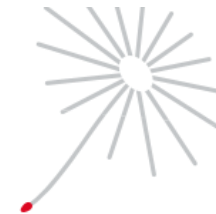




# *Creating value from bioresources - Innovation in Nordic Bioeconomy*

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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

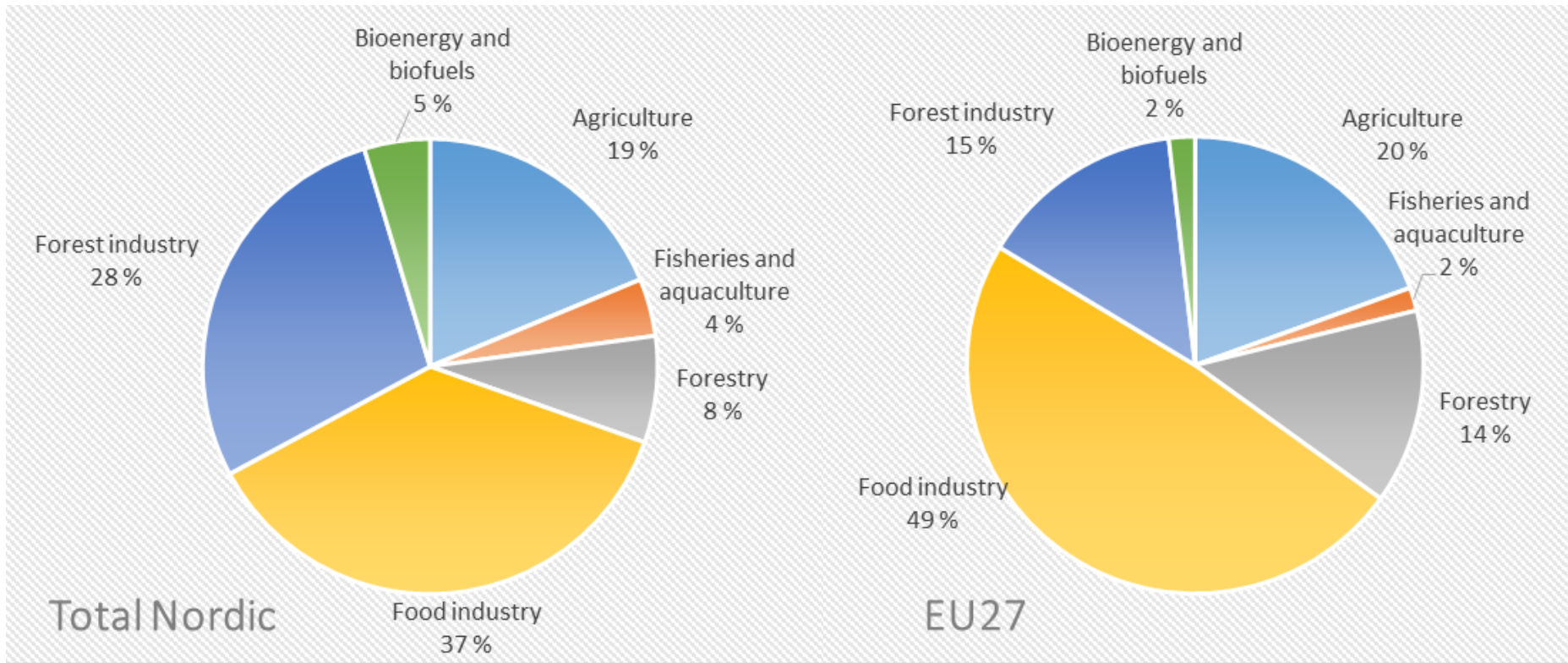
B-100100 Electricity and heat from biomass and waste

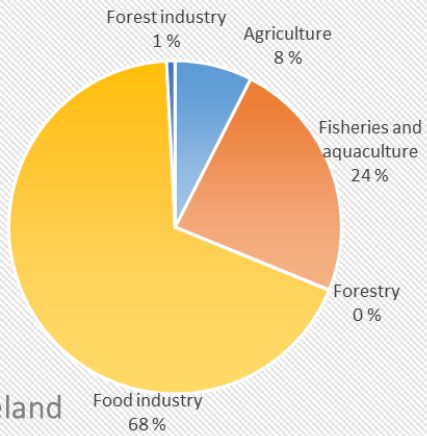
Biofuels



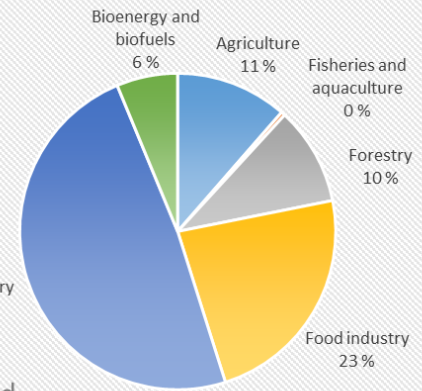
# What is our bioeconomy made of?

## Traditional bioeconomy sectors

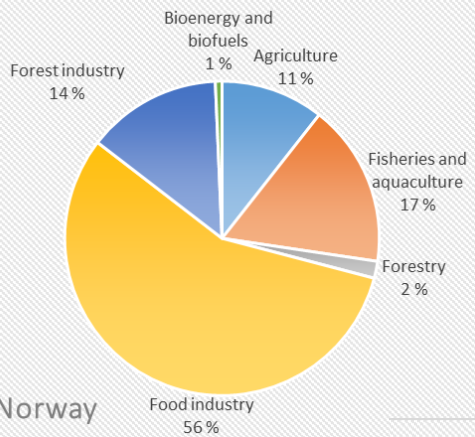




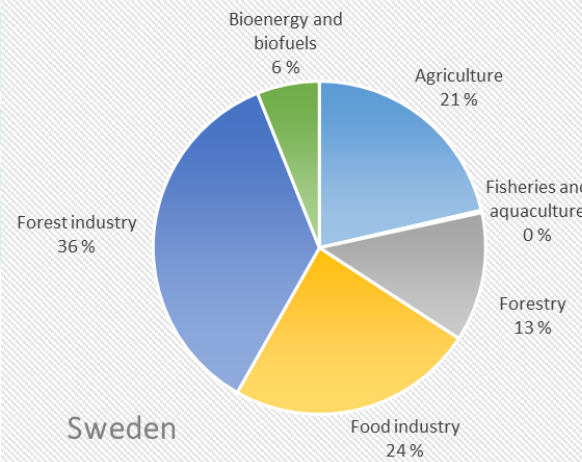
Iceland



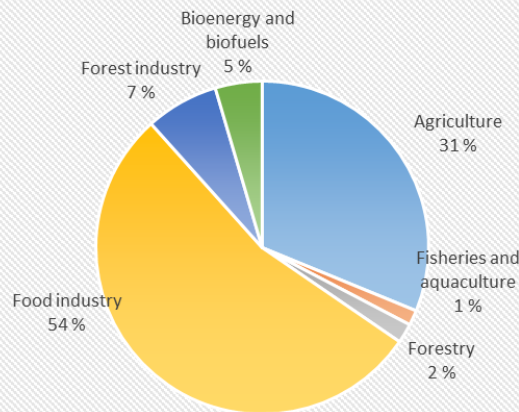
Finland



Norway



Sweden



Denmark



# 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 %
<i>Total bioeconomy</i>	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.

# *Selected business ecosystems in the Nordic Bioeconomy and forerunner examples*



## **1. Aquatic Biorefinery**

- Icelandic Ocean Cluster, IS
- Sybimar, FI



## **2. Nordic Functional Bio Ingredients**

- Chitonor, NO
- Danisco, DK



## **3. Advanced Biomaterials**

- Inventionia, SE
- Valmet, FI



## **4. Biorefinery Concepts**

- Borregaard, NO
- Sunpine, SE



## **5. Biocatalysis**



## **6. Decentralized Energy Systems**

- Bigadan, DK



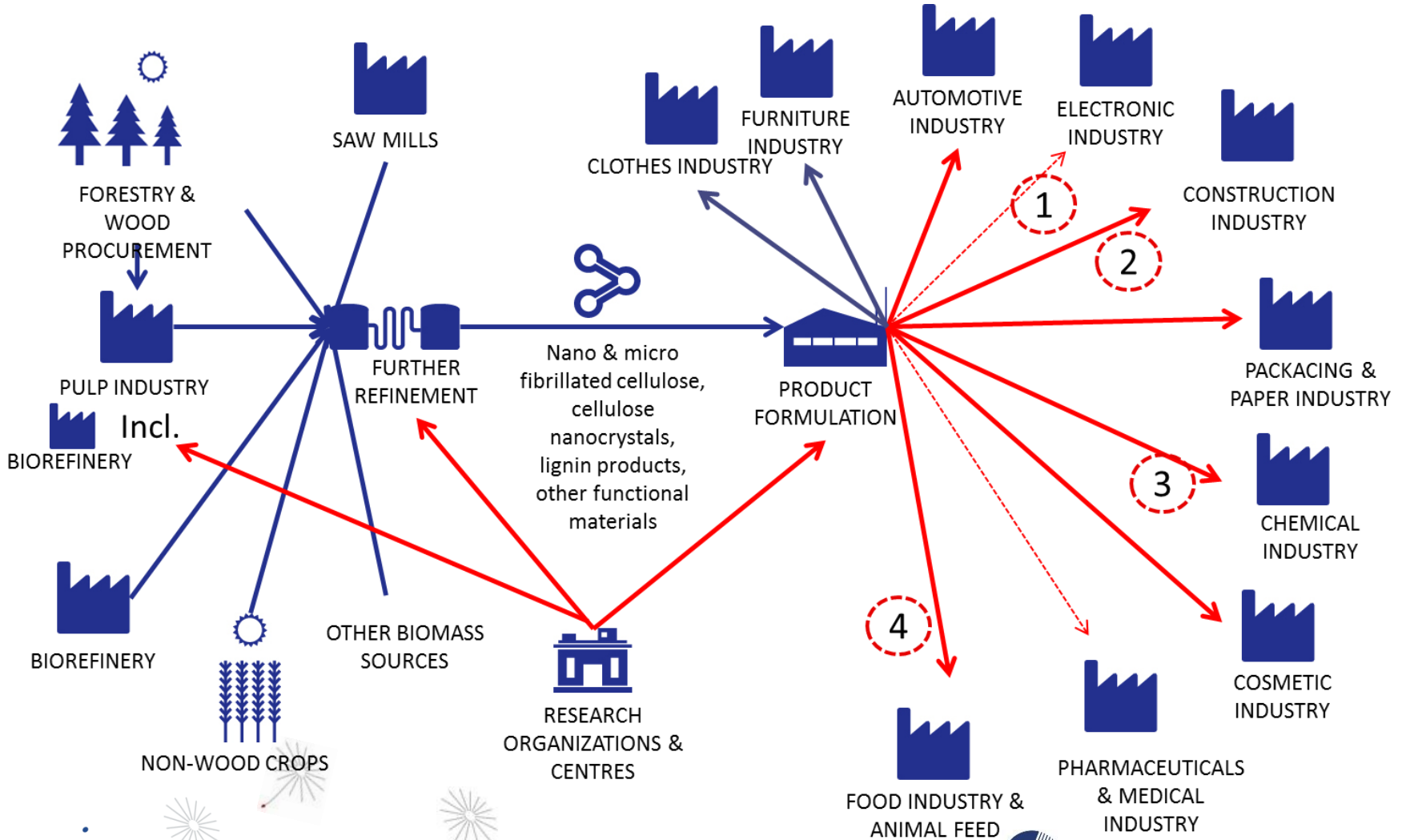
## **7. Bioeconomy Related Recreational Services**

- Pink Iceland, IS

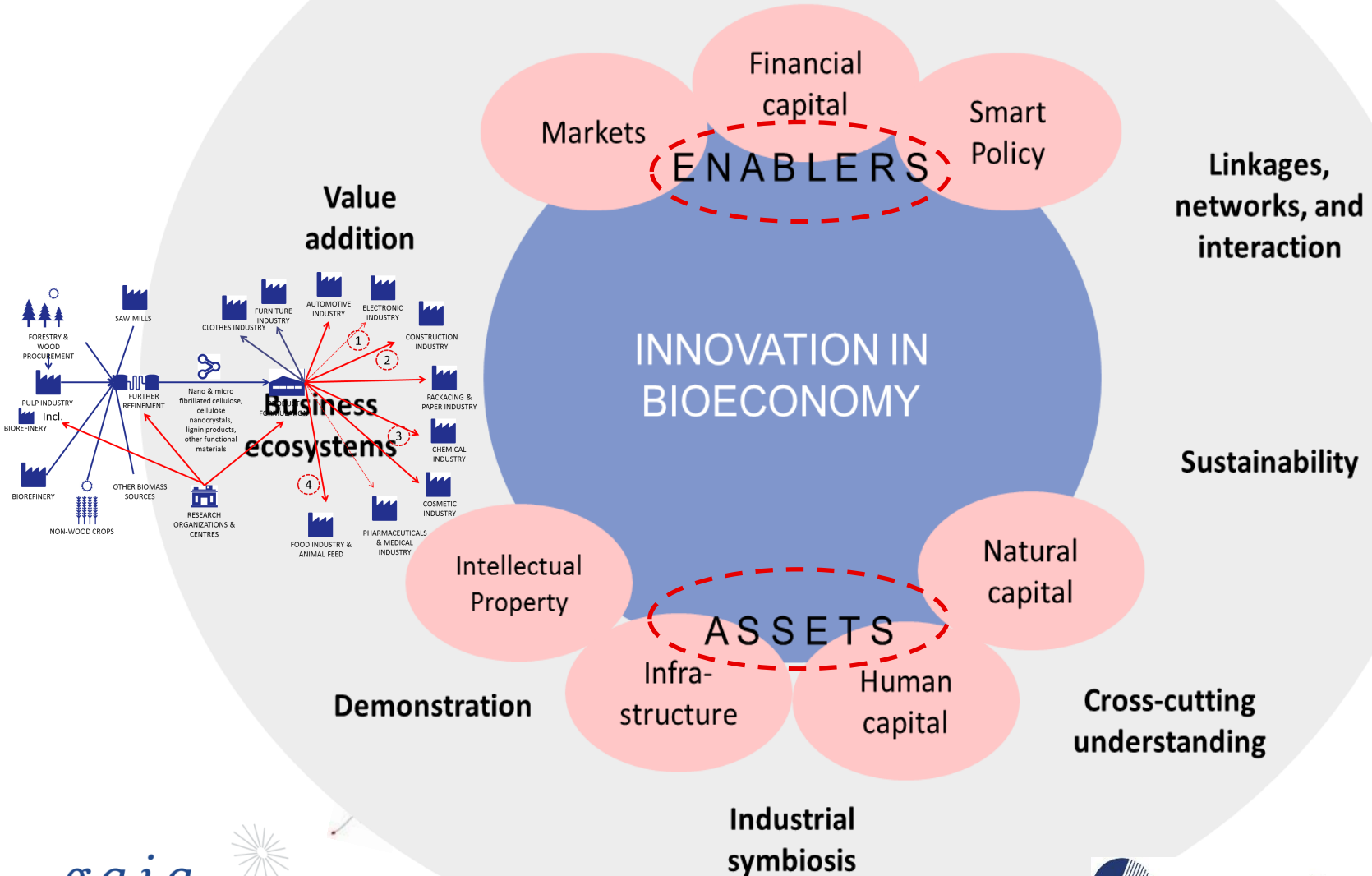




### 3. Advanced Biomaterials: *Innventia, Sweden*



# FUNDAMENTALS OF THE SYSTEMIC INNOVATION MODEL





# 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/  
Publications/creating-value-  
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in-nordic-bioeconomy/](http://www.nordicinnovation.org/Publications/creating-value-from-bioresources-innovation-in-nordic-bioeconomy/)





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