

5th Conference on

CO₂

Carbon Dioxide
as Feedstock for
Fuels, Chemistry
and Polymers

www.CO2-chemistry.eu

CO₂ as chemical feedstock – a challenge for sustainable chemistry

6–7 December 2016, Maternushaus, Cologne (Germany)

Conference Journal



1st Day, 6 December 2016: Political Framework & Visions

- Policy & Visions
- Artificial Photosynthesis & H₂ Generation

Leading event on
Carbon Capture &
Utilization (CCU)



2nd Day, 7 December 2016: Chemicals & Energy from CO₂

- CO₂-based Chemicals & Polymers
- CO₂-based Fuels



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www.phytonix.com

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Venue

Maternushaus

Kardinal-Frings-Straße 1,
50668 Cologne, +49 (0)221 163 10

www.maternushaus.de



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Conference Team



Asta Partanen

Sponsoring

+49 (0) 151 1113 0128

asta.partanen@nova-institut.de



Achim Raschka

Programme, Poster Session

+49 (0)2233 4814-51

achim.raschka@nova-institut.de



Dominik Vogt

Conference Manager,
Organisation, Exhibition

+49 (0)2233 4814-49

dominik.vogt@nova-institut.de



Jutta Millich

Partners & Media Partners

+49 (0)561 503580-44

jutta.millich@nova-institut.de



Barbara Dommermuth

Programme

+49 (0)2233 4814-56

barbara.dommermuth@nova-institut.de



Vanessa Kleinpeter

Contact, Registration,
Organisation

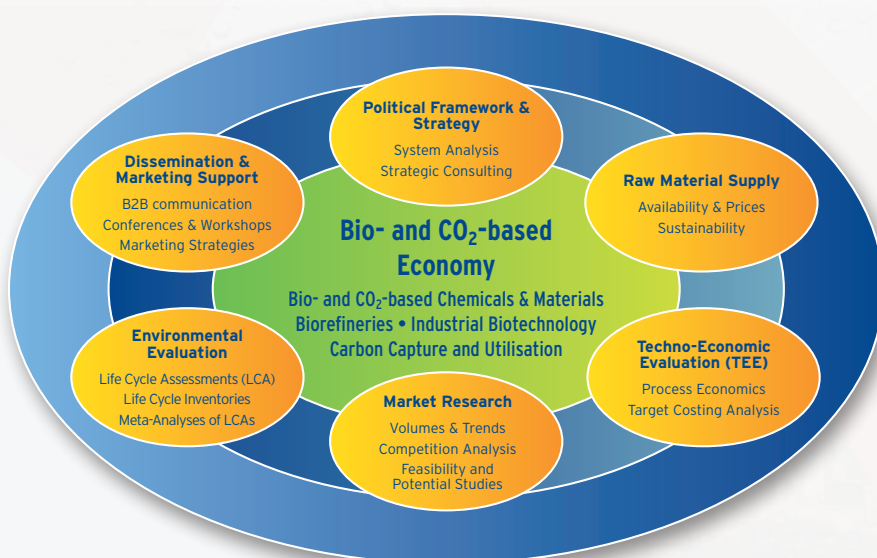
+49 (0)2233 4814-40

vanessa.kleinpeter@nova-institut.de

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Our nova-Institute's Services in the bio-based Economy for Companies, Associations and Politics



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Message of Greeting

Our society is faced with the challenge of having to reduce or outright avoid carbon dioxide emissions.

In order to put a brake on global warming and to use sustainable energy sources, we need clever and efficient ways of managing resources and energy.

The utilisation of CO₂ as feedstock and economic resource is a building block in the transition to sustainable energy sources.

Let me wish you a superb conference, a fruitful exchange of ideas and many productive discussions.

Patronage

**Ministry of Innovation,
Science and Research of
the German State of North
Rhine-Westphalia** 

Ministry of Innovation, Science
and Research of the German State
of North Rhine-Westphalia



The conference is under the
patronage of

Svenja Schulze

Minister of Innovation, Science and
Research of the German State of
North Rhine-Westphalia

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PROGRAMME OF THE 1st DAY, 6 DECEMBER 2016: POLITICAL FRAMEWORK & VISIONS

9:00 Registration and Welcome Coffee

10:00 Conference Opening, nova-Institut GmbH 
Michael Carus



10:05 Opening Words from the
Ministry of Innovation, Science and Research of
the State of North-Rhine Westphalia – MIWF 
Dr.-Ing. Walther Pelzer



10:15 EnergieAgentur.NRW 
Dr. Frank Köster
*Bioeconomy and the Future of Mobility –
Findings from a Regional Perspective*



POLICY & VISIONS

Chairwoman: Kathryn Sheridan, Sustainability Consult (BE)

10:30 CO₂ Sciences, Inc. 
Dr. Issam Dairanieh
Global CO₂ Initiative



11:00 Climate KIC 

Ted Grozier

Covestro 

Dr. Niklas Meine

EnCO₂re – a Flagship Initiative for CO₂ Utilization



11:30 Coffee Break

12:00 DG Grow / EU Commission 
Dr. Reinhard Büscher

*CO₂ Reuse in and for the Circular Economy –
the Industrial Dimension*



12:25 European Commission 
Soren Bowadt

An Update on Commission Activities towards CCU



12:40 Federal Ministry of Education and Research (BMBF) 
Dr. Helmut Löwe

*From Waste to Resource – New Developments in
German CCU Research and Innovation*



12:55 University of Sheffield 
Prof. Dr. Peter Styring

*CO₂ – a Valuable Building Block for
the Chemical Industry*



13:15 Lunch Break

14:15 HeidelbergCement 

Jan Theulen

HeidelbergCement Driving Carbon Capture and Storage/Utilization



14:35 SCOT/Greenwin 

Damian Dallemagne

Creation of a European Association Dedicated to CO₂ Utilisation



14:55 Greenpeace Energy eG 

Marcel Keiffenheim

The Role of Gas in the Energy Revolution



15:15 nova-Institut GmbH 

Michael Carus

*Full Integration of CCU Fuels in the Next Renewable Energy
Directive (RED)*



15:35 bse engineering 

Christian Schweitzer

*CO₂-Recycling at Waste Incineration Plants and
GHG-Reduction Quota for Fuels*



15:55 Coffee Break

ARTIFICIAL PHOTOSYNTHESIS & H₂ GENERATION

Chairman: Achim Raschka, nova-Institut GmbH (DE)

16:25 Uppsala University 

Prof. Stenbjörn Styring

CO₂ Reduction to Solar Fuels by Artificial Photosynthesis



16:55 Evonik Industries 

Dr. Martin Demler

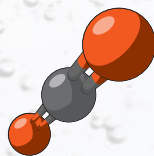
*Artificial Photosynthesis
Development at Evonik*



17:15 Panel Discussion

20:00 Dinner Buffet

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PROGRAMME OF THE 2nd DAY, 7 DECEMBER 2016: CHEMICALS & ENERGY FROM CO₂

CO₂-BASED CHEMICALS & POLYMERS

Chairman: Prof. Dr. Haralabos Zorbas, IBB Netzwerk GmbH (DE)



9:00 nova-Institut GmbH 
Dr. Christin Liptow
Fraunhofer IBP 
Aleksandar Lozanovski
RWTH Aachen 
Leonard Müller

Life Cycle Assessment (LCA) in Carbon Dioxide Utilization Processes



9:30 University of Bayreuth 

Oliver Hauenstein

Bio-based CO₂/limonene copolymer as versatile toolbox



9:50 VITO – Flemish Institute for Technological Research 

Dr. Deepak Pant & Dr. Linsey Garcia-Gonzalez

Technological Advances in CO₂ Conversion Electro-Biorefinery

Valorization of CO₂-rich Off-Gases to Monomers and Biopolymers Through Biotechnological Process



10:20 Coffee Break

10:50 Covestro (formerly Bayer MaterialScience AG) 

Dr. Christoph Gürtler

New Activities of Covestro in CO₂ Utilization



11:10 Phytonix 

Bruce Dannenberg

Utilizing Synthetic Biology to Address Global Challenges: Climate Change and Sustainable Chemistry



11:30 Photanol 

Ross Gordon

Producing high purity Lactic Acid from CO₂, powered by the Sun



11:50 Lunch Break

CO₂-BASED FUELS

Chairman: Lars Schulze-Beusingsen, EnergieAgentur.NRW (DE)



12:50 Methanol Institute 
Eelco Dekker

Renewable Methanol as a Key Molecule for CCU Fuels



13:10 InfraServ GmbH & Co. Knapsack KG 
Dr. Moritz Wendt

Fritz-Haber Institut der Max-Planck-Gesellschaft 
Dr. Elias Frei

Dynamic Methanol Synthesis by CO₂ Utilization under Various Site Conditions



13:40 Energy Research Centre of the Netherlands 
Jaap Vente

Thermodynamic limitations and how to overcome them in Carbon Utilization – Pilot Activities on the Production of Methanol based on Residual Gases in the Steel Industry



14:00 Mitsubishi Hitachi Power Systems Europe GmbH 
Torsten Buddenberg

Power to Fuel as a Sustainable Business Model for Cross-Sectorial Energy Storage in Industry and Power Plants

14:20 Coffee Break

Chairwoman: Dr. Cornelia Bähr, CLIB2021 (DE)



14:50 LanzaTech 
Dr. Sean Simpson

Innovations for a Carbon Smart Future

15:10 Syngip 

Bernhard Guentner

The Zero Emission Steel Plant of the Future



15:30 sunfire GmbH 
Christian von Olshausen

Power-to-Liquids: sunfire's Activities in Synthetic Hydrocarbons from CO₂, H₂O and Electricity



15:50 Electrochaea GmbH 
Dr. Doris Hafenbradl

Power-To-Gas – from the Laboratory to Industrial Scale



16:10 Bauhaus Luftfahrt e.V. 
Valentin Batteiger

SUN-to-LIQUID – Integrated Solarthermochemical Synthesis of Liquid Hydrocarbon Fuels

16:30 Networking Reception with Snack

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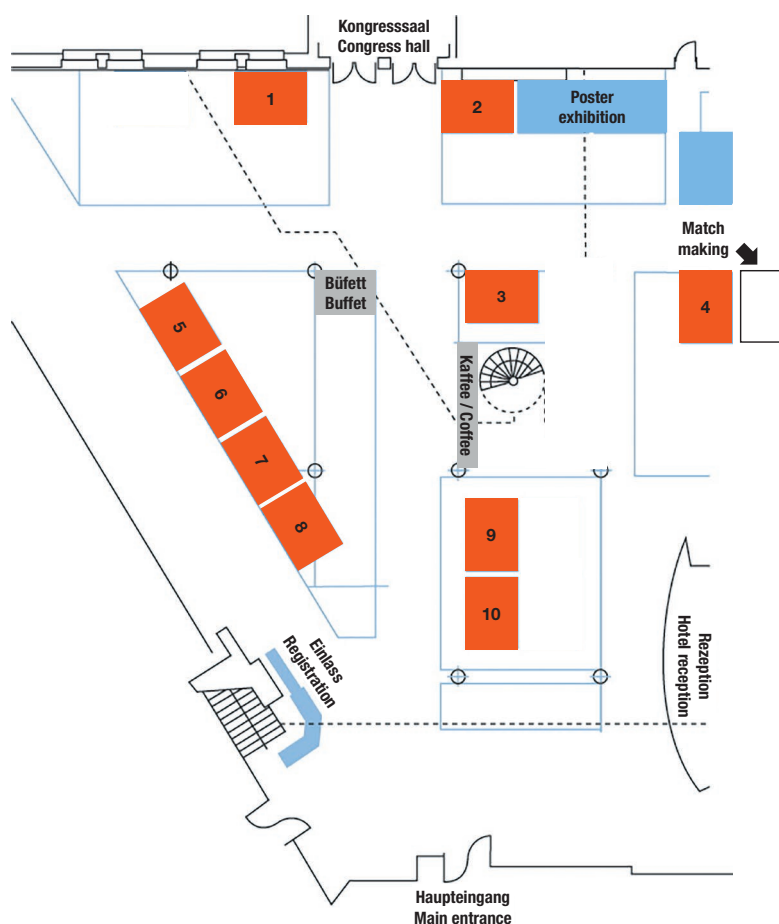


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Exhibition




Exhibitors


Booth No. 01: EcoSynth 


Booth No. 02: Industrielle Biotechnologie Bayern Netzwerk GmbH  & network "UseCO₂" 

Booth No. 03: Wageningen UR Food & Biobased Research 

Booth No. 04: nova-Institut GmbH 

Booth No. 05: Phytonix Corporation 

Booth No. 06: Sustainability Consult 

Booth No. 07: sunfire GmbH 

Booth No. 08: Zeton BV 

Booth No. 09: EnCO₂re 

Booth No. 10: bse Engineering Leipzig GmbH 

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www.ieaghg.org



<http://scotproject.org>

BCNP Consultants

www.bcnpc-consultants.com

ENCO₂RE = Innovation Hub Partner Network Market Developer

<http://enco2re.climate-kic.org>

kunststoffland NRW e.V.

www.kunststoffland-nrw.de

BIG Bioinnovation Growth Cluster

www.clib2021.de/club2021/laufende_projekte/big-c

THE GLOBAL CO₂ INITIATIVE

www.globalco2initiative.org

polycomply hoechst

www.polycomply-hoechst.com

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IBB Netzwerk GmbH

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www.stoffstroeme.de

Media Partners

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European Biotechnology Life Sciences and Industry Magazine

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www.fuelsandlubes.com

Industrial Biotechnology Many from Liebert, Inc. publishers

www.liebertpub.com

plasticker the home of plastics

<http://plasticker.de>

Bio-based News

<http://news.bio-based.eu>

Chemical Portal

www.chemicaldirectorysouthafrica.com

Life Sciences Serie

www.goingpublic.de/kat/life-sciences

INICOP (Institute for International CO₂ Capture & Utilization)

www.inicop.org

Plastixportal Plastics Directory

www.plastixportal.co.za

ChemicalWeekly

www.chemicalweekly.com

GREEN CHEMICALS BLOG

<http://greenchemicalsblog.com>

K ZEITUNG

www.k-zeitung.de

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14. Internationaler Fachkongress für erneuerbare Mobilität

23.–24. Januar 2017, Berlin

- Mehr als 500 Teilnehmer
- Mehr als 60 Referenten
- 14 verschiedene Panels
- Ausstellungsmöglichkeiten

Der internationale Fachkongress für erneuerbare Mobilität ist zugleich Leitveranstaltung und wichtiges Diskussionsforum über die internationale Politik für eine erneuerbare Mobilität. Im Januar 2017 werden wieder mehr als 500 internationale Teilnehmer erwartet, darunter Vertreter aus der Rohstoffproduktion und Logistik, Biokraftstoffproduzenten, Vertreter der Mineralölwirtschaft, der Fahrzeugtechnologie und Automobilindustrie, der chemischen Industrie, der Politik, Auditoren und Umweltgutachter, der Zertifizierungssysteme und aus Wissenschaft und Forschung.

AUSSTELLUNG

Positionieren Sie Ihr Unternehmen beim größten Branchentreffen der erneuerbaren Kraftstoffwirtschaft und Mobilität in Deutschland und Europa. Profitieren Sie von der starken medialen, wirtschaftlichen und politischen Präsenz in der Hauptstadt. Vergrößern Sie Ihr Netzwerk durch hochklassige nationale und internationale Kontakte. Präsentieren Sie Ihre Produkte und Dienstleistungen und gewinnen Sie neue Aufträge.

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Premium Partner EnergyAgency.NRW

The EnergyAgency.NRW works on behalf of the state government of North Rhine-Westphalia as an operative platform with broad expertise in the field of energy: from energy research, technical development, demonstration, market launch and energy consultancy to continuous vocational training. Many of its activities focus on energy efficiency and climate protection.

The EnergyAgency.NRW was established in 1990 and operates now with around 120 employees from its locations in Düsseldorf, Gelsenkirchen and Wuppertal. It is funded by, among others, the European Regional Development Fund (ERDF). Over 3.300 companies and institutions are partners of the EnergyAgency.NRW, most of them are small and medium-sized enterprises. The network counts also 64 universities, 107 institutes and 94 associations.

The EnergyAgency.NRW manages the energy industry cluster 'EnergyRegion.NRW' and the cluster EnergyResearch.NRW 'CEF.NRW'. Furthermore, the EnergyAgency.NRW offers energy consulting services in the form of initial and contracting consultancy for companies and administrative bodies, as well as information and continuous training facilities for specialists and individuals. The portfolio also includes courses in user behavior, mediation services and state-wide campaigns as well as joint actions.

Cluster Management

On behalf of the NRW Environment and Climate Protection Ministry, the EnergyAgency.NRW with EnergyRegion.NRW is responsible for a powerful economic cluster for climate protection incorporating thirteen networks: biomass, fuel cells and hydrogen, carbon capture usage, energy efficiency in municipalities, energy efficiency in companies, geothermal energy, climate-friendly and energy-efficient construction, CHP/power plant technology, future fuels and drives, grids and storage systems, photovoltaics, hydropower and wind energy. On behalf of the NRW Economics Ministry the EnergyAgency.NRW is organising the 14th network "Energy/Mining Economy and Technology". In the spotlight: highly competitive co-operations to initiate innovative projects and products, to speed up their market readiness and to exhaust all economic potentials. This also includes providing support for companies from NRW in the domain of foreign trade.

The EnergyAgency.NRW launched the network "Future Fuels and Drives". The aim is to muster all the forces along the respective value chains in order to develop joint solutions for future forms of mobility. This also encompasses the development of new technologies and the testing of new business models.

EnergieAgentur.NRW
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EnergieAgentur.NRW

Netzwerk Kraftstoffe und Antriebe
der Zukunft

Dr. Frank Köster
Munscheidstr. 14
45886 Gelsenkirchen

Phone: +49 209 167-2811
koester@energieagentur.nrw

www.energieagentur.nrw/mobilitaet

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Covestro Deutschland AG

Stefan Paul Mechnig
Communication & Public Affairs
Kaiser-Wilhelm-Allee 60
51373 Leverkusen, Germany
Phone: +49 214 6009 3635
stefanpaul.mechnig@covestro.com
www.covestro.com

Silver Sponsor Covestro Deutschland AG

Covestro is a world-leading supplier of high-tech polymer materials: innovative, sustainable and diverse.

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In line with our vision "To make the world a brighter place," we work on solutions to the challenges of our time – to push the boundaries of what is possible.

We help make cars lighter so they save fuel. Our insulation systems protect buildings against the heat and cold to reduce energy consumption. In entertainment electronics, our products support functionality, safety and sleek design.

In 2015, Covestro generated sales of EUR 12.1 billion and employed approximately 15,800 people across the globe.



Phytonix Corporation

Box 565 Black Mountain
North Carolina 28803 USA

<http://phytonix.com>

Bruce Dannenberg
Founder & CEO
Phone: +1 (828) 230-5892
bruce@phytonix.com

Gordon Skene
Executive Vice-President
Phone: +1 (604) 790-8989
gordon@phytonix.com

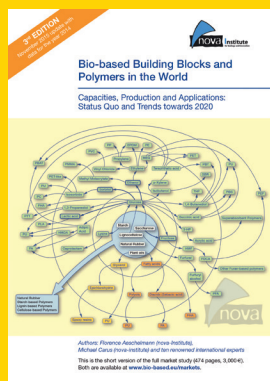
Bronze Sponsor Phytonix Corporation

Phytonix Corporation is a renewable-chemical technology company headquartered in North Carolina, with development laboratories in Sweden, Virginia and South Dakota, and a business office in Vancouver, Canada. The Company is commercializing a patented process using photosynthesis that directly converts carbon dioxide emissions from industrial and manufacturing plants into renewable, high-value chemicals.

The Company's initial product will be n-butanol (also referred to as "normal butanol" or "butanol") which currently sells at a wholesale price of approximately \$6.25/gallon in the industrial chemical market.

Phytonix management estimates that its patented process, which has been proven at lab scale, will enable it to produce butanol for about \$1.35/gallon – which is less than 1/3 of the cost of the current method of producing butanol from propylene, a petroleum derivative. This would make Phytonix the world's low-cost producer of butanol. The world industrial chemical market for butanol is about \$9 billion per year, of which about \$2 billion per year is sold in the United States.

The Company's carbon-negative butanol production process replaces an existing fossil-based, carbon-intensive process currently employed by some of the world's largest chemical companies. For every 125 gallons of n-butanol produced, the Phytonix process eliminates one ton of CO₂.



Market study and Trend Reports on "Bio-based Building Blocks and Polymers in the World" (2,100 € instead of 3,000 €)

Winter Special: Benefit from 30% discount on the most comprehensive market study and trend reports on bio-based polymers with the allowance code winter16 and also get new market data for free in January 2017 - and if you are not satisfied, give it back. Don't miss the comprehensive chapter on CO₂ as chemical feedstock!

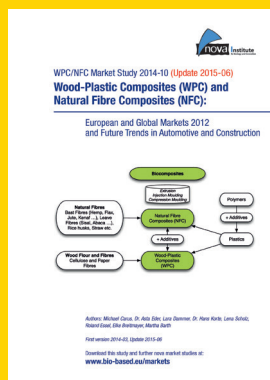
Allowance Code: winter16



Market study on "Consumption of biodegradable and compostable plastic products in Europe" (3,500 €)

First comprehensive market study in this field:

- Well-structured market and company data
- Case studies
- Feature on biodegradation and composting
- EU policy and legislation review and analysis



"Wood-Plastic Composites (WPC) and Natural Fibre Composites (NFC): European and Global Markets 2012 and Future Trends in Automotive and Construction" (1,000 €)

First comprehensive and detailed picture of the use and amount of wood and natural fibre reinforced composites in the European bio-based economy: extrusion, injection and compression moulding in different branches and applications



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7 – 8 June 2017, Maternushaus,
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www.eiha-conference.org



6 – 7 December 2017, Maternushaus,
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Partner event

29 – 30 March 2017, Beursgebouw, Eindhoven,
The Netherlands, www.map-expo.com

Contact: Mr. Dominik Vogt, +49 (0) 2233 48 14 49, dominik.vogt@nova-institut.de

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