Possibilities and effects of a reduction of peat use in horticultural substrates in Germany (MITODE)

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Chrysanthemum (ZHAW, 2021)

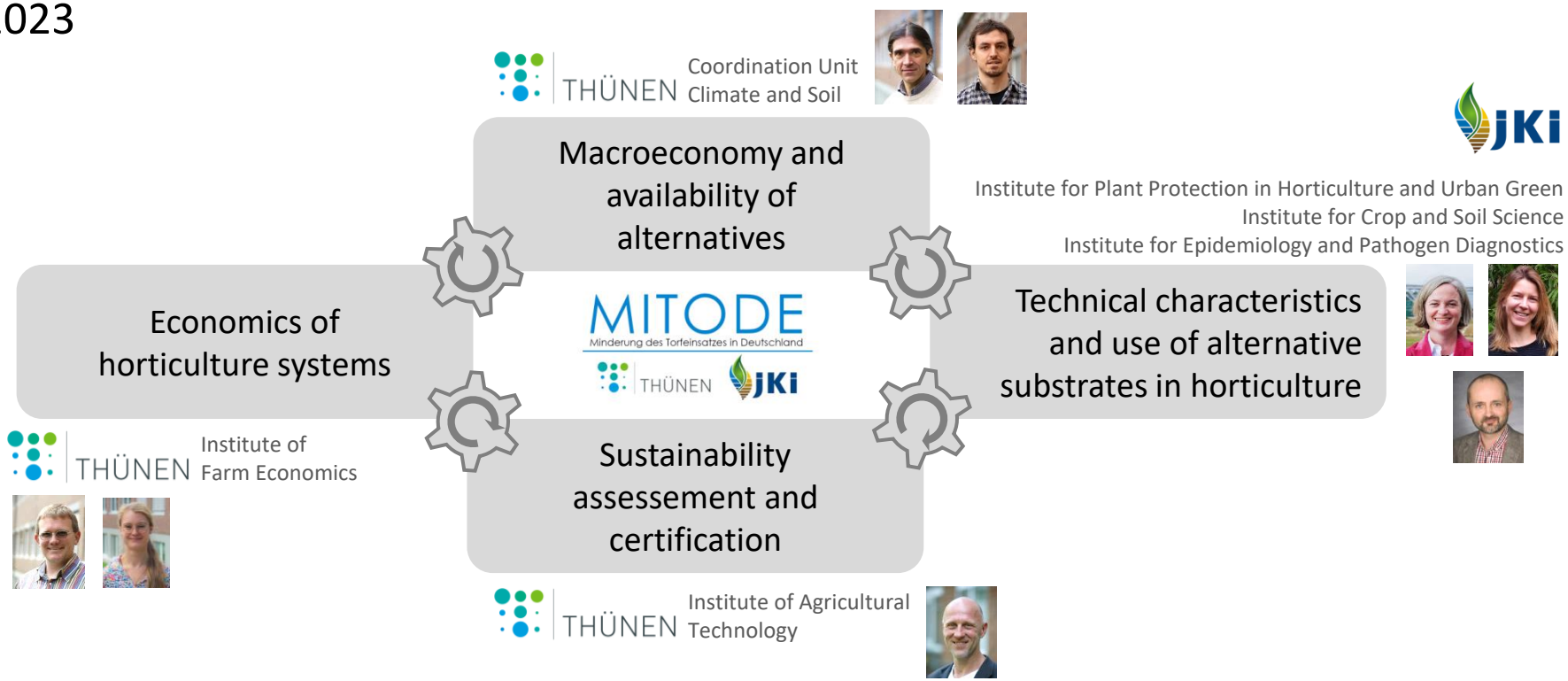
Wood shavings (Klasmann-Deilmann, 2020)

FNR Workshop – Off the peat path

22.11.2022, online

I. The MITODE project

- MITODE ist a German joint research project between the **Thünen Institute** and the **Julius Kühn Institute**.
- The goal is to investigate possibilities and consequences of the **peat reduction strategy** of the German Federal Ministry of Agriculture.
- Time frame: 2019 - 2023

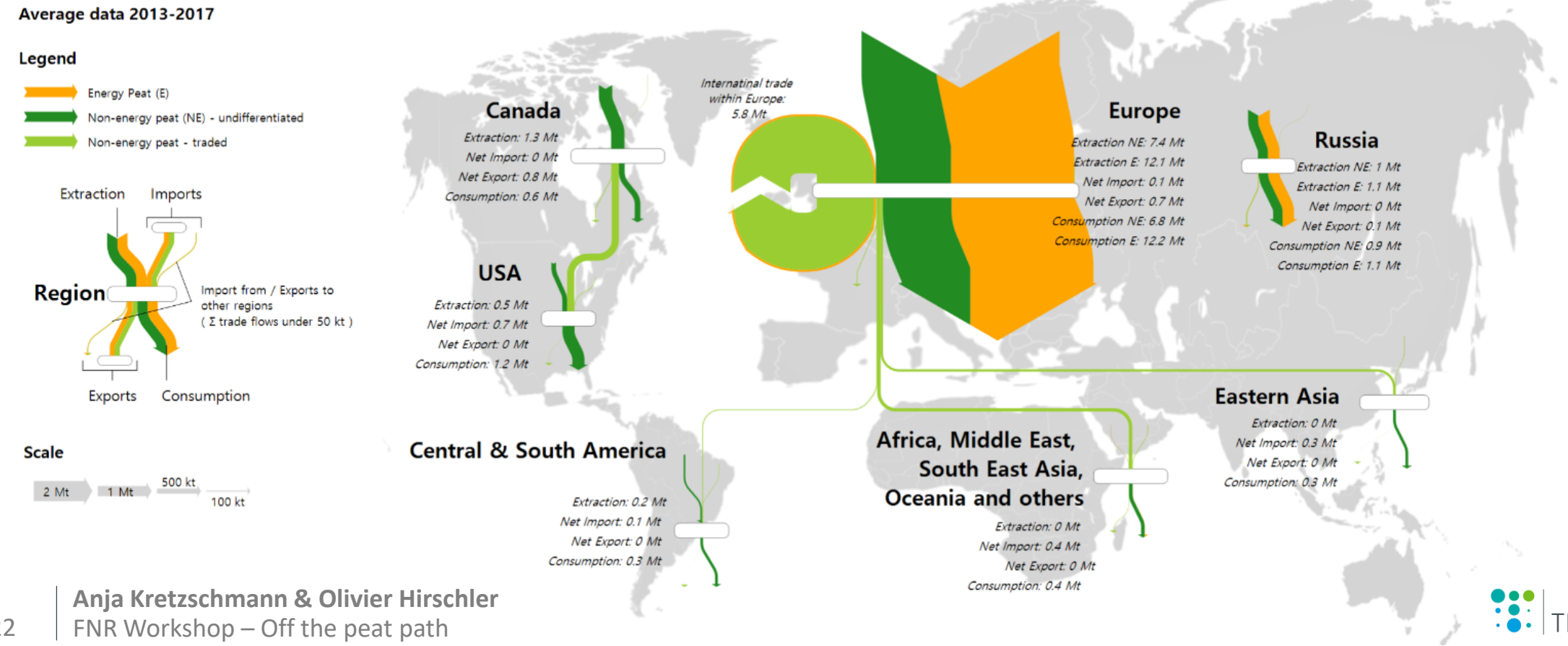


II. How much peat is extracted and used in Europe and in the world?

German peat for growing media (Gramoflor, 2019)

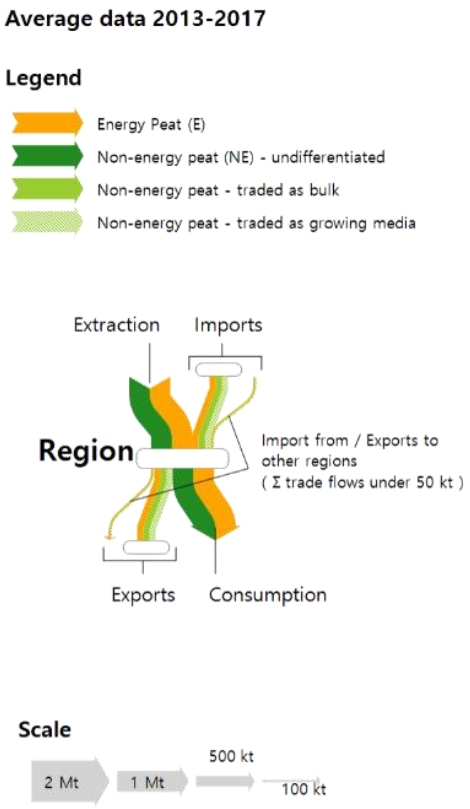
World peat market 2013-2017

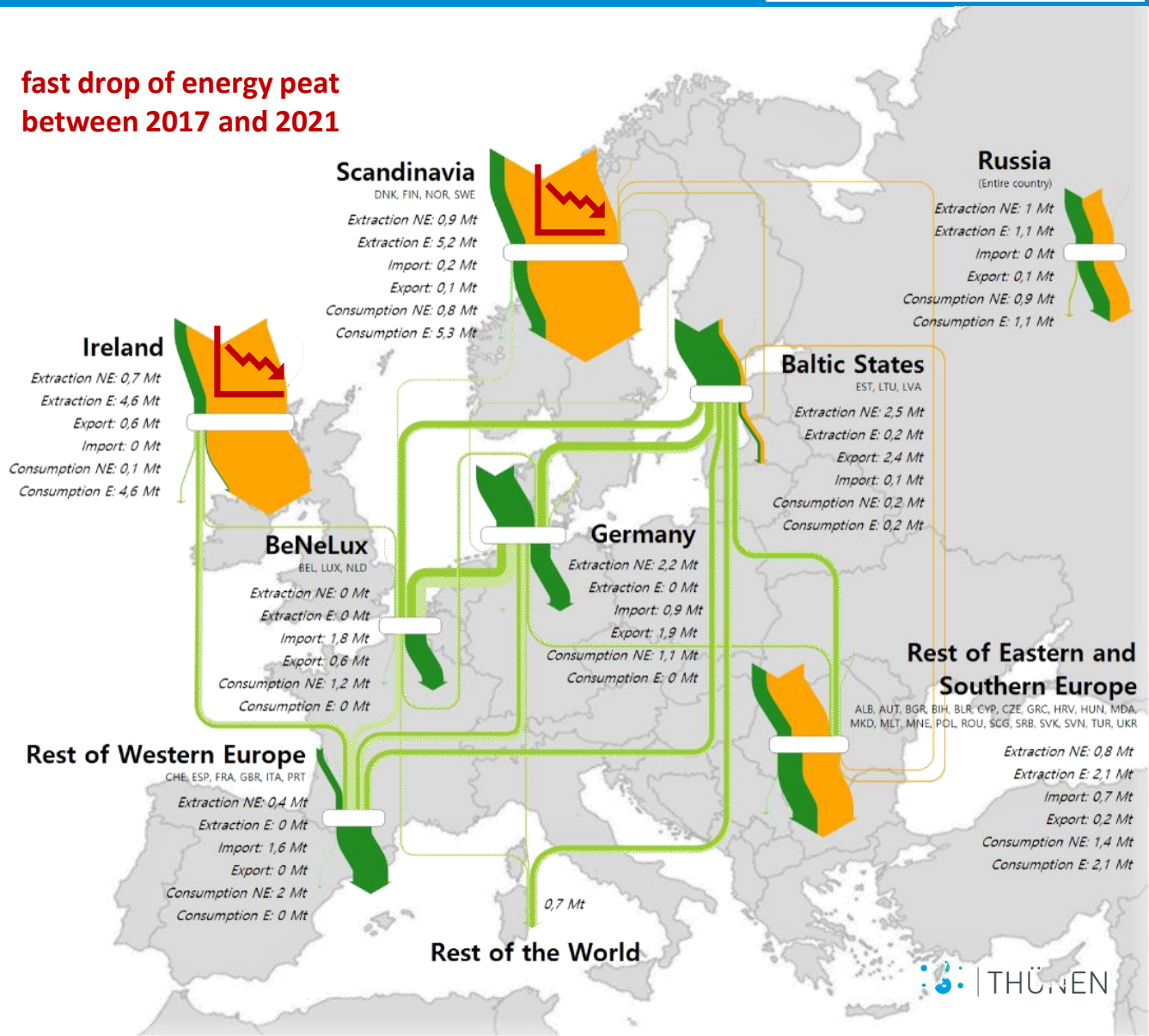
- Today, peat and its emissions are mostly a European problem
- Projections on the development of (peat-based) growing media worldwide



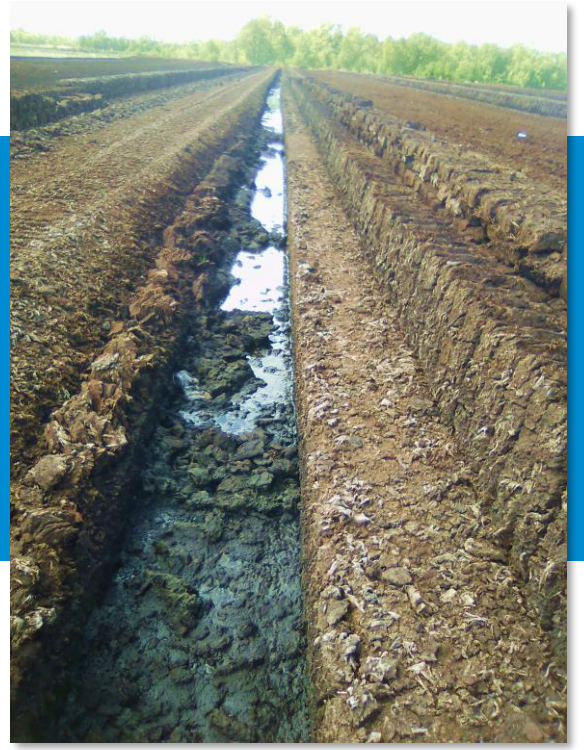
European peat market 2013-2017

- Important trade flows of peat and peat-based growing media within Europe
- Better and more data are needed





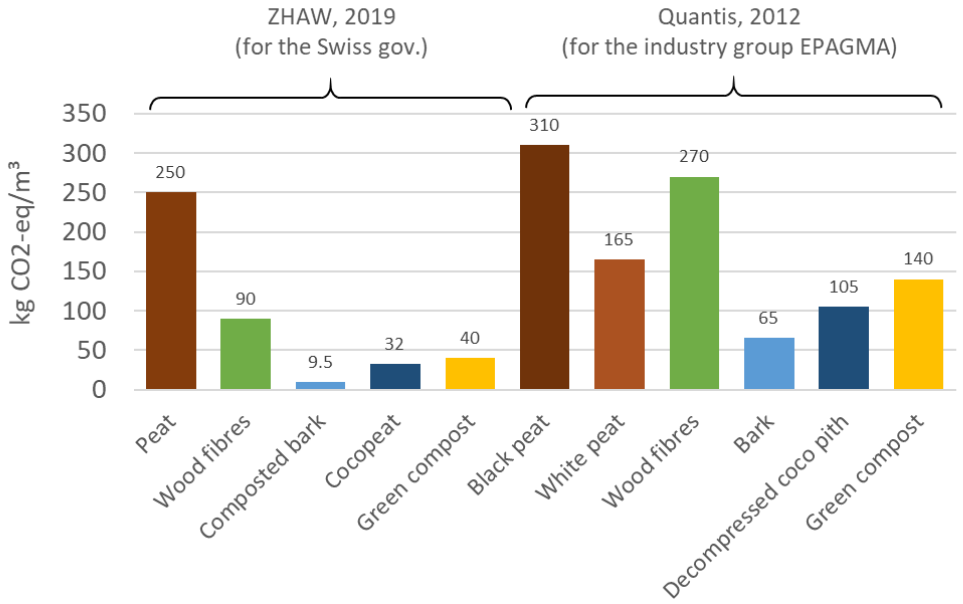
III. What does peat have to do with climate?

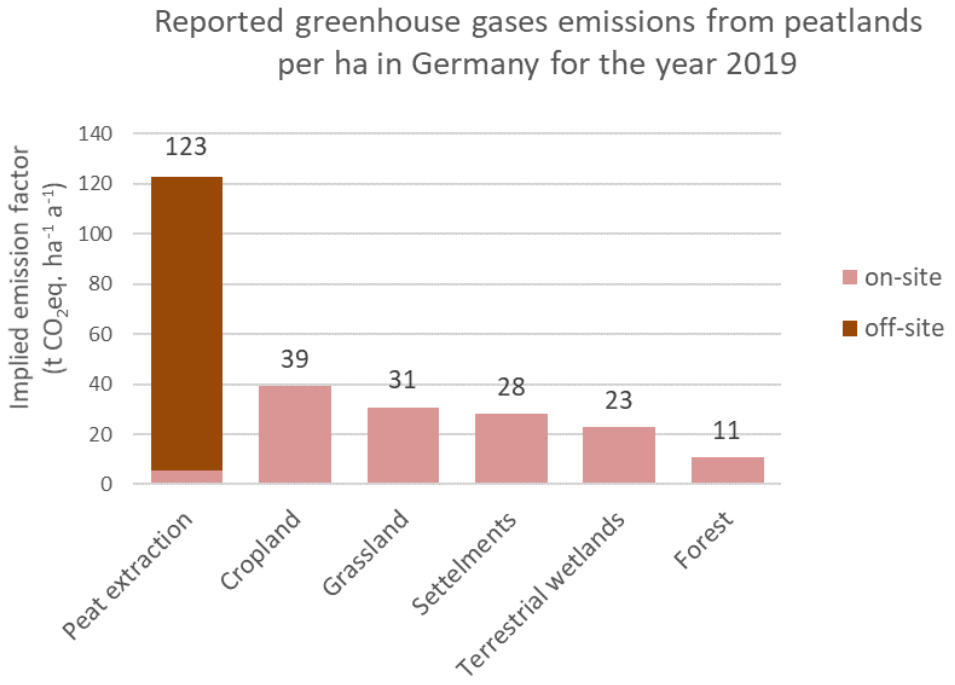


Peat extraction site (Gramoflor, 2019)

Footprint comparisons

- Peat is the growing media constituents with the higher carbon footprint
- Peat extraction is the most destructive activity (per ha) of the peatland carbon stocks

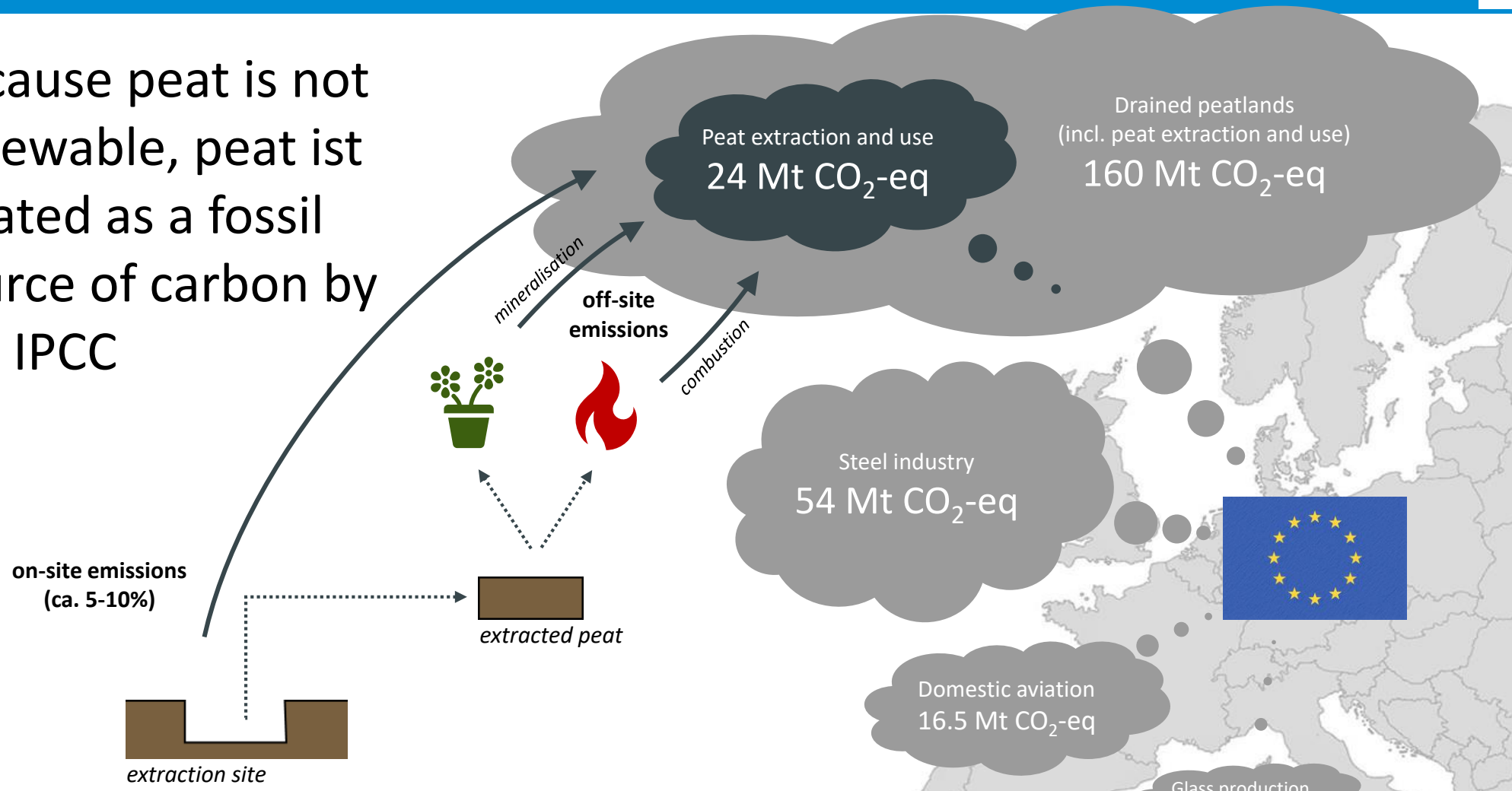




Greenhouse gases emissions from peat

MITODE
Minderung des Torfeinsatzes in Deutschland
THÜNEN JKI

Because peat is not renewable, peat ist treated as a fossil source of carbon by the IPCC



source: reported emissions from the European Union in the UNFCCC framework for the year 2019

Peat reduction and climate policies

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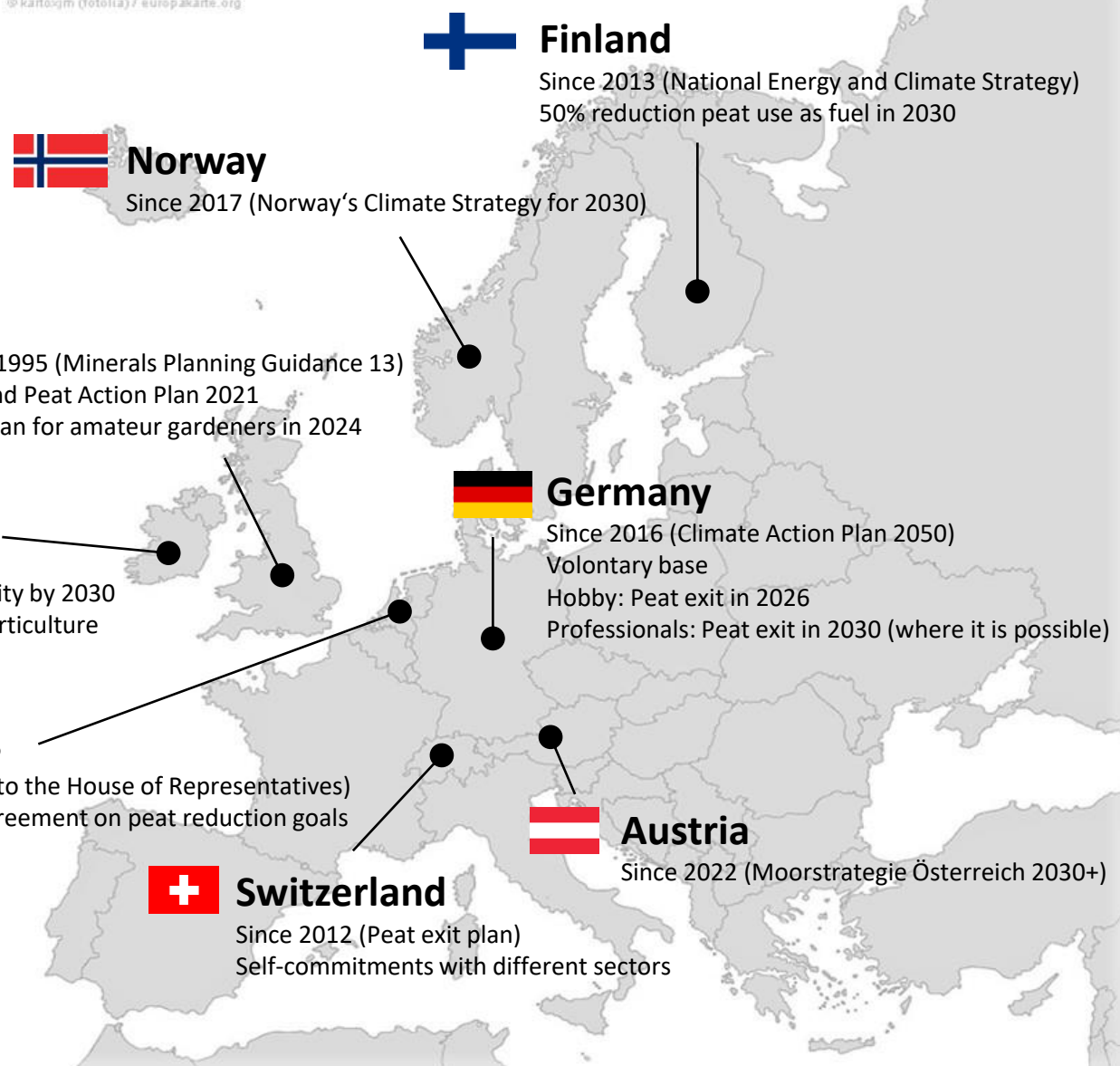
European Union

The ETS system includes emissions from energy peat for electricity and heat
LULUCF regulation: emissions from peat in LULUCF are accounted for climate goals
Agriculture and Fisheries Council 24.05.22: Germany calls for a common peat reduction strategy in horticultural growing media https://europa.eu/!JNqMXX

Alpine Convention

1998: Protocol on Soil Conservation



Finland

Since 2013 (National Energy and Climate Strategy)
50% reduction peat use as fuel in 2030

Norway

Since 2017 (Norway's Climate Strategy for 2030)

UK

Since 1995 (Minerals Planning Guidance 13)
England Peat Action Plan 2021
Peat ban for amateur gardeners in 2024

Ireland

Since 2015 (Bord na Móna)
Legal shutdown 2019-2022
Phase-out peat use for electricity by 2030
Measures to reduce peat in horticulture

Germany

Since 2016 (Climate Action Plan 2050)
Volontary base
Hobby: Peat exit in 2026
Professionals: Peat exit in 2030 (where it is possible)

Netherlands

Since 2021 (Motion to the House of Representatives)
November 2022: Agreement on peat reduction goals

Austria

Since 2022 (Moorstrategie Österreich 2030+)

Switzerland

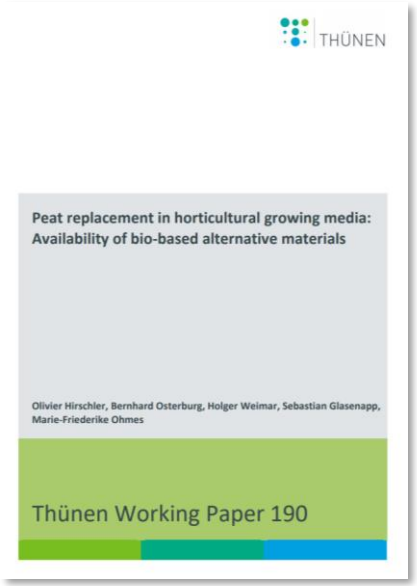
Since 2012 (Peat exit plan)
Self-commitments with different sectors

IV. Is there enough alternative materials to replace peat?

Wood shavings (Klasmann-Deilmann, 2020)

Background and first step

- Availability of alternatives is one of the main challenges of peat reduction for the growing media industry
- Analysis of potentials:
  - How much material is supplied today?
    - For wood fibers: Sawmill by-products from sawmill production
    - For composted bark: Bark from industrial roundwood
    - For green compost: Green waste separate collection
    - For cocopith: Coir by-products from coconut production
  - How much does the growing media industry need?
    - current demand (last data available from 2013)
    - maximal potential demand:
      - complete peat replacement
      - doubling of the growing media production
  - Comparison



Wood fibers

Green compost

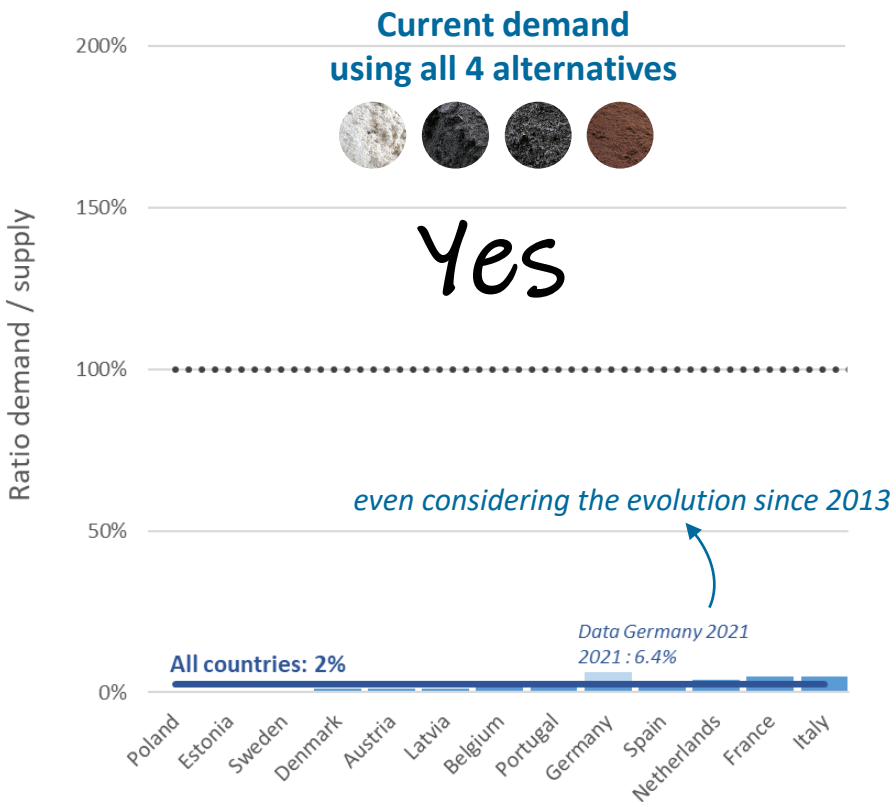
Composted bark

Cocopith

https://literatur.thuenen.de/digbib_extern/dn064753.pdf

Physical amounts for Europe

Are there physically enough amounts of alternative materials to replace peat?



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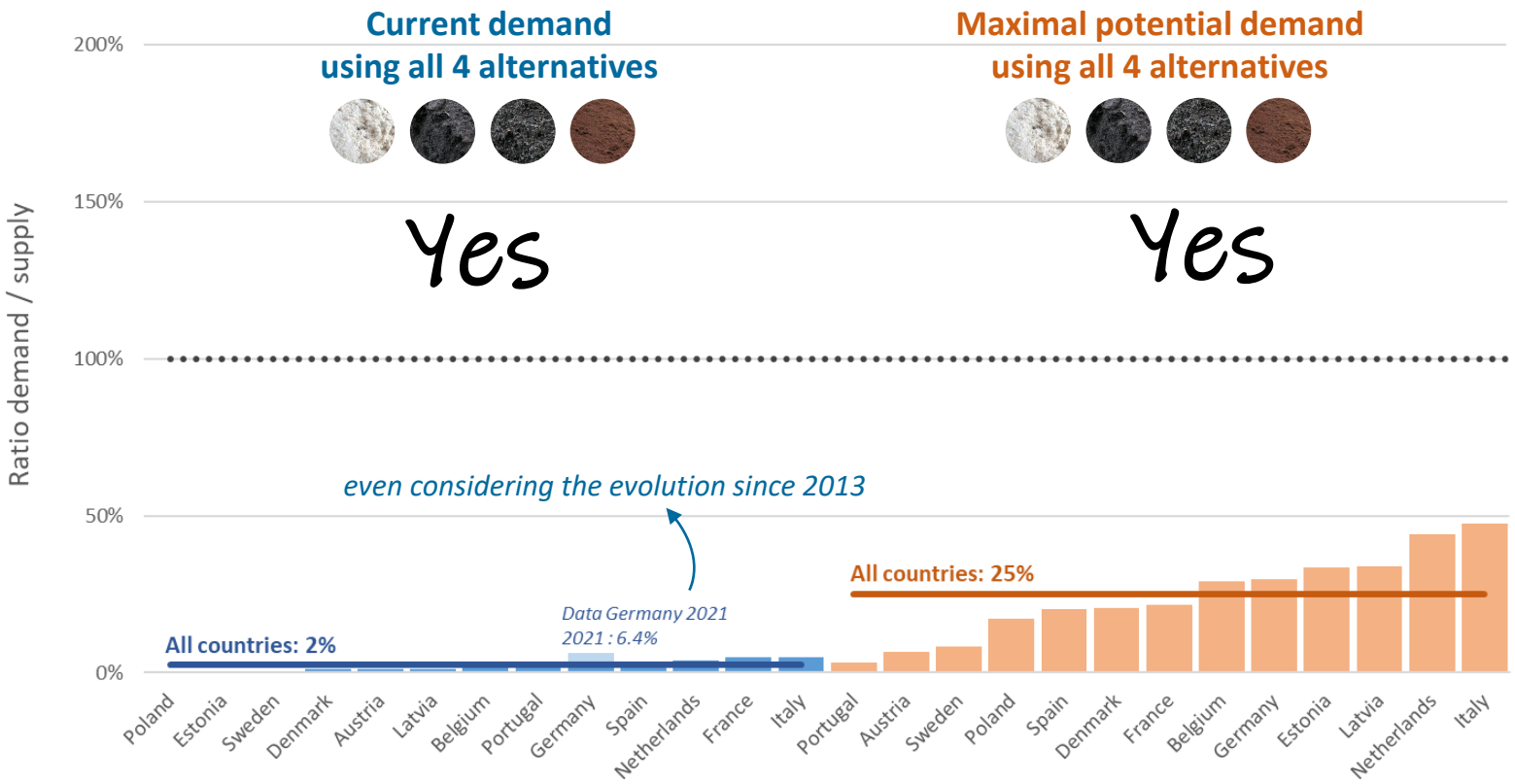

Physical amounts for Europe

MITODE
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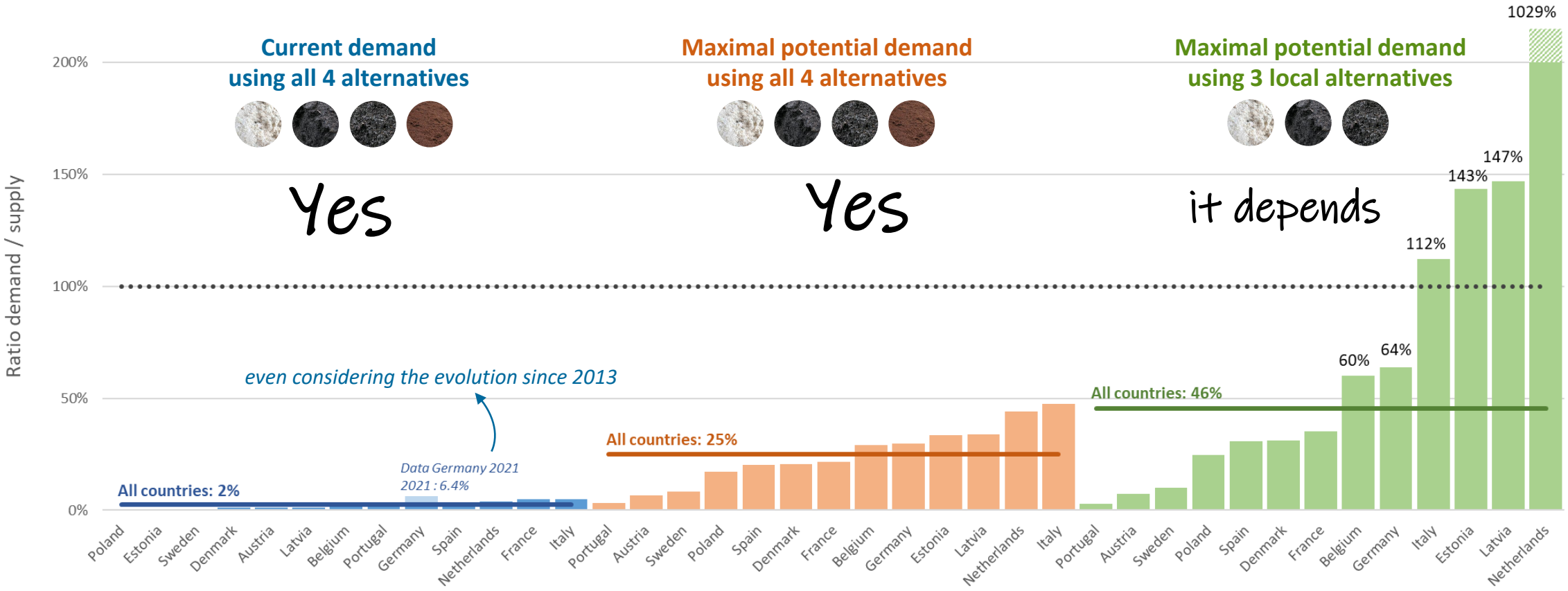
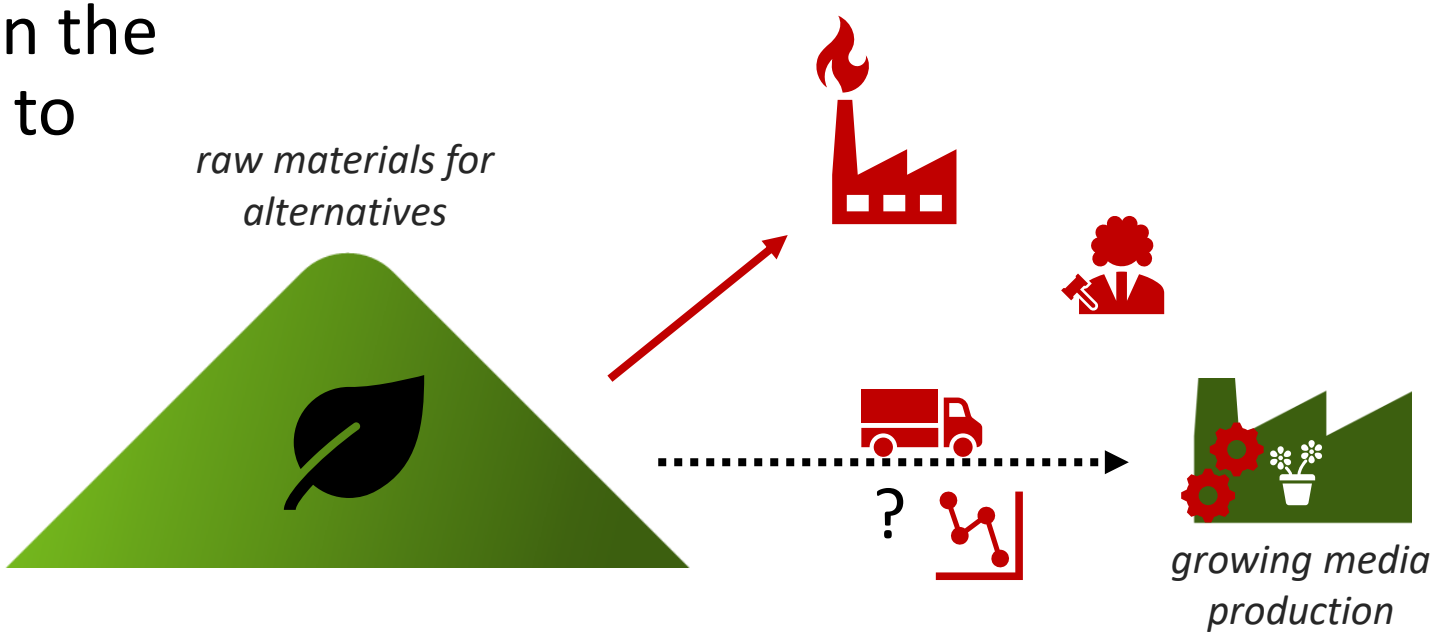


Preliminary conclusions

- There seem to be enough amounts physically available
- More research is needed on the conditions for the industry to access these amounts:
  - Competition (Energy)
  - Transportation costs
  - Cost of processing
  - Reliability
  - Legal issues and trade
  - Other factors



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- More research is needed on the conditions for the industry to access these amounts:
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  - Transportation costs
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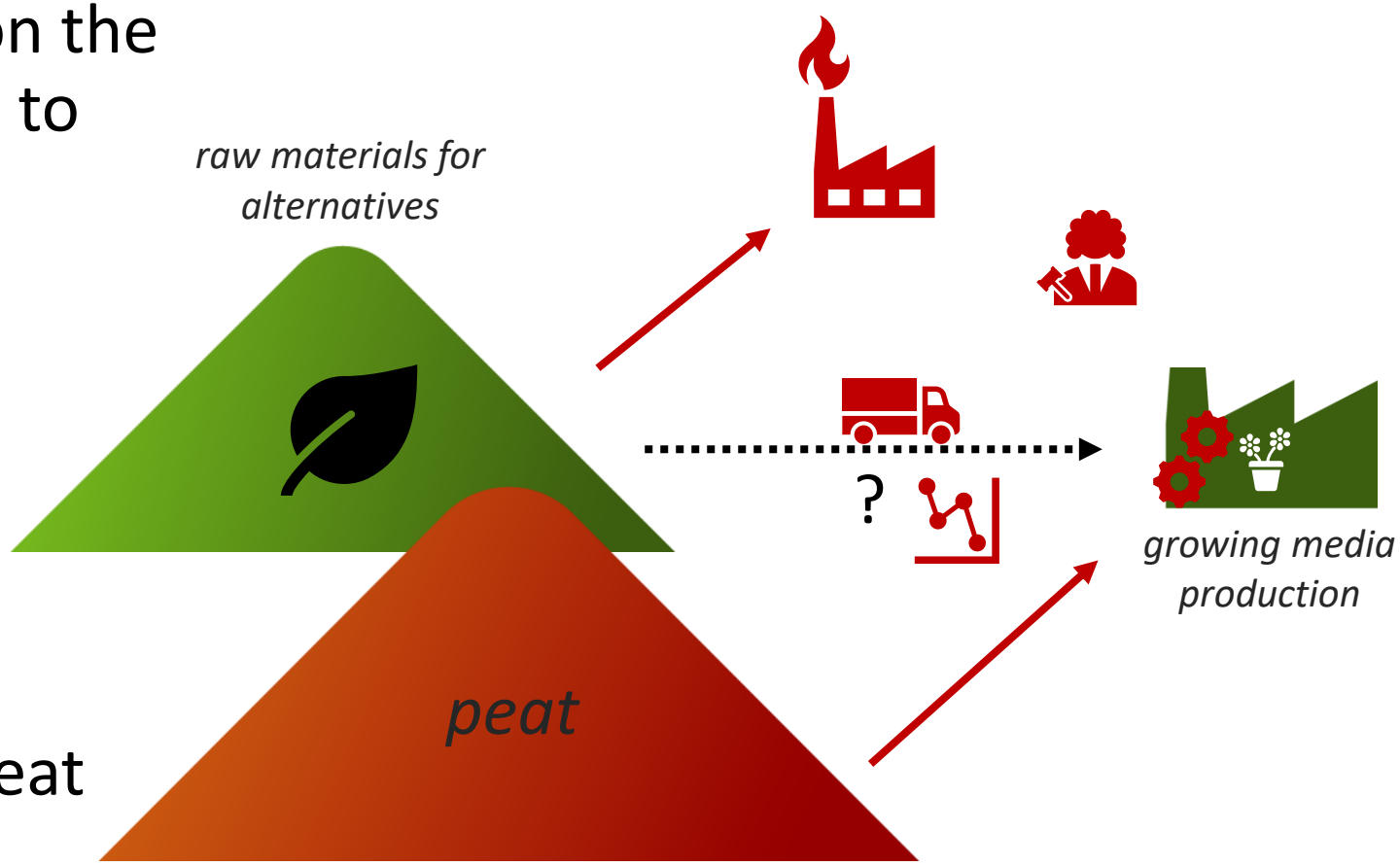
  - Reliability
  - Legal issues and trade
  - Other factors
- Always in comparison to peat



V. Effects of peat replacement in and for German horticulture

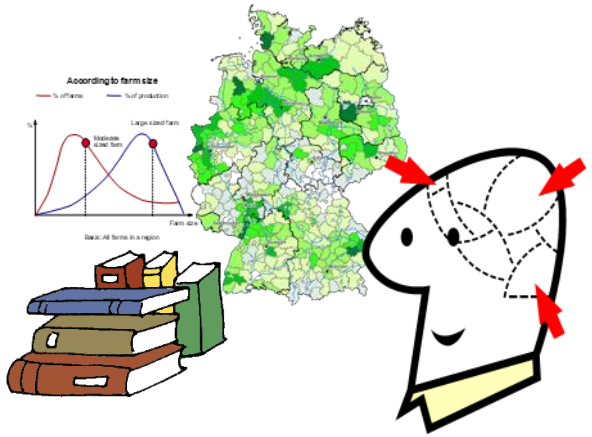
(zu Jeddeloh, 2020)

Initial situation

- Horticultural production systems have adapted to the use of peat over decades.

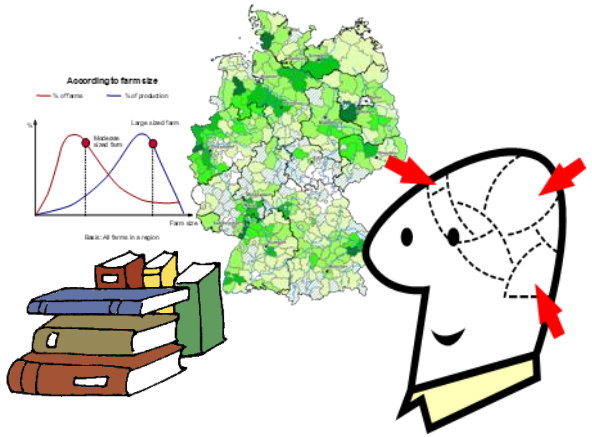
Source: shutterstock.com

Approach



- Selected cultures
- Typical production regions
- Farms that produce typically

Approach



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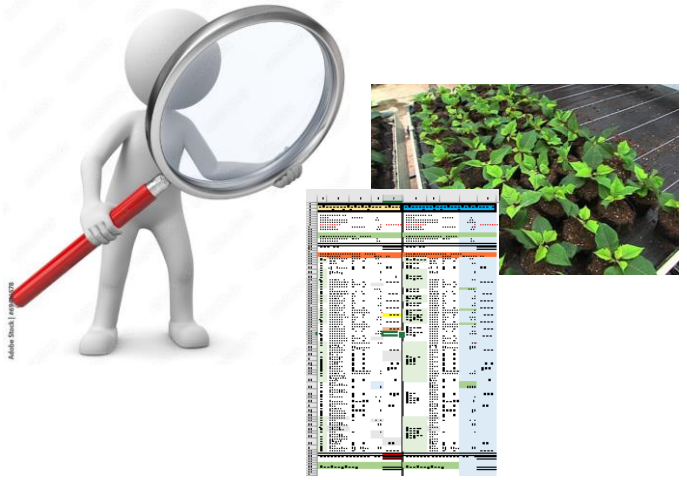

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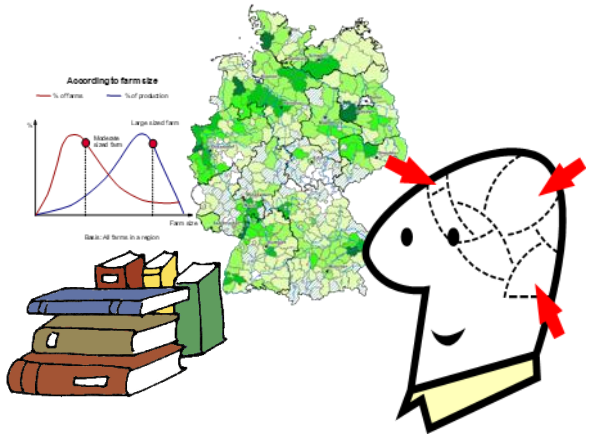

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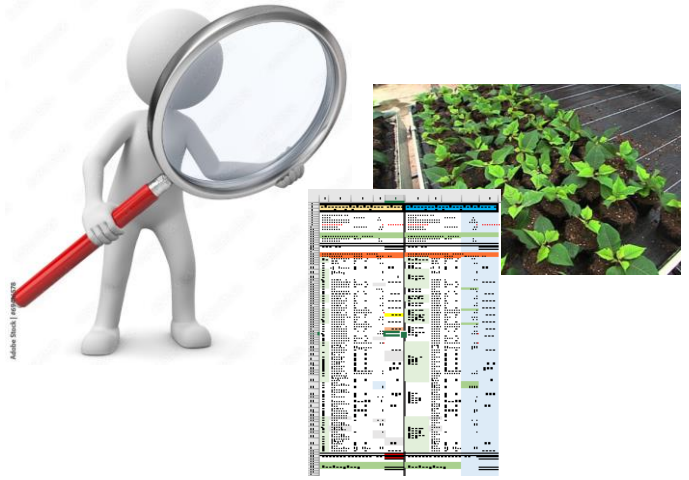
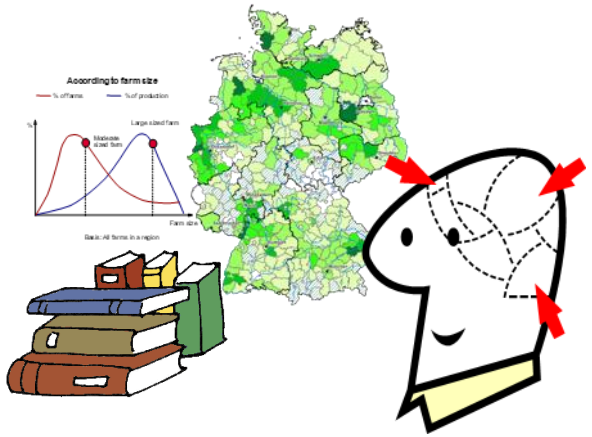


- Design for the typical production system

Approach



- Selected cultures
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- Design for the typical production system

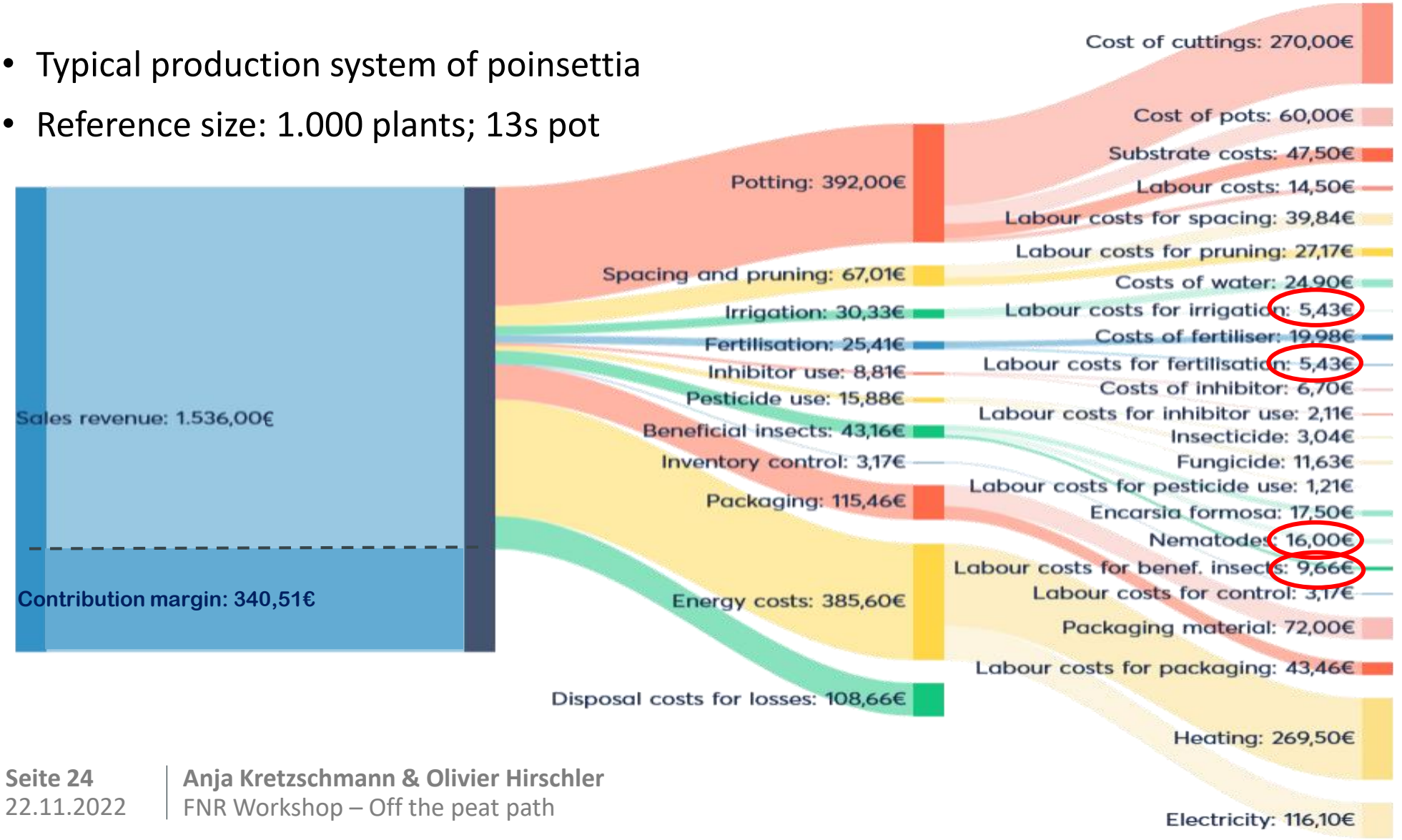
Typical production system

Typical production system of **Poinsettia**

Poinsettia (Gramoflor, 2019)

Results - typical production system

- Typical production system of poinsettia
- Reference size: 1.000 plants; 13s pot



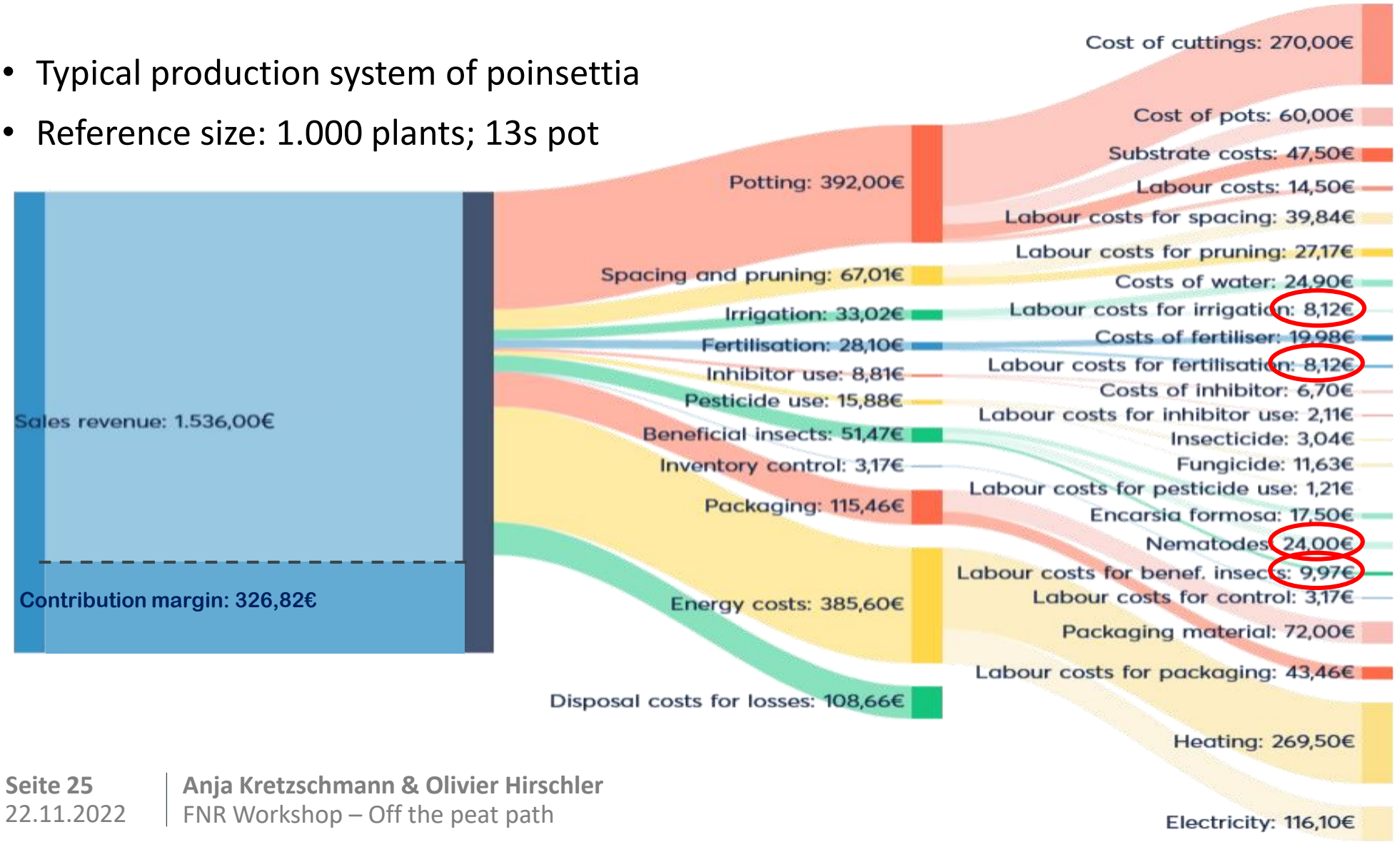
15 min. for irrigation of 30,000 plants 2 times per week

15 min. for fertilisation of 30,000 plants 2 times per week

30-40 min for a pesticide application 30,000 plants with the barrow sprayer

Results - peat replacement (0% peat)

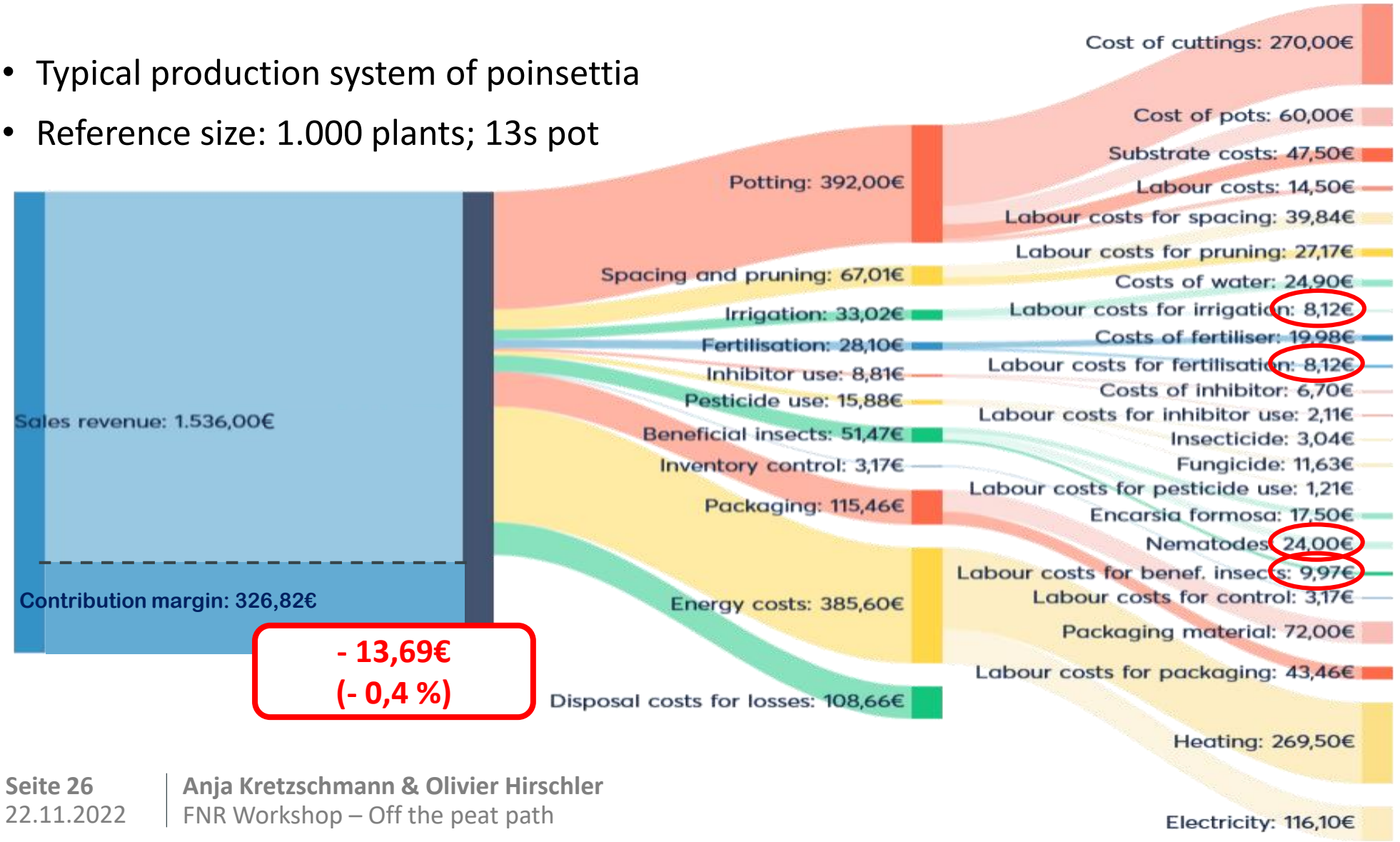
- Typical production system of poinsettia
- Reference size: 1.000 plants; 13s pot



15 min. for irrigation of 30,000 plants <now 3 times instead of 2 times per week

Results - peat replacement (0% peat)

- Typical production system of poinsettia
- Reference size: 1.000 plants; 13s pot



- Water more frequently
- Fertilize more frequently
- Additional treatment against fungus gnats

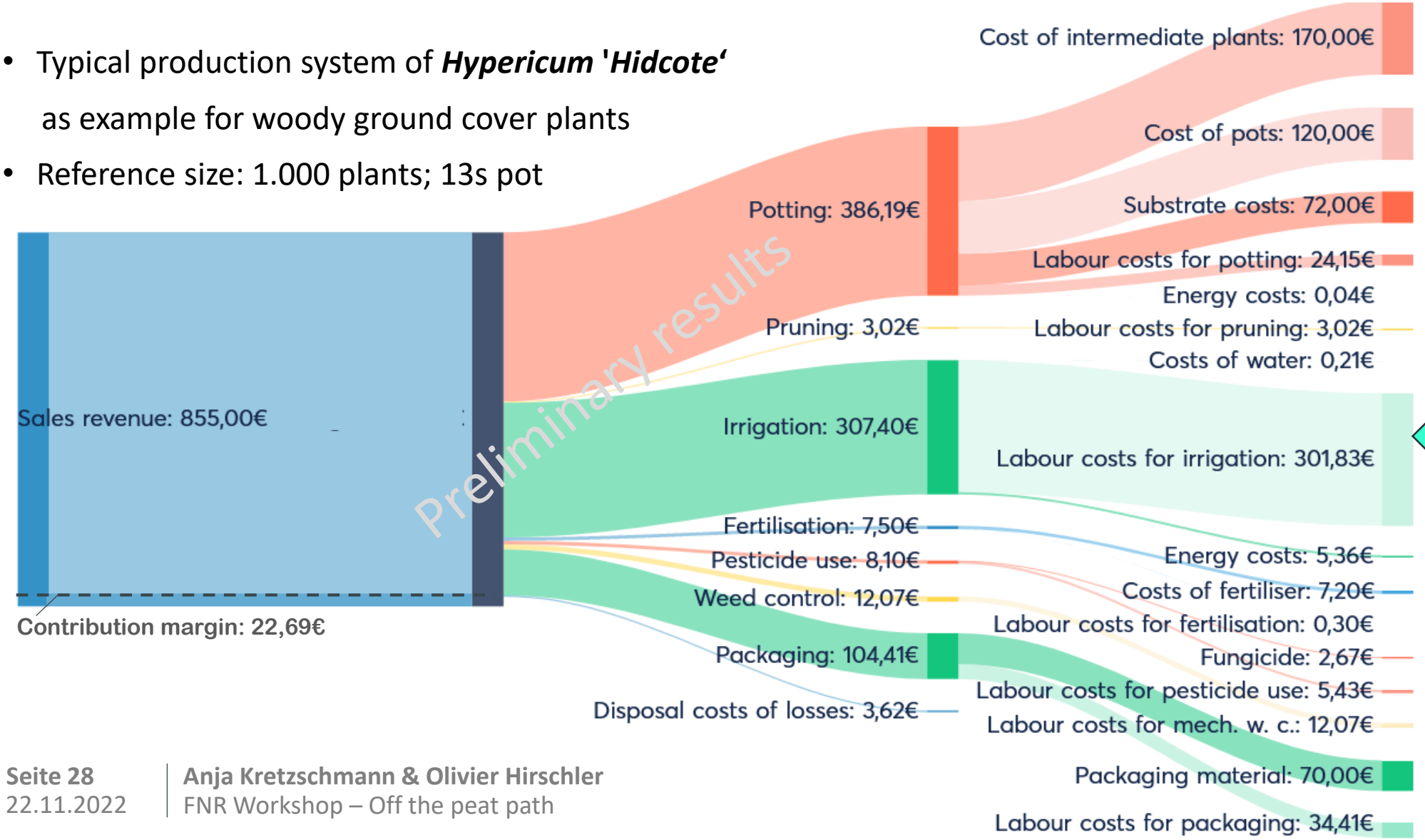
Typical production system of *Hypericum 'Hidcote‘*

(example for woody ground cover plants)

Hypericum 'Hidcote‘ (2020)

Results - typical production system

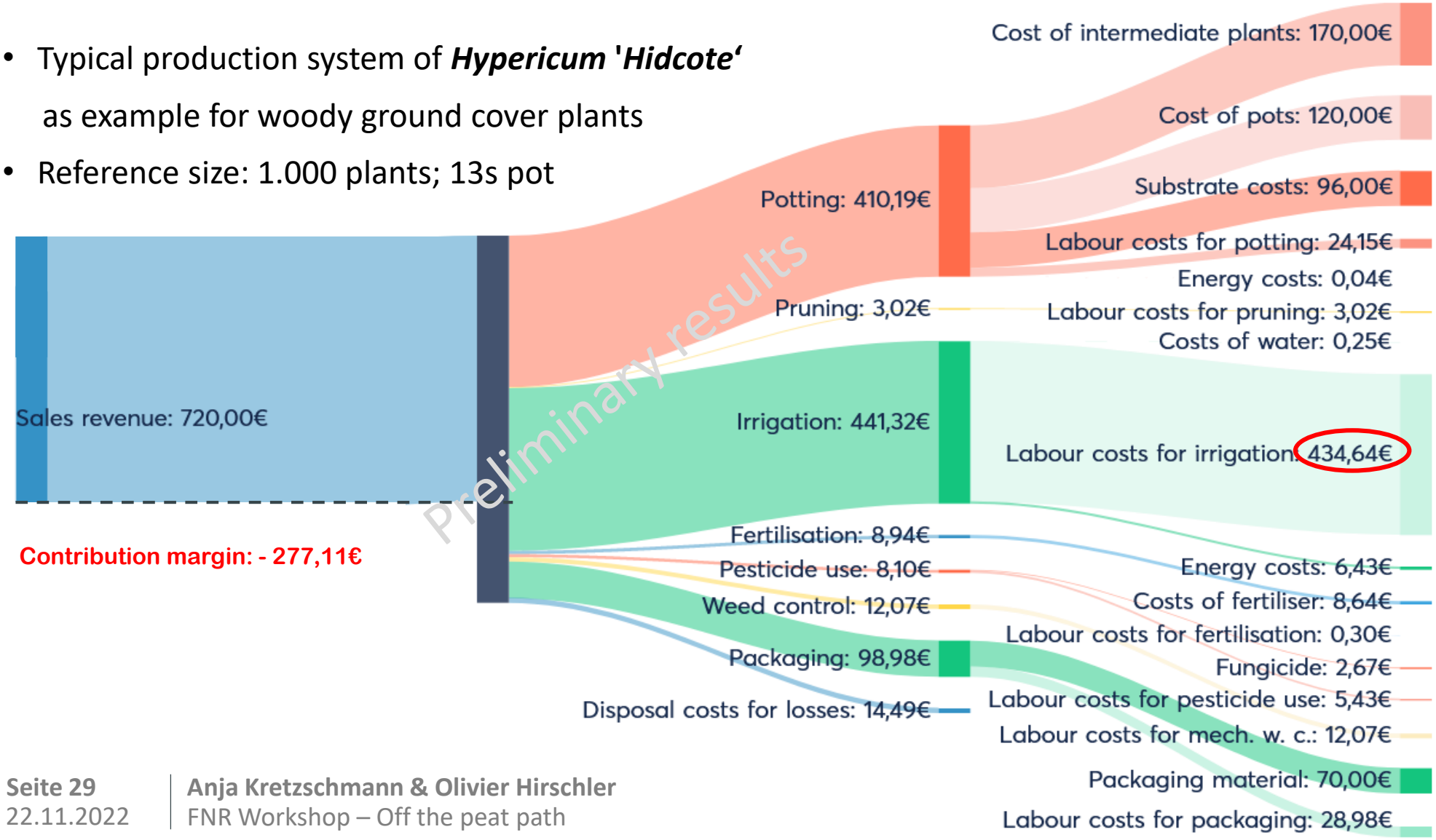
- Typical production system of ***Hypericum* 'Hidcote'**
  as example for woody ground cover plants
- Reference size: 1.000 plants; 13s pot



200 irrigations during one growing season; 5 minutes per irrigation pass

Results - peat replacement (20% peat)

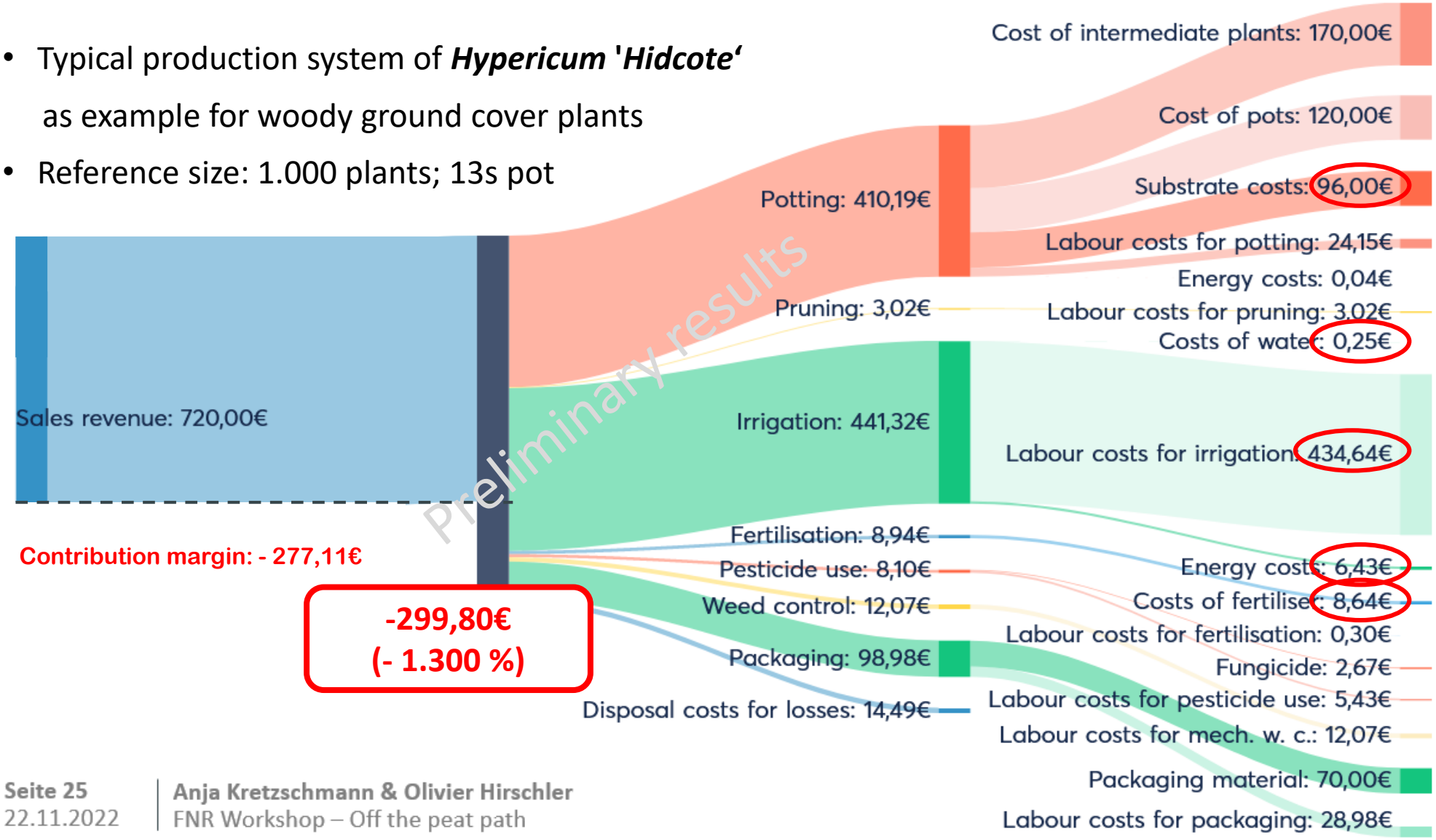
- Typical production system of ***Hypericum* 'Hidcote'**
  as example for woody ground cover plants
- Reference size: 1.000 plants; 13s pot



240 irrigations during one growing season; 7 minutes per irrigation pass (incl. control)

Results - peat replacement (20% peat)

- Typical production system of ***Hypericum* 'Hidcote'**
  as example for woody ground cover plants
- Reference size: 1.000 plants; 13s pot



- Higher substrate costs
- Water more frequently
- Fertilize more frequently

Results - peat replacement (20% peat)

- Typical production system of ***Hypericum* 'Hidcote'**
  as example for woody ground cover plants
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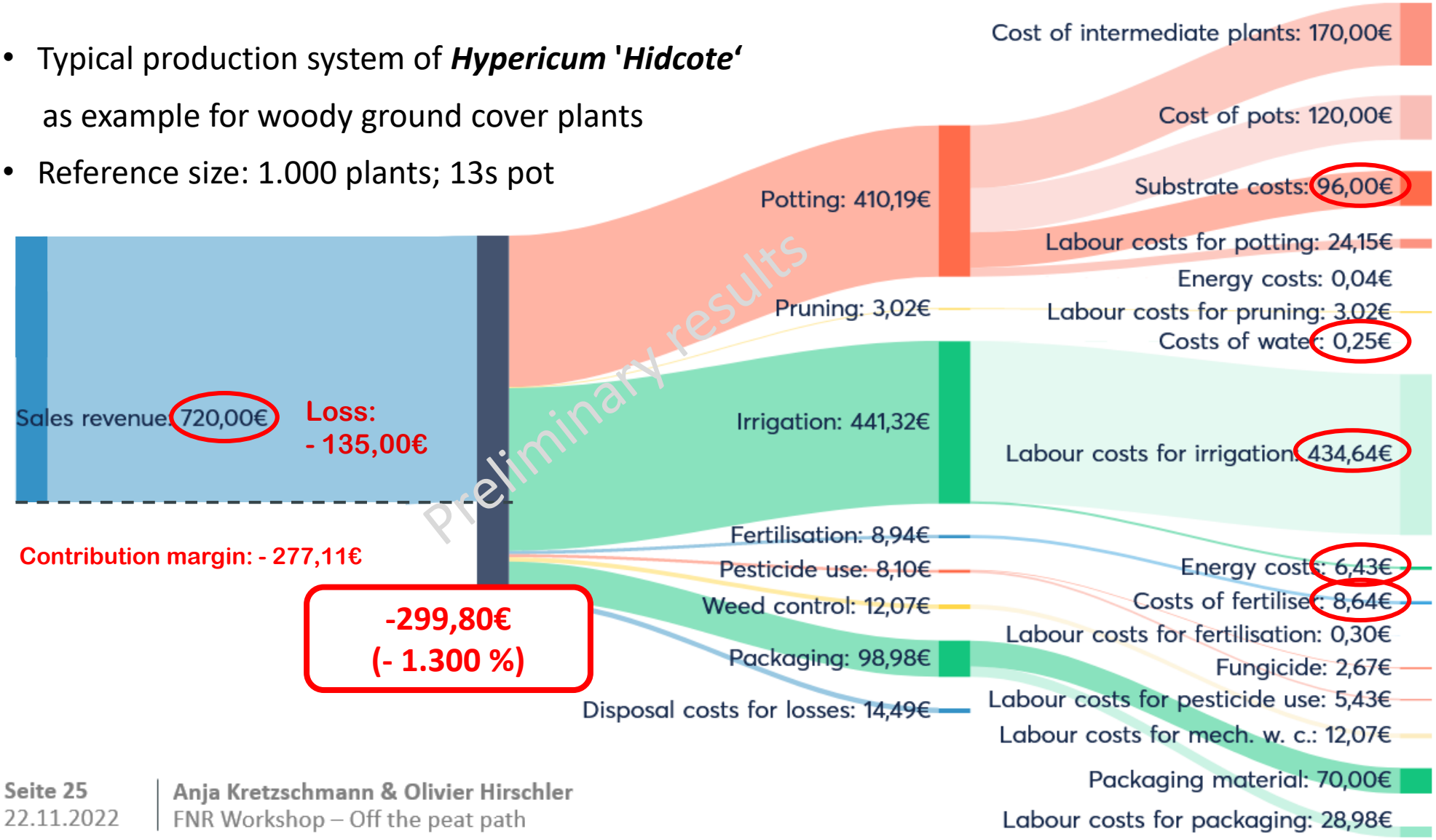
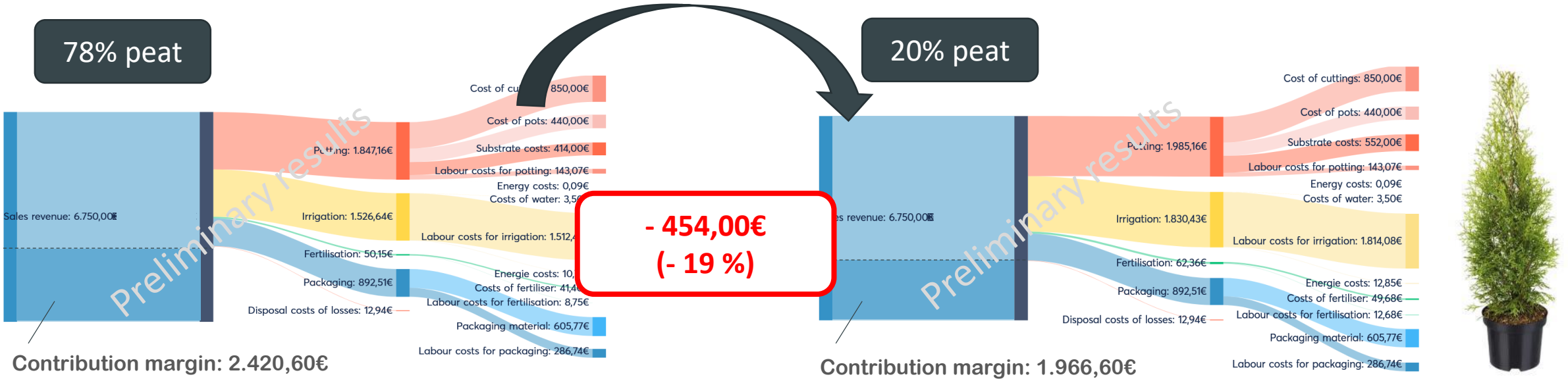


To be discussed:

- Much higher loss rate: 5% → 20%
- current framework (quality requirements and low selling price)
- - 299,80€ compared to status quo

Other results - *Thuja ccc.* 'Smaragd‘

- Typical production system of ***Thuja ccc.*** **'Smaragd‘**
- Reference size: 1.000 plants; C7,5



Summary

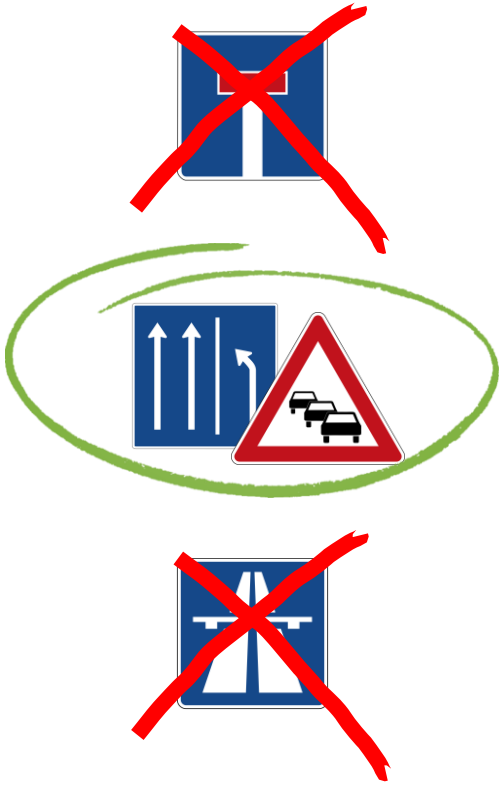
- Preliminary results show, that reducing peat content in horticultural substrates may have contrary economic effects depending on the culture:
  - In poinsettia (and *thuja occ.*) production, abandoning peat has only minor economic effects
  - In contrast, for the production of Hypericum '*Hidcote*', reducing the peat content to 20% can result in significant economic losses.

VI. Outlook

Peat extraction site (Klasmann-Deilmann, 2020)

Outlook – General conclusions

- The necessity of peat reduction for climate is widely recognised
- A peat exit for hobby gardeners seems achievable on the short/middle term
- Peat reduction faces challenges
  - in the supply of alternatives for the growing media production
  - in the use of peat-reduced substrates in professional horticulture
- There seem to be no fundamental problems
  - the availaibility of alternative is not limited by amounts
  - horticultural systems can be adapted
- The transition seems to be linked to uncertainties
  - But what is the risk of continuing business as usual?



Outlook – Policy options

- Peat must be addressed on an European level
- Coordinated biomass strategy needed between energy and material use
- Policy options to discuss?
  - Risk compensation
  - Support for investments
  - Adaptation of regulations
  - Carbon price on emissions of peat
  - Adaptation and development of statistics
  - Development of paludiculture
- Next steps for us:
  - Interviews in the German growing media industry
  - Risk analysis and comparison of horticultural systems across Europe

Thank you for your attention!

Contact:
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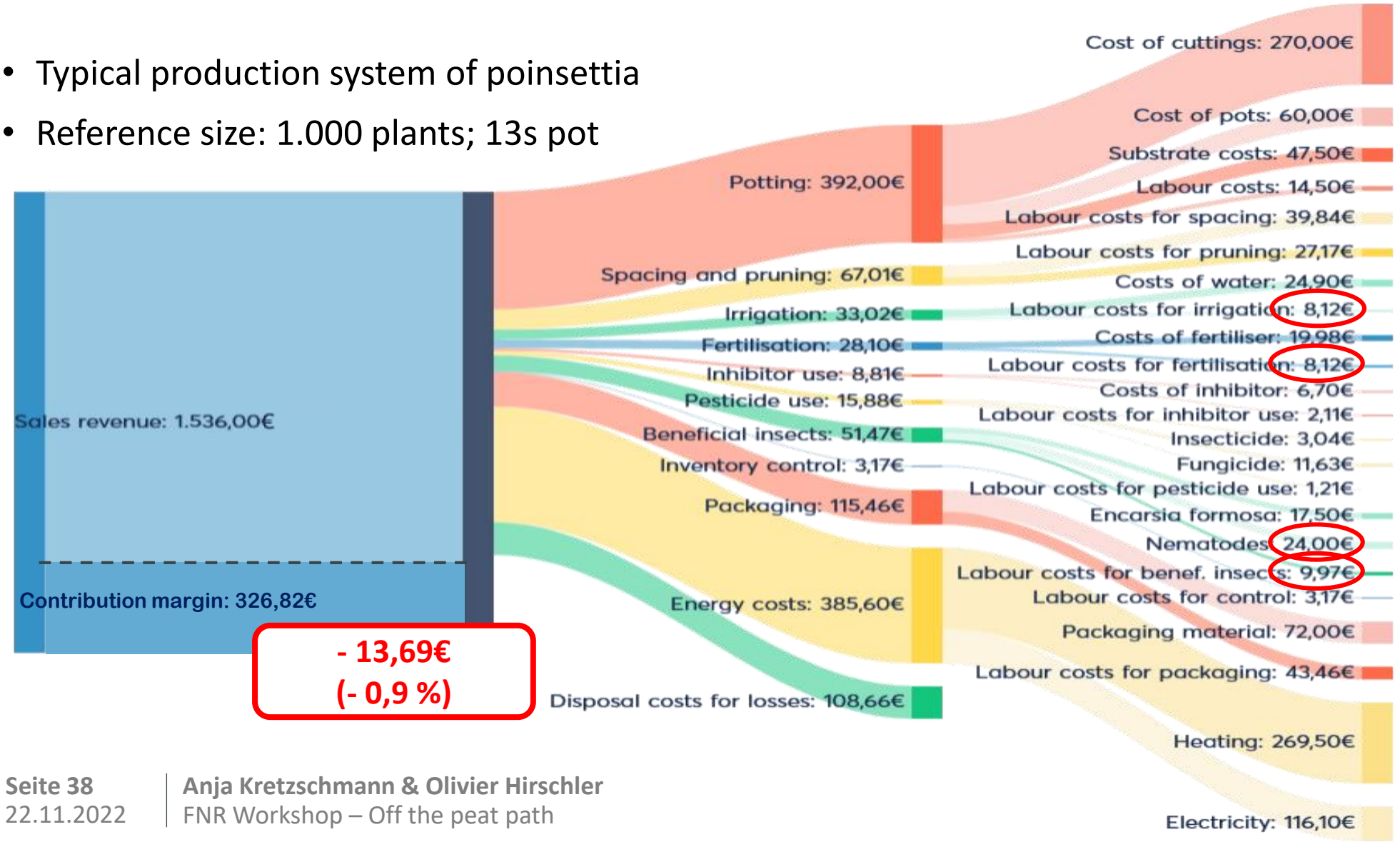
Anja Kretzschmann – anja.kretzschmann@thuenen.de

Results - peat replacement (0% peat)

- Typical production system of poinsettia
- Reference size: 1.000 plants; 13s pot



To be discussed:

- Substrate costs?
- Fertiliser / pots / other input materials?
- Energy costs?

Poinsettia

- Typical current substrate for the production of poinsettia

	%
Peat content	**75 %**
Wood fibre	20 %
Perlit	10 %
Clay	5 %

- Peat reduced substrate for the production of poinsettia

	%
Peat content	**0 %**
Wood fibre	35 %
Perlit	20 %
Substrate compost	20 %
Cocopeat	15 %
Composted bark	10 %

Source: shutterstock.com