Biomass feedstock availability for biorefineries

Availability and quality of biomass Based on Virtual pyrolysis plant locations

CAPAX Biobased development

Dr. Amanda Kozlo

EU Industry week 2021
Webinar

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 723070.

What does Capax do?

We focus at creating sustainable business cases

- Long term feedstock securement
- Sales agreements

In short you need to secure the IN's & OUT's of your project

- First step → thorough surrounding analysis

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Bio4Products case

Bio4Products demonstrates feedstock transformation into renewable chemicals with the aim of at least 30% substitution of fossil based equivalents.

Using four residual Feedstocks within the EU zone

- Agriculture → Wheat Straw
- Forestry → Forestry & sawmill residues
- Food/feed processing → Sunflower husks

Transformation into bio-oil fractions that are then used for the production of roofing material, resins and engineered wood and natural fibre reinforced products




Virtual Pyrolysis Plant Locations

feasibility & sustainability of potential future projects

- Feedstocks within the EU zone
- Avoiding the food/feed chain
- Technical suitability, geographical spreading, strategical aspects and sustainability aspects
- Pricing
- Availability
- Focus on **residual lignocellulosic** feedstocks from 3 domains

Principle of VPL's (Virtual Pyrolysis plant Locations)→ realistic feedstock scenarios

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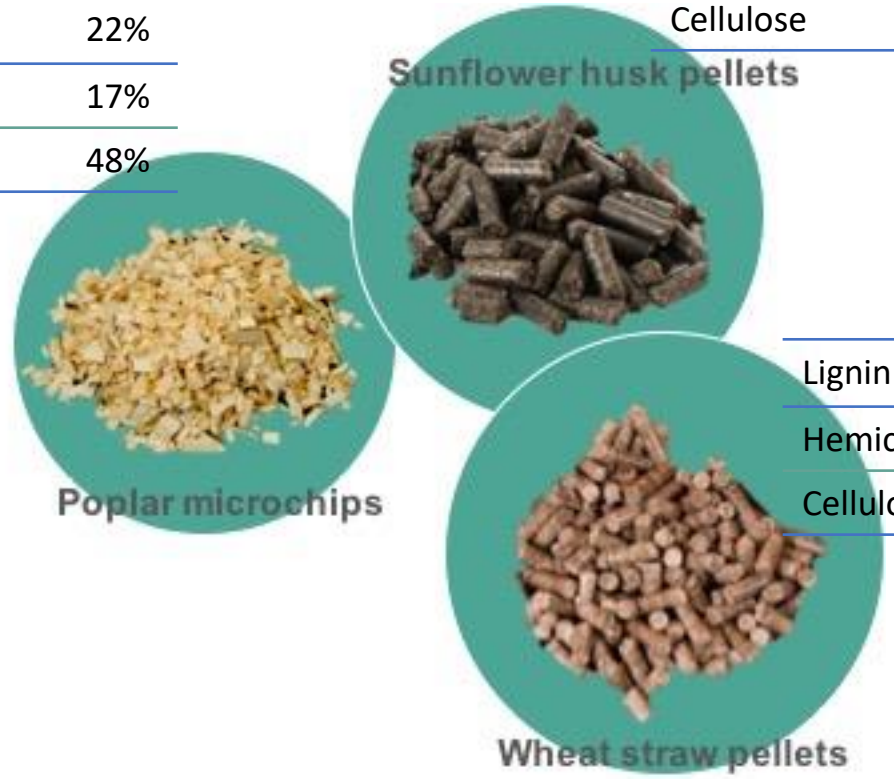
Biomass Quality

- Physical characteristics
- Chemical composition

- Quality influencing parameters:
  - Weather conditions
  - Harvesting operations
  - Logistics
  - Conditioning
  - Handling and storage
- Acceptance criteria at the delivery gate
  - Particle size deviation
  - Moisture content
  - Contaminations with undesirables

Lignin	22%
Hemicellulose	17%
Cellulose	48%

Lignin	17%
Hemicellulose	35%
Cellulose	48%



Lignin	14%
Hemicellulose	24%
Cellulose	34%

Correlation between conversion technology and selected biomass

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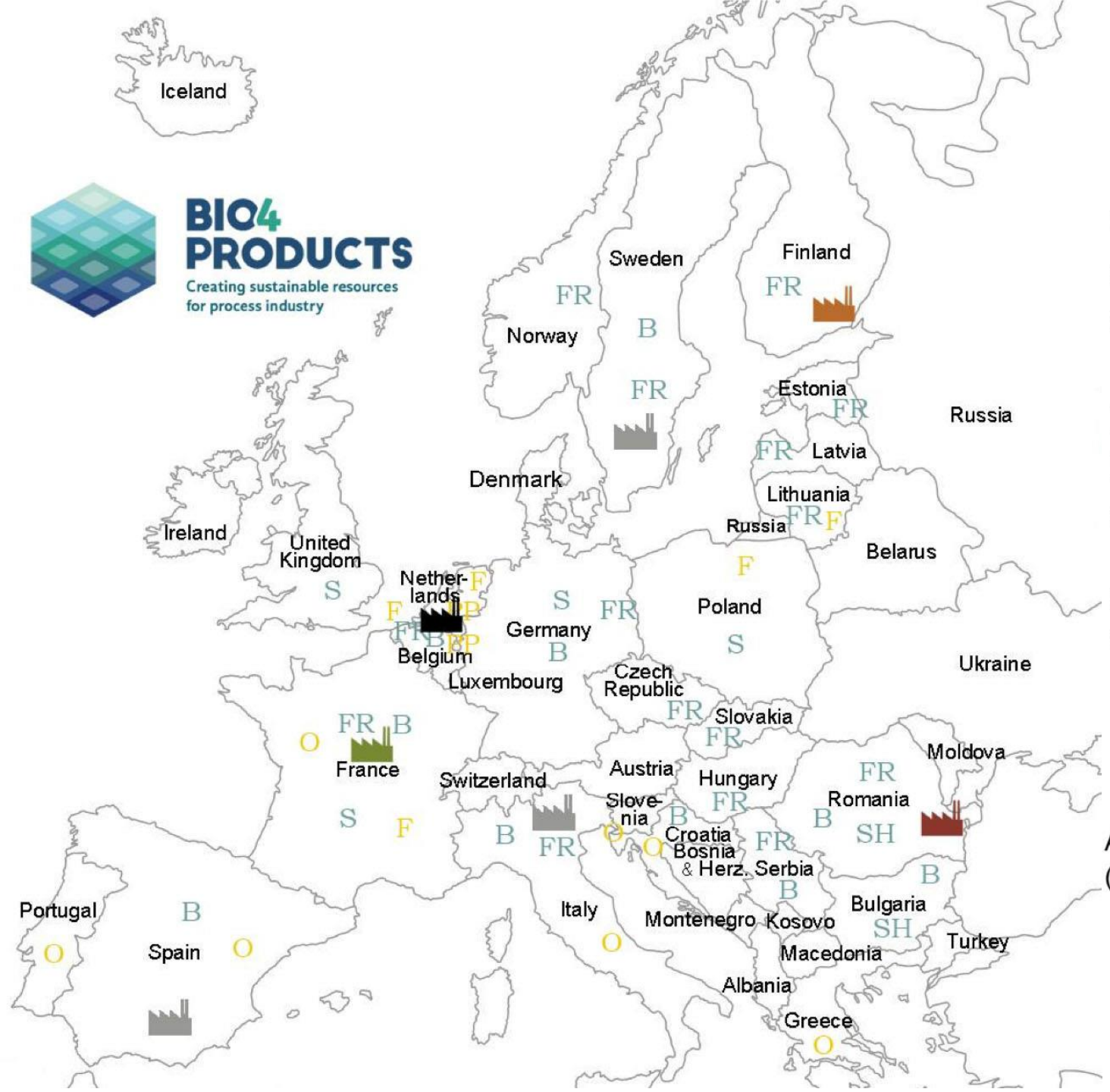

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BIO4 PRODUCTS
Creating sustainable resources for process industry

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VPL - Feedstocks:

France – Multi-feedstock

Netherlands – Phytoremediated poplar

Romania – Sunflower husks

Finland – Forestry residues

Other – excluded

Main feedstock categories (in **green**)

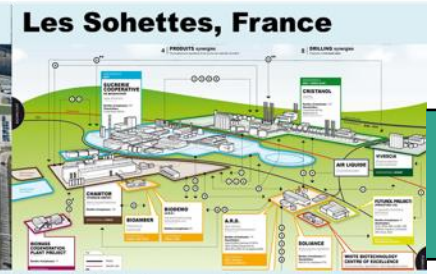
- S – Straw
- B – Poplar bark
- SH – Sunflower husks
- FR – Forestry residues

Additional categories (shown in **yellow**)

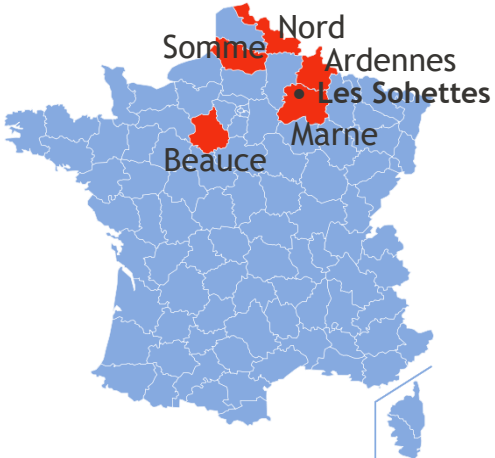
- O – Olive stones
- PP – Phytoremediated poplar
- SH – Flax shives

MAIN Feedstocks	Leading countries by production	Production capacity	Competitive markets and applications
Straw residues	**France** Germany	9.5 mil ha (22% of EU28) 3.2 mil ha (16% of EU28)	Feed, animal bedding, energy, construction
Sunflower husks	**Romania** Bulgaria	1 mil ha (24% of EU28) 0.8 mil ha (22% of EU28)	Fertiliser, feed, energy
Poplar bark	**France** Italy	236,000 ha 101,000 ha	Mulching, energy
Forestry residues: Softwood	**Finland** Sweden	50 mil. m^3 70 mil. m^3	Pulp & paper, panelwood, mulching, energy
Hardwood (poplar)	**France** Italy	236,000 ha 101,000 ha	Pulp & paper, panelwood, mulching, energy
Phytoremediated poplar	Belgium & **Netherlands**	70,000 ha of contaminated land	Energy
Olive stones	Spain Italy	42,000 ha (51% of EU28) 11,000 ha	Energy, additives
Flax Shives	**France** & Benelux	82,000 ha	Animal bedding, construction, mulching, energy

Virtual Pyrolysis Plant Locations



Radius - synergies - logistics!



Virtual Pyrolysis Plant Location	Biomass feedstock	Local availability	Local price (€/t)
Netherlands, Bergen op Zoom	SRC poplar, phytoremediated	300 kt/y	35
France, Les Sohettes	Wheat straw *(Beauce)*	1100 kt/y	70-90
	Flax shives *(Somme)*	14 kt/y	70-90
	Poplar forestry residues *(Ardennes, Nord)*	2500 kt/y	50-60 (res.)
	Poplar wood slabs (sawmills) *(Ardennes, Marne)*	285 kt/y	30 (slabs)
Finland, Lappeenranta	Softwood forestry residues	1640 kt/y	50-60
Romania, Braila city	Sunflower husk	103 kt/y	50-60

Summary

- **Biobased project success, long term feedstock securement is key!**

- **VPL strategy – a tool to do a realistic biomass surrounding analysis**
  - **Availability, competition, suitability, quality, sourcing strategies**

  = Tangible feedstock analysis

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Further reading

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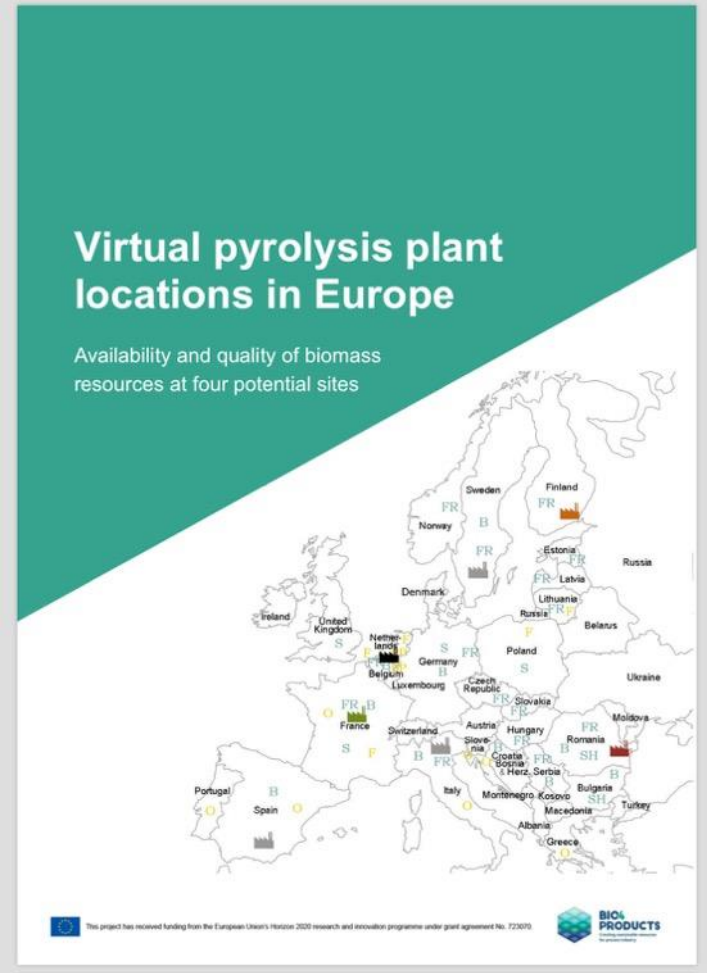

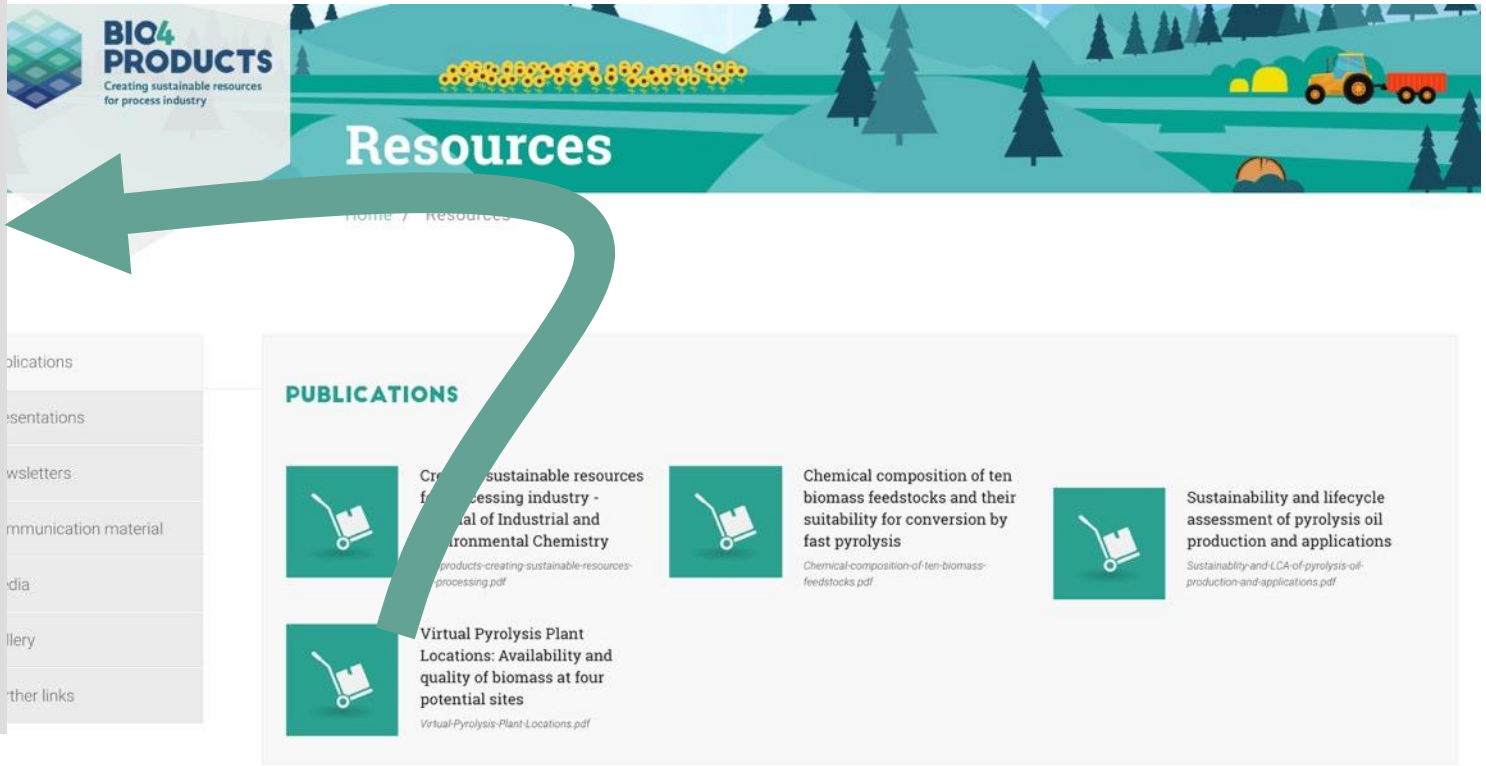

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Thank you for your attention!

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Dr Amanda Kozlo

+32 52 30 26 71 info@capax.be

www.capax.be

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