



ŠTAJERSKA  
GOSPODARSKA  
ZBORNICA

Strategic Research and Innovation Partnership (SRIP) –  
Networks to the transition in to circular economy

**/ SRIP-Circular economy/**

**Information session on  
Horizon 2020-Green Deal Call**



Univerza v Mariboru

Fakulteta za kemijo  
in kemijsko tehnologijo



KEMIJSKI  
INŠTITUT

Dragica Marinič

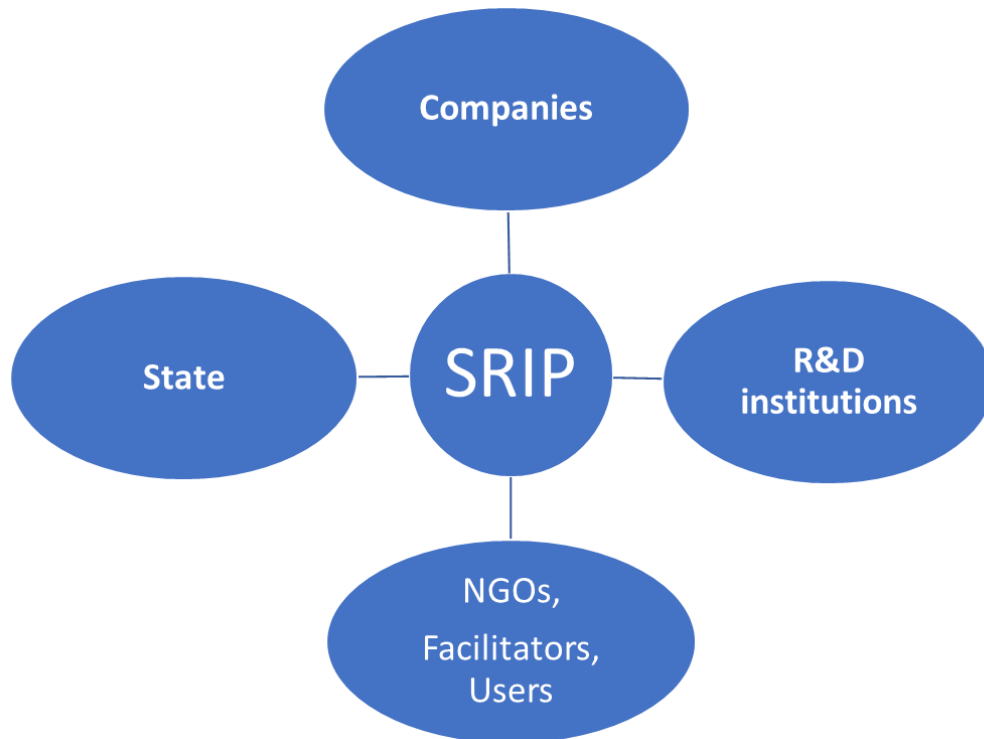
Coordinator of SRIP – Circular economy  
Štajerska gospodarska zbornica /Chamber of Commerce and  
Industry of Stajerska

09. 07. 2020, Maribor, Slovenia

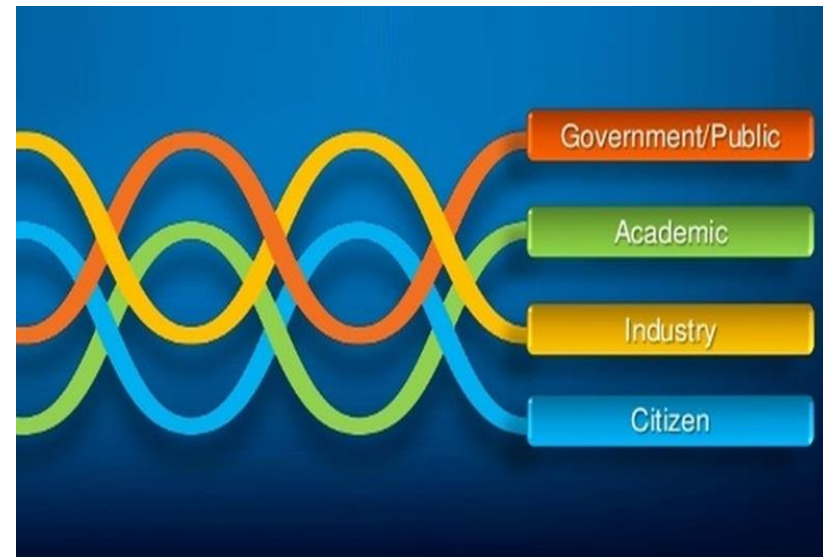


# Slovenian Smart Specialisation Strategy, S4: implementation and EU green deal, Action plan for transition to circular economy

**SRIP – Circular economy:** a long term, sustainable public - private partnership /cluster, innovation ecosystem, intellectual potentials for an entering to global market among:  
circular value chain / internationalization



**Quadruple helix model** of the open innovation in knowledge-based development



# SRIP – Circular economy: Action Plan – Business Strategy / Sustainability / Research and Career Platform / Entrepreneurship / Investment, collaboration with start-ups

Action plan of SRIP:  
research & development  
of products, services,  
human resources  
development,  
entrepreneurship, start-  
ups, internationalization,  
sharing the capacities,  
Covid influence

Public – Private Investment  
/ Public calls:

- Slovenia,
- EU
- Private Investment

1. Career Platform:

- Profession of future
- Individual career plan
- Training, Education,
- Competences

2. Innovation

3. Digitalization

4. Ecodesign

5. Platforms:

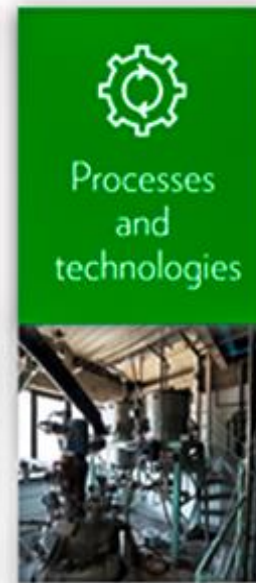
<https://www.s3vanguardinitiative.eu>

<https://www.clustercollaboration.eu/cluster-organisations/strategic-research-and-innovation-partnership-networks>

<https://www.bbi-europe.eu/>

# SRIP-Circular economy

## Focus areas



## Focus area: Functional materials / smart packaging **company Steklarna Hrastnik**

### **Project: eBOTTLE – Smart multicomponents glass bottle**

- Excellent solution for smart packaging – high quality glass material
    - a) with integrated sensors for connection with users through smart mobiles, personalization, information, security issue, monitoring,
  - Innovation of the bottle: eco design – start is research- production- distribution-use of product
- 
1. Different adhesives produced from biomass - a new challenge for the next generation of functional composites
  2. Connection with IT – digitalization, LCA, internet of Things and services, Digital marketing, blockchain technology etc.
  3. Close the loop: with integration of e-component – e-Bottle is totally reusable – from users back to producer.

## **Focus area: Secondary raw materials**

### **Project: Waste as a resource of secondary raw materials - POLY CIRCULARITY**

- **Strategic plan of industry symbiosis of secondary raw materials from waste packaging of different origin (synthetic-plastic, natural)**
- **Collecting optimization, logistic and waste traceability**
- **Sorting and pre-treatment of waste packaging**
- **Process optimization for chemical and biotechnological conversion natural/plastic packaging in to intermediates for secondary raw materials**
- **Industry application development from secondary raw materials for chemistry, plastic industry-production of gasses and energy products**
- **Demonstration with a new DEMO pilot at company IOS which is already running for textile waste treatment (Resyntex project)**
- **Digital material passport –secondary raw materials (blockchain technology)**



Polyethylene terephthalate

High-density polyethylene

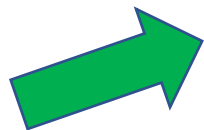
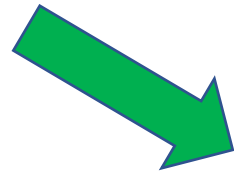
Polypropylene



Polyvinyl chloride



Low-density polyethylene



REACTOR FOR CHEMICAL  
AND BIOCHEMICAL  
DECOMPOSITION







Focus area: Biomass and alternative raw materials

Pulp and Paper Institute, Ljubljana



## **Project: CelCycle**

- To develop new technologies and value chains
- To develop and optimise new, sustainable technologies and procedures to lead us to useful biomass components, which can be later used as environmentally acceptable and renewable materials and products.
- Possibility of biomass residue conversion into energy.

Focus area: Biomass and alternative raw materials

Pulp and Papir Institute, Ljubljana



Project CelCycle

- To develop of knowledge and technologies on bio source utilization:

- \* Database on availability, characteristics and usability of various types of biomass.
- \* Advanced processes for fractionation of biomass.
- \* Effective continuous processes for production of nanocellulose from various types of biomass.
- \* Fibres and materials treatment technologies for improvement of functional properties.
- \* Technologies in production of fibre webs and biocomposites.
- \* Technologies and processes for biological treatment of waste and enzyme production.
- \* Efficient processes for mechanical treatment of solid waste and materials recovery.
- \* Innovative technologies for energy recovery of waste materials flows.

Focus area: Biomass and alternative raw materials

Pulp and Papir Institute, Ljubljana



Project: CelCycle

- To develop of bio-based products and components:

- \* Green chemicals to be used in coating, resin and adhesive industries.
- \* Nanocrystalline cellulose (NCC) and nanofibrilated cellulose (NFC) produced from residual biomass.
- \* Paper/board with improved existing and new functional properties.
- \* Smart packaging with printed sensors.
- \* Active yarns with functionalized cellulose fibres.
- \* Bio-based filtering materials.
- \* Lightweight and thermostable bio-composites for different applications.
- \* Cellulose-based battery separators.
- \* High-performance cellulose-based insulating materials.
- \* Enzymes, produced from biological decomposition of waste.
- \* Innovative system for energy recovery from waste with high water containment.

Focus area: Biomass and alternative raw materials

Pulp and Paper Institute, Ljubljana



## Project CelCycle

- This programme represents a unique example of enforcement of circular economy principles. By connecting various value chains following a common goal – effective cascade use of biomass, we aim to:

- \* reduce dependence on foreign sources of raw materials,
- \* replace fossil based raw materials,
- \* establish efficient systems of closing materials loops,
- \* exploit opportunities on the growing market of green solutions,
- \* connect local competencies into innovative circular partnerships,
- \* strengthen local socio-economic relations,
- \* encourage society as a whole to act towards green co-existence and thus contribute significantly to reducing the burden on the environment.



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SRIP CIRCULAR  
ECONOMY



REPUBLIC OF SLOVENIA  
MINISTRY OF ECONOMIC DEVELOPMENT  
AND TECHNOLOGY



EUROPEAN UNION  
EUROPEAN REGIONAL  
DEVELOPMENT FUND  
INVESTING IN YOUR FUTURE

## SRIP – Circular economy

Thank you for your attention!

<https://www.srip-krozno-gospodarstvo.si>

<https://srip-circular-economy.eu/>

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