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- Redistribute edible surplus
- Convert residues → compost or biogas
- Use circular recovery chains

Regenerate Nature

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- Compost food waste
- Promote regenerative farming
- Restore soil & biodivers

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SECTION 2

Case Studies: Circular Food Systems

Real examples of how food waste becomes value

Ostara Nutrient Recovery Technology (Vancouver, Canada)

- Recovers phosphorus (85%) and nitrogen (up to 15%) from wastewater—often from food processing—to create Crystal Green® fertilizer, closing nutrient loops and preventing runoff.

- Circular Focus: Transforms "waste" streams into slow-release plant nutrients, replacing synthetic fertilizers.

- Impacts: Cuts 10 tonnes of CO_2e emissions per tonne of fertilizer; generates revenue while saving wastewater facilities from blockages.

Agriprotein (Cape Town, South Africa)

- Uses Black Soldier Fly larvae to convert organic food waste into high-protein animal feed for aquaculture and livestock, with leftovers as compost.
- Circular Focus: Cascades waste into renewable feedstocks, reducing arable land use for feed (which consumes 1/3 of global farmland).
- Impacts: One factory processes 250 tonnes daily, sparing 15 million wild fish annually and bolstering bio-economy resilience.

Lufa Farms (Montreal, Canada)

- Operates commercial rooftop hydroponic greenhouses on underused urban spaces to grow fresh produce, shortening supply chains and minimizing transport-related waste.
- Circular Focus: Localizes production to cut food miles and spoilage; integrates with urban waste heat for efficiency.
- Impacts: First site (0.75 acres) feeds 2,000 people yearly, creates jobs, reduces energy use, and enhances urban biodiversity.

Biopolus (Budapest, Hungary)

- Builds decentralized "urban metabolic hubs" for neighborhoods (10,000–20,000 people) to process organic food waste and wastewater into energy, biochemicals, and clean water.
- Circular Focus: Regenerates local resources on-site, turning waste into community assets like reusable water and food additives.
- Impacts: Eliminates landfill externalities, fosters vibrant spaces, and supports integrated urban food systems with minimal environmental harm.

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SECTION 3

Figuring things out

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Final Assessment: Post-Test

Format: 10 short questions + 1 practical task

Duration: 20 minutes

Question	Type	Correct/Expected Answer	Competence Assessed
1. Name two key principles of the circular economy.	Open	Reuse, reduce, recycle / keep resources in use	Concept
2. Give one example of a circular food practice in your workplace.	Open	(e.g., donating leftovers, composting)	Application
3. What are the benefits of reducing food waste?	Multiple	Saves money, protects the environment	Understanding
4. How can you reduce waste in the kitchen?	Open	Portion control, better storage, reusing ingredients	Problem-solving
5. What should be avoided to promote circularity?	Multiple	Over-ordering / disposable packaging	Awareness

Group Activity

👩‍🍳 Design a **Circular Kitchen Plan**

- Rethink one process
- Reduce waste
- Reuse materials creatively

Quiz & Reflection . . . . .

- What did you learn?

- How can you apply it at work?

Wrap-up & Resources

Post-test + Action plan

Resources:

FAO Food Waste Toolkit
Ellen MacArthur Foundation
Sustainable Restaurant Association videos

THE END