

9 Sessions, 18 Presentations

Join Free Webinars on Markets and Strategies for Renewable Chemicals and Materials

11 – 22 October 2021

Hosted by nova-Institute and Wageningen University & Research

Dear expert on renewable solutions,

The nova-Institute invites you to participate in a series of webinars on the future of chemical production, chemical recycling, bio-based polymers, and CO₂-based polymers, which will be held in collaboration with experts from WUR (Wageningen University & Research). Michael Carus, CEO of nova-Institute, and other nova specialists, as well as WUR experts, host the sessions.

All webinars are free of charge!

The seminars will provide you a deep dive into market data as well as strategies for achieving a fossil-free industry. They also provide opportunities for discussion.

When:

Monday, 11 October 2021	
14:00 – 15:30 CET	01 The Renewable Carbon Vision
15:30 – 17:00 CET	02 Carbon Flows for Chemicals and Derived Materials and Carbon Management
Thursday, 14 October 2021	
14:00 – 15:30 CET	03 Technologies, Markets and Trends for “CO ₂ -based Products”
15:30 – 17:00 CET	04 Technologies, Markets and Policies on “Chemical Recycling”
Tuesday, 19 October 2021	
13:00 – 14:30 CET	05 Future of Refineries and Chemical Verbund Sites
14:30 – 16:00 CET	06 Circular & Plastic Policy
16:00 – 17:30 CET	07 Production Capacities, Markets and Trends for “Bio-based Building Blocks & Polymers”
Friday, 22 October 2021	
14:00 – 15:30 CET	08 Food vs. Non-Food Crops for Industry
15:30 – 17:00 CET	09 Useful Applications of Biodegradable Plastics

Where:

Online via Zoom

Link to join Webinar:

<https://us02web.zoom.us/j/89492719676>

01 The Renewable Carbon Vision

Moderation: **Michael Carus**
(nova-Institute)

Monday
11 October
14:00 – 15:30 CET

14:00 Renewable Carbon Concept and Initiative Michael Carus (nova-Institute)

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.

14:30 Discussion

14:45 Circular Bio-based Production Systems in the Context of Current Biomass and Fossil Demand Harriette Bos (WUR)

Carbon is the main constituent of food and feed. It is the most important energy carrier, and it is the main constituent of a broad range of materials – in particular wood, wood products, paper, board, and plastics. Bound carbon is essential for these products and is therefore one of the necessities of modern societies. It presently comes from two sources: fossil feedstock and biomass feedstock. However, in the near future we have to transform our carbon use to only three renewable sources: biomass, CO₂ capture and use and recycled carbon-based products. In this presentation we explore the quantitative challenges towards a circular bio-based economy.

15:15 Discussion

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02 Carbon Flows for Chemicals and Derived Materials and Carbon Management

Moderation:
Michael Carus
(nova-Institute)

Monday
11 October
15:30 – 17:00 CET

15:30 Carbon Flows and Carbon Demand Today and in 2050 – How the Growing Demand can be Covered? Michael Carus and Ferdinand Kähler (nova-Institute)

How to meet the global need for carbon as a feedstock in the chemical and derived materials sector in the future? The chemical sector has a long-lasting and increasing demand for carbon that is embedded in its products. Today, 450 million tonnes of carbon are contained in chemicals and polymers, mostly sourced from fossil resources. The free report "Turning off the Tap for Fossil Carbon", shows how the demand is met today and could be covered by renewable carbon in the year 2050. In this new report, conducted by nova-Institute and commissioned by Unilever, the total carbon embedded in products from the chemical and derived material sector is examined on a global scale. This includes product groups like plastics, rubbers, textile fibres, detergents and personal care solutions. For the first time ever, the total global amount of embedded carbon is calculated, visualized and connected to the different feedstocks. Furthermore, end-user applications are investigated and depicted. The authors present a 2050 scenario is introduced that outlines prospects to transition from fossil to renewable carbon sources. Moreover, solutions for the highly interconnected chemical industry are illustrated together with supporting policy measures.

16:00 Discussion

16:15 Circular by Design; Taking Control at End of Life Daan van Es (WUR)

Till now the design of (new) chemicals and materials has been driven by functionality, performance and cost during the production and use phase. Next to the use of renewable energy and resources, the concept of circularity requires control over the post-use or end of life phase in order to retain valuable raw materials and prevent undesirable environmental emissions. This will require a number of paradigms shifts with respect to resource use and the design of new circular products. In this webinar we will present a long term vision on circularity, and address some of the challenging choices that need to be made.

16:45 Discussion

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03 Technologies, Markets and Trends for “CO₂-based Products”

Moderation:
Jacco van Haveren (WUR)

Thursday
14 October
14:00 – 15:30 CET

14:00 Technologies, Markets and Trends for CO₂-based Polymers Pauline Ruiz (nova-Institute)

The use of CO₂ as chemical feedstock for polymers has been intensively diversified. Besides the long-established use of CO₂ for the synthesis of polycarbonates, also polyurethanes can already be based on it. Optimised technology approaches in fermentation, electrochemistry and catalysts for conversion are emerging and broaden the CO₂-based polymer portfolio. In this webinar, a comprehensive overview will be given on the different production routes of CO₂-based polymers that are developed and commercialised.

14:30 Discussion

14:45 CO₂ to Bio-based Building Blocks Ana Lopez Contreras (WUR)

In this webinar, an overview will be given on approaches to produce bio-based polymer precursors from CO₂ using Biotechnology. The webinar content is based on the approaches followed in the EU project BIOCON-CO₂: Fermentation of CO₂ under aerobic or anaerobic conditions for hydroxy-propionate and alcohols, respectively and direct enzymatic conversion of CO₂ to organic acids. The challenges on the different approaches will be discussed as well.

15:15 Discussion

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04 Technologies, Markets and Policies on “Chemical Recycling”

Moderation:
Christiaan Bolck
(WUR)

Thursday
14 October
15:30 – 17:00 CET

15:30 Main Results for the Year 2020 from the Latest Market Reports from nova-Institute Lars Krause (nova-Institute)

There are gaps in the current life cycle of plastic products, a total of 30 million tonnes of plastic waste is generated annually in Europe, of which about 29 million tonnes are collected. Most of the collected plastic waste is incinerated or landfilled, which are the least preferred options according to the waste hierarchy. In addition to conventional mechanical recycling, a wide range of chemical recycling technologies are coming into focus in discussions on improving recycling rates. Chemical recycling technologies represent innovative ways of dealing with post-consumer waste and offer a range of options not available in current materials recycling pathways. However, as these new technologies are still at an early stage of development, developers face the challenge of proving their potential. While critics point to the stage of development of the technologies and the very large areas of uncertainty in the assessments to date, proponents of chemical recycling see the latest technologies as core technologies of the circular economy and the European Green Deal.

16:00 Discussion

16:15 Review on (Bio)chemical Recycling of Polycondensates Shanmugam Thiyagarajan (WUR)

Recycling plastics by their end of life is one and key among very few strategies to address the pressing demands (a) circularity of plastics, and (b) the transition towards a sustainable future. Whereas both mechanical and chemical recycling methods of plastics have their own merits of transforming further into (new) products, the latter gives an opportunity to use (consume) spent plastics as a feedstock to derive primary raw materials (i.e., monomers), that can be used to produce virgin plastics. In this webinar, we will highlight the chemical recycling technologies developed so far (TRL 1-9) for polycondensation type polymers with the aim to create a renewed awareness to valorize plastic waste into virgin plastics.

16:45 Discussion

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05 Future of Refineries and Chemical Verbund Sites

Moderation:
Edwin Hamoen (WUR)

Tuesday
19 October
13:00 – 14:30 CET

13:00
Renewable Carbon Refineries Integrating Biomass, CO₂ and Hydrogen as well as Chemical Recycling
Achim Raschka (nova-Institute)

What will refineries and verbund sites look like in 2050? How can the existing refineries and verbund sites remain structurally intact but without fossil carbon? They need to integrate biomass, as well as CO₂ and hydrogen, and also chemical recycling. What feedstocks and technologies can feed today's petrochemical plants in 2050?

13:30 Discussion

13:45
Will Biorefineries Develop Into Future “Chemical Verbund sites”
Jacco van Haveren and Edwin Hamoen (WUR)

Current Chemical verbund sites are large integrated industrial complexes refining crude oil into fuels and a slate of different base and more commodity chemicals. By feeding “bionaphtha” to existing installations these Chemical verbund sites will increasingly produce renewable drop-in chemicals. New chemicals resulting into products with desired new, unique properties, are more likely to result from integrated biorefineries coproducing food, feed and chemicals for non-food applications. This presentation will highlight existing and potential future developments of biorefinery systems, including Wageningen research contribution to developing to these systems.

14:15 Discussion

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06 Circular & Plastic Policy

Moderation:
Christiaan Bolck (WUR)

Tuesday
19 October
14:30 – 16:00 CET

14:30
“WFBR The Flow of Plastic Packages Through our Society; Circular Visions and Harsh Realities”
Dr. Ulphard Thoden van Velzen (WUR)

Confronted with the need to mitigate climate change and plastic soup, most stakeholders in the value chain of plastic packages are striving towards a “circular economy”. What visions of a circular economy exist, and do they imply, in reality? Which actions do the incumbents take and what will they bring us? This presentation will paint a picture of what will happen when the incumbents will progress themselves towards a more circular economy and what ideally could happen when the actions of all actors would be aligned.

15:00 Discussion

15:15
Latest Policy News from Brussels with a Focus on Renewable Carbon in the EU Policy Landscape
Nicolas Hark (nova-Institute)

With substantial political adaption announced shortly in order to achieve the climate goals set out by the EU the political framework for renewable carbon is expected to improve (further). Recently enforced directions (SUPD), policies being newly developed (CBAM) as well as revisions of existing policies (PPWD, REDII, EU ETS, and many more) are on everyone's mind right now. How renewable carbon is (going to be) influenced by these and what consequences may arise for plastics and other materials will be the focus of this presentation.

15:45 Discussion

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07 Production Capacities, Markets and Trends for “Bio-based Building Blocks & Polymers”

Moderation:
Jacco van
Haveren (WUR)

Tuesday
19 October
16:00 – 17:30 CET

16:00 Latest Market Data and Trends on Bio-based Building Blocks and Polymers World Wide Pauline Ruiz (nova-Institute)

The year 2020 was a promising year for bio-based polymers: Sold out PLA in 2019 has led to the installation of increased capacities, PE and PP made from bio-based naphtha are breaking ground and future expansion for bio-based polyamides as well as for PBAT, PHAs and casein polymers is on the horizon. A lower production is only observed for bio-based PET.

16:30 Discussion

16:45 Developments at WFBR Concerning Bio-based Building Blocks and Polymers Daan van Es and Jacco van Haveren (WUR)

Renewable polycondensation polymers containing hydrolysable bonds are regarded as the ideal future circular polymers: due to the presence of hydrolysable bonds they are more suitable for chemical recycling and environmental degradation than polymers based upon non-hydrolysable bonds like polyolefins. The presentation will highlight ongoing activities at WFBR on developing synthesis routes to building blocks suitable for polycondensation polymers and will highlight results on polymer synthesis and characterization.

17:15 Discussion

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08 Food vs. Non-Food Crops for Industry

Moderation: Michael Carus
(nova-Institute)

Friday
22 October
14:00 – 15:30 CET

14:00 Sustainability Assessment of Different Biomass Sources Michael Carus (nova-Institute)

What are the most sustainable biogenic resources for the bioeconomy? Food crops or non-food crops? Wood? Sidestreams and biowaste? Different concepts for assessing the sustainability of biomass will be discussed. In addition, a study by the nova-Institute is presented, which looks for the most sustainable sources of fermentable sugars.

14:30 Discussion

14:45 Biomass Supply for Bio-based Products and Fuels in a Circular Economy Wolter Elbersen (WUR)

Large amounts of biomass are underutilized in the world which offers possibilities for use in the bio-based economy. The circular applications of biomass will change the types of biomass that can be used but may also increase the availability of feedstocks. In this talk the logistics of biomass supply, how to quantify circularity of applications and the role of lignocellulosic commodities will be discussed.

15:15 Discussion

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09

Useful Applications of Biodegradable Plastics

Moderation: **Michael Carus**
(nova-Institute)

Friday
22 October
15:30 – 17:00 CET

15:30

Useful Applications of Biodegradable Plastics

Karin Molenveld (WUR)

When designing products that need to fully biodegrade at end of life the main challenge is to combine reliable functionality during the service time of the product with rapid biodegradation at end of life. The starting point is the need for a manmade product that does not accumulate (but will biodegrade) in a specific environment, and this can be challenging for products that need to biodegrade in the open environment (soil, marine). Polymer, material and product development need to be combined with biodegradability studies both at lab-scale but also in field tests to prove biodegradation in the actual environment. In this webinar we will present practical examples of developed products and their biodegradation behaviour with a specific focus on technical aspects.

16:00 Discussion

16:15

Applications Where Biodegradability is Really an Advantage - Results of the German BioSinn Project

Michael Carus and Verena Bauchmüller (nova-Institute)

The BioSinn project found products and applications for which biodegradation at the end of life is a real option. 25 fact sheets answer technical and regulatory questions for each application. The market volume of these applications was also estimated: in the European Union about 1 million tonnes per year! In the EU, several million tonnes of plastics end up in the environment. In nature, in water, in the compost stream – every year, unhindered. Once landed there, it is often almost impossible to return them to the recycling stream: too small, untraceable, too costly. But there are plastic products that, even when used correctly, don't even make it into the recycling stream and end up in nature, in water or in the compost. And we deal with many of them every day. Think of cosmetics, tea bags, chewing gum or stickers on fruit and vegetables.

16:45 Discussion

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Participate in discussions about current scientific research approaches, advancements, and market reports with us.

It's completely free to join – just use the Zoom link.

If you have any questions, please do not hesitate to contact us. We are looking forward to seeing you.

Best regards,
Your teams from nova-Institute and WUR

Contact: contact@nova-institut.de