D8.8 Annual Mobilisation and Mutual Learning events III.

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Deliverable description

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Abbreviations

BB(s)	Building Block(s)
GDPR	General Data Protection Regulation
MML	Mobilisation and Mutual Learning
MoU	Memorandum of Understanding
REP	Recyclable Elastomeric Plastics
RRI	Responsible Research and Innovation
SSbD	Safe- and Sustainable-by-Design
TPE(s)	Thermoplastic elastomer(s)
WP(s)	Work Package(s)

Executive summary

As an integral part of the Communication and Dissemination Plan of the REPurpose project (D8.2, M2) and subsequent updates (D8.3/D8.4, published in month 24/36), the cooperation with projects funded by the European Commission and other national public institutions aims to maximise the impact of the project, ensure the long-term sustainability of its products, as well as to create a community of stakeholders engaged in designing and validating Safe-and- Sustainable by Design (SSbD) materials approaches.

With this aim, an engagement strategy (D8.6, submitted in month 12) was developed, defining aims, objectives, actions, and results obtained in the first project year. At month 24, D8.7 was produced, an updated version of the first document. The present deliverable D8.8 is the third update of the interaction strategy with the so-called "Sister" projects (funded by the same Call HORIZON-CL4-RESILIENCE-2021-01-08/11/12/13)) and "Cousins" (funded by other EU programmes) and reports the results obtained in the period M1-36.

Since the start of the REPurpose project, interactions between the "Sister" projects have been activated, resulting in the signing of a Memorandum of Understanding (June 2023), the launch of the co-creation event (January 25, 2023), and the organisation of the first Mobilisation and Mutual Learning (MML) workshop in a strategic event for the sector (NanoSafe 23, Grenoble, June 5-9, 2023). In total, 7 MML events were promoted, which involved the Sister projects SURPASS, ESTELLA, and REDONDO (June 5, 2023, October 19, 2023 and May 14, 2025) and the Cousin projects SOS, REPLAY and PROPLA (November 9, 2023, and May 29, 2024) and ROBUSTOO, FURIOUS and FUTURENZYME (February 11, 2025).

To make it easier to identify the updates made to the actual document compared to the previous version, all new inputs have been highlighted in black, while the unchanged text has been shown in light grey (Table 1).

***Table 1** – text colour legend*

Color	Meaning
Light grey	Text unchanged compared to D8.7
Black	New updates and/or changes at the text compared to D8.7

1. Introduction

This chapter reports unchanged the contents described in deliverable D8.6 and D.8.7, providing a framework of the reference context of the mutual learning activities conducted by REPurpose and the Sister/Cousin projects.

Plastics, key materials in strategic sectors such as packaging, building and construction, transport, renewable energy, medical devices and even sports products, mobilise over 60,000 businesses in Europe and 1.5 million workers. Although their versatility offers relevant advantages, how they are produced and consumed represents an environmental risk responsible for over 25 million tons of waste yearly, of which only less than 30% is recycled. Therefore, a more virtuous approach to using resources requires identifying efficient solutions for their recycling and rethinking their design according to Safe-and-Sustainable-by-Design (SSbD) criteria.

In the REPurpose project, local post-consumer waste is upcycled into new functional Recyclable Elastomeric Polymers (REP) destined for the high-value market of thermoplastic elastomers that today face recycling problems. New building blocks derived from biomass or enzymatically degraded organic or plastic waste will be incorporated, giving REP polymers unique characteristics:

- tunable elastomeric properties avoiding the need for additives
- production, processing and recycling using existing equipment
- controllable degradation in different habitats
- unprecedented indefinite recycling, surpassing fossil carbon at each recycling stage

In the context of the strategy for Communication and Dissemination of REPurpose results, the development of a Plan (D8.2) is foreseen by WP8 (Task 8.3). It aims to ensure the broadest involvement of all stakeholders and target users of the project innovations, thanks to online (e.g. website, social media campaigns) and offline (e.g. organisation of events, thematic workshops) tools for communicating the objectives and the benefits produced. Dissemination actions aim to ensure the maximisation of impacts even beyond the end of the project, helping to strengthen policy tools (e.g. policy briefs), generate new knowledge (e.g. scientific publications) and mobilise the whole community of experts, universities, companies and policymakers in the advanced materials sector.

Closely related to this strategy, creating a cooperation network between EU projects in the same area is considered a pillar. Task 8.4 “Collaboration and networking with other initiatives

and projects targeting SSbD materials" provides a series of initiatives aimed at this end. Intending to build a cooperation platform that contributes to the broader adoption of the SSbD criteria, deliverable D8.6 illustrates the strategy and the actions undertaken to strengthen the collaboration network between the projects in the area and the results obtained during the first year of the project launch. Annual updates of the deliverable (D8.7) are planned to quantify the relevance of the impacts obtained. REPurpose sharing efforts for modelling and implementing SSbD criteria with some H2020 projects, commits to ensuring the involvement of all stakeholders, promoting the sharing and co-design of Mobilisation and Mutual Learning (MML) events.

The MML approach includes events attended by "Sister" projects funded by the same Call (HORIZON-CL4-RESILIENCE-2021-01-08/11/12/13) and so-called "Cousin" projects, which are other complementary European projects supported by other EU programs and Horizon Europe/H2020 Calls. Interaction between projects aims to maximise their impact through the co-organisation and joint participation in dissemination opportunities open to all interested actors to share different perspectives, ideas, knowledge and experiences in open dialogues. The specific objective of Task 8.4 to mobilise all stakeholders through the sharing of tools for SSbD and pursue long-term project impacts (e.g. policy recommendations, research and innovation projects, inventories, etc.) is described in D8.6 through the following operational actions:

1. Identify and create a community of "Sister" and "Cousin" projects operating in the plastics sector and the SSbD approach. The common intention of triggering mutual learning initiatives is governed by signing a Memorandum of Understanding based on an operational plan for exchanging knowledge and opportunities.
2. Organise a Co-creation event to identify mutual learning topics to foster the development of SSbD criteria.
3. Organise an annual Mobilisation and Mutual Learning (MML) event involving projects in the area.
4. Promote and organise joint events and initiatives to maximise communication efforts and stakeholder engagement.

2. Building an SSdB project community of interest

This chapter largely retains the content presented in deliverables D8.6 and D8.7, which provide the framework for the Mobilisation and Mutual Learning Strategy (Chapter 2.1) and the mapping of Sister projects (Chapters 2.2 and 2.2.1). However, Chapter 2.2.2 has been updated to reflect recent alliance-building activities and now includes an expanded and complete list of Cousin projects, incorporating those identified during this reporting period.

Following the objectives of the European Green Deal, business models based on the circular economy and the systematic adoption of SSbD practices represent the most promising path towards the climate neutrality of production systems. The concept of SSbD aims to integrate the safety, circularity and functionality of materials and products throughout the entire material cycle, from design to end-of-life, helping to shape flexible and scalable manufacturing processes, quality standards and competitiveness.

In the EU policy framework, efforts for the widespread use of SSbD criteria are based on the pursuit of the following key elements:

- SAFE BY DESIGN. Plastics free from dangerous chemicals, *e.g.* safer alternatives to current additives and coatings, avoidance of microplastics.
- CIRCULAR AND EFFICIENT RESOURCES. Durable, reusable and recyclable, easily disassembled and bio-based plastics.
- FUNCTIONAL PRODUCTS AND EFFICIENT PROCESS DESIGN. Efficient and environmentally compatible performance and design.
- ENABLE FRAMEWORK CONDITIONS. Education, awareness, new business models, social innovations, standards, and investments[1].

2.1. Mobilisation and mutual learning strategy

Committed to ensuring that research and innovation in the plastics sector are increasingly geared towards applying SSbD criteria, the Mobilisation and Mutual Learning (MML) strategy proposed by REPurpose is an integral part of the dissemination strategy of its results.
Building synergies with “Sister” and “Cousin” projects is a means of building a community of stakeholders and aims to address research and innovation challenges by stimulating dialogue and exchanging perspectives, knowledge and experience.

[1] European Commission, Directorate-General for Research and Innovation, Plastics sustainable-by design, Publications Office, 2020, https://data.europa.eu/doi/10.2777/606684

Starting from mapping active projects in the same field, it includes organising discussion meetings and events. The final aim is to create a permanent network between research institutes, universities, associations, and companies to implement tools to support SSbD.
The strategy proposed by REPurpose includes the following:

1. The organisation of a co-creation event within five months of starting the project,
2. The organisation of an annual joint MML workshop,
3. Participation in public events in the context of a relevant European initiative on the subject of plastic recycling, SSbD and biopolymers,
4. Expansion of the collaboration network to "Cousin" projects on the subject of SSbD and plastic recycling,
5. Creation of a permanent network of collaboration and knowledge exchange between projects.

Deliverable 8.6 will be updated annually to shape the cooperation strategy between projects, considering the intermediate results obtained and the joint opportunities for their exploitation.

2.2. Mapping of "Sister" projects and "Cousin" in the SSbD field

Collaboration and networking with complementary European projects, funded by the HORIZON-CL4-RESILIENCE-2021-01-08/11/12/13 call, SURPASS, ESTELLA, REDONDO, as listed in Table 2, has been running since the beginning of the REPurpose project.
The first contacts with the "Sister" projects were activated in October 2022 (18/10/2022). The coordinators and leaders of communication and dissemination were involved in a meeting to define a cooperation strategy. The meeting helped to share the projects' target topics and define the first co-organised workshop open to all consortia members.

Table 2 – "Sister" projects. Website, Coordinator, start/end dates, target issue

"Sister" project Website, Coordinator	Start date	End date	Target issue
SURPASS Cordis [link] Commissariat a l'energie atomique et aux energies alternatives (France)	6/2022	11/2025	Design SSbD polymeric materials for building, transport, and packaging applications
ESTELLA Cordis [link] Fundacion Cidaut (Spain)	6/2022	11/2025	Design of novel biobased epoxy resins with inherent recyclability capabilities
REDONDO Cordis [link] Aristotelio Panepistimio Thessalonikis (Greece)	9/2022	8/2026	Design SSBD reversibility cross-linked polyethylene (rPEX)

2.2.1. Building synergies among "Sister" projects

At the first co-creation event, held on January 25, 2023, common priorities of interest were identified, and it was agreed to sign a Memorandum of Understanding (MoU) to plan the operational steps to be shared during the projects' implementation.

The MoU prepared by REPurpose and signed in the following months by all the "Sister" projects is a voluntary agreement not subject to the exchange of financial resources between the signatories. It aims to define an operational plan based on the activities and results pursued by each project to optimise investments and share new knowledge.

Cooperation includes i) creating a dialogue on experimental approaches and protocols, ii) sharing data, models, and research methodologies, jointly creating policy briefs and communication materials, and iii) organising joint communication and dissemination initiatives of common interest (*e.g.* solution based on SSbD, RRI, Life cycle thinking), such as seminars, lessons, workshops, fairs. Any intellectual property implications will be considered before sharing, thanks to identifying a project' contact person for communication and dissemination strategy. With the signing of the MoU, numerous interactions were activated during the first year of the launch of REPurpose, aimed at organising the co-creation event (January 2023), participation in thematic meetings and the first MML event (June 2023), further described in the following deliverable chapters.

Cooperation between projects is also promoted through the REPurpose website, which hosts a dedicated page (https://www.repurposeproject.eu/en/sister-projects/), as well as through social media (https://www.linkedin.com/company/86421286/admin/feed/posts/) where updates and news from the projects are shared.

2.2.2. "Cousin" projects mapping – updated

To extend the collaboration network between projects operating in the SSbD sector, REPurpose started mapping and contacting the so-called "Cousin" projects from the beginning of the project. The "Cousin" projects identified so far are listed in Table 3. The newly identified Cousin projects are added in black to the table.

Like the one already formalised among the "Sister" projects, the project involvement strategy provides an in-depth study of the objectives and results already obtained, identifying possible synergies with the focus of REPurpose and initiating interactions with the coordinators. Project involvement may include the signing of an MoU.

***Table 3** – "Cousin" projects. Website target issue and complementarities with REPurpose goals*

"Cousin" project	Target issue	Relevance and complementarity with REPurpose
PROPLA [link] • Start date: 1/2023 • End date: 12/2024	Developing an innovative biotechnological application to recover PET microplastics (microPET) from wastewater and exploit the power of protein engineering and systems biology approaches to generate a novel bacterial strain that converts microPET into amino acids.	Division of new enzymatic processes and biocatalysis
REPLAY [link] • Start date: 16/2023 • End date: 5/2026	Upcycling PET from post-consumer plastic waste through sustainable depolymerisation and fermentation is a principle that fosters the reconnection of fossil	Biotechnologies applied upcycling, degradation techniques, oxidative pre-treatment and fermentation.

	resources with the biogeochemical cycles of elements and materials.	
SOS [link] • Start date: 6/2021 • End date: 11/2024	Promote sustainability by designing information and training initiatives for students and civil society.	Design of dissemination initiatives on RRI and SSbD.
UPLIFT [link] • Start date: 3/2021 • End date: 2/2025	Biological depolymerisation of plastic packaging waste and conversion into recyclable polymers and biobased BB integration	Biotechnologies applied upcycling, degradation techniques, oxidative pre-treatment and fermentation.
Smartbox [link] • Start date: 5/2019 • End date: 4/2023	Development of enzyme conversion of lignin monomers to bio-based BBs for polycarbonates and vanillin	Division of new enzymatic processes and biocatalysis
Glaukos [link] • Start date: 6/2020 • End date: 5/2024	Development of biobased textile fibres and textile coatings for fishing and the textile industry	Design of molecular tools to degrade ultra-strong polymers by implementing severable links designed to be cut by microorganisms or enzymes.
upPE-T [link] • Start date: 11/2020 • End date: 10/2024	Upcycling of PE and PET post-consumer packaging wastes by transformation into biodegradable & recyclable bioplastics for food & drink packaging manufacturing.	Plastic degradation into monomers used for PHA fermentation and identification of a new PE degradation system
Agro2Circular [link] • Start date: 10/2021 • End date: 9/2024	Technical feasibility of the enzymatic conversion of non-recyclable PET and PE waste and agri-food residues	Development of plastic degradating enzymes and scalability up to TRL8
Preserve [link] • Start date: 1/2021 • End date: 12/2025	Improve the recyclability of multi-materials, biodegradation, versatility and recycled secondary applications and methodologies to reduce the release of microplastics.	Development of biobased coating, characterisation and prototyping, upcycling through reprocessing of biopolymers
Enzycle [link] • Start date: 6/2020	New enzymatic processes to recycle plastic fractions	Large-scale enzyme production

• End date: 5/2024	enzymatically and suitability studies for industrial applications.	
Resyntex [link] • Start date: 6/2015 • End date: 5/2019	Recycling of post-consumer textile waste (PET) by enzymatic depolymerisation into monomers	Management of different waste streams (textile) and evaluation of new industrial applications thanks to the high purity level.
Scirt [link] • Start date: 1/2021 • End date: 5/2024	Demonstration of recycling of post-consumer fabrics (natural and synthetic fibers, as well as blends of fibers)	Sharing of tissue conversion processes using enzymes
BioICEP [link] • Start date: 1/2020 • End date: 12/2023	Biochemical and biological degradation (triple-action) of plastic waste into BBs for bioproducts via fermentation	Degradation of post-consumers plastics by enzymatic depolymerisation, extrusion and microwave irradiation
BioRen [link] • Start date: 11/2018 • End date: 1/2023	Development of biofuels from the organic fraction of municipal solid waste	Enhancement of post-consumer waste streams and optimisation of fermentation processes.
LignoValue [link]	Microbial production of biodegradable PHA polymers	Knowledge and technologies of lignin pre-treatment
BioNylon [link]	Development of the value chain to derive C6 diacids from lignin monomers using metabolically engineered microbes	Engineering strains and proof of concept for the conversion of alkylated cresols to corresponding diacids
Fermenter [link]	Sustainable route from pulp mill residues to bioactive peptides using metabolically engineered cells	New insights into *C. glutamicum* cell factories and subsequent scale-ups
BioProfile [link]	Development and application of (co-)extruded profiles from vegetable waste-reinforced bioplastics for architectural applications	Product development and prototyping for construction applications (*e.g.* window sealing

		applications) using bioplastics
FuturEnzyme [link] • Start date: 6/2021 • End date: 5/2025	Developing low-cost, highly sustainable enzymes to support the production of more eco-friendly, efficient, and less environmentally harmful consumer products, in response to the growing demand for greener solutions from both consumers and industry.	Development of newly engineered enzymes for biocatalysis aimed at producing highly sustainable products
Furious [link] • Start date: 6/2023 • End date: 5/2027	Developing advanced, versatile, and bio-based polymer materials that can replace traditional plastics in demanding applications (such as biomedical, electronic packaging, automotive, and underwater devices), where current bioplastics fall short, while ensuring sustainability, processability, and end-of-life recyclability.	Development of bio-based polymers with tailored properties for demanding applications in plastic products.
Robustoo [link] • Start date: 1/2024 • End date: 12/2027	Developing robust, scalable oxidative enzymes to enable greener, more efficient production of bio-based chemicals and materials, overcoming current limitations in biocatalysis and replacing unsustainable traditional chemical processes.	Development of engineered enzymes to enable greener and more efficient production of bio-based materials.

3. Mobilisation and Mutual Learning events

This chapter largely retains the content presented in deliverables D8.6 and D8.7, regarding the Annual Mobilisation and Mutual Learning events organised ,but it also provides an update of Section 3.2 and 3.3, where new events are described.

3.1. Co-creation event

The preparation of the co-creation event between the "Sister" projects, held online on January 25, 2023, was preceded by carefully analysing the expected outputs to define an efficient operational plan for mutual growth and exchange. Output is the product immediately achieved after the initiative, capable of encouraging follow-up activities undertaken by participants and fueling communication between consortia members at all levels.

As described in detail in deliverable D8.6, it represents the starting point of cooperation between Sister projects, aimed at defining the expectations and usability of the generated products with particular attention to the aspects of construction and application of the SSbD criteria. The SSbD concept was explored through four main messages that also became the subject of dialogue. As the themes and challenges of SSdB are relatively new, the co-creation event aims to stimulate dialogue between participants, frame the problem by capturing different needs and welcome research perspectives.

The outcomes of the co-creation event coincided with the definition of a strategy:

1. Develop communication materials (*e.g.* infographics, brochures, etc.) or joint activities (*e.g.* additive inventory)
2. Develop joint policy recommendations
3. Sign an MoU, which sets the objective of mutual collaboration

3.2. Joint sectorial events

In the context of the **nanoSAFE 23 conference**, a joint event of the "Sister" projects was organised to illustrate the objectives, tools and methodologies applied with special reference to the SSdB criteria.

Organised every two years in Grenoble since 2008, the conference (https://www.cea.fr/cea-tech/pns/nanosafe/en/Pages/Welcome.aspx/) aims to share the latest research results on health and safety issues related to nanomaterials and beyond for a socially responsible approach.

The 8th International Conference on Health and Safety Issues for a Socially Responsible Approach to Nanomaterials was held from 5 to June 9 2023, in Grenoble, France.

The detailed description of the event is included in deliverable D8.6.

In 2023, the second MML event, "Safe & Sustainability by Design Workshop" (19 October 2023 online), was organised among the Sister projects. The workshop involved all the partners of the Sister projects and focused on the discussion of the following aspects:

- Framing the new SSbD approach of Horizon Europe as a systemic approach to integrating safety, circularity, and functionality of products and processes throughout their life cycle, from design to end-of-life (also considering the possibility of recycling and reusing them).
- Challenges and methodologies for technological design on advanced materials: case studies and solutions adopted by the projects.
- Criteria for the definition of benefits, in addition to safety and sustainability, such as a better cost/effectiveness ratio of the innovation process, greater compliance with current and future regulatory requirements (and therefore a reduction in time to market), and better acceptability of the final product.

On 14 May 2025 the third MML event, the "**Safe & Sustainability by Design Workshop**", was organised among the Sister projects and held during the SETAC Europe 35th Annual Meeting. During the workshop, each project's strategies, key findings, and the specific gaps it is addressing, were presented. In particular:

- The challenges related to the availability and quality of data for SSbD assessments,
- The need for specific methodologies tailored to polymeric materials,
- The integration of digital tools to support decision-making in industrial contexts.

The overall goal was to share knowledge to support the implementation of the SSbD framework and also to provide examples of case studies illustrating how the challenge of developing SSbD-compliant materials is being approached.

In preparation for the workshop, the main Sister project partners involved in the development of the SSbD framework, held some meetings to agree on the central theme and to coordinate the timing, location, and format of the event.

Figure 1 - "Safe & Sustainability by Design Workshop" held during the SETAC Europe 35th Annual Meeting

3.3. Building synergies with other complementary projects - updated

The interaction between the Cousin projects aim to maximise their impact through co-organisation and joint participation in dissemination opportunities open to all interested actors to share different perspectives, ideas, knowledge and experiences in open dialogues. This interaction resulted in the joint organisation of the following events:

- **"Sustainable Polymers Value Chains", Rimini, 9 November 2023 (Ecomondo Expo – Rimini, Italy).** The workshop was organised by the REPurpose project, represented by ITB and AIM, with the participation of the Cousin projects (REPLAY, PROPLA). The workshop aimed to present the REPurpose project in general and some specific results obtained from several consortium partners. The workshop has also hosted speeches from outside the consortium under the "Sustainable Polymers Value Chains" theme. The purpose of hosting external speakers was to present additional approaches to R&D on sustainable polymers, such as those of our Cousin projects, and best practices from companies in the business. The workshop engaged 32 participants.

Figure 2 - Save the Date of the workshop "Sustainable Polymers Value Chains, 9 November 2023"

- **Revaluation of Plastic and Microplastics, 29 May 2024 (online).** The workshop aimed to deepen and share the latest innovations in enzymatic and biotechnological technologies to address the issue of plastic and microplastic pollution. Furthermore, it encouraged a responsible and sustainable use of plastic recycling from a circular economy perspective. REPurpose co-organised the event with the Cousin projects SOS (Sustainability On Stage), REPLAY, and PROPLA. The workshop was attended by 111 participants, mostly university students and young researchers.

Figure 3 - Save the Date of the workshop "Revaluation of Plastic and Microplastics, 29 May, 2024"

- **Challenges in the discovery, design, improvement and upscale production of recombinant enzymes, 11 February 2025 (online).** The workshop was jointly organised by the REPurpose project and its Cousin projects ROBUSTOO, FUTURENZYME, and FURIOUS, with the aim of fostering knowledge exchange on innovative technologies and methodological approaches for the discovery, design, and upscaling of recombinant enzymes for a wide range of industrial applications. Conceived as a closed event exclusively for the members of the participating projects, the workshop provided a dedicated space to present and discuss advancements in enzyme engineering for different industrial applications. Through a series of presentations, participants had the opportunity to explore key aspects of enzymatic development, including the activity, structure, and function of the selected enzymes.

  In addition, the workshop also aimed at the creation of potential synergies among the participating projects, encouraging collaboration and knowledge sharing, to facilitate and stimulate the progress towards enzyme-based industrial innovation.

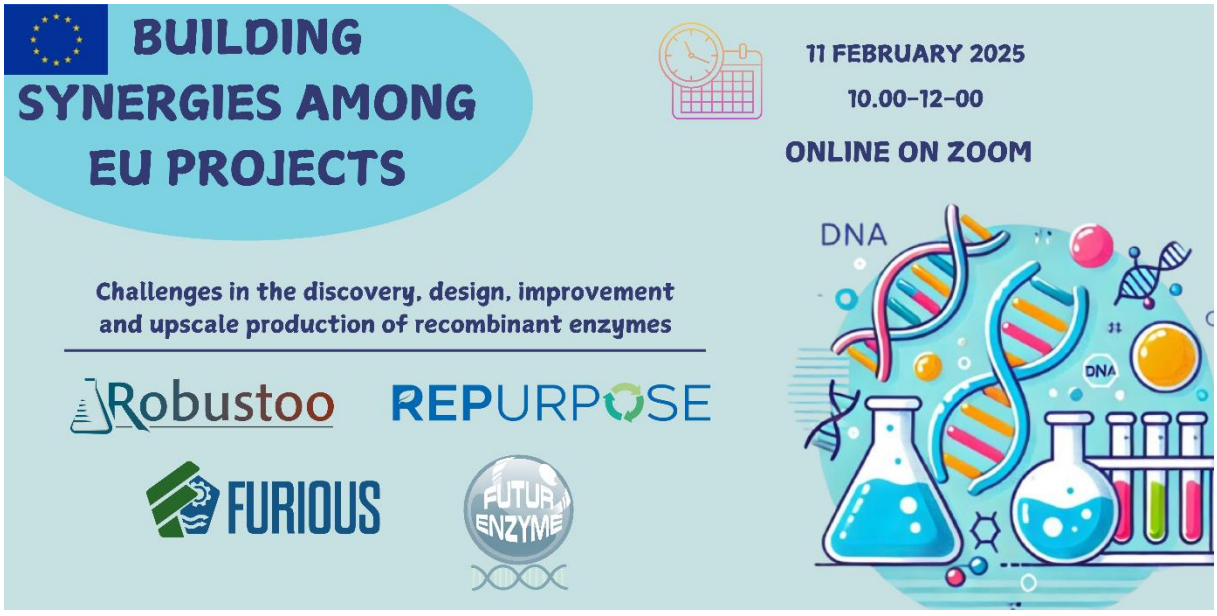

Figure 4 *- Save the Date of the workshop "Challenges in the discovery, design, improvement and upscale production of recombinant enzymes"*

4. Actions planned for the next period

The goal is to organise at least one more event. To this end, an assessment will be carried out in coordination with the Sister projects, and potentially also with the Cousin projects, to evaluate the best course of action.