



COMMUNICATION AND DISSEMINATION PLAN

ARRS RPROJ-JR-PRIJAVA/2020/36

**Design and Management of Sustainable Plastic Value
Chains to Support a Circular Economy
Transition (Circular Plastics)**

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Deliverable D5.3

Communication and Dissemination Plan

Short description of the Deliverable:

This document sets the dissemination goals, identifies the target audiences and defines the relevant communication channels, dissemination activities and tools.

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EXECUTIVE SUMMARY

The project “Design and Management of Sustainable Plastic Value Chains to Support a Circular Economy Transition (Circular Plastic)” aims to develop a method for optimal design and operation of the entire value chains, including recycling and upcycling of renewable, waste and end-of-life plastic materials. The goal is to maximise sustainability and economic value.

Plastics are an important class of materials, bringing many social and economic benefits. Global production of plastics reached 380 million tons in 2018 (a 20-fold increase since the 1960s) and its further growth is expected. Due to the long decomposition time and low recycling rates, large quantities of plastics are accumulated in the natural environments and landfills. Less than 30% of such waste is collected for recycling, where majority of it comes as a single use origin. This issue of disposable plastic products leads to extensive usage of mostly fossil-based raw materials and a large amount of plastic waste, which causes severe environmental damage, impact on human health and wildlife and economic loss. Therefore, more research is needed to improve our understanding of the source and impact of plastic materials, formation of micro and nano plastics, and their impact on the environment. Therefore, it is needed to provide theoretical support for the sustainable and circular design and management of various plastic value chains. The COVID-19 pandemic has impacted the entire world, leaving significant consequences. One such serious problem is the pollution caused by plastic waste - face masks and packaging waste. The project aims to minimize the negative impacts and maximize the economic value of plastic use through an economically and ecologically optimal increase in the circularity and overall plastic value chains. The degrees of freedom to be exploited include Industrial Symbiosis, and material, and chemical recycling. This project aims to develop the syntheses of different plastic materials in the most sustainable way. The basic idea is to complement the earth's natural cycles and integrate them into industrial supply networks to minimize waste and aim for zero-waste in future developments. Options and solutions for degradation, reuse, recycling, and valuable upcycling of products will be explored, including various options for faster degradation of plastic materials. The performance criteria to be used include environmental, economic, social and energy dimensions. The project will focus on at least two plastics types: at least one thermoplastic and one thermoset plastic material. We will focus on widely used type of plastics and specialized industrial plastics. Although various biodegradable and alternative plastics are used, their value chains, degradation processes and environmental impacts have not yet been clarified. A comparative analysis will be performed for different plastic value chains and compared with their alternatives. The main research tasks in developing the sustainable methodology for circular design and management of plastic value chains in this collaboration are: * Synthesis of sustainable value chains of different plastics using renewable and waste materials (water, air, sun, waste) and energy based on the Mathematical Programming approach. * Minimization of the environmental footprint of the plastics value chain through Process Integration and resource substitution (e.g. raw material, renewable energy). * Develop the plastic waste footprint to measure the circularity of a given process system (waste recovery and disposal, including the supply chain). * Exploring different degradation options and leaching behaviour of plastics, including laboratory studies, to understand the degradation process under different soil and marine conditions. * Investigation of chemical recycling options and upcycling of plastics value chains to recover monomeric components or other valuable chemicals.

* Techno-economic assessment and environmental and social impacts of different plastic waste recovery processes. * Comparative analysis of the environmental footprint of the different plastic value chains (conventional and improved) compared to their alternatives (e.g. paper, glass, metal).

KEY WORDS

Thermoset and thermoplastic polymers; plastic value chain; synthesis of plastic value chains; Chemical recycling; Fragmentation in soil and waters; Circularity, techno-economic and socio-environmental performance; Comparative assessment; Plastics footprint

1 INTRODUCTION

This document is the deliverable “D5.3 – Communication and Dissemination Plan” of the project Circular Plastic, which is financed by ARRS (Slovenian Research Agency) and GAČR (Czech Science Foundation). It lays out dissemination and communication tools and strategies, providing a guideline for all the project partners to achieve the largest possible impact for the project.

The research will be promoted based on a dissemination and communication plan, including:

- Dissemination channels: the main dissemination channels will be a website and e-mails, then some project flyer, conferences and workshops. Special attention will be paid to the conferences organized by VUT Brno (PRES, SPIL), annually conferences organized by FKKT UM (TBMCE). Our researchers will be attending the SDEWES and ESCAPE conferences and some other conferences on plastics.
- The generated knowledge will be directly transferred to BSc and postgraduate programmes.
- The target stakeholders identified in D5.2 will be contacted via the dissemination channels.
- The scientific articles (14 publications) will be published in peer-reviewed journals and conference proceedings to be documented in the communication summary report at the end of the project.

Deliverable “D5.3 – Communication and Dissemination Plan” will contain active two-way communication via the defined channels with the stakeholders. At month 36, the results will be summarised by the Key Performance Indicators (KPI):

- the number of conference lectures with numbers of exposed stakeholders – scientific, decision-makers, industrial actors.

1.1 Purpose of this document

The Dissemination and Communication Plan is drafted at an early stage of the project implementation and shall provide a framework for all the partners, helping to effectively communicate and report all relevant activities and outcomes. While it is rooted in the initial Description of Action, it will be refined and updated throughout the project duration in order to reflect the project’s progress and possible new opportunities.

Apart from the dissemination plan, the deliverable includes key dissemination materials and templates that will be available to consortium partners, in order to have a homogeneous strategy and approach to execute dissemination activities as well as to report on them.

2 BACKGROUND

2.1 Project summary

Plastics are an important class of materials, bringing many social and economic benefits. Global production of plastics reached 380 million tons in 2018 (a 20-fold increase since the 1960s) and its further growth is expected. Due to the long decomposition time and low recycling rates, large quantities of plastics are accumulated in the natural environments and landfills. Less than 30% of such waste is collected for recycling, where majority of it comes as a single use origin. This issue of disposable plastic products leads to extensive usage of mostly fossil-based raw materials and a large amount of plastic waste, which causes severe environmental damage, impact on human health and wildlife and economic loss.

Therefore, more research is needed to improve our understanding of the source and impact of plastic materials, formation of micro and nano plastics, and their impact on the environment. Therefore, it is needed to provide theoretical support for the sustainable and circular design and management of various plastic value chains. The COVID-19 pandemic has impacted the entire world, leaving significant consequences. One such serious problem is the pollution caused by plastic waste - face masks and packaging waste. The project aims to minimize the negative impacts and maximize the economic value of plastic use through an economically and ecologically optimal increase in the circularity and overall plastic value chains. The degrees of freedom to be exploited include Industrial Symbiosis, and material, and chemical recycling. This project aims to develop the syntheses of different plastic materials in the most sustainable way. The basic idea is to complement the earth's natural cycles and integrate them into industrial supply networks to minimize waste and aim for zero-waste in future developments. Options and solutions for degradation, reuse, recycling, and valuable upcycling of products will be explored, including various options for faster degradation of plastic materials. The performance criteria to be used include environmental, economic, social and energy dimensions. The project will focus on at least two plastics types: at least one thermoplastic and one thermoset plastic material. We will focus on widely used type of plastics and specialized industrial plastics.

Although various biodegradable and alternative plastics are used, their value chains, degradation processes and environmental impacts have not yet been clarified. A comparative analysis will be performed for different plastic value chains and compared with their alternatives.

The main research tasks in developing the sustainable methodology for circular design and management of plastic value chains in this collaboration are:

- * Synthesis of sustainable value chains of different plastics using renewable and waste materials (water, air, sun, waste) and energy based on the Mathematical Programming approach.
- * Minimization of the environmental footprint of the plastics value chain through Process Integration and resource substitution (e.g. raw material, renewable energy).
- * Develop the plastic waste footprint to measure the circularity of a given process system (waste recovery and disposal, including the supply chain).
- * Exploring different degradation options and leaching behavior of plastics, including laboratory studies, to understand the degradation process under different soil and marine conditions.

- * Investigation of chemical recycling options and upcycling of plastics value chains to recover monomeric components or other valuable chemicals.
- * Techno-economic assessment and environmental and social impacts of different plastic waste recovery processes.
- * Comparative analysis of the environmental footprint of the different plastic value chains (conventional and improved) compared to their alternatives (e.g. paper, glass, metal).

2.2 WP 5 Communication and dissemination plan

Work Package 5 (WP5) covers the communication and dissemination of the CIRCULAR PLASTICS results to the relevant stakeholders and the public at large. This work package will disseminate the results, gather community feedback for improving the results. The principles of open science will be followed. The generated knowledge will be promoted in Slovenia, in the Czech Republic and in Europe, raising the awareness about the sustainability benefits.

The dissemination and communication plan (D&C plan) will be devised with one main goal in mind: achieving the maximum possible impact within the allocated budget, amongst the target groups identified.

The project dissemination activities will be targeted to make knowledge and the results of the project available to relevant stakeholders.

Activities will include:

- 1) News on websites
- 2) Newsletters released
- 3) Articles submitted
- 4) International scientific publications
- 5) Presentation of achievements through conference participations

Promotional materials

The project flyer will be developed, containing basic information on the project. They shall be distributed through web page etc. These materials were initially developed in English but the project partners are encouraged to translate and adapt them for their national audiences. To make this possible, apart from the usual forms (i.e. PDF, JPG, etc.), the promotional materials will also be made available to consortium members in the editable versions.

Dissemination channels

Most of the information will be available on the web site, other dissemination channel will be the scientific conference, project flyer, news and professional Journals.

Academia and Engineers





The plan for academic dissemination is driven by UM FKKT, UM FS and Melamin, following the structure of presenting the Circular plastics results at conferences (see Table 1 1) and in scientific journal articles (see Table 22).

Table 1. Planned conferences for presentation of CircularPlastics results to academia and engineers

Conference	Participants
(1) PRES'22, PRES'23, PRES'24: Conference on Process Integration, Modelling and Optimisation for Energy Saving and Pollution Reduction (organised by BUT) with over 500 participants attending.	UM FKKT, UM FS, BUT
(2) SEE SDEWES 2022, SDEWES 2023 Conference on Sustainable Development of Energy, Water and Environmental Systems (co-organised by BUT) with over 600 participants attending.	UM FKKT, BUT
(3) CLES-CE 2022 1-st International Scientific Conference on Cleaner Energy and Chemical Engineering for Sustainable Circular Economy (co-organised by BUT) with over 300 participants .	UM FKKT, UM FS, BUT
(4) TBMCE 2022, 2023, 2024 Technologies and Business Models for Circular Economy (organized by UM FKKT) with over 100 participants .	UM FKKT, UM FS, BUT
(5) µMED – III International Conference on Microplastic Pollution in the Mediterranean Sea, with over 200 participants attending.	UM FKKT
(6) CORFU 2022 9 th International conference on sustainable solid waste management with over 800 participants attending.	UM FKKT, BUT
(7) SPIL 22, SPIL 23, SPIL 24 Sustainable Process Integration Laboratory (SPIL) Scientific Conference	UM FKKT, BUT
(8) ESCAPE European Symposium on Computer-Aided Process Engineering	UM FKKT, BUT
(9) ICLCA22, 23 International Conference on Low Carbon Asia	UM FKKT, BUT

Table 2. Planned journal articles for dissemination of CircularPlastics results to academia and engineers

Journal	Publisher	Participants
Journal of Cleaner Production 	Elsevier	UM FKKT, UM FS, BUT
Energy 	Elsevier	UM FKKT, UM FS, BUT

Frontiers in Sustainability (frsus)		Frontiers	UM FKKT, UM FS, BUT
Sustainable Production and Consumption		Elsevier	UM FKKT
Renewable and Sustainable Energy Reviews		Elsevier	UM FKKT
Chemical Engineering Transactions (CET)		AIDIC	UM FKKT, UM FS, BUT

Professional Journals

- Journal of Cleaner Production and his Family of journals (Cleaner Production Letters, Cleaner Engineering and Technology, Cleaner and Responsible Consumption, Cleaner Environmental Systems, Cleaner Energy Systems, Cleaner Chemical Engineering)

The **Journal of Cleaner Production** is an international, transdisciplinary journal focusing on Cleaner Production, Environmental, and Sustainability research and practice. Through our published articles, we aim at helping societies become more sustainable.

Project website

The project website – <https://circularplastics.fkkt.um.si/> will be finalized at M3. The main objective of the website is to serve as a vehicle for the dissemination of the project activities and results. The project website is developed in the early stages of the project to facilitate information-sharing among the consortium members and between the consortium and the public, i.e. to disseminate information of the project, such as the outcomes of the project and upcoming events. The project website on the coordinator's server will be created by month 3. It will be set up in English, providing information about the project actions, objectives, ideas, partners, and progress. All public deliverables will be made available through the website. Partners area will be established in order to enable communication among partners. A feedback channel for two-way communication will be enabled. The task will be driven by FKKT UM, supported with information contributions by all other project partners - VUT Brno, FS UM, Melamin.

Target groups and professional networks

The project partners collaborate with research institutions at the international level that aligns with the project topic. The involvement of relevant actors related to circular plastics (interested consumers, the scientific community, potential industrial users) will ensure the maximum dissemination impact. The project will seek synergies with other relevant and thematically similar (EU-funded) projects to gain insights into best practices and capitalize on previous research. All stakeholders will be identified and classified into target groups, producing a stakeholder's database, to be used in Task 5.3. The task will be driven by FKKT UM with information contribution by project partners - VUT Brno, FS UM, Melamin.

The following target groups have been identified for the purpose of project dissemination:

- industrial actors
- decision-makers
- scientific- conferences

In Appendix 1 there are listed all identified stakeholders, their contacts and names. There are listed conferences, where our work and research among this project are presented and promoted.

At month 36, the results will be summarized by Key Performance Indicators (KPI): the number of conference lectures with numbers of exposed stakeholders – scientific, decision-makers, industrial actors.

3 CONCLUSION

The dissemination and communications plan (D&C plan) provide the CIRCULAR PLASTICS project with a solid framework, roadmap and practical toolkit that will help to disseminate project results and activities. Having defined the list of target stakeholders and the appropriate channels to reach them, the future dissemination and communications activities will aim to further increase the interest of stakeholders in the project and further promote the results of the CIRCULAR PLASTICS to the selected target groups.