European Bioeconomy Scene 2019

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Outcome Report

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and Joel Järvinen

European Commission

Ministry of Agriculture and Forestry of Finland

Ministry of Economic Affairs and Employment of Finland

Ympäristöministeriö
Miljöministeriet
Ministry of the Environment

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bioeconomy+

BIOECONOMY CONFERENCE:

EUROPEAN BIOECONOMY SCENE 2019

#EUBioScene19

Helsinki, Finland on 8 – 10 July 2019

Helsinki City reception on 8 July and excursions on 10 July

CONFERENCE PROGRAMME

CONFERENCE DAY OPENING

9 July 2019

Hotel Scandic Park Helsinki (Street address: Mannerheimintie 46)

HIGH LEVEL OPENING

Moderator: **Kirsi Heikel**, Journalist, Yleisradio Oy, Finnish broadcasting company

08.00	*Registration opens*
	Coffee
09.00	**High level opening**
	Jyrki Katainen – Vice-President of the European Commission for Jobs, Growth, Investment and Competitiveness
09.10	**Jari Leppä** – Minister of Agriculture and Forestry, Finland
09.20	**Key note: Updated Bioeconomy Strategy for a Sustainable Europe**
	John Bell – Director of Healthy Planet, DG RTD, European Commission
09.40	**Key note: Bioeconomy and Future life-styles**
	Christine Lang – Chair, German Bioeconomy Council
10.00	*Break*

SESSION 1

9 July 2019

Hotel Scandic Park Helsinki (Street address: Mannerheimintie 46)

ROLE OF BIOECONOMY STRATEGIES IN
SUPPORTING THE TRANSITION TO A SUSTAINABLE AND CIRCULAR BIOECONOMY

The session aims to discuss how the transition to a sustainable and circular economy can be justly guided and what the role of national and regional bioeconomy strategies is in supporting this transition

Moderator: **Kirsi Heikel**, Journalist, Yleisradio Oy, Finnish broadcasting company

10.20 **Panel discussion: Rapid uptake of the bioeconomy in Europe**

Kristīne Sirmā – Head of Sustainable Agriculture Development Division, Ministry of Agriculture of Latvia:
Latvian bioeconomy strategy

Lisa Lehner – Forest Policy Officer, Federal Ministry of Sustainability and Tourism, Austria:
The forest perspective of the Austrian bioeconomy

Barna Kovács – Secretary General of the BIOEAST Initiative*:*
BIOEAST - Central and Eastern European initiative for knowledge agriculture, aquaculture and forestry in the bioeconomy

Mikael Höysti – Head of Department for Culture and Resources, Nordic Council of Ministers:
Nordic bioeconomy – a green transition

11.20 **Feedback from speakers**

Udo Hemmerling – Member of the European Economic and Social Committee

Eleni Zika – BBI JU's Head of Programme**,** Public Private Partnership instruments

11.30 **Bioeconomy – bridge to the future**

Matti Häyry – Professor of Philosophy, Aalto University School of Business

11.45 **How to guide the systemic change to sustainable bioeconomy**

Maarit Laihonen – Postdoctoral Researcher, Aalto University School of Business

12.00 *Lunch*

SESSION 2

9 July 2019

Hotel Scandic Park Helsinki (Street address: Mannerheimintie 46)

UNLOCKING THE POTENTIAL OF THE EUROPEAN BIOECONOMY

The session aims to discuss how innovative bio-based products are created and how investments and markets can be enhanced

Moderators: **Jussi Manninen** – Executive Vice President, Solutions for Natural Resources and Environment, VTT Technical Research Centre of Finland; and **Linda Fröberg-Niemi** – Business Development Manager, Chemical Industry and Cleantech, Turku Business Region

13.15 **Accessibility and sustainability of biomass resources**

Giovanni De Santi – Director, Sustainable Resources, Joint Research Centre, European Commission's Joint Research Centre

13.30 **EIB Funding of bioeconomy**

Shiva Dustdar – Head of Division, Innovation Finance Advisory at EIB

13.50 **Bioeconomy in Europe: role of European Research and Innovation infrastructures**

Leena Sarvaranta – Head of EU Affairs, VTT Technical Research Centre of Finland

Michael O'Donohue – Head of CEPIA Division, Institut National de la Recherche Agronomique; and
Mika Härkönen – Manager, Pilot Plant Development, VTT Technical Research Centre of Finland:
IBISBA and ERIFORE projects' main messages: "Science and innovation bridge" ESFRI initiatives

Katrien Molders – Communication Manager, Bio Base Europe Pilot Plant:
Pilots4U and SmartPilots

Niklas von Weymarn – CEO of Metsä Spring

Rob Beekers – Business Development Director, Cargill's Bio-industrial Group

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14.45 **Panel discussion: Societal challenges – What consumers need to move towards bio-based products?**

Karl-Henrik Sundström – CEO, Stora Enso

Johann Kottulinsky – Vice President, Biorefinery & Co-Products, Lenzing AG

Nils Hannerz – Head of Research and Innovation, IKEM Innovation and Chemical Industries

Susanna Albertini – Managing Director of FVA. Researcher and communication expert in EC research projects

Luke Edwards – Climate Change and Land Use Policy Officer, BirdLife Europe

Questions and answers

15.30 *Coffee break*

SESSION 3

9 July 2019

Hotel Scandic Park Helsinki (Street address: Mannerheimintie 46)

ADDING VALUE TO BIO-BASED VALUE CHAINS

The session aims to introduce new value chains in the agrifood and blue bioeconomy sectors and bottlenecks, enablers and gaps affecting bio-based sectors

Moderators: **Jussi Manninen** – Executive Vice President, Solutions for Natural Resources and Environment, VTT Technical Research Centre of Finland; and **Linda Fröberg-Niemi** – Business Development Manager, Chemical Industry and Cleantech, Turku Business Region

15.50 **How farmers get their fair share of added value from bio-based value chains**

Oana Neagu – Director General Affairs, COPA – COGECA 16.15

16.10 **Regional and local new value chains in food production**

Mari Sandell – Deputy Director, Functional Foods Forum, University of Turku

16.25 **How to unlock the potential of coastal and inland waters**

Petri Suuronen – Programme Manager, Blue bioeconomy, Natural Resources Institute Finland:
Growth and well-being from sustainable and aquatic resources and their smart use

Gabriel Acién – Professor, University of Almeria: *Unlocking potential of algae*

Janno Joosep – CEO, Berrichi: *From nature to make ups*

Jussi Mälkiä – Chair, Meriaura Group:
Circularity and industrial symbiosis in blue bioeconomy

Carla Domingues – Project officer, Fórum Oceano, Associação da Economia do Mar, Portugal
Blue growth

Questions and answers

17.30 **Closing remarks and next steps**

Jaana Husu-Kallio – Permanent Secretary, Ministry of Agriculture and Forestry, Finland

Tugomir Majdak – State Secretary, Ministry of Agriculture, Croatia

Planting a virtual tree

University of Eastern Finland

18.30 *Buffet dinner*

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1. EUROPEAN BIOECONOMY SCENE 2019

1.1. Introduction to the report

The European Commission published a long-term strategy for the development of the European bioeconomy in 2012 [1], and an update of the strategy in October 2018 [2]. The strategy outlines the great potential in the bioeconomy as a means of tackling some of the global challenges related to sustainability, including climate change, land and ecosystem degradation, and population growth. It calls for improvements and innovation related to production and consumption of food, products and materials. The bioeconomy will reduce our dependence on fossil natural resources, prevent biodiversity loss and create new economic growth and jobs in line with the principles of sustainable development. Successful implementation of the bioeconomy will not only help to modernise Europe's industries but it will also reinforce Europe's position in the global market. Furthermore, the bioeconomy can contribute to regional, urban, rural and coastal development and it supports the creation of new, value added, bio-based products and services.

The bioeconomy, at its simplest, means a shift from fossil-based and inorganic raw materials to biological and renewable alternatives. The European Commission defines the bioeconomy in the following manner:

"*The bioeconomy covers all sectors and systems that rely on biological resources (animals, plants, micro-organisms and derived biomass, including organic waste), their functions and principles. It includes and interlinks: land and marine ecosystems and the services they provide; all primary production sectors that use and produce biological resources (agriculture, forestry, fisheries and aquaculture); and all economic and industrial sectors that use biological resources and processes to produce food, feed, bio-based product, energy and services."* [2, p.4]

Since the publication of the European Bioeconomy Strategy, several steps have been taken in advancing the bioeconomy and the number of EU countries with their own national strategies is increasing, which highlights the bioeconomy's growing importance. In light of the updated Bioeconomy Strategy of 2018, it is good opportunity to increase public awareness of the bioeconomy and to promote the dialogue between various stakeholders. The Romanian Presidency of the Council of the EU, in the first half of 2019, placed the bioeconomy high on their agenda and the Finnish Presidency continues on the same path, recognising the centrality of the bioeconomy on the way towards a climate neutral Europe.

The European Bioeconomy Scene 2019 conference, from 8–10 July in Helsinki, was one of the major events at the beginning of the Finnish Presidency. The high-level conference brought together around 330 participants representing policymakers, research institutions, academia, businesses and civil society from all over Europe to exchange knowledge, discuss new actions and coordinate activities. The programme included expert speeches and panel discussions on the first conference day and, excursions to some of the most interesting Finnish bioeconomy sites on the second day.

Major topics of the conference were the role of bioeconomy strategies in the transition to a sustainable and circular economy, ways of unlocking the potential of the sector, and adding value to bio-based value chains with special focus on the farming sector and the so-called blue bioeconomy. The programme endorsed social sustainability as the cross-cutting theme of the conference.

This conference outcome report presents the highlights from each expert presentation and panel discussion, as presented by the speakers and panellists.

1.2. High level opening

Jyrki Katainen – *Vice-President of the European Commission for Jobs, Growth, Investment and Competitiveness*

In his opening speech, Jyrki Katainen addressed the growing importance of the bioeconomy to the European Commission.

He reminded the audience that we are living in a world of finite resources to which global challenges such as climate change, increasing world population and pollution bring additional pressure. This requires us to seriously think about the way we produce, consume and discard goods. Humankind is facing a multifaceted sustainability challenge to which there is no single quick fix.

To tackle this challenge, the Commission has adopted several measures during this mandate such as the reflection paper Towards a sustainable Europe by 2030 [3], the Circular Economy Action Plan and the comprehensive climate and energy package towards 2030.

The Commission has also taken action to promote the bioeconomy, which has great, untapped potential to address several global challenges. In 2018, the Commission presented its updated Bioeconomy Strategy, which outlined a holistic way to promote and increase the sustainable use of renewables. This conference, organised by the Finnish Presidency, is a great opportunity to present the capability of the circular bioeconomy and help it reaching its full potential.

Jari Leppä – *Minister, Ministry of Agriculture and Forestry, Finland*

Finland's Minister of Agriculture and Forestry Jari Leppä welcomed the participants to Finland and stressed that each member state should create a bioeconomy based on their own strengths.

For Finland, that strength has been the abundance of natural resources. Forests in particular have been the cornerstone of the Finnish bioeconomy for a long time. Alternatives to fossil-based materials have developed greatly in recent years and, in addition, material that was previously considered waste is being turned into valuable raw materials. In Finland, systematic work across governments has been carried out to promote the bioeconomy, and Finland published its national bioeconomy strategy as early as 2014, two years after that of the EU. Advancing the bioeconomy has been, and remains, central to government programmes. There has also been great successes in attracting investment, for example in the form of new biorefineries.

Minister Leppä encouraged all member states to prepare their own bioeconomy strategies, as these can help to find solutions to some major challenges that humanity is facing today, such as mitigating and adapting to climate change, ensuring sufficient food production and finding ways to produce more with less. The bioeconomy can enable the creation of new jobs, sustainable economic growth and vitality throughout Europe. At the same time, it can help in achieving the EU's goal of carbon neutrality in the upcoming decades.

Minister Leppä welcomed the selection of social sustainability as the cross-cutting theme of the bioeconomy conference. A just and equitable way of implementing the bioeconomy is important: The benefits of the bioeconomy should be distributed evenly and the losses caused by the changes must be compensated fairly. The European Commission and the EU Member States should work together to ensure that the United Nations' Sustainable Development Goals (SDGs) and the principles of social justice are the guiding principles in society's journey towards carbon neutrality.

1.3. Key note: Updated bioeconomy strategy for a sustainable Europe

John Bell – *Director, Directorate C – Healthy Planet, DG Research & Innovation, European Commission*

In his keynote speech, John Bell talked about how the European bioeconomy sector advanced and underlined the importance of a circular, sustainable bioeconomy in the great transition that is ahead of us. The three major topics he addressed were the bioeconomy in a new policy context, the EU's updated Bioeconomy Strategy, and the upcoming Horizon Europe Framework Programme.

According to John Bell, we find ourselves in a new context of transition. In 2015, we had the SDGs and the Paris Agreement setting the framework for the future. We are increasingly aware of the planetary boundaries that need to be respected, while public trust building remains a difficult task. In September, we will have two major reports grabbing the world's attention on what is happening in our oceans and what is happening with land use. We are aware about the problems with biodiversity, with one million species being threatened with extinction according to the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services.

We are looking at a system change and we need the circular, bio-based approach to be one of the catalysts, or motors, of the great transitions that are ahead of us. One could say that from a planetary point of view, we are on "extra time", and we are living in a unique period, as change has to take place in the next decade. In John Bell's view, it will be a decade of investment, a decade of transition, and a decade of reconnection and regeneration with local communities and the Member States. The role of the circular bioeconomy will be central in delivering deep decarbonisation, the regeneration of work, jobs and industry, and the rebuilding of public trust in how we live and work.

Politically, a transition towards a fairer and more sustainable society will occur. We now have a once in a lifetime opportunity to get things right: To invest in the systems and communities and ways of life and ways of living and ways of shaping the global economy that will make us proud.

The updated EU's bioeconomy strategy and action plan list 14 concrete actions and 3 big areas. The action plan also includes many concrete measures, such as a EUR 100 million Circular Bioeconomy Thematic Investment Platform for the bioeconomy and innovations, which offers financing for innovative ideas. Further support will be given to Member States, particularly the Central and Eastern European countries, which do not have a national Bioeconomy Strategy yet, via a Policy Support Facility.. Overall, advancing the bioeconomy is not a research and innovation issue as much as it is an issue about industry, agriculture, fisheries and marine, biotech and all kinds of different areas as well as the environment. More attention has also been paid to rural development policy and programmes, including those of the Common Agricultural Policy. The programmes enable rural stakeholders, rural enterprises and farmers to fully benefit from the new opportunities.

Financing has an important role to play in the transition. The new Framework Programme for research and innovation, called Horizon Europe, is currently under preparation. More direct investment will be possible, compared to past Framework Programmes. Research, innovation and finance are going to be key drivers of the transition to a circular and sustainable bioeconomy. John Bell also stressed the need to identify potential financing gaps, challenges and constraints that operators face when accessing funds for their projects, and to explore the best ways to address these barriers. The European Investment Bank (EIB) has published reports and studies on this. Under Horizon 2020, ambitions for the bioeconomy have been significant, and so far EUR 3.85 billion has been invested to make the transition happen. The last Work Programme of Horizon 2020 has

a special focus on Central and Eastern European countries. The role of cities is also important, as cities will be one of the main drivers of transformation. The single biggest investment in Horizon 2020 has been the Bio-Based Industries Joint Undertaking (BBI JU), which has a hundred projects which are leading the world in developing new value chains.

1.4. Key note: The Bioeconomy and future lifestyles

Christine Lang – *Chair, German Bioeconomy Council*

In the second keynote speech, Christine Lang talked about the paradoxical and contradictory relationship between climate awareness and the pursuit of convenience. She provided a short overview of where we are today and where we are going, as well as looking at the consumers and the lifestyles of the people of Europe.

The bioeconomy concerns all economic sectors. The main challenge we will have in the future is that we need to go through a transformation. We need to broaden our views on the bioeconomy, it is not just about transition, but also includes areas such as energy transition, circularity, waste prevention and sustainable lifestyles. Lang's presentation focused on the latter, drawing attention to the need to involve society and consumers in the transition to a bioeconomy.

A study on European lifestyle trends in 2020 [4] has identified and mapped the trends in lifestyles now and in the coming years. It outlines four trends: augmented and programmed lives (increased internet connections and usage), a culture of producing and sharing (e.g. consumer interest in the production of goods), resilient and proactive citizens (including movements to protect the climate and the environment) and the quest for purpose (people want to have a purpose in life).

We see many contradictions in people's behaviour. On the one hand, people strive for increases in living standards and convenience, further driving unsustainable consumer behaviours and creating enormous resource footprints per person. On the other hand, the same people report an unprecedented level of awareness about climate change and environmental issues, which motivates a number of ecological product innovations and sustainability-oriented consumer choices. According to Lang, the important question is: in the mixture that we see in society, how do we realise the transition to a sustainable society?

Another study by the Thünen Institut in Germany [5] focused on lifestyles with some interesting results. Society is not unified. There are three distinct groups in society, with different ideas on how to go about tackling climate and environment-related issues. The First highlights sufficiency and a close affinity to nature. The Second technological disruption and technological opportunities. The Third believes in green growth, focusing on economic cost-benefit considerations. To address these groups, you need to use different kinds of communication. This creates a communication challenge. When asked if people feel they can make a difference, many people feel they are not in control. In turn, when asked if bio-based products are sustainable the response tends to be positive. An interesting observation is that people are most concerned about health benefits, so the health sector would be a good place to start. People are also well aware that there are trade-offs between production and land use, and other things. Finally, when asked who should pay for the transition, people expect responsibility to be shared with the producers.

People generally know what they can do, but they don't do it all. There is an implementation gap between knowledge and action. To address this problem, the bioeconomy should be supported by technological and social innovations. Social innovations include bio-cities, and the upscaling of bio-based niche products. Consumers would also like the transition to occur step by step. Uncertainty and confusion should be avoided. The heterogeneity of consumers should be respected. National competitiveness and job losses should be

addressed. Finally, consumers believe that government, industry and business, and citizens together bear the costs and are part of the movement. The challenge is one of shared responsibility, and if we recognise this, we will get an outcome that consumers respect.

2. ROLE OF BIOECONOMY STRATEGIES IN SUPPORTING THE TRANSITION TO A SUSTAINABLE AND CIRCULAR BIOECONOMY

Addressing the question: *How can the transition to a sustainable and circular economy be guided justly and what is the role of national and regional bioeconomy strategies in supporting this transition?*

2.1. Panel discussion: Rapid uptake of the bioeconomy in Europe

The first panel discussion addressed the rapid uptake of the bioeconomy in Europe. The panel of four consisted of **Kristīne Sirmā** (Head of Sustainable Agriculture Development Division, Ministry of Agriculture of Latvia), **Lisa Lehner** (Forest Policy Officer, Federal Ministry of Sustainability and Tourism, Austria), **Barna Kovács** (Secretary General of the BIOEAST Initiative), and **Mikael Höysti** (Head of Department for Culture and Resources, Nordic Council of Ministers). **Kirsi Heikel** moderated the discussion. Major discussion topics included the current situation of the bioeconomy in the EU, employment aspects, as well as the means to achieve the rapid uptake of the bioeconomy in Europe.

The number of national Bioeconomy Strategies is increasing. Austria for example published its strategy in early 2019. The BIOEAST initiative of the countries in Central and Eastern Europe is seeking to tackle challenges related to topics such as innovation, investments in new value chains and a lack of awareness of the bioeconomy at a societal level. Actions taken so far include, for example, the establishment of national discussion forums with different stakeholders. This development is similar to that in the Nordic countries, where the process is also ongoing. In the Nordic countries, a lot of advanced technologies and industry funding for R&D exists already.

Regarding employment, it was noted that the goal of maintaining the number of employees in traditional rural sectors is a challenging one and requires broad discussion. Education has an important role to play in securing jobs, but new professions are also likely to emerge. Other aspects to consider that were mentioned include work-life balance, diversity, and the role of digitalisation and artificial intelligence. Politically, the bioeconomy is a cross-ministerial issue, which makes it essential to convince people that investing in bioeconomies can bring economic benefits in the form of employment and value added products. Some of the speakers raised gender aspects, highlighting the need to ensure that women who leave rural areas also have incentives to come back. For example, it was mentioned that the use of wood-based textile fibres in the clothing industry could potentially provide new attractive opportunities for them.

The bioeconomy is not separate from other trends. A lot of discussion focused on silos, and the various ways in which the barriers separating the different sectors of the bioeconomy could be broken down. A recent joint declaration of the ministers of agriculture and ministers of research of the Eastern EU states was welcomed as an example of how different sectors can work together and how the political sector can set an example to other actors in breaking down sectorial barriers.

Some panellists pointed out that the uptake of the bioeconomy is not a particularly rapid process. There is a lot of discussion, but in addition, long-term goals reaching far beyond 2030 need to be set to gain the trust of society. Strong political commitment, labelling and public procurement, along with investments, play a major role in the speed of the transition. The views of the young are important to take into account. Both soft and hard laws are required in directing the change. General dialogue between different actors is important, and politicians have an important role to play as the facilitators of discussion and in bringing the different actors together.

2.2. Feedback from speakers

Udo Hemmerling – *Member of the European Economic and Social Committee EESC(NAT/758)*

Commenting on the topic of the panel discussion, Hemmerling introduced the European Economic and Social Committee (EESC), which represents organised civil society with approximately 350 members.

According to Hemmerling, there exists a sense of global urgency: global challenges like climate change and worldwide population growth are enforcing an urgent need to find substitutes to fossil fuels and to increase the efficiency of bio-based material usage. Agriculture and forestry are the key sectors. New value chains provide additional opportunities for rural economies to shift from fossil-based to bio-based economies. Against this background, increased awareness of the consumption of our biological resources must be given priority in line with the climate objectives of the Paris Agreement. Furthermore, the bioeconomy can bring new opportunities in terms of biodiversity, industry, jobs and economic development.

The EESC welcomes the update of the EU's Bioeconomy Strategy and considers it an important step in the right direction. There is global demand for sustainable, resource-efficient bio-based products. However, despite the significant progress in the updated strategy compared to the previous version, some of the measures included still need to be put into practice. Hemmerling mentioned a few examples: it would be beneficial to set up individual and flexible consulting or advisory services. Public-private cooperation should give due attention to primary producers, and this could be supported by a range of measures and instruments under the CAP. Incorporating research, innovation and bioeconomy activities into a long-term strategy would make it easier to support development and replication. Continuing education and the training of workers and primary producers is also crucial. Furthermore, the circular economy and inter-sectoral, territorial linkages within the EU and beyond should be promoted. Finally, all Member States should mainstream a comprehensive bioeconomy strategy into their policies and programmes, and the EU should strive for a global pricing system for carbon emissions.

Respecting the principles of sustainability is essential for the "new" bioeconomy and natural resources must be conserved in order to keep them productive. Moreover, in that respect, the usage of sustainability certification schemes has an important role.

Eleni Zika - *Head of Programme, Bio-based Industries Joint Undertaking*

In her follow-up commentary, Eleni Zika presented the bio-based industries joint undertaking (BBI JU).

Bio-based industries and their value chains are facing complex and substantial technology and innovation-related challenges. Full deployment of such technologies onto the market requires sustainable sourcing of biomass, as well as new business models, which integrate all the economic actors across value chains. The

complexity of such an endeavour dictates the necessity to foster collaborations – not only across sectors, but also across borders.

Therefore, an institutional public-private partnership is very much needed to ensure the full deployment of the bioeconomy in Europe. The BBI JU is a EUR 3.7 billion public-private partnership between the EU and the Bio-based Industries Consortium (BIC), which was created to act as a catalyst to tackle these challenges by de-risking investments for scaling up innovation in the sector.

Two main positive effects of the BBI JU are the structuring effect in organising the value chains across sectors and the innovation-driven mobilising effect of all key stakeholders. The BBI JU is contributing to the fast transformation of the bio-based sector: processes, feedstock and actors that were not traditionally part of the bio-based economy are now becoming fully involved in it. Through the 100 projects launched so far, the BBI JU fosters new collaborations, transforming once linear value chains into more interconnected ones. Moreover, the BBI JU is supporting the introduction of innovations into the market by boosting large-scale production, and the creation of sustainable products and materials with an equal or overall better performance than their fossil-based counterparts.

Through the implementation of its mission, the BBI JU is delivering concrete socio-economic and environmental benefits to Europe. More than 80 per cent of their ongoing projects support the creation of new skilled jobs in the bioeconomy, many of them in rural and coastal areas and more than 70 per cent of them expect to deliver bio-based products with lower greenhouse gas emissions than the fossil-based alternatives. For example, their first seven bio-refinery flagship projects alone will generate more than 3,000 direct and more than 10,000 indirect jobs, while at the same time delivering bio-based products with a lower greenhouse gas footprint.

2.3. The Bioeconomy – a bridge to the future

Matti Häyry - *Professor of Philosophy of Management, Aalto University School of Business*

Häyry provided his insights into the aspects of ethics and justice in the transition to a bioeconomy, stressing the need to carefully investigate the full range of impacts to ensure a socially acceptable outcome. The philosophy unit at Aalto University, School of Business, where Häyry works, studies questions of justice and the management of a systemic transition in the context of the bioeconomy and its predecessors.

According to their interim findings for the implementation of the EU's bioeconomy strategy, the current economic system in the EU and globally faces major challenges related to climate change among others. The solutions provided by the bioeconomy, which are technical, political, organisational and ethical in nature, address some of these challenges.

The most straightforward ethical solution to the problem we are facing would be to follow the path of equality: to stop promoting economic growth in its current sense and to settle for a reasonable material contentment instead of consumerist bliss. However, achieving this is politically difficult. We should therefore start afresh by recognising the complexity of the challenges and by focusing on their systemic – conceptual as well as empirical – investigation. According to Häyry, these would include looking into the ethics/morality and justice/equality of different solutions, as well as determinism/voluntarism and techno-optimism/pessimism related to the identified threats to the economic transition. This way, we should work methodically towards solid normative recommendations for the future.

2.4. How to guide the systemic change to a sustainable bioeconomy

Maarit Laihonen – *Postdoctoral Researcher, Aalto University School of Business, Department of Management Studies*

Laihonen, who comes from the same philosophy unit as Häyry, presented a project, which aims to develop understanding of the bioeconomy as a particular political path, among others, towards an environmentally and socially sustainable and just society, where the economy can also flourish within the limits of natural resources and local as well as global social equality.

In the project, they study current relevant policies at a European level, starting from Finnish examples and the framework of SDGs, and specifically their relationship to the idea of the bioeconomy and policies closely related to it. The starting point of the project is to recognise the existing overlaps and contradictions, which halt efficient actions. Laihonen mentioned one example, which is the repeated clash between economic interest (economic growth) and the sustainable use of biomass. Based on the analysis of case studies, for example, on the participation of businesses and citizens, the project seeks to create and provide a management model, which goes beyond current policy tools in offering possibilities for a sustainable bioeconomy. In the long-term, the objective is to utilise the model on a European scale.

3. UNLOCKING THE POTENTIAL OF THE EUROPEAN BIOECONOMY

Addressing the question: *How are innovative bio-based products created, and how can investments and markets be enhanced?*

3.1. Accessibility and sustainability of biomass resources

Giovanni De Santi – *Director, Sustainable Resources, European Commission, Joint Research Centre DG*

In his speech, opening the third session of the conference, Giovanni De Santi stressed that the majority of the products that we now consume can be made from renewable materials but there are many challenges that we will need to overcome to realise the full potential of biomasses. In addition, he outlined the role of the Joint Research Centre of the European Commission in the transition to a bioeconomy.

De Santi argued that from the food we eat to the cosmetics and health care products we use; from the energy we consume to the houses we live in; from the plastics and packaging materials we manage to the clothes we wear – all these products we consume daily can be produced from renewable biological resources in a sustainable manner.

However, biomass and natural resources are limited and global challenges like climate change, land degradation, ocean pollution, and the decline in biodiversity, coupled with a growing demand for food, energy, products and materials force us to seek new ways of producing and consuming. Deploying a circular and sustainable bioeconomy across Europe can address these challenges and provide sustainable goods and services that value local resources. It can create new jobs and value chains, regenerate territories, renew industry and production sectors, mitigate climate change and restore the environment and the ecosystems we rely on, including biodiversity.

The Joint Research Centre of the European Commission (EC) is contributing to the EU Bioeconomy Strategy and Action Plan, to ensure that:

1) Knowledge on the bioeconomy is systematically provided, as a basis for impactful policy making across different sectors. The EC's Knowledge Centre for Bioeconomy co-ordinates the overall provision and analysis of knowledge, scientific evidence and collective intelligence across the bioeconomy areas. This includes the analysis and forward-looking capacity of biomass availability and sustainability across sectors, while monitoring and assessing ecosystems and their services in order to ensure that the bioeconomy is operating within safe ecological limits.
2) The bioeconomy delivers sustainability across policies and sectors, interconnecting them through a systemic approach. The JRC research activities adopt a life-cycle assessment approach to perform integrated assessments of biomass availability (in the present and in the future) and of bio-based products, to assess the environmental benefits and impacts of the bioeconomy, and the opportunities, synergies and trade-offs of policies towards the Sustainable Development Goals.
3) A monitoring framework is established to track economic, environmental and social progress towards a circular sustainable bioeconomy. The involvement of national and regional stakeholders is key to the success of these collective intelligence tasks.

3.2. EIB Funding of the bioeconomy

Shiva Dustdar - *Head of Division, Innovation Finance Advisory (IFA) at the European Investment Bank (EIB)*

The next speech addressed the financing of the transition to a bioeconomy and the contribution of the European Investment Bank (EIB). More specifically, the focus on Dustdar's speech was on the EIB lending to, and advisory services for, the circular economy and the bioeconomy.

According to Dustdar, the bioeconomy sector needs to invest in new business opportunities, adapt to challenges and innovate in order to be able to unlock production potential in a sustainable and resource-efficient way. The EIB provides the necessary access to (long-term) finance. With around EUR 6.7 billion lending to the agri-bioeconomy sector in 2018, the sector received approximately 12 per cent of EIB's total 2018 lending of EUR 55.6 billion. The EIB lending to the bioeconomy sector follows the EIB lending priorities, which include, among others, support for SMEs and midcaps, the environment and climate, renewables and energy efficiency.

The EIB also provides advisory services across all innovative sectors including the bioeconomy and circular economy. Having started as a relatively new concept, the circular economy is today embedded in the EIB's DNA. The InnovFin Advisory (IFA) team contributed to this with its market report on Access-to-finance conditions for projects supporting the Circular Economy [6].

The IFA also conducted a market assessment of the Access-to-finance conditions for Investments in Bio-Based Industries and the Blue Economy [7]. This led to the creation of the Circular Bioeconomy Investment Platform. The EIB Advisory Services are actively engaged in the wider ecosystem supporting the circular bioeconomy, including working groups, advisory platforms and related awareness raising events. Furthermore, the IFA team provides targeted financial advice to promoters active in the circular bioeconomy field.

3.3. Panel discussion: The Bioeconomy in Europe – the role of European research and innovation infrastructures

In the second panel discussion, the panellists addressed the role of European research and innovation infrastructures. The panel of six brought together views from businesses and service providers, and consisted of: **Leena Sarvaranta** (Head of EU Affairs, VTT Technical Research Centre of Finland), **Michael O'Donohue** (Head of CEPIA Division, Institut National de la Recherche Agronomique), **Mika Härkönen** (Manager, Pilot Plant Development, VTT Technical Research Centre of Finland), **Katrien Molders** (Communication Manager, Bio Base Europe Pilot Plant), **Niklas von Weymarn** (CEO, Metsä Spring), and **Rob Beekers** (Business Development Director, Cargill Bioindustrial Group). **Jussi Manninen** and **Linda Fröberg-Niemi** moderated the discussion.

The discussion focused on the shared (or open access) pilot facilities. From the industry perspective, it was said that bringing new products to market is costly and using shared infrastructure in the pilot phase can bring costs down as well as decrease the time to market. They also provide a platform for networking and learning from others. From the service providers' perspective, in turn, it is important to find synergies between their usage of infrastructure assets. A free online database called Pilot4U [8], which lists Europe's open access pilot facilities, is an example of a project enhancing collaboration.

At the EU level, there is a lot of discussion around the issue of technology infrastructures, but perhaps not enough interest to conduct research into technological readiness levels (TRL). In pursuit of climate neutrality, testing new ideas is very important and broad collaboration can enhance this. However, some obstacles exist relating to, for example, funding gaps and state aid when trying to collaborate across borders. Participation and financing rules also differ at European, national and regional levels. SMEs in particular may face a challenge in finding finance, as the European funding instruments can require high administration fees and getting the money can be a slow process, whereas regional funding agencies may not allow companies to spend the money outside their own region. On the positive side, however, it seems as though this problem is being more and more recognised.

The panellists mentioned some ways in which collaboration could be enhanced. For companies it is generally important to specialise and to be the best in class in order to be competitive. Policymakers should make sure that the framework for adopting bio-based products is favourable, and Horizon Europe and BBI JU are doing great work in this respect. Enhanced collaboration not only brings financial benefits, but it also connects the expertise and allows complementary production, even after the pilot phase. There should be more coordination at the European level of where the money is being directed in order to make smart investments, while recognising that regions and pilot plants also compete with each other. A strategic vision for technology infrastructure shared by all stakeholders would also improve cooperation and help create synergies. When it comes to start-ups, things that they seek in developing their businesses, and which therefore should be kept in mind, include flexibility, low thresholds, accessibility and co-funding. Finally, a systemic change requires holistic thinking and respective policies.

The main outcome of the panel discussion was that building business ecosystems around European research and innovation infrastructures increases the chances of biotech innovations making it to market, in addition to which it has a significant impact on bioeconomy transformation and piloting. Open innovation and pilot infrastructures speed up the innovation cycle and commercialisation, and decrease the business risks at an individual level. In the long term, research and innovation infrastructures strengthen the competitiveness of European companies and support the establishment of a novel, bio-based industry.

3.4. Panel discussion: Societal challenges – What consumers need to move towards bio-based products

The third panel discussion addressed the willingness of consumers to move towards bio-based products, the panel consisted of representatives from businesses, research institutions and NGOs. The participants in the panel were: **Karl-Henrik Sundström** (CEO, Stora Enso), **Johann Kottulinsky** (Vice President, Biorefinery & Co-Products, Lenzing AG), **Nils Hannerz** (Head of Research and Innovation, IKEM Innovation and Chemical Industries), **Susanna Albertini** (Managing Director of FVA, Researcher and Communication Expert in EC Research projects), and **Luke Edwards** (Climate Change and Land Use Policy Officer, BirdLife Europe). **Jussi Manninen** and **Linda Fröberg-Niemi** moderated the panel.

All the panellists agreed that consumers, and especially young consumers, are increasingly interested in buying sustainable and ethical products. The market for bio-based products, however, is still developing. The communication and marketing of bio-based values should be the next step towards creating conditions where companies have the confidence to make long-term investment decisions knowing that there will be demand for their bio-based products. Communication about the bioeconomy generally, as Albertini put it, should now move to the next stage, from 'bio-what to bio-how'.

What is important for the success of bio-based products is not only the raw material it is made from, but also whether it delivers the expected functionality and quality. Some panellists also highlighted the importance of price competitiveness, whereas others argued that when sustainability is guaranteed, consumers get additional value for which they are willing to pay. However, if the production of a bio-based material is on an unsustainable basis, the additional value is lost in the eyes of the consumers. Marketing has a role in spreading information on sustainable products, and companies can use labels and third-party certification schemes to communicate the advantages. Particularly important in that respect is the scientific base, so that consumer knows they are making the right choice.

Some of the risks regarding the strengthening of bio-based products in the market were mentioned. These include, among other things: lack of functionality, technological risks, and possible negative perceptions, for example, that there may not be enough feedstock or that bio-based products will compete with food production. In terms of scientific knowledge, it is also problematic that there are various different methods of conducting life-cycle assessments (LCA) of products, which makes it hard to compare different products.

For a successful transition to a bioeconomy, the relevant players should work together in its creation, including establishing direct dialogue between industry and NGOs so that any issues can be understood early on. In terms of technological development, supporting innovation is important for improving the price competitiveness of bio-based products. Policymakers and regulators have an important role to play in this. They should also promote the use of harmonised ways to conduct holistic, science-backed LCAs of different products. Furthermore, they should create a stable and strategically harmonised regulatory environment. The multipliers, which refers to people like architects and designers, should be actively involved in promoting the use of sustainable materials. Finally, the transition to a circular bioeconomy should be globally implemented in line with the global problems it addresses.

The panel concluded that a novel bioeconomy has the potential to contribute significantly to the reduction of CO_2 emissions by reducing the environmental impact of manufacturing processes and industry. For the bioeconomy concept to succeed, acceptance by the general public is crucial. To achieve this, consumers need to be informed about the benefits, costs and risks of bio-based versus traditional products, as well as their applications. This requires full and transparent information being given to the public and to the consumer,

as both consumer awareness and demand for responsible products and solutions are growing. Industry and businesses need to find novel elements in their value propositions and invest readily in consumer interface activities. Having a harmonised European business environment for the bio-based industry will become even more important in the future.

4. ADDING VALUE TO BIO-BASED VALUE CHAINS

Addressing the topic: *New value chains in the agrifood and blue bioeconomy sectors and bottlenecks, enablers and gaps affecting bio-based sectors.*

4.1. How farmers get their fair share of added value from bio-based value chains

Oana Neagu - *Director General Affairs, COPA – COGECA*

Discussing the ways in which farmers could capture their share of the added value of bio-based value chains, Neagu argued that farmers and especially their cooperatives have made important investments and initiatives that promote the efficient use of natural resources. This pattern should be supported and farmers should be considered an integral part of projects seeking to create new value added, bio-based value chains. The policies of the EU should also be coherent in supporting farmers' participation in bioeconomy initiatives.

According to Neagu, the role of farmers, forest owners and their cooperatives is crucial in achieving a European circular bioeconomy which ensures rural development and tackles climate change. Even now, agriculture and the forestry sector are making a great contribution to this goal by sustainably producing biomass and ecosystems services for various uses and various scales of bio-businesses, including bioenergy. Furthermore, important investments, mainly by cooperatives, have been made in research and innovation, logistics, and technologies to replace fossil-based materials and to promote green growth. Numerous initiatives promoting efficient use of natural resources have also been implemented to boost the viability of rural areas. In most of these cases, farmers play a key role and the added value is shared equally between the actors involved.

This is something we need to continue supporting in the future. We also need to further support the development of the rural bioeconomy in the EU and especially where it is not considered a priority (through initiatives like the BIOEAST). This requires certain actions. First, we need to ensure that farmers are an integral part of the bio-based value chains and that they are considered real partners from the outset of the project. Second, we need a strategic vision, supported by specific measures, financial support and fair partnerships both at a national and at an EU level. This should address the challenges that primary producers face related to biomass mobilisation and enhancing their sustainability and competitiveness. The implementation of the EU's bioeconomy strategy should reflect this by ensuring more coherence between EU policies, such as the CAP, Horizon Europe and EU regional development policy. Further examples of aspects that should be taken into consideration include advisory services, knowledge exchange, investments, infrastructure and services.

The role of farmers and cooperative organisations is key to success and it must be backed by strong political commitment and initiatives to raise awareness among consumers of the importance of bio-based products and businesses.

4.2. Regional and local new value chains in food production

Mari Sandell - *Deputy Director, Functional Foods Forum, University of Turku, Turku, Finland*

Focusing on food production, Sandell gave practical examples of co-creative activities, which have created new local value chains. These address the fact that the global food system is facing great challenges, and relating to all of the SDGs. In the future, all food should be sustainably produced and valuable natural resources should be recycled. Currently, globally, too much of the food produced for human consumption is either lost or wasted. Furthermore, food-based bio-waste is expensive for both companies and society – too often consumers are only perceived as the end users in the current food ecosystem.

It is therefore necessary to develop new tools to increase common understanding to bring about change. We should understand what the valuable bioeconomical resources in nature are, and how to recycle them in a sustainable way. We should also understand what the safe or toxic ingredients are before recycling them. Finally, taste and other quality factors should be sufficiently good enough for consumers to be motivated by them, as the human senses are the best instrument for the overall evaluation of complex food.

On this basis, the *FoodiEX project*, funded by Business Finland, the University of Turku and the Finnish food industry, is a consumer-driven multisensory food chain development project. *FoodiEX* combines research, development, and commercialisation through co-creation with food influencers, chefs, food producers and researchers. As a result, new, inspiring and sustainable food concepts are developed. Yet another project called *Flavoria*, presented by the University of Turku, is an innovation and biofuture research platform, which is a living lab for researching genuine consumer experience. It brings together consumers, companies and researchers to develop sustainable practices in the food chain and eating. Iit fits in with European joint projects working, for example, towards a biofuture and circularity in food systems. Finally, Sandell also mentioned that Finland has launched a new ecosystem called *FoodTech Platform Finland*, which is a joint growth network of companies, entrepreneurs, researchers and the general public, as well as the third sector. It is a response to the massive global challenges in the food system, which require new ICT solutions and digital innovation along the entire food chain. Understanding the challenges and desires in consumers' everyday lives leads to better success for future food products.

4.3. Panel discussion: How to unlock the potential of coastal and inland waters

In the final panel, the five panellists delivered short individual presentations on different aspects of the blue bioeconomy, before coming together to answer some questions from the audience. This section summarises the content of the individual presentations.

4.3.1. Added value and well-being from aquatic resources

Petri Suuronen – *Development Manager, Natural Resources Institute Finland (Luke)*

The blue bioeconomy can be understood as business activities and value creation, which are based on sustainable and smart use of renewable aquatic resources. Water and aquatic resources have a significant role to play in meeting the UN's SDGs by 2030. Ensuring a good status of aquatic environments and water for different uses is an essential part of sustainable blue development. According to Suuronen, the blue bioeconomy has the potential to improve water and food security, to provide healthy and low-carbon

footprint food, to innovate added-value technologies and products, to maintain and revitalise rural and coastal areas, and to bring about many other benefits.

To achieve this, the blue bioeconomy needs smart, digital water management, a healthy aquatic environment, resilient fisheries and aquatic production systems, intensive collaboration across sectoral boundaries, technological innovations, new financing instruments as well as improved services and business models. A shared understanding of the status of the blue bioeconomy in the EU is needed. The opportunities and research priorities to boost the growth of the economy and jobs in this field have to be identified. The EU has the potential to become a major global player in the blue bioeconomy and related services.

4.3.2. Unlocking the potential of algae

Francisco Gabriel Acién Fernández – *Professor, University of Almeria, Spain*

The presentation by Acién Fernández focused on the potential of microalgae and introduction of the SABANA project.

Algae and in particular microalgae, are a potential source of bioactive compounds in addition to food and feed, as well as services such as wastewater treatment and CO_2 capture. The major bottleneck limiting the expansion of this sector is the low scale of actual production systems and, consequently, the high production cost of the biomass. This also limits the application of this biotechnology to high value products.

In the past year, there has been interest in the large-scale production of biostimulants, biopesticides and feed additives, in addition to biofertilizers and aquafeed, using microalgae. The SABANA project focuses on the development of large-scale microalgae-based biorefineries for these applications and the project aims to demonstrate a real industrial process up to 5 hectares, based on this technology.

The reliability of large-scale, low-cost raceway reactors has been validated with the reactors being operated in full recirculation mode to save water and nutrients. Harvesting the biomass has been optimised by combining a pre-concentration and de-watering step, using dissolved air flotation and a nozzle separator. Concerning cell disruption, this step is mandatory to adequately obtain the end products. Although ultrasound allows greater breakdown of the cells to be achieved, the utilisation of high-pressure homogenisers allows sufficient cell disruption to be produced for further extraction processes, saving energy.

Extracts obtained from the biomass sludge demonstrate relevant effects both as biostimulants and biopesticides. Concerning the biostimulant effect, both Auxin-like and Cytokinin-like activities were found. In some cases, increases in the plant growth performance larger than 200 per cent were measured. When it comes to biopesticides, results demonstrate the inhibition of growth by up to 60 per cent of five of the most relevant fungal pathogens. These effects have previously been demonstrated in small-scale laboratory and culture chambers, and now they have been validated in real field trials. Concerning aquaculture, although the biochemical composition of the microalgae biomass is highly valuable, the digestibility of the biomass is largely dependent on the strain. To improve digestibility, it is recommended to perform a previous cell disruption, both mechanically and enzymatically. Fish trials performed, incorporating biomass of different microalgae strains and percentages to Aquafeed, demonstrate that the major advantage of incorporating microalgae biomass is not related to the improvement in growth, but to the enhancement of the health of fish as a probiotic.

The first end products are being evaluated, prior to market evaluation by companies. The SABANA project is thus expected to unlock the potential of algae to contribute to the blue economy and the circular economy in Europe, demonstrating real commercial processes based on these microorganisms.

This project has received funding from the European Union's Horizon 2020 Research and Innovation program under Grant Agreement No. 727874.

4.3.3. From nature to make-up

Janno Joosep – *CEO, Berrichi*

Another example of using algae was presented by Janno Joosep, who co-founded the Estonian skincare company Furcella PLC together with Berit Joosep. Their main activity is the production of a natural skincare product under their trademark BERRICHI, the formula of which utilises algae-based antioxidants. The product was developed together with Tallinn University over a period of three years. It has three key elements: furcellaran, which originates from red algae in the Baltic Sea and acts as a transporter of other ingredients; astaxanthin, the most powerful natural antioxidant in the world, which captures skin-damaging free radicals that cause premature ageing and inflammations; and finally, cacay oil, which gives extraordinary hydration and nourishment. Today, BERRICHI skincare has seven products and four more in development, all utilising the same protected formula as their basis. In terms of packaging, BERRICHI products now use conventional plastics with a pilot scheme in place, where customers are encouraged to return the empty bottles in exchange for discounts. The used bottles are then upcycled for building materials. In the future, the goal is to develop a packaging solution based on biological materials.

Furcella PLC has been a case study and partner of Baltic Blue Biotechnology Alliance since 2016.

4.3.4. Circularity and industrial symbiosis in the blue bioeconomy

Jussi Mälkiä – *Chairman of the Board, Meriaura Group*

The Meriaura Group has conducted systematic study and work to bring a strong bioeconomy element to the maritime business and the marine environment. With 20 dry cargo vessels, Meriaura is the leading Finnish shipping company in sustainable logistics and they transport approximately three million tonnes of cargo annually, which represents around 3 per cent of Finnish imports/exports. The group of companies combines the use of waste-based biofuel in coaster vessels, the collection of used cooking oils and other side streams for bioenergy and food production.

Since 2012, the concept has included a plant utilising recirculating aquaculture systems by Sybimar in Uusikaupunki, Finland. The closed circulation bio-production park combines a greenhouse, a biogas plant and a bio-oil plant. It has a cutting-edge energy solution, which utilises and recycles waste, energy, heat, nutrients and carbon dioxide for energy and food production. The award-winning concept produces food (fish and vegetables), energy, biogas, biofuel, electricity and heat, as well as nutrients for growth. The greenhouse is located above the fish farm, with circulating heat and water, whereas the bio oil and biogas are produced from residuals. The concept has been developed in cooperation with several universities. VG Marine EcoFuel is used on Meriaura's ships and on the research vessel Aranda.

Meriaura is known as the only actor in the maritime business, even at a global level, that has had such concrete and tangible bioeconomy solutions in extensive use for several years already.

4.3.5. The Blue Bioeconomy – a perspective from Portugal

Carla Domingues - *Project officer, Fórum Oceano, Associação da Economia do Mar, Portugal*

Domingues introduced the recently launched Blue Bioeconomy Roadmap for Portugal, which highlights the opportunities and challenges, as well as the actions already in progress and those still to be done necessary for a paradigm shift to an economic model based on blue bioresources. Portugal is taking a position at the forefront of the blue bioeconomy in Europe by 2030, contributing to the transition of the Portuguese economy towards a more competitive model focused on sustainable innovation.

Fórum Oceano – Association of Maritime Economy is a private, non-profit association created in 2009 and since then formally recognised by the Portuguese Government as the National Maritime Cluster. The association gathers several members from the whole country, covering all sectors of the blue economy, from traditional to emerging activities.

One of these emerging sectors is the blue bioeconomy, related to the extraction of aquatic bioresources such as fish, algae, macro and microorganisms, by means of biotechnology, to produce food, feed, pharmaceuticals, cosmetics, energy and alternative biomaterials. This sector has the potential to contribute to economic growth in the EU and to provide new jobs, while also supporting sustainable development, public health, and environmental protection.

5. CONFERENCE CONCLUSIONS: THE BIOECONOMY – A BRIDGE TO THE FUTURE

Jaana Husu-Kallio - *Permanent Secretary, Ministry of Agriculture and Forestry, Finland*; and
Tugomir Majdak - *State Secretary, Ministry of Agriculture, Croatia*

Setting the scene:

- In 2018, the Commission presented its updated Bioeconomy Strategy, which outlined a holistic way to promote and increase the sustainable use of renewables. The Bioeconomy conference entitled European Bioeconomy Scene 2019, which was jointly organised by the Commission and the Finnish Presidency, aimed at raising public awareness and promoting dialogue on the progress towards a sustainable bioeconomy in the Europe.
- We are living in a world of finite resources to which global challenges such as climate change and increasing world population bring additional pressure. It forces us to think about the ways we produce, consume and dispose of goods.
- The bioeconomy has a transformative potential and it seeks to contribute to a more sustainable production and consumption.
- The updated EU Bioeconomy Strategy and action plan contains 14 concrete actions that will support a transition to a circular and sustainable bioeconomy operating within planetary boundaries.
- Social and technological innovations are key when changing our way of living, thus supporting more sustainable lifestyles in the future.
- The bioeconomy has a central role to play in the decarbonisation of our economies.

- Research and innovation are at the core of providing the solutions that will allow us to drive a just transition to a circular and sustainable bioeconomy.

How the transition to a sustainable and circular economy can be guided justly and what the role of national and regional bioeconomy strategies is in supporting the transition:

- Our current economy, in the European Union and globally, faces challenges related to climate change. Bioeconomic solutions – technological, political, organisational and ethical – address some of these challenges.
- Better awareness of our consumption of bioresources must be given priority ,in line with the climate objectives of the Paris Agreement.
- The most straightforward ethical solution would be to follow the path of equality, stop promoting economic growth in its current sense, and to settle for reasonable material contentment instead of consumerist bliss, but this is politically difficult.
- We should therefore start afresh by recognising the complexity of the challenges; by focusing on their systemic – conceptual as well as empirical analysis; and by working methodically towards solid normative recommendations for the future.
- All Member States should mainstream a comprehensive bioeconomy strategy into their policies and programmes, but this is not enough. Concrete action plans should be made in order to design the right measures that will support the actual development of a country's bioeconomy.
- An institutional public-private partnership is needed to ensure the full deployment of the European bioeconomy.

How innovative bio-based products are created and how investments and markets can be enhanced:

- All the products we consume daily in our lives can be produced from renewable biological resources in a sustainable manner and we should all strive to switch as soon as possible to this kind of production. This will not be easy nor happen overnight, especially in some countries, because it requires a multi-sectoral approach and a lot of R & D investment, but it is crucial for our future.
- Biomass and natural resources are limited and global challenges like climate change, land degradation, ocean pollution, and the decline in biodiversity, accompanied by a growing demand for food, energy, materials and products simply force us to seek new ways of producing and consuming.
- Deploying a circular and sustainable bioeconomy across Europe can address these challenges and provide sustainable goods and services that value local resources.
- Systematically provided knowledge is a basis for impactful policy-making across different sectors. This includes the analysis and forward-looking capacity of biomass availability and sustainability, while monitoring and assessing ecosystems and their services in order to ensure that the bioeconomy is operating within safe ecological limits.
- The bioeconomy delivers sustainability across policies and sectors, interconnecting them through a systemic approach, paving the way for synergies and trade-offs of policies towards the UN Sustainable Development Goals.
- The bioeconomy sector needs to invest in new business opportunities, adapt to challenges, and innovate to be able to unlock production potential in a sustainable and resource-efficient way. Access to long-term finance provided by the EIB is necessary.

- Building innovation and business ecosystems around European Research and Innovation Infrastructures, accelerates bioeconomy transformation by bringing innovations to the market faster. Open innovation and pilot infrastructures help companies reduce technical risks and produce first batches of new products to be evaluated by prospective business partners.
- In the long term, Research and Innovation Infrastructures strengthen the competitiveness of European companies and support the establishment of a novel bio-based industry. As these infrastructures are expensive and require highly skilled staff, it is important for the infrastructure providers to network and develop new business models that provide an improved service offering for clients. This is especially true for the Eastern part of the EU and the new Member States, where the existing infrastructure is not at a sufficient level to support ambitious bioeconomy transformation.
- The Horizon programme plays a crucial role in the financing part, setting aside a substantial amount of money for the circular bio-based economy, with the goal to drive sustainable and climate-neutral solutions and accelerate the transition to a healthy planet. However, optimal implementation is not being achieved due to a number of regions in the EU lagging behind in terms of research and innovation capabilities.
- Another substantial future source of funding at EU level should be the reformed Common Agricultural Policy, with its goals and objectives shifting towards addressing issues like climate change and sustainability.
- For the bioeconomy concept to succeed, acceptance by the public is crucial. This requires full and transparent information being given to the public and the consumer, as both consumer awareness and demand for responsible products and solutions are growing. We should raise primary producers' awareness to implement zero-waste production and to reduce the carbon footprint of their production.
- Both Industry and businesses need to find novel elements in their value propositions and invest readily in consumer interface activities. In the future, a harmonised European business environment for the bio-based industry will become ever more important.

New value chains in the agrifood and blue bioeconomy sectors and bottlenecks, enablers and gaps affecting bio-based sectors:

- The role of farmers, forest owners and their cooperatives is crucial in achieving a European circular bioeconomy that ensures rural development and tackles climate change.
- Farmers must be seen as an integral part of the bio-based value-chains, and added value must be shared equally between the actors involved in them.
- Farmers and cooperative organisations must be backed by strong political commitment to raise awareness among consumers of the importance of bio-based products and business.
- We need to develop rural bioeconomies across the EU, and to encourage countries, where the development of the bioeconomy is not yet a priority.
- Due to the global challenges in the food system, new ICT solutions and digital innovations along the entire food chain are needed.
- Ensuring a good status of aquatic environments and water for different uses is essential for the blue bioeconomy. The blue bioeconomy needs smart, digital water management, resilient fisheries and aquatic production systems, intensive collaboration across sectorial boundaries, technological innovations, new financing instruments, and improved services and business models. A shared understanding of the status of the blue bioeconomy in the EU is needed.

- Existing bioenergy players should become an integral part of the bioeconomy – using bioenergy in the technological processes and logistics of primary producers, and developing new value added materials from bioenergy by-products.

Take home message:

- We need to understand the bioeconomy as a political path towards an environmentally and socially sustainable and just society, where the economy can also flourish within the limits of nature and local and global social equality.

Next steps:

- The Finnish EU Presidency will elaborate on the Council Conclusions of the updated European Bioeconomy Strategy.
- Croatia plans to put the bioeconomy very high on its priority list, primarily in, but not limited to, the area of agriculture. Croatia will build on the foundation created by the Finnish and Romanian presidencies in raising awareness about the bioeconomy, as well as its implementation in agriculture and other sectors.
- Croatia intends to organise a high-level event on the topic of the bioeconomy, alongside some technical meetings in Brussels and Croatia.
- In 2020, it will have been two years since the adoption of the EU's updated bioeconomy strategy, which potentially marks a good time to start the discussion about its evaluation.

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7. LIST OF SPEAKERS

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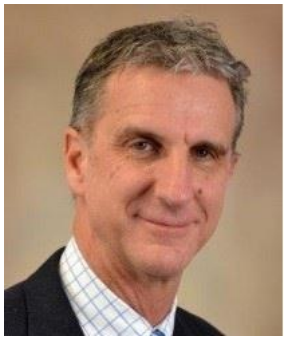

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