



CITISYSTEM 1st Newsletter

Supporting cities in sustainable biobased systemic change

Biobased waste is one of the largest material flows in European cities. A central concern is how to utilise biomass in a circular way.

According to the waste hierarchy, after prevention; re-use, recycling, and energy use are the preferred options, however, quite a large amount of biobased waste is disposed. Biowaste has a high potential for contributing to circularity, delivering valuable soil-improving materials, fertiliser, and biogas. With a share of 34%, biowaste is the largest single component of municipal waste in the EU. Recycling of biowaste is key to meeting the EU target to recycle 65% of municipal waste by 2035.

Valuable resources for both material, energy and nutrition are lost through under-utilisation of bioresources, e.g., biowaste disposed of in the mixed municipal waste.

The importance of supporting the utilisation and circulation of biobased materials in nutrient and energy loops is more important than ever. Involved project partners share the desire to develop biobased circular economy on system and stakeholder levels in cities. Systemic solutions include effective and innovative ways to organise the policies to support circular biobased economy, circulation of bioresources, separate biowaste collection and processing, as well as the most effective utilisation of biowaste.

Lead partner:

LAB University of Applied Sciences

Collaborating with:

- City of Lahti (Finland)
- Technical University of Košice (Slovakia)
- BSC, Business support centre Lt.d., Kranj (Slovenia)
- City of Mechelen (Belgium)
- Regional Development Fund of Central Macedonia (Greece)
- CERCA Institute-Catalan Research Centres Institute (Spain)



The total budget of the EU Interreg Europe funded project is 1 476 343€ out of which 1,18M€ is ERDF.

The project lasts for four years (implementation 2023–2026 and follow-up 2026–2027).

Terminology

Supporting cities in sustainable biobased systemic change

- "Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs."
- Environmental, Economic, Social, Cultural

Source; World Commission on Environment and Development: Brundtland's report, un.org, europa.eu

Biobased products

- are wholly or partly derived from materials of biological/living origin

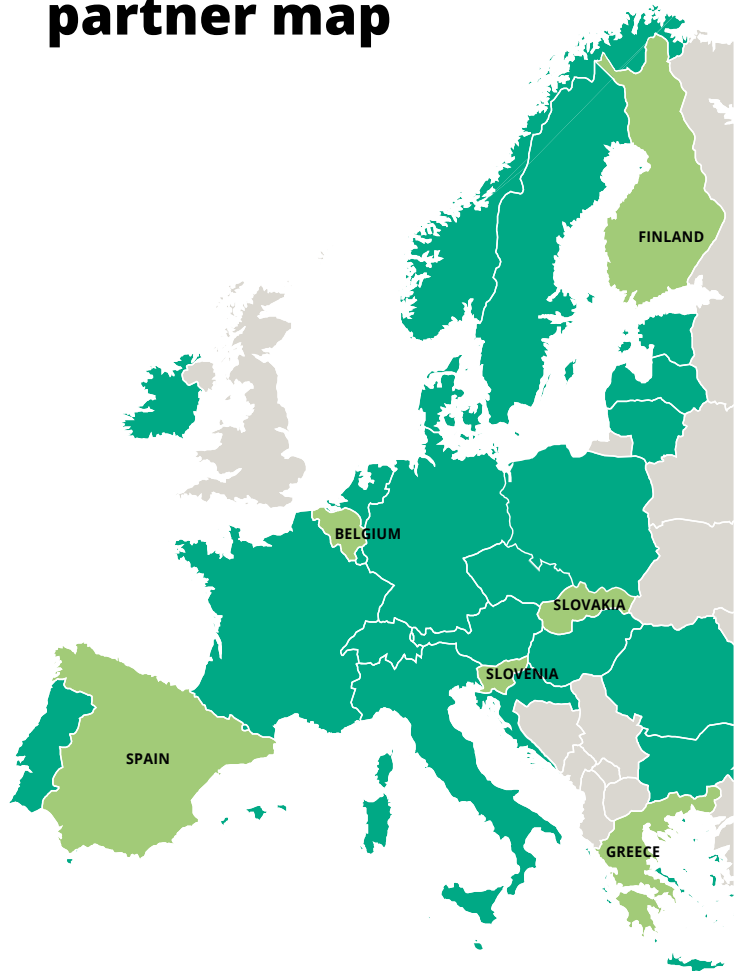
Source: environment.ec.europa.eu

System level or systemic

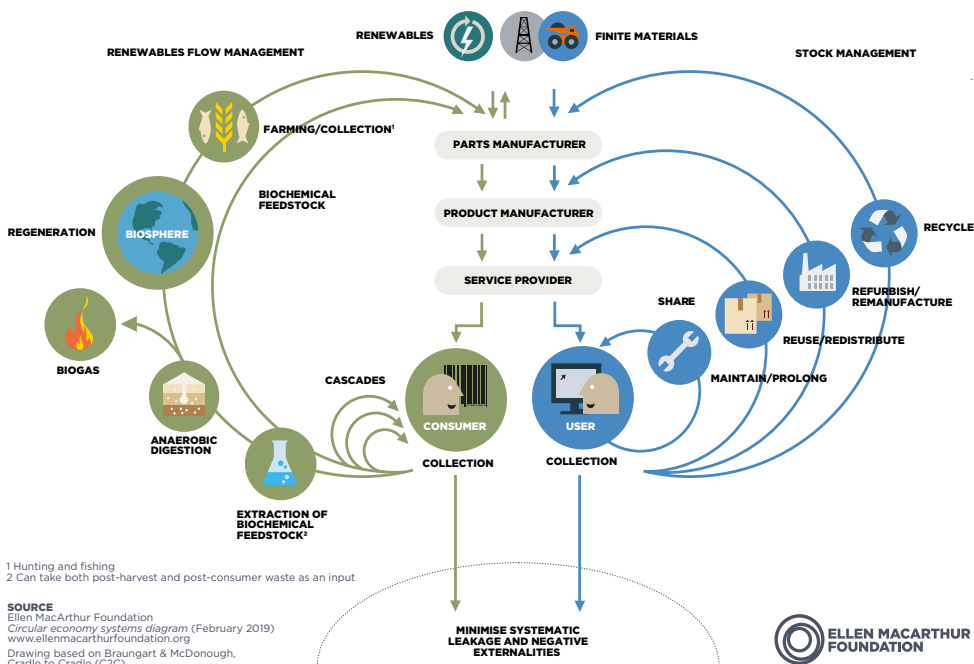
- addressing the root causes, rather than the symptoms
- fundamental, affecting the whole system
- simultaneous change of operating models, structures and their interactions, which creates conditions for future sustainable development

Source: eea.europa.eu, ilo.org, sitra.fi

CITISYSTEM partner map



What do we mean with bio-based materials?



Lead Partner:

LAB University of Applied Sciences (Finland) presents local bio circular economy



Picture: Katerina Medkova

The kick-off meeting of the CITISYSTEM – Supporting cities in sustainable biobased systemic change -project took place in Lahti, Finland on 9–10 May 2023. The meeting gathered around 20 project partners, their stakeholders, and expert speakers from six countries. The CITISYSTEM partnership consists of seven partners from Finland (2 partners), Slovakia, Slovenia, Belgium, Greece, and Spain. There are two partners in Finland, LAB University of Applied Sciences, who acts as a lead partner, and the City of Lahti. (Interreg Europe 2023.)

CITISYSTEM promotes bio circular economy and focuses on the circulation of materials, nutrients, and energy flows in the urban environment. The project aims to improve respective policies to stimulate utilisation, circulation, and recovery of biobased resources and to foster a systemic change on the city-level. For that, a number of learning activities and exchanges of experience on both regional and interregional (among EU regions) levels involving project partners and stakeholders will take place.

Showcasing Lahti expertise

The 1st CITISYSTEM meeting started by site visits and expert presentations. The first stop was at the Kujala Waste Centre, Lahti. The group received a comprehensive presentation of Salpakierto’s waste treatment facilities, collection, processing and utilisation system with a focus on biobased materials, such as biowaste, wastewater sludge, soil, garden waste, and waste wood.

The waste management company started its operations already in 1993 with the separate biowaste collection since 1995. Since 2005, the composting plant was in use and the Labio biogas plant since 2014. As **Kimmo Rinne**, Development Manager at Salpakierto, pointed out, according to the new waste legislation, all properties in urban areas with a population over 10 000 must separate biowaste. (Rinne 2023.)

After that, the presentation of Labio, an integrated biogas and composting plant was given, followed by a site-visit. According to **Niko Wassholm**, Chief Executive Officer at Labio, the plant has operated for 18 years while handling over 1 000 000 tons of waste with no shutdowns. In terms of production capacity, Labio is the second largest producer of upgraded biogas in the country. The biogas plant uses dry fermentation anaerobic digestion in four digester units. The integrated composting plant consists of 11 tunnels and uses natural aerobic processes with heat recovery. (Wassholm 2023.)

Continues on the next page >>



Picture: Katerina Medkova



Elina Ojala, Environmental director at City of Lahti, presented the story of Lahti becoming the smallest and northernmost European Green Capital 2021. Lahti's environmental journey has a long history started back in the late 1980s. Lahti aims to become carbon-neutral by 2025 by cutting the emissions by 80 % from 1990 level and the rest to be compensated with local carbon sinks and offsetting. Ojala pointed out the importance of citizen engagement as well as environmental education starting already in kindergartens. (Ojala 2023.)

Finally, **Mikko Väisänen**, Project Manager at Lahti Energia, presented the case of Ali-Juhakkala. There, the energy company installed seven heat pumps to utilize up to 5 MW heat capacity from wastewaters. As a result, the achieved reduction of natural gas consumption of 9,3 GWh/a led into CO₂ emissions decrease of 1700 t/a. (Väisänen 2023.)



CITISYSTEM - Good Practices

During the CITISYSTEM kick-off meeting, the project partners and stakeholders worked together to define what a Good Practice (GP) within the project could be.

In terms of CITISYSTEM, a GP can be:

- practices
- tools & solutions (e.g., technology, digitalization, software)
- cooperation models
- ecosystems
- change in regulations/legislation
- educative actions

Next, we brainstormed on the related Interreg Europe GP features, such as:

- an initiative related to regional development policies (e.g., project, process, technique)
- proved to be successful (tangible and measurable results)
- transferable: interesting to other regions
- preferably achieved through public funding,

and we listed also CITISYSTEM specific features to support our selection to be:

- city (or region) level
- promoting sustainability
- related to biobased resources and processes
- systemic ('change of operating models, conditions for future sustainability')



FINLAND

Picture: Unsplash

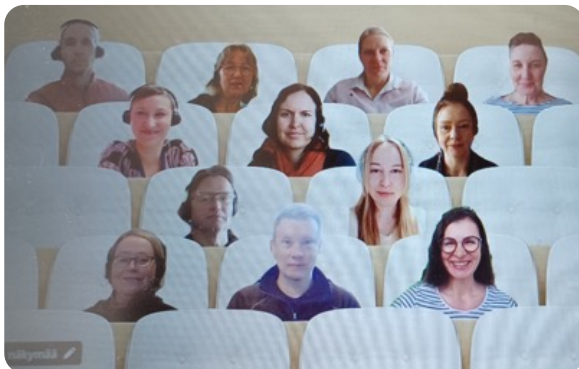
City of Lahti:

Current state of biobased circular system-level

The Kujala Waste Centre in Lahti takes in waste from communities and production facilities for interim storage, handling, reclamation, transfer and final disposal. The Kujala Waste Centre is **Salpakierto Ltd's** main site and the only location where it processes waste. Its operations have been granted an environmental permit.

The site covers 70 hectares in total. Salpakierto receives approximately 100,000 tonnes of waste each year. Municipal waste accounts for approximately 85,000 tonnes of this. Of the waste received by the centre, almost 100% is utilised.

Currently, biowaste collection is privatized, however, Salpakierto Ltd. will provide collection from 2024. Biowaste is processed into biogas or compost biomass, in the LABIO Ltd. facilities, up to 21 000 t/a.



Printscreen: Päivi Sieppi

Sorting of waste in housing units and in private housings

According to the new waste legislation the obligation to sort biowaste starts from 1 July 2022 in all properties with at least 5 households in all urban areas. These properties must organize the collection for biowaste.

The collection of biowaste will shift into the collection system arranged by the municipality (organised by Salpakierto Ltd.) in March 2024.

Private housing, semi-detached houses and holiday homes must sort waste at least into energy waste and mixed waste. However, from 2023 energy waste fraction will be converted into plastic packaging. Also, biowaste have to be source separated at household level in larger communities. As an alternative, residents are encouraged to compost biowaste (food waste) of their own composters.



Stakeholder meetings

The first stakeholder meeting was organized on the 9th of February 2023. There were people from Salpakierto Ltd and Labio Ltd. Salpakierto Ltd is a limited liability company owned by 9 municipalities, tasked with performing municipal waste management services in the region of the shareholder municipalities.

These tasks include the reception, transportation, processing and recycling of waste, the development of waste management and the provision of information related to it. The company is part of Lahti Group. LABIO Ltd is the biogas and composting plant owned by Salpakierto Ltd (40 %) and Lahti Aqua Ltd (60 %). It is one of Finland's largest biogas production and processing plants intended for transport use.

The second stakeholder meeting was held on the 18th of April 2023. The meeting lasted two hours and we had a very good discussion about the challenges and success in biobased circular economy in Lahti region. For example - we have some very obvious challenges in logistics: Finland is sparsely populated and distances are long between cities. In the second meeting there were people from Salpakierto Ltd, LABIO Ltd, The Regional Council of Päijät-Häme and The Centre for Economic Development, Transport and the Environment (ELY Centre Häme). Also Helsinki University and LUT University were represented. There were sixteen participants in the meeting and eleven of them could be named as possible stakeholders.

SLOVAKIA

Current state of biobased circular system-level

In Košice Self-governing Region and Slovakia, the main goal for biodegradable waste and biodegradable waste from the commercial network is to divert from landfilling, as landfilling has a significant negative environmental impact in terms of greenhouse gas emissions and pollution of surface water, groundwater, soil and air. In Slovakia in 2019, the dominant component of Mixed Municipal Waste was biodegradable waste, and accounted for up to 46 %, while in apartment houses 272,000 tons per year (96 kg per inhabitant) are collected, in family houses the amount of 262,000 tons (100 kg per inhabitant) were collected. Since 2022, the compulsory collection of biodegradable waste was introduced for municipalities, with exception for 2 biggest Slovak cities – Bratislava and Košice – that are equipped by incineration plants and therefore recover the waste for heat and do not landfill it, postponing the obligation to beginning of 2023. The attention is nowadays focused on introduction and improvement of the separate collection system of biodegradable kitchen waste from households, which is a specific type of waste from the point of view of collection, but also from the point of view of treatment. Its recovery in the conditions of the Slovak Republic is most often carried out in two ways, mainly by composting and anaerobic digestion. An important part of this process is also to ensure sufficient information and awareness of the inhabitants. The new collection system is still very new for both municipalities and citizens, and therefore the optimization of the waste management infrastructure and processes, but also preparation of fair fee system, is still necessary.



Picture: Unsplash



Info on regional stakeholder meeting

We have organized only 1 preparatory meeting on May 5th, with Kosice Self-governing Region (Associated Policy Authority) representative (prior to inter-regional event), but we plan to meet more stakeholders in the last week of June – still waiting for the dates to be confirmed.



The bio waste, and especially food waste, belongs the most complicated waste streams our society needs to tackle, and the Košice region is not an exception. On the other hand, this waste stream can be seen as an opportunity for creating the new value and jobs in the territory. The creation of functioning bio-based circular systems requires the coordinated interventions in various areas, not forgetting about stakeholders' attitudes and (de) motivations, and we see the CITISYSTEM project as a journey that will help us to learn from other European regions and their experiences to design the pathway for our region and our community.

- statement of stakeholder



SLOVENIA

In Gorenjska region, we have several communal companies (owned by local communities) that are responsible for managing waste. – mainly this is connected with gathering of waste from private households, its storage and taking care about usability/reuse of waste. Due to the fact that all garbage areas for final disposal of waste were closed in recent years, main concern of communal companies is reduction of waste, usability of waste and reuse of waste. Households and also other sectors producing waste (e.g. companies, NGOs institutions) they have to separate waste e.g. plastic, metal, other waste, bio waste, while bigger garbage like furniture, electronic appliances, are also delivered to communal companies/or there are organised lift offs. They are also responsible for gathering of bio waste. Communal companies are working also on empowerment of producers of waste – via promotional actions, via open days, via reuse centers (partly managed also by social enterprises).

Additionally, private companies are gathering the different usable garbage (e.g. paper, metal) and also dangerous waste. There is a strong understanding and support to circularity in certain aspects of waste (e.g. metal, paper) while in other

fields need to be upgraded (e.g. food waste): The circularity is strongly connected to preservation of biodiversity, environment – stronger aspects need to be addressed there, while also constant monitoring and improvement of conditions (less leakage of dangerous substances) from closed waste areas need to be put in to the centre of attention.

Meeting with stakeholders in Gorenjska region – preparation activities

In May and June, we had several individual discussions with communal companies (that are owned by local communities) and social enterprise (dealing with reuse centres). Additionally, some discussions took place with local communities that are interested in reuse and improving circular approaches. Individual discussion also took place with University of Ljubljana (e.g. topic of better usage of food).

BELGIUM

Current state of biobased circular system-level in the region of Mechelen, Flanders

In line with the European regulation, the Flemish government stipulated that biowaste from households and all companies or private institutions need to be sorted out in order to be recycled by the 1st of January 2024. In the region of Mechelen, biowaste from households has not been collected yet at source, and hence is not processed into biogas or other products. The city of Mechelen has been promoting and supporting composting at home to its citizens, but this is not sufficient any longer under the new regulations. That is why we are participating in the CITISYSTEM project, together with our intermunicipal waste company IVAREM as a stakeholder because they collect all other kinds of waste streams for households until now. Within CITISYSTEM we want to focus on systemic change and hence investigate both opportunities of collecting household and private institutions' biowaste at the same time in view of volumes and logistic efficiency. Certainly within the city center it is difficult to implement different solutions for hospitality industry, as private sector, and household biowaste collection, if we want to keep trucks out of the city center.

First stakeholder meeting : who is involved & some figures

Different Flemish institutions have been engaging as stakeholders in the CITISYSTEM project; Circular Flanders, the Flemish Department of Economy, Science and Innovation (EWI) and the Flanders Innovation and Entrepreneurship institution (VLAIO). CITISYSTEM is in their interest because it may contribute to the Flemish working agenda on bio-economy as well as on circular food loops, which are 2 of the 6 strategic lines of the circular economy policy in Flanders. At the same time, local stakeholders, from the city departments, the city board as well as organisations, entrepreneurs, the local university college Thomas More and the intermunicipal waste management company from the region have shown interest in collaborating in our CITISYSTEM project in different ways.



Picture: Unsplash

On the first stakeholder meeting on 24 April 2023, we gathered 13 participants and allready discussed a specific action, which has been on the Flemish agenda since January first 2021, namely the selective collection of organic waste of hotels, restaurants and caterers. Hospitality as well as hospitals, elderly home care and penitentiary centres have been obliged to sort out organic waste since then, but different challenges are faced by those who implement the new legislation. Therefore, the city of Mechelen together with the association for retail and hospitality in Mechelen decided to launch a pilot to increase the efficiency and sustainability of the collection of organic waste at source as well as increase knowledge on possibilities to process that waste in the most circular way according to value retention principles. The pilot will start in fall of 2023, will reenforce stakeholder engagement thanks to concrete results, and will provide us insights to feed the drafting of our action plan later on in this project.



I was happy to be invited as a stakeholder in this project because it means better cooperation with the city of Mechelen. But also enables us to acquire knowledge and information from the different countries on how they handle the new European and regional legislations regarding organic waste, in line with the different socio-economic contexts in the various countries. As a project manager of operations of the intermunicipal waste company for household waste collection and processing in the region Rivierenland in Flanders, especially the technology used for processing the organic waste and presentation of the waste management company Salpakierto contained interesting information and statistics. Such as the amount of organic waste collected, the fermentation technology, the processing and cleaning steps (in Salpakierto the plastics were sorted out "after" drying the compost and not "prior" as we were advised to), and the different advantages of homogeneous legislation in Europe. Now the colour of containers to collect organic waste differs from country to country, from brown to green to other colours. Would it not be clearer to citizens that the same color and pictogrammes are used across Europe, in order to enhance correct sorting in a highly globalized Europe?

- statement of stakeholder

GREECE

Current state of biobased circular system-level

The participation rate of the Region of Central Macedonia in the total production of municipal solid waste (MSW) in the country, is calculated to 16.23%. Today, there is no separate collection of bio waste from the citizens in Metropolitan Area of Thessaloniki. But, according to the approved 'National waste Management Plan 2020 – 2030', separate bio-waste collection will become mandatory in 2024 through the expansion of the brown bins at national level. Hence, the Metropolitan Area of Thessaloniki needs to move on a new more sustainable waste management system in which product loops and materials chains are closed, and new economic models are developed. The funding of infrastructures in the sector of waste management through the Program 'Environment, Energy and Climatic Change 2021–2027' of the Ministry of Development and Investment, and the ROP of Central Macedonia 2021–2027, is a major chance for the development of circular economy and bioeconomy in Metropolitan Area of Thessaloniki. In this pilot phase, approximately 35.000 brown bins are expected to be placed in the Metropolitan Area of Thessaloniki as well as in other cities of RCM. The organic waste, that will be collected in the brown bins, will then be taken to BioWaste Treatment Plants located in Municipalities of Thermaikos and Chalkidona. Fertilizers and soil conditioners will be produced by the decomposition of the organic waste.



Picture: Regional Development Fund of Central Macedonia



Picture: Regional Development Fund of Central Macedonia



First stakeholder meeting:

We had our first stakeholder meeting on 8 June 2023, in the framework of the 1st International Circular Economy Exhibition "Forward Green", which was held in Thessaloniki from 8 to 10 June. We combined our meeting with the co-creation workshop of the Regional Governance Model of the HORIZON project "ROBIN", in which our Associated Policy Authority (Region of Central Macedonia) is a partner. Both projects have the same target group and some of their goals are closely aligned, so it was beneficial for all to have this common event. There were 36 participants (representatives from civil society, local and regional authorities and entrepreneurs) that shared their views and experiences regarding the regional framework and we had the chance to discuss about the current state and the challenges of the biobased circular economy in the Region of Central Macedonia.



"Our gathering in Lahti as stakeholders of the CITISYSTEM project was truly enlightening. We learned effective policies and practices for biowaste management, gaining valuable knowledge to apply in our regions. Witnessing the impact of community involvement in the circular scheme was inspiring. Interregional collaboration broadened our perspectives, fostering fruitful exchanges and joint policy development. We are grateful for this opportunity to contribute to a resilient and biobased circular economy, and we look forward to continuing our efforts for sustainable change!"

- statement of stakeholder

SPAIN

Current state of biobased circular system-level

The bioeconomy sector in Catalonia represents 4,5 % of the GDP and 5,2 % of the jobs in Catalonia, a country of 7,5m people (4,7m of which live in greater Barcelona). The Catalan government, through the Ministry for Climate Action, Food and Rural Agenda, has devised the Catalan Bioeconomy Strategy 2030, which seeks to advance towards economic, social and environmental sustainability with a focus on fostering circular economy practices. Among its specific goals are increasing the circular use amount of biomass and optimizing its management; developing a business community based on circular bioeconomy, and encouraging consumption of bioproducts, bioenergy and biomaterials on the market, both by companies and citizens.

There are, however, many challenges that Catalonia needs to tackle to fully achieve the goals set out in the Bioeconomy Strategy. Among them are the lack of local technology for certain waste; the need to strengthen the connection between research and commercialization of scalable technologies; logistic and transport barriers for biowaste valorization; and budgetary constraints. There is also room for improvement in waste collection and management: although separate collection is universally implemented, 53,4 % of the total waste is still labelled as “residual fraction” and therefore not suitable to enter circularity streams. It is with a view to help to overcome these obstacles that CERCA takes part in CITISYSTEM.



Picture: CERCA Institute-Catalan Research Centres Institute

CERCA is the institution managing and coordinating 41 Catalan research centres, including 7 whose activities are closely connected to circular economy and biowaste management, and 2 of them (CTFC and IRTA) have spearheaded the Catalan Bioeconomy Strategy. At the same time, we are part of the Ministry for Research and Education. This places us in an ideal position to connect the cutting-edge research happening in our centres with policy-makers and stakeholders in the region.

With our participation in CITISYSTEM we seek to learn from what is working in other places in Europe and adapt it to our context; we want to strengthen the synergies between our research centres and the private sector, and we will liaise with the relevant Ministries and government bodies (such as the Catalan Waste Agency and the Catalan Energy Institute) to influence policies and practices. Specifically, our goal is to champion a revision of the Catalan EDRF Regional Operation Programme 2021–27 so that it incorporates the best practices learned from CITISYSTEM.

Stakeholder meeting

On June 2nd CERCA attended a dissemination event of the EU LIFE Biorreformed project, led by the CERCA centre Forest Science and Technology Centre of Catalonia (CTFG) and with other CERCA centres as partners. As some of the goals of LIFE Biorreformed are closely aligned with those of CITISYSTEM, some of the stakeholders for CITISYSTEM were present and we had the chance to continue to engage with them.

Aside from learning from the LIFE Biorreformed, we discussed the involvement of the companies Energ-Bas (who are developing the upgraded bio-refinery) and Eco Intelligent Growth in CITISYSTEM. They showed great interest and kindly offered to explain their activities to the CITISYSTEM partners (Marc Basany, their CEO, will be happy to contribute to one of our webinars) and we are both currently looking at ways to concretise their participation. We also had the chance to move forward with our conversation with the Catalan Ministry of Climate Action, Food and Rural Agenda, one of CITISYSTEM's associated policy authorities, who were also represented in the event.

The dissemination event took place in Solsona (Catalonia), a small city in a heavily forested region, where the CTFC headquarters are located. We discussed with its director Antoni Trasobares their participation in CITISYSTEM, and we will soon have a meeting with all the rest of the relevant CERCA centres to make the work plan for the coming weeks and months.

CITISYSTEM events

Webinars

We plan to have every semester a thematic webinar. The first webinar was organized on the 16th June 2023.

Semester 1:

1st webinar

16.6.2023 9:40–11:30 CEST

Challenges and Solutions
for Biobased Circular Systems
in Cities

Agenda of the 1st webinar

Advancing Circular economy in public works. The case study of Kavala, Greece. - Io Chatzivaryti, Municipality of Kavala/ Mayor's Advisor in EU projects

Assessing biodiversity impacts of biobased circular systems - Ville Uusitalo, LUT University

BIOSYKLI - Bio-based Circular Economy in Päijät-Häme & PULINA project - focusing on nutrient recovery from municipal sewage sludge
- Mari Eronen, LAB University of Applied Sciences

Insights from the 5R Refinery project
- Mikko Rahtola, LAB University of Applied Sciences



Upcoming in Semester 2:



CITISYSTEM

2nd webinar

23.1.2024 8:30–11:30 CEST

(9:30 – 12:30 EET, Finnish time).

System/city-level examples of
successful biowaste collection,
processing and utilisation for
energy and compost



Upcoming in Semester 2:



CITISYSTEM

2nd Interregional meeting 8.-9.11.2023

hosted by CERCA Institute-Catalan Research Centres Institute in Barcelona, Spain



Project partners and stakeholders at the Kick-off meeting. Picture: Oona Rouhiainen.

CITISYSTEM Core Phase Semester Periods:

» Semester 1: 3-8/2023 FINLAND

Semester 2: 9/2023-2/2024 SPAIN

Semester 3: 3-8/2024 BELGIUM

Semester 4: 9/2024-2/2025 SLOVENIA

Semester 5: 3-8/2025 SLOVAKIA

Semester 6: 9/2025-2/2026 GREECE

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Co-funded by
the European Union