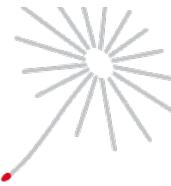


Creating value from bioresources - Innovation in Nordic Bioeconomy

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Nordic Innovation

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Content plan

1. The study on innovation in Nordic bioeconomy.
2. Creating value from bioresources. **What is our bioeconomy made of?**
3. **How have we created value so far?** Business ecosystems, forerunner companies and systemic innovation.
4. **Which obstacles are in the way?** And what support measures are there to overcome the obstacles?

Objective.

- Within the Nordic Bioeconomy
 - identify the innovation-oriented challenges
 - identify areas with high growth potential
- Describe volume and constituents of bioeconomy in the Nordic countries: Finland, Sweden, Norway, Denmark and Iceland



Global bioeconomy potential is high

- Nearly **1800** new biorefineries will be commissioned during 2012-2022
 - current situation 1415
- Biorefineries will attract **132 billion €** investments, reaching 240 million tons per year installed capacity
 - current capacity for biofuels is 100Mt and biochemicals 50 Mt

What is our bioeconomy made of?

Traditional bioeconomy sectors

Sectors included in bioeconomy

Agriculture

A1 Crop and animal production, hunting and related service activities

Fisheries and aquaculture

A3 Fishing and aquaculture

Forestry

A2 Forestry and logging

Food industry

C10 Manufacture of food products

C11 Manufacture of beverages

C12 Manufacture of tobacco products

Forest industry

C16 Manufacture of wood and of products of wood and cork, except furniture;
manufacture of articles of straw and plaiting materials

C17 Manufacture of paper and paper products

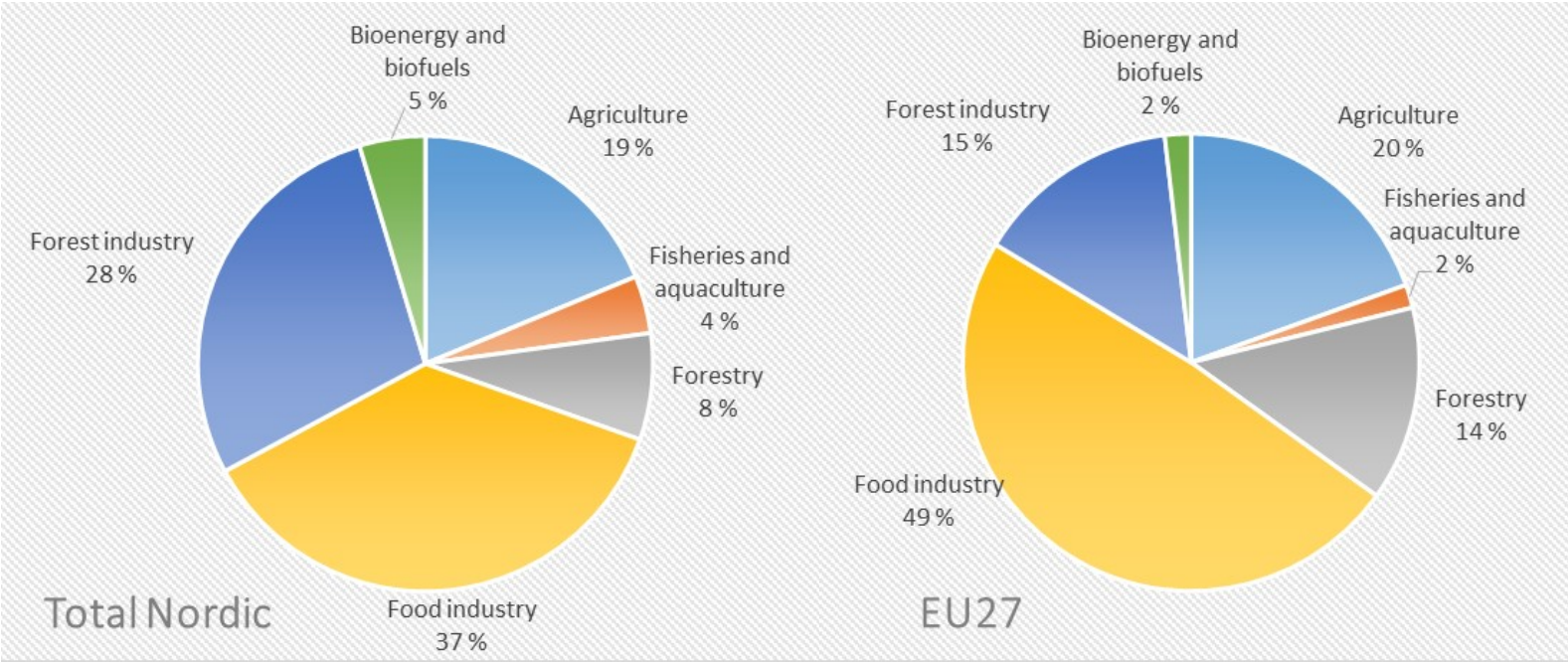
Bioenergy and biofuels

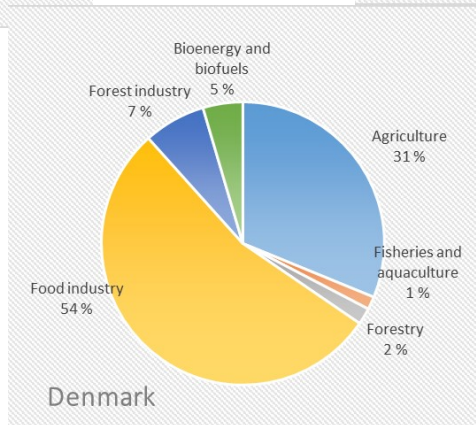
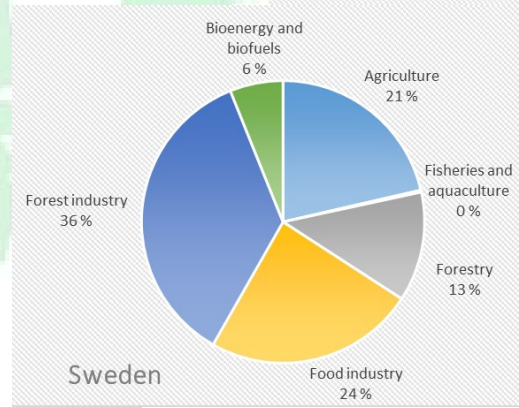
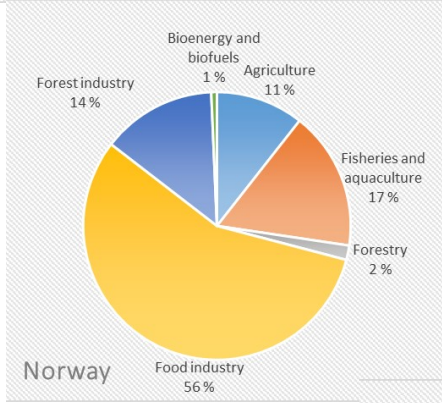
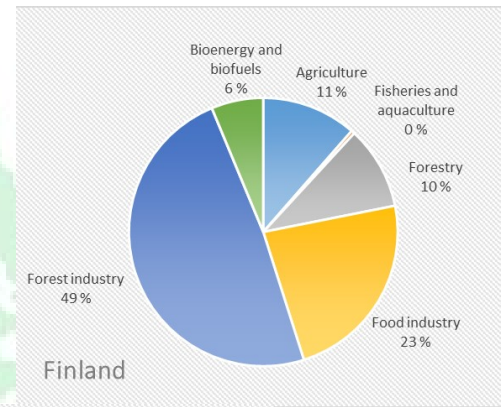
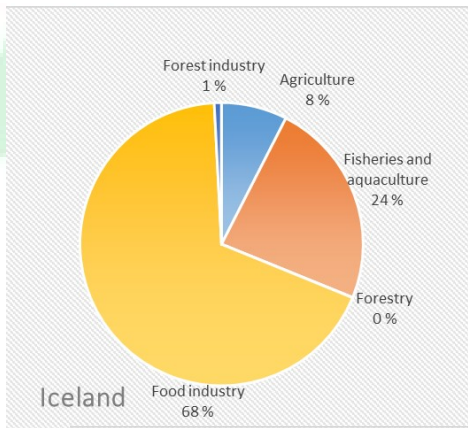
B-100100 Electricity and heat from biomass and waste

Biofuels

What is our bioeconomy made of?

Traditional bioeconomy sectors





What is our bioeconomy made of?

Contribution of Nordic countries to European total

Volume of bioeconomy in Nordic countries	Nordic / EU 27
Agriculture	9 %
Fisheries and aquaculture	23 %
Forestry	5 %
Food industry	7 %
Forest industry	18 %
Bioenergy and Biofuels	24 %
Total bioeconomy	10 %

Sectors	Nordic / EU 27
Building and construction	9 %
Textile industry	2 %
Chemical and plastics industry	5 %
Pharmaceutical industry	8 %
Technologies	10 %
Services (accommodation and food services)	6 %
Water treatment and supply	4 %
Waste treatment	8 %
Total economy	9 %





Growth potential of bioeconomy from crosscutting opportunities



- **Biofuels for transportation**

- **Biochemicals**



- Bulk chemicals could reach 113 Million tonnes by 2050 and represent 38 % of all organic chemical production
- High-value chemicals, e.g. aromatic compounds of lignin



- **Advanced biomaterials**

- **Services**



- Crosscutting opportunities in all areas of bioeconomy as source of growth, but challenging to quantify
- Maintenance, delivery channels, R&D and expert services etc.

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Selected business ecosystems in the Nordic Bioeconomy and forerunner examples



1. Aquatic Biorefinery

- Icelandic Ocean Cluster, IS
- Sybimar, FI



2. Nordic Functional Bio Ingredients

- Chitinor, NO
- Danisco, DK



3. Advanced Biomaterials

- Inventa, SE
- Valmet, FI



4. Biorefinery Concepts

- Borregaard, NO
- Sunpine, SE



5. Biocatalysis



6. Decentralized Energy Systems

- Bigadan, DK

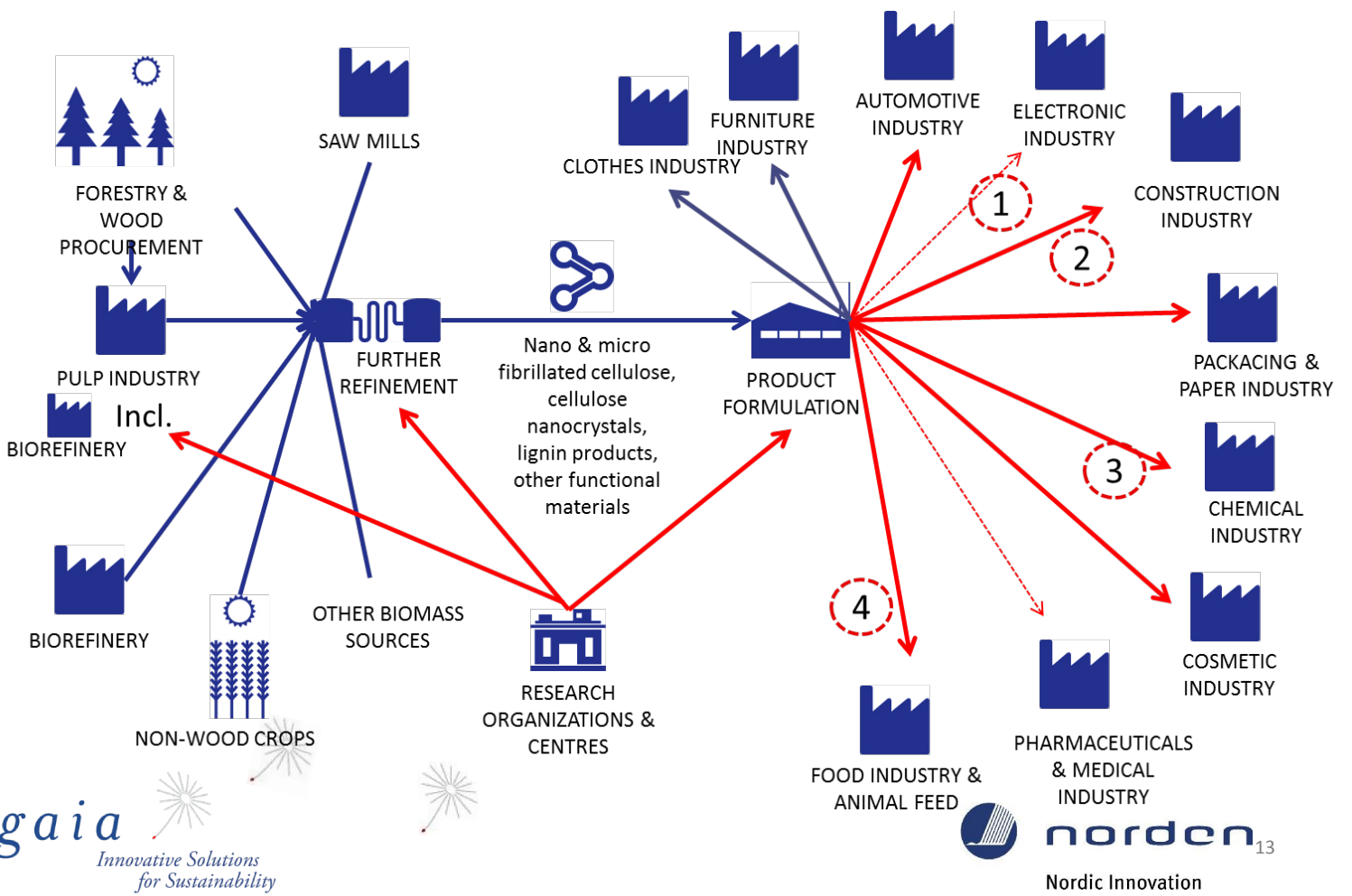


7. Bioeconomy Related Recreational Services

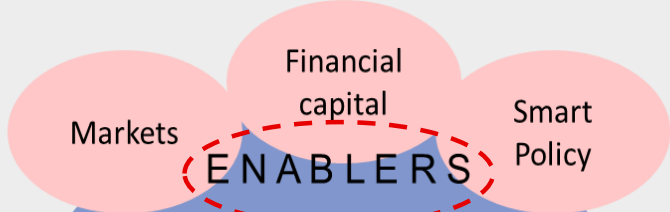
- Pink Iceland, IS



3. Advanced Biomaterials: Innventia, Sweden

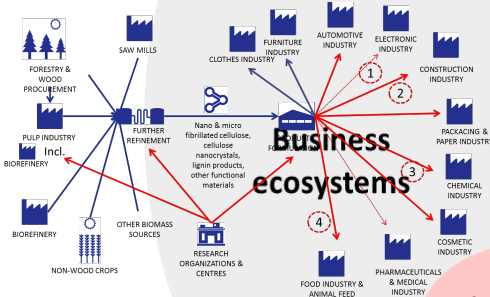


FUNDAMENTALS OF THE SYSTEMIC INNOVATION MODEL



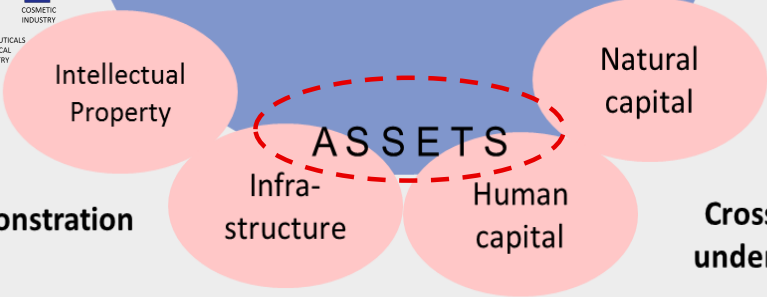
Linkages, networks, and interaction

Value addition



INNOVATION IN BIOECONOMY

Sustainability



Demonstration

Cross-cutting understanding

Industrial symbiosis



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Identified obstacles in Nordic bioeconomy (1/2)

- Remarkable **need of capital and lack of financing**
 - Bioeconomy related businesses are resource and investment intensive
 - Bioeconomy as a sector is not familiar to the financiers
- **Lack of references and track record**
- **Unclear market outlook**, regulation biases the markets, and unstable operating environment
- **Long and slow regulatory procedures**, innovations are not recognized by existing laws
- **Difficulties in commercialization** of bio-based products and services
 - Innovations are often technology driven, instead of being market driven
 - The lack of piloting and demonstration possibilities

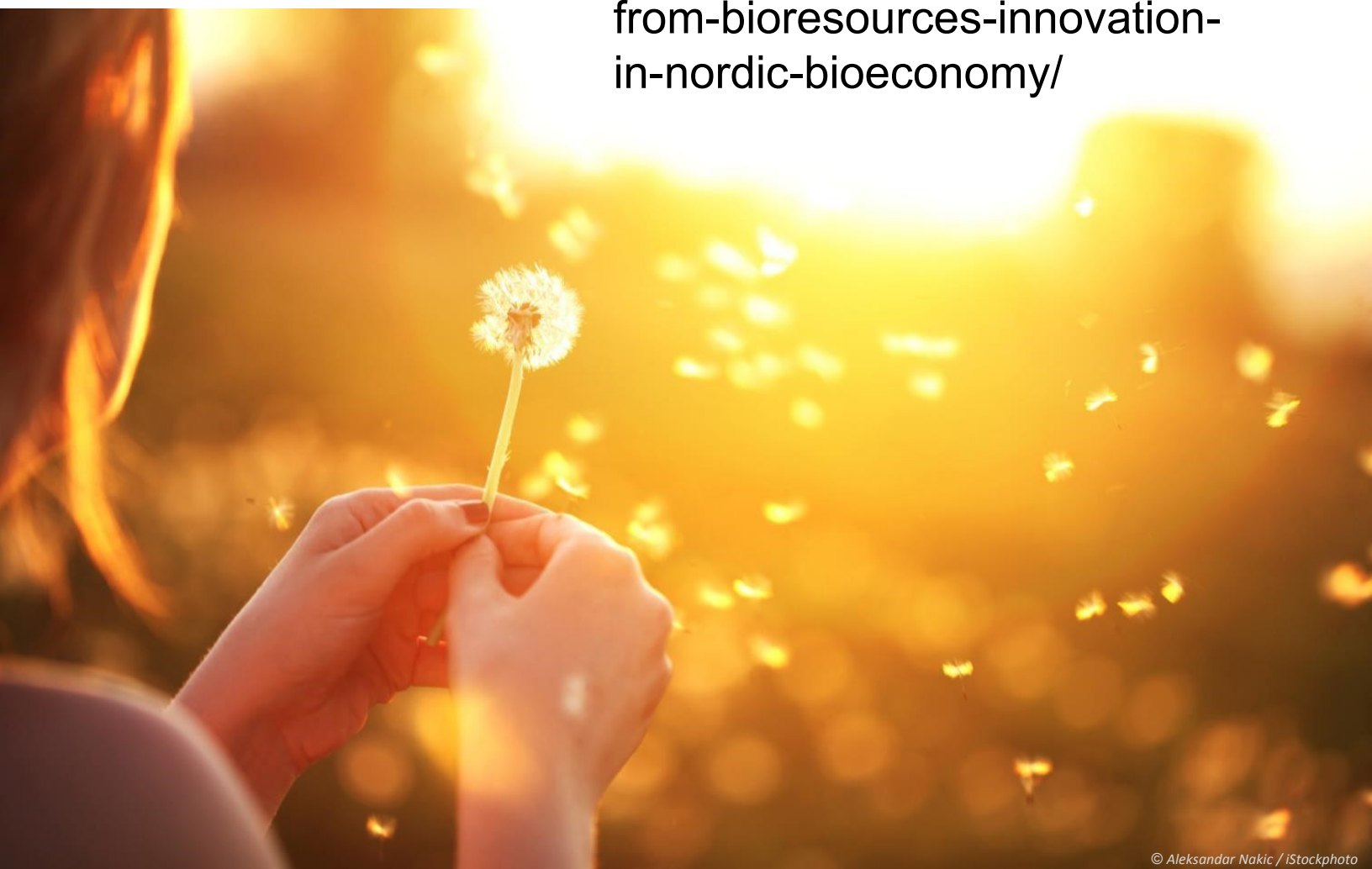
Identified obstacles in Nordic bioeconomy (2/2)

- **Access to markets is lacking** and market knowledge is limited. Lead markets do not exist.
- Questionable **access to raw materials**
- The existing **infrastructure does not support new innovations**
- **Crosscutting nature of bioeconomy** presents challenges
- Too little experience of **open innovation and cooperation**
- **Lack of actors** in the value chains and ecosystems
- **Diversified beneficiaries** in bioeconomy business ecosystems are not clear

Ideas for needed support

- **Make it simpler to seek financing** – important for SMEs to simplify process
- **Promote access to seed-money and especially venture capital for commercial phase** – educate financing providers
- **Ensure mobility** and access to specialists
- Enable **cross-sector transfer of ideas**
- **Support for demonstration plants** requiring sizeable investments
- **Support for acquiring market knowledge** for promoting exports

[http://www.nordicinnovation.org/
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