

DTU



**The Novo Nordisk Foundation
Center for Biosustainability**

High Value Biochemicals

Utilizing the power of Precision Fermentation

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Senior Researcher, Group Leader & Deputy Head of Section Sustainable Chemicals

Novo Nordisk Foundation Center for Biosustainability

Technical University of Denmark

About me: Sumesh Sukumara

Research focus

- Integrated Sustainability Assessment
- Process Simulation
- Conceptual Process Design
- Techno-economic Evaluation

- Process Systems Engineering
- Supply Chain Management

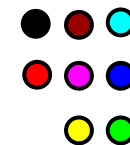
- Econometric Assessment
- Business and Market Analysis

Broader Interest

Guiding innovation by quantitative assessment and optimization of technologies from economic and sustainability standpoint.

Email: susu@biosustain.dtu.dk

Work

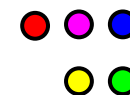


Sustainable Innovation Office
Senior Researcher 2019-present



Global Econometric Modeling Unit
Researcher 2017-2019
Post Doc 2014-2017

Education



PhD (2010-2014)
Chemical Engineering
University of Kentucky



MS (2007-2009)
Chemical Engineering
Texas A&M University



B-Tech (2002 – 2006)
Chemical Engineering
University of Calicut

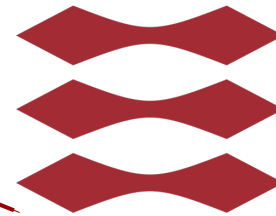
An aerial photograph of a large, modern building with a distinctive grid-like facade of dark panels and lighter-colored vertical accents. The building is surrounded by trees and other structures, all under a dark, blue-tinted sky. The text is overlaid in the center of the image.

NNF Center for Biosustainability (DTU Biosustain)

The Technical University of Denmark (DTU)



DTU



The University is at the academic and multidisciplinary forefront of the **technical and the natural sciences** with new initiatives in a number of demanding engineering disciplines, including **sustainable energy technology and life science**.

11.200 students are educating themselves for the future, and **6,000 employees** focus each day on education, research, consulting and innovation, which contribute in creating value, welfare, and growth.

DTU BIOSUSTAIN IN NUMBERS

~ 320 Staff Members



179 International
92 Danish



46% women
54% men



50 Nationalities



39 Start-ups (Since 2012)



~80 PhD Students



Ranked #3 in the world in
Biotechnology





Environmental sustainability



Land use and biodiversity

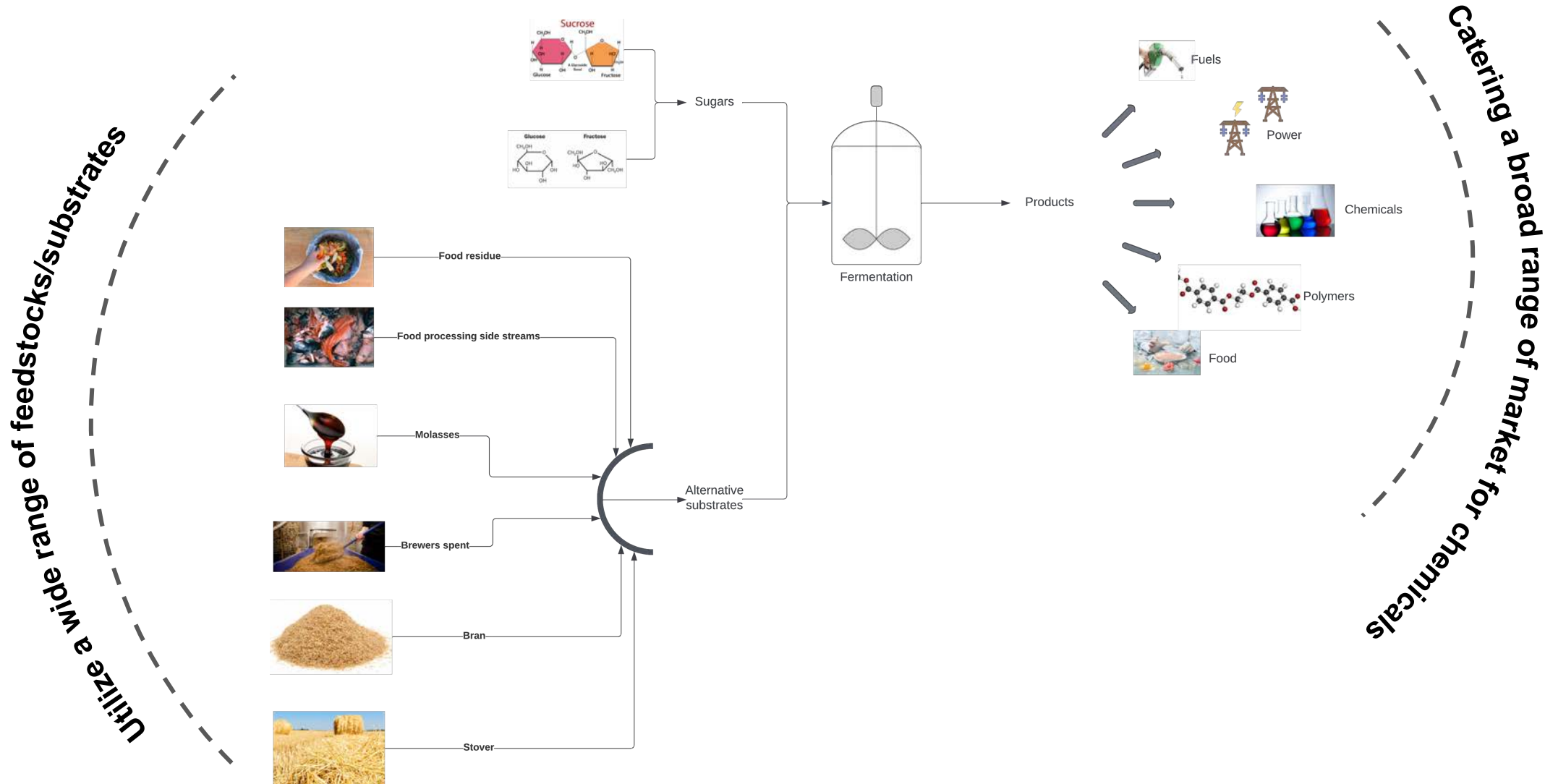


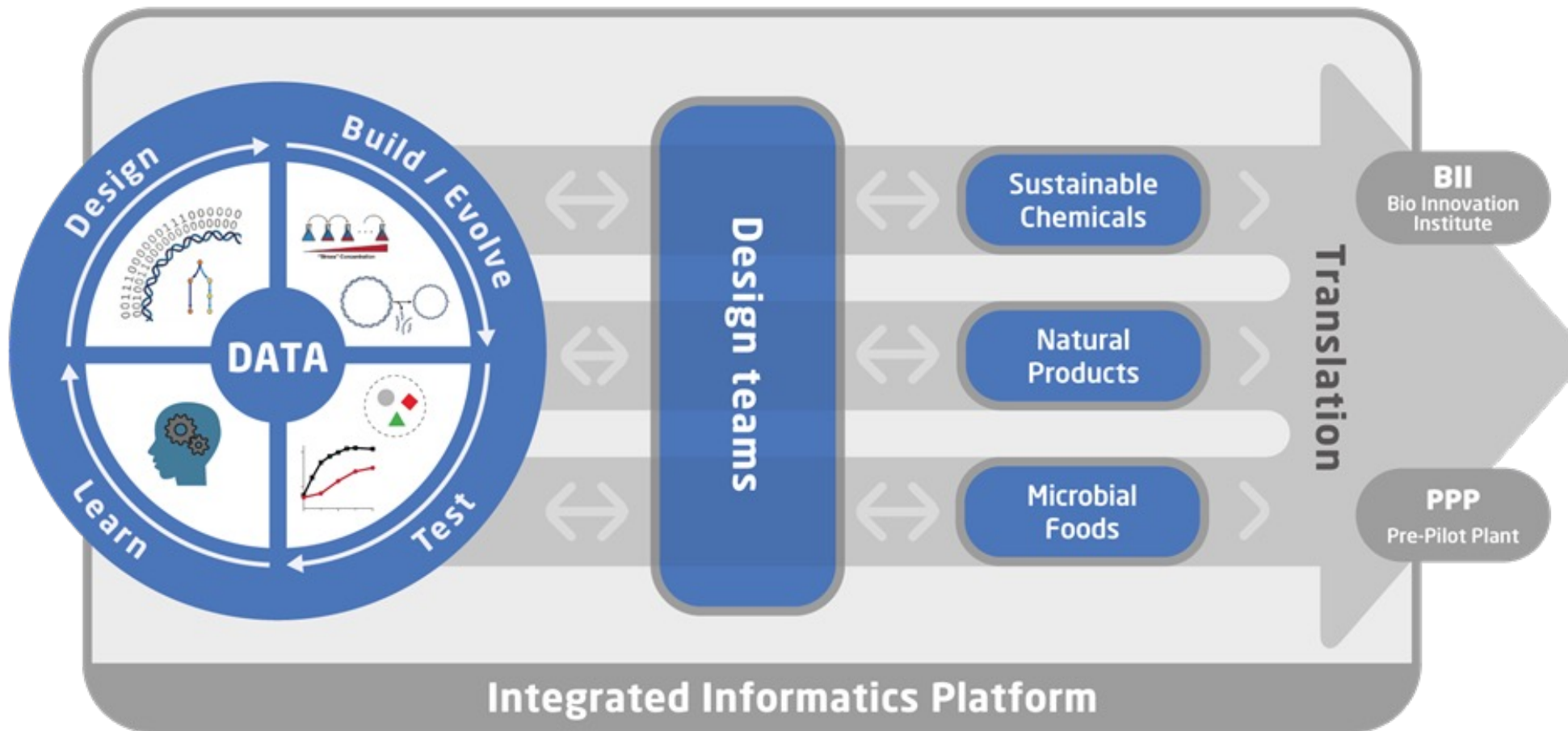
Food and Nutrition



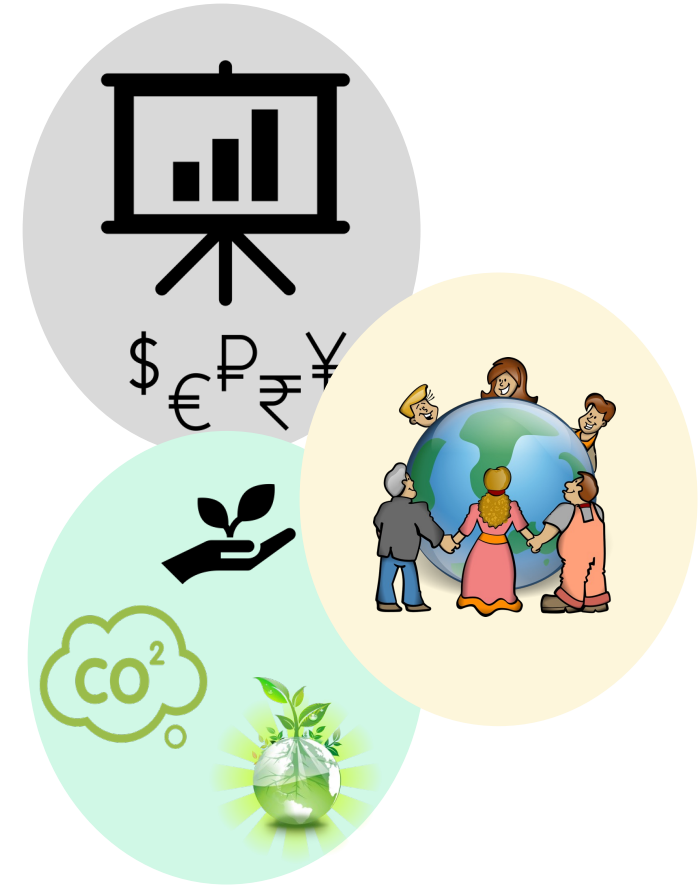
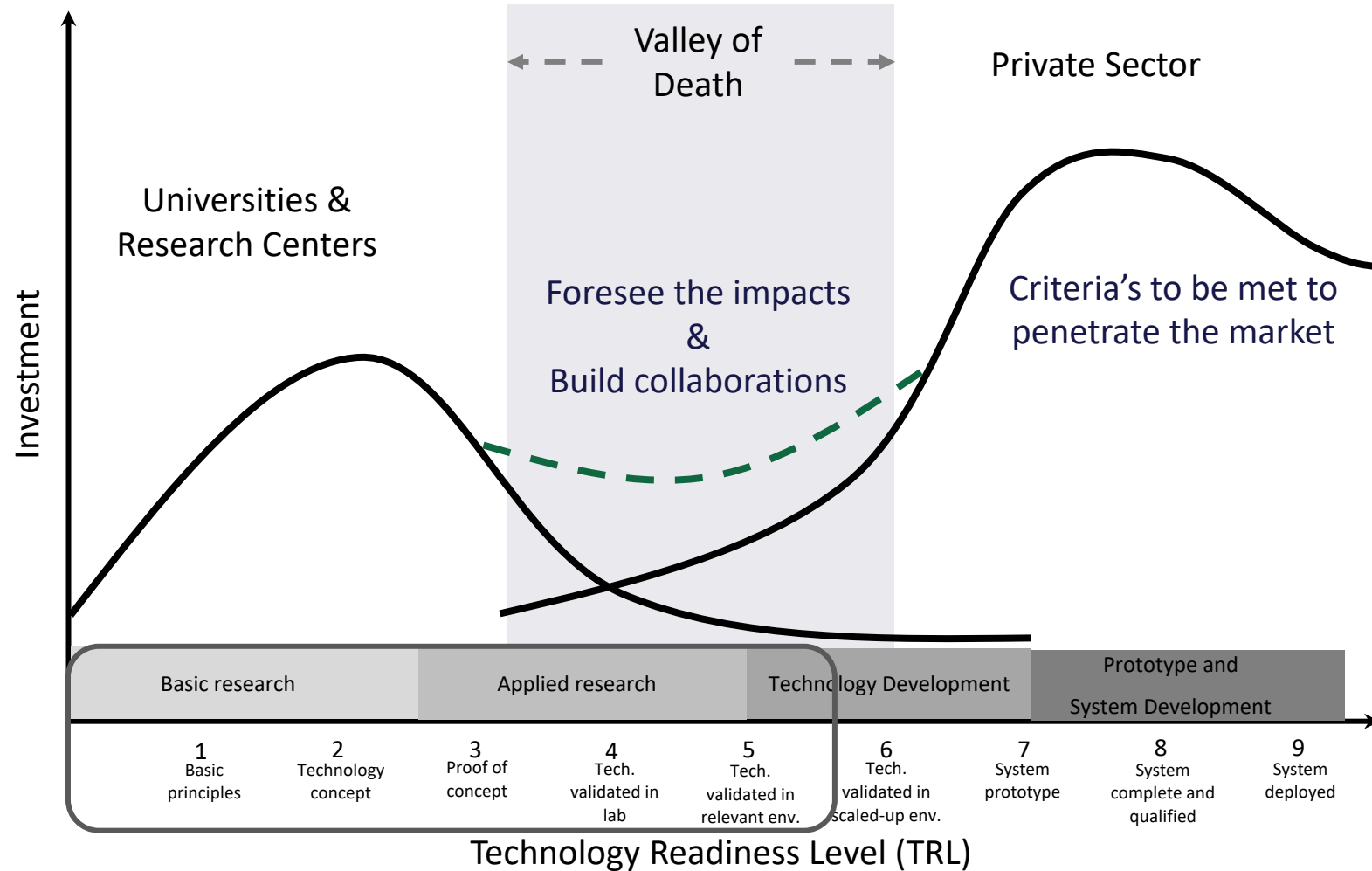
Sustainable Innovation at DTU Biosustain

Utilizing the power of precision fermentation

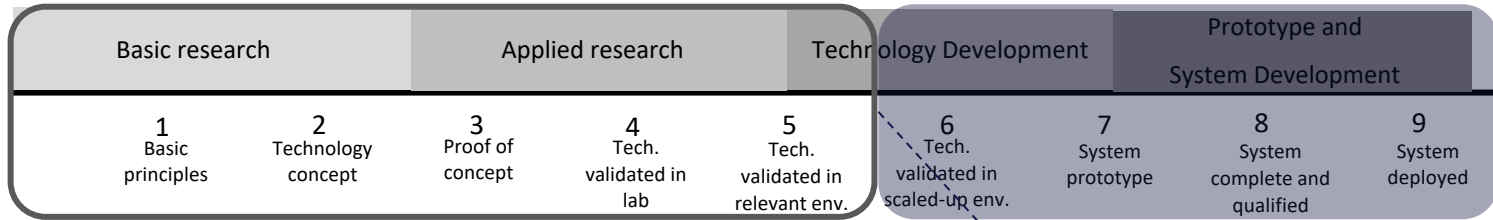




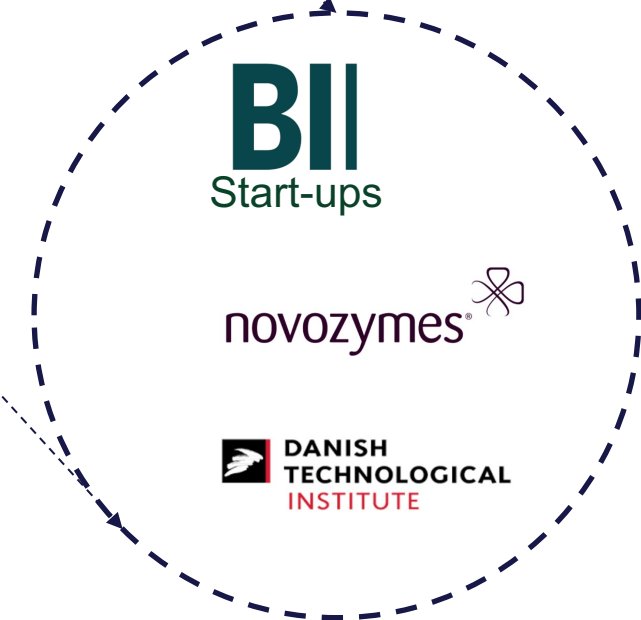
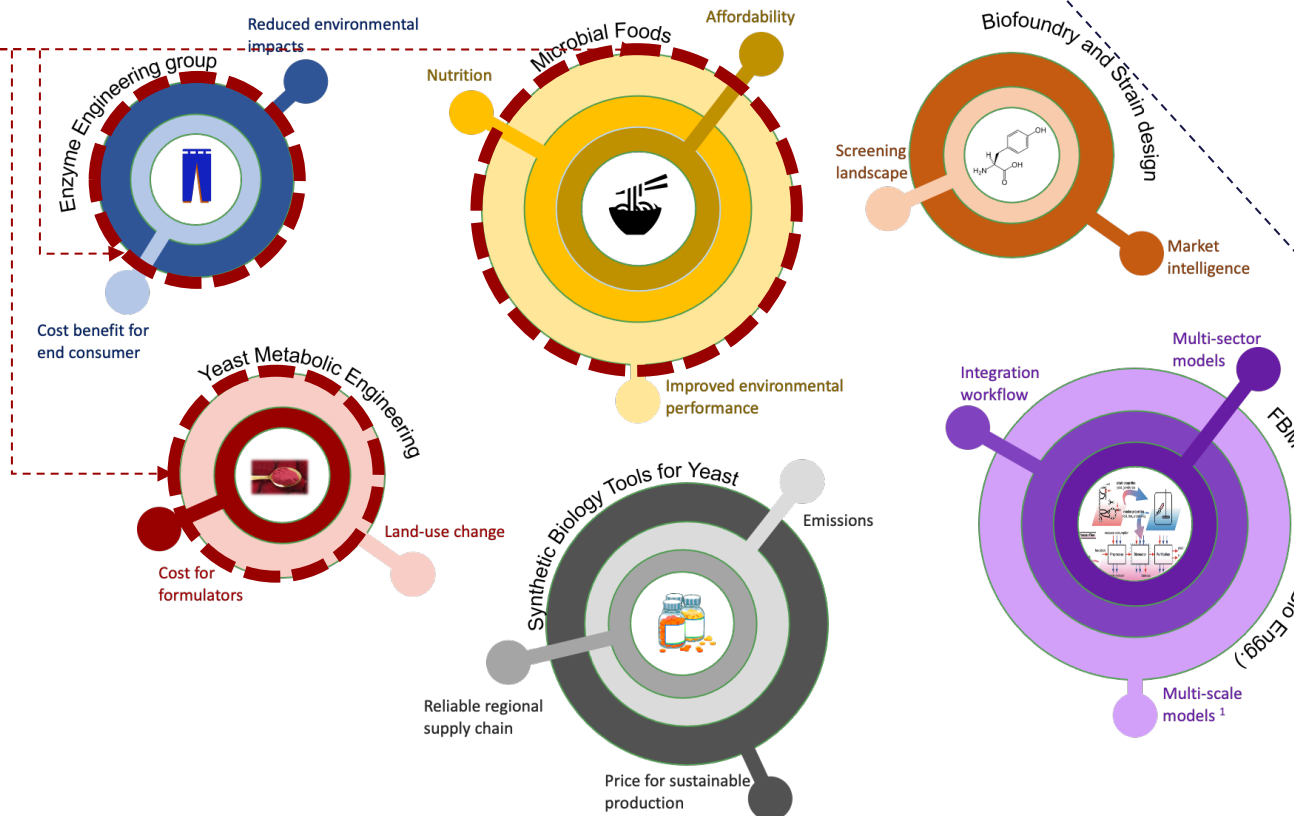
Identify Opportunities/Challenges at Early-Stages

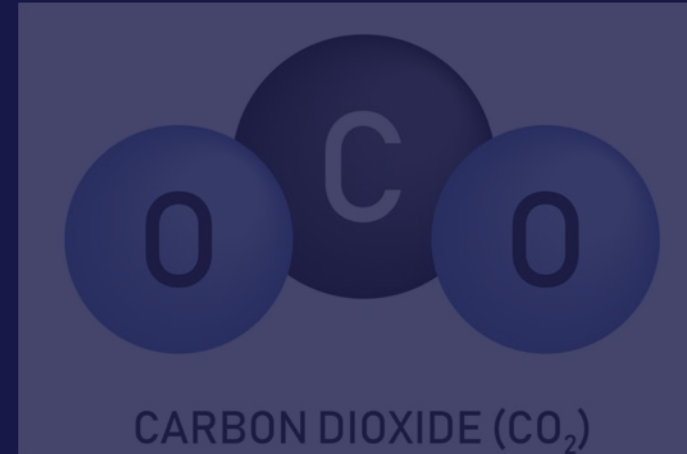
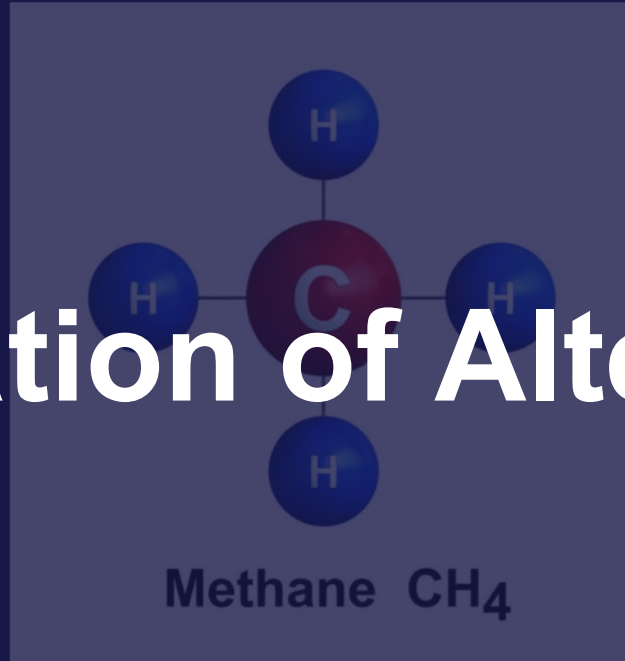


Projects Support: Industry Collaboration

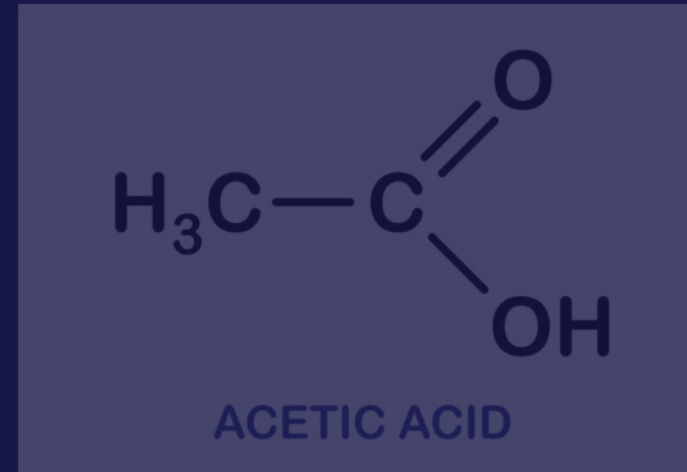


Focus on utilizing side streams

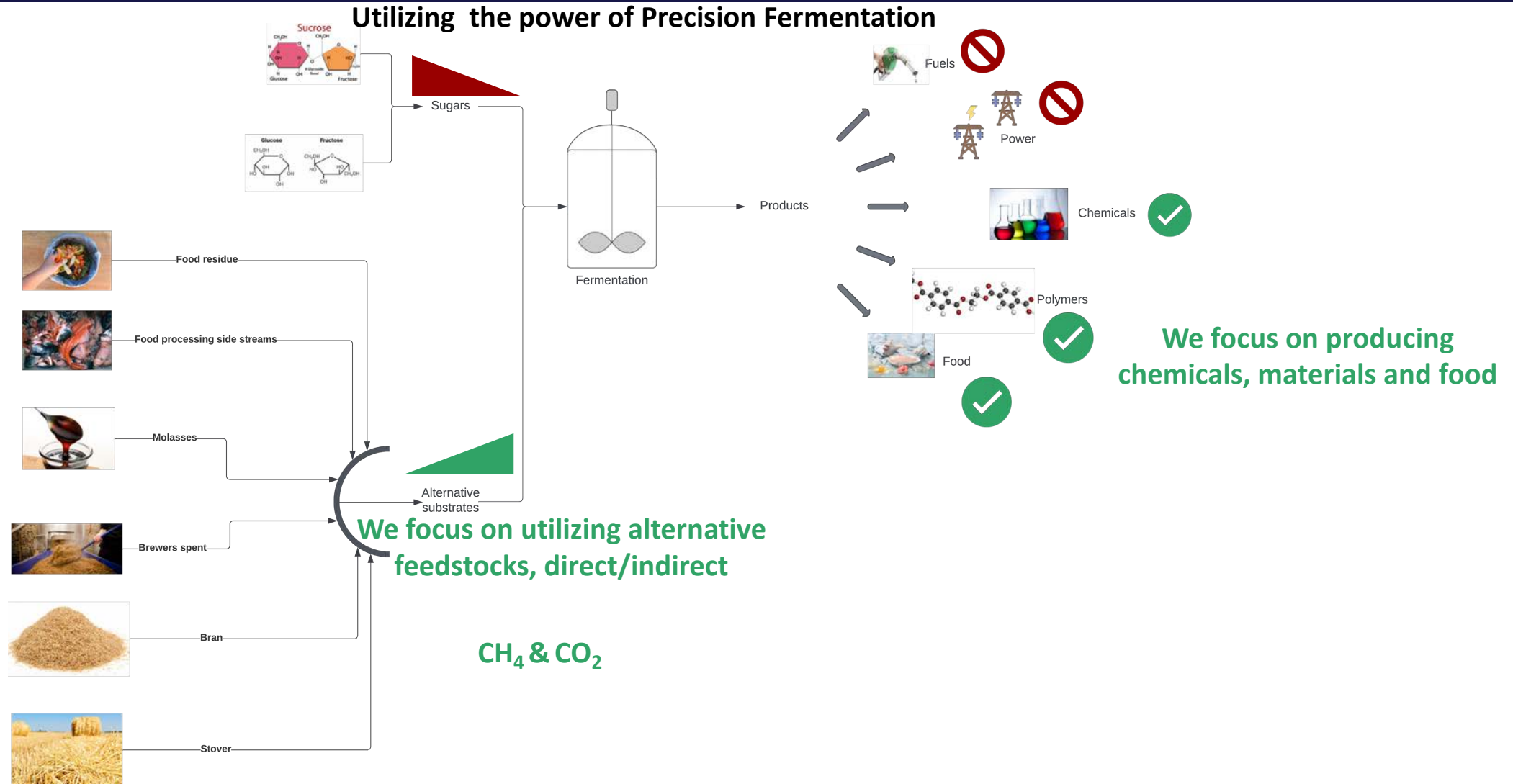




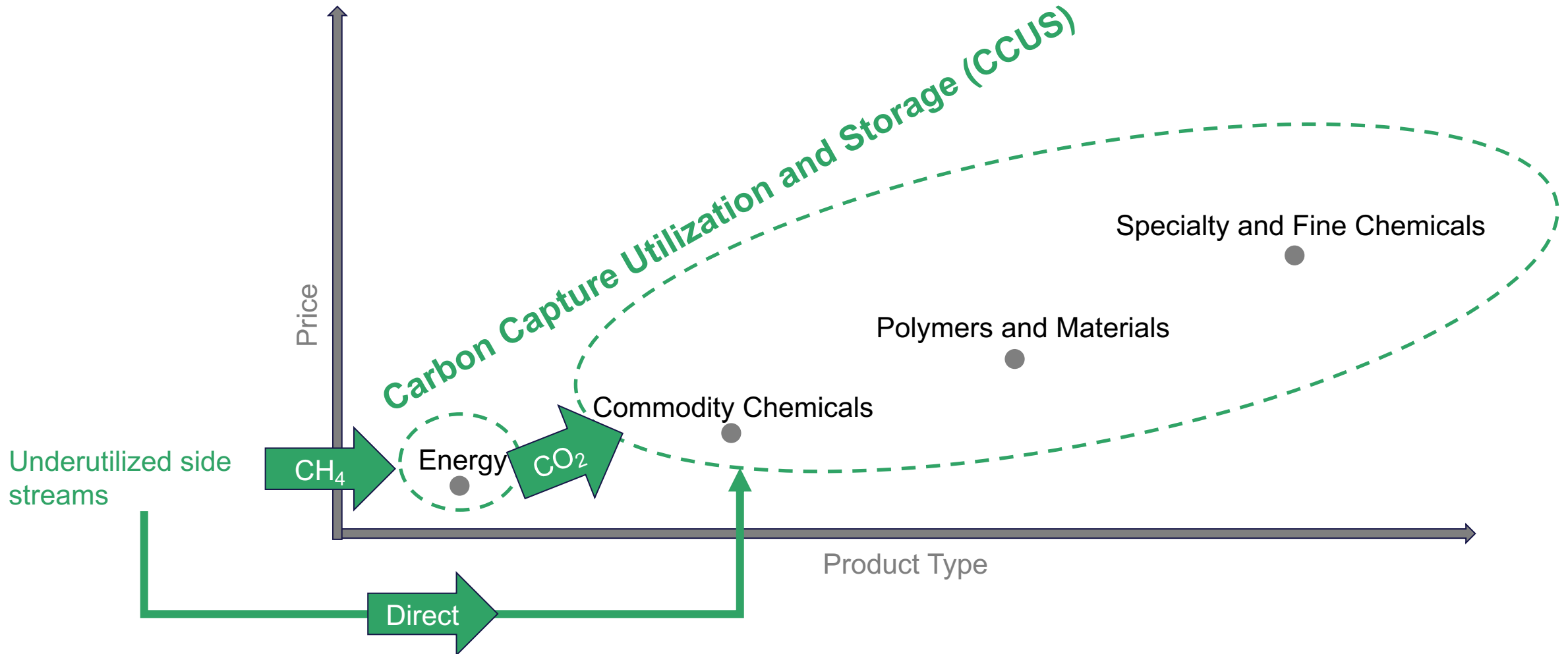
Utilization of Alternative Feedstocks



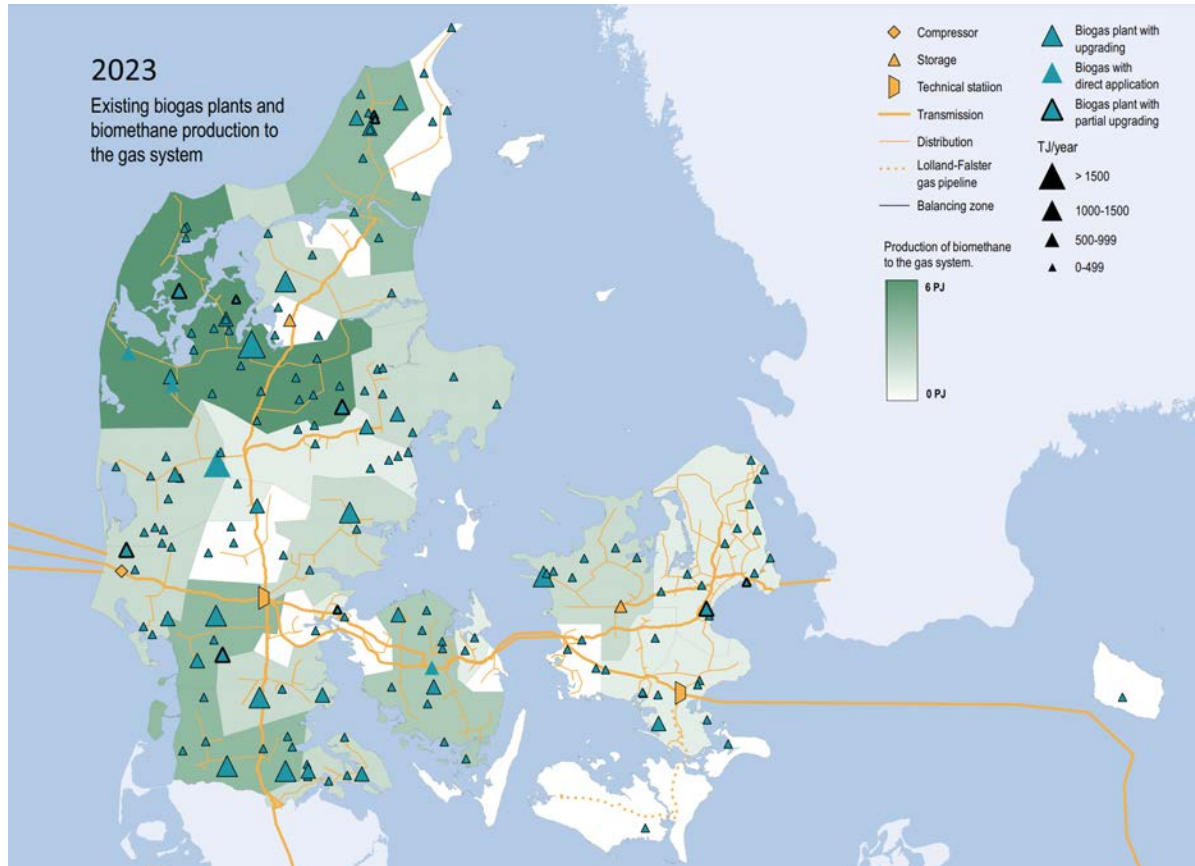
Our technologies focuses on side-stream utilization



Side Streams: Economic Potential and Outlook

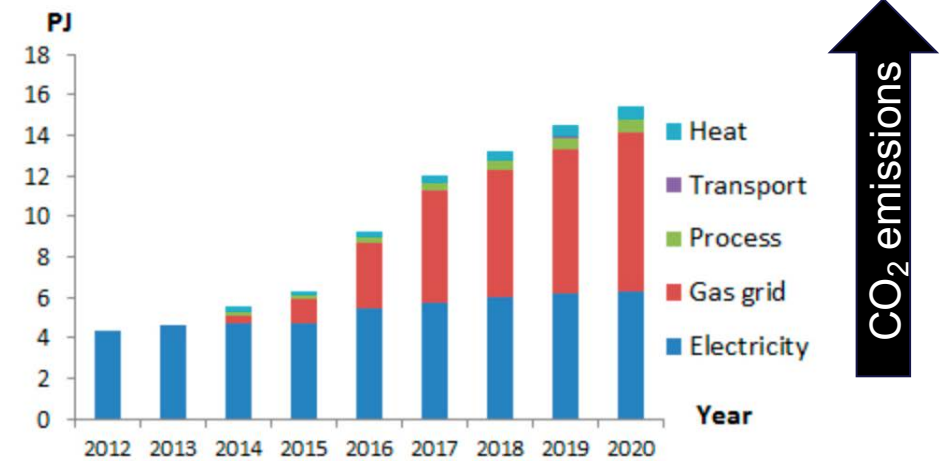


Biogas Storage and Supply Infrastructure

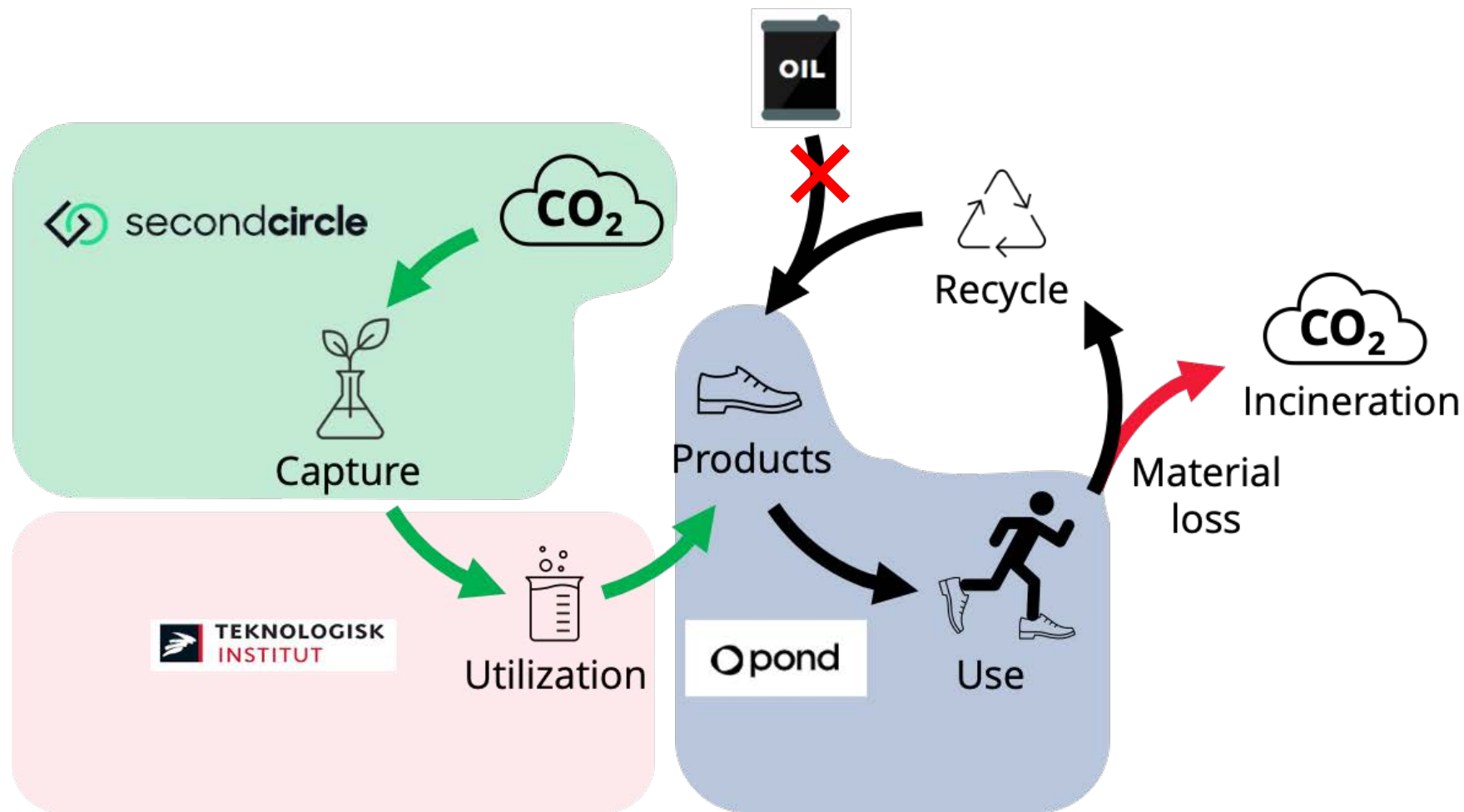


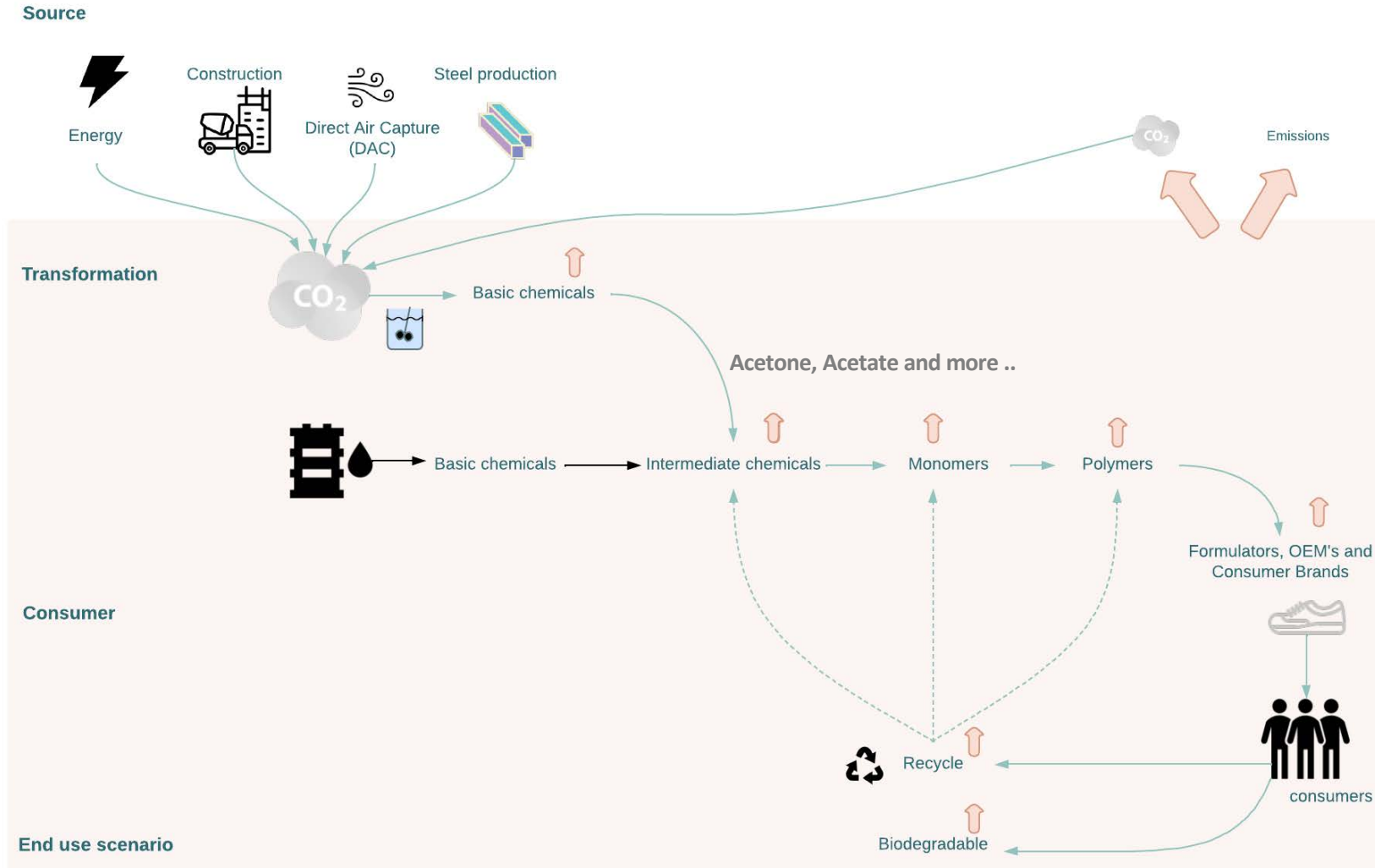
Biogas production, transport and storage map of Denmark

What happens to the emitted CO₂ ?



Historical and expected future biogas production and its use in Denmark 2012-2020.



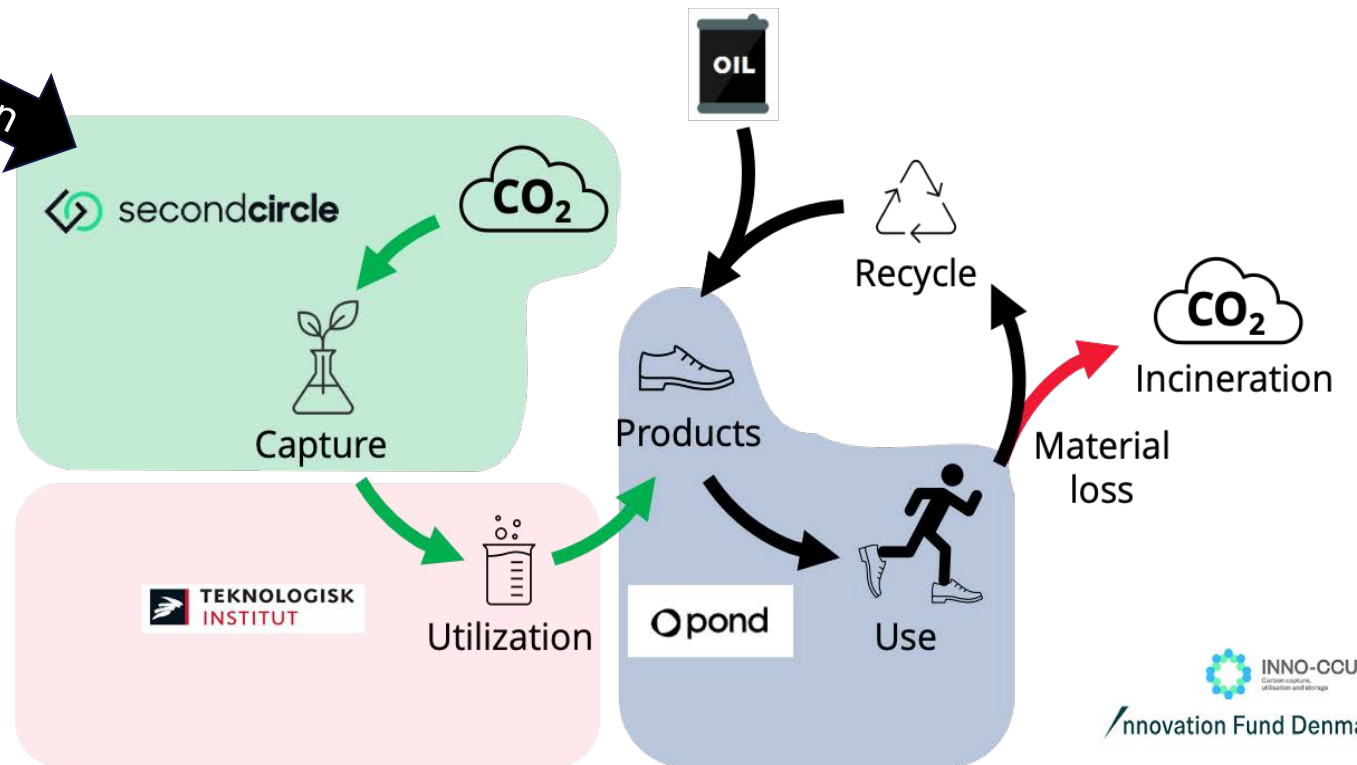


CCUS project: Developing New CO₂ Supply Chain



A snapshot of planned CO₂ pipeline in Denmark

CO₂ Utilization





what is the current use of sidestreams from aquaculture in your company / country / ?

Can we transform fish waste from a CCS to to a potential CCUS supply chain?

Advantages of production of high value chemicals in Iceland.

Denmark: Feed, fishmeal, oil and biogas



How can new chemicals from sidestreams best be fast-tracked to market?

What could be good target products?

Use existing policy driven value chains

Andreas Worberg & Sustainable Innovation Office Team Members

novo nordisk fonden

Benefiting people and society



- Andreas Worberg
 - Bernhard Palsson
 - Bo Skjold Larsen
 - Dina Petranovic Nielsen
 - Lars Nielsen
 - Evelyn Travnik
 - Jochen Forster
- DTU Sustain (QSA Section)
- Prof. Peter Fantke
 - Prof. Michael Hauschild
 - Dr. Morten Ryberg, Asst. Prof.

Jens Kindler

Ólafur Ögmundarson (University of Iceland)

Hariklia Gavalá (DTU Chemical Engg.)

Birte Kastrup Rasmussen

Darko Kjiproski

Secretariat, Administration, IT & Communications Team

Synthetic Biology Tools for Yeast & MIAMI H2020
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High Density Physiology
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Pre-Pilot Plant Team

Systems Environmental Microbiology
Pablo I Nikel

Strain Design Team
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Natural Products Genome Mining
Tilman Weber

Data and Software Engineering Team
Lea Mette Madsen Sommer

Bacterial Cell Factories
Alex T Nielsen

Thanks for Attention

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