Østfoldforskning

SUSTAINABLE INNOVATION

The potential and future for valorisation of agri-food in Norway

Andreas Brekke, Østfoldforskning AS

Ås, November 14th 2016

Østfoldforskning AS (Ostfold Research)

- Main office in Fredrikstad
  - «Regional office» in Oslo
- Applied R&D for sustainable development
  - Value creation
  - Resource efficiency
- Project portfolio
  - 70% private sector, 30% public sector
  - Regional (30%), national (60%) and international projects (10%)
  - Life cycle approach
  - Food and packaging, waste, energy, construction, network innovation, furniture, etc.
- Vision:
  - Leading in sustainable innovation

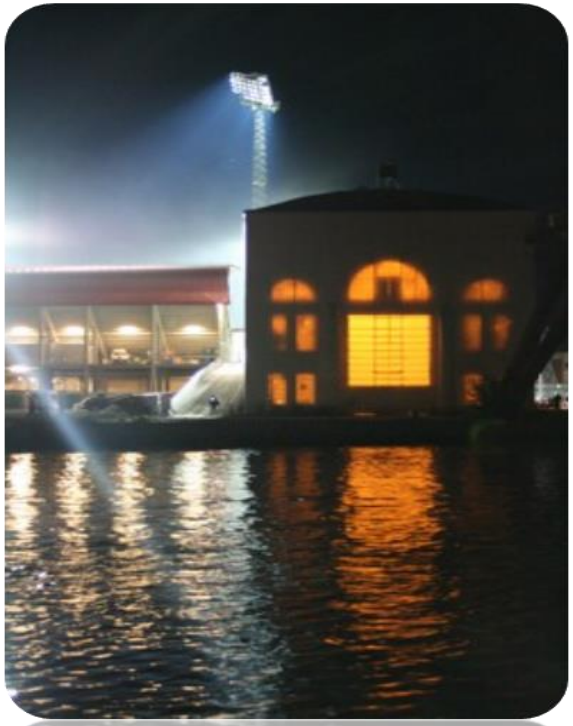


Photo: Guro Nereng

SUSVALUEWASTE

- Sustainable Value Creation Based on Organic Rest-products

Research

- 2015-2019
- Part of Research Council of Norway's Bionær programme
- Budget 4,5 mill (EUR)
- 1 PhD at TIK + 2 PostDoc at TIK + 1 PostDoc at Circle

Project partners:

- NIFU (project coordinator)
- University of Oslo/TIK-centre
- OREEC
- Østfoldforskning
- Norwegian Institute of Bioeconomy Research
- University of Stavanger
- Circle/Lund University
- LTH
- Technical University of Denmark

SusValueWaste

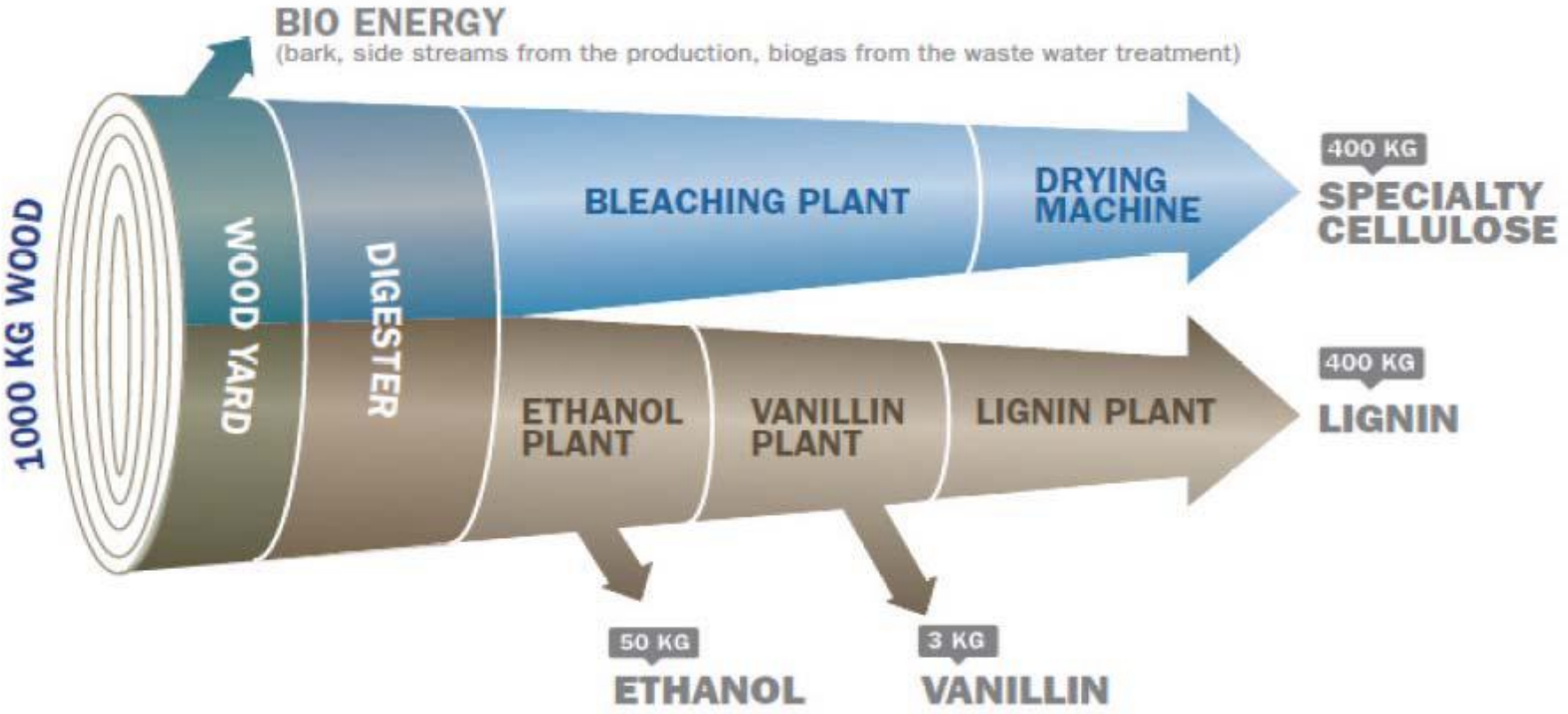
What are we studying?

Potential for value added and improved sustainability in the valorisation of organic waste streams, residual feedstock and by-products by analysing value chains inside and across different sectors of the bioeconomy (dairy, brewery, slaughterhouse, household waste, wood,…)

Outline

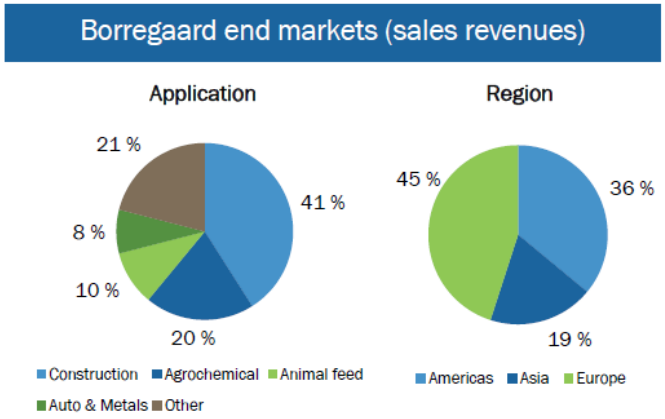
- Access to resources
- Market pull
- Regulatory framework
- Sustainability
- Alignment of actors

First: an example

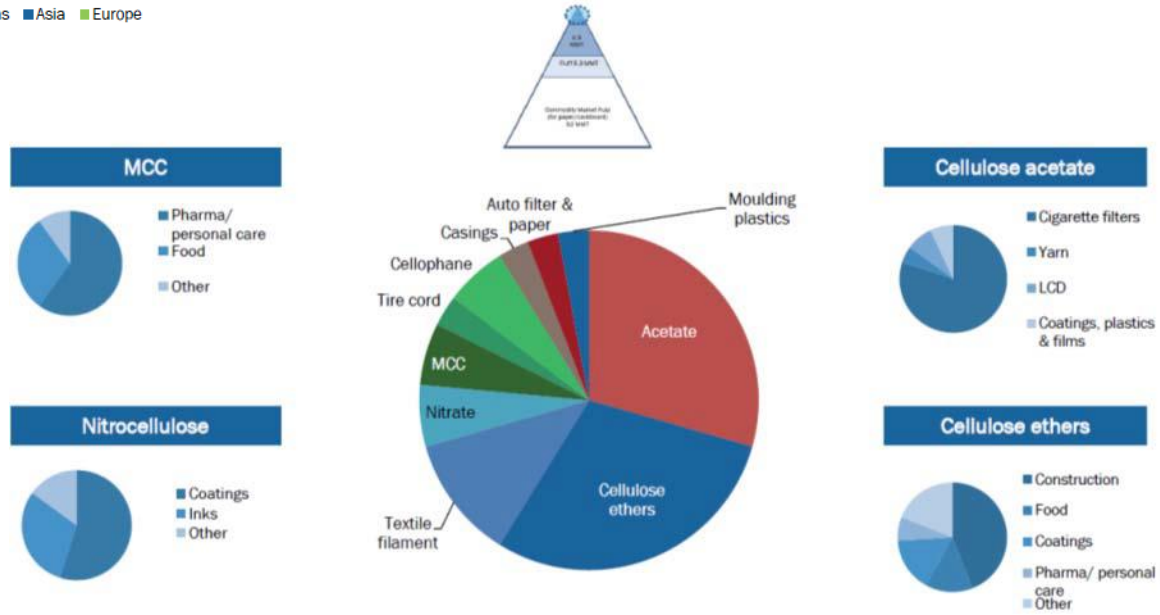


From: Borregaard ASA

Complex product portfolio



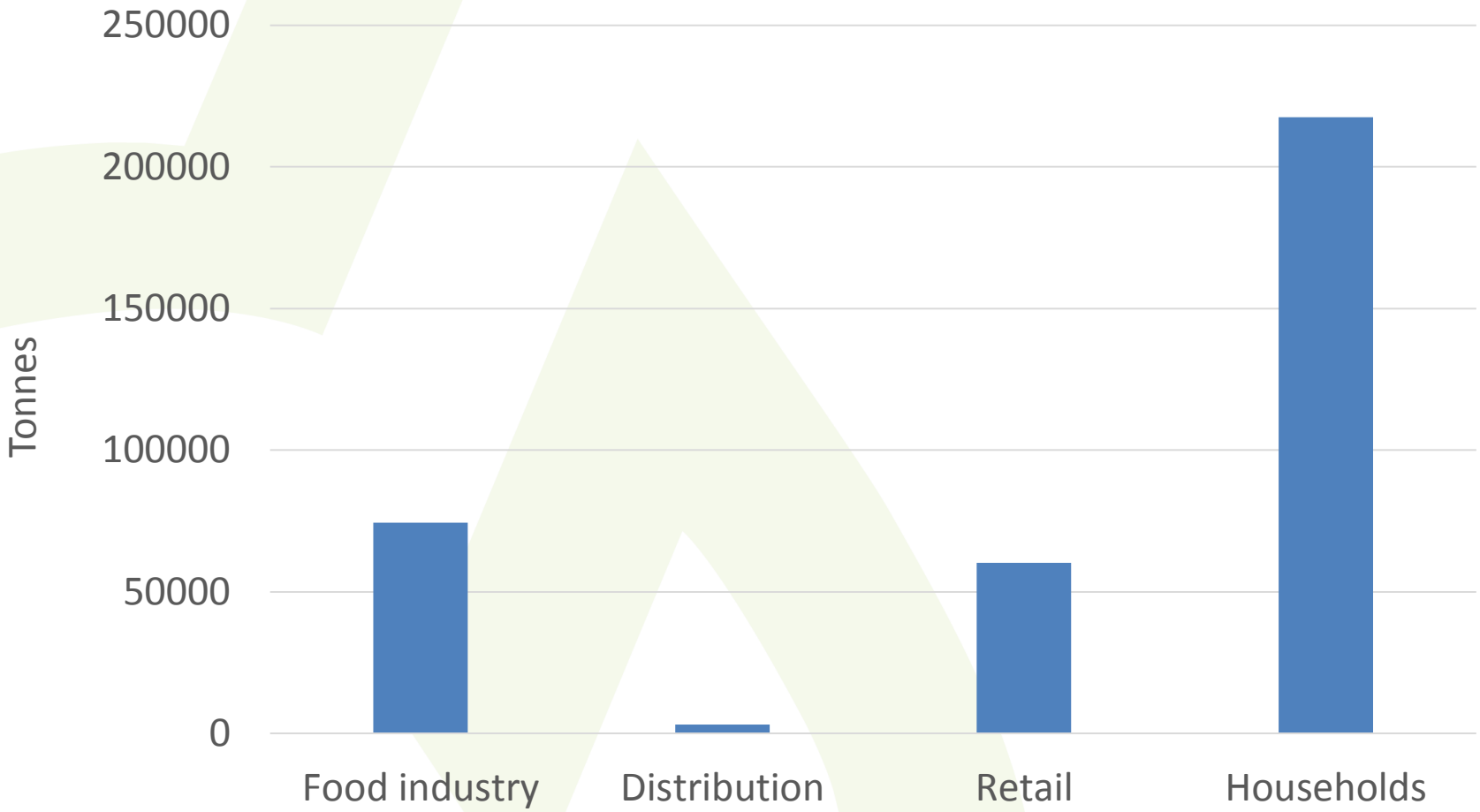
~18% of revenues from new products



From: Borregaard ASA

Access to resources

Food waste in Norway



From the Format project 2016

Type næring	Sum våtorganisk avfall, restråstoffer og matsvinn	Utnyttet til mat	Utnyttet til fôr og gjødsel	Utnyttet biologisk behandling	Netto potensial for økt sortering og utnyttelse	Total andel som utnyttes	Kilde
Snacks- og ferdigmat	10		3	2	4	55 %	ForMat
Meierisektor	792	450	338		3	100 %	ForMat
Slakteri	176		155	6	16	91 %	Norsk Protein
Bakeri (inkl. returvarer fra dagligvare)	88		88			100 %	ForMat
Gartneri	27		11	9	6	76 %	Data fra næring
Fiskerier	514	60	232		222	57 %	Richardsen et al, 2015
Havbruk (inkl. fiskeslam)	887	24	278	35	551	38 %	Richardsen et al, 2015 og Ytrestøyl et al. 2013
Dagligvare*	70			39	31	56 %	ForMat
Serveringsbransjen	84			12	72	14 %	Pilotstudie i regi av Matvett
Andre tjenesteytende næringer	54			15	39	28 %	SSB
SUM næring	**2 701**	**534**	**1 104**	**118**	**944**	**65 %**	

From Raadal et al. 2016

In addition

- Straw (700 000 tonnes DM, 100 000 tonnes to feed, Bardalen 2016)
- Husk (20 000 tonnes, Bardalen 2016)
- Cereals, vegetables, fruits and berries left on field (25 000 tonnes, Franke *et al* 2016)
- (Same reference states 108 000 tonnes biomass from food production go to side flows)

Resources summarised

- Statistics scattered, if existing
- Large amounts in total
- Heterogenous resources
- Much used for (low value) feed


Market pull

Food waste (and surplus resources) contains things we want to eat!

- Proteins
- Saccharides
- Fibers
- Antioxidants
- Lipids

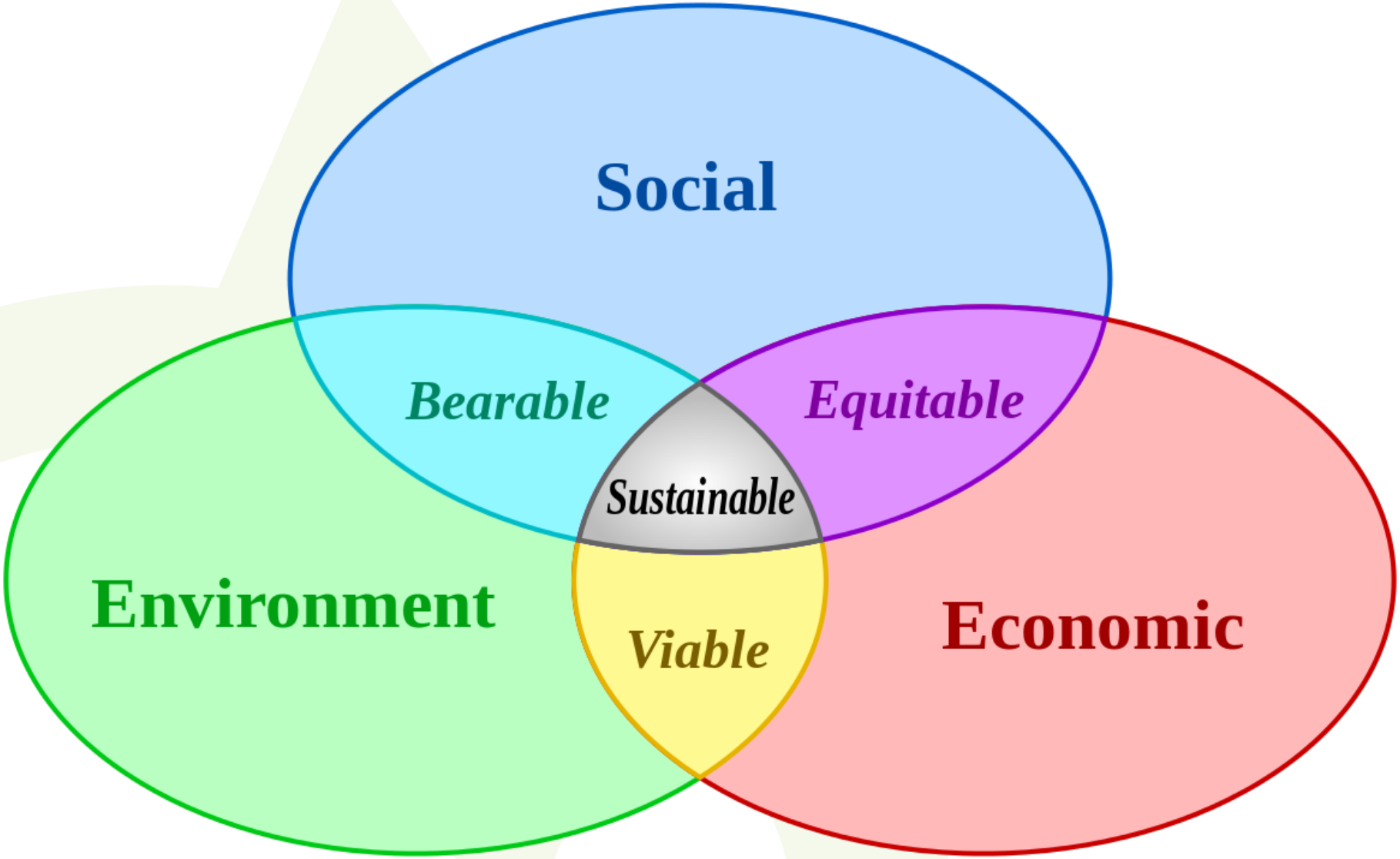
But…

- Others want to eat it too – competition with feed
- Others want it for other purposes: biofuels, energy, soil enhancement, carbon storage


Regulatory
framework

It’s a jungle out there

- Laws
  - Food production and food safety
  - Competition
- Regulations
  - Novel food and novel food ingredients
  - Food hygiene
  - Waste
- Industry agreements
  - STAND in Norway (between retailers and food industry)
  - Agreement between authorities and food sector on food loss
- Local agreements
  - Current practices where local farmers collect surplus resources



Sustainability

Is valorisation for food sustainable?

- Good for the environment?
  - Yes, resource efficiency is key
  - Perhaps, depends on what happens with the surplus surplus resources and what feed sources are substituted

Is valorisation for food sustainable?

- Good for the economy?
  - Yes, higher value products from lower value raw materials
  - No, better utilisation of biomass means someone must earn less (or only a myth?)

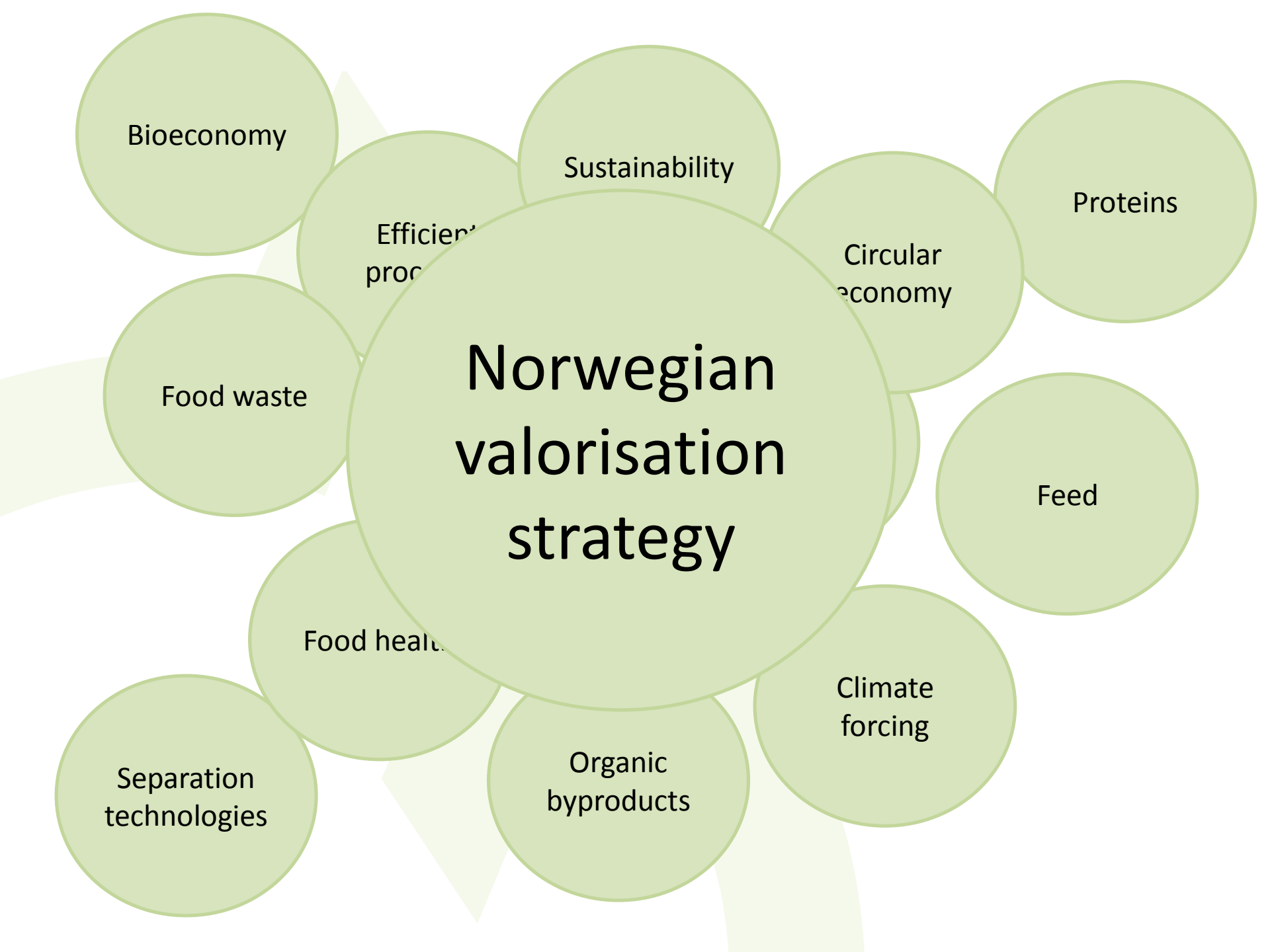
Is valorisation for food sustainable?

- Good for the social?
  - Yes: better products for consumers, more jobs, ethically right, increased status of jobs related to waste
  - Perhaps, depends on health and safety issues, the risk of creating a larger gap between wealthy and poor

Alignment of actors

Let’s return to the Borregaard example

	Borregaard	Food waste and surplus resources
Nature of raw materials	Homogenous (spruce)	Heteregenous (in total, but can be homogenous from one field or facility)
Raw material supply	Stable	Varying (in total, but can be stable for certain facilities)
End products	Multitude of niche products	Multitude of niche products
Regulatory framework	Complex	Complex
Sustainability	Excellent score in all three dimensions	Needs to be evaluated


Bioeconomy
Sustainability
Proteins
Circular economy
Food waste
Norwegian valorisation strategy
Feed
Climate forcing
Organic byproducts
Separation technologies

Thanks for your attention!

andreas@ostfoldforskning.no