Rehap

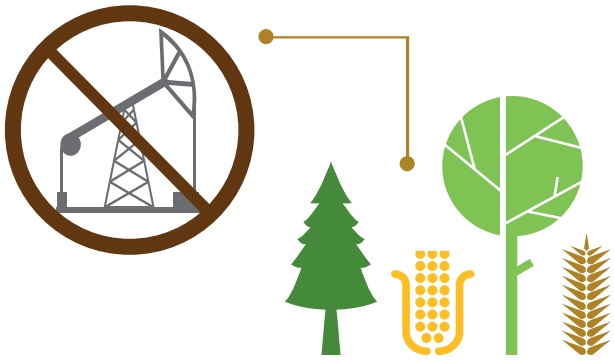
Assessing the availability of agroforestry residues

The EU has seen an upsurge in the use of bio-based alternatives to fossil fuels in the chemical industry. For instance, the EU-funded Rehap project is creating new construction materials from agricultural and forestry residues such as straw and bark.

As part of the project, researchers have been collecting data on how much agricultural and forestry residues are available to sustainably use across Europe. This information can help Europe make better use of its sustainable resources and reduce its reliance on fossil fuels.

Agroforestry residues

Rehap is taking underutilised waste from agriculture and forestry and extracting lignin, cellulose, tannin and hemicellulose. It is then using these compounds to create biopolymers, which can then be used to make high value-added construction materials, which are normally derived from fossil fuels.

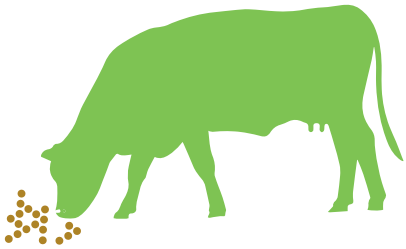


These compounds have the potential to replace a substantial share of the **50 Million tonnes (Mt)** of crude oil currently used in the EU chemical industry.

Sensitivity analysis

Agricultural and forestry waste is already used for many applications such as:

Animal bedding



Animal feed

New farming technologies

Horticulture

*To make sure the assessed biomass did not include these other applications, **Rehap** completed a sensitivity analysis to demonstrate the robustness of the project's results. The analysis revealed:*

Opportunities =
Increasing removal rates and residue to crop ratios; bark is an already-available stream, therefore, less unstable.

Risks =
Competing against the continued combustion of bark and straw

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What do the results show?

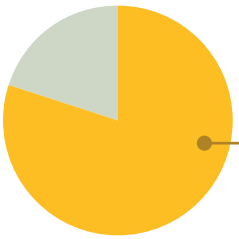
Based on regional data of the bioeconomic potential of agroforestry waste in Europe, including a sensitivity analysis, the project revealed that…

Agriculture

How much is available?

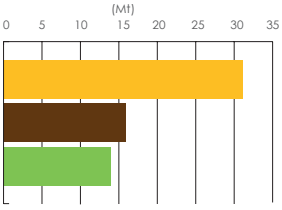
The agricultural sector produces large amounts of residues for bioeconomic purposes. Of these residues, **straw** is the most promising source:

There is approximately **95 Mt** of it



It has the highest concentration of lignocellulose at **80%** of its dry matter

Of this straw, wheat straw was the most promising source at **46Mt.**



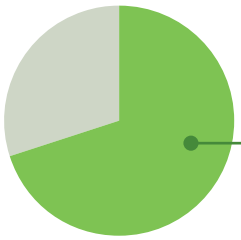
Then maize stover **(31Mt),** barley straw **(16Mt),** rapeseed straw **(14Mt).**

Forestry

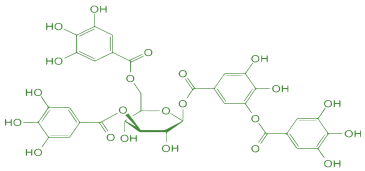
How much is available?

Residue bark from **two conifer species** (pine and spruce) is the most dominant source:

They have a joint bioeconomic potential of **15 Mt**



It has the highest concentration of lignocellulose at **70%**



They contain a considerable amount of **tannin**

From harvested wood, the dry matter density available is:
380kg/m^3 spruce bark
400kg/m^3 pine bark

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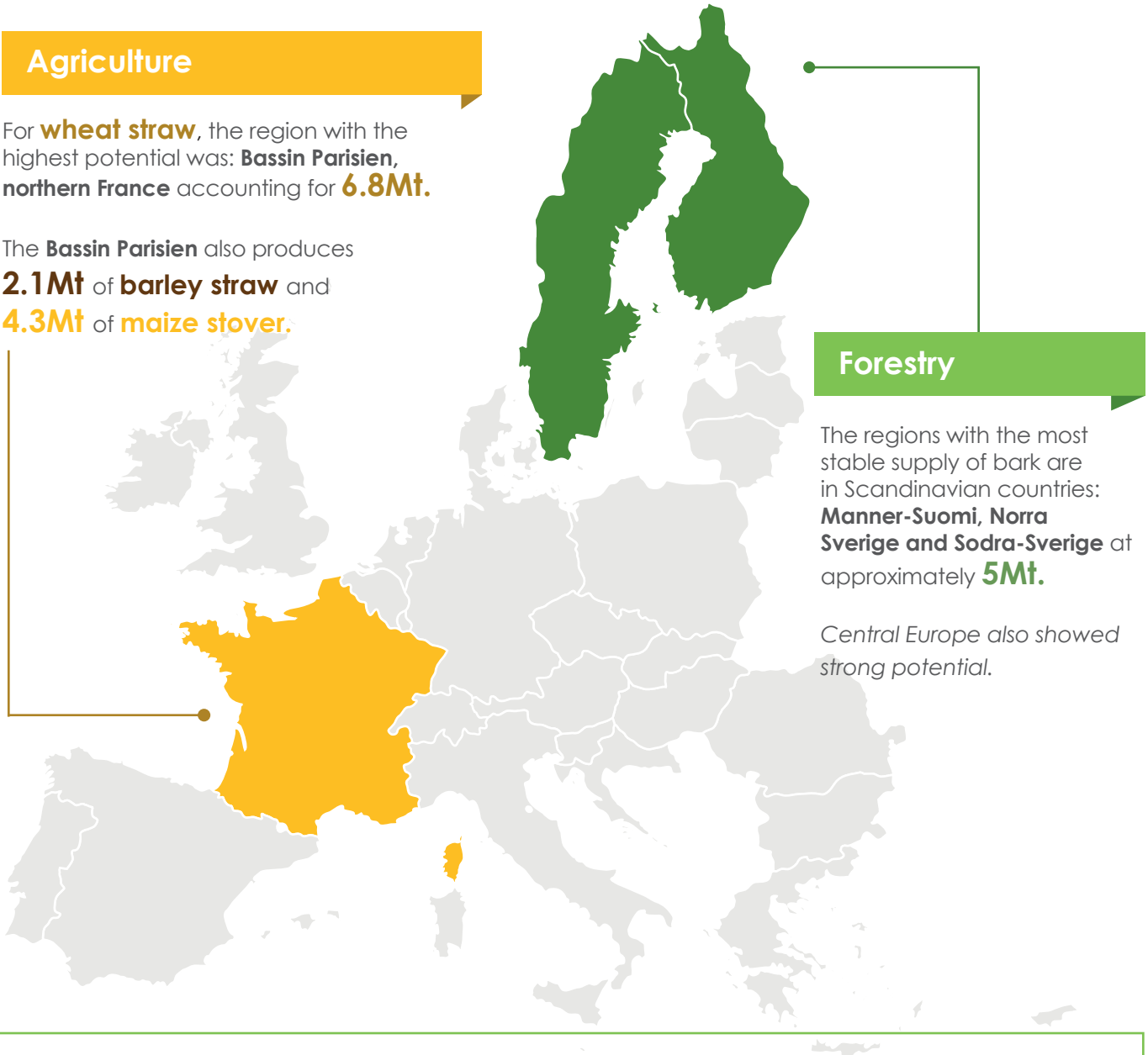
Where is it available?

Agriculture

For **wheat straw**, the region with the highest potential was: **Bassin Parisien, northern France** accounting for **6.8Mt.**

The **Bassin Parisien** also produces **2.1Mt** of **barley straw** and **4.3Mt** of **maize stover.**



Forestry

The regions with the most stable supply of bark are in Scandinavian countries: **Manner-Suomi, Norra Sverige and Sodra-Sverige** at approximately **5Mt.**

Central Europe also showed strong potential.

What's next?

Future feasibility studies for bioeconomic development in Europe should concentrate on lignocellulose feedstock sourced from **wheat, grain maize, barley, rapeseed and coniferous trees.**

Rehap has developed a methodology tool that forecasts the future availability of lignocellulose feedstock from agricultural harvesting residues till **2030.**