

# Vanguard Initiative – *New Growth Through Smart Specialisation* The Bioeconomy Pilot



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New growth through smart specialisation

# Slovenia Region: Forestry-based biomass valorisation

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# Context

- In Slovenia, the „Technologies for sustainable biomass transformation and new bio-based materials“ are a part of the „Networks for the transition to circular economy“
- „Networks for the transition to circular economy“ are 1 of 9 S4 (Slovenia’s Smart Specialisation Strategy) Priority Areas
- The Priority Area is coordinated by a national cluster-like entity, Strategic Research and Innovation Partnership (SRIP) Networks for the transition into circular economy



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# Why even interesting?

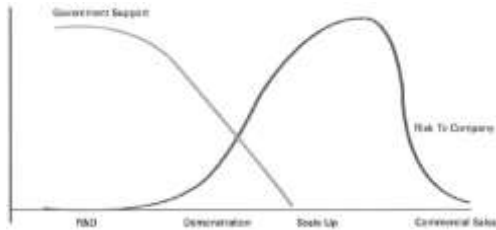
- Biomass availability and accesability; forest ([third country in EU in terms of relative forest cover](#)) and agricultural (production of 2,5 t/inhabitant, Berst, 2016)
- Existing industrial structure; importance of sectors leading innovation and market uptake of biobased products ([chemical industry one of four strongest sectors](#))
- Investment in R&D; Slovenia is among [front runners in investment in biopolymer research \(Birch Indexs, EU-28\)](#)
- Proven industrial interest; involvement /investment in RDI and new, [up and down stream, value chains](#) (Slovenian emerging industries hubs; Biopharmaceuticals, Advanced Packaging, Mobility, Medical Devices – Danube Region EI Mapping, 2014)



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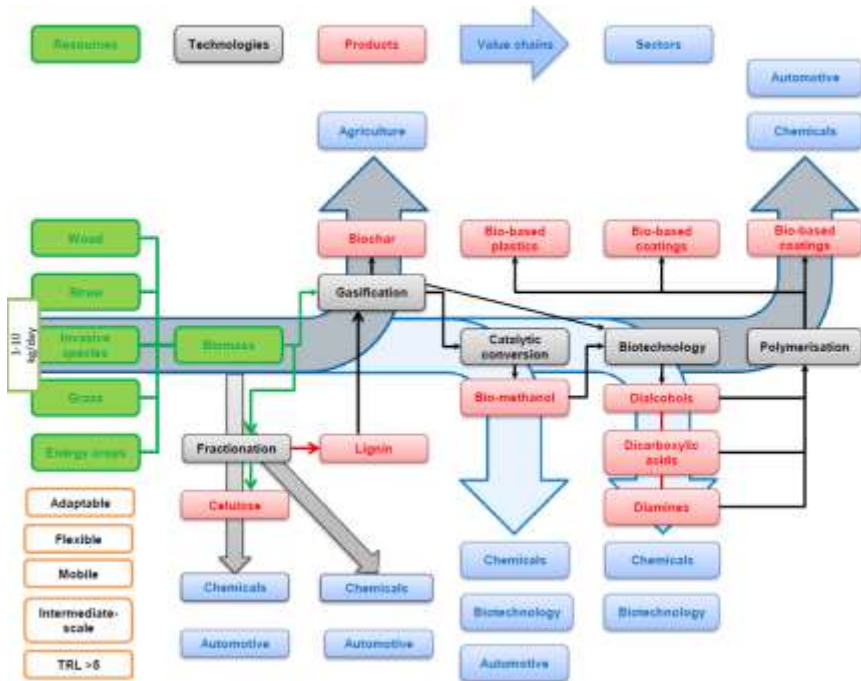
# But...

- European „Valley of death“: model of risk profile for companies of innovation processes.
- Slovenian (additional) „Valley of death“: lacking basic/commodity chemicals.
- Large-scale biomass bio-refinery optimal for Slovenia?



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# Pilot bio-refinery plant concept outlined (Slovenia)



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## Pilot bio-refinery plant concept outlined (Slovenia) (cont.)

- **Strength:** extensive and accesible biomass resources (forest harvesting/processing improving) / R&D network / willing industrial partners.
- **Weakness:** middle of bio-chemicals/bio-materials value chain missing / very high-CAPEX technologies.
- **Threat:** loss of competitive market advantage / not developing own bio-based processes (buying them).
- **Opportunity:** companies with strong bio-based interests / state-of-the-art chemicals/plastic production.



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# Action plan correlation: Bio-based Industry



(BBI, 2019)



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# Action plan correlation:

Sustainable Process Industry through Resource and Energy Efficiency



(SPIRE, 2019)



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# Related showcase projects: CEL.CYCLE



#### Cascading use of biomass

Rather than burning most of biomass, various useful primary and secondary raw materials can be obtained from it by extraction, decomposition and reprocessing.



#### Industrial symbiosis

What is waste to some may be useful raw material or energy source for the others. This partnership focuses on closing materials loops and opening new opportunities.



#### Circular economy

By forming local socio-economic circles, we are optimising rotation of production means, thus empowering ourselves and the environment.



#### New value chains

By redesigning system of values, thinking and acting, changes can occur. From working to co-working, from use to re-use, from habitation to co-habitation.

(CEL.CYCLE, 2019)



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## Strategic RDI Program - “Potential of biomass for development of advanced materials and bio-based products”

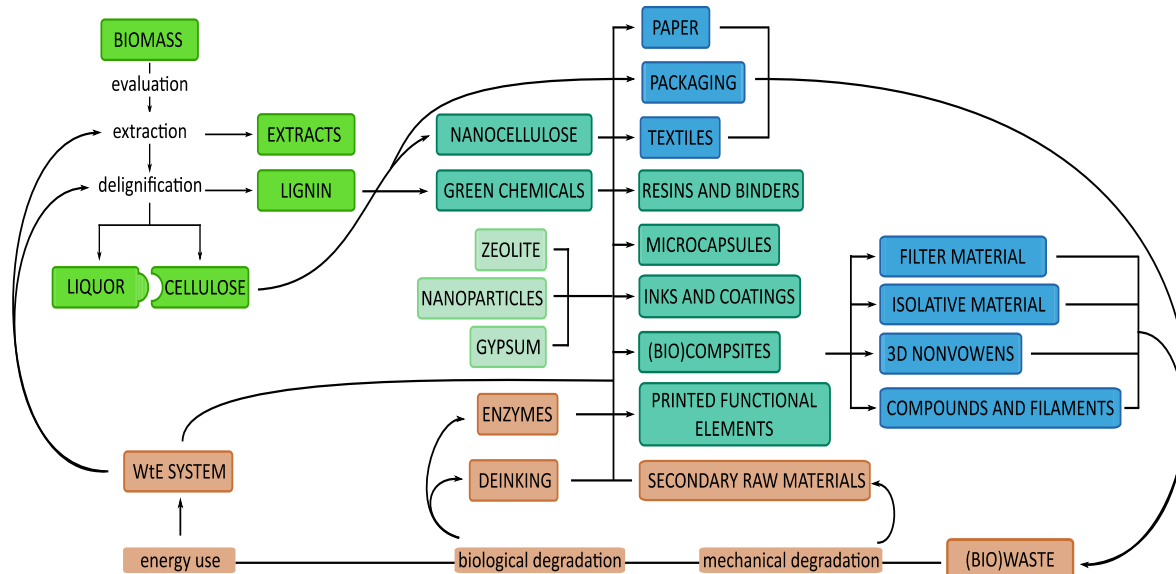
**Four year research and innovation programme  
2016-2020**

**Priority area of Slovenian Smart Specialization strategy  
- Networks for the transition to circular economy**

**Interdisciplinary and cross-sectoral partnership  
- 26 partners, of which 17 industrial**

Science	Industry sectors
Material science	Paper and board
Wood science	Chemical
Biotechnology	Construction
Chemistry	Automotive
Engineering	Textile
Machinery	Energy, logistics

**Closed material flows and development of advanced products in the entire circuit; from the biomass fractioning, the use of building blocks in different products, to re-use and final recovery of waste.**





## Product lines and value chains

**Green chemicals** (coatings, adhesives, resins): chemical industry

**Multifunctional cellulose materials** (bio-based additives, barrier coatings); chemical, paper/board, textile, packaging

**Bio-based filtering and insulating materials;** textile/nonwovens, construction/housing, automotive, electric

**Thin polymer composites** ((NC)cellulose, bio-based additives); automotive, electric, energy, engineering

**Digestion of biomass & isolation of components (DES)**

**Pre-treatment technologies (chemical/mechanical, biological)**

**Material functionalization (sol-gel, plasma)**

**Nanocelulose production.**

**Over 50 accessible biomass sources evaluated and characterized.**

# Bio-based company examples: Helios

Resource: oleo-chemicals  
Product (*i.a.*): coatings



(Helios, 2019)



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# Bio-based company examples: Melamin

Resource: bio-methanol  
Product (*i.a.*): resins



(Melamin, 2019)



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# Bio-based company examples: Tanin

Resource: wood  
Product (*i.a.*): furfural



(Tanin, 2019)



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# Bio-based company examples: Acies Bio

Resource: [whey](#)  
Product (*i.a.*): [chemicals](#)



(Acies Bio, 2019)



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Thanks for listening!

Questions?

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