



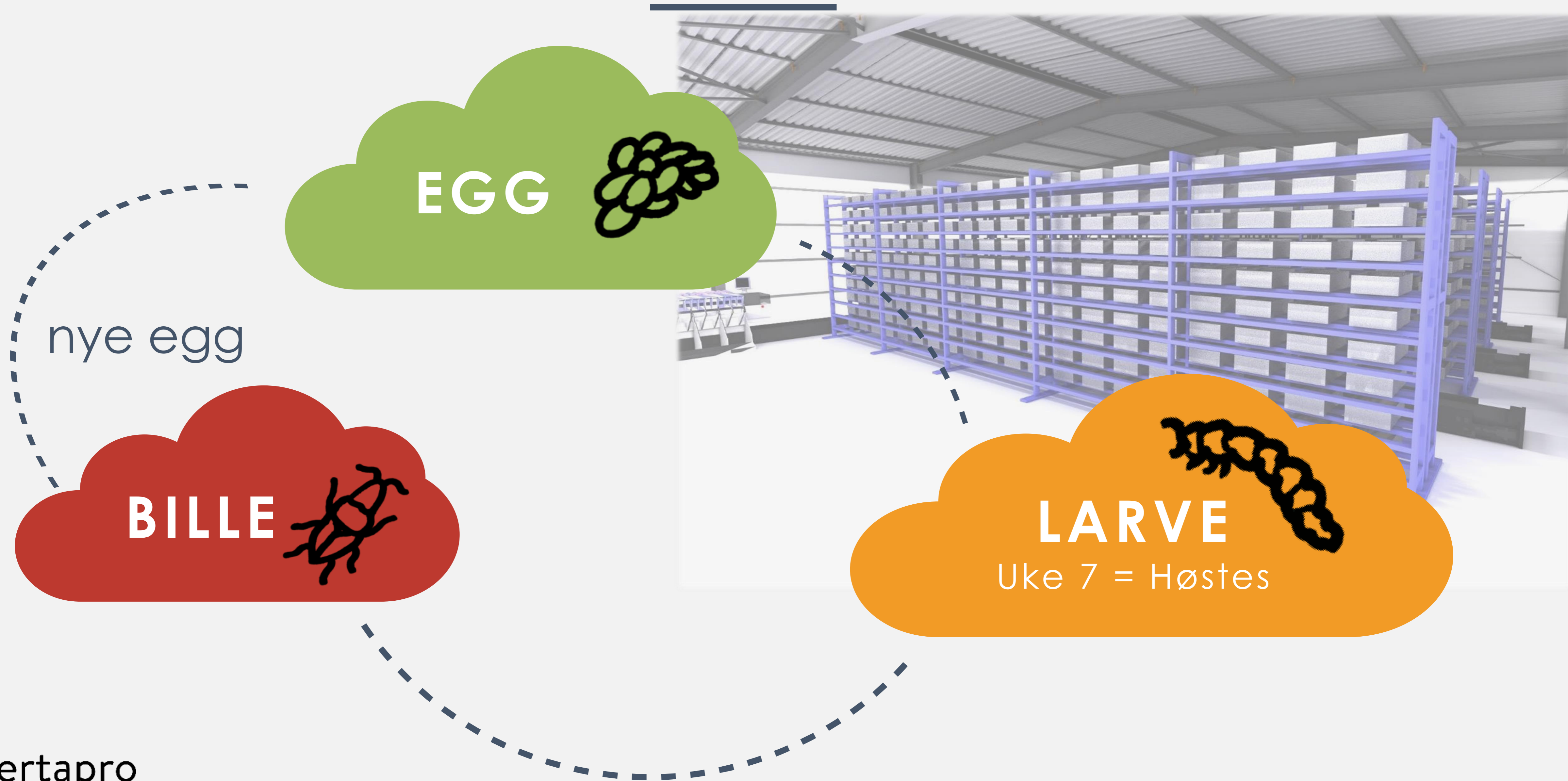
## Biosirkulæritet!

Insekt + Avfall = Bærekraft i praksis

Avfallsforum Rogaland  
16 Nov 2017



# Melorm Livsyklus



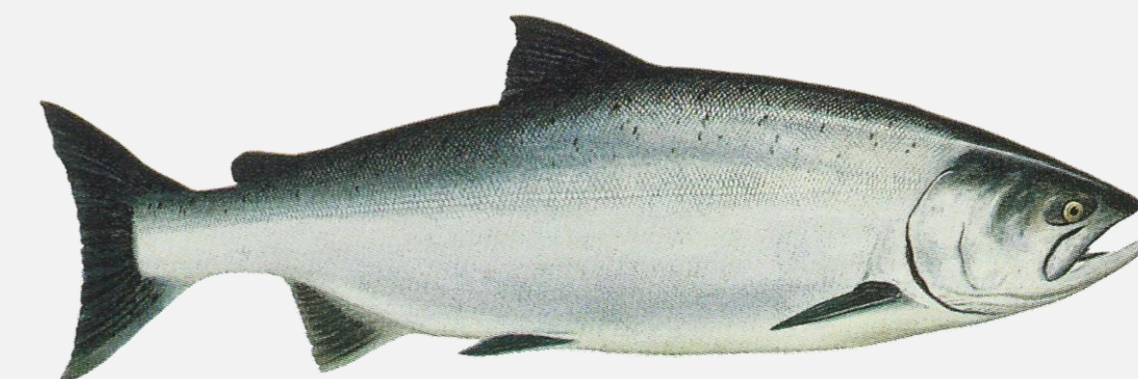
# Konsept



**PRODUKT**  
insektmel  
olje

**BI-PRODUKT**  
klasse-0  
Gjødsel "Bløme"

**KUNDE**  
oppdrettsnæringen  
petfood





Innssamling



Fôring

# Restråstoff

Reine kilder

## Fremover

- Avfall dagligvarehandel

- Nye innovative vegetabiliske kilder

Catering, hotell avfall

Husholdingsavfall

Forhindre

Ombruk

Resirkulere

Energi

Forbrenning

Deponering

Bakeri



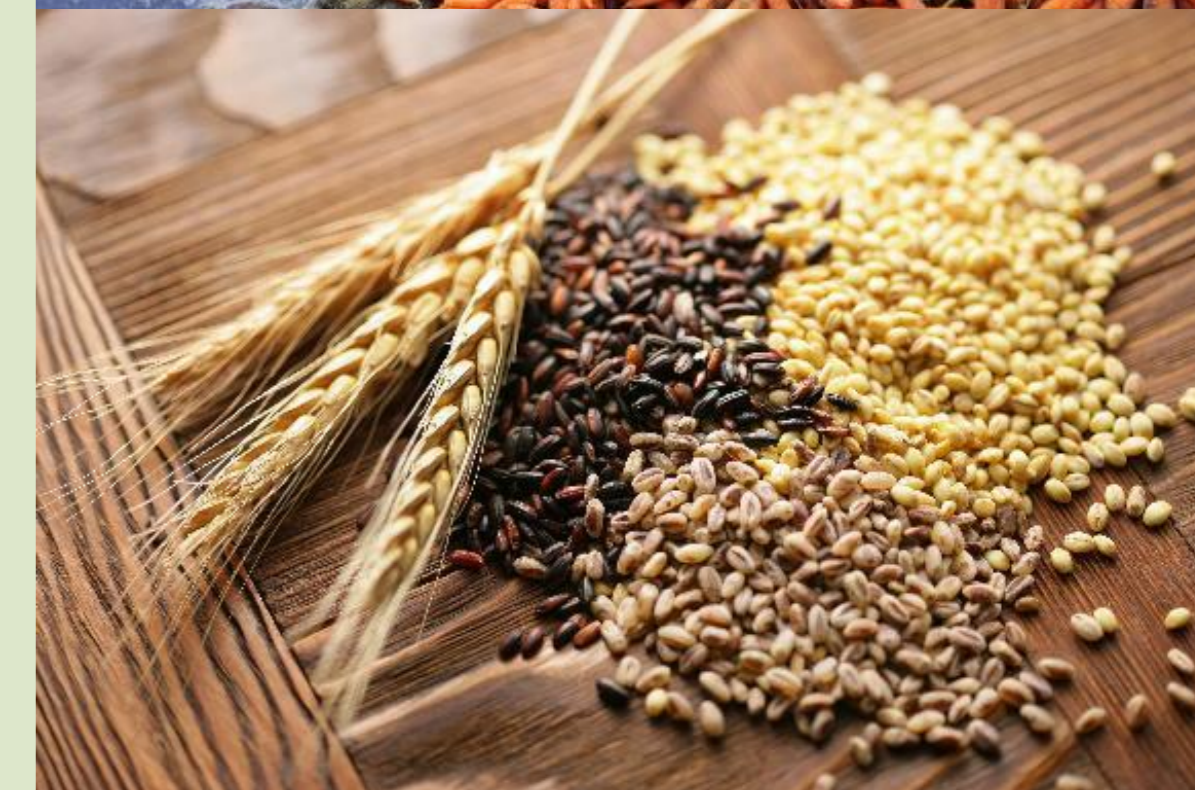
Bryggeri



Grønnsaker

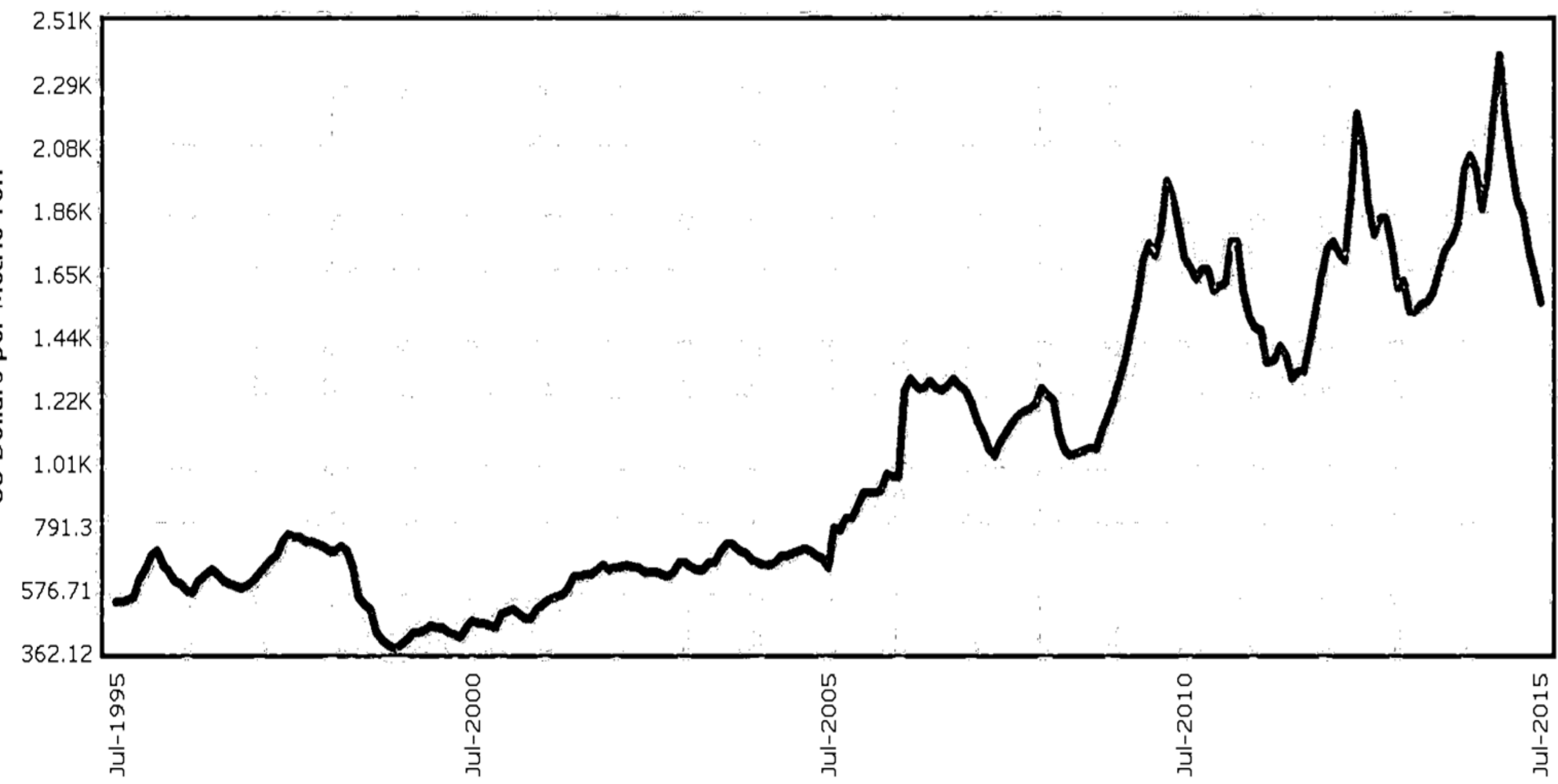


Korn og mel



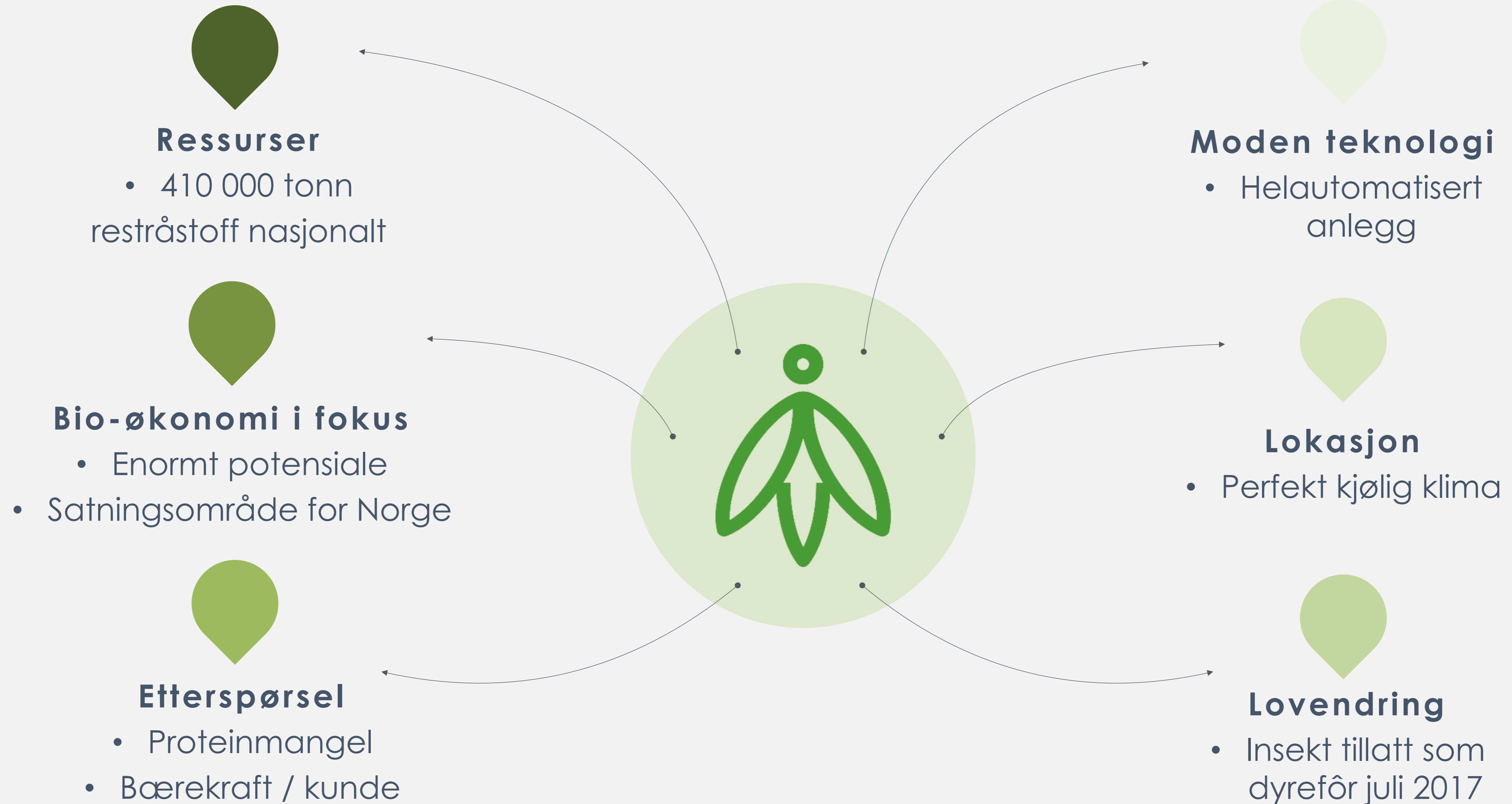
# Produkt & Marked

Fiskemel US\$ per Tonn (1995-2015)



	Fiskemel	Insektmel
<b>Protein</b>	64%	60%
<b>Brutto energi (MJ)</b>	20.4	22.1
<b>Pris/kg</b>	16 NOK	18 NOK
<b>CO2 utslipp (kg/tonn)</b>	11 000	2 000

# Hvorfor Norge



# Bærekraft

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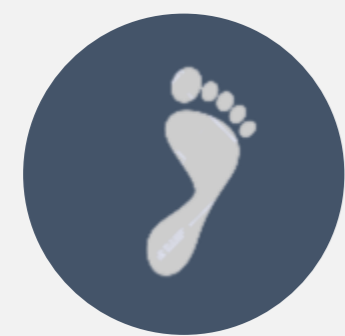
Ikke bare resirkulering – **Oppsirkulering!**

**9** INDUSTRY, INNOVATION AND INFRASTRUCTURE



**Kortreist.** Lokale ressurser, produksjon og kunder

**12** RESPONSIBLE CONSUMPTION AND PRODUCTION



**Minimalt fotavtrykk:** Energi, vann, mat, m2

**13** CLIMATE ACTION



**Rent produkt:** Ingen kjemikalier, sprøytemidler, hormoner, medisiner

**14** LIFE BELOW WATER





# Progressjonplan

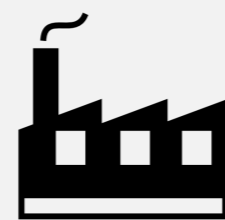


2016-17

**Test fasilitet**

Tilstrekkelig ressurser

MVP

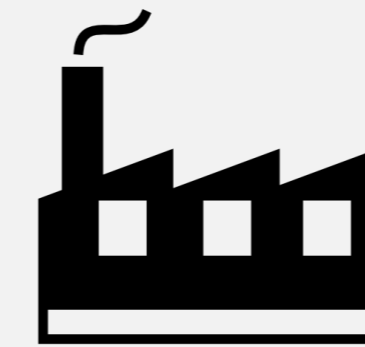


2017-18

**Produksjon**

Pilot Produkt

FoU

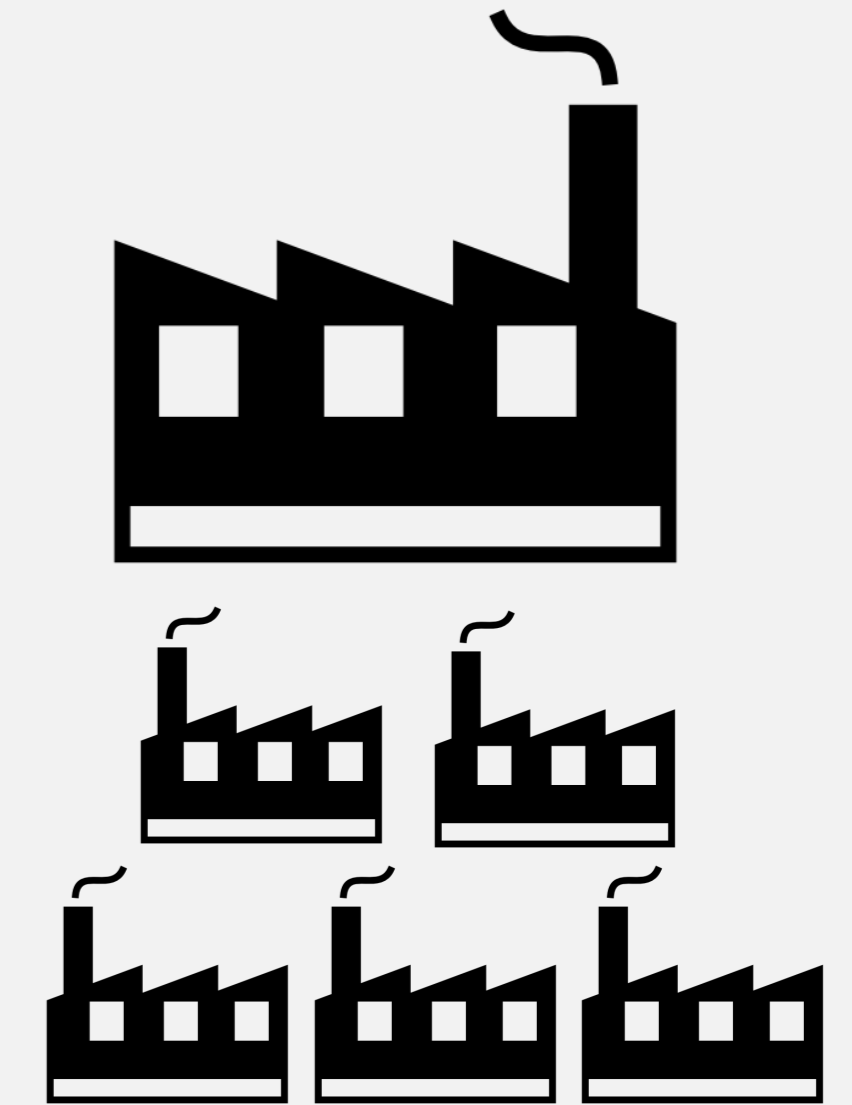


2018-19

**Pilotanlegg**

6 000 tonn substrat

1 200 tonn produkt



2019+

**Fabrikk**

30 000 tonn substrat

6000 tonn produkt

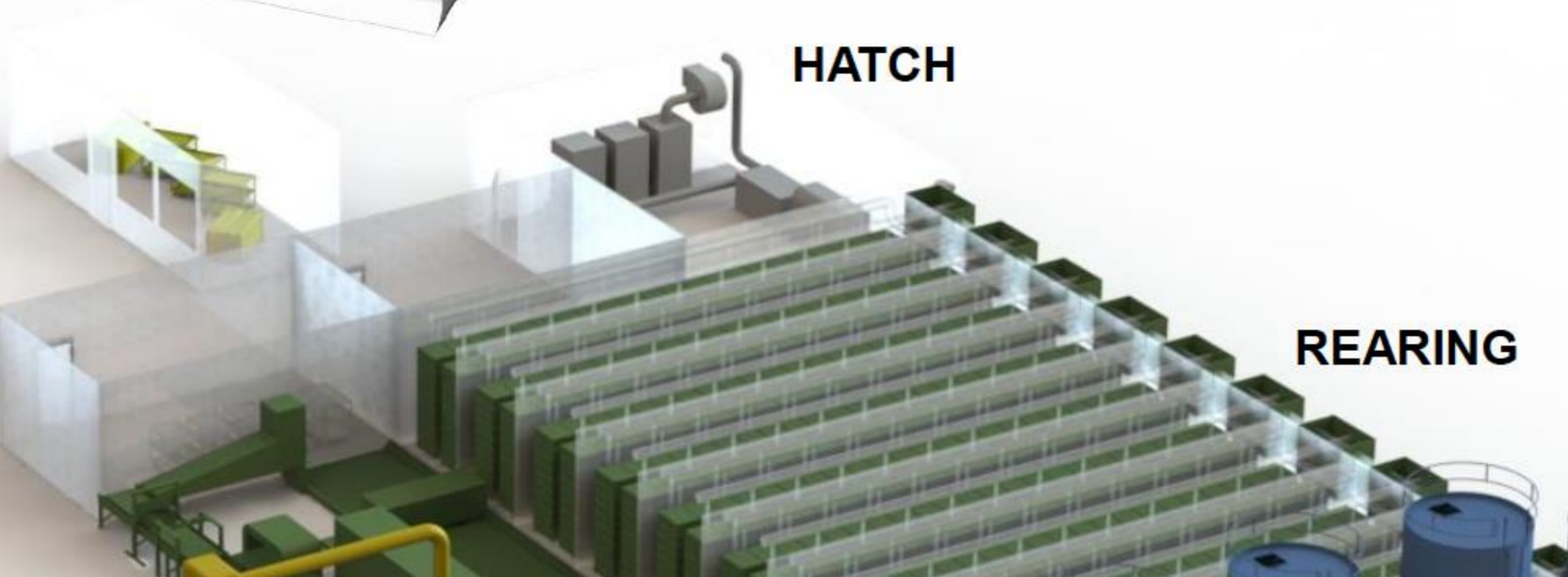
# Insektfabrikk



**PRODUCT STORAGE**



**HATCH**

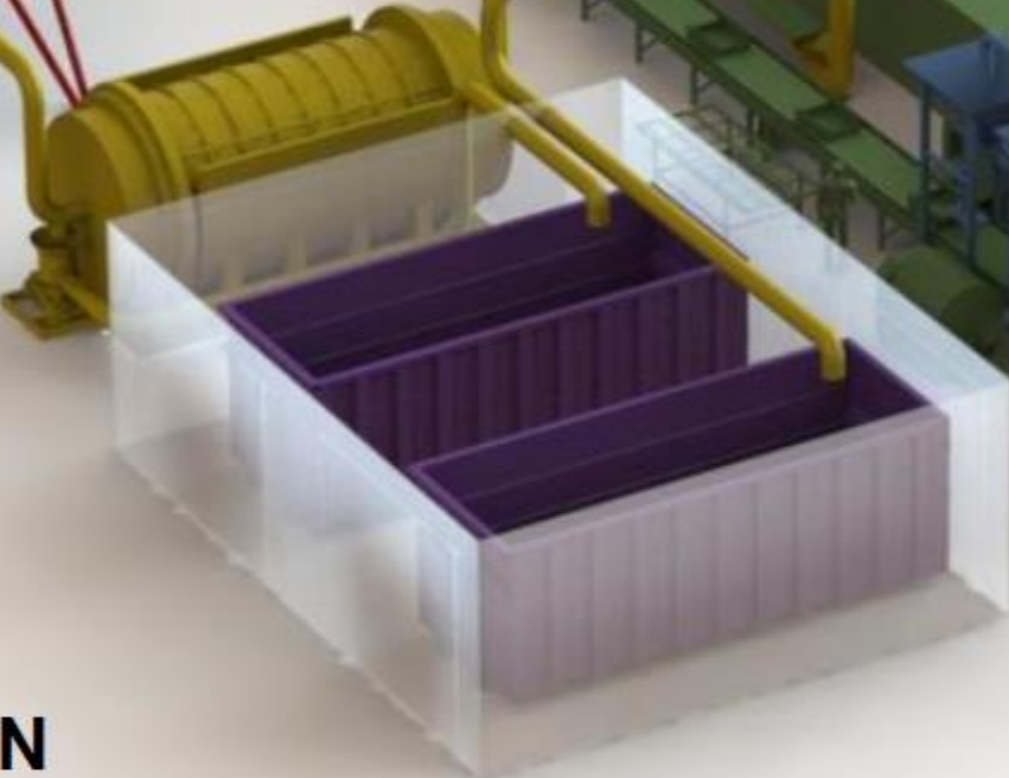


**REARING**

**PROCESSING**



**SEPARATION**



**FERTILISER PRODUCTION**

**FEEDSTOCK MIXING**

**FEEDSTOCK STORAGE**



# Hva gjør me på i dag?

## MVP klargjøring Pilot kunde/produkt

- Hundefôr
- Fiskefôr
- Frass (insektdritt!)
- Prøver til akvakultur



## FoU

- Fôrprøver
- Optimere produktet
  - Øke omega 3
  - Dobbel-loop



## Kartlegging

- Økonomi
- Teknologi
- Ressurser



# FoU

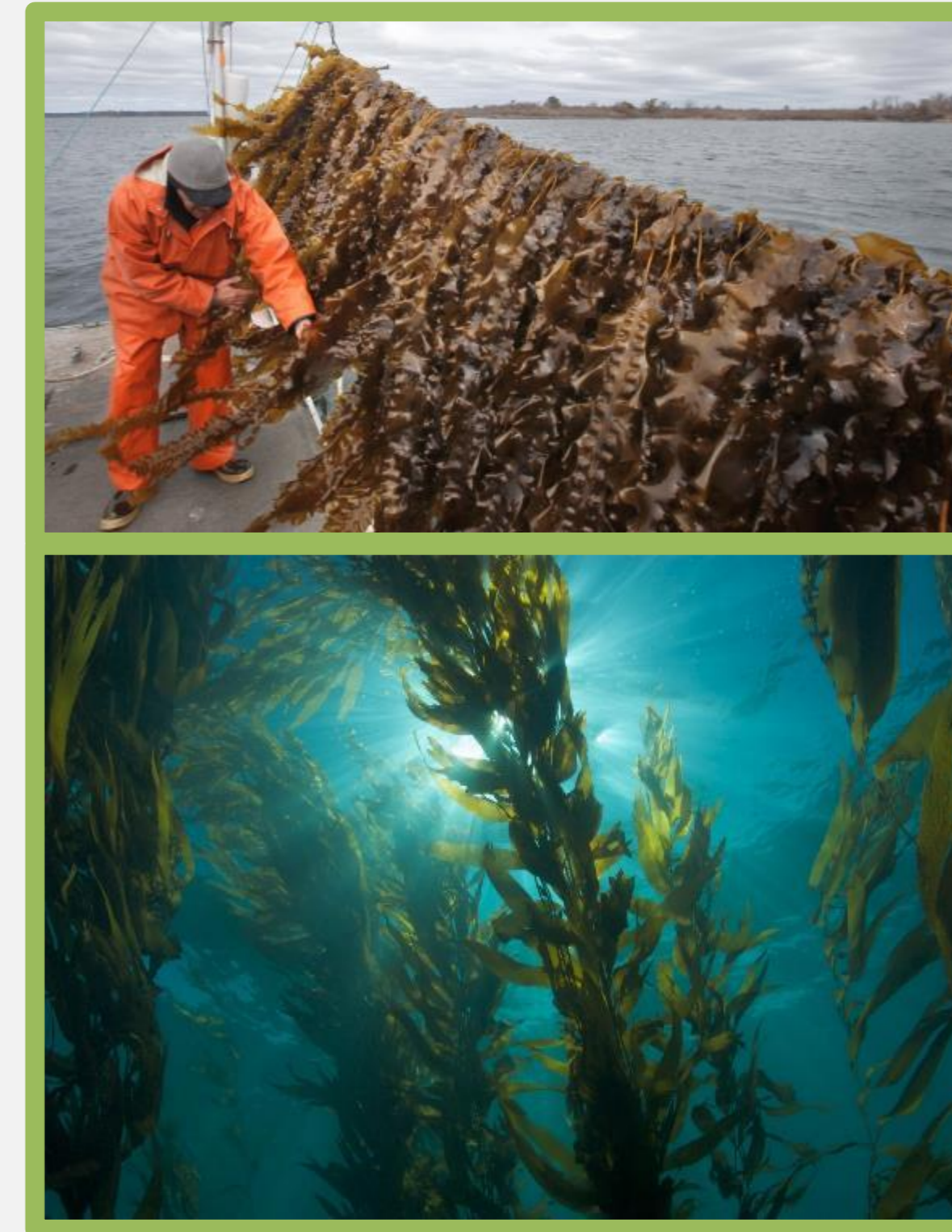
Produkt optimering



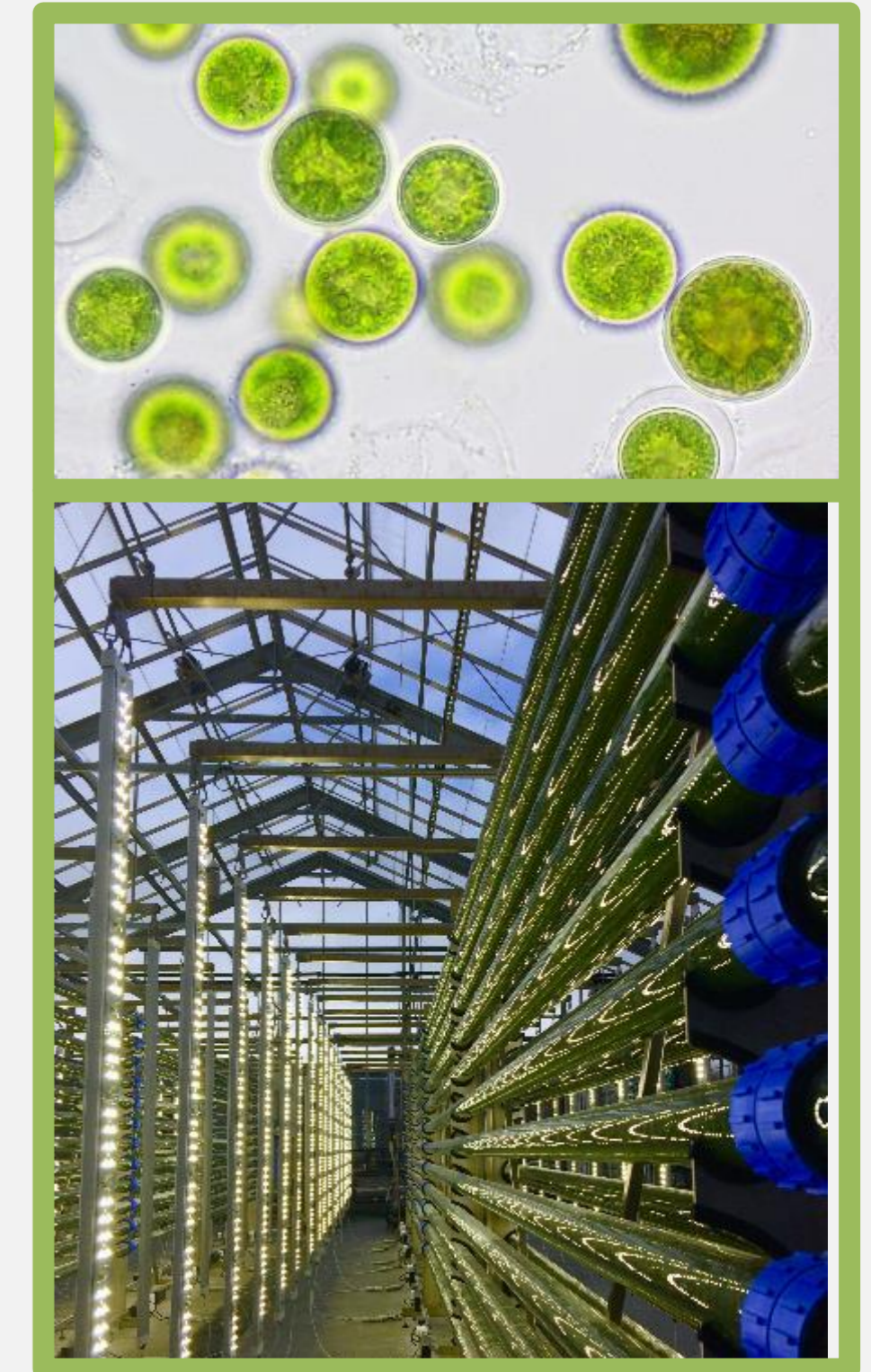
Ressurser Lokalt



Makroalge



Mikroalge



**NIBIO**  
NORSK INSTITUTT FOR  
BIOØKONOMI

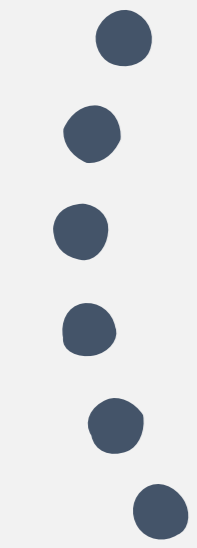


**N I F E S**  
NATIONAL INSTITUTE  
OF NUTRITION AND  
SEAFOOD RESEARCH



# Dobbel sirkel

Produkt – Selskap X



Restråstoff

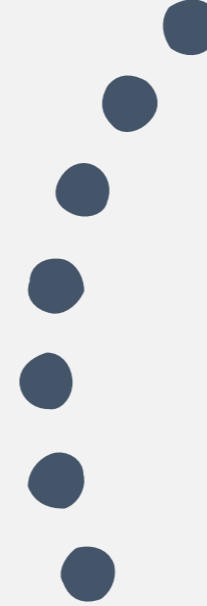


Insektmel/olje  
Produkt



Naturlig gjødsel  
Klasse 0

Mikroalge



Avfall - insekt ekskret



Produkt



# Invertapro

## Vi trenger

- Protein – helst kortreist
- Bærekraft A-Å
- En sirkulær tilnærming

### Nettverk & partnerskap

Lære fra hverandre

### Sterkt team

Tverrfaglig

### Erfaring

Over 3 år

### Unik

Tilnærming & teknologi



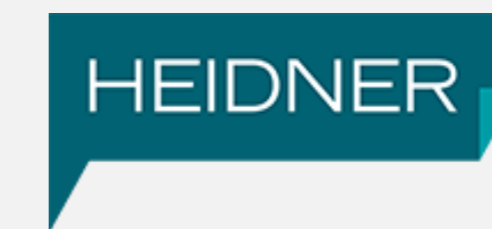
## Kapital & Støtte



Voss kommune bygd for sterke opplevingar



## Kompetanse & Ressurser



Takk for  
Oppmerksomheten!



 invertapro

