

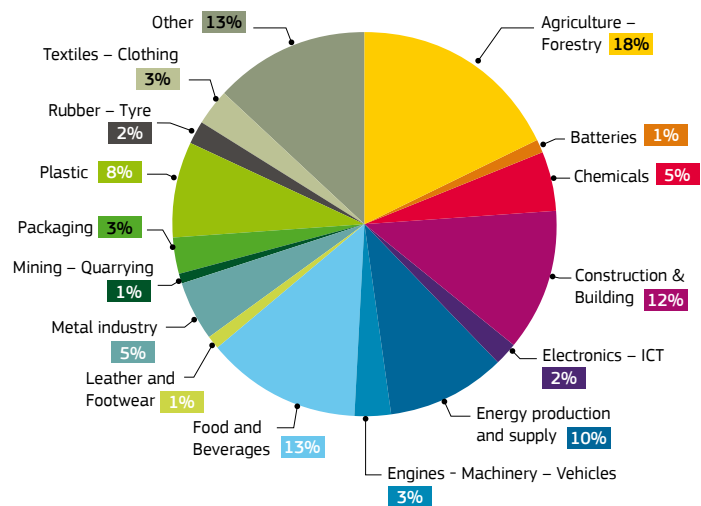
# Disrupting the linear model: LIFE and the circular economy



People living in today's developed economies have access to all kinds of products at affordable prices. But making these products is often associated with an excessive and intense use of natural resources as well as related CO<sub>2</sub> emissions linked to these resources' extraction and transformation. Also, many items break down too easily, cannot be reused, repaired or recycled, or are made for single use only. The solution to our dependence on these resources and this needless waste is the circular economy. It aims to transform the way products are made and empower consumers to make sustainable choices for the environment. Through LIFE co-funded projects, the EU LIFE programme has been helping to make the transition away from a linear model while supporting the implementation of the EU's Circular Economy Action Plan.

## Fast facts

- LIFE has been supporting circular economy-related projects since 1992 through some 700 projects on waste prevention and reduction, recycling and re-use, totalling more than €1 billion of investment.
  - Under the 2014 – 2020 LIFE programming period, more than €948 million was invested in over 215 projects that contributed to the circular economy. These projects also built on the CIP eco-innovation programme that helped innovative green ideas to become marketable solutions.
  - LIFE circular economy projects have helped implement EU environmental legislation. And some have been pivotal for crafting and reviewing existing legislation.
  - Several projects have increased citizens' awareness of waste prevention or established new processes for preventing waste.
  - Others have contributed to 'closing the loop' upstream in such areas as product design, new production processes, consumer awareness and new value chains.
  - As well as helping to protect our environment, these projects can lead to market solutions and new green jobs.
  - Multiple projects have come up with resource-efficient, sustainable, and green alternatives to raw materials for use in the plastic, food pulp and paper industries.
- Many LIFE solutions are replicable and transferable across the EU, leading to a multiplier effect.
  - Close collaboration between different players is vital for developing a circular economy. LIFE is well-versed in this area.



LIFE circular economy projects by sector (2014 - 2020)

## A reinforced LIFE focus on the circular economy

For 2021-2027, the European Commission has increased LIFE programme funding to €5.4 billion. LIFE has several new sub-programmes including Circular Economy and Quality of Life for which €1.3 billion has been earmarked.

As regards the circular economy, LIFE funding also targets projects focused on the recovery of resources from waste and waste prevention.

These projects implement circular business models and sustainable consumption practices or solutions for value retention as set out in the new **EU's Circular Economy Action Plan** including the implementation of ecodesign solutions, to improve durability, reparability, reusability, upgradability, recyclability and the use of recycled content in new products. These innovative or best practice solutions also aim at reducing impacts holistically by considering aspects such as whole life cycle approach, uptake of ecolabelling, green procurement and tracking of raw materials in components and products.

Find out more information [here](#) and [here](#)

# LIFE projects performing all-round

## BIOCOPACPLUS



### BIOCOPACPLUS produced a bio-lacquer for coating metal cans containing food.

Each year, Europe generates more than 300 000 tonnes of solid tomato residues like skins and seeds.

To reduce this waste, the BIOCOPACPLUS team designed and built a prototype manufacturing plant to produce a bio-lacquer from tomato waste. This allowed them to make 250 kg of a waxy, water-repellent substance called cutin from around five tonnes of tomato skins. This cutin formed the main ingredient of the lacquer and was used to line and protect cans containing food.

A test run of 3 000 cans was coated with the bio-lacquer and it met all the required functional and hygienic properties. This means it can replace existing commercial lacquers made from oil. Also, the solution solves the problem of traditional organic coatings which could contaminate canned food and harm human health.

Resources and energy consumption were saved by reducing processing temperatures and times.

Also, all the solid and liquid waste generated was used to produce biogas. When compared with a standard lacquer of fossil fuel origin, CO<sub>2</sub> equivalent emissions were 730 mg lower per can.

The bio-solution gives value to the tomato industry by-products through its waste reuse approach. As the container is more easily recyclable, the metal packaging sector also becomes more competitive. The approach is highly replicable.

The project supports the EU's **Waste Framework Directive** and the Circular Economy Action Plan.

## LIFE RE-WEEE

The **LIFE RE-WEEE** project set out to prevent and reduce the amount of Waste Electrical and Electronic Equipment (WEEE) in Greece.

Up to **185 000 tonnes of electronic waste** is generated annually in Greece. This waste contains hazardous substances like heavy metals that can harm human health and ecosystems. Also, some of this waste could be reused.

To counter this, the RE-WEEE team set up two sorting centres for waste electrical and electronic equipment (WEEE) in the outskirts of Attika and Central Macedonia. These centres, which sort and prepare WEEE for reuse, were the first in Greece. They will operate until 2024.

8 600 tonnes of WEEE were collected during the project, of which 4 900 tonnes were prepared for use after visual inspection. Also, some 9 760 items were repaired and more than 3 160 of these went on sale as Reusable Waste Electrical and Electronic Equipment (REEE). By reusing these appliances, emissions of more than 445 tonnes of CO<sub>2</sub> have to date been avoided. This is equal to the amount of CO<sub>2</sub> absorbed by 23 million trees in one day. Vulnerable groups, such as the poor or disadvantaged, benefited from the project as they had access to low cost and functional equipment.

The team developed a **web platform** where the public could donate and exchange equipment. Various events took place where the public could bring their items to be fixed on the spot.

LIFE RE-WEEE supports the European Green Deal and the EU Circular Economy Action Plan, the **Waste Electrical and Electronic Equipment Directive** (WEEE Directive) and the Waste Framework Directive.



Photo: LIFE14 ENV/GR/000856

## LIFE-ECOTEX

The **LIFE-ECOTEX** project developed an innovative, eco-efficient and highly replicable recycling system for polyester textile waste.

Polyester is the second largest family of plastics in terms of quantity used. But in the footwear industry, up to 7% of high-grade polyester textiles is lost during manufacture. This waste is difficult to recycle, making landfilling and incineration the most frequent solution.

Spain's LIFE-ECOTEX project set out to find a sustainable solution for this polyester waste. To do this, the team chemically recycled it via catalytic glycolysis. The process resulted in high added value chemical monomers that were used again as a raw material to produce new footwear and insulation materials.

The project team has increased the circularity of this industry and

reduced Greenhouse gas (GHG) emissions. For example, manufacturing the new raw material cut emissions by 35% when compared to producing virgin polyester. Also, a pair of shoe insoles made from recycled polyester had a 23% lower carbon footprint than insoles commonly used in trainers. And the new method saw a fall in the amount of polyester textile waste being landfilled by 750 kg.

The team went on to develop 330 prototype shoe insoles and 24 insulation panels, which were manufactured with chemically recycled polyester. Several companies in the textile, automotive and packaging industries have started projects with the project coordinator to replicate the chemical process.

LIFE-ECOTEX is in line with the EU's Circular Economy Action Plan, the Waste Framework Directive and the **Landfill Directive**.



## LIFE GreenShoes4All

The LIFE **GreenShoes4All** project is measuring the environmental impact of footwear products to help manufacturers reduce their waste and emissions.

The European footwear industry emits a good deal of waste. And around 50% of raw materials discarded by shoe manufacturers are polymers, like rubber, textile or polymer composites, which are hard to recycle.

The project's partners from Belgium, Portugal, Romania and Spain are contributing to the development of the European Commission's Product Environmental Footprint (PEF) methodology that will help footwear companies measure the environmental impact of their products. These metrics support the **EU's Single Market for Green Products** by looking at environmental performance throughout the supply chain. It is hoped that the PEF methodology could become a worldwide standard for measuring environmental performance.

The team is also testing new recycling routes to reduce the use of raw materials and waste in production. And they are developing innovative eco-design concepts and eco-processes for shoe manufacturing, which could be used in the apparel and leather goods sectors. This could lead to the creation of new green jobs, services and products. Recommendations on the first draft of the Footwear Product Environmental Footprint Category Rules (PEFRC) are being prepared for the Commission's review. These rules could help manufacturers reduce emissions related to footwear production by 15% and recyclable waste linked to sole production by 70%.



## LIFE CEPLAFIB

Slovenia's LIFE **CEPLAFIB** project has developed a sustainable, recycled alternative to virgin plastics for use in the packaging, automotive and construction sectors.

Each year, **275 million tonnes of plastic waste** are generated worldwide but only 9% of this waste stream is recycled. The rest is either incinerated or sent to landfill. It is imperative to develop an effective after-use economy to improve recycling rates.

The CEPLAFIB team has developed new compounds such as packaging trays and pipe plugs from used plastics like recycled polypropylene, high-density polyethylene as well as old newsprint paper. When combined, these materials can be used as industrial packaging or protective covers for pipes, fastening parts for caravans, decorative panels for facades, soundproofing for walls, and even building blocks for kids. The goal is to show that products made from recycled materials are just as reliable and attractive to consumers as those coming from virgin raw materials.

Their method should boost the participating regions' recycling rates of used plastics by 40% and cut GHG emissions by the same figure when compared to current recycling activities. Also, tests show that these eco-materials are around half the price of plastic-wood composites currently available on the market. And this innovation should be easily transferable to other regions and sectors.

CEPLAFIB's approach is completely in line with the **EU's Circular Economy Action Plan**.



## LIFE Waste2Protein

Germany's LIFE **Waste2Protein** uses organic residues from supermarkets as a resource to produce sustainable and location-independent insect protein from black soldier flies.

By 2050, the demand for animal protein will be 75% higher than it was in 2007 due to population growth and more meat consumption. This could lead to a lack of feed for livestock. Insects offer a solution as they can fill this gap.

Insect protein meal is a resource-efficient, sustainable and green alternative to animal feed. And it can replace the production of fish and soy meal, which are both damaging to our seas and overall biodiversity.

This project's production process **results in fewer GHG emissions** by using insect protein. It follows the circular economy concept as there is zero waste. The approach protects biodiversity as it produces sustainable proteins. And there is less pesticide and land use.

The team has already set up its first industrial insect factory and aims to expand globally.

Project coordinator madebymade recently won the **Dealflow.eu** 'Best EU-backed sustainable start-ups' award for its work on LIFE Waste2Protein. The competition featured seven of the EU's most innovative, early-stage sustainability start-ups.

The project supports the implementation of the EU's Waste Framework Directive, the Circular Economy Action Plan and the Landfill Directive.

Photo: LIFE15 ENV/ES/000658 © EU

# EU policy behind the circular economy

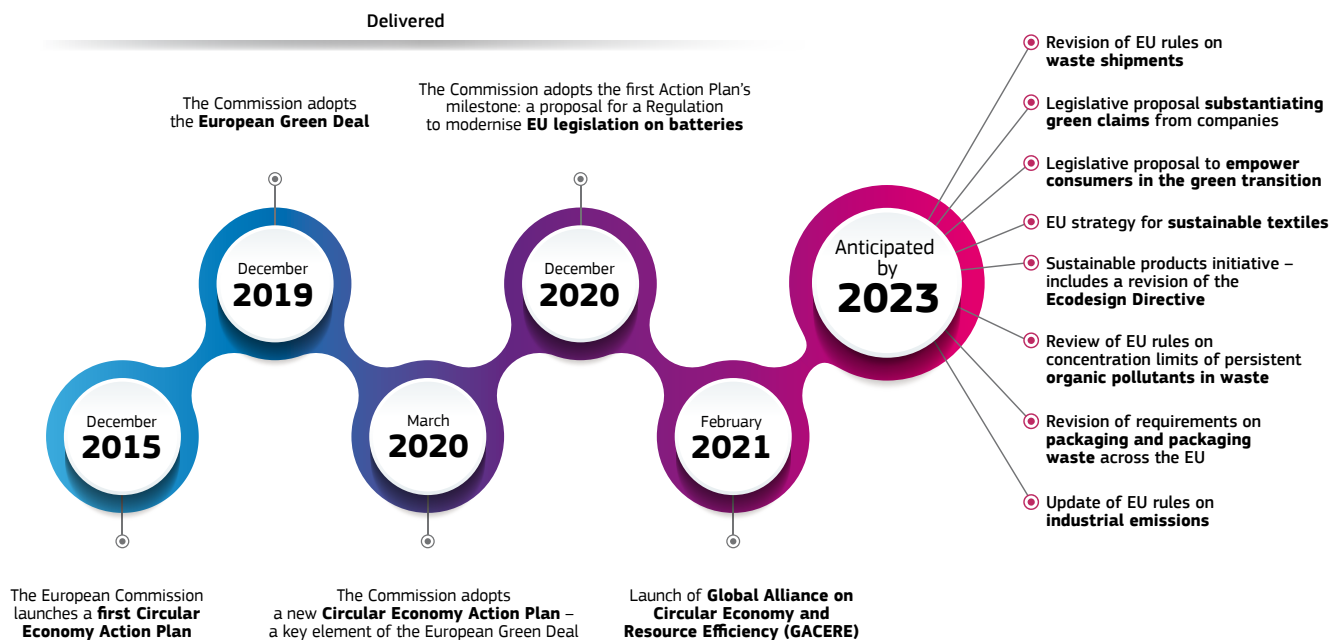
In 2015, the European Commission adopted its **first Circular Economy Action Plan**. This action plan helped to put the EU on a path towards a new regenerative growth model that gives back to the planet more than it takes. It also supported Europe's global competitiveness and job creation. Its 54 actions were delivered, and a **new Circular Economy Action Plan** was adopted in March 2020.

The new action plan is one of the key elements of the **European Green Deal** - Europe's agenda for sustainable growth. It focuses on

how products are designed, promotes circular economy processes and encourages sustainable consumption. And it aims to prevent waste and keep resources in the EU's economy for as long as possible.

The plan contains legislative and non-legislative measures targeting areas where action at the EU level brings real added value. Both completed and upcoming measures can be seen in the below timeline.

## Timeline



### Learn more

[ec.europa.eu/life](https://ec.europa.eu/life) LIFE programme  
 @LIFEprogramme LIFE programme

### How to apply for LIFE funding

The European Commission organises annual calls for proposals. Full details are available at [ec.europa.eu/life](https://ec.europa.eu/life)

### Contact

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