Rehap

Systemic approach to reduce energy demand and CO2 emissions of processes that transform agroforestry waste into high added value products

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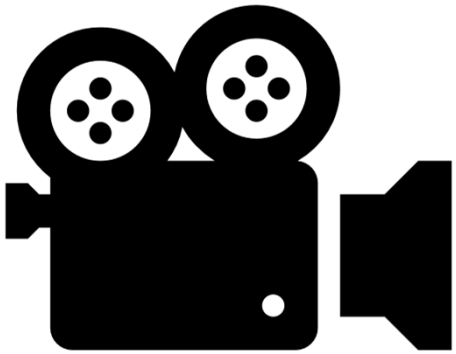
Asamblea general SUSCHEM, 26 de Junio, MADRID

Dr. Aitor Barrio Ulanga (Project Coordinator)

HORIZON 2020



Opportunity

- The development of **chemicals and materials from lignocellulosic biomass** is a particularly **important area in terms of research**, thanks to the **abundance of these type of resources** and additionally because they do not compete with the food chain.

- Specifically **wheat straw** is an attractive residue with a global generation of **1.5 billion tons annually**, which is used almost entirely as litter. (Similar case than **Bark**). **Poplar** also of interest.

- However, the **conversion of lignocellulosic biomass into a real chemical platform** is not trivial and today **it has still little commercial viability**. For instance, several processes have been studied at R&D level, but **none have been industrially implemented yet.**

- **Europe's position** in the production of biopolymers from biomass and by-products is **limited to a few polymers**, **while the demand for them is among the largest in the world**, which means that they have to be imported, mainly from Asia and South America.

Rehap

Aim

Main goals

The Rehap project aims to strengthen the European bio-economy industry by creating novel materials from agricultural and forestry waste, and will demonstrate how they can be used commercially in the green building sector.

Rehap

How?

The project will use Agricultural and forestry residues and Lignocellulosic biomass (plant dry matter) to develop these four innovative bio-products:

Impacts

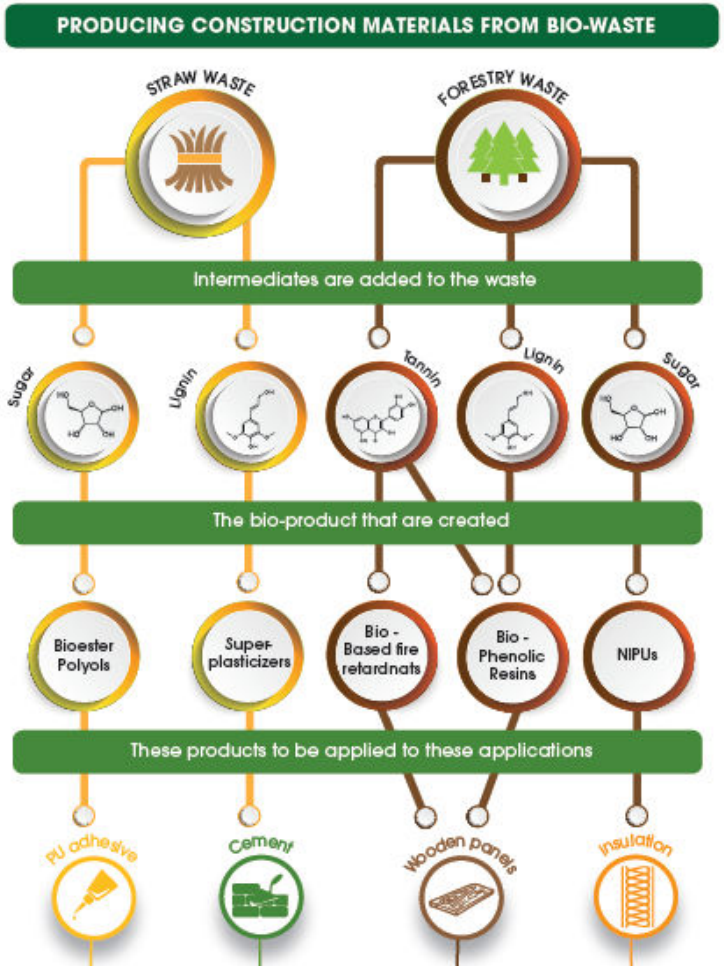
- Decreased use of fossil resources and energy in the process industry
- Creation of new jobs in the bio-based products sector
- Improved innovation capacity and the integration of new knowledge at EU level
- Improved industrial competitiveness

What?

Material	Problems to be solved in conventional materials	REHAP solution
	✓ Petroleum-based ✓ High values of VOC's emissions	**Material 1. Straw and forestry waste-based bio-adhesives** ✓ Bio-waste based resin from 1,4 BDO which is obtained by hydrolysis of sugars from straw and forestry wastes. ✓ Low level of VOC's emissions
	✓ Petroleum-based ✓ VOC's and formaldehyde emissions in manufacturing step and in indoor air quality	**Material 2. Waste-based thermoset bio-resin for BioPUR foams** ✓ Bio-waste based resin is obtained from 2,3 BDO which is obtained by fermentation of sugars from forestry wastes. ✓ Low level of VOC's emissions
	✓ Petroleum-based binder ✓ Need to increase fire retardancy and acoustic performance further	**Material 3. Waste-based wooden panel** ✓ Bio-waste based bio phenolic panels with low embodied energy and low carbon footprint ✓ Introduction of sustainable routes of fire protection via environmentally friendly fire retardants
	✓ Petroleum-based additives	**Material 4. Straw based lignin bio superplasticizers for green cement** ✓ Biowaste-based additives instead of petroleum-based ones ✓ Controlled rheology of the cement ✓ Affordable processing routes

Rehap

What?


PRODUCING CONSTRUCTION MATERIALS FROM BIO-WASTE
STRAW WASTE
FORESTRY WASTE
Intermediates are added to the waste
Sugar
Lignin
Tannin
Lignin
Sugar
The bio-product that are created
Bioester Polyols
Super-plasticizers
Bio - Based fire retardnats
Bio - Phenolic Resins
NIPUs
These products to be applied to these applications
PU adhesive
Cement
Wooden panels
Insulation

Rehap

Who?

Consortium

Bio Base Europe Pilot Plant

biochemtex

BIOSYN CAUCHO

CARTIF

CROMOGENIA UNITS

COLLANTI CONCORDE
Colle speciali per applicazioni industriali

RINA

FORESA

INSIGHT publishers

LafargeHolcim

NOVAMONT

RAMPF
discover the future

UNIA Universität Augsburg University

VTT

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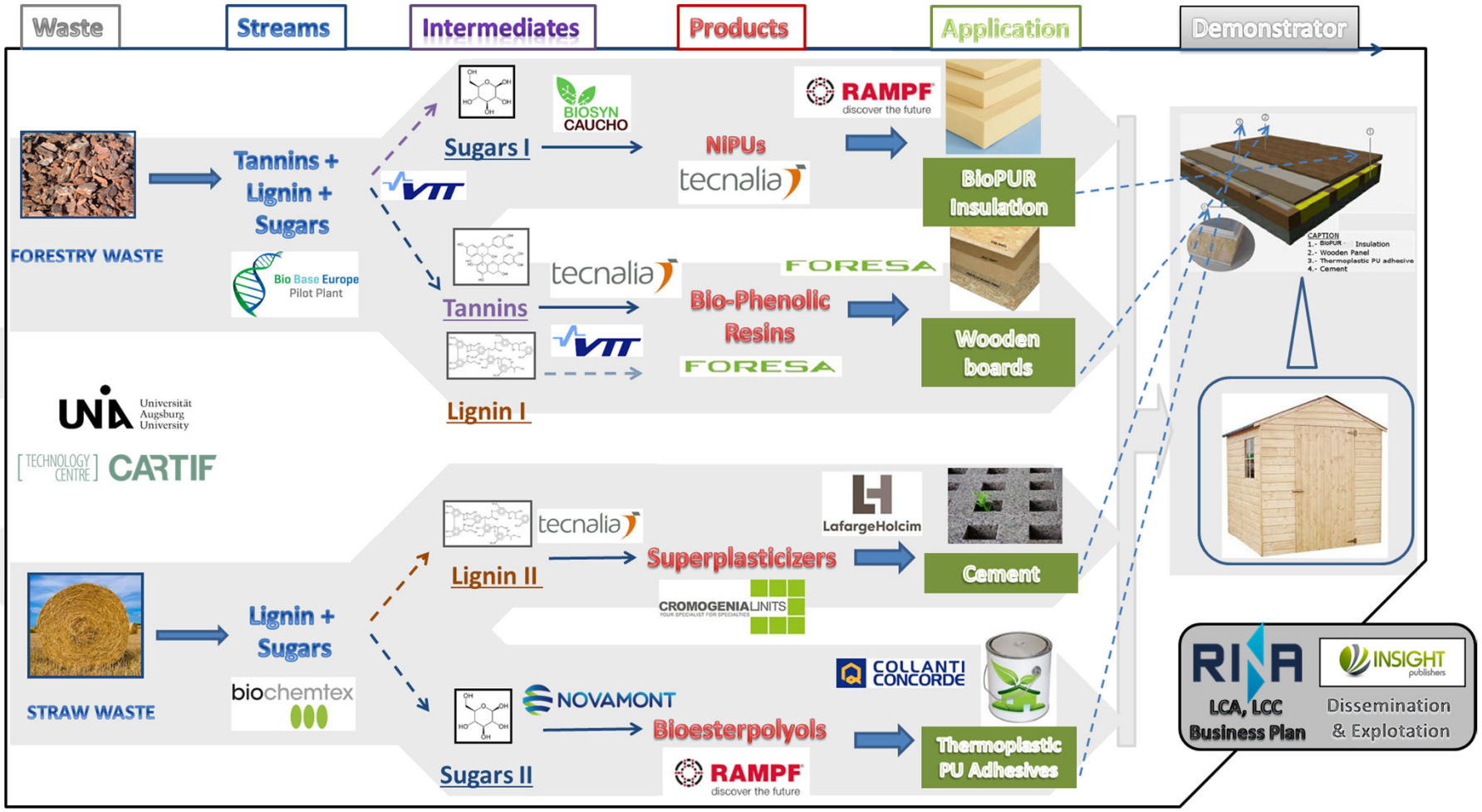
Project Coordinator

Who?

Rehap


Waste
Streams
Intermediates
Products
Application
Demonstrator
FORESTRY WASTE
Tannins + Lignin + Sugars
Bio Base Europe Pilot Plant
Sugars I
BIOSYN CAUCHO
VTT
NIPUs
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RAMPF discover the future
BioPUR Insulation
Tannins
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FORESA
Bio-Phenolic Resins
FORESA
Wooden boards
VTT
Lignin I
Universität Augsburg University
[TECHNOLOGY CENTRE] CARTIF
STRAW WASTE
Lignin + Sugars
biochemtex
Lignin II
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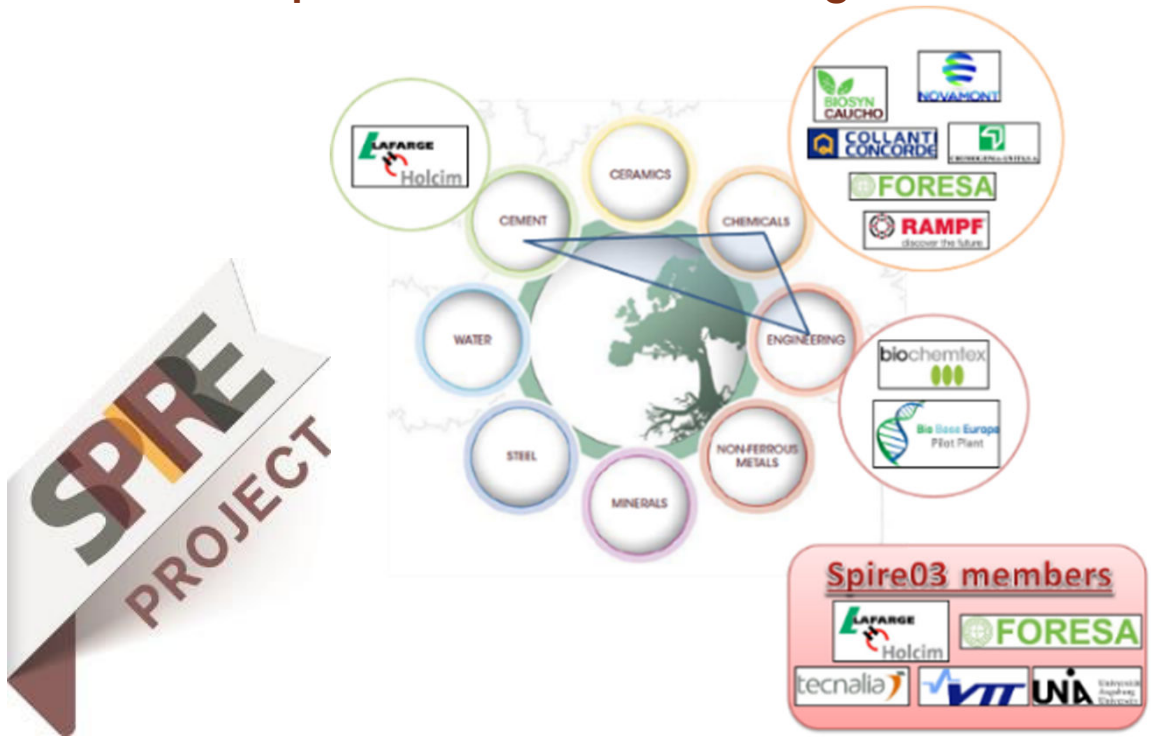
Superplasticizers
CROMOGENIA UNITS
LafargeHolcim
Cement
NOVAMONT
Bioesterpolyols
COLLANTI CONCORDE
Thermoplastic PU Adhesives
Sugars II
RAMPF discover the future
CAPTION
1.- BioPUR Insulation
2.- Wooden Panel
3.- Thermoplastic PU adhesive
4.- Cement
RINA
LCA, LCC
Business Plan
INSIGHT publishers
Dissemination & Explotation

Where?

Project funded by H2020 - GA:723670

Topic: SPIRE-03-2016
Industrial technologies for the valorisation of European bio-resources into high added value process streams

Duration: Oct 2016 - Sep 2020



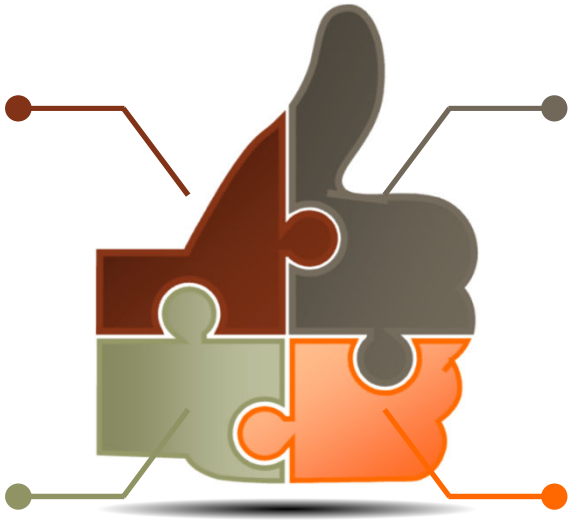
Where?

1. The EU/ SPIRE needs

To create commercially viable ways to convert the abundance of agroforestry waste in Europe into high added-value products

2. The Project Solution

To develop and test new processes to create bio-polymers for industrial implementation – and demonstrate their commercial viability



4. How will this happen?

Demonstration of the technical, environmental and economic feasibility of the product use in the construction sector, with important mass consumption perspective by the companies. Involving industry partners, who will commercialise and produce high-value-added products.

3. Value to Customers

Not only will these products be greener and economically viable, they will out-perform their fossil-based equivalents, with significant gains across sectors.

Muchas Gracias
por su atención

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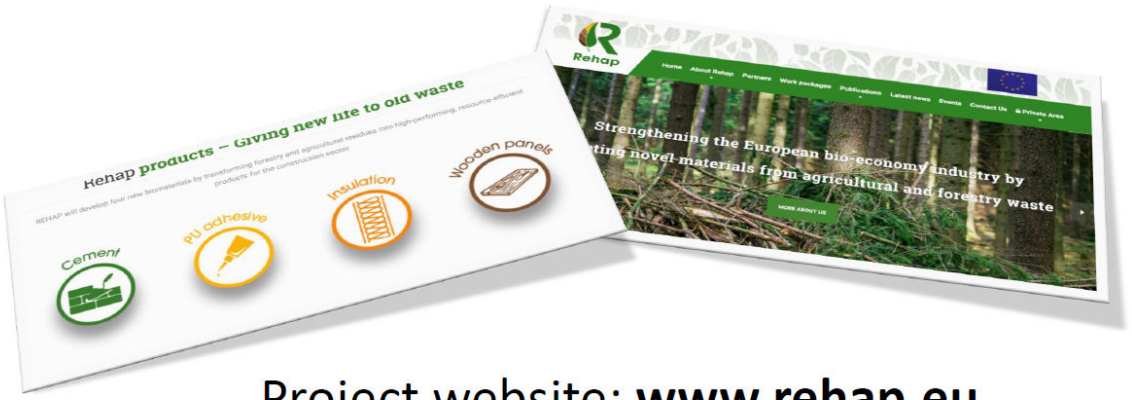

Project website: **www.rehap.eu**

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