

LIFE16

RE Waste 1
Sustainability & Replicability
Brussels

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The dual nature of LIFE!!



Technical **feasibility** of the process/method/solution → **technical success**

&

Actions to safeguard sustainability and replication → **project's success**

Why replicability and sustainability are so significant?

- **Impact to wider audience, increasing the added value of the project**
- **Promotes the quality of your team's work**
- **Assists in the creation of business opportunities**
- **Maximises the impact of LIFE programme**



Projects categorisation based on topic (1/2)

Biowaste	"Waste" Plastic
LIFE16 ENV/ES/185 **LIFE WASTE2BIOFUEL** (MSW biomass) LIFE16 ENV/ES/160 **LIFE-Brewery** (Brewing wastes) LIFE16 ENV/IT/179 **LIFECAB** (MSW biomass) LIFE16 ENV/IT/547 **i-REXFO LIFE** (food waste) LIFE16 ENV/SI/335 **LIFE for Acid Whey** (dairy waste)	• LIFE16 ENV/ES/258 **LIFE EPS SURE** (EPS, fish boxes) • LIFE16 ENV/ES/305 **LIFE RECYPACK** (LDPE, EPS) • LIFE16 ENV/ES/254 **LIFE REPOLYUSE** (PU) • LIFE16 ENV/NL/271 **LIFE-PSLOOP** (EPS, construction)

Projects categorisation based on topic (2/2)

Product Env. Footprinting (PEF)	Food Supply Chain Waste
LIFE16 ENV/ES/173 **LIFE-RENDER** LIFE16 ENV/IT/225 **TTGG** LIFE16/ENV/IT/172 **LIFE EFFIGE**	• LIFE16 ENV/ES/158 **LIFE YEAST** • LIFE16 ENV/ES/171 **LIFE CITRUSPACK** • LIFE16 ENV/ES/254 **LIFE byProtVal**

LIFE16 ENV/ES/185 **LIFE WASTE2BIOFUEL**

Demonstration of Integrated Technologies to transform Biowaste from MSW into 2G Biofuels

- **Product:** Biofuel
- **Market**: Road vehicle and aviation fuel (output)
- **Competition:** Alternative waste treatment technologies (input) and fossil / other biofuels (outputs)
- **Replicability and sustainability**

Strategy: To develop an Integrated Gasification Fischer-Tropsch (IGFT) process for the thermal treatment of the Municipal Solid Waste (MSW) biomass fraction. Build a 450tpa pilot plant and carry out a feasibility study to scale up to 15ktpa (2MW) commercial plants. Post project objective of building 3 commercial scale plants. Develop business plan.

LIFE16 ENV/ES/185 **LIFE WASTE2BIOFUEL**

Demonstration of Integrated Technologies to transform Biowaste from MSW into 2G Biofuels

⚠ ***Challenges:***

- ***Technical: obtaining an organic input fraction for the gasification process at a commercial scale.***
- ***Access to MSW and developing partnerships with waste management companies and municipalities.***
- ***Reducing percentages of organics in MSW as food and green waste collections increase.***
- ***Competing technologies for waste treatment – MBT, EfW technologies, etc.***
- ***Alternative sources of biofuels.***
- ***Managing price fluctuation in the fossil fuel market.***

LIFE16 ENV/ES/160 **LIFE-Brewery**

New Strategies for Improving the Sustainability of Breweries: Full Waste Recovery for Aquaculture Feed

- **Product:** 3 sustainable aqua-feed diets
- **Market**: Aquaculture feed producers (for onwards supply to fish farms)
- **Competition:** Producers of alternative feedstocks
- **Replicability and sustainability**

Strategy: Demonstration through a full scale trial in Spain the recovery of two by-products from the brewing industry (grain and yeast), their preparation (drying pilot plant) and use in the manufacture of 3 acqa-feed products. Demonstrate economic viability and preparation of business plan to replicate in two further EU Regions after project end. Engage with investors.

LIFE16 ENV/ES/160 **LIFE-Brewery**

New Strategies for Improving the Sustainability of Breweries: Full Waste Recovery for Aquaculture Feed

Challenges:

- ***Economics of by-product collection from small and micro breweries.***
- ***Alternative disposal routes – animal feed / anaerobic digestion***
- ***Performance in relation to standard aquaculture feeds***

LIFE16 ENV/ES/258 **LIFE EPS SURE**

Expanded Polystyrene SUstainable Recycling: From EPS waste to food contact PS final market

- **Product:** Food contact PS pellet with recycling content
- **Market**: Focus: food contact PS packaging
- **Competition:** Virgin PS pellet
- **Replicability and sustainability**

Strategy: Define business model to collect, wash and recycle waste EPS fish boxes. Demonstrate EPS recycling process and produce 4-5t of recycled PS to produce pellet with different recycled contents. Produce PS sheet and 40 prototypes of food contact packaging. Develop a feasibility study and business plan to build a 100-150tpd plant (30-35% RPS content).

LIFE16 ENV/ES/258 **LIFE EPS SURE**

Expanded Polystyrene SUstainable Recycling: From EPS waste to food contact PS final market

⚠ ***Challenges:***

- ***Pollutant and odor removal.***
- ***Achieving food contact standard polymer.***
- ***Waste management cost associated with EPS.***
- ***Economic costs of producing a food grade polymer.***
- ***Fluctuating virgin polymer costs.***

LIFE16 ENV/ES/305 **LIFE RECYPACK**

Circular Economy of Commercial Plastic Packaging in Urban Environments

- **Product:** Recovered LDPE and EPS plastic
- **Market**: European waste management and recycling industry
- **Competition:** Waste management industry and alternative recovery / disposal routes
- **Replicability and sustainability**

Strategy: Collection trials of commercial plastics in different waste management scenarios: shopping centre, smaller retail premises, a distribution company (backhaul), small SME (via civic amenity sites). Focus on LDPE and EPS. Recycling trials. Development of a business model and best practise report to facilitate transferability.

LIFE16 ENV/ES/305 **LIFE RECYPACK**

Circular Economy of Commercial Plastic Packaging in Urban Environments

⚠ ***Challenges:***

- ***Economic and operational challenges around door to door collections from small town centre retailers.***
- ***Managing quality and maximising recovered plastic value.***
- ***Dealing with the low weight / high volume of C&I plastic packaging.***
- ***Working with existing waste management contractors to access material.***
- ***Developing a European wide business model that can be widely applied.***

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LIFE16 ENV/ES/254 **LIFE REPOLYUSE**

REcovery of POLYurethane for reUSE in eco-efficient materials

- **Product:** Gypsum-PU construction products (ceiling boards)
- **Market**: Construction sector
- **Competition:** Other ceiling board types
- **Replicability and sustainability**

Strategy: Developing PU collection protocols, production of ceiling boards with PU content, trials of boards in buildings in the UK and Spain. Analysis and development of business and marketing plan. Placing product on Spanish market with development of plan for other European countries.

LIFE16 ENV/ES/254 **LIFE REPOLYUSE**

REcovery of POLYurethane for reUSE in eco-efficient materials

⚠ ***Challenges:***

- ***Economics of collection of PU waste.***
- ***Managing PU waste quality.***
- ***Acceptance by the construction sector of a product containing 'waste'***
- ***Recycling at end of life.***

LIFE16 ENV/IT/179 **LIFECAB**

Biogas and digestate with controlled ammonia content by a virtuous biowaste cycle with integrated bio&chemical processes

- **Product:** Soluble biobased products (SBO) for use in anaerobic digestion facilities
- **Market**: Anaerobic digestion and composting
- **Competition:** Status quo (Secondary treatment of digestate with bacteria when rich in ammonia).
- **Replicability and sustainability**

Strategy: Demonstrate how SBO can be used to control ammonia in digestate and increase biogas production during AD treatment of biowastes. Development of pilot plant to produce SBO. Trials at a large existing municipal biowaste treatment facility and pilot plant trials at two further facilities in other countries. Development of business and transferability plans.

LIFE16 ENV/IT/179 **LIFECAB**

Biogas and digestate with controlled ammonia content by a virtuous biowaste cycle with integrated bio&chemical processes

⚠ ***Challenges:***

- ***Developing an SBO that can be used commercially on varying biowaste compositions.***
- ***Demonstrating the benefits and gaining market uptake.***

LIFE16 ENV/IT/547 **i-REXFO LIFE**

Increase in the REduction and REcovery of EXpired FOod

- **Product:** Food waste reduction and food waste energy valorisation tool
- **Market**: Consumers, wholesale-retail, horeca, food processing and farming sectors
- **Competition:** Environmental consultants
- **Replicability and sustainability**
- **Strategy:** To develop and test a practical tool for the design, application and transfer of the i-REXFO approach across Europe. Tool to be used for techno-economic evaluation by stakeholders and investors. Based on a demonstration project to reduce food waste generation and increase recovery of food waste to generate biogas in Umbri, Italy. To use the tool to prepare for replication of demonstration activities in four other regions (2 in Italy and 2 in Hungary) after the project end.

LIFE16 ENV/IT/547 **i-REXFO LIFE**

Increase in the REduction and REcovery of EXpired FOod

⚠ ***Challenges:***

- ***Populating the tool with data and keeping it up to date.***
- ***Cost of the above.***
- ***Operational complexity of the market – changing availability of food wastes volumes and types over time.***

LIFE16 ENV/SI/335 **LIFE for Acid Whey**

Reuse of waste acid whey for extraction of high added value bioactive proteins

- **Product:** High added value proteins (e.g. food additive quality lactoferrin) & technology
- **Market**: Food sector (proteins) & dairy processing industry or service providers (technology)
- **Competition:** Other whey protein fractionation options
- **Replicability and sustainability**

Strategy: Design and develop pilot plan Fast Flow Monolith Based Whey Protein Fractionation Technology (MWF) to process whey (100m^3/day) to produce added value proteins. AD of processed whey in biogas co-digestion plant. Technology assessment, economic assessment, business plan, market replication and technology transfer plan.

LIFE16 ENV/SI/335 **LIFE for Acid Whey**

Reuse of waste acid whey for extraction of high added value bioactive proteins

⚠ ***Challenges:***

- ***Competition with alternative disposal routes.***
- ***Maintaining quality / consistency of whey input.***
- ***Maintaining quality control / traceability if using decentralised mobile plant.***

LIFE16 ENV/NL/271 **LIFE-PSLOOP**

Polystyrene Loop

- **Product:** Demonstration facility to remove HBCD from EPS used in construction sector. De-polluted recycled PS. Recovered bromine products.
- **Market**: Construction industry and waste management sector (inputs). Users of PS, including construction industry (outputs)
- **Competition:** Alternative disposal routes, notably incineration
- **Replicability and sustainability**

Strategy: Construction of 3000tpa demonstration recycling facility and collection and pre-treatment system. Techno-economic analysis and development of business case. Planned replication in 10 other locations in the Netherlands and Germany. Potential use in other plastic waste streams, e.g. WEEE and ELV.

LIFE16 ENV/NL/271 **LIFE-PSLOOP**

Polystyrene Loop

⚠ ***Challenges:***

- ***Contamination of post use construction EPS with cement, paper, glues, etc.***
- ***Managing quality in the supply chain prior to recycling.***
- ***Cost of transporting waste EPS.***
- ***Economics connected to dealing with the above.***
- ***Encouraging C&D sites to divert EPS for recycling.***
- ***Building a plant flexible enough to deal with different types and quantities of contamination.***
- ***Managing fluctuations in virgin PS price.***

LIFE16 ENV/ES467 **LIFE byProtVal**

Protein recovery and recycling from animal by-products processes

- **Product:** Gelatine and / or collagen derivatives
- **Market**: Agriculture (fertiliser / animal feed) & chemical sector and tanning industry
- **Competition:** Existing fertiliser and tanning chemicals
- **Replicability and sustainability**

Strategy: Construction of a demonstration plants with units for treatment of greaves (5tpd) and wet rendering processing water (750lpd). Assessment of extracted proteins for use as retanning agents and fertilisers (compliance with standards). Preparation of business plan and replicability and transferability plan.

LIFE16 ENV/ES467 **LIFE byProtVal**

Protein recovery and recycling from animal by-products processes

⚠ ***Challenges:***

- ***Technical – recovery rates and purity of gelatine and collagen.***
- ***Regulatory – producing fertilisers that meet the required standards.***
- ***Economic - Cost of production vs. value of products.***

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LIFE16 ENV/ES/171 **LIFE CITRUSPACK**

Revalorization strategies within the circular economy for the use of citrus waste in green packaging and cosmetics

- **Product:** Bioplastic bottles and jars, additives for beauty products
- **Market**: Packaging and beauty products
- **Competition:** Other bio based and petrochemical based plastic packaging, such as PET. Other beauty product additives.
- **Replicability and sustainability**

Strategy: Pilot line to treat citrus peel and produce natural fibres for packaging production. 80% beneficial recovery of target agrowaste. Development of a commercial brand with full validation and pre-norm testing approval. Bioplastic suitable for injection or blow moulding. Market testing with consumers.

LIFE16 ENV/ES/171 **LIFE CITRUSPACK**

Revalorization strategies within the circular economy for the use of citrus waste in green packaging and cosmetics

⚠ ***Challenges:***

- ***Incoming feedstock – logistics costs and quality control***
- ***Production cost and competition from other bioplastics***
- ***End of life model – how packaging might be captured and composted. Avoiding mixing with non biodegradable plastics.***

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LIFE16 ENV/ES/173 **LIFE RENDER**

Promoting the implementation of Product Environmental Footprint Methodology in the European Dairy Sector

- **Product:** A Product Environmental Footprint (PEF) tool to carry out Product Environmental Footprint Category Rules (PEFCR) complaint studies of SMEs in the dairy sector.
- **Market**: Product Environmental Footprint services
- **Competition:** Other PEF tools
- **Replicability and sustainability**

Strategy: Development of tool and associated guidance followed by demonstration on 30 dairy products produced by SMEs in France. Transferability tests in Spain and Portugal. Development of business plan to commercialise after the end of the project. Incentives for take up with members of associations involved in project . Project outcomes transferred to 20 European food and drink federations.

LIFE16 ENV/ES/173 **LIFE RENDER**

Promoting the implementation of Product Environmental Footprint Methodology in the European Dairy Sector

Challenges:

- ***Take up of the tool after LIFE project – will complexity (& cost) still be a barrier even with the software tool?***
- ***Expanding the use of the tool to other food and drink sectors.***

LIFE16 ENV/IT/225 **LIFE TTGG**

The tough get going

- **Product:** Product Environmental Footprint (PEF) tool for use on protected designation of origin (PDO) products
- **Market**: Product Environmental Footprint Services – initial focus dairy (hard and semi hard cheese) sector
- **Competition:** Other PEF tools
- **Replicability and sustainability**

Strategy: Development of tool to calculate PEFs to be used in conjunction with an environmental decision making tool (focused on the hard cheese sector) to reduce the PEF.

LIFE16 ENV/IT/225 **LIFE TTGG**

The tough get going

⚠ ***Challenges:***

- ***Developing an EDSS software package that can be used widely but that can produce meaningful results on a company specific basic.***
- ***Commercialising the product after the end of the project.***
- ***Expanding the product to other PDO products after the end of the project.***

LIFE16 ENV/IT/172 **LIFE EFFIGE**

Environmental Footprint For Improving and Growing Eco-efficiency

- **Product:** Development of a Product Environmental Footprint (PEF) tool & supporting guidance.
- **Market**: PEF services with SME focus
- **Competition:** Other PEF tools
- **Replicability and sustainability**

Strategy: Creation of a PEF toolkit and to test it in different supply chains in Italy (furniture, foundry, agrifood, catering services). To create a public database for environmental impacts for use by SMEs when carrying out PEFs. To create a tool that can easily be applied to other supply chains and geographic regions in Europe.

LIFE16 ENV/IT/172 **LIFE EFFIGE**

Environmental Footprint For Improving and Growing Eco-efficiency

Challenges:

- ***Developing a business model for the PEF toolkit to ensure its continuation after the end of the project.***
- ***Populating the database for a broad range of supply chains and keeping it updated.***
- ***Ensuring take up by SMEs.***

LIFE16 ENV/ES/158 **LIFE YEAST**

Recycling brewer's spent YEAST in innovative industrial applications

- **Product:** Customised yeast extract (CYE), yeast cell wall (YCW), partially autolysed yeast (PAY) and bioactive peptides.
- **Market**: Various including brewing, pharmaceutical, cosmetic, wine and agricultural sectors.
- **Competition:** Various alternative constituents / additives.
- **Replicability and sustainability**

Strategy: Demonstration plant to recover the constituents from brewer's spent yeast (BSY). Range of demonstration activities for use of constituents, notably a full industrial scale demonstrator an AB InBev brewery to use CYE and YCW to enhance the efficiency of the fermentation process. Range of exploitation focused activities: marketing and business plans, engineering package. Expectation to role out to all AB InBev breweries.

LIFE16 ENV/ES/158 **LIFE YEAST**

Recycling brewer's spent YEAST in innovative industrial applications

⚠ ***Challenges:***

- ***Economic - ensuring the added value from further treatment exceeds processing costs.***
- ***Regulatory – use in the pharmaceutical sector.***

Conclusions

- **Enhance market uptake during and after the project**
  - Identify market gaps, policy gaps
  - Develop long-term vision
  - Orient project towards an increase of the market uptake
- **Tackle the challenges**
  - Do targeted dissemination and network
  - Increase benefits to the project
  - Strengthen leadership position / innovation character
  - Increase environmental benefits at EU level

Wishing you Success
in achieving
sustainable results...

Thank you!