



Sustainability in bioeconomy

Bio4Products Webinar

7 April 2020

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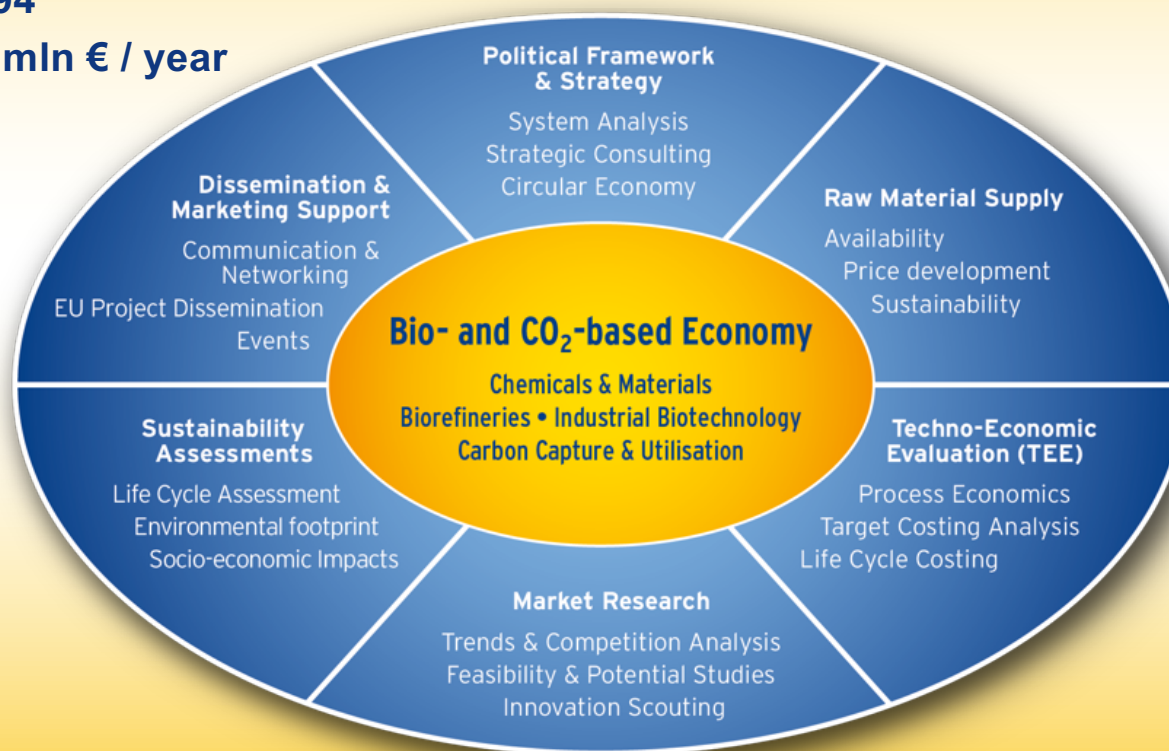
nova-Institut GmbH, Hürth (Cologne), Germany



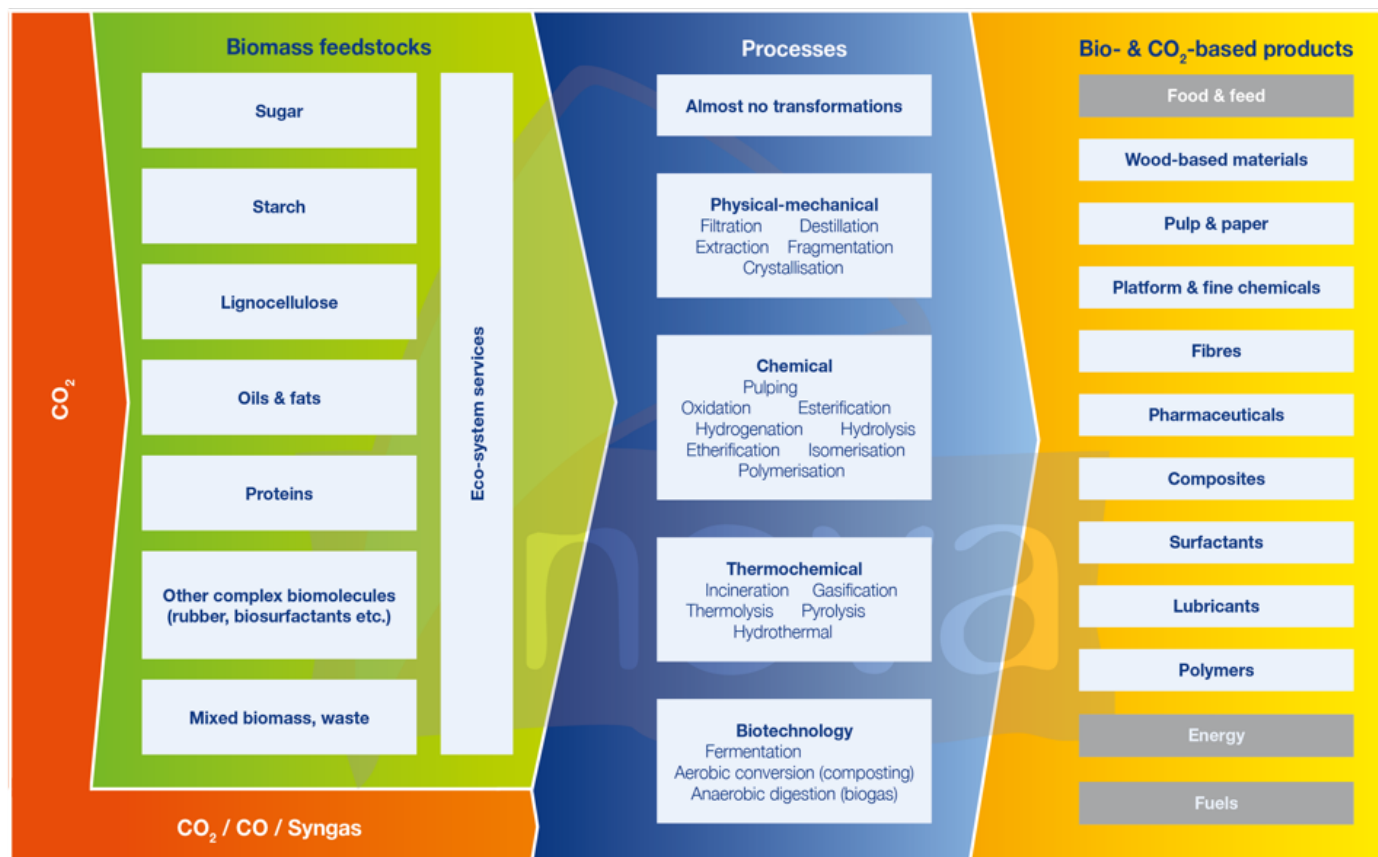
nova-Institut GmbH – SME

private and independent research institute
interdisciplinary, international team

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



Bio- and CO₂-based Economy: feedstocks, processes and products





Selected Customers from all Industrial Sectors



IKEA of Sweden





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)

BioRECO₂VER – Microbial platforms for CO₂-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: Turning 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 diacids to multiple advanced bio-based material with a preference for polyethylene 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 auf 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)





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."*



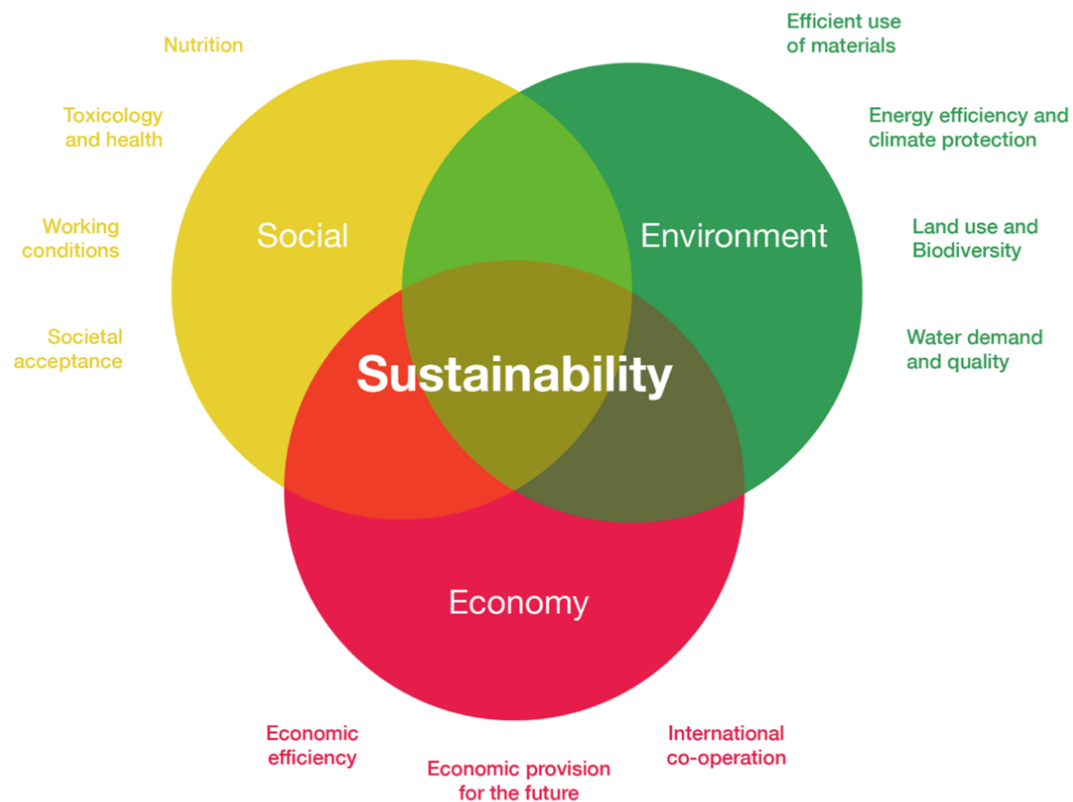


Sustainability – UN SDGs





Dimensions of sustainability



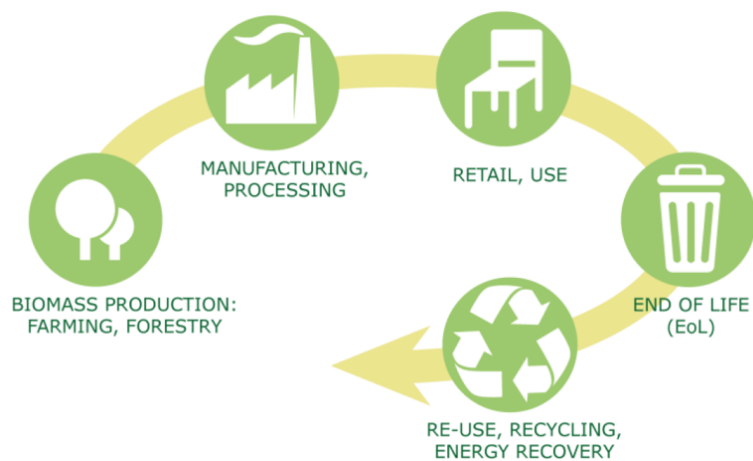


What is sustainable?

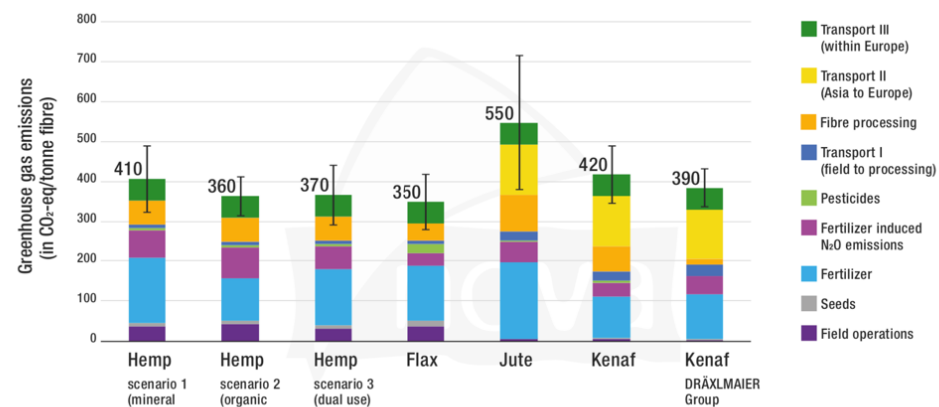


How to assess environmental sustainability?

→ Life Cycle Assessment



https://ec.europa.eu/jrc/sites/jrcsh/files/20190522-lca_fw_.png



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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.



<https://i.pinimg.com/236x/2e/b5/e2/2eb5e292415c74bd956635f980b7db2f.jpg>
<http://usking.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



Resume



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

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Thank you for your attention!



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Life Cycle Assessment

Sustainability

Renewable Carbon

