RENEWABLE MATERIALS CONFERENCE 2021

18-20 May - Online Event

CONFERENCE JOURNAL

All renewable material solutions at one event: bio-based, CO_2-based and recycled. The Renewable Materials Conference will provide new advantages and synergies by establishing a meeting point for numerous cross-sectoral networking opportunities.

First day: Renewable Chemicals and Building Blocks from Biorefineries, CCU and Chemical Recycling

Second day: Renewable Polymers and Plastics from Biomass, CO_2 and Recycling, Innovation Award

Third day: Renewable Plastics and Composites, Packaging and Biodegradation

Organiser

nova-institute.eu

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2021-05-20

www.renewable-materials.eu

RENEWABLE MATERIALS CONFERENCE 2021

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Conference Advisory Board

We would like to thank the experts of the conference advisory board for their great help in selecting the best papers submitted.

Christiaan Bolck
Wageningen UR (NL)

Jörg Müssig
Hochschule Bremen - University of Applied Sciences (DE)

Michael Costello
Stahl Holding B.V. (NL)

Jan Ravenstijn
Jan Ravenstijn Consulting (NL)

Doris De Guzman
Tecnon OrbiChem (US)

Sarah Refai
CLIB -Cluster Industrielle Biotechnologie e.V. (DE)

Ludo Diels
VITO (BE)

Gudbrand Rødsrud
Borregaard AS (NO)

Matthias Gluth
WWF Deutschland (DE)

Alastair Sanderson
Unilever Research and Development (UK)

Reinier Grimbergen
TNO Voltachem (NL)

Haralabos Zorbas
Industrielle Biotechnologie Bayern Netzwerk GmbH (IBB) (DE)

Conference Team

Michael Carus
CEO
michael.carus@nova-institut.de

Verena Bauchmüller
Innovation Award & Speaker Support
+49 (0)2233 4814-01
verena.bauchmueller@nova-institut.de

Marla Carus
Speaker Management
+49 175 2677027
marla.carus@nova-institut.de

Vanessa Kleinpeter
Contact & Registration
+49 (0)2233 4814-40
vanessa.kleinpeter@nova-institut.de

Jutta Millich
Media & Partnerships
+49 (0)561 50358044
jutta.millich@nova-institut.de

Guido Müller
Sponsoring & Alliances
+49 (0)2233 4814-44
guido.mueller@nova-institut.de

Dr. Asta Partanen
Chairwoman, Sponsoring & Award
+49 (0)2233 4814-59
asta.partanen@nova-institut.de

Dominik Vogt
Conference Manager
+49 (0)2233 4814-49
dominik.vogt@nova-institut.de

Ticket Fee

Online Conference (18-20 May 2021) **450 €**

Twitter
#2021RMC

Research and Science-based Consulting Services

nova-Institute is a private and independent research institute, founded in 1994; nova offers research and consultancy with a focus on the smart transition of the chemical and material industry to renewable carbon.

- What are future challenges, environmental benefits and successful strategies to substitute fossil carbon with biomass, direct CO_2 utilisation and recycling?
- What are the most promising concepts and applications?

We offer our unique understanding to support the transition of your business into a climate neutral future.

Strategic & One-on-One Consulting

Michael Carus
+49 (0)2233 4814-40
michael.carus@nova-institut.de

Political Framework & Social Impact Assessment

Christopher vom Berg
+49 (0)2233 4814-61
christopher.vomberg@nova-institut.de

on temporary leave

Market Research & Technology Scouting

Achim Raschka
+49 (0)2233 4814-51
achim.raschka@nova-institut.de

Life Cycle & Sustainability Assessments Critical Reviews

Matthias Stratmann
+49 (0)2233 4814-68
matthias.stratmann@nova-institut.de

Workshops & Stakeholder Engagement

Linda Engel
+49 (0)151 19 52 47 31
linda.engel@nova-institut.de

Contact us directly or learn more at **www.nova-institute.eu**

nova-Institut für politische und ökologische Innovation GmbH

Chemiepark Knapsack
Industriestraße 300
50354 Hürth, Germany

Tel. +49 (0) 2233 - 48 14 40
Fax +49 (0) 2233 - 48 14 50
contact@nova-institut.de

nova Institute for Ecology and Innovation

A warm welcome to the first Renewable Materials Conference!

Michael Carus
CEO

We are overwhelmed by the response to our new and unique Renewable Materials Conference. Record submissions for presentations and the Innovation Award exceeded our expectations. So did the number of participants.

We set up this new conference to build bridges between the diverse solutions of the bioeconomy, the emerging utilisation of CO_2 and the latest advanced recycling technologies. For the first time since the industrial revolution, these three renewable carbon sources together enable us to decouple the production of chemicals and materials from crude oil. At the Renewable Materials Conference, we will get to know and discuss particularly exciting solutions from all three areas.

Building bridges means bringing different sectors together for the first time. And triggering synergy effects: Creating new connections and broadening networks from start-ups with new technologies, innovative SMEs, large corporations and investors to brands looking for sustainable materials and willing to drive the demand for new solutions.

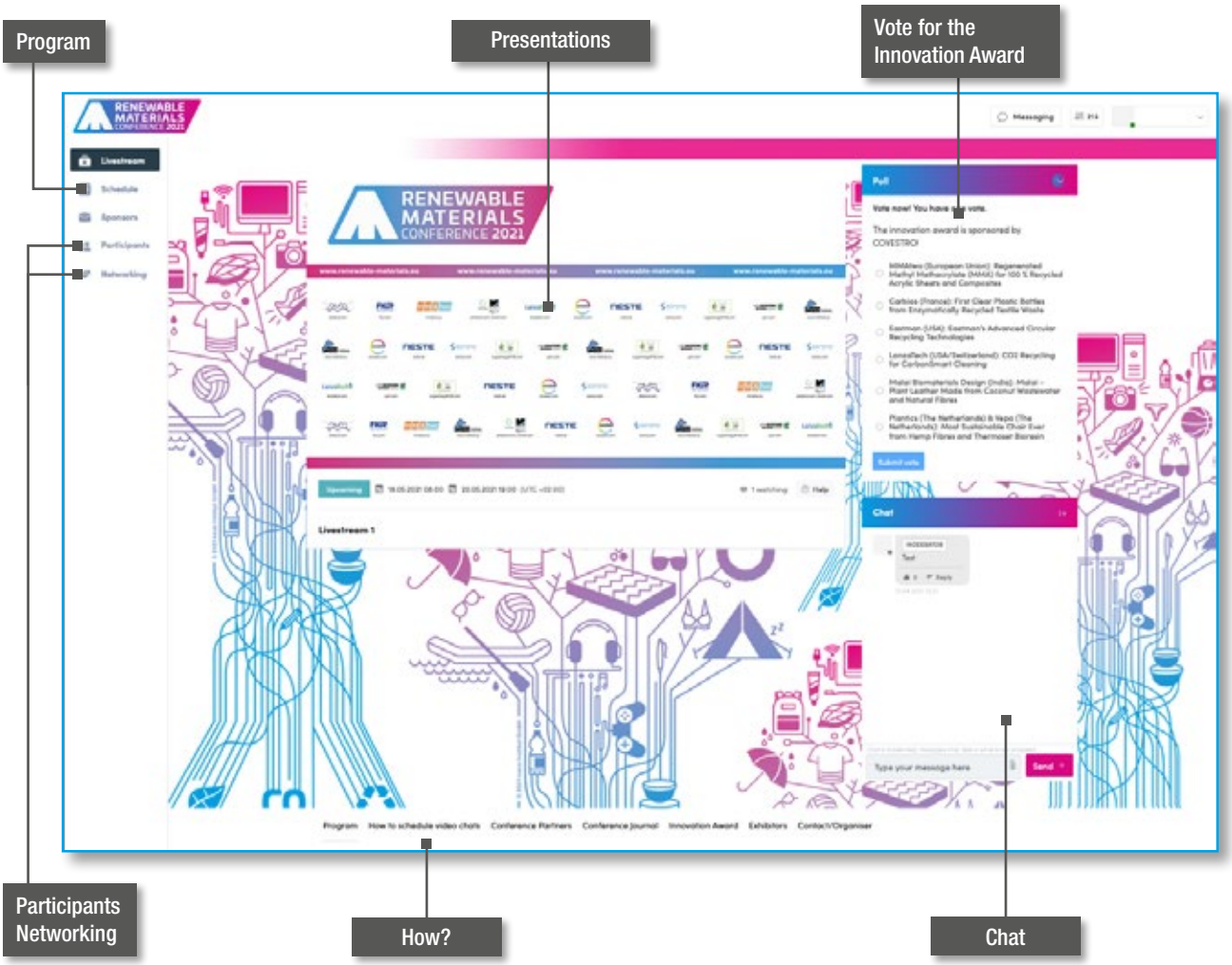
We hope that the Renewable Materials Conference will make a significant contribution to the raw material shift towards products made from renewable carbon.

We wish all participants three exciting and stimulating days, many new ideas and, above all, contacts that reach far beyond their existing networks. Our special conference software enables you to engage in active exchange online – make use of it!

Michael Carus, founder and CEO of nova-Institute

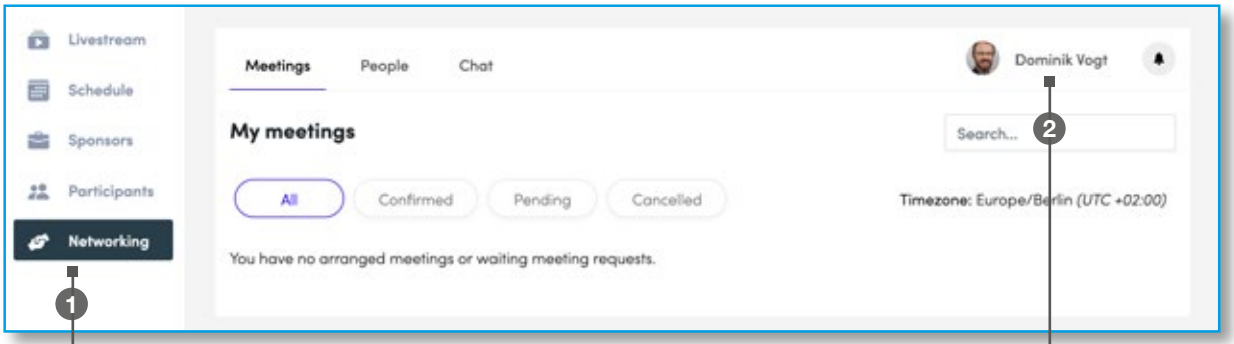
Online networking opportunities

Arrange video chats with promising conference participants – during the networking time (8:00 - 09:15 (CET), lunchtime and late afternoon) or parallel to the presentations. Every registered participant has access to the networking tool. After you have been logged in successfully you can adjust your profile and your personal time slots and you can directly arrange meetings with other participants of your choice.

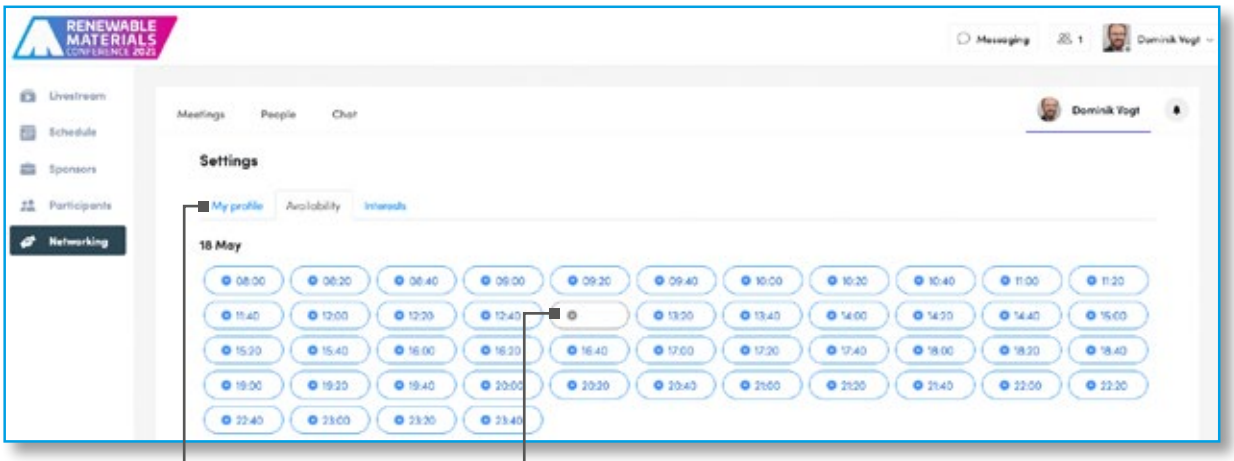


RENEWABLE MATERIALS CONFERENCE 2021

Manage availabilities and interests



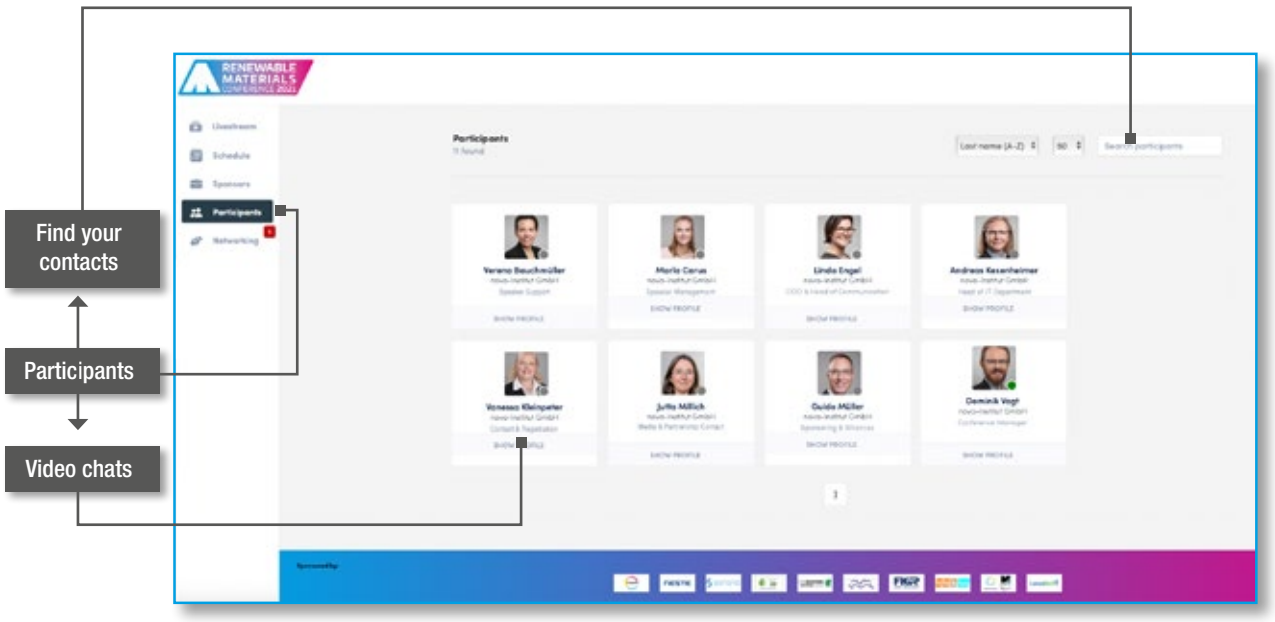
Click “Networking” in the left menue (1) and afterwards click on your name in the upper right corner (next to the bell) (2) to open your profile and settings



Fill out your profile and set up your availabilities and interests

Turns into grey by clicking and shows your **non-availability**

Get in contact



All advantages at a glance

- Video chat tool - meet decision makers of the industry – 1-on-1
- Find new networking and business opportunities via direct contact or topic search
- Arrange meeting time with ease based on available time slots
- Manage all your meetings in one simple user-friendly environment
- Get alerts for meeting requests

You are not registered yet or you have questions about the networking tool? Dominik Vogt will help you.

Dominik Vogt
dominik.vogt@nova-institut.de

20% DISCOUNT | CODE: RMC20
VALID FROM 18 MAY TO 18 JUNE

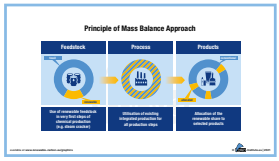
Market and Trend Reports

nova Institute for Ecology and Innovation

NEW

Bio-based Naphtha and Mass Balance Approach

Status & Outlook, Standards & Certification Schemes

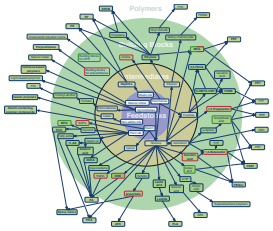


Authors: Michael Carus, Doris de Guzman and Harald Käb
March 2021

This and other reports on renewable carbon are available at **www.renewable-carbon.eu/publications**

DATA FOR 2020

Bio-based Building Blocks and Polymers – Global Capacities, Production and Trends 2020–2025



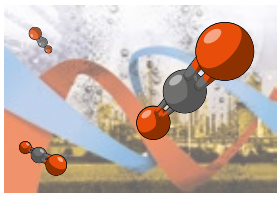
Authors: Pia Skoczinski, Michael Carus, Doris de Guzman, Harald Käb, Raj Chinthapalli, Jan Ravenstijn, Wolfgang Baltus and Achim Raschka
January 2021

This and other reports on renewable carbon are available at **www.renewable-carbon.eu/publications**

REVISED AND EXTENDED 2021

Carbon Dioxide (CO_2) as Chemical Feedstock for Polymers

Technologies, Polymers, Developers and Producers



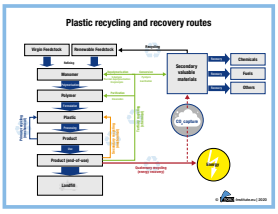
Authors: Pauline Ruiz, Achim Raschka, Pia Skoczinski, Jan Ravenstijn and Michael Carus, nova-Institut GmbH, Germany
January 2021

This and other reports on renewable carbon are available at **www.renewable-carbon.eu/publications**

NEW

Chemical recycling – Status, Trends and Challenges

Technologies, Sustainability, Policy and Key Players



Author: Lara Krause, Florian Dietrich, Pia Skoczinski, Michael Carus, Pauline Ruiz, Lara Dammer, Achim Raschka, nova-Institut GmbH, Germany
November 2020

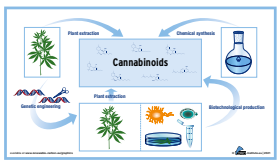
This and other reports on the bio- and CO_2-based economy are available at **www.renewable-carbon.eu/publications**

THE BEST MARKET REPORTS AVAILABLE

Bio- and CO_2-based Polymers & Building Blocks

Production of Cannabinoids via Extraction, Chemical Synthesis and Especially Biotechnology

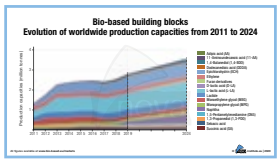
Current Technologies, Potential & Drawbacks and Future Development



Authors: Pia Skoczinski, Franjo Grotenhermen, Bernhard Beitzke, Michael Carus and Achim Raschka
January 2021

This and other reports on renewable carbon are available at **www.renewable-carbon.eu/publications**

Commercialisation updates on bio-based building blocks



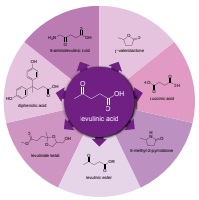
Author:
Doris de Guzman, Tecnon OrbiChem, United Kingdom

Updated Executive Summary and Market Review May 2020 – Originally published February 2020

This and other reports on the bio- and CO_2-based economy are available at **www.bio-based.eu/reports**

Levulinic acid – A versatile platform chemical for a variety of market applications

Global market dynamics, demand/supply, trends and market potential

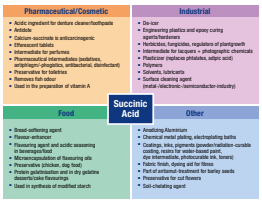


Authors: Achim Raschka, Pia Skoczinski, Raj Chinthapalli, Ángel Puente and Michael Carus, nova-Institut GmbH, Germany
October 2019

This and other reports on the bio-based economy are available at **www.bio-based.eu/reports**

Succinic acid – From a promising building block to a slow seller

What will a realistic future market look like?



Authors: Raj Chinthapalli, Ángel Puente, Pia Skoczinski, Achim Raschka, Michael Carus, nova-Institut GmbH, Germany
October 2019

This and other reports on the bio-based economy are available at **www.bio-based.eu/reports**

Standards and labels for bio-based products

Authors: Lara Dammer, Michael Carus and Dr. Asta Partanen nova-Institut GmbH, Germany
May 2017

This and other reports on the bio-based economy are available at **www.bio-based.eu/reports**

Bio-based polymers, a revolutionary change

Comprehensive trend report on PHA, PLA, PUR/TPU, PA and polymers based on FDCA and SA: Latest developments, producers, drivers and lessons learnt

E-mail: j.ravenstijn@kpnmail.nl
Mobile: +31.6.2247.8593

Author: Jan Ravenstijn, Jan Ravenstijn Consulting, the Netherlands
April 2017

This and other reports on the bio-based economy are available at **www.bio-based.eu/reports**

narocon

Market study on the consumption of biodegradable and compostable plastic products in Europe 2015 and 2020

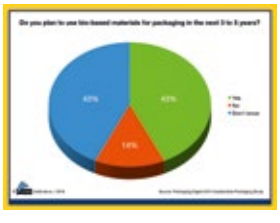
A comprehensive market research report including consumption figures by polymer and application types as well as by geography, plus analyses of key players, relevant policies and legislation and a special feature on biodegradation and composting standards and labels

Bestsellers

Authors: Harald Kaeb (narocon, lead), Florence Aeschelmann, Lara Dammer, Michael Carus (nova-Institute)
April 2016

This and other reports on the bio-based economy are available at **www.bio-based.eu/reports**

Brand Views and Adoption of Bio-based Polymers



Author: Dr. Harald Kaeb, narocon Innovation Consulting, Germany
January 2016

This and other reports on the bio-based economy are available at **www.bio-based.eu/reports**

www.renewable-carbon.eu/publications

1ST DAY OF CONFERENCE | 18 MAY 2021 (10-18:30, CET)

Networking

08:00 - 09:30 **1:1 Meetings – Schedule Video Chats with the Participants!**

Conference Opening

Chairpersons of the day
Michael Carus, CEO and Asta Partanen, Senior expert
nova-Institute (DE)

09:30 **Michael Carus**
nova-Institute (DE)
Renewable Carbon is the Key, the Renewable Carbon Initiative (RCI)

Biorefineries

09:45 **Gudbrand Rødsrud**
Borregaard (NO)
Potentials, Challenges and Strategies to Meet Them for an Advanced Biorefinery under the Current Situation

10:10 **Rahul Dagwar**
Cosun Beet Company (NL)
Sugar Beet as a Sustainable Source of Inspiration for Innovation in Bio-based Chemicals and Materials

10:35 **Karolien Vanbroekhoven**
VITO (BE)
Applications from Lignin and its Derivatives – is There More Than Burning it?

11:00 **Joop Groen**
Circular Biobased Delta (NL)
CHAPLIN Program: Bio-based Asphalt for Sustainable Roads

11:25 **Okko Ringena**
UPM Biochemicals (DE) (FI)
Keynote – Closing the Circle – the Role of Bio-based Carbon within a Carbon Neutral Economy

11:50 **Lars Börger**
Neste (DE) (FI)
Keynote – Change runs on Renewables – how Neste closes Gaps with Existing and new Renewable Carbon Sources

12:15 **Panel Discussion with all Speakers of the Session and Special Panelists:**
Doris de Guzman, Tecnon OrbiChem (US/UK), Ludo Diels, VITO (BE),
Tim Yin, Zhejiang Sugar Energy Technology (CN)

12:35 **Break**

RENEWABLE MATERIALS CONFERENCE 2021

1ST DAY OF CONFERENCE | 18 MAY 2021 (10-18:30, CET)

CO_2-based Chemistry


12:55 **Robert Blok**
RENOLIT GROUP (DE)
Véronique de Bruijn
Photanol (NL)
Chemicals Out of CO_2 – Making the Chemical Industry Carbon Footprint Neutral

13:45 **Jörg Dehmel**
Shell Energy and Chemicals (DE)
Renewable Material in the Petrochemical Industry on the Example of Shell Energy and Chemicals Park Rheinland

13:20 **Sean Simpson**
LanzaTech (US)
Out with the Old, and in with the Renewable: Gas Fermentation for Fuels, Chemicals, Materials and Protein from Renewable Carbon

14:10 **Panel Discussion with all Speakers of the Session and Special Panelists:**
Christoph Gürtler, Covestro (DE), Sarah Refai, CLIB (DE), Pia Skoczinski, nova-Institute (DE)

14:25 **Break**

Chemical Recycling

14:40 **Lars Krause**
nova-Institute (DE)
Chemical Recycling – Technologies for Renewable Carbon and a Circular Economy

15:30 **Inari Seppä**
Eastman (US)
Transitioning Toward a Circular Economy with Advanced Recycling Technologies

15:05 **Ton Vries**
BioBTX (NL)
Full Circularity Enabled for Renewable Chemicals Through Conversion of Sustainable and Circular Materials

15:55 **Christian Krüger**
BASF (DE)
Chemical Recycling – Key Success Factors from the Life Cycle Assessment Perspective

16:20 **Panel Discussion with all Speakers of the Session and Special Panelists:**
Lars Börger, NESTE (DE/FI), Ludo Diels, VITO (BE), Christian Hässler, Covestro (DE)

16:35 **Break**

1ST DAY OF CONFERENCE | 18 MAY 2021 (10-18:30, CET)

Sustainability

16:50 **Jan Henke**
Meo Carbon Solutions (DE)
Latest Development in the Circular and Bioeconomy from a Sustainability Certification Scheme's Perspective

17:40 **Michael Carus and Asta Partanen**
nova-Institute (DE)
Nora and her FlyPhone on Renewable Carbon

17:15 **Reinier Grimbergen**
TNO (NL)
Recarbonizing the Chemical Industry by Electrification: Shifting Gears

18:00 **Panel Discussion with all Speakers of the Session and Special Panelists: Lars Börger, NESTE (DE/FI), Hao Ding, DuPont Biomaterials/Sorona (US), Okko Ringena, UPM Biochemicals (DE/FI)**

18:15 **Networking**

UPM BIOFORE
BEYOND FOSSILS

RENEWABLE FEEDSTOCKS
RECYCLABLE PRODUCTS
RESPONSIBLE CHOICES

Switching from fossil-based solutions to new bio-based alternatives is good for your products and customers. And for the environment.

UPM Biochemicals solutions are produced outside the food value chain using responsibly sourced wood. Our bio-based products help you improve your company's responsibility performance – while upholding the required quality. Moreover, our team of experts and technology partners support you in making a smooth switch from fossils to renewables.

Together, we lead the way to a future beyond fossils.

SWITCH

upmbiochemicals.com

UPM BIOCHEMICALS

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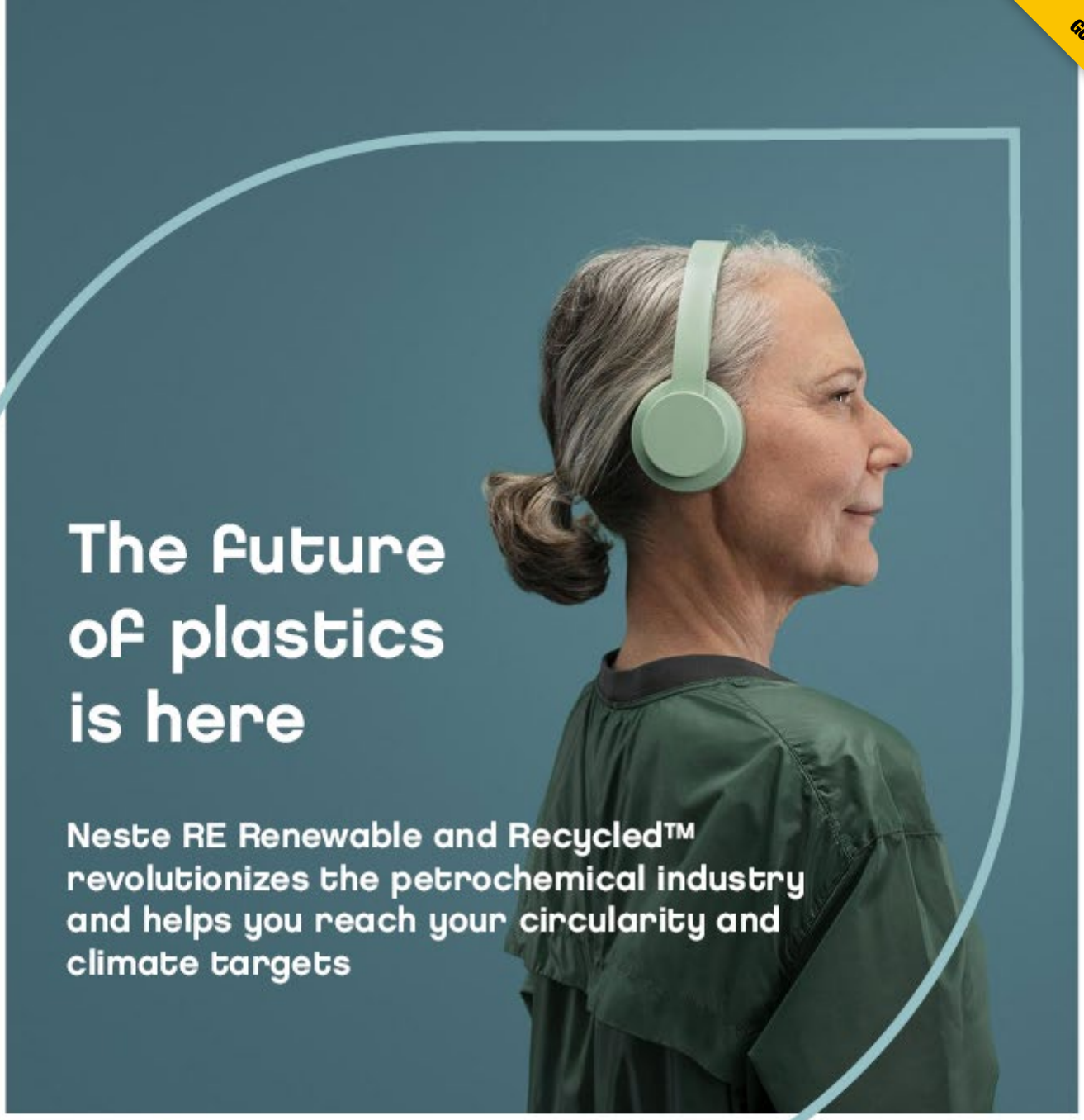

Neste RE is a 100% renewable and/or recycled raw material for plastics and chemicals production, available globally today.

As a drop-in replacement to conventional virgin fossil-based raw materials, it is safe to use for the production of plastics and chemicals, compatible with the existing infrastructure and equal in quality to conventional plastics, eligible for reuse and recycling.

www.neste.com/neste-re

NESTE RE
Renewable and Recycled

RENEWABLE MATERIALS CONFERENCE 2021

2ND DAY OF CONFERENCE | 19 MAY 2021 (10-18:30, CET)

Networking

08:00 - 09:15 1:1 Meetings – Schedule Video Chats with the Participants!

09:15 **Michael Carus**
nova-Institute (DE)
Introduction

Recycled Polymers

Chairpersons of the day
Michael Carus, CEO and Asta Partanen, Senior expert
nova-Institute (DE)

09:30 **Anna Schwarz**
TNO (NL)
Plastic Recycling in a Circular Economy: Determining Environmental Performance through an LCA Matrix Model Approach

09:55 **Maurizio Crippa**
gr3n (CH)
ET/Polyester Same Materials for a New Era: Chemical Recycling for Plastic Circularity

10:20 **Sven Riechers**
INEOS Styrolution (GB) (DE)
Styrenics Materials for a Circular Economy

10:45 **Jean-Luc Dubois**
Arkema France (FR)
New Innovative Process for Recycling End-of-life PMMA Wastes

11:10 **Panel Discussion with all Speakers of the Session and Special Panelists:**
Lars Börger, NESTE (DE/FI), Jan Ravenstijn, GO!PHA (NL)

11:25 **Break**

11:40 **Bram van der Drift**
Synova (NL)
A Shortcut from Post-Consumer Plastic Waste to Circular Polyolefins

12:30 **Tato „Jack“ Bigio**
UBQ Materials (IL)
One Mighty Step: How Small Amounts of Bio-based Materials Can Make a Big Environmental Impact

12:05 **Stephan Aschauer**
Recenso (DE)
Regeneration of Resources from Mixed Waste by CARBOLIQ Technology

12:55 **Panel Discussion with all Speakers of the Session and Special Panelists:**
Lars Börger, NESTE (DE/FI), Lars Krause, nova-Institute (DE), Jan Ravenstijn, GO!PHA (NL)

13:10 **Break**

2ND DAY OF CONFERENCE | 19 MAY 2021 (10-18:30, CET)

CO_2- and Bio-Based Polymers

13:25 **Christoph Gürtler**
Covestro (DE)
Brighter Use of Resources: New Applications for CO_2 Chemistry – Foams, Fibres, Surface Active Ingredients

14:40 **Christian Lenges**
IFF (US)
Engineered Polysaccharides – Sustainable Material Innovation

13:50 **Erica Ording**
Avantium (NL)
Pioneering Renewable Carbon Based Technology

15:05 **Christopher Carrick**
Lignin Industries (SE)
RenCom Transforms Lignin, the Most Abundant Unused Biopolymer on Earth, Into a Renewable and Functional Biomaterial

14:15 **Matthias Stratmann**
nova-Institute (DE)
Life Cycle Assessment (LCA) of PEF in Comparison to PET

15:30 **Éverton Simões Van Dal**
Braskem (BR)
Making Impact on Renewable Chemicals and Plastics

15:55 **Panel Discussion with all Speakers of the Session and Special Panelists: Michael Costello, Stahl (NL), Hao Ding, DuPont Biomaterials/Sorona (US), Okko Ringena, UPM Biochemicals (DE/FI), Gudbrand Rødsrud, Borregaard (NO)**

16:15 **Break**

RENEWABLE MATERIALS CONFERENCE 2021

2ND DAY OF CONFERENCE | 19 MAY 2021 (10-18:30, CET)

Innovation Award „Renewable Material of the Year 2021“


16:30 Michael Carus and Asta Partanen
nova-Institute (DE)
Introduction

Sucheta Govil
Covestro (DE)
Sponsor Introduction

16:40 The six nominees present their innovations in ten minutes for each presentation

Martin Stephan
Carbios (FR)
First Clear Plastic Bottles from Enzymatically Recycled Textile Waste

Zuzana Gombosova
Malai Biomaterials Design (IN)
Malai: Plant Leather Made from Coconut Wastewater and Natural Fibres

Inari Seppä
Eastman (US)
Eastman's Advanced Circular Recycling Technologies

Jean-Luc Dubois
MMAtwo (EU)
Renerated Methyl Methacrylate (MMA) for 100% Recycled Acrylic Sheets and Composites

Sean Simpson
LanzaTech (US/CH)
CO_2 Recycling for CarbonSmart Cleaning


Gertjan de Kam
Vepa (NL)
Wridzer Bakker
Plantics (NL)
Most Sustainable Chair Ever from Hemp Fibres and Thermoset Bioresin

17:50 Winner Ceremony presented by Sucheta Govil, Covestro (DE)


18:00 Michael Carus and Asta Partanen
nova-Institute (DE)
Nora and her FlyPhone on Renewable Carbon

18:15 Networking

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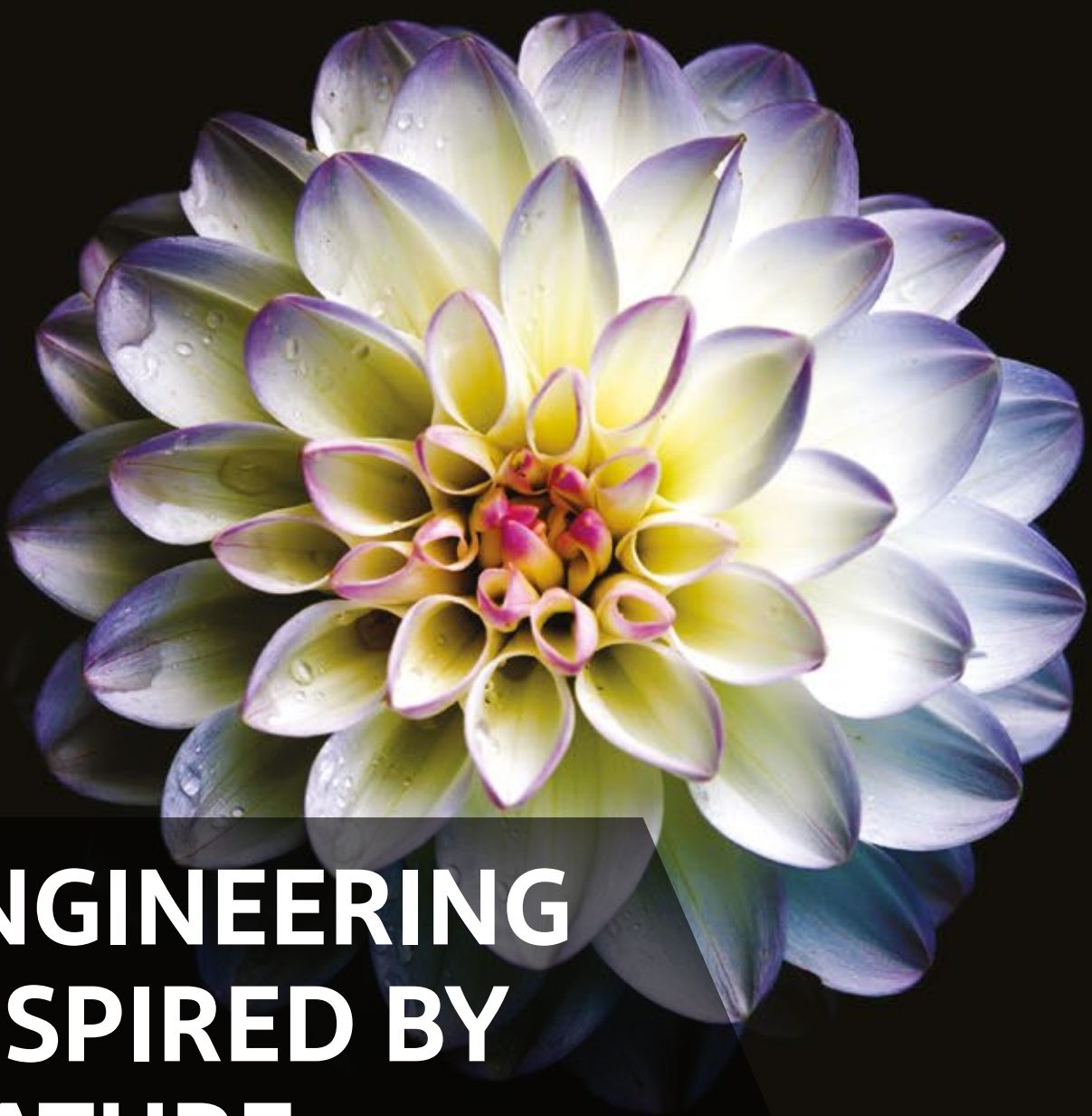

ENGINEERING INSPIRED BY NATURE

DuPont Biomaterials: Leading the Sustainable Transformation of the Global Economy

RENEWABLE MATERIALS CONFERENCE 2021

3RD DAY OF CONFERENCE | 20 MAY 2021 (10-18:30, CET)

Networking

08:00 - 09:15 1:1 Meetings – Schedule Video Chats with the Participants!

09:15 Michael Carus
nova-Institute (DE)
Introduction

Markets

Chairpersons of the day
Michael Carus, CEO and Asta Partanen, Senior expert
nova-Institute (DE)

09:30 Michael Carus & Team
nova-Institute (DE)
Market and Trends for Renewable Polymers – Bio-based, CO_2 and Recycling, Biocomposites & Biodegradable Plastics

Michael Carus: Introduction and Overview

Raj Chinthapalli: Deep Dive for Single Client Studies

Pia Skoczinski: Market Update Bio-based Polymers

Pauline Ruiz: Market Update CO_2-based Polymers

Asta Partanen: Market Update Biocomposites

Michael Carus: Potential of Biodegradable Plastics

Ángel Puente: Evaluating the Most Promising Renewable Chemicals

10:40 Panel Discussion with all Speakers of the Session and Special Panelists:
Jan Ravenstijn, GO!PHA (NL), Tim Yin, Zhejiang Sugar Energy Technology (CN)

10:55 Break

3RD DAY OF CONFERENCE | 20 MAY 2021 (10-18:30, CET)

Keynotes: Perspectives from International Brands and Politics

11:10 **Peter Ter-Kulve**
President of Unilever's Home Care Business and a Member of the Unilever Leadership Executive (GB)

12:00 **Bernhard Bauske**
WWF Germany (DE)
Using Renewable and Circular Carbon within an One Planet Framework

11:35 **René Bethmann**
VAUDE Sport (DE)
Creating Demand for Sustainable Materials from Biomass and Recycling

12:25 **Werner Bosmans**
DG Environment / European Commission (Brussels)
EU Policies on Bio-based, Biodegradable and Recycled Plastics

12:50 **Panel Discussion with all Speakers of the Session and Special Panelists:**
Raj Chinthapalli, nova-Institute (DE), Ian Howell, Unilever (GB), Jan Ravenstijn, GO!PHA (NL)

13:15 **Break**

Bio-based Plastics

13:30 **Patrick Zimmermann**
FKuR Kunststoff (DE)
Circular Economy: Raw Materials, Applications, End of Life – What Needs to be Considered to be Successful

14:20 **Clémentine Arnault**
Carbiolice (FR)
EVANESTO® Innovative Enzymatic Master Batch Making PLA Fully Compostable in All Composting Conditions

13:55 **Martin Zahel**
Papiertechnische Stiftung, PTS Heidenau (DE)
Bio-based Hotmelt Adhesives for Paper and Cardboard Packaging

14:45 **Panel Discussion with all Speakers of the Session and Special Panelists:**
Jan Ravenstijn, GO!PHA (NL), Tim Yin, Zhejiang Sugar Energy Technology (CN)

15:10 **Break**

RENEWABLE MATERIALS CONFERENCE 2021

3RD DAY OF CONFERENCE | 20 MAY 2021 (10-18:30, CET)

Cellulose & Natural Fibres and Biocomposites

15:25 **Stephan Kulka**
Lenzing (AT)
Cellulose Fibres – Natural Versatility

15:50 **Cláudia Peixoto**
Amorim Cork Composites (PT)
Cork Polymer Compounds

16:15 **Matthew Smyth**
Stora Enso (SE)
Combining Generative Design and 3D Printing to Enable Climate Smart Products with Biocomposites

16:40 **Mark Reinders**
HempFlax Group (NL)
Industrial Hemp – a Crop for the Future

17:05 **Régis Voillat**
Bcomp (CH)
Sustainable and Lightweight Natural Fibre Solutions for the Future of Mobility

17:30 **Panel Discussion with all Speakers of the Session and Special Panelists: Jan Ravenstijn, GO!PHA (NL)**

17:45 **Break**

18:00 **Michael Carus and Asta Partanen**
nova-Instiute (DE)
Nora and her FlyPhone on Renewable Carbon

18:10 **Final Networking**

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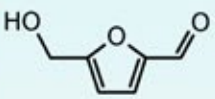
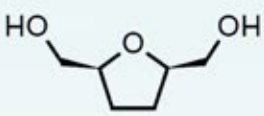
Product Profile

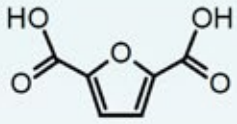


5-Hydroxymethylfurfural
CAS No.67-47-0

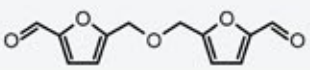
2, 5-furandimethanol
CAS No.1883-75-6



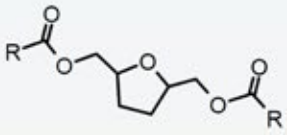
2, 5-Tetrahydrofurandimethanol
CAS No.2144-40-3



2, 5-Furandicarboxylic acid
CAS No.3238-40-2



5, 5'(oxy-bis(methylene))bis-2-furfural
CAS No.7389-38-0



2, 5-Tetrahydrofurandimethanol
Fatty Acid Diesters

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SUGAR ENERGY

Zhejiang Sugar Energy Technology Co.,Ltd
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Email: sales@sugarenergy.com
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HMF
(The normal sales)

HMF
(Need to customize)

Application market

pharmaceutical intermediates

surfactant

engineering plastics

bio-based polyester

essences and fragrances

Zhejiang Sugar Energy Technology Co.,Ltd
Mobile: +86 13969720677
Email: sales@sugarenergy.com
Website: www.sugarenergy.com

SMART CITY

RENEWABLE MATERIAL OF THE YEAR 2021

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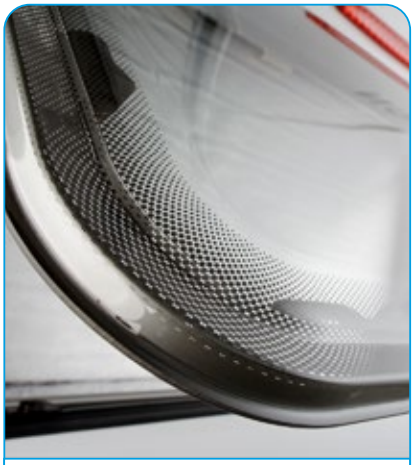
INNOVATION AWARD

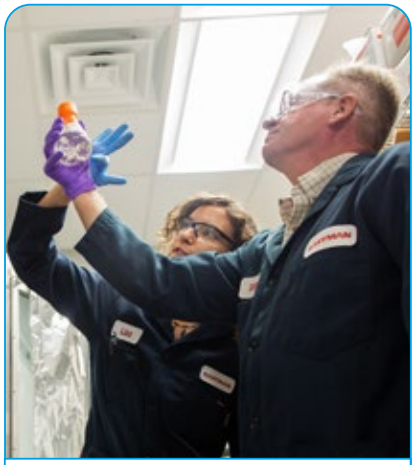
RENEWABLE MATERIALS CONFERENCE 2021

Nominees of the Innovation Award
"Renewable Material of the Year 2021!"



MMAtwo (EU)
Regenerated Methyl Methacrylate (MMA) for 100% Recycled Acrylic Sheets and Composites

Carbios (FR)
First Clear Plastic Bottles from Enzymatically Recycled Textile Waste



Eastman (US)
Eastman's Advanced Circular Recycling Technologies

LanzaTech (USA/CH)
CO_2 Recycling for CarbonSmart Cleaning

Malai Biomaterials Design (IN)
Malai – Plant Leather Made from Coconut Wastewater and Natural Fibres

Plantics (NL) & Vepa (NL)
Most Sustainable Chair Ever from Hemp Fibers and Thermoset Bioresin

Organiser

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Innovation Award Sponsor

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RENEWABLE MATERIAL OF THE YEAR 2021

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INNOVATION AWARD

RENEWABLE MATERIALS CONFERENCE 2021

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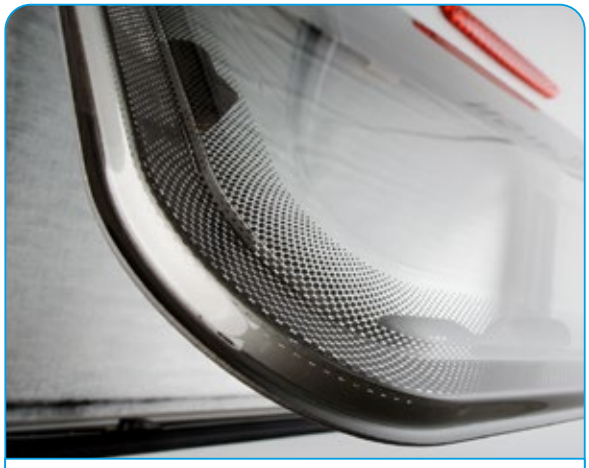

MMAtwo (EU)
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Carbios (FR)
First Clear Plastic Bottles from Enzymatically Recycled Textile Waste

MMAtwo (EU)
Regenerated Methyl Methacrylate (MMA) for 100 % Recycled Acrylic Sheets and Composites

New polymers are obtained from the regenerated MMA, leading to 100 % recycled-content products, such as new acrylic sheets and composites. Demonstrators have been produced such as a caravan window and kitchen sinks. The regenerated MMA is produced by a new innovative process, developed in the EU funded project MMAtwo, and will enter the market soon. It is obtained through depolymerisation of PolyMethylMethAcrylate – PMMA, also known as acrylic glass or plexiglas. In the recycling process, PMMA has been heated, and MMA unzips selectively from the polymer chain. Crude MMA is further purified to reach very high purity (99.8 wt % obtained on large batches).

More information: www.mmatwo.eu

Carbios (France)
First Clear Plastic Bottles from Enzymatically Recycled Textile Waste

Carbios is the first and only company that develops biological processes to revolutionise the end-of-life of plastics and textiles. The mission is to provide an industrial solution to the recycling of PET plastics and textiles. This enzymatic recycling technology deconstructs any type of PET plastic waste into its basic components (monomers) which can then be reused to produce new PET plastics of virgin quality. In 2020, the first transparent plastic bottle from enzymatically recycled polyester textile waste was produced. Mechanical recycling technologies cannot recycle textile waste efficiently. In contrast, this new enzymatic process enables polyester fibres to be "upcycled" to a high-quality grade of PET suitable for the production of clear bottles.

More information: www.carbios.com/en/enzymatic-recycling

Nominees of the Innovation Award
"Renewable Material of the Year 2021!"

Eastman (US)
Eastman's Advanced Circular Recycling Technologies

LanzaTech (USA/CH)
CO_2 Recycling for CarbonSmart Cleaning

Eastman (USA)
Eastman's Advanced Circular Recycling Technologies

Circularity is a path to repair and prepare our world for future generations, which is why Eastman is dedicated to advancing a circular economy. The new molecular recycling technologies can lead to an infinite lifespan – a truly circular solution – for waste materials that were previously destined to end up in landfills or incinerators. Eastman's Advanced Circular Recycling Technologies, break down plastic waste into molecular building blocks and rebuild them into new materials like carpets and textiles, thus creating a truly circular solution. By 2030, Eastman expects to recycle up to 225,000 tonnes of waste plastic annually.

More information:
www.eastman.com/Company/Circular-Economy/Solutions/Pages/Overview.aspx

LanzaTech (USA/CH)
CO_2 Recycling for CarbonSmart Cleaning

In 2020, Switzerland's largest retail company, Migros, and its subsidiary, Mibelle Group, launched a range of liquid cleaning products containing LanzaTech CarbonSmart Ethanol as part of Migros Plus Oeco Power and Potz cleaning ranges. These products are now on sale in Migros supermarkets in Switzerland. The CarbonSmart Ethanol is produced from recycled carbon from steel emissions. The new pathway reduces greenhouse gas emissions and keeps additional fossil resources in the ground, protects biodiversity and avoids land use change. The significant contribution to sustainability was validated through an independent life cycle analysis and the approach received support from experts at WWF in Switzerland.

More information: www.lanzatech.com

Nominees of the Innovation Award
"Renewable Material of the Year 2021!"

Malai Biomaterials Design (IN)
Malai – Plant Leather Made from
Coconut Wastewater and Natural Fibres

Plantics (NL) & Vepa (NL)
Most Sustainable Chair Ever from Hemp Fibers and
Thermoset Bioresin

Malai Biomaterials Design (IN)
Malai – Plant Leather Made from
Coconut Wastewater and Natural Fibres

Malai is a novel biocomposite material based on bacterial cellulose cultivated on wastewater from mature coconuts blended with fibres from banana stem, hemp and sisal. It is made without any oil-based or toxic substances, is bio-based and home compostable. Similar to leather in its properties and appearance, the material is used for accessories such as bags and purses. Malai works with wastewater from coconut processing plants in Southern India. A small coconut plant disposes of about 4,000 litres of this water per day. Such wastewater is usually discharged into the environment, where it acidifies the soil. Malai collects and sterilises the water, which can then be used as feed for the bacteria. This bacterium produces nano cellulose sheets, which are further enriched with natural fibres to obtain the final material.

More information: www.malai.eco

Plantics (NL) & Vepa (NL)
Most Sustainable Chair Ever from Hemp Fibers and
Thermoset Bioresin

Dutch furniture manufacturer Vepa is the first in the world to launch a collection of chairs with a shell of a unique biomaterial. The used materials hemp fibre and bioresin are both fully biological, plant-based and recyclable. The unique bio-based resin and material are part of a new family of bio-based materials that has been developed by Plantics and is patented worldwide for many different applications. Plantics and Vepa collaborated intensively for two years to turn the biomaterial into a high-quality seat shell. The collection is produced entirely in the Netherlands and currently includes chairs and bar stools. The production process absorbs more CO_2 than it emits. In addition, the chairs are designed in such a way that the various parts are easy to separate and materials can be reused endlessly.

More information: www.plantics.nl or www.vepa.nl

RENEWABLE MATERIALS CONFERENCE 2021

36 award applications were submitted!

Comprehensive information including pictures at: www.renewable-materials.eu/award-applications

Company/Institution	Country	Product	Website
Anacarda Limited	United Kingdom	CARDAMINE – bio-based Phenalkamine epoxy curing agents derived from sustainable feedstocks	www.anacarda.com
Arkema France - (Application for the EU project MMAtwo)	France	Regenerated Methyl Methacrylate	www.mmatwo.eu
Assocanapa Srl	Italy	Blonde and Brown Hemp Fibers	www.assocanapagroup.it
Bcomp Ltd.	Switzerland	ampliTex™ + powerRibs™ Natural Fibre Technology – Sustainable Lightweighting for High Performance Applications	www.bcomp.ch
BIOVOX GmbH	Germany	BIOVOX vexo	www.biovox.systems
Bitrez Limited	United Kingdom	FURACURE – poly-furfural alcohol “PFA” bio-based resins derived from sustainable feedstocks	www.bitrez.com
BPREG Composite Inc	Turkey	EcoRein	www.bpreg.com
Captured Carbon Studio	United States	Captured Carbon Studio	www.capturedcarbon.studio
Carbios	France	First clear plastic bottles from enzymatically recycled textile waste	www.carbios.fr/en/technology/bio-recycling
ChainCraft	Netherlands	ChainCraft – Renewable medium chain fatty acids	www.chaincraft.com
Chemical Processing Services Ltd	United Kingdom	FURALKAMINE – Mannich base epoxy curing agents derived from sustainable feedstocks	www.cps-consultancy.com
CHT Germany GmbH	Germany	TUBINGAL® RISE – Recycled Innovative Silicone Emulsion	www.cht.com/cht/web.nsf/id/pa_en_startseite.html
Croda Nederland B.V.	Netherlands	B-Tough PLA	www.crodasmartmaterials.com/en-gb
DuPont Industrial Biosciences USA, LLC	United States	Sorona(R)	www.sorona.com
Eastman	United States	Eastman Advanced Circular Recycling technologies	www.eastman.com/Company/Circular-Economy/Solutions/Pages/Overview.aspx

36 award applications were submitted!

Comprehensive information including pictures at: www.renewable-materials.eu/award-applications

Company/Institution	Country	Product	Website
easy2cool GmbH	Germany	easy2cool paperfloc – ecological insulating packaging made of paper	www.easy2cool.de
Kintra FIbers	United States	Kintra Fibers	www.kintrafibers.com
LanzaTech	Belgium	CarbonSmart Ethanol	www.lanzatech.com
LLC „Crystacel“	Russian Fede-ration	Thermosetting resin based on hemicelluloses of plant materials	www.navigator.sk.ru/orn/1122905
Loop Biotech	Netherlands	Loop Living Coffin™	www.loop-biotech.com
MALAI BIOMATERIALS DESIGN PVT LTD	India	Malai Biocomposite	www.malai.eco
Mosca GmbH	Germany	Eco Strap	www.mosca.com
OutNature GmbH	Germany	Silphie-fibers: New, regional, sustainable raw material	www.out-nature.de
PJIM Polymer Scientific Co., Ltd	China	Vytal: a polyglycolic acid (PGA) plastic	www.pjchem.com/en/index.aspx
Plantabl Packaging Pty Ltd	Australia	Great Wrap	www.greatwrap.co
Plantics B.V.	Netherlands	PLANTICS-Superior Natural Materials	www.plantics.nl
Promateris SA	Romania	Bio-based compostable gloves	www.promateris.com
Röchling Automotive SE & Co. KG	Germany	Röchling-BioBoom	www.roechling-automotive.com
Spoontainable UG (haf-tungsbeschränkt)	Germany	Spoonie choc	www.spoontainable.com
Terracaps GmbH	Germany	Terracaps	www.terracaps.bio
The Circular Materials GmbH	Germany	Fashion waste fiber-pellets for injection molding – Circular Materials	www.circularmaterials.de
traceless materials GmbH	Germany	traceless materials	www.traceless.eu
Trifilon AB	Sweden	Trifilon Revo / CAKE AP Electric Motorbike	www.trifilon.com
UBQ Materials Ltd.	Israel	UBQ™ Material	www.ubqmaterials.com
Vepa B.V.	Netherlands	Hemp of Vepa, most sustainable chair ever	www.vepa.nl
Woodly Oy	Finland	Woodly	www.woodly.com

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Circular economy

End the cycle of "take, make, waste"

Moving away from today's linear economy toward one where we reduce, reuse and recycle waste, using our natural resources in the most efficient way, will create many new possibilities.

- Improve your environmental footprint
- Dramatically cut costs in your operation
- Create profitable new revenue streams

Learn how to accelerate your transition to the circular economy at **www.alfalaval.com/sustainablesolutions**

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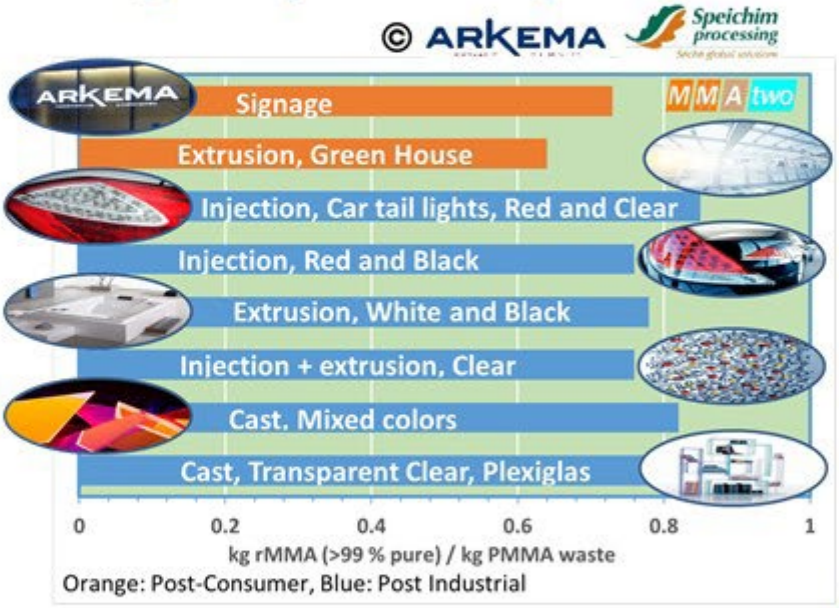
MMA two Second Generation MethylMethAcrylate

High Polymer to Polymer yields



High monomer purity: 99.8 wt %

Demonstrators made with Regenerated MMA

Transparent Cast flat sheet

Caravan Window

Composite Kitchen sink

Certech
R&D partner in chemistry

Speichim processing
Séché global solutions

Contact information

ARKEMA

Jean-Luc Dubois (Arkema), Chairman of the project's Executive Board:
jean-luc.dubois@arkema.com.
Tel : +33 472398511

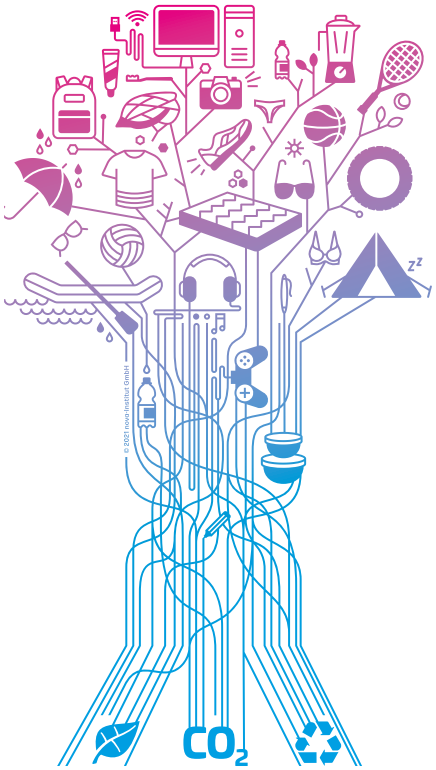
Simon van der Heijden (Heathland), Project Coordinator: simon@heathland.com.
Tel: +31 30 721 0890; Heathland B.V., Arkansasdreef 8, 3565 AR Utrecht, The Netherlands.

HEATHLAND

Website address : **https://www.mmatwo.eu**

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement N°820687.

SAVE THE DATE!



RENEWABLE MATERIALS CONFERENCE 2022

10-12 May - **Hybrid Event**

All renewable material solutions at one event: bio-based, CO_2-based and recycled

The Renewable Materials Conference will provide new advantages and synergies by establishing a meeting point for numerous cross-sectoral networking opportunities.

www.renewable-materials.eu

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CIC2021 Event Series

Final Session

CIC 2021

Advancing into a decade of sustainability

Session 1:
The long and winding road to scale

Session 2:
Functionality meets sustainability - Biotech in textiles

Session 3:
Biotech: silver bullet to cure our oceans from plastic?

29.06.2021
Düsseldorf, Hotel Lindner / Digital

For further information please follow us on LinkedIn, twitter and www.clib-cluster.de

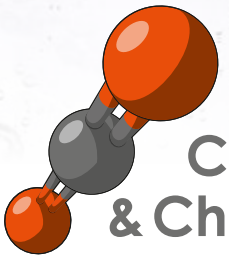
SAVE THE DATE!

Cellulose Fibres Conference, 2 - 3 February 2022

International Conference on
CELLULOSE FIBRES
2–3 February 2022
Hybrid Event

Third International Conference on Cellulose Fibres, the fastest growing fibre group in textiles, the largest investment sector in the bio-based economy and the solution for avoiding microplastics.

www.cellulose-fibres.eu



Conference on CO_2-based Fuels & Chemicals 2022

23 – 24 March • Cologne (Germany)

SAVE THE DATE

23 – 24 March 2022
Hybrid Event

www.co2-chemistry.eu

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renewablematter.eu | rosflaxhemp.ru | heise.de/tr

Valuable Quotes: Renewable Materials Conference:

Arkema
Jean-Luc Dubois (FR)
"MMAtwo develops technologies to regenerate the PMMA (Acrylic glass) monomer, and achieve high purity from post-consumer and post-industrial plastics."

Avantium
Erica Ording (NL)
"Bringing a future technology, such as CCU, to market comes with challenges and opportunities that will be highlighted in this presentation."

BASF
Christian Krüger (DE)
"Life cycle thinking needs to be taken into account for evaluating the environmental impacts of chemical recycling, which is expected to play a crucial role for the transition to a sustainable Circular Economy."

Bcomp
Régis Voillat (CH)
"Plants have been working for millions of years on transforming atmospheric CO_2 into cellu- lose - a lightweight, stiff and strong structural material - as efficiently as this process can be, using solar energy. Let them do that work for us while we focus on addressing the needs of the modern world with advanced composites."

BioBTX
Ton Vries (NL)
"Chemical recycling has to further build creditability."

Borregaard AS
Gudbrand Rodsrud (NO)
"A wide product portfolio, increasing specialization, planned flexibility, focus on sustainability and offensive product development is the basis for success that can exploit the challenges and opportunities we meet these days."

Carbiolice
Clémentine Arnault (FR)
"By accelerating the disintegration of PLA so that is more quickly assimilated by the micro-organisms in the compost (without residue or toxicity), Carbiolice's innovation makes biobased plastics compostable, even at home."

Circular Biobased Delta
Joop Groen (NL)
"CHAPLIN program going European: a value chain collaboration for replacement of bitumen in asphalt by lignin."

Eastman
Inari Seppä (NL)
"Enabling a circular economy through molecular recycling. Right now."

gr3n
Maurizio Crippa (CH)
"Waste of PET/Polyester a new source of valuable molecules trough Chemical Recycling."

HempFlax
Mark Reinders (NL)
"Hemp is one of the world's most versatile crops."

INEOS Styrolutions
Sven Riechers (CH)
"INEOS Styrolution is committed to a fundamental shift to a circular economy for styrenics based materials and develops respective innovations."

Lenzing
Stephan Kulka (DE)
"Wood-based cellulosics – natural versatility for a broad range of applications."

Lignin Industries
Christopher Carrick (SE)
"Lignin Industries has started the production of more than 1000 tonnes of modified lignin p.a. to replace fossil-based thermoplastics in applications such as films, packaging and injection moulding."

Meo Carbon Solutions
Peter Hawighorst (DE)
"The presentation will focus on the sustainability certification of companies and supply chains in the circular economy and the bioeconomy."

Papiertechnische Stiftung
Martin Zahel (DE)
"Paper is a bio-based material, but so must the additives and processing aids. So let's start with hotmelt adhesives!"

Photanol
Veronique de Bruijn (NL)
"The chemical industries global GHG emission will grow to 25% in 2050 if it continues to rely on fossil carbon alone. Photanol and Renolit Healthcare are collaborating to offer an innovative solution, powering a disruptive, positive impact technology that will accelerate the sustainable transformation of the global chemical industry."

Recenso
Christian Haupts (DE)
"First findings from continuous oiling of multilayer PE/PA film by applying CARBOLIQ technology in industrial scale"

Renolit
Robert Blok (NL)
"Forget oil. Let's make polymers out of air."

Shell Deutschland
Jörg Dehmel (DE)
"Shell Energy and Chemicals Park Rheinland aims to eventually process substantial, industry-scale amounts of renewable feedstocks (ranging green hydrogen & power, bio feedstocks and circular feedstocks), which would form the basis for a whole suite of new value chains."

Stora Enso
Niki Jennische (SE)
"Combining generative design and 3D printing to enable circular design."

Synova
Bram van der Drift (NL)
"The presentation will show that waste can be converted in a process very similar to naphtha steam cracking, producing the same chemicals, and using technologies that are common in chemical industry."

TNO Voltachem
Reinier Grimbergen (NL)
"The energy transition will enable and accelerate a fully circular Chemical Industry."

TNO
Anna Schwarz (NL)
"The environmental benefits of plastic recycling vary strongly and the diversity in plastic waste streams and compositions show the diverse need of recycling options."

UBQ Materials
Tato (Jack) Bigio (IL)
"From 100% unsorted household waste, UBQ has created a bio-based material that is setting a new bar for climate positive manufacturing."

VAUDE Sport
René Bethmann (DE)
"Shaping the carbon circular economy with bio-based and recycling technologies."

WWF Deutschland
Bernhard Bauske (DE)
"This presentation will describe, in which way renewable and circular carbon can be used by taking planetary boundaries into account."

Bioeconomy is not alone – from Bioeconomy to Carbon Management

Author: Michael Carus, nova-Institut

The bioeconomy faces great expectations and hopes in the fight against climate change, and at the same time is viewed critically. The biggest problems in building a strong bioeconomy are direct and indirect land use changes, which have significant impacts on biodiversity, climate change, and food security.

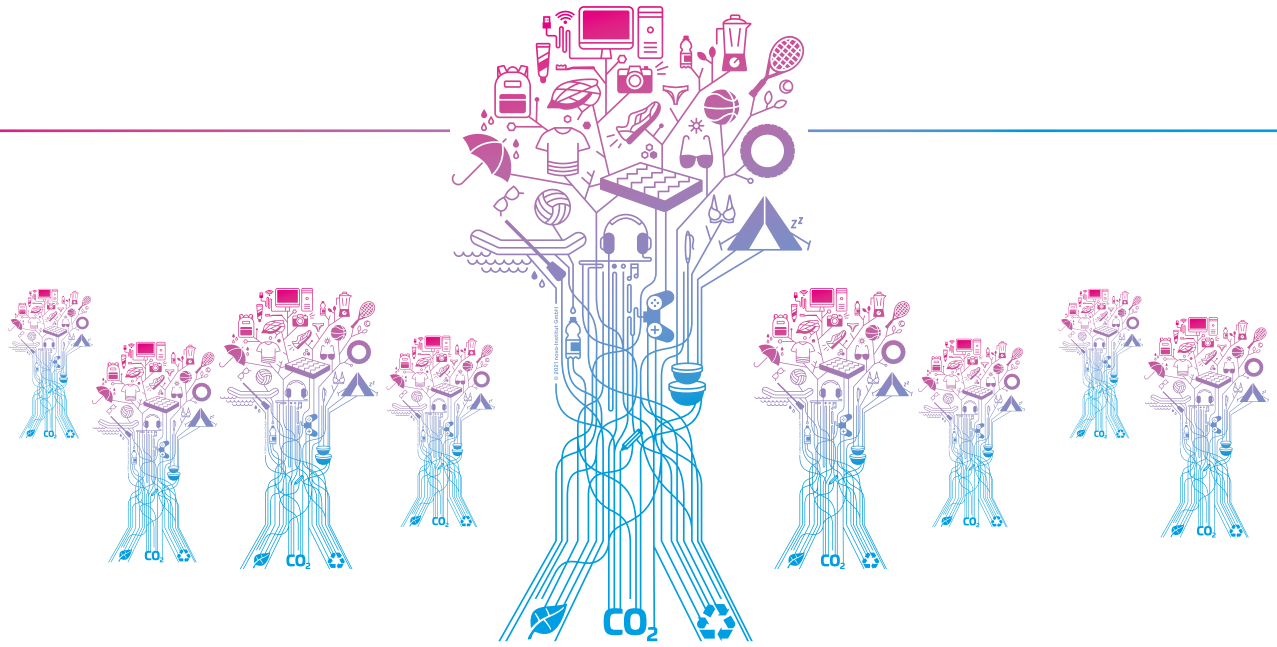
What could be a solution here? The most prevalent approach is to develop comprehensive sustainability indicator systems to identify consequences of land use changes. But so far, it has proven very difficult to develop consistent and harmonised systems that are also applicable. Especially because dilemmas arise when such indicators intrinsically oppose each other. Apart from this, the Renewable Energy Directive (RED) in Europe led to the development and establishment of various biomass certifications on the market that also request compliance with sustainability criteria. However, the application of strict sustainability criteria for biomass also means that not enough biomass can be used to replace the fossil feedstock, which in turn has significant impacts on climate protection, biodiversity, and food security.

Nevertheless, there is a completely new and surprising solution, an "out of the bio-box thinking", by expanding the frame of reference. The bioeconomy has never been an end in and by itself, it has never been propagated for its own sake. Rather, the bioeconomy was promoted to help reduce greenhouse gas (GHG) emissions in the areas of fuels, chemicals, and materials by replacing the fossil economy. The carbon needed for these sectors should then no longer be taken from fossil sources in the soil, but instead through plants straight from the atmosphere. Over the past decade however, it has become clear that the bioeconomy cannot achieve this without seriously compromising food security and biodiversity. For this reason, we also see a European bioeconomy policy that acts very cautiously and focuses primarily on biogenic waste streams.

Fortunately, new technologies have been developed in the last ten years that represent further alternatives to fossil carbon. In the transportation sector, electric mobility and hydrogen fuel cells are promising options for future mobility. For the chemical and material industries, CO_2 utilisation (Carbon Capture and Utilisation (CCU)) and plastic waste recycling represent significant alternative carbon streams that can and already do substitute additional fossil carbon. The bioeconomy is no longer alone. Together, all three renewable carbon sources – biomass, CO_2 utilisation, and recycling – can replace the entire fossil system.

With the introduction of chemical recycling, the limitations of mechanical recycling can be overcome so that almost all waste streams can be used as a carbon source. The use of CO_2, with the help of green hydrogen from renewable energy sources, brings significant advantages over biomass due to considerably higher land efficiency and the option to utilise non-arable land such as deserts. This can substantially reduce the pressure on natural ecosystems. Finally, CO_2 use fits perfectly with the emerging hydrogen economy.

So, the question on how to deal with sustainable trade-offs of the bioeconomy has a surprising answer: expand the reference system to all alternative carbon sources. A new, comprehensive strategy for sustainable chemicals and materials must include the long-term carbon demand that still exists after extensive decarbonisation of the energy sector. Furthermore, it needs to show how this carbon demand can be covered in the most sustainable way possible – and what role the bioeconomy will play in this, in different regions, for different applications and technologies.



Most certainly, the bioeconomy will continue to play an important role, short as well as long term. There will always be biogenic material flows that can only be used outside the food sector. There will be areas that can produce additional biomass without any competition with the food supply. There will be special fine chemical molecules that can be best produced from biomass. And in addition to thermo-chemical and chemical-catalytic processes, biotechnology including synthetic biology will continue to develop rapidly and make the use of biomass ever more efficiently. Biotechnology is not limited to biomass but will also play an important role in CO_2 utilisation and enzymatic recycling.

Carbon management

By expanding the reference system, we properly integrate the bioeconomy into a long-term strategy for future carbon demand in the material sector. This facilitates what we call carbon management, which is an overarching challenge of the future and could serve as an excellent framework for constructive discussions between all stakeholders. What is the long-term carbon demand of chemicals and materials after the energy sector has been largely decarbonised? And how can this demand be met as sustainably as possible, including all alternative carbon sources?

What is required here is an overarching carbon management strategy that also takes specific regional and application-related features into account. Which simultaneously applies the same sustainability requirements to all renewable carbon streams. Such a strategy does not yet exist, but it is indispensable if we want to shift towards renewable chemicals, materials, and products.

This is the only way to develop a realistic strategy to completely substitute fossil carbon and thus tackle the climate problem at its root.

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nova Institute for Ecology and Innovation

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www.nova-institute.eu

THE RENEWABLE CARBON INITIATIVE

Shape the future of the chemical and material industry

RENEWABLE CARBON INITIATIVE

Bio-based | CO_2-based | Recycling

Circular Economy

Renewable Carbon Initiative (RCI) was founded in September 2020. RCI members are committed to create a sustainable, fossil-free future for the chemical and material industry.

WHY JOIN RCI?

RCI is an organization for all companies working in and on sustainable chemicals and materials – renewable chemicals, plastics, composites, fibres and other products can be produced either from biomass, directly via CO_2 utilisation, or recycling.

RCI members profit from a unique network of pioneers in the sustainable chemical industry.

RCI OFFERS ITS MEMBERS

- A common voice for the renewable carbon economy.
- Increased visibility of their individual renewable carbon solutions.
- Collective advocacy work to create a supportive regulatory and economic framework.
- Support in finding solutions for your specific problems on the way to your renewable carbon goals.

MEMBERS

Beiersdorf, BioBTX, Cosun Beet Company, covestro, Firmenich, Givaudan, Henkel, IBB Netzwerk GmbH, iff, LanzaTech, Lenzing, NESTE, nova, SHV ENERGY, Stahl, TCC, TripleW, Unilever, uniper, UPM BIOFORE BEYOND FOSSILS

PARTNERS

CO_2 VALUE EUROPE, Global CO_2 Initiative, GO!PHA, TextileExchange, WWF

JOIN NOW

Become a part of the Renewable Carbon Community (RCC) and shape the future of the chemical and material industry
www.renewable-carbon-initiative.com/membership/application

More members, partners and information
www.renewable-carbon-initiative.com
Contact: **dominik.vogt@nova-institut.de**
#renewablecarbon

RENEWABLE CARBON INITIATIVE (RCI) DRAWS WORLDWIDE ATTENTION

FROM INTERNATIONAL BRANDS TO LEADING CHEMICAL AND BIOECONOMY COMPANIES TO INNOVATIVE START-UPS FOR CO2 UTILISATION, COMPANIES ARE COLLABORATING TO GUIDE A SMART TRANSITION FROM FOSSIL CARBON TO RENEWABLE CARBON

Author: Michael Carus, founder and CEO nova-Institute

The climate crisis is accelerating at an unprecedented pace, with global warming, greenhouse gas emissions and deforestation leading to food insecurity, global health problems and biodiversity loss. Greenhouse gas emissions associated with the use of carbon-containing, fossil energy sources such as oil, coal and natural gas have been shown to be a major contributor to climate change. Thus, for decades the focus in climate protection has been predominantly placed on the energy sector. A more holistic approach – such as the renewable carbon strategy – that also incorporates embedded carbon in chemicals and derived materials has been well received by the chemical and materials industry. And not only there but outside of this sector, too. In December 2020, the Bioenergy International Journal pointed out that the International Energy Agency (IEA) recently highlighted 'blind spots' of the global petroleum system. The journal emphasises the importance of petrochemicals, their prevalence in everyday products and their relevance to manufacture many parts of the modern energy system. The crux: the more we extract from under the ground, the more we are adding to the problem above.

The **Renewable Carbon Initiative (RCI)** (www.renewable-carbon-initiative.com) was initiated by nova-Institute after observing the struggles of the chemical and plastics industry in facing the enormous challenges to meet the climate goals set by the European Union and the sustainability expectations held by societies around the globe. It was clear that the industry has to go beyond using renewable energy and also consider their raw materials. As decarbonisation of those is not an option for organic chemistry, as it is entirely based on the use of carbon, an alternative strategy was needed. Hence, nova-Institute developed the renewable carbon strategy and set up the RCI to bring theory to life.

Eleven leading companies from six countries founded the RCI on 23 September 2020 under the leadership of nova-Institute – in May 2021 RCI has already 20 members, 5 partners and more than 200 supporters. The initiative aims to support and speed up the transition from fossil carbon to renewable carbon for all organic chemicals and materials.

The RCI addresses the core problem of climate change, which is largely related to extracting and using additional fossil carbon from the ground. The vision is stated clearly: By 2050, fossil carbon shall be completely substituted by renewable carbon, which is carbon from alternative sources: biomass, direct CO_2 utilisation and recycling. The founders are convinced that this is the only way for chemicals, plastics and other derived products to become more sustainable, more climate-friendly and part of the circular economy – part of the future.

The RCI urges the industry to go beyond just using renewable energy and face the issue that ALL fossil carbon use has to end, as the carbon contained in the molecules of organic chemicals and materials is prone to end up in the atmosphere sooner or later as well. Only a full phase-out of fossil carbon will help to prevent a further increase in CO_2 concentrations. Consequently, companies are encouraged to focus on phasing out fossil resources and to use renewable carbon instead.

Michael Carus, CEO of nova-Institute and head of the Renewable Carbon Initiative: *"This is about a fundamental change in the chemical industry. Just as the energy industry is being converted to renewable energies, so renewable carbon will become the new foundation of the future chemical and material industry."*

For the first time since the industrial revolution, technology allows us to decouple chemical, plastics, fibre and other material industries from the use of fossil carbon. This is a fundamental game-changer, which inherits the potential for significant impact on climate protection since most of the embedded carbon in global commodities and consumer goods finds its way into the atmosphere.

The last few decades have given rise to multiple technological pathways to completely replace fossil carbon with sources of renewable carbon: biomass, direct CO_2 utilisation (from industrial flue gases or the atmosphere), and mechanical and chemical recycling. The renewable carbon strategy unites these sources and provides companies with a framework for future investments by creating sufficient space to operate. It also provides a strategic direction to reduce fossil carbon dependency, ultimately eliminating fossil carbon utilisation altogether. This material transformation is driven by a diverse mix of international brands and start-ups, initiated and headed by German nova-Institute.

Currently, RCI aims at fostering networks among its members and building new value chains to replace fossil carbon with biomass, CO_2 utilisation and recycling. Since its launch, the initiative has been busy raising awareness and reaching out to industry, policy and the public. Besides creating a webpage with comprehensive information and press releases on current policy issues such as the European Green Deal, the RCI regularly holds public webinars to address questions around renewable carbon (https://www.renewable-carbon-initiative.com/events/).

More background information and position papers to promote and drive the renewable carbon strategy will be published in spring and summer 2021. Video clips and a comic as a playful option for sharing and understanding the renewable carbon message will be released. Moreover, the development of a label for products that use renewable carbon is on its way. A growing number of working partnerships with other stakeholder organisations like CO_2 Value Europe, Textile Exchange or **WWF Germany** as well as participation in events such as the "Renewable Materials Conference" have already been established. Further joint activities are under development.

In summary, the RCI's activities reflect the needs of its members: awareness-raising for renewable carbon, promoting the strategy, networking and building new value chains to replace fossil carbon with biomass, direct CO_2 utilisation and recycling.

Michael Carus also commented on the rapid success of the initiative: *"Nothing is more powerful than an idea whose time has come. I can't explain the success any other way. It was obvious that the embedded fossil carbon had to come into focus in the world of chemistry and materials now that there are far-reaching strategies for the energy sector. For two reasons: with the increasing decarbonisation of the energy sector, the GHG emissions of material use are becoming increasingly visible and relevant. Moreover, the chemical and plastics industry in particular needs a sustainable strategy that gives it enough leeway to become an accepted part of the future again. The time is right and new companies are joining the Renewable Carbon Initiative every month, so we see strong momentum and are happy that the members seem to be very satisfied with our leadership."*

nova-Paper #12 "Renewable Carbon – Key to a Sustainable and Future-Oriented Chemical and Plastic Industry"

The nova-Paper #12 "Renewable Carbon – Key to a Sustainable and Future-Oriented Chemical and

RENEWABLE MATERIALS CONFERENCE 2021

Plastic Industry" was published as a comprehensive background paper on renewable carbon: definition, strategy, measures and potential. It gives a full and in-depth picture of renewable carbon and related strategies – and works as a background paper of the RCI. The paper entails clear definitions, pros and cons of the different renewable carbon sources, a discussion of the huge market potential, scenarios for a chemical and polymer industry fully based on renewable carbon and political measures to support a quick transition to renewable carbon. It outlines the cornerstones of the transition from fossil carbon to renewable carbon for all organic chemicals and materials. The paper is a reaction to the increasing need for reform in the chemical industry and offers a comprehensive approach for policy and industry alike. The equivalent to decarbonisation in the energy sector is a transition to renewable carbon in the chemical and plastics industries. The paper defines renewable carbon as such:

Renewable carbon entails all carbon sources that avoid or substitute the use of any additional fossil carbon from the geosphere. Renewable carbon can come from the biosphere, atmosphere or technosphere – but not from the geosphere. Renewable carbon circulates between biosphere, atmosphere or technosphere, creating a carbon circular economy.

Free download of the full paper here:
https://renewable-carbon.eu/publications/product/nova-paper-12-renewable-carbon-key-to-a-sustainable-and-future-oriented-chemical-and-plastic-industry-%E2%88%92-full-version/

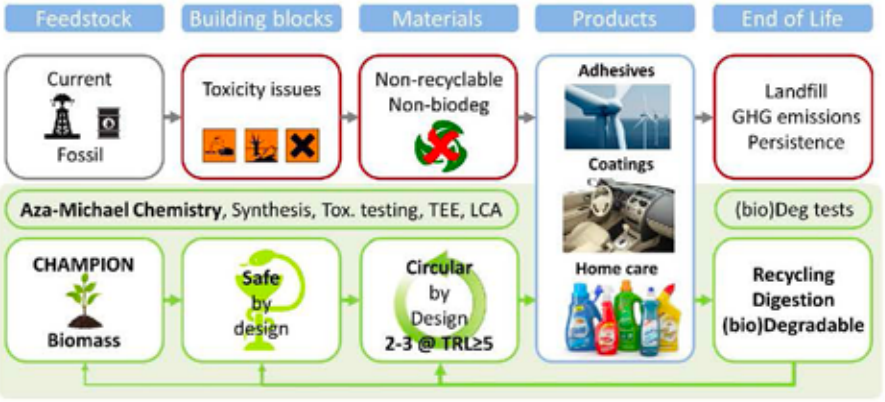
www.champion-project.eu

CHAMPION
circular bio-based polymers

Circular High-performance Aza-Michael Polymers as Innovative materials Originating from Nature

CHAMPION aims to replace conventional polymers with novel and sustainable bio-based polymers for their application in coatings, textiles, home care uses and structural adhesives.

The majority of conventional polymers are not fit for recycling and end up being incinerated or landfilled. Novel CHAMPION bio-based polymers, resulting from the aza-Michael addition reaction, are expected to be suitable replacements for polymers used in resistant kitchen counter coatings, laundry detergents and other homecare products, car interior surfaces, and structural adhesives. Recovery, chemical recycling and organic recycling are the end-of-life options planned for the design of products using CHAMPION polymers.



CHAMPION Objectives

- Produce a library of + 50 novel bio-derivable and bio-degradable materials
- Test CHAMPION polymers for home care formulation additives, structural adhesives, coatings and automotive interior surfaces
- Increase resource efficiency and reduce GHG emissions with novel polymers
- Evaluate polyester candidates in environmental, social and economic terms
- Establish an innovative testing strategy to evaluate toxicological safety

PARTNERS

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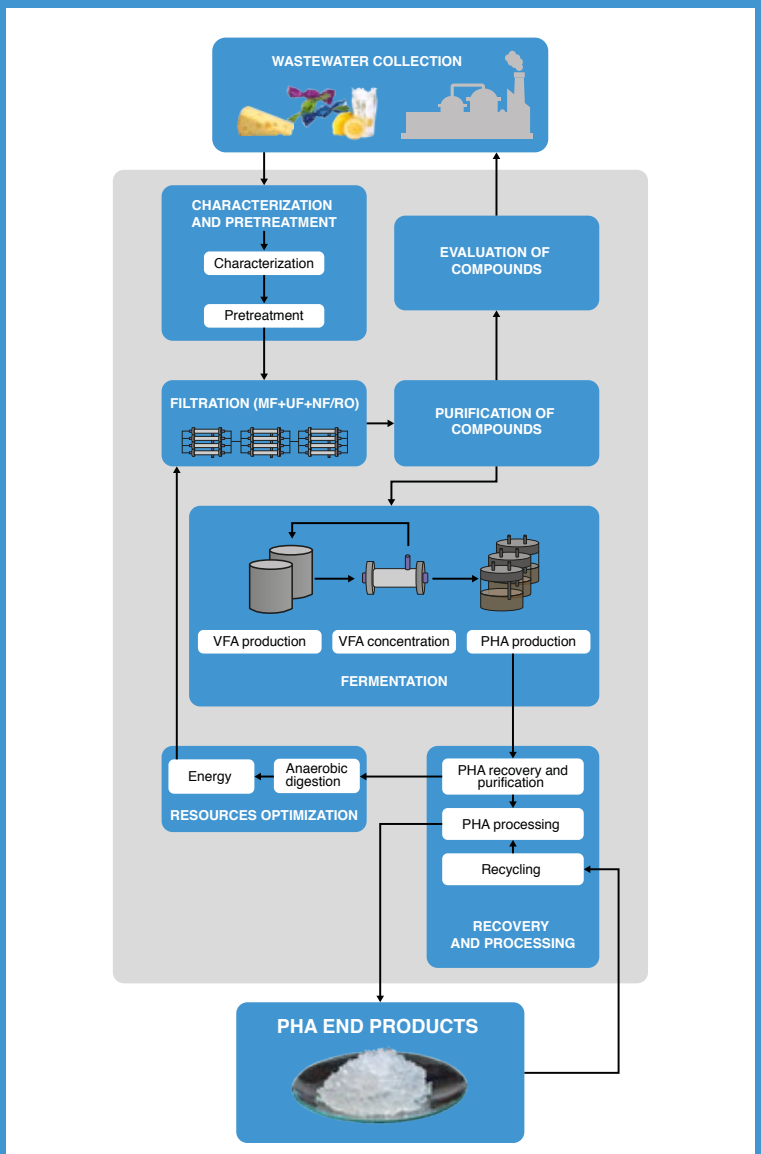
BBI JU · Horizon 2020 European Union Funding for Research & Innovation · Bio-based Industries Consortium

This project has received funding from the Bio Based Industries Joint Undertaking (JU) under grant agreement No 887398. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Bio Based Industries Consortium.

AFTERLIFE

www.afterlife-project.eu

ADVANCED FILTRATION TECHNOLOGIES FOR THE RECOVERY AND LATER CONVERSION OF RELEVANT FRACTIONS FROM WASTEWATER



Bio·based Industries Consortium

Horizon 2020 European Union Funding for Research & Innovation

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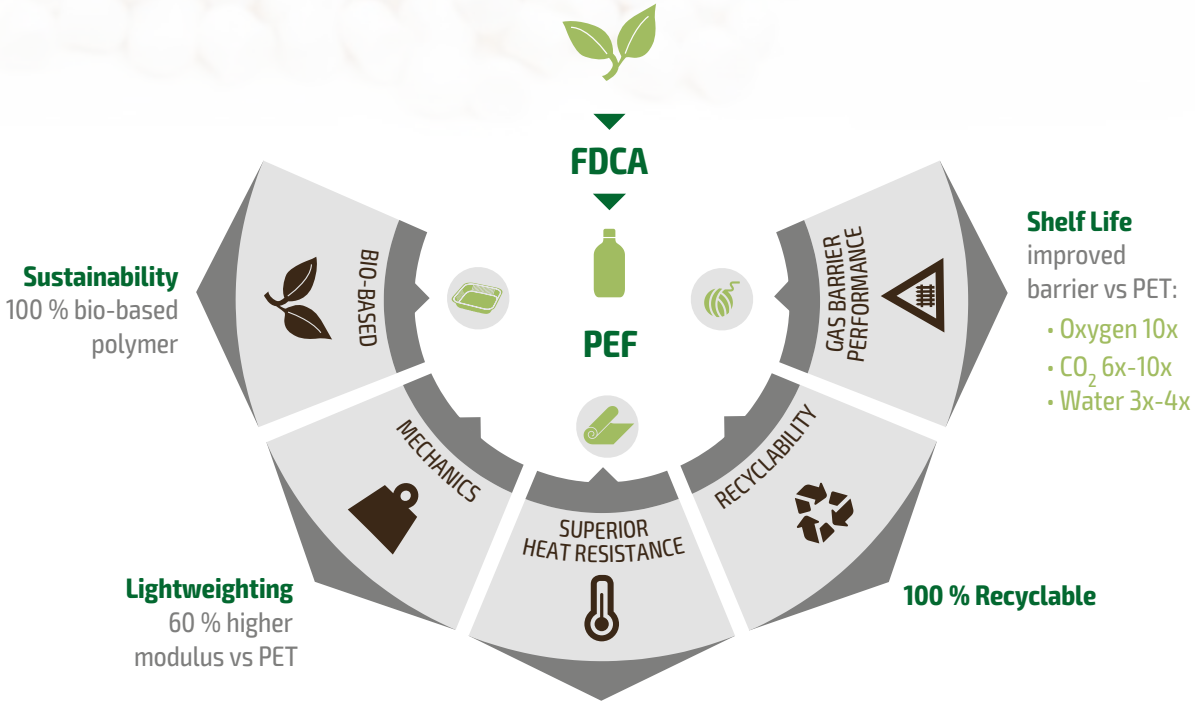
www.peference.eu

PEFerence

The Renewable Innovation

From bio-based feedstocks via di-acids to multiple advanced bio-based materials with a preference for polyethylene furanoate



Sustainability
100 % bio-based polymer

Shelf Life
improved barrier vs PET:
- Oxygen 10x
- CO_2 6x-10x
- Water 3x-4x

Lightweighting
60 % higher modulus vs PET

100 % Recyclable

Hot Filling
12°C higher glass transition vs PET

The consortium consists of 12 companies from 11 countries

ALPLA · avantium · Carlsberg Group · Henkel · kebony Natural wood Made to last · LEGO · Nestlé Research · nova Institute · polytype OMV · SPINVERSE · Tereos · Worley energy | chemicals | resources

BBI JU · Bio-based Industries Consortium · Horizon 2020 European Union Funding for Research & Innovation

This project has received funding from the Bio Based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 744409.

wood CIRCUS

Launch of WOODCIRCUS WHITE PAPER for the European wood processing industries

July 15th, 2021
Grand Palais Ephémère (Paris, France) & online
In cooperation with Forum Bois Construction 2021

WoodCircus is a joint project of 17 European forest-based sector actors and part of the European Union's Horizon 2020 programme. Project's main goal is to promote wood-based value chains as a key part of a circular bioeconomy in Europe.

Underpinning the vital role of the forest-based sector in the Circular Bioeconomy

woodcircus.eu @WoodCircusEU @WoodCircus Project

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 820892.

Project Coordinator
VTT Technical Research Centre of Finland Ltd.
Dr. Anne-Christine Ritschkoff
Anne-Christine.Ritschkoff@vtt.fi
woodcircus.eu

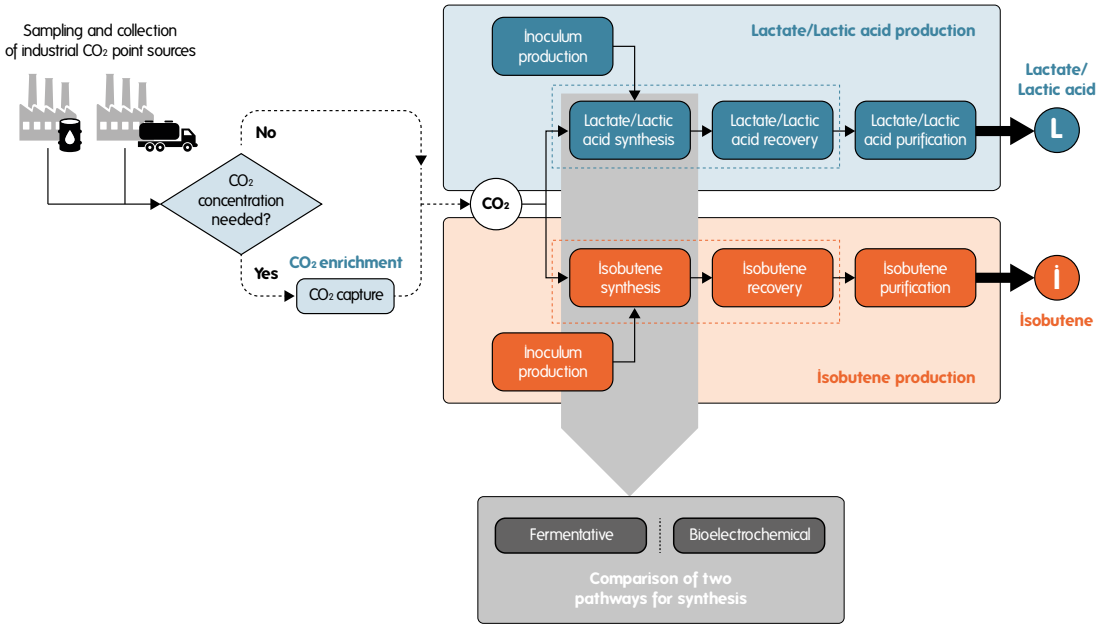
BioRECO$_2$VER

Biological routes for CO_2 conversion into chemical building blocks

More energy efficient and sustainable biotechnological processes for the capture and conversion of CO_2.

BioRECO$_2$VER aims to demonstrate the technical feasibility of more energy-efficient and sustainable non-photosynthetic biotechnological processes for the capture and conversion of CO_2 from industrial point sources like refineries and cement production plants into valuable platform chemicals, i.e., isobutene and lactate.

To overcome several of the existing technical and economic barriers for CO_2 conversion by industrial biotechnology, BioRECO$_2$VER will focus on minimizing gas pre-treatment costs, maximizing gas transfer in bioreactors, preventing product inhibition, minimizing product recovery costs, reducing footprint, and improving scalability.

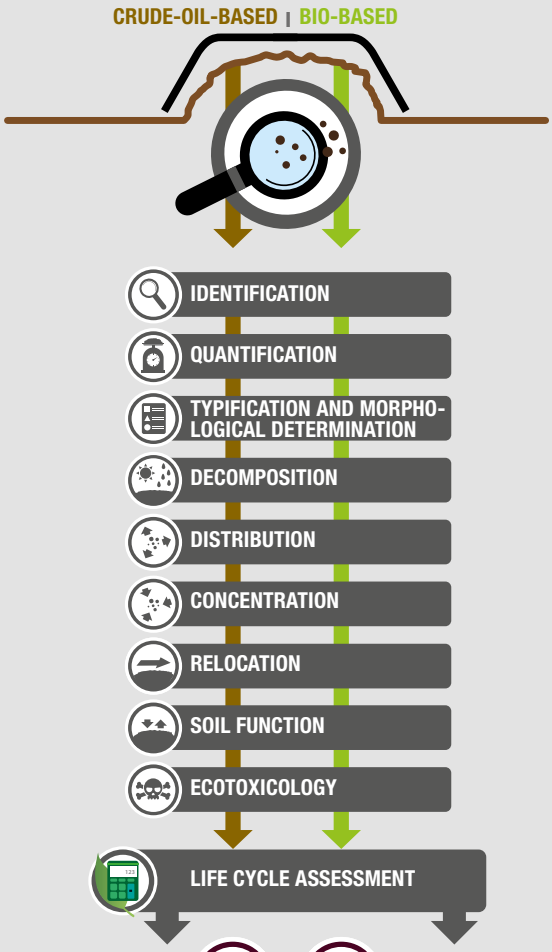


To this end, a hybrid enzymatic process will be investigated for CO_2 capture from industrial point sources, and conversion of captured CO_2 into the targeted end-products will be realized through three different proprietary microbial platforms which are representative of a much wider range of products and applications. Bioprocess development and optimization will occur along two lines: fermentation and bio-electrochemical systems. For more information, please visit our website: **www.bioreco2ver.eu** or contact the project coordinator: **heleen.dewever@vito.be**

Horizon 2020
European Union Funding
for Research & Innovation

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 760431.

iMULCH



Upcycling of mulch films by bacteria:

- Microorganisms degrade the films under laboratory conditions and convert them into new plastic molecules.
- These molecules are to be returned to the value chain and can thus increase the recyclable fraction of the film.

Substitution strategies:
The results are used to derive avoidance and substitution strategies with the aim of reducing film fragments of plastics in the environment.

An investigation of the influence of polymers on a terrestrial ecosystem using the example of mulch films used in agriculture

The issue of plastic waste has become part of all social debates. However, the pollution of the ecological system soil still receives little attention. The problem: Until now, there have been no valid measurement methods to answer questions about the amount, type, or impact of plastics on the soil ecosystem.

As part of the research project “iMulch”, a methodology is being developed that enables the detection of plastics (micro-and macroplastics) in soils and drainage waters to better measure plastic emissions in the soil ecosystem in the future and to better assess their impact. The subject of the investigations are mulch and agricultural films, which are used extensively in agriculture to stimulate plant growth and reduce the use of pesticides. Both conventional, petroleum-based, and bio-based plastic films are being tested and the effects will be considered in terms of life cycle assessment.

The following investigation criteria will be developed in the project and established in the test rig: Identification (1), quantification (2), typing and morphology determination (3), decomposition (4), distribution (5), concentration (6), relocation (7), soil function (8), ecotoxicology (9) (see Figure 1).

To gain further knowledge, the behaviour of plastic films is being investigated in a laboratory sewage treatment plant. Another approach deals with the upcycling of mulch films by bacteria. For this purpose, plastic fragments are degraded by microorganisms in the laboratory and converted into new plastic molecules. Finally, avoidance and substitution strategies are derived from the results. The aim is to reduce plastic emissions from films in the environment. For more information, please read our last press release or visit our project website: **www.imulch.eu**

EFRE.NRW
Investitionen in Wachstum und Beschäftigung

EUROPÄISCHE UNION
Investition in unsere Zukunft
Europäischer Fonds für regionale Entwicklung

The “iMulch” project is funded by the Europäischen Fond für regionale Entwicklung (EFRE) “Investitionen in Wachstum und Beschäftigung”.

Magic

Marginal lands for Growing Industrial Crops

Turning a burden into an opportunity

MAGIC is a four-year project that aims to promote the sustainable development of resource-efficient and economically profitable industrial crops grown on marginal lands. To achieve this, an **up-to-date database** of existing resource-efficient industrial crops **(MAGIC CROPS)** and a map of current and future areas in Europe facing natural constraints **(MAGIC MAPS)** will be developed and combined into a **Decision Support System (DSS).**

MAGIC CROPS categorize existing industrial crops on their agronomic characteristics, input requirements, yield performance and quality traits for end-user application.

MAGIC MAPS will map, characterize and analyse future marginal lands in Europe facing natural constraints to provide a spatially explicit classification.

A **Decision Support System (DSS)** is based on MAGIC-CROPS and MAGIC-MAPS, the DSS gives farmers and end-users a quick and easy overview of the most productive industrial crops to meet the geological requirements of their soils.

This strategy will foster the sustainable development of the European bio-based economy and will contribute to achieving the energy and climate targets of the EU! The first version of the three data sets can be found here: www.magic-h2020.eu

Horizon 2020
European Union Funding
for Research & Innovation

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727698.

TECH4 BIOWASTE

A Dynamic Database of Technologies for Bio-waste Utilisation

Bio-waste utilisation is key for a circular economy. Which existing and emerging technologies are best suited to turn a specific bio-waste stream into value?

The Tech4Biowaste project consortium is developing a comprehensive wiki-style overview on bio-waste valorisation technologies. It will cover technologies from readiness level 4 onwards, relevant feeds and products.

Are you experienced in specific bio-waste technologies?

Then you can help us feeding the database, showcase your technology and assess your commercialisation potential.

Do you want to get involved?

Contact the Tech4Biowaste stakeholder relations manager Stef Denayer **stef.denayer@bbeu.org**

or visit our website **www.tech4biowaste.eu**

Bio Base Europe Pilot Plant

btg biomass technology group

nova Institute

Pilots4U

RENEWABLE CARBON INITIATIVE

BBI JU

Bio-based Industries Consortium

Horizon 2020 European Union Funding for Research & Innovation

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