# CIRCULAR ECONOMY

THE FUTURE OF SUSTAINABILITY

Chennai, Tamil Nadu

WHY ARE WE TALKING ABOUT THIS?

- Chennai produces 5,000–6,000 tons of waste every day
- Most waste ends up in landfills or the environment
- Natural resources like water, energy, and materials are limited
- Question: What if waste could become a resource?

As cities grow, consumption increases. Managing waste only after it is created is not enough — we must rethink how products and materials are used from the beginning.
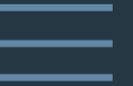
SUSTAINABILITY CHALLENGES: LOCAL & GLOBAL

These challenges affect health, climate, and quality of life. Local problems in Chennai are closely connected to global environmental issues.

01.

Local Challenges

- Rapid urban growth in Tamil Nadu
- Water scarcity and pollution
- Plastic and food waste problems

02.

Global Challenges

Humans use resources faster than Earth can replace them

LINEAR ECONOMY

TAKE MAKE WASTE

WHAT IS A LINEAR ECONOMY?

- **Make → Use → Dispose**
- **Resources are extracted, used once, and thrown away**
- **Creates pollution and waste**
- **Common in fast fashion, plastics, electronics**

The linear economy assumes resources are unlimited and waste can be ignored — an approach that no longer works in today's world.
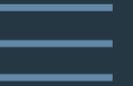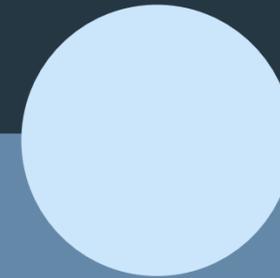
PROBLEMS WITH THE LINEAR ECONOMY

Once materials are thrown away, their value is lost, leading to environmental damage and higher costs for society.

Large amounts of waste in landfills

**Pollution of air, water, and soil**

Loss of valuable materials

WHAT IS A CIRCULAR ECONOMY?

- **A system where materials are used again and again**
- **Focuses on Reduce, Reuse, Recycle, Repair, Regenerate**
- **Waste is treated as a resource**
- **Inspired by nature (nothing is wasted)**

In a circular economy, products are designed to last longer and materials stay in use instead of becoming waste.

LINEAR ECONOMY

TAKE   MAKE   DISPOSE

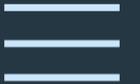CIRCULAR ECONOMY
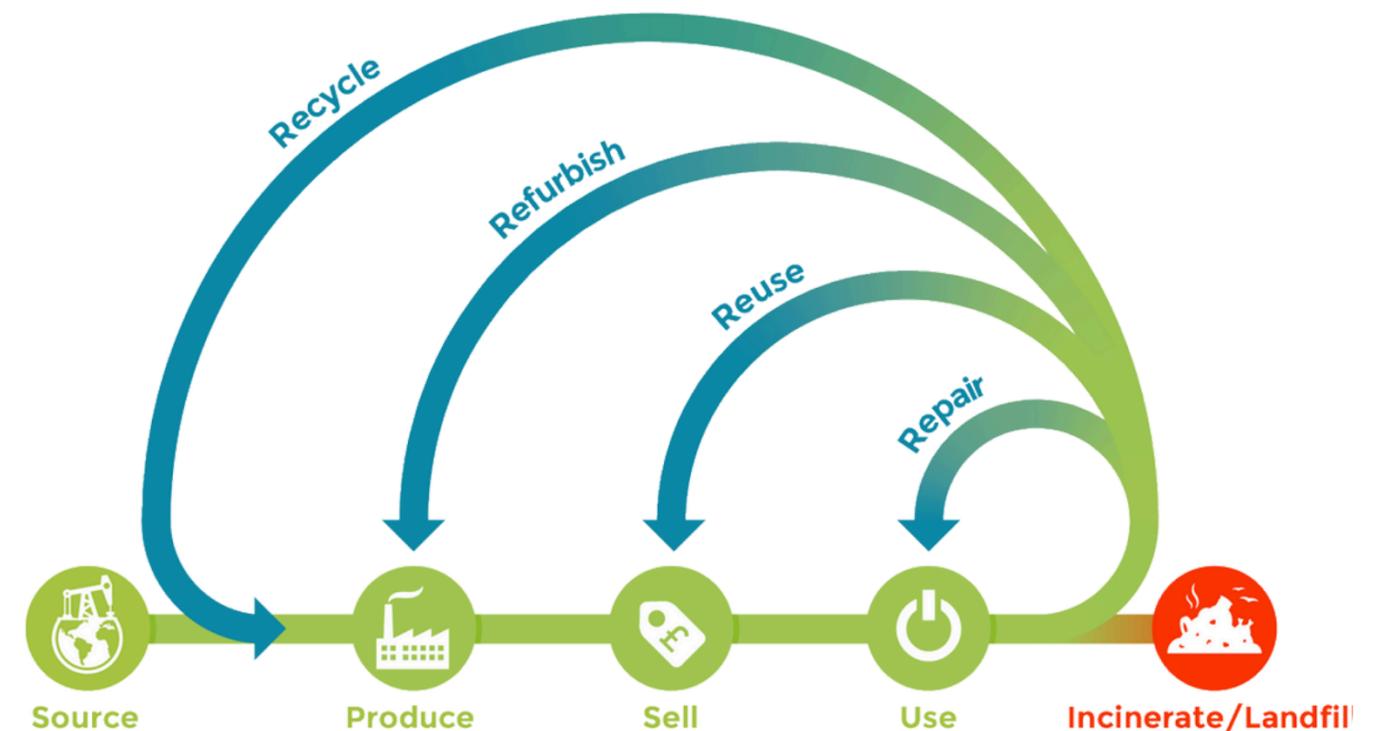
MAKE   USE   RECYCLE

LINEAR VS CIRCULAR ECONOMY

- **Linear: Make–Use–Dispose**
- **Linear creates pollution and waste**
- **Linear depends on continuous extraction of new raw materials**

In a linear system, value is lost once a product is discarded.

- **Circular: Make–Use–Reuse–Recycle**
- **Circular saves resources and energy**
- **Circular keeps products and materials in use for longer through repair and recycling**
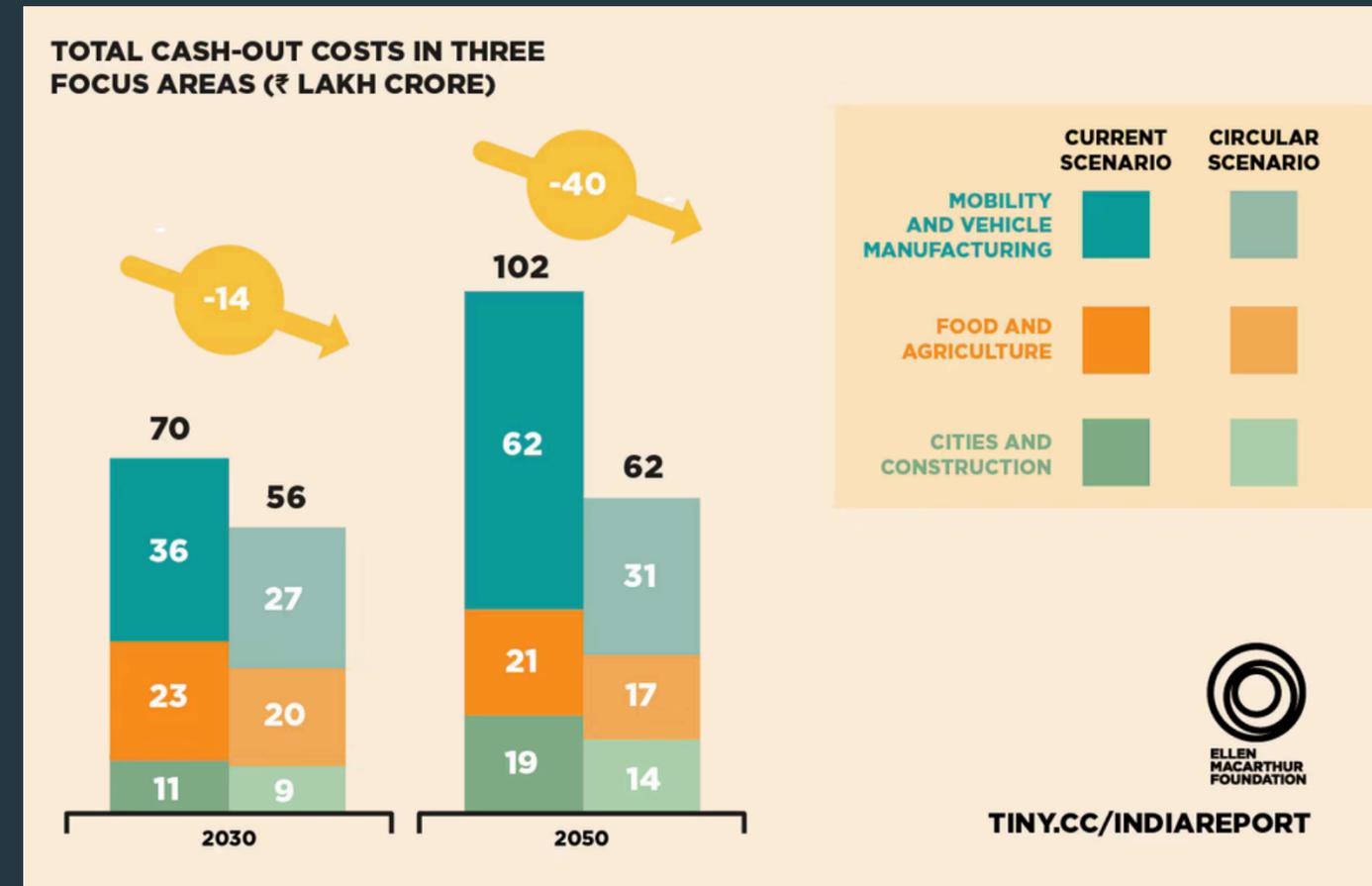
In a circular system, value is retained by designing products to last longer and by recovering materials after use, reducing environmental damage and conserving natural resources.

WHY CIRCULAR ECONOMY MATTERS

- **Less waste and pollution**
- **Cleaner cities and environment**
- **New jobs and innovation**
- **Better future for people and the planet**

Circular economy helps protect the environment while supporting economic growth and social well-being.

TOTAL CASH-OUT COSTS IN THREE FOCUS AREAS (₹ LAKH CRORE)

-40

-14

102

70

56

62

36

62

27

31

23

21

20

17

11

19

9

14

2030

2050

	CURRENT SCENARIO	CIRCULAR SCENARIO
MOBILITY AND VEHICLE MANUFACTURING		
FOOD AND AGRICULTURE		
CITIES AND CONSTRUCTION		

ELLEN MACARTHUR FOUNDATION
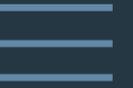
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CIRCULAR ECONOMY AROUND THE WORLD

Examples of global companies using circular economy

- **Patagonia repairs and resells clothes**
- **IKEA buys back used furniture**
- **Apple recycles metals from old devices**

Circular economy is already happening

Many global companies are proving that sustainability and business success can go together.

CIRCULAR ECONOMY IN TAMIL NADU

- **Zoho: eco-friendly campuses**
- **ITC: paper recycling and waste management**
- **Auroville: sustainable living practices**
- **Tamil Nadu is a leader in renewable energy**

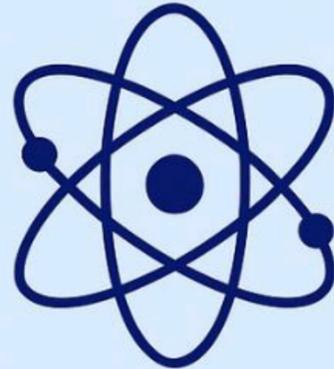Local examples show that circular economy solutions can work close to home.

CIRCULAR BUSINESS MODELS

- **Product-as-a-Service (rent instead of buy)**
- **Sharing economy (bikes, cars, tools)**
- **Recycling materials into new products**
- **Businesses can reduce waste and costs**

These models reduce resource use while delivering the same or better value to customers.

ROLE OF STEM IN CIRCULAR ECONOMY

- **Science:** biodegradable materials
- **Technology:** smart waste sorting, AI
- **Engineering:** renewable energy, water treatment
- **Math:** efficiency and optimization

STEM

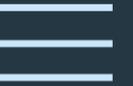- Science
- Technology
- Engineering
- Math

STEM skills are essential for designing, testing, and improving circular solutions.

FUTURE INNOVATIONS

Innovation will play a key role in making circular economy scalable and affordable.

- Biotech: mycelium leather, algae plastics.
- Chemical engineering: recycling efficiency, water treatment.
- Renewable microgrids and solar innovations in TN.
- Government initiatives: Extended Producer Responsibility (EPR), Mission LiFE.

WORKSHOP CHALLENGE OVERVIEW

- Work in teams of 4–6 students
- Identify a local problem in Chennai (plastic, food waste, e-waste, water, energy)
- Use circular thinking to design a practical solution
- Time: 30 minutes to design, 10 minutes to present

Judging Criteria:

- Creativity
- Feasibility
- Circular thinking
- Sustainability impact

Judging Sheet

Creativity

Score	Description
9–10	Highly original idea; rethinks the problem in a new way. Strong design thinking and clear differentiation from common solutions.
6–8	Some originality; builds meaningfully on existing ideas with creative improvements.
3–5	Idea is familiar or expected; limited innovation.
0–2	Very basic or copied idea; lacks creative thought.

Feasibility

Score	Description
9–10	Solution is practical, realistic, and well thought out. Uses existing resources, technology, or systems.
6–8	Mostly feasible; minor gaps in cost, scale, or implementation details.
3–5	Significant challenges; unclear how the solution would work in practice.
0–2	Unrealistic or impractical idea with no clear path to implementation.

Circular Thinking

Score	Description
9–10	Strong closed-loop thinking. Clear explanation of material flow from use → reuse → recovery → reuse again.
6–8	Demonstrates circular concepts but with some linear elements remaining.
3–5	Mentions circular economy but applies it weakly or incorrectly.
0–2	No real circular thinking; solution remains linear (make–use–dispose).

Sustainability Impact

Score	Description
9–10	Clear, measurable positive impact. Addresses environmental and social issues meaningfully.
6–8	Positive impact identified, but metrics or scale are limited.
3–5	Impact is vague or minimal.
0–2	Little to no sustainability benefit demonstrated.

Example

ReLoop Chennai: Turning Street Plastic Waste into Modular Urban Furniture

Problem Statement

Chennai generates thousands of tons of plastic waste daily, much of which ends up in landfills, waterways, or burned openly. At the same time, public spaces lack durable, affordable seating and shaded infrastructure, especially in high-footfall street markets and beaches.

How can we reduce plastic waste while creating value for the community?

Solution Overview

ReLoop Chennai addresses both challenges by creating a closed-loop system that transforms low-value plastic waste into functional public infrastructure.

The project collects discarded plastic waste from:

- Street vendors and local markets
- Beach clean-up drives
- Informal waste collection networks

This waste is then processed using low-energy compression molding to manufacture:

- Modular public benches
- Urban planters
- Shade and partition panels

All products are designed to be long-lasting, repairable, and recyclable at end-of-life, ensuring materials remain in use rather than becoming waste again.

How can we reduce plastic waste while creating value for the community?

How the System Works

1. Collection – Low-value plastics are gathered locally through vendor partnerships and community drives.
2. Sorting & Cleaning – Plastics are manually sorted and cleaned using minimal water.
3. Manufacturing – Materials are compression-molded into standardized modular components.
4. Deployment – Products are installed in public spaces across Chennai.
5. Return Loop – Damaged components are collected, remelted, and remanufactured.

This process keeps materials circulating within the system instead of being discarded.

Key Design Features

1. Modular Design: Individual panels or parts can be replaced without discarding the entire product
2. Weather Resistance: Suitable for Chennai's heat, humidity, and monsoon conditions
3. Local Manufacturing: Reduces transportation emissions and supports local employment
4. Scalable Production: Same molds can be used to create multiple product types

Why This Solution Is Effective

1. Environmentally Responsible: Reduces plastic leakage into oceans and landfills
2. Socially Beneficial: Improves public spaces and awareness of waste issues
3. Economically Viable: Uses low-cost input materials and simple manufacturing processes
4. Truly Circular: Waste is treated as a resource, not an endpoint

மாற்றம், நம்ம கையில்தான் இருக்கு

THE FUTURE IS IN OUR HANDS."
THINK CIRCULAR. ACT LOCAL. BUILD A SUSTAINABLE FUTURE.

ETHOS SUSTAINABILITY
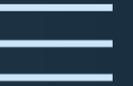
THANK YOU
FOR YOUR ATTENTION

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