

WELCOME TO CIRCULAR BIOECONOMY DAYS 2019

AARHUS UNIVERSITY
CAMPUS FOULUM



Circular bioeconomy

“CASE Foulum”: New possibilities for local and safe supply of protein via biorefinery technologies



DCA APPROACH: INTEGRATION OF ACTIVITIES

Science based Policy Advice to Ministry of Environment, Food & Agriculture

Current challenges in food and agriculture:

Environment (nitrate leaching, pesticides), climate, productivity, antibiotics animal welfare etc.



Global agenda & international collaboration

- > Focus: sustainability/eco-functional intensification, food security, climate change, agroecology
- > Food systems

Collaboration with sector/industry

= farmers and companies!

- > Focus on innovation and solutions to challenges:
- > Smart farming, environmentally friendly growth, bioeconomy, business creation, productivity

THE +10 MILL. TONS PLAN (2013)

Is it possible in 2020 to increase the production of biomass with 10 million tons?

- ❑ Increasing bioenergy and
- ❑ replacing fossil inputs and imported feed

- ❖ Without increasing the agricultural area
- ❖ Without reducing food production
- ❖ With positive effects on the biodiversity
- ❖ With positive effects on eutrophication



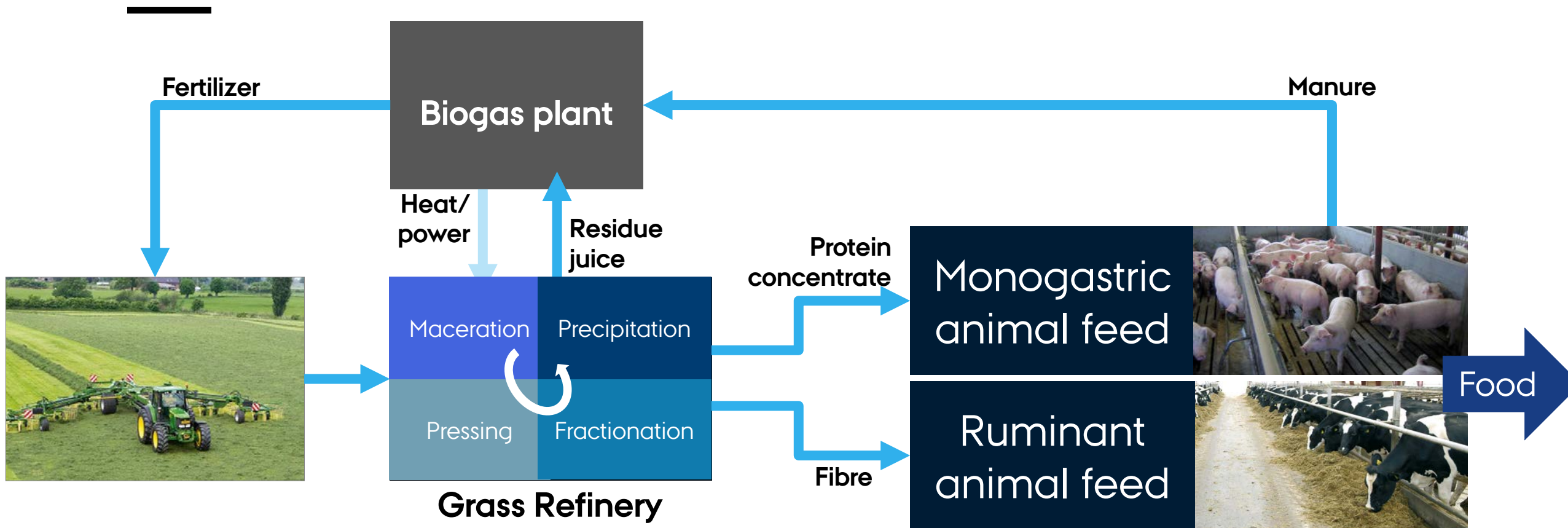
THE + 10 MILLION TONNES STUDY

Increasing the sustainable production of biomass for biorefineries



Aarhus University and University of Copenhagen
Supported by DONG Energy

PROTEIN FEED FROM GREEN BIOMASS



Combining new crop production with development of green biorefineries, innovative feeding and improved recycling
= *Circular Bioeconomy*
----- *And a whole new set of interlinked challenges... !*

AU FUNDED PROGRAM: *BIOBASE 2013-2017*

RESEARCH IN GREEN BIOMASS THROUGH FIVE INTEGRATED PLATFORMS

1. New cropping systems
2. Biomass from wetlands
3. Extraction of protein from green biomass for feed and food
4. Hydrothermal conversion of wet biomass to liquid fuel
5. Economic and socio-economic consequences





From field to feed in less than eight years

In less than 8 years researchers at AU Foulum have

- developed a complete production system,
- produced high quality protein from green biomass
- demonstrated the options for replacing concentrates and
- demonstrated the potential environmental benefits and climate change mitigation
- Economic assessments and business models

THE LIMFJORD PROJECT

Integrating agricultural benefits,
value chain development and
environmental improvements
combining agriculture, industry and
policy advise for
a nitrate sensitive water catchment
area and fjord

“Sustainable Intensification” as an
alternative to setting aside land

KAN REDUKTIONSMÅLSÆTNINGER FOR NITRAT- UDVASKNING TIL LIMFJORDEN OPFYLDES VED ØGET DYRKNING AF BIOMASSE?

CHRISTEN DUUS BØRGESEN, TOMMY DALGAARD, BIRGER FAURHOLT PEDERSEN, TROELS
KRISTENSEN, BRIAN H. JACOBSEN, JØRGEN DEJGÅRD JENSEN, MORTEN GYLLING OG UFFE
JØRGENSEN

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AARHUS
UNIVERSITET
DCA - NATIONALT CENTER FOR FØDEVARER OG JORDBRUG



FROM LAB TO PILOT TO DEMONSTRATION SCALE



With support from Arla, Danish Crown, DLG, DLF, GUDP, Central Region Denmark & Aarhus University



NIELS HALBERG
DIRECTOR, DCA

AU FOULUM
JUNE 2019

Opening today... 😊



AU CENTRE FOR CIRCULAR BIOECONOMY – CBIO

UFFE JØRGENSEN, CENTRE DIRECTOR

CBIO - 8 dept. forming 7 research platforms:

- Production and management of **agricultural biomass** (AGRO)
- Production of **marine biomass** (BIOS)
- **Biorefining**, conversion and recycling (ENG)
- **Bio-based materials** and bio-oils (CHEM)
- **Feeds**, by-products and feed ingredients (ANIS)
- Utilization of biomass for food, ingredients and **high-value products** (FOOD)
- **Society, sustainability** and economy (ENVS)



DANISH PROTEIN INNOVATION - DPI



Dansk Protein Innovation

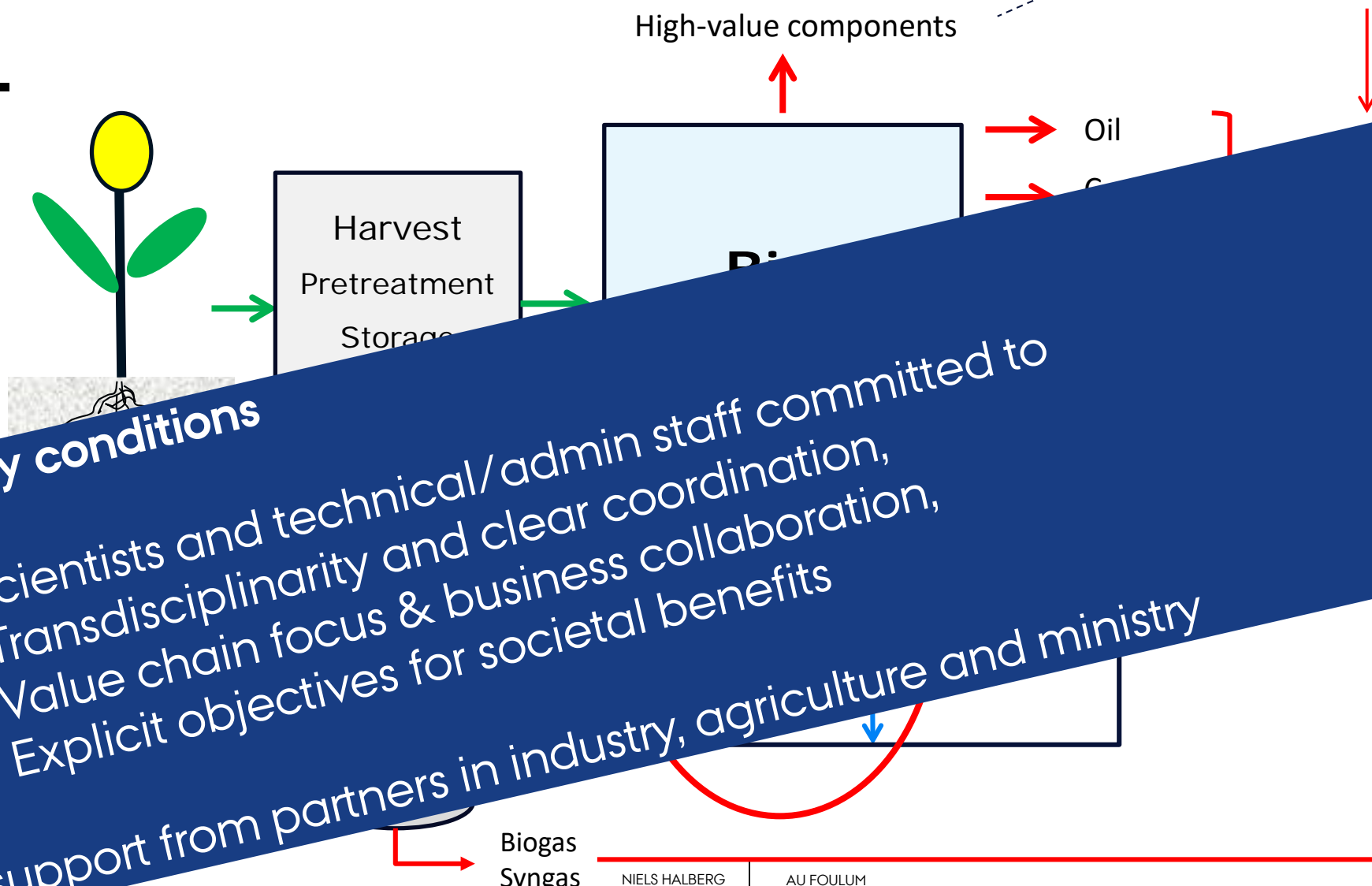
DPI objective:

To promote and coordinate research and innovation with the aim of increasing a market based and sustainable Danish production of protein for food and feed.



Implementation of a radical new crop production paradigm is conditional to development of green biorefineries

Colours
Flavors
Medicin
Other chemicals



Necessary conditions

- ✓ Skilled scientists and technical/admin staff committed to
- ✓ Transdisciplinarity and clear coordination,
- ✓ Value chain focus & business collaboration,
- ✓ Explicit objectives for societal benefits

And support from partners in industry, agriculture and ministry

Biogas
Syngas



INNOVATION IS HIGHLY NEEDED!



Thank you!

Special thanks to all our collaborators and support from industry, agriculture, ministries and local authorities