Sustainability in bioeconomy

Bio4Products Webinar

7 April 2020

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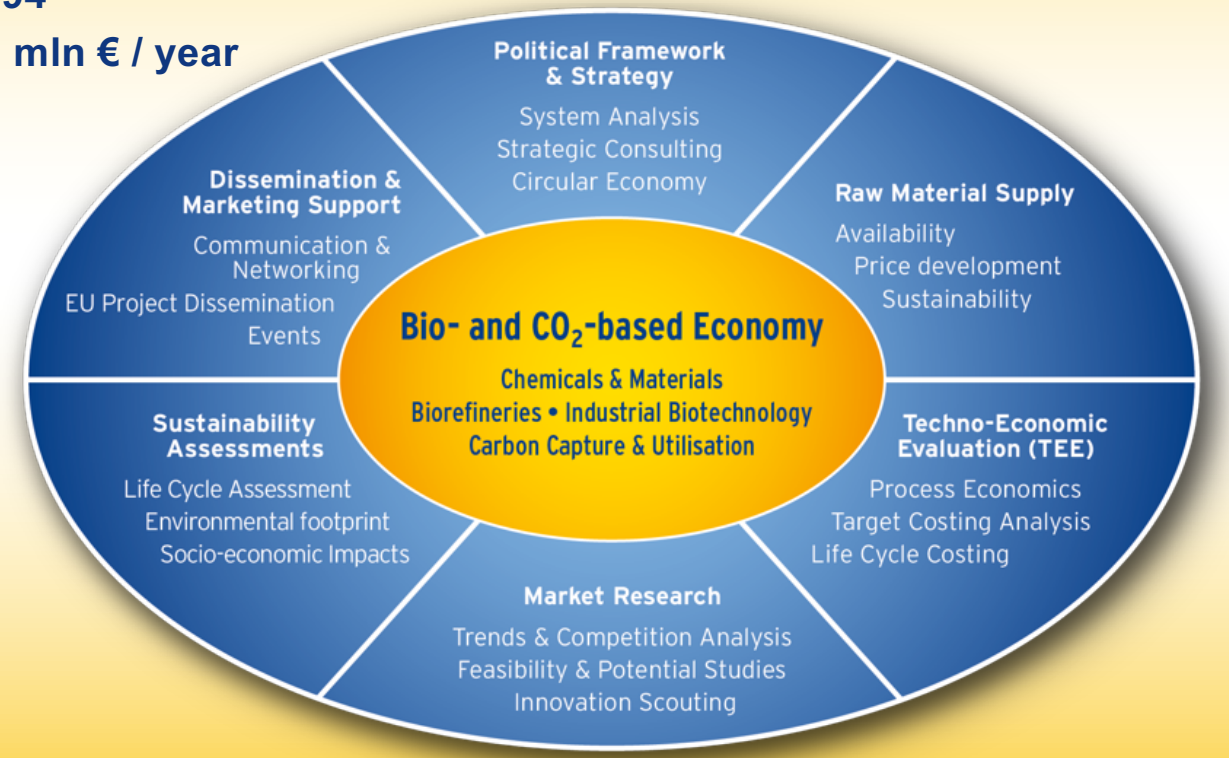
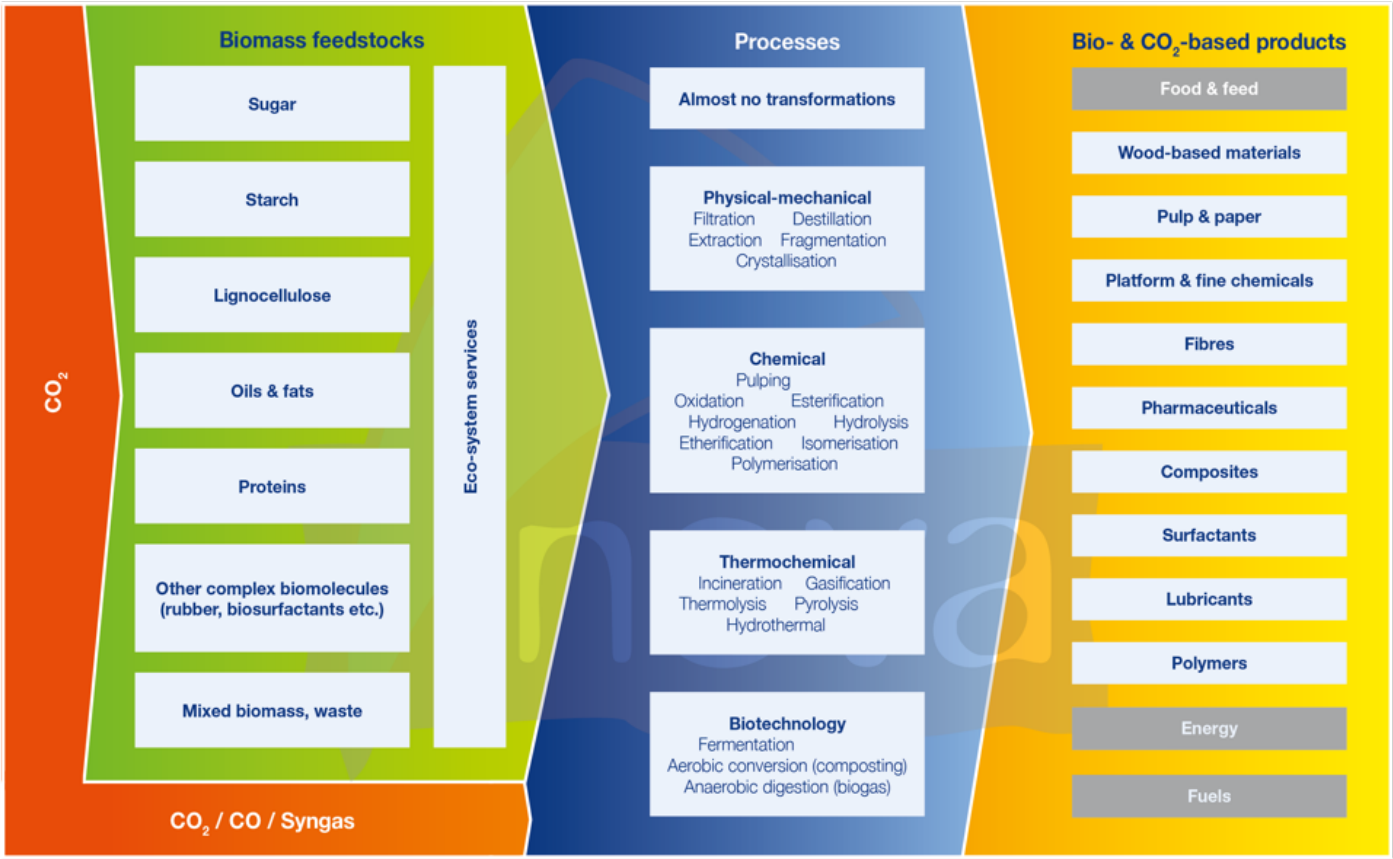
nova-Institut GmbH – SME

private and independent research institute
interdisciplinary, international team

- **Founded in 1994**
- **Turnover > 3.0 mln € / year**
- **35 employees**



Bio- and CO_2-based Economy: feedstocks, processes and products



Selected Customers from all Industrial Sectors

IKEA of Sweden
STAEDTLER
cefic
BMW
BCG
BIO-BASED INDUSTRIES Public-Private Partnership
LEGO
VELUX
BASF We create chemistry
faurecia inspiring mobility
Deloitte.
LEIFHEIT AKTIENGESELLSCHAFT
CLIB 2021
covestro
Ford
ECORYS
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Nestlé
european bioplastics
DSM
EY Building a better working world
playmobil
CO2 VALUE EUROPE
DUPONT
PORSCHE
KPMG
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Tetra Pak PROTECTS WHAT'S GOOD
WWF
NESTE
meo CONSULTING TEAM
NIA

Current Projects

European research projects

AFTERLIFE – Advanced Filtration Technologies for the Recovery and Later conversIon of relevant Fractions from wastewater. (09/2017 – 08/2021)

BioMonitor – Towards a method for the collection of statistical data on bio-based industries and bio-based products. (06/2018 – 05/2022)

BioRECO$_2$VER – Microbial platforms for CO_2-reuse processes in the low-carbon economy. (01/2018 – 12/2021)

CHASSY – Model-Based Construction and Optimisation of Versatile Chassis Yeast Strains For Production Of Valuable Lipid and Aromatic Compounds. (12/2016 – 12/2020)

MAGIC – Marginal lands for Growing Industrial Crops: Turining a burden into an opportunity. (06/2017 – 05/2021)

MARISURF – Novel marine derived biomolecules and industrial biomaterials. (09/2015 – 08/2020)

PEFerence – From bio-based feedstocks via di-acids to multiple advanced bio-based material with a preference for polythylene furanoate. (09/2017 – 04/2022)

ReSolve – REnewable SOLVEnts with high performance in application and improved toxicity profile. (06/2017 – 05/2020)

WoodCircus – Underpinning the vital role of the forest-based sector in the Circular Bio-Economy. (11/2018-10/2021)

Zelcor – Zero Waste Ligno-Cellulosic Biorefineries by Integrated Lignin Valorisation. (09/2016 – 08/2020)

National Projects

BioCOnversion – Bioconversion of CO/syngas into a plastic precursor. (04/2018 – 04/2021)

BioSinn: Steckbriefe sinnvoll biologisch abbaubarer Produkte aus Basis von nawaRo (11/2019 – 10/2020)

EvaChem: Verbundvorhaben: Entwicklung eines praktikablen Multikriterien-Systems zur Evaluierung der Chemikalienproduktion (10/2019 – 03/2021)

WeRümA – Werkstoffentwicklung auf Basis von Rübenschnitzeln für marktrelevante Anwendungen. (01/2017 – 12/2020)

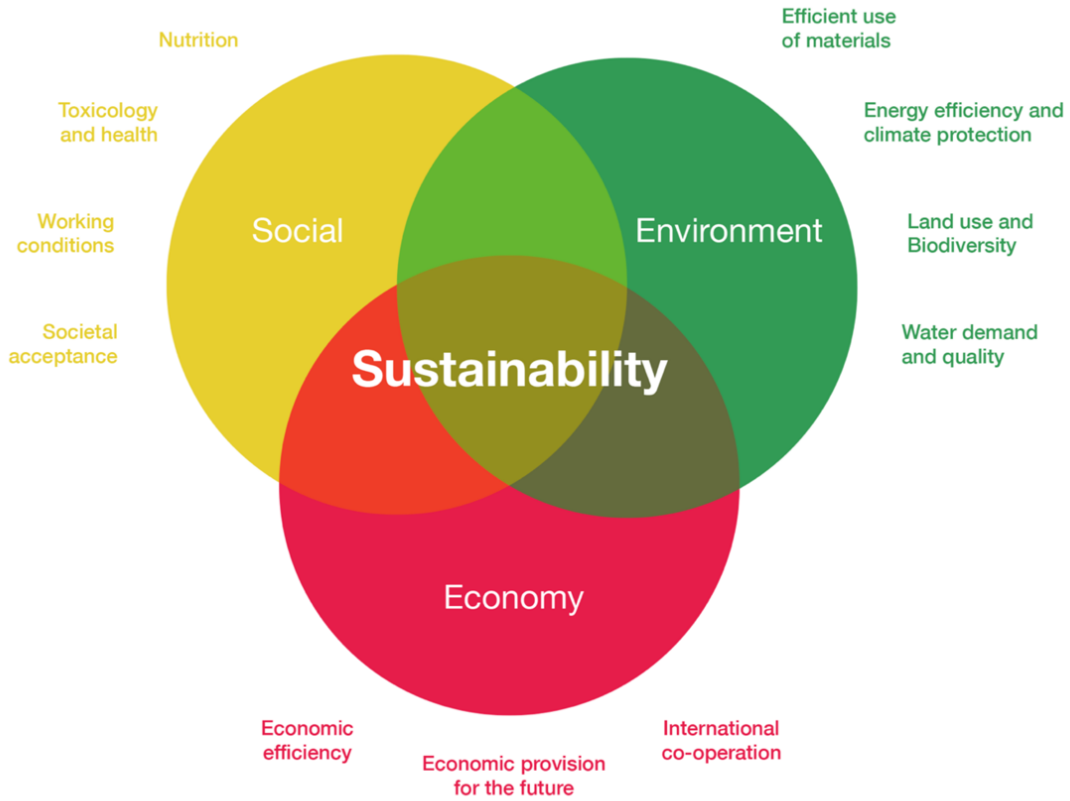
nova-Institute's Sustainability Department

What is sustainability?

Gro Harlem Brundtland 1983: Sustainable development is defined as a *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs.“*

Sustainability – UN SDGs

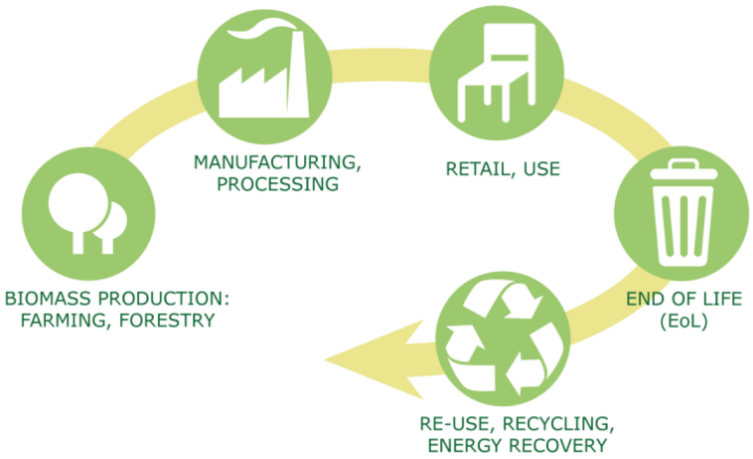
Dimensions of sustainability



What is sustainable?

How to assess environmental sustainability?

→ Life Cycle Assessment



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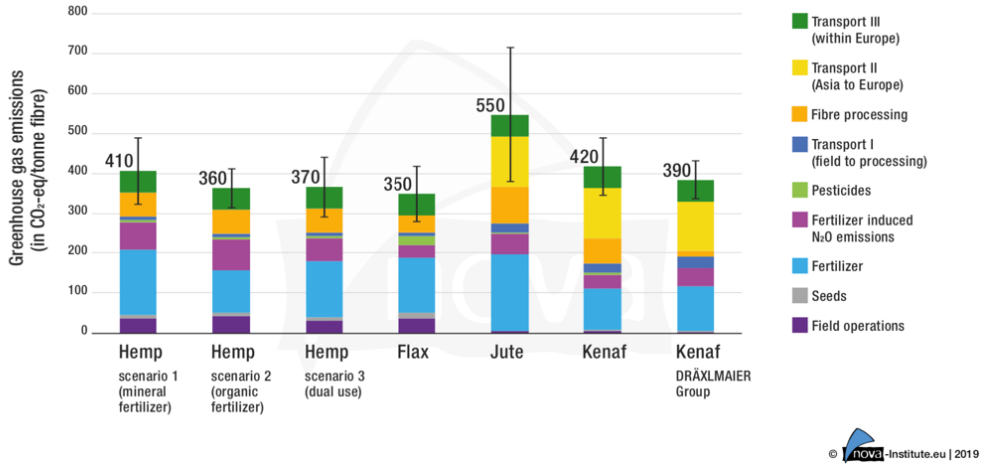

Challenge 1 – Different impacts

Results for different impact categories

	Bio-based Products	Fossil-based Products
Global Warming Potential	better	
Abiotic Depletion Potential	better	
Land use		better
Water use		better
Eutrophication		better
Biodiversity		better

Decision making becomes challenging

Challenge 2 – Economies of scale

Bio-based products often early state of development - Labscale, pilot plant, etc.

Industry plants in large scale and optimized since decades.

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http://uskings.us/Userfiles/Upload/images/AP-RITA-REFINERIES-Port-Arthur-Texas.JPG

Challenge 3 – Future scenarios

Bio-based products

- Higher yield in agriculture
- Green energy to run processes

Fossil-based products

- Mining of the reserves becomes more expensive
- Credits for burning fossil-based products become less

Future scenarios seem to be more favorable for bio-based materials

Resumee

Sustainability assessment in the bioeconomy is challenging

LCAs are today sometimes unfair in comparison with fossil counterparts

But: Meaningful LCAs are absolutely necessary to decide on future pathways

13th International Conference on Bio-based Materials

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12.-13. May 2020

Maternushaus | Cologne | Germany

Thank you for your attention!

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Life Cycle Assessment
Sustainability
Renewable Carbon

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