

Fibenol: Shaping the Future of Chemicals and Materials with Superior Scope 3 Solutions

Andres Maser | Sales Manager

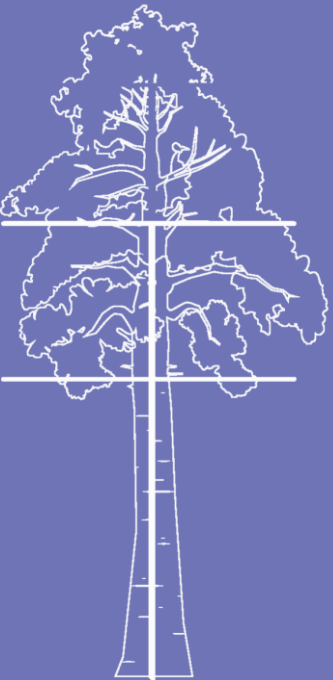
fibenol.com

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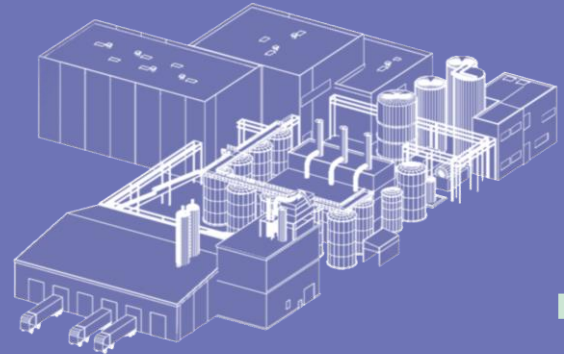
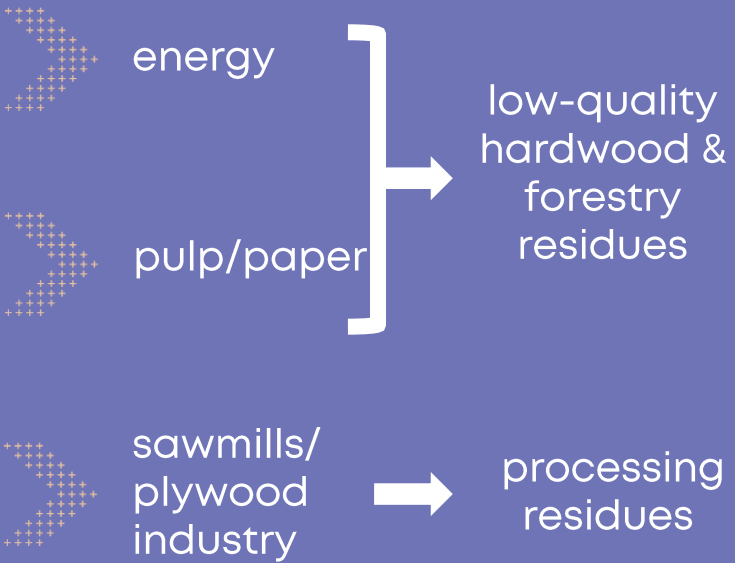




Valorizing local bioresource



Fibenol



95%
water reuse

100% renewable
energy



LIGNOVA™



C5/C6
WOOD
SUGARS



SPECIALTY
CELLULOSE



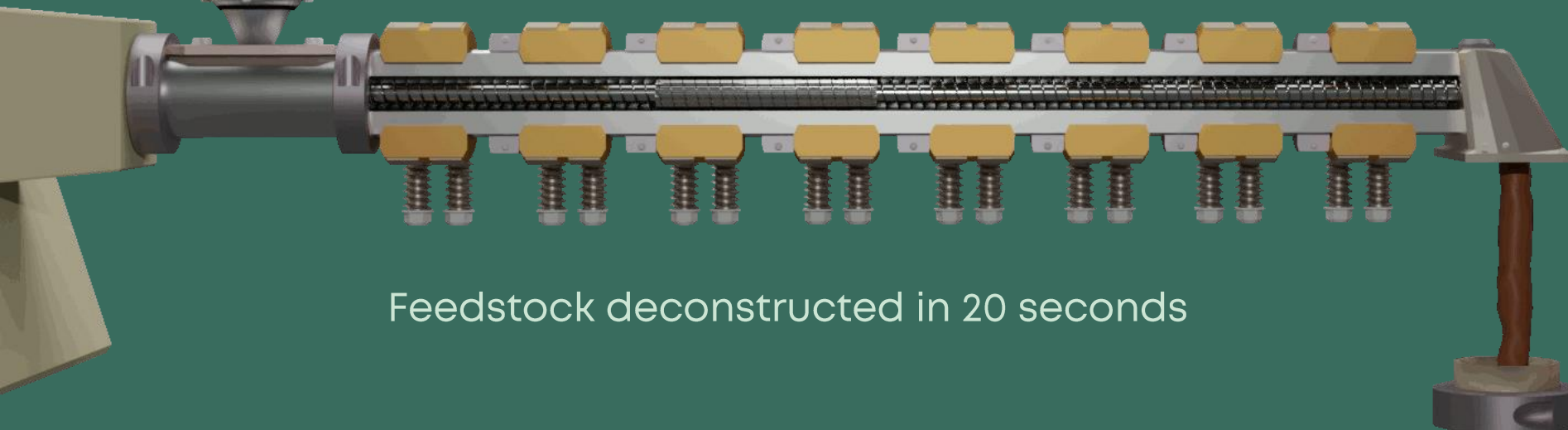
Advancing Sustainable Biorefineries

- + Innovative Pre-Treatment
- + Future Biorefinery Model

SUNBURST™ pretreatment



Process: temperature + pressure + mechanical force



Feedstock deconstructed in 20 seconds

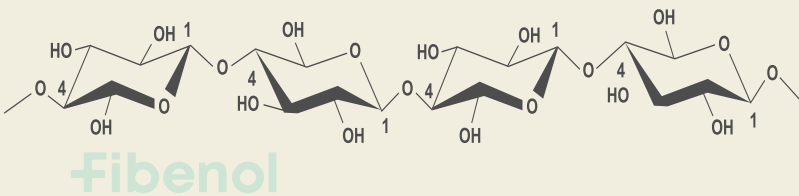
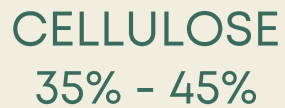
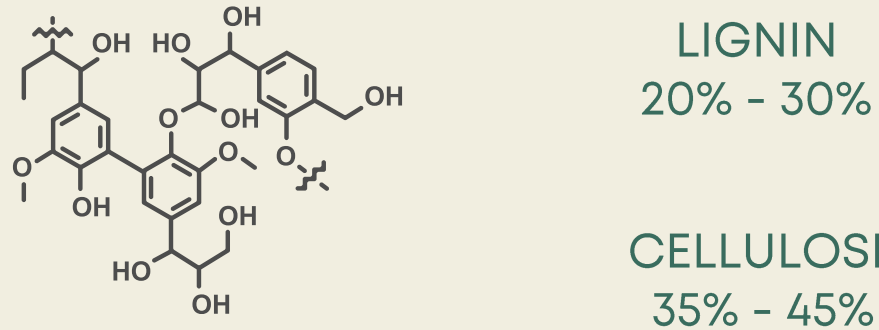
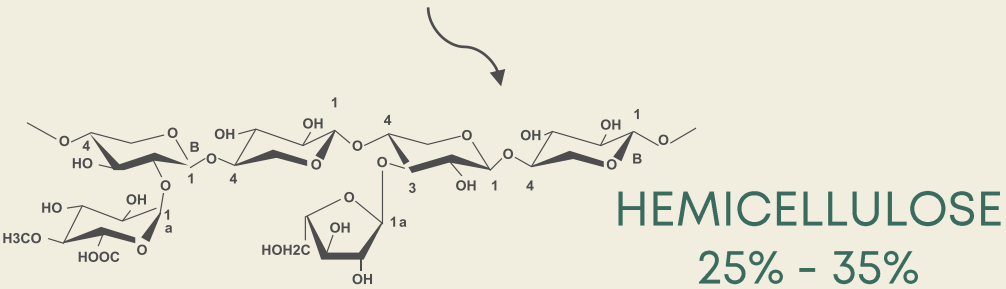


Result: chemically unmodified, high-purity products

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Technological breakthrough

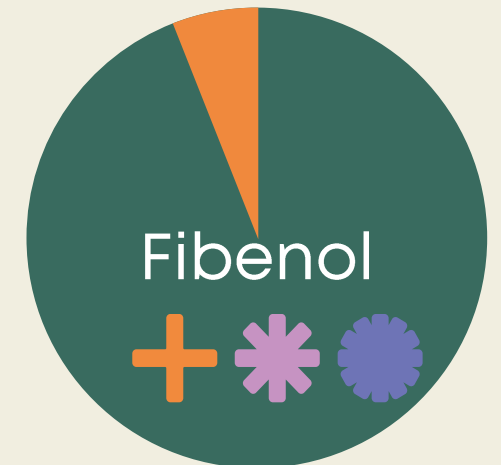
COMPOSITION OF WOOD



from one product focus to whole wood valorization

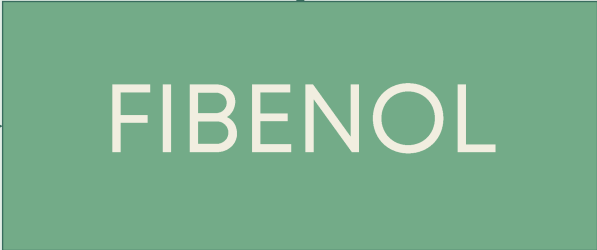


40%-50%
vs
> 90%



Fibenol Products

Residual Birch



Cellulosic sugars:

- C5 SUGARS
- C6 SUGARS



Hydrolytic lignin:

- LIGNOVA™ Crude
- LIGNOVA™ Pure



Specialty cellulose:

- NATURAL MICROCRYSTALLINE CELLULOSE



Fibenol today

Capacity:

- + 20 000 ton C5 & C6 wood sugars
- + 6 500 ton LIGNOVA lignin
- + Specialty cellulose on ton scale



+ Total Investment & EU support: <100 mEUR.

2016-2017
SUNBURST™ technology

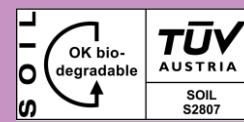
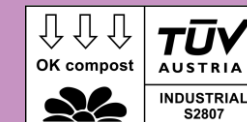
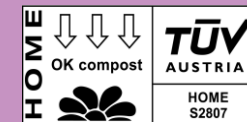
2018
SWEETWOODS project

2020
PILOT LINE

2023
COMMISSIONING & RAMP UP

2028
1ST INDUSTRIAL PLANT

EPD®



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 SWEETWOODS

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 792061

 Horizon 2020
European Union Funding
for Research & Innovation

 Bio-based Industries
Consortium



Biosurfactants



Cement



Fats & oils



Bitumen



Bioplastics



Wood adhesives



**Verified Sustainability:
Pioneering Premium SCOPE 3
Biomaterials on the Path to
a Fossil-Free World**

Science based and data driven LCA

+ High quality primary data is key!

+ Transparency!



Carbon Footprint of **LIGNOVA™**

EPD verified



*IPCC, mass allocation
**GWP-fossile

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LIGNOVA™ use-case in road construction

FUTURE: carbon storing roads

- + Lower carbon footprint
- + Promote resource independence
- + Long-term carbon sequestration
- + Local resources

HOW?

Biofuel use at asphalt making +
25% LIGNOVA substitution = Carbon-
neutral road

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Carbon-neutral road project,
June 2023, Estonia





LIGNOVA™ as bitumen replacement

Collaboration with TalTech Road Engineering and Geodesy Research Group

Test sections in 2022 (drop-in)

up to 20% in surf
up to 15% in base

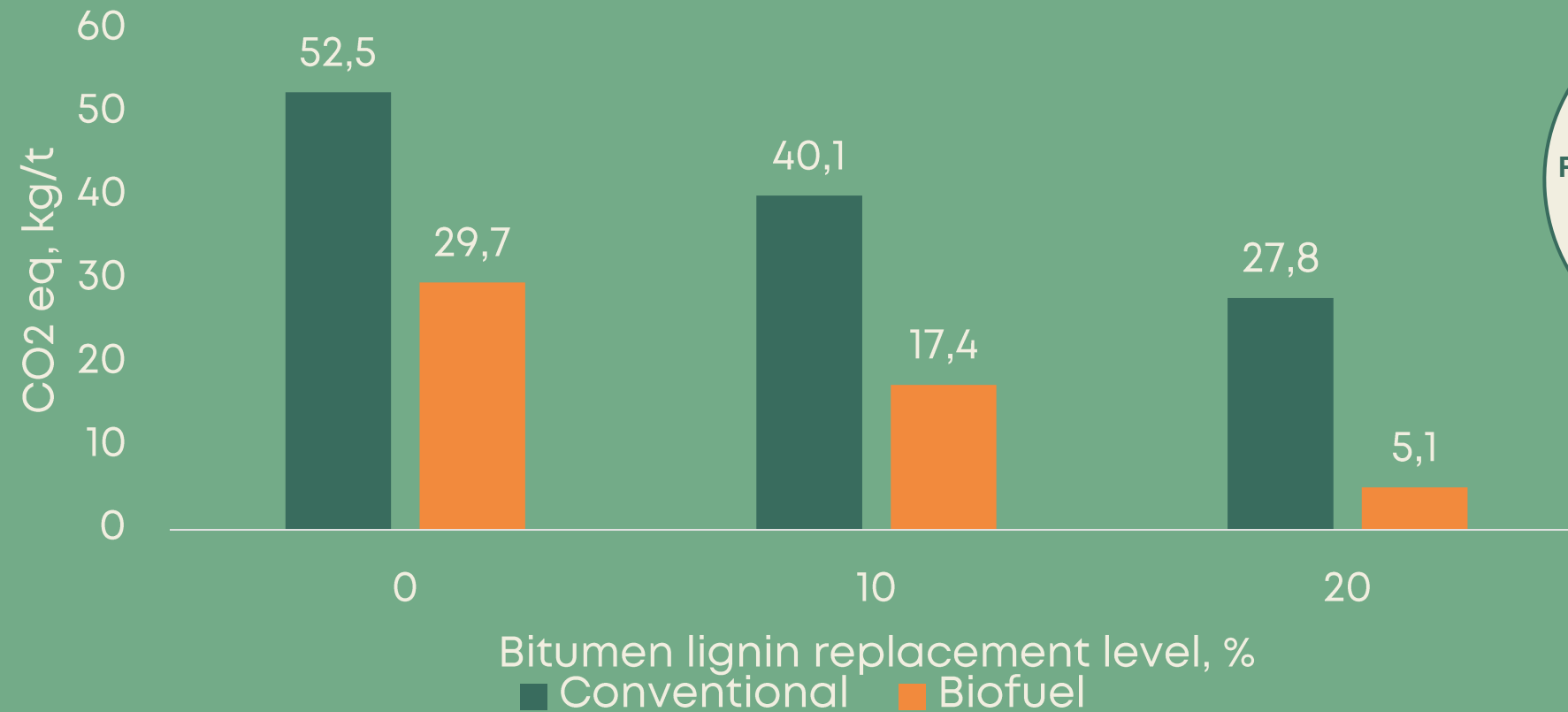
Test sections in 2023 (drop-in)

up to 25% in surf
up to 18% in base

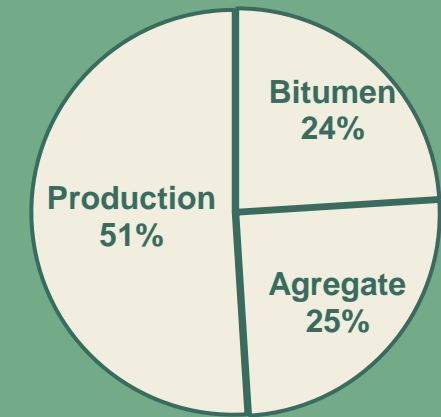
- ❖ Passes standard requirements
- ❖ Increase in stiffness observed
- ❖ No impact to wear caused by studded winter tyres (Prall lab test)

Asphalt CO₂ emission and ways to reduce them

Example: AC 16 surf



ASPHALTMIX CO₂ COMPONENTS



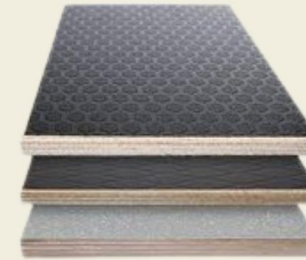
LIGNOVA in adhesives



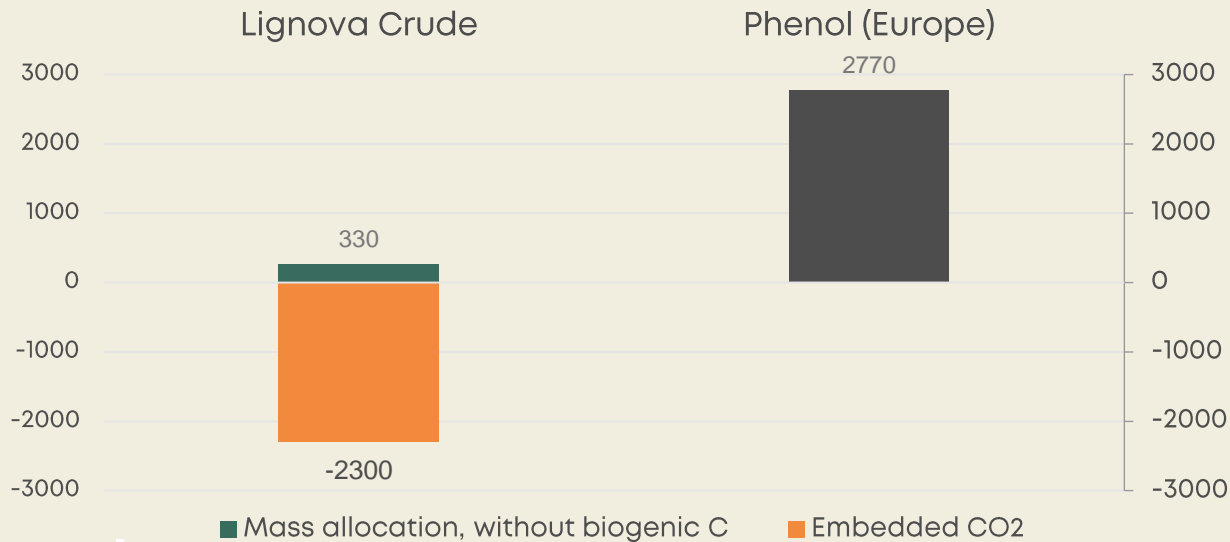
VILOBOND



MIRKA



Global warming potential (kg CO₂ eq/ ton dry product)



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LIGNOVA™ use- case in bioplastics

+ WHAT?

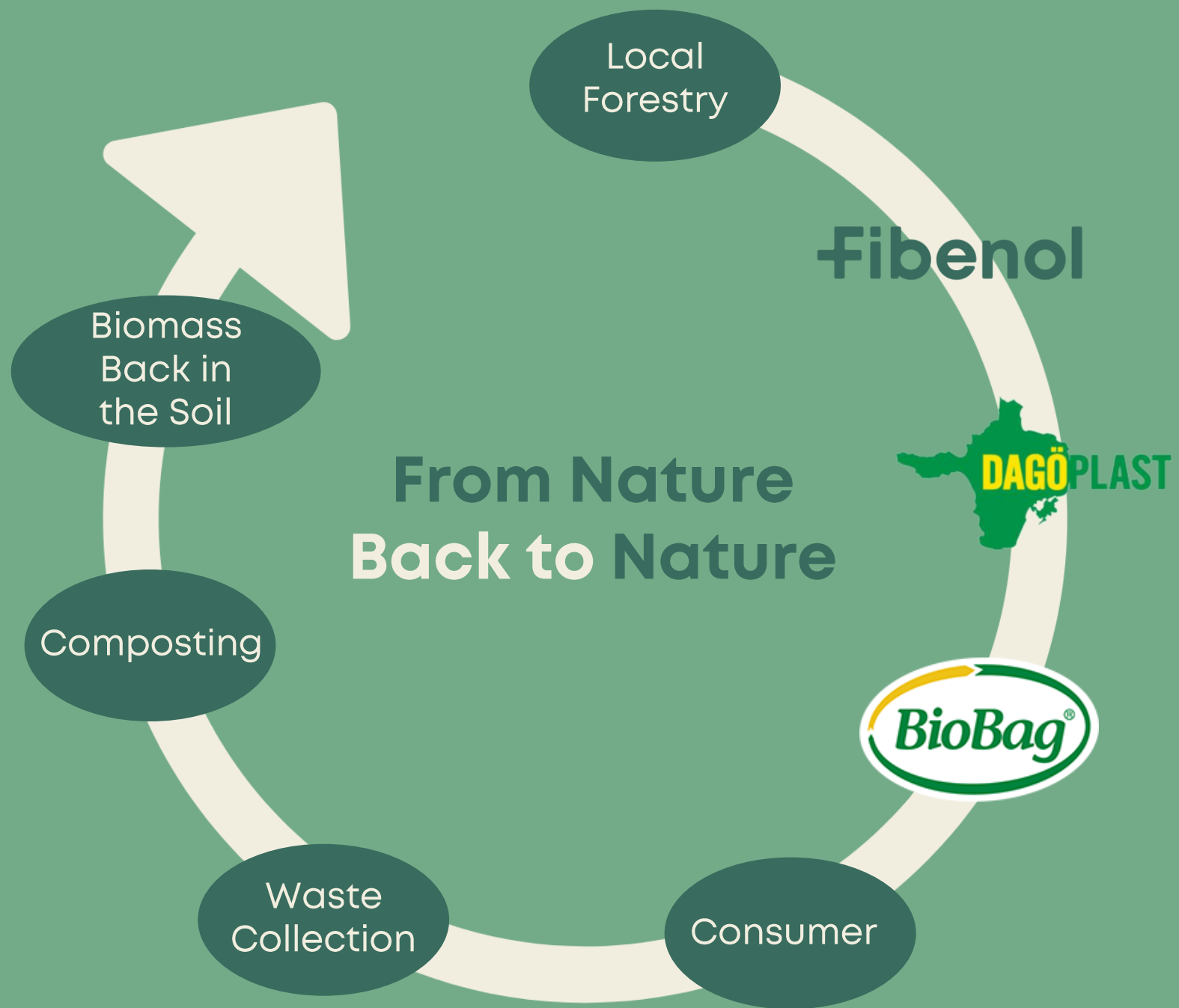
- + First biowaste bags made partially from local raw material LIGNOVA

+ WHY?

- + Generate value & expand local value chain
- + Reduced environmental impact
- + Premium CO₂ footprint
- + Good SAUNA smell :)

Closed-Loop Value Chain of the Local Bio-Resources

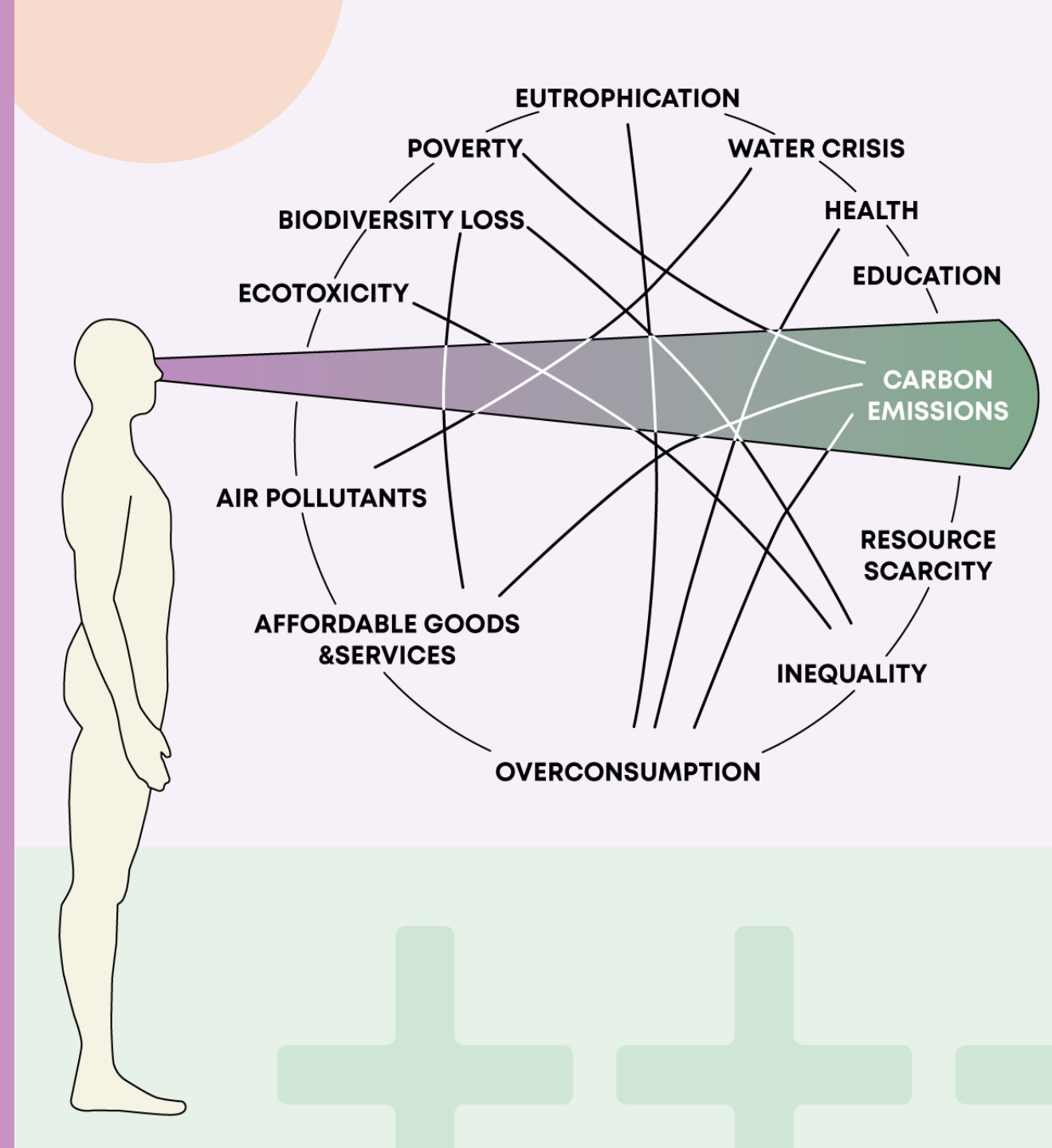
From Nature
Back to Nature



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The Big Picture

Instead of just focusing on one challenge, we have adopted a holistic approach to climate solutions.



FIBENOL1- 300kton dry/year



2023 2025 2028 2030 2032 2034 2035

Demo X 2 Fibinol 1 Fibinol 2 Fibinol 3 Fibinol 4 Fibinol 5



Are you ready to Lead the Way Towards a Greener Future with Fibenol?

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#fiberbeyondoil

More from fibenol.com

Innovation Projects



**Circular
Bio-based
Europe**

Joint Undertaking



Bio-based Industries
Consortium



Co-funded by
the European Union



COUNTLESS

ECOLOOP

Fibinol is leading and participating in the projects that are supported by Circular Bio-based Europe Joint Undertaking and its members and Co-funded by the European Union under grant agreements No 792061 SWEETWOODS, No 101022987 VIOBOND, No 101112555 SYLPLANT, No 101112453 COUNTLESS, No 101112521 REDYSIGN, No 101118127 ECOLOOP.