Bio-based Plastics Products from Paludiculture (Plant^3)

Paludi-Produkt - Natural fibre enforced plastics from paludiculture biomass

UNIVERSITÄT GREIFSWALD
Wissen lockt. Seit 1456

Partner in the
GREIFSWALD MIRE CENTRE

GEFÖRDERT VOM
Bundesministerium für Bildung und Forschung

wir! Wandel durch Innovation in der Region

Plant^3

Partner im
GREIFSWALD MOOR CENTRUM

Volker Beckmann
Maximilian Wenzel
Nora Köhn

Chair of Landscape Economics
University of Greifswald

Picture from: Tobias Dahms

Project „Paludi-Produkt“

Natural fibre enforced plastics from paludiculture biomass

UNIVERSITÄT GREIFSWALD
Wissen lockt. Seit 1456

Partner in the
GREIFSWALD MIRE CENTRE

UNIVERSITÄT GREIFSWALD
Wissen lockt. Seit 1456

ipt² INSTITUT FÜR POLYMER- UND PRODUKTIONSTECHNOLOGIEN E.V.
An-Institut der Hochschule Wismar

GERMAAT
Polymere und Maschinen

Schweriner saz
Aus- & Weiterbildungszentrum

Picture from: Tobias Dahms

Paludi-Produkt

Project related objectives:

- Finding optimal paludiculture-biomass for (bio-)plastic products

- Development of a natural fiber enforced (bio-)plastic compound…
  … suitable for a wide range of products
  … transferable to industry standard

- Getting a detailed impression of ecological impacts related to…
  … the project results
  … the implications of the project findings for (local/regional/global) value chains

Paludi-Produkt

Biomass pellets

+

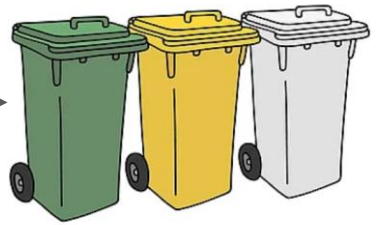
Polymer matrix

=

Fibre enforced compound

→

Product



↑

Pictures from: Tobias Dahms + Greifswaldmoor

Common reed (*Phragmites sp.*)

Sedges (*Carex sp.*)

Reed canary grasss (*Phalaris sp.*)

Cattail (*Typha sp.*)

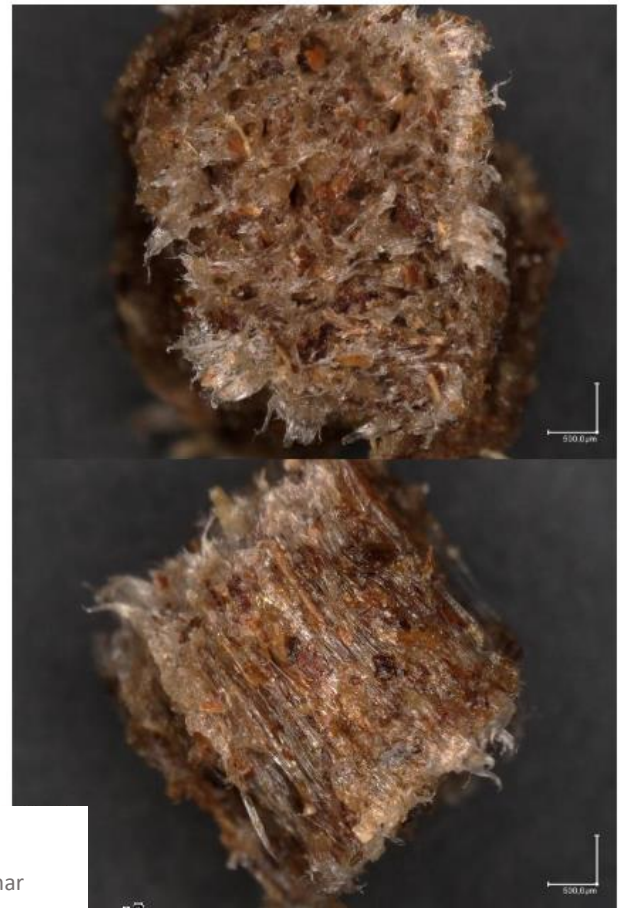
Paludi-Produkt

Picture from: Max Wenzel

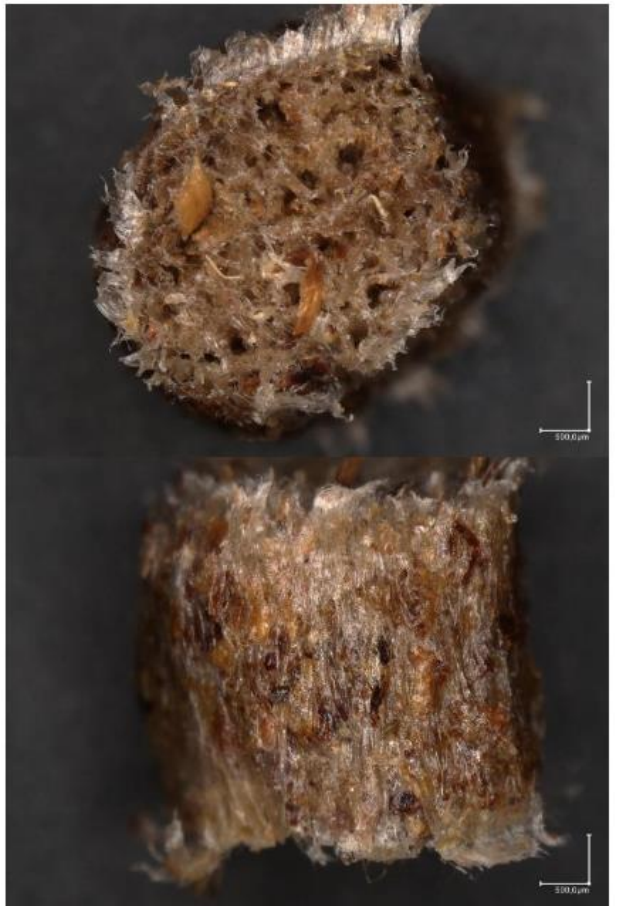
Paludi-Produkt

Natural fibre enforced compound – Tests with LDPE

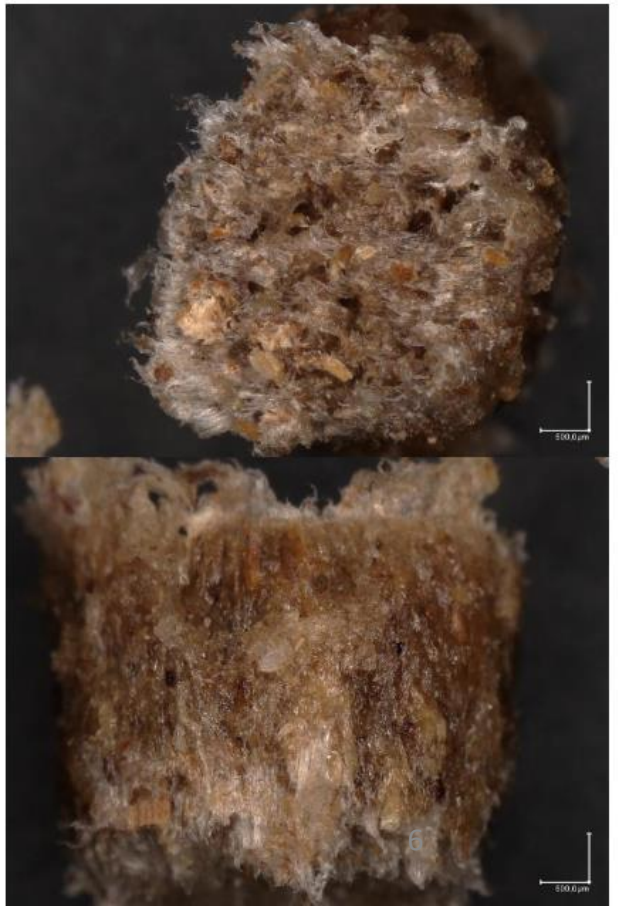
[1] Reed-canarygrass



[2] Sedges



[3] Common reed



Pictures from: IPT Wismar

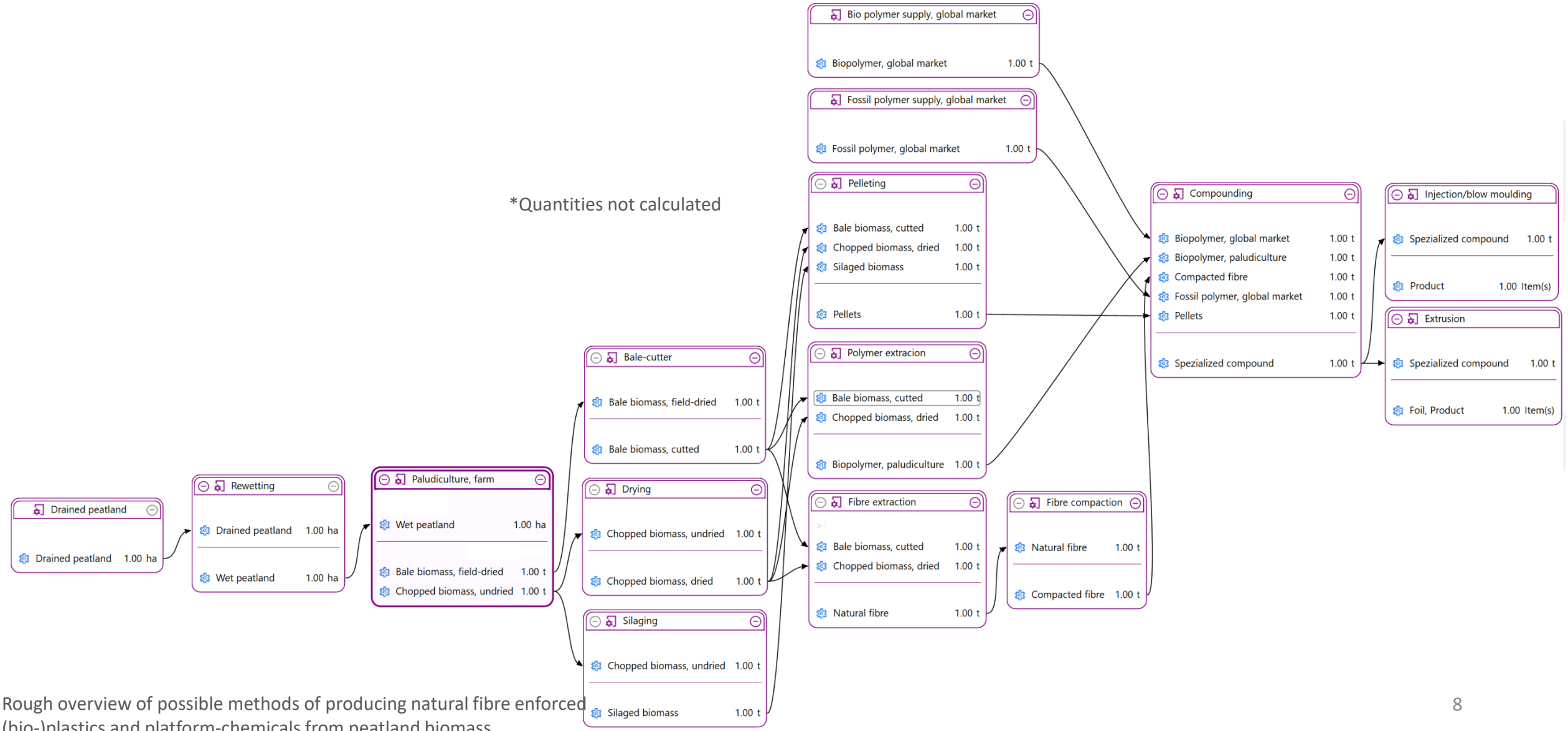
Paludi-Produkt

Compound (Resin) -> Injection moulding -> Foil extrusion

Pictures from: IPT Wismar

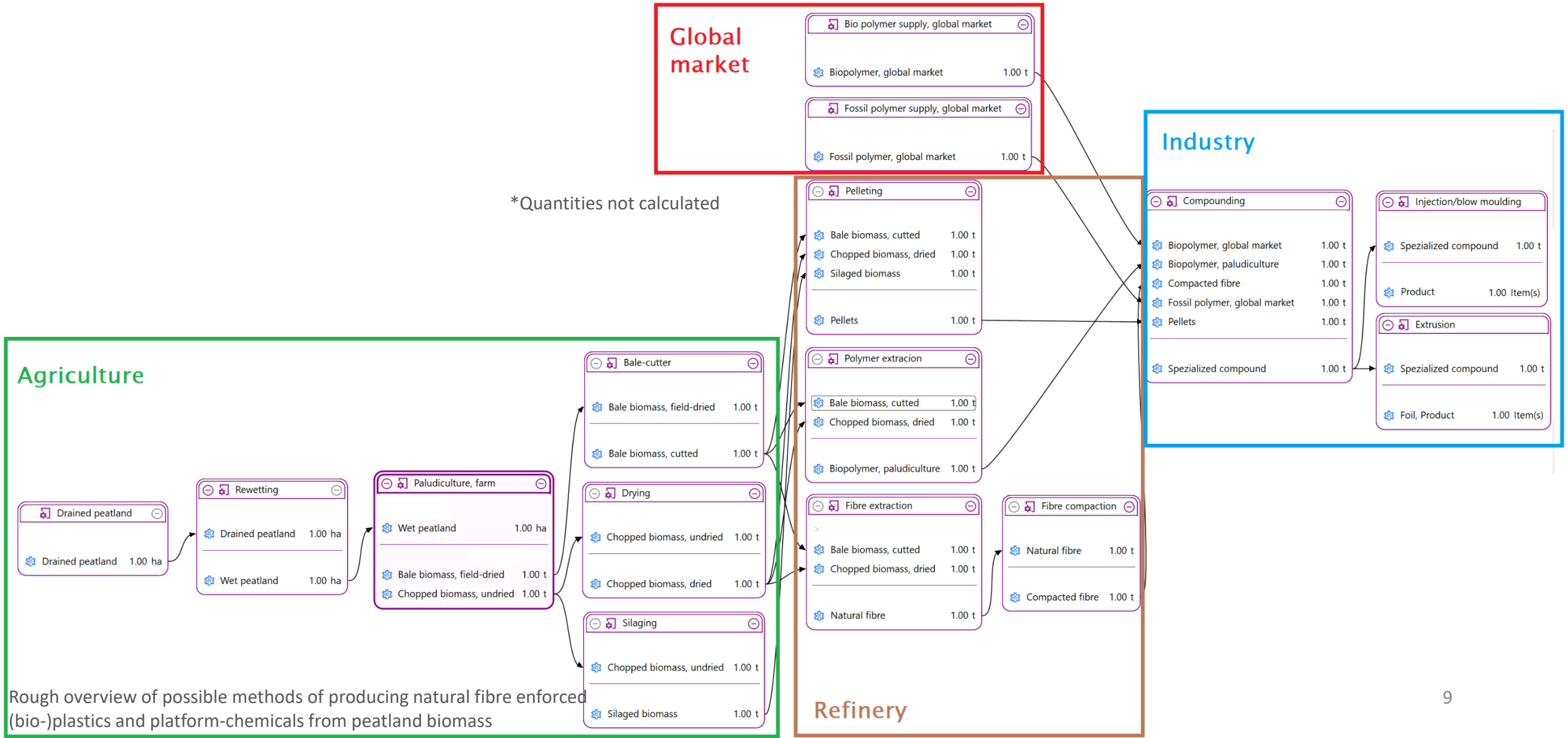
Paludi-Produkt

*Quantities not calculated



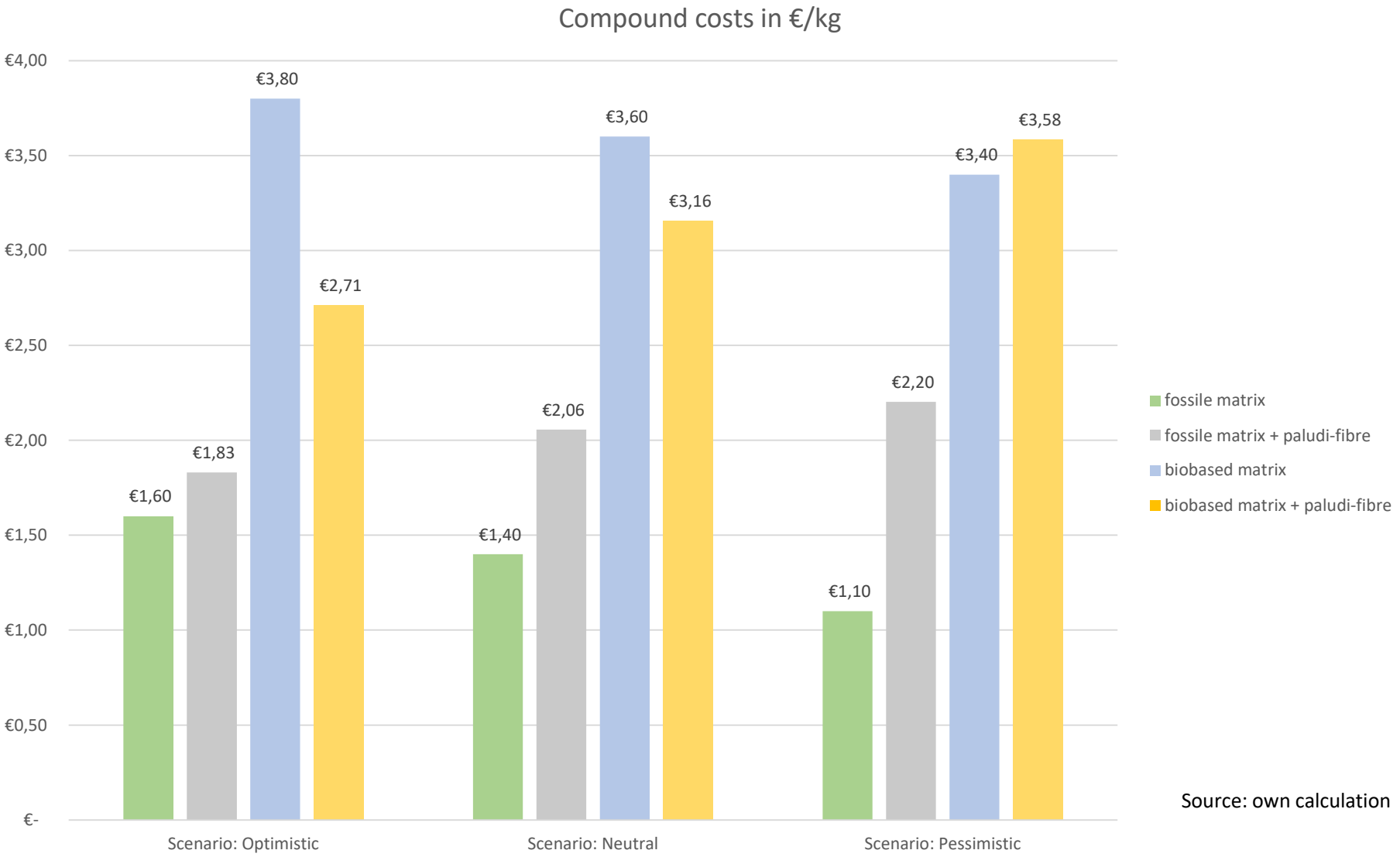
Rough overview of possible methods of producing natural fibre enforced (bio-)plastics and platform-chemicals from peatland biomass

Paludi-Produkt



Rough overview of possible methods of producing natural fibre enforced (bio-)plastics and platform-chemicals from peatland biomass

Paludi-Produkt



Source: own calculation

Paludi-Produkt

Utilization of peatland biomass for the production of natural fibre enforced (bio-)plastics

<u>Pros</u>

- Relocation of global value chains
- Reduction of fossil resource use
- Peatland restoration and protection
- (Possible reduction of CO_2-emissions)

<u>Cons</u>

- Increased energy demand -> land use change (LUC) pressure
- Can not outcompete cheap fossil compound prices
- Can not saturate current market for plastics
- Recyclable, but not necessary biodegradable or compostable
- No solution for micro plastics / massive plastic waste
- (Possible increase of CO_2-emissions)

Paludi-Produkt

Preliminary results

- Paludiculture biomass generally suitable as fibre enforcement
- Seem to have positive impact on plastic properties

Outlook

- Checking impacts of different plant species on plastic properties
- Analysing ecological impacts of natural fibre in plastics
- Developing of illustrative material (i.e. Flyer →) and scientific publications

Additional insights from the new EDELNASS Project

GREIFSWALD MOOR CENTRUM

EDELNASS

Polymer matrix

Polyethylen furanoat (PEF)

Pictures from: Tobias Dahms + Greifswaldmoor

Common reed (*Phragmites sp.*)

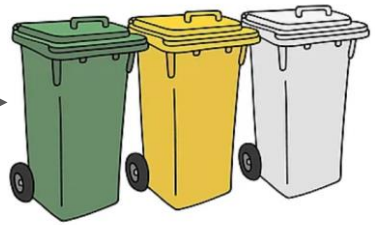
Sedges (*Carex sp.*)

Reed canary grasss (*Phalaris sp.*)

Cattail (*Typha sp.*)

Paludi-Produkt + EDELNASS

Biomass pellets + Polymer matrix = Fibre enforced compound → Product



Pictures from: Tobias Dahms + Greifswaldmoor

Common reed (*Phragmites sp.*)

Sedges (*Carex sp.*)

Reed canary grasss (*Phalaris sp.*)

Cattail (*Typha sp.*)

Project „Paludi-Produkt“

Natural fibre enforced plastics from paludiculture biomass

UNIVERSITÄT GREIFSWALD
Wissen lockt. Seit 1456

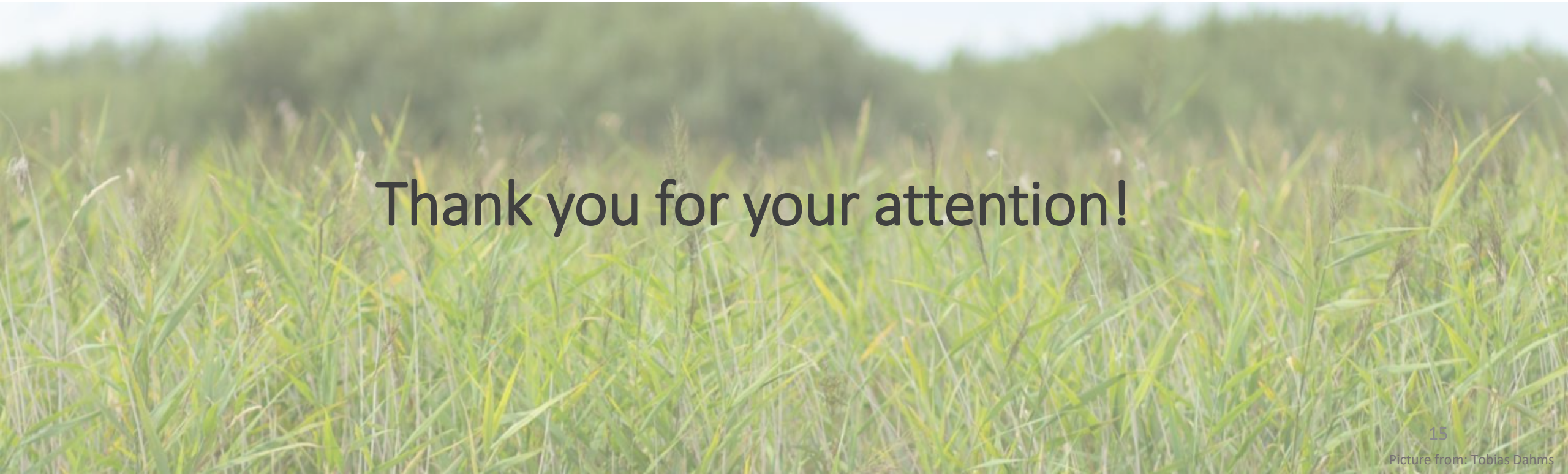
Partner in the
GREIFSWALD MIRE CENTRE

UNIVERSITÄT GREIFSWALD
Wissen lockt. Seit 1456

ipt² INSTITUT FÜR POLYMER- UND PRODUKTIONSTECHNOLOGIEN E.V.
An-Institut der Hochschule Wismar

GERMAAT
Polymere und Maschinen

Schweriner saz
Aus- & Weiterbildungszentrum



Thank you for your attention!

Picture from: Tobias Dahms