

Governing sustainability in biomass supply chains for the bioeconomy

Summary and conclusions from the IEA Bioenergy
workshop, Utrecht (Netherlands), 23 May 2019



This publication provides the summary and conclusions for the workshop 'Governing sustainability in biomass supply chains for the bioeconomy' held in conjunction with the meeting of the Executive Committee of IEA Bioenergy in Utrecht, The Netherlands on 23 May 2019.

IEA Bioenergy

Governing sustainability in biomass supply chains for the bioeconomy

Summary and conclusions from the IEA Bioenergy workshop, Utrecht (Netherlands), 23 May 2019

Luc Pelkmans, Technical Coordinator, IEA Bioenergy
Göran Berndes, Task Leader, IEA Bioenergy Task 45
Uwe R. Fritsche, Task Leader, IEA Bioenergy Task 40
September 2019

Front cover image: Beech forest in northern Zealand, Denmark

Copyright © 2019 IEA Bioenergy. All rights Reserved

Published by IEA Bioenergy

TABLE OF CONTENTS

KEY MESSAGES FROM THE WORKSHOP	2
EXECUTIVE SUMMARY	3
The bioeconomy and contribution to Sustainable Development Goals	4
Sustainability governance	4
Priority goals and actions	5
WORKSHOP AGENDA	7
WORKSHOP REPORT AND NOTES	9
Welcome speeches	9
Session 1: Setting the scene and policy experiences	11
Biobased systems in sustainability transitions	11
The IEA's outlook for sustainable bioenergy	12
Lessons learnt from the IEA Bioenergy Inter-Task Project 'Measuring, governing and gaining support for sustainable bioenergy supply chains'	13
EU bioeconomy strategy and sustainable bioenergy governance	14
Governing sustainability in biomass supply chains for the bioeconomy: some OECD perspectives	15
Bioeconomy, governance, and developing countries	16
Governing bioeconomy pathways	17
Session 2: Collecting the evidence: Views from multi-lateral partnerships, industry, and civil society: success stories and lessons learned	18
Global Bioeconomy Summits and International Bioeconomy Forum	18
How to create the Biofuture?	19
Global Bioenergy Partnership – GBEP: working together for sustainable bioenergy	20
New paths to a renewable carbon economy	21
Ensuring the sustainability of Europe's bioeconomy	22
How to account for biogenic carbon of forest biomass?	23
Position of Solidaridad towards the bioeconomy	24
World Café Round 1: What actions are needed for progressing towards a sustainable, circular bioeconomy	25
Main conclusions of the World Café 1 discussions	26
World Café Round 2: A collaborative way forward	29
Main conclusions of the World Café 2 discussion	30
Concluding session	32
ACKNOWLEDGEMENTS	32

KEY MESSAGES FROM THE WORKSHOP

IEA Bioenergy, in close collaboration with GBEP, FAO, IEA, Biofuture Platform, IRENA, and below50, held a workshop on 'Governing sustainability in biomass supply chains for the bioeconomy' in Utrecht, the Netherlands on 23 May 2019.

Securing a sustainable supply of biomass is one of the key issues for deploying biobased value chains, including bioenergy and biomass-based products. This workshop provided the initiation of a series of events within the frame of the new IEA Bioenergy Task 45 on '*Climate and sustainability effects of bioenergy within the broader bioeconomy*', focusing on identifying approaches and implementation strategies for sustainable cross-sectoral biobased supply chain management. Key messages from this workshop are:

- **Creating trust** that biomass can be applied sustainably is crucial. This requires credible **governance** systems, and monitoring, traceability and **transparency** are key to gain trust.
- An important step will be to agree on and implement a minimum set of **key sustainability criteria** and related indicators (e.g., based on the GBEP sustainability indicators) in relation to the most important risks and opportunities that need to be addressed through sustainability governance. Where data gaps exist and methodologies are preliminary or lacking, proxies can foster initial steps.
- Sustainability governance of bioenergy should not be separated from other uses of biomass (i.e., broader bioeconomy). Sustainability criteria should **apply to all biomass** and not just to the portion of it used for bioenergy. **Linking** sustainability governance **to incentive programmes** and **decarbonisation policies** can help drive acceptance and expand a sustainable bioeconomy.

- **Future dialogue** should in principle involve all bio-based value chains' stakeholders, but also policymakers and the private sector, with an emphasis on the **financing** sector. Dialogue is also needed with **critical voices** ("meet the opposition"): what are real risks, what is actual practice, and how can sustainability governance help de-risking? Social and local economic opportunities should be brought forward more prominently, also towards developing countries. Also **younger generations** need to be more involved, as they will be in the driver's seat in the coming decades to steer the transition to a low-carbon economy.
- For all this it is necessary to step out of one's own circle, **beyond** the bioenergy community: bioenergy is to be considered part of the bioeconomy. The workshop was a first step to reach a wider audience in order to explain what biomass can mean for society and the economy.

More detailed conclusions and priority actions identified during the workshop are given in the following Executive Summary, together with the workshop, notes which cover all sessions and presentations.

In the coming years, IEA Bioenergy Task 45 will organise additional dialogues to discuss approaches and implementation strategies for sustainable biobased supply chain management, building further on the outcomes and conclusions of this workshop. If you are interested in joining IEA Bioenergy in pursuing the objectives outlined in the Workshop Report, we invite you to contact us to discuss collaboration¹.

¹ Contacts: Uwe R. Fritsche, Göran Berndes. For overall IEA Bioenergy, contact Luc Pelkmans or Jim Spaeth.

EXECUTIVE SUMMARY

The IEA Technology Collaboration Programme on Bioenergy (IEA Bioenergy) held its biannual workshop in Utrecht, the Netherlands on 23 May 2019 on the topic 'Governing sustainability in biomass supply chains for the bioeconomy', in close collaboration with the Global Bioenergy Partnership (GBEP), the Food and Agriculture Organisation of the United Nations (FAO), the International Energy Agency (IEA), the Biofuture Platform, the International Renewable Energy Agency (IRENA), and below50, a global collaboration established by the World Business Council for Sustainable Development (WBCSD).

Securing a sustainable supply of biomass is one of the key issues for deploying biobased value chains, including bioenergy and biomass-based products. Given the ample debate on the sustainability of bioenergy and biofuels, it can be expected that similar requirements and governance systems will need to be set up for additional emerging biobased products. Such initiatives should consider the governance structures and other contextual conditions that already shape the biomass supply systems that are associated with existing bioeconomy commodities such as food & feed, fibres or timber products.

This workshop provided the initiation of a series of events within the frame of the new IEA Bioenergy Task 45 on '*Climate and sustainability effects of bioenergy within the broader bioeconomy*', focusing on identifying approaches and implementation strategies for sustainable cross-sectoral biobased supply chain management. The key issues discussed in this workshop were:

- pragmatic solutions to activate sustainability governance of biomass-based value chains,
- actions needed to progress towards a sustainable, circular bioeconomy,
- how to gain trust and support for biobased systems and supply chains,
- how international collaboration can provide a way forward.

The workshop consisted of four sessions: the morning programme had two plenary sessions to set the scene and collect evidence on sustainability governance; in the afternoon, two 'World Cafés' discussed in small groups, actions needed to progress towards a sustainable bioeconomy, and future collaboration. Both sessions were followed by reporting to the plenary. The workshop was attended by around 100 participants.



The bioeconomy and contribution to Sustainable Development Goals

Long-term scenarios that keep global warming well below 2°C by 2100 commonly include important roles for bioenergy, not least in association with systems that provide so-called negative carbon dioxide (CO₂) emissions, thus creating a large need for biomass resources. Moreover, transformative changes will be needed in different sectors, moving from greenhouse gas (GHG)-intensive materials such as cement and steel, towards low-GHG biobased products. There will be trade-offs between different sectors; bioenergy and biobased products should not be considered separately, but rather as components of integrated value chains and processes in the overall bioeconomy.

The UN Sustainable Development Goals (SDGs) provide a global framework to activate the sustainability of the bioeconomy. The bioeconomy as a whole will need to respect ecological boundaries, which can be facilitated through enhancing knowledge and monitoring the status of biodiversity and ecosystems, and promoting sustainable practices in primary production. In addition to reducing climate impact, a sustainable bioeconomy can have various economic and social co-benefits, such as diversity of energy supply, improved energy access, more sustainable agricultural practices, increased implementation of sustainable forest management (with reduced risk of losses due to disturbances such as storms, insect infestations and wildfire), reduced land degradation, economic development in rural areas, improved waste management, and job creation.

For this reason, the sector can play an important role in the implementation of the UN 2030 Agenda for Sustainable Development, and of the related SDGs. In that sense, reaching out to developing countries is also important, thereby recognising different dynamics compared to OECD countries.

Sustainability governance

Policy frameworks are needed to speed up the deployment of the most beneficial forms of biobased products, energy and other bio-based systems, linked to demonstrating sustainability.

Different governance approaches (policies, certification, legal frameworks, etc.) should be considered, as well as their efficiency in specific contexts. Sustainability governance schemes should build upon and integrate existing relevant policies and regulations (e.g., laws protecting forests and regulating their use, groundwater protection, waste management regulations, land tenure), as well as operational voluntary systems, such as sustainable forestry schemes. While several OECD countries have already taken steps to implement relevant governance systems, many other countries, particularly in Africa and Asia, have come less far.

Sustainability governance schemes should entail a set of criteria and science-based indicators. Various relevant tools and references have been developed at international level (e.g., the GBEP sustainability indicators for bioenergy). These tools need to be scaled down to the national and, especially, local levels, and adapted to local conditions. The engagement of all relevant actors and stakeholders along biomass supply chains is key to – and part of – the successful implementation of sustainability governance of the bioeconomy.

One key aspect emphasised several times during the workshop was that sustainability governance and indicators should address the full agroforestry (“all land”) sector, instead of a narrow end-use approach, such as for bioenergy or biomaterials only. Due to the increasing integration in the provision of food/feed, fibre, materials and bioenergy/fuels, it was recommended that sustainability governance should include all bioeconomy and land uses, i.e. agriculture, forestry and waste.

Many sustainability criteria and indicators have already been identified, often creating complexity that causes challenges for implementation in real markets. These should be distilled down to a relevant number of key criteria and respective indicators that can be used to address the issues considered most important in a given context. It should be recognised that it is not possible to have a perfect system from the outset. It is better to begin with a pragmatic approach and then improve over time, being able to respond and adapt to changing information and circumstances.

An important step is to keep sustainability criteria and indicators operational and cost-effective, to avoid associated costs on producers and consumers (compared to the fossil counterparts) creating barriers to projects with low sustainability risk. Good examples include (i) the phasing out of fossil fuel use in the Nordic forest industry, that currently mainly uses wood processing by-products to meet their own energy needs, thus ultimately relying on existing regulations and recommendations to ensure sustainable forestry; (ii) the assurance of sustainability of biofuels in the EU within the RED directive; and (iii) the assurance of sustainability of wood pellets for co-firing in the Netherlands, where a lengthy debate resulted in applicable systems.

Priority goals and actions

In order to unlock the potential of a sustainable bioeconomy, including modern bioenergy, it is crucial to improve understanding of its multiple environmental and socio-economic benefits among the public, decision-makers and the finance community; and to strengthen trust. More cooperation is needed among relevant economic actors and stakeholders along bioeconomy supply chains.

Key priorities emerging from the workshop:

- The focus should be on **implementation** of sustainability governance in the field; there is a need for further research to support implementation, although existing knowledge and experience provide a sufficient basis for near-term implementation.
- An important step will be to agree on and implement a minimum set of **key sustainability criteria** and related indicators (e.g., based on GBEP sustainability indicators) in relation to the most important risks and opportunities that need to be addressed through sustainability governance. Where data gaps exist and methodologies are preliminary or lacking, proxies can foster initial steps.
- One of the main issues in the current debate is how to deal with **biogenic carbon**, including the timing of carbon emissions and uptake in forests and other ecosystems, as well as avoided GHG emissions achieved through substitution of fossil fuels and other GHG-intensive products. While the timing of net GHG savings is relevant to consider for many mitigation options (e.g., build-up of new railway infrastructure and of electric vehicle fleets) it has received particular attention in relation to biobased products and systems due to associated land use and/or biomass harvest, which may cause significant changes in the cycling of carbon between land and atmosphere. As debates on these issues often reflect misunderstandings of fundamental factors, IEA Bioenergy provided readable publications² explaining fundamentals including concepts such as carbon neutrality.
- Also, the implementation of systems to achieve **negative emissions** (e.g., afforestation, reforestation, bioenergy combined with carbon capture and storage or use – BECCS/U) raise issues related to

2 <https://www.ieabioenergy.com/iea-publications/faq/woodybiomass/>
<https://www.ieabioenergy.com/publications/on-the-timing-of-greenhouse-gas-mitigation-benefits-of-forest-based-bioenergy/>

the timing of GHG emissions and carbon uptake and storage in ecosystems and products. Science based, but still pragmatic approaches should be agreed to address this.

- **Monitoring, traceability and transparency** are crucial to gain trust. Progress needs to be tracked, and monitoring using 'smart indicators' implemented. This implies taking stock of real impacts, capturing evidence-based lessons learned, which also means relying less on model calculations of impacts. Quantification of experiences and interpretation is important and should be transparent.
- **Linkage of sustainability governance to incentive programs and decarbonisation policies** is a key policy orientation that can help drive acceptance and expand the sustainable bioeconomy.
- Inspirational **case studies and stories** (in terms of, e.g., technologies, business models and good practices) should be identified, as well as champions to present the message. Good examples should be made much more visible, and experiences shared through efficient communication efforts. Real-life demonstration is the best tool to showcase.
- Sustainable bioeconomy **guidelines** should be provided, as well as clear rules for implementation adapted to local circumstances, involving local actors.
- Due to the increasing **integration of food/feed, fibre, materials and bioenergy/fuels**, a sustainability assessment and/or sustainability governance scheme and regulation should have land use, agriculture, and forestry practices as their main object, avoiding a focus on one specific end use.
- Evidence-based, **multi-stakeholder dialogues** can be facilitated, especially at regional and local levels, to create coalitions across value chains, bringing together representatives of all relevant economic actors, from biomass growers and local communities, all the way to users/consumers of biofuels and bioproducts.
- Awareness of the **finance community** should be raised, both on the private sector side and in international finance institutions, concerning the potential of the bioeconomy/bioenergy sector; the possibility of tapping into climate finance can also be explored.
- The multiple ongoing initiatives and events on sustainable bioeconomy/bioenergy should be streamlined and consolidated, to avoid overlaps and to ensure synergies. A collective effort of international initiatives will be needed to guide countries towards **efficient policy frameworks** supporting bioeconomy developments – the workshop organisers will work together in this. Policies that impact agriculture, forestry, climate, environment, and other areas, should – where appropriate – be harmonised to avoid being in conflict. Bioeconomy initiatives can also link to other initiatives and processes such as measures to prevent deforestation and/or land degradation.
- A **level playing field** should be provided for all biomass applications, and at the same time with fossil fuels. Introducing a price on carbon, as well as removing fossil fuel subsidies, can change the picture.
- Good **communication** is key: messages need to be understandable, and wording should be compelling but accurate and based on facts. There are enough good (and bad) examples to make the case for bioeconomy developments that properly balance multiple objectives. Modern ways of communication should be employed. More efforts are needed on communication/consensus building with mainstream media and the public, especially young people who will be in the driver's seat in the coming decades to steer the transition to a low-carbon economy.

The presentations during the workshop can be downloaded from the IEA Bioenergy website³.

³ <https://www.ieabioenergy.com/publications/ws24-governing-sustainability-in-biomass-supply-chains-for-the-bioeconomy/>

WORKSHOP AGENDA

Governing sustainability in biomass supply chains for the bioeconomy

Thursday 23 May 2019, Utrecht, the Netherlands

8:45 Welcome and introduction to the workshop (Kees Kwant, RVO.nl; Uwe R. Fritsche, IINAS; Bert Stuij, manager RVO.nl)

9:15 Session 1: Setting the scene and policy experiences (Moderator: Kees Kwant)

- Biobased systems in sustainability transitions (Göran Berndes, Chalmers Univ.)
- The IEA's outlook for sustainable bioenergy (Pharoah Le Feuvre, IEA)
- Lessons learnt from the IEA Bioenergy Inter-Task Project "Measuring, governing and gaining support for sustainable bioenergy supply chain" (Martin Junginger, Utrecht Univ.)
- EU view on bioeconomy governance and bioenergy experiences (Robert Kaukewitsch, EC DG ENER)
- Beyond Europe:
 - OECD perspective (Jim Philp, OECD)
 - Bioeconomy governance in developing countries (Jan Börner, ZEF Bonn) with comments from Francis Johnson (SEI)
- Voices from the plenary: brief interventions on "where we are"

11:00 Tea/coffee break and informal talks

11:15 Session 2: Collecting the evidence: Views from multi-lateral partnerships, industry, and civil society: success stories and lessons learned (Moderator: Uwe R. Fritsche)

- The global fora: brief interventions on
 - Global Bioeconomy Summits and International Bioeconomy Forum (Andrea Camia, JRC)
 - Biofuture Platform (Renato D. Godinho, Brazilian Ministry of Foreign Affairs)
 - Global Bioenergy Partnership (Michela Morese, GBEP Secretariat, FAO)
- Sustainable supply-chain governance – brief interventions on experiences and views from
 - Below 50 (Gerard Ostheimer)
 - industry (Craig Winneker, ePURE representing EUBA)
 - civil society:
 - Environmental NGO (Jenny Walther-Thoss, WWF)
 - Development NGO (Katie Minderhoud, Solidaridad)
- Roundtable with Session 2 speakers: Joint views on sustainability governance of the bioeconomy?

12:50 Brief introduction to World Café 1 + 2 (by Uwe R. Fritsche)

13:00 *Lunch break and informal talks*

14:00 **World Café Round 1: What actions are needed for progressing towards a sustainable, circular bioeconomy (moderated parallel groups)**

- What research is needed to address sustainability and how can governance contribute to gaining support for sustainable biobased systems and supply chains?
- What are the top three priorities to enable align international sustainability criteria, to move beyond controversies on biobased systems and enable developing sustainable biobased systems?
- What are the roles, responsibilities and resources required?

15:00 *Tea/coffee break and informal talks*

15:30 **Plenary Session: Panel with World Café 1 rapporteurs (Moderator: Göran Berndes)**

16:00 **World Café Round 2: A collaborative way forward (moderated parallel groups)**

- Who should be included in the future dialogue?
- Which events, fora etc. could be used to continue the dialogue?
- What are next steps, and which contributions are foreseen by workshop participants?

17:00 *Short tea/coffee break and informal talks*

17:15 **Plenary Session: Panel with World Café 2 rapporteurs (Moderator: Uwe R. Fritsche)**

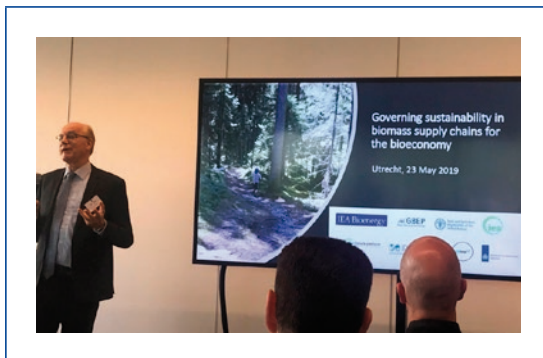
17.45 **Conclusions on next steps (Jim Spaeth, US DOE, Chair of IEA Bioenergy ExCo)**

18:00 *Reception & informal discussions*

WORKSHOP REPORT AND NOTES

Welcome speeches

Kees Kwant of the Netherlands Enterprise Agency (RVO.nl), previous chair of IEA Bioenergy, welcomed all participants to the workshop and expressed the importance of replacing fossil fuels and the crucial role of sustainable biomass, which should be used in an efficient way. He asked for a moment of silence to remember Jeffrey Skeer of IRENA, who was a member of the organising committee of this workshop but who passed away unexpectedly in April (*see tribute at the end of this report*).



Uwe Fritsche of IINAS, leader of IEA Bioenergy Task 40 (on Deployment of biobased value chains), and co-lead of IEA Bioenergy Task 45 (with a focus on sustainability governance) introduced the workshop topic and programme. He stressed that the Sustainable Development Goals (SDGs) provide a normative framework to activate the sustainability of the bioeconomy, which includes bioenergy. 15 out of 17 SDGs are directly or indirectly linked to biomass. This workshop provides the initiation of a series of events within the frame of the new Task 45 of IEA Bioenergy on 'Climate and sustainability effects of bioenergy within the broader bioeconomy', focusing on identifying approaches and implementation strategies for sustainable cross-sectoral supply chain management. This will be closely connected with other international players. The key issues to be discussed in this workshop are:

- pragmatic solutions to activate governance of sustainable biomass,
- actions needed to progress towards a sustainable, circular bioeconomy,
- how to gain trust in a sustainable bioeconomy, including bioenergy,
- how international collaboration can provide a way forward.

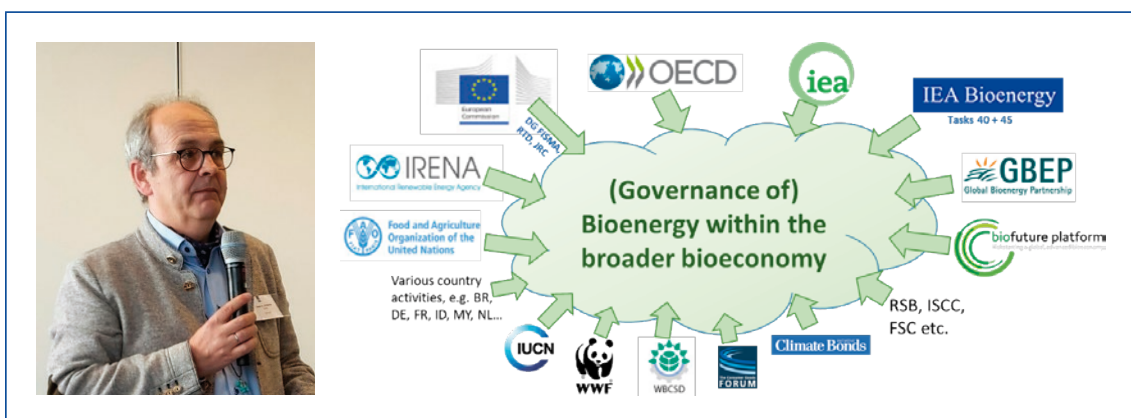


Figure 1: International contributors to sustainable bioeconomy governance (more to be involved). Source: IINAS



Bert Stuij,
representative for
the Netherlands
in CERT (IEA
Committee on
Energy Research
and Technology),
manager of the
Netherlands
Enterprise Agency

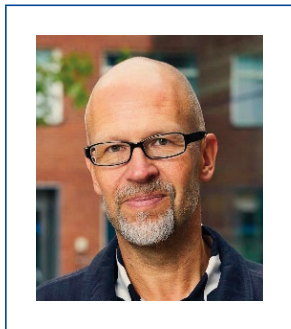
(RVO.nl) and Vice President Innovation of the Energy Delta Institute, spoke on behalf of the Dutch government. Biomass is a key topic in the transition, currently representing two thirds of renewables in the Dutch energy system, and there is a sharp and somewhat polarised debate about its sustainability, with some people completely excluding biomass, while others state that it can be done in a sustainable way. It is recognised that we need all renewable resources to their maximum. There will be a need for carbon in society, also in the long term, but this should be renewable carbon. Biomass has associated impacts, but these need to be managed in a sensible way through sustainability governance.

Session 1: Setting the scene and policy experiences

This session was moderated by Kees Kwant (RVO.nl).

Biobased systems in sustainability transitions

Göran Berndes, Chalmers University, Sweden, leader of IEA Bioenergy Task 45



Long-term scenarios to reduce global warming include an important role for bioenergy as well as negative carbon emission technologies, particularly bioenergy

combined with carbon capture and storage (BECCS), creating a large need for biomass resources. Biomass is not only used for energy – transformative changes will be needed in different sectors, moving from fossil-intensive materials towards renewable biobased products.

When using biomass, it should be ensured that there is no net loss of carbon from the biosphere (soils, forests, vegetation) into the atmosphere.

Göran Berndes further explained the background and work areas of Task 45, which is consolidating the work on sustainability in IEA Bioenergy in one Task. While implementing sustainability governance we should recognise that bioenergy systems are commonly components in value chains or production processes that also produce other biobased products (including food, feed and fibre). Sustainability governance in biomass supply chains develops over time to fit market dynamics, adapts to new knowledge and to new concerns or priorities. It needs to be based on a holistic perspective that recognises a multitude of societal objectives and should promote options that contribute positively to the implementation of the Sustainable Development Goals.



Figure 2: Sustainable Development Goals. Source: <https://sustainabledevelopment.un.org/sdgs>

The IEA's outlook for sustainable bioenergy

Pharoah Le Feuvre, *International Energy Agency (IEA)*

The presentation highlighted key sustainability considerations arising from current bioenergy deployment trends. Modern bioenergy⁴ currently represents around 50% of all renewables in final energy consumption at the global level. However, deployment differs across electricity, heat and transport.

New policy impetus is needed to accelerate the deployment of sustainable transport biofuels and bioenergy for heat to bring them on track with the needs of the IEA Sustainable Development Scenario (SDS) for 2030. However, only sustainable bioenergy has a place in the SDS. Therefore, the enhanced policy support needed to accelerate deployment must come with rigorous sustainability governance frameworks.

The IEA's medium-term forecasts covering the period until 2024 indicate that half of transport biofuel growth is forecast to take place in Asia, notably China and Southeast Asia. This is also

the case in the electricity sector where around 70% of new capacity is anticipated to come online in Asia. Therefore, the introduction of bioenergy sustainability frameworks in these Asian markets that account for most bioenergy growth is especially important.

Several policies and initiatives – such as the EU Renewable Energy Directive – already monitor and report on biofuel sustainability performance. However, governance frameworks need to cover a larger share of bioenergy use and be extended in geographical scope. Bioenergy policy development must consider both potential sustainability risks and the wider benefits that can be achieved e.g. improving air quality, supporting enhanced waste management and strengthening security of supply etc. It is important to find a balance to ensure sustainability policies focus on fuels and feedstocks with potential sustainability implications, without unduly hindering deployment of low sustainability risk and beneficial bioenergy feedstocks, fuels and technologies.

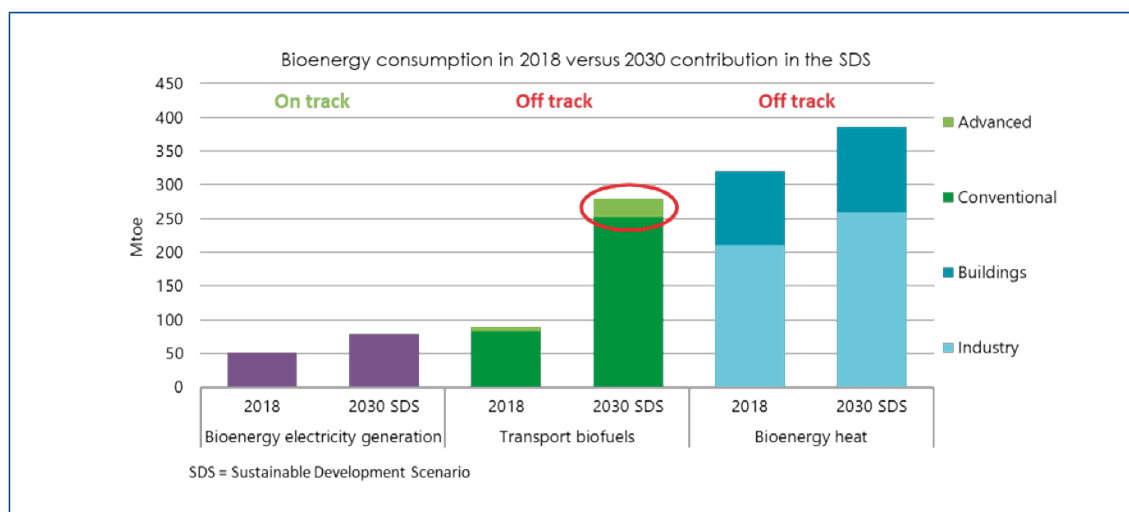


Figure 3: current role of bioenergy in different sectors and needed contribution in the IEA Sustainable Development Scenario in 2030. Source: IEA

⁴ which excludes the traditional use of biomass in developing and emerging economies



Lessons learnt from the IEA Bioenergy Inter-Task Project ‘Measuring, governing and gaining support for sustainable bioenergy supply chains’

Martin Junginger, Utrecht University, the Netherlands, former Task Leader for IEA Bioenergy Task 40

This presentation summarised the lessons learned and recommendations from a 3-year project on sustainability of bioenergy supply chains, which involved different IEA Bioenergy Tasks. The project looked at (1) calculation methods to assess sustainability, (2) approaches to govern and verify sustainability and (3) positions, motivations and perceptions of bioenergy.

The main recommendations can be summarised as follows:

- Sustainability governance should be an integral part of bioenergy deployment, in adaptive frameworks, which continuously monitor and assess the situation.
- Transparent and comprehensive assessment methodologies should be applied, which distinguish between fossil and biogenic carbon and consider both changes in net GHG emissions due to product substitution and changes in carbon stocks in ecosystems and wood product pools in an integrated framework.
- Calculation frameworks and standards should include the impacts of the larger sectors to which bioenergy development is linked, e.g., agriculture, forestry, waste handling, nature conservation.
- Methodologies and indicators should be developed which can clarify if and when bioenergy is the most desirable option for use of biomass resources and how bioenergy can be integrated with other renewables to support decarbonisation.
- We need more focus on communication for creation of trust and confidence among different groups of actors.
- Stakeholders underrepresented in the discussions (e.g. social stakeholders) are to be included, while also highlighting positive effects (e.g. rural income).
- Local governance systems already in place need to be recognised.
- Progressing towards sustainability requires (1) active stakeholder engagement throughout the bioenergy production process; (2) transparent sharing of information on the social, economic, and environmental costs and benefits; (3) ongoing monitoring; and (4) working together towards identifying and implementing better practices.

EU bioeconomy strategy and sustainable bioenergy governance

Robert Kaukewitsch, European Commission, DG Energy

The EU bioeconomy strategy was first adopted in 2012 and updated in 2018. The updated strategy has the following policy priorities: (1) ensuring food security; (2) managing natural resources sustainably; (3) reducing dependence on non-renewable resources; (4) mitigating and adapting to climate change; (5) creating jobs and maintaining European competitiveness.

The strategy states that there will be trade-offs between different sectors; bioenergy should not be considered on its own, but within the overall demand for biomass. It will be important to understand the ecological boundaries of the bioeconomy, through enhancing knowledge and monitoring of biodiversity and ecosystems; promoting good practices to operate the bioeconomy within safe ecological limits; and enhancing the benefits of biodiversity in primary production.

The original Renewable Energy Directive (RED) already contained sustainability criteria for biofuels. In the post-2020 framework the bioenergy sustainability criteria will be extended to cover all energy uses of biomass (transport, heat and power), and to introduce additional land criteria for feedstock production (e.g. assuring that forest biomass is sustainably harvested and appropriately accounted) and efficiency criteria for bio-power.

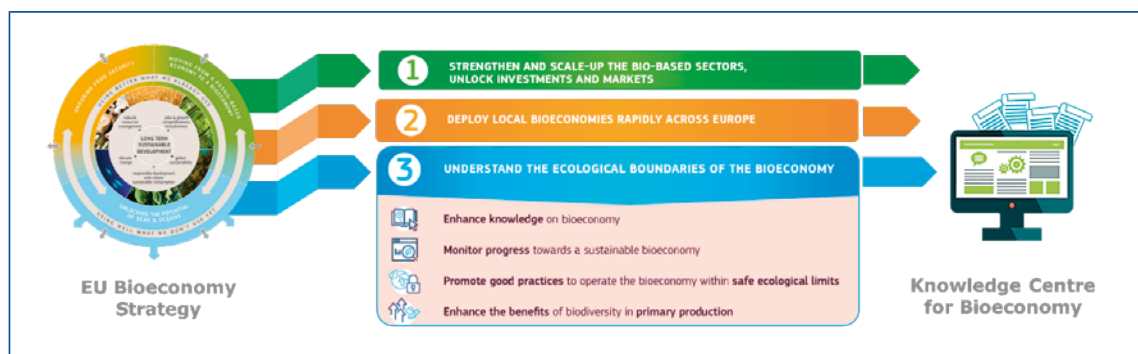


Figure 4: EU Bioeconomy policy context. Source: European Commission

Governing sustainability in biomass supply chains for the bioeconomy: some OECD perspectives

Jim Philp, Organisation for Economic Cooperation and Development (OECD)

An internationally agreed framework on biomass sustainability is generally a top priority, however there is a lack of agreement on how to measure biomass sustainability, no agreement on biomass potentials and there are already international biomass disputes.

The OECD recently published a 'Circular Bioeconomy policy paper' considering how the bioeconomy and circular economy can work together for a sustainable future. The answer is not self-evident: 'bio' is not necessarily more sustainable; 'circular' is not necessarily easier; and both are not necessarily cost-competitive. There are both potential conflicts and synergies.

The OECD conducted several national case studies and international workshops on 'Innovation Ecosystems in the Bioeconomy'. Some top messages:

- Valorisation of wastes and residues is at the very heart of a circular bioeconomy.
- Be cautious with the interpretation of cascading use of biomass.

- Not only focus on SMEs but also include measures to grow to medium size.
- The interplay between the traditional bioeconomy and "advanced bioeconomy" needs to be strengthened.
- A better balance is needed between technology push and market pull; policy should be evidence based.
- Education and training needs suggest radical adaptations in higher education.
- Engaging the general public is of high value and very important. Governance needs to adjust to a new world of communication.

We also need to talk about failures and what can go wrong. In local bioeconomy ecosystems, bioenergy is often a foundation (e.g. local district heating), with higher value added on top. This doesn't all have to be high-tech.

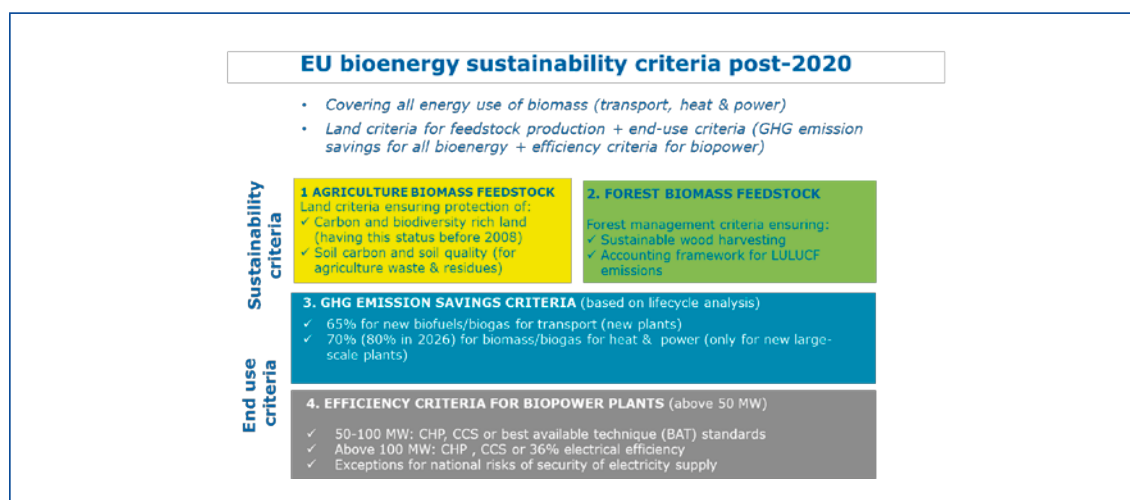


Figure 5: EU bioenergy sustainability criteria post-2020

Bioeconomy, governance, and developing countries

Jan Börner, University Bonn, Germany

In general, there are four different transformation pathways relevant to the bioeconomy: (1) fossil fuel substitution; (2) boosting primary sector productivity; (3) new and more efficient biomass uses; and (4) low-bulk and high-value applications. Industrialised countries with strategic goals tend to invest in all four pathways. Only a few developing countries have specific

bioeconomy strategies. The means to pursue this is a combination of enabling governance (e.g. subsidies, R&D support, infrastructure investments, awareness campaigns) and regulatory governance (international cooperation, private standards/certification).

There is still a gap between bioeconomy ambitions and governance capacity. Not only quality of rules is an issue, but also capacity. Voluntary governance approaches cannot fill this gap. Overregulation and issues around benefit sharing can lead to failures.

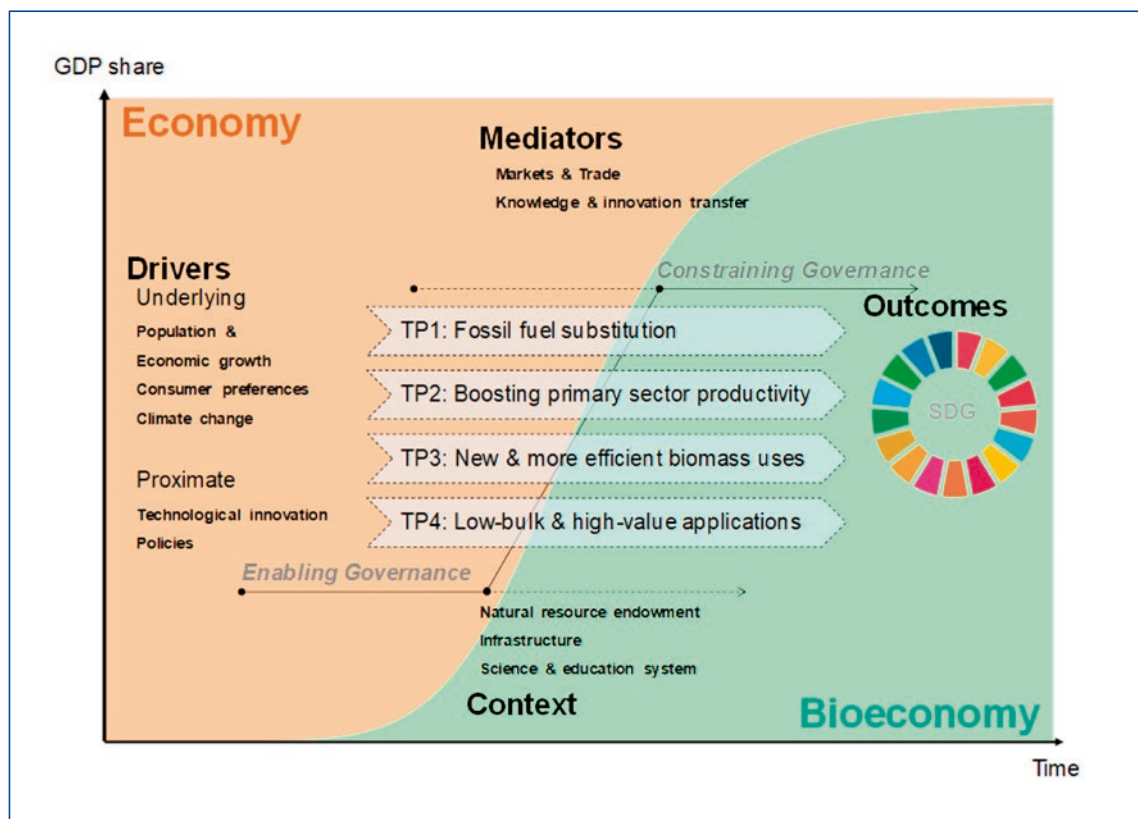
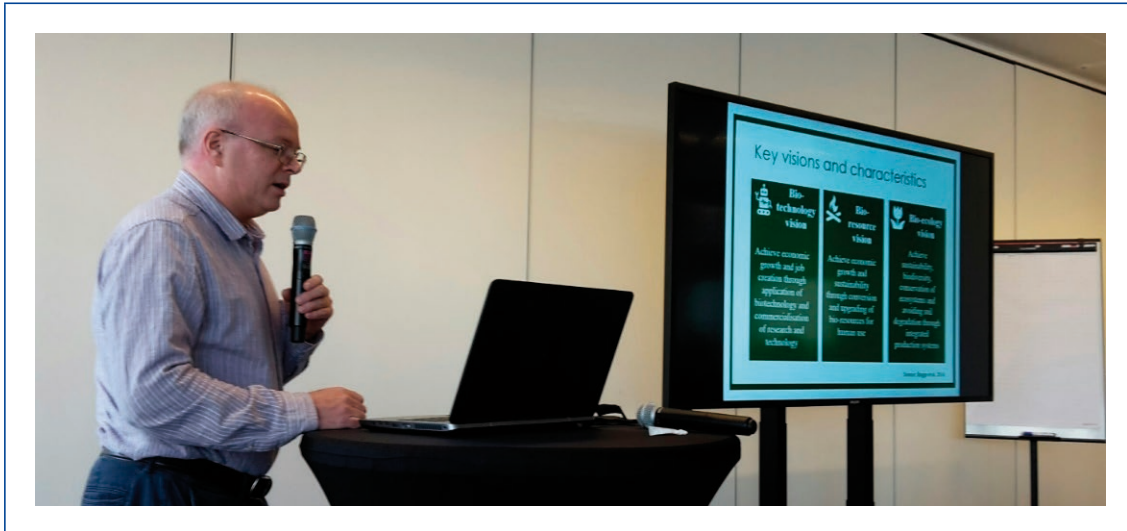


Figure 6: Drivers and context of bioeconomy transformation pathways. Source: Dietz et al., Sustainability 2018



Governing bioeconomy pathways

Francis Johnson, Stockholm Environment Institute (SEI), Sweden

A modern bioeconomy – producing materials, foods and feeds, fuels and more from biological resources – is a vital element of poverty reduction and global sustainable development transitions. It can offer resource efficiency, climate-smart and sustainable production systems for food, feed, fuels and value-added agro-industrial products, and hence a healthier and more prosperous future.

However, despite wide agreement on the future significance of the bioeconomy, there is less accord on the pathways that should be followed. This is mainly due to the wide range of biophysical and socio-economic circumstances in which bioeconomies are developing, and to uncertainty about the potential impacts of bioeconomy development over time. The SEI programme on governing bioeconomy pathways aims to better articulate the alternative pathways available for bioeconomy development, and to identify the policies, institutions and governance mechanisms that can facilitate each of them. It includes case studies in developing countries,

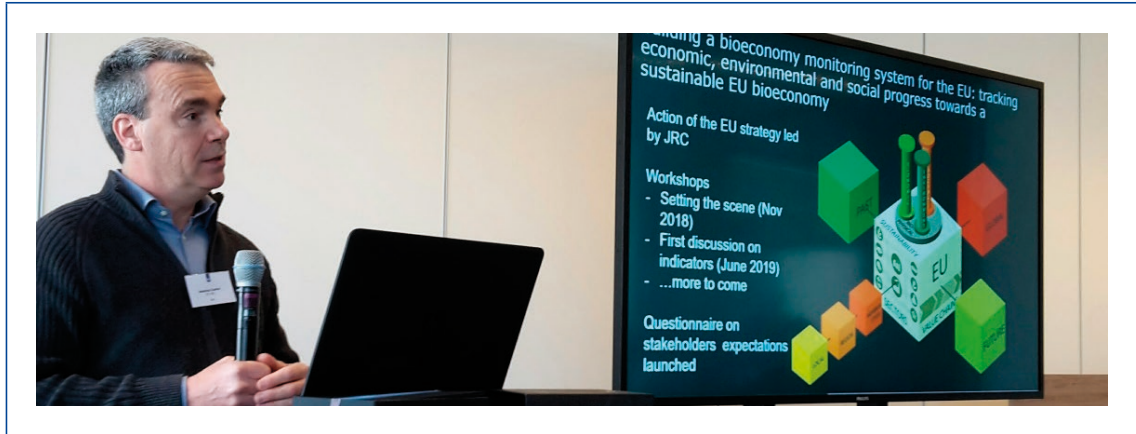
bioeconomy strategies and policy dialogues, starting from three different visions of the bioeconomy that are prominent within the overall discourse:

- The **biotechnology** vision is much more technological and focuses on economic growth and job creation through the application of biotechnology and commercialisation of research and technology.
- The **bioresource** vision is much more utilitarian and focuses on achieving economic growth and sustainability through conversion and upgrading of biological resources for human use.
- The **bioecology** vision is more about sustainability and promoting the bioeconomy primarily for the purpose of protecting ecosystems and avoiding degradation. This one is least prominent within existing bioeconomy strategies but is seeing some growth.

These three visions need to come together in dialogues and can be visualised in causal maps, with feedback loops and leverage points (having different connections).

Session 2: Collecting the evidence: Views from multi-lateral partnerships, industry, and civil society: success stories and lessons learned

This session was moderated by Uwe Fritsche, IINAS.



Global Bioeconomy Summits and International Bioeconomy Forum

Andrea Camia, Joint Research Centre of the European Commission, Italy

Global Bioeconomy Summits (GBS) have been initiated by the German Bioeconomy Council to create an evolving multi-stakeholder platform aimed at addressing the policy issues related to global bioeconomy development. Since 2015, it provides global exchange on bioeconomy policy, governance and sustainable development.

The International Bioeconomy Forum (IBF) was launched in 2016 to guide international

cooperation on specific research and innovation priorities crucial for the development of a global, sustainable bioeconomy. The objectives are to align research funding programmes, identify emerging needs and future research trends, raise international awareness of the role of the bioeconomy, knowledge exchange and to develop a policy dialogue. There is a specific working group on the forest bioeconomy.

Within the frame of the EU Bioeconomy Strategy, the JRC is leading an action to build a bioeconomy monitoring system for the EU to track economic, environmental and social progress towards a sustainable EU bioeconomy.



Figure 7: Bioeconomy policies around the world. Source: German Bioeconomy Council

How to create the Biofuture?

Renato D. Godinho, Biofuture Platform/
Ministry of Foreign Affairs, Brazil

The Biofuture Platform is a 20-country effort to promote an advanced low carbon bioeconomy that is sustainable, innovative and scalable. In 2018 the Biofuture Platform published the report 'Creating the Biofuture: A Report on the State of the Low Carbon Bioeconomy'. Some conclusions:

- After a 2006-2008 boom, investments in biofuels have struggled. They are now starting to pick up again linked to higher oil prices, new and/or reinforced policies and further maturing technologies.
- Lack of finance, competitiveness with fossil fuels, unfavourable policy frameworks, and limited feedstock supply are four main barriers to faster bioeconomy growth.

- At this stage the sustainable low carbon bioeconomy must be policy driven to overcome barriers to growth and reach competitive scale. A complete policy package is recommended to create an enabling environment: technology push (R&I support); market pull (market demand support and incentives); ties to sustainability measures and lifecycle assessments; and strong financial instruments, leveraging green finance.

A collective effort of international initiatives will be needed to guide countries towards bioeconomy developments, concretely providing: (1) policy guidance and convergence; (2) appropriate financing mechanisms; (3) a working sustainability approach and governance; and (4) technical and technological cooperation.

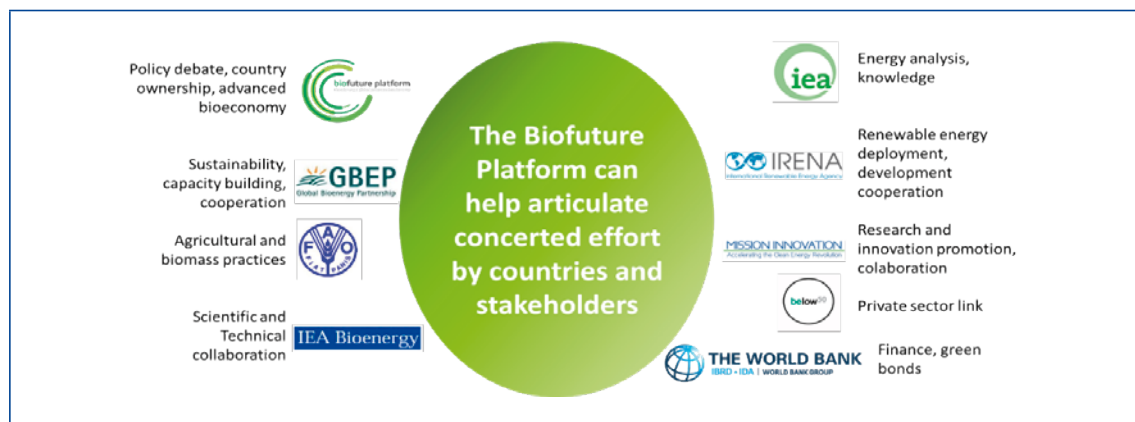


Figure 8: A collective effort of international initiatives. Source: Biofuture Platform

Mr. Godinho put forward the following questions in relation to the topic of sustainability approach and governance:

- Should sustainability governance be dealt with in an integrated way across all uses, or be sector specific?
- Do we need to take an active approach to sustainability governance through mandated requirements, or better aim at avoiding high risk practices?
- What is the proper scope for sustainability governance, at project or national/territorial level?
- Do we need rules for every aspect, or can there be more flexibility in which markets can decide? Systems and schemes need to be workable in practice. What limit is there to complexity of sustainability requirements?
- How can course corrections be implemented?
- How can sustainability be linked to incentives?

Global Bioenergy Partnership – GBEP: working together for sustainable bioenergy

Maria Michela Morese, GBEP/FAO, Italy

The Global Bioenergy Partnership (GBEP) was established in 2006 to implement the commitments taken by the G8 Leaders in 2005. GBEP has 38 Partners and 41 Observers (Governments and International Organisations).

The base starting point of GBEPs work is that sustainability is key in bioenergy deployment. In 2011 GBEP published a framework of 24 **sustainability indicators** – evenly spread over environmental, social and economic indicators – with a view to informing decision making and facilitating the sustainable development of bioenergy. Measured over time, the indicators can show progress towards a sustainable development path. Meanwhile 14 countries have implemented the GBEP indicators and 2 countries are in the process of implementation.

In the light of the lessons learned from those collected so far on the measurement of the GBEP sustainability indicators (GSI), GBEP decided to develop an **Implementation Guide** to provide further guidance on methodological and practical issues related to the implementation of certain indicator methodologies. The Guide includes advice on cross-cutting issues relevant to implementation of the indicators (e.g. integration of definitions, guidance on attribution of impacts to bioenergy, information on best practices, and a 'stepwise approach' for GSI project implementation), as well as methodological guidance for each individual indicator.

GBEP has recently started a discussion about the role of bioenergy in the context of the bioeconomy and on how the GBEP experience in the last 13 years could contribute to this.





New paths to a renewable carbon economy

Gerard J. Ostheimer, below50, United States

'below50' is a global collaboration established by the World Business Council for Sustainable Development (WBCSD) that brings together the entire value-chain for sustainable fuels – that is, fuels that produce at least 50% less CO2 emissions compared to conventional fossil fuels. It brings together private sector players, with a high focus on the off-take side (connecting corporate fuel buyers directly to fuel producers), thereby stimulating demand for low-carbon fuels. Market examples will bring more confidence in these fuels, can engage the public and further drive demand.

More focus should go to regions that have biomass resources and to empowering people to act themselves at the local level. below50 is tailoring solutions to the national context through the creation of below50 hubs. Each hub works on solutions tailored for their country/region – including policy, awareness raising and financing.

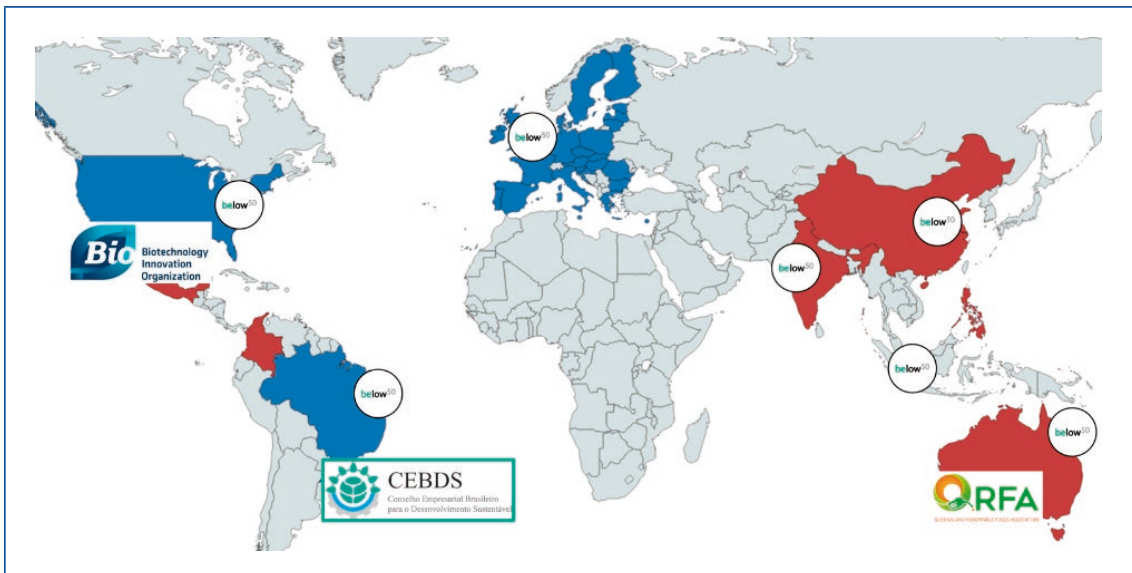


Figure 9: below50 hubs



Ensuring the sustainability of Europe's bioeconomy

Craig Winneker, European Bioeconomy Alliance (EUBA)/ePURE, Belgium

The European Bioeconomy Alliance (EUBA) is a cross-sectoral alliance of 12 associations dedicated to mainstreaming and realising the potential of the bioeconomy in Europe. EUBA represents about 4,700 companies (including 5,100 production sites and mills) as well as 12 million farm holdings and 16 million forest owners. In 2016 these sectors transformed about 340 million tonnes of agricultural or forestry raw materials – mainly cereals, cocoa beans, crude vegetable oil, rapeseeds, soybeans, starch potatoes, sugar beet, sunflower seeds, and wood – into 200 million tonnes of products, such as paper, pulp, starch products and ingredients, sugar, vegetable oils, vegetable proteins, wheat flour, bioplastics, ethanol and other innovative bio-based building blocks, and 447 million cubic meters of round wood.

EUBA's policy priorities are:

- Integrate bioeconomy into key EU policies (agriculture, climate, R&D, industry, circular economy) to increase the availability of biomass. It should be recognised that sustainably and competitively produced and recycled biomass can contribute significantly to the EU's climate commitments and create more jobs and growth.
- Increase financing for the European bioeconomy. There is a need to support and enhance investment decisions based on financing expertise.
- Secure the Bio-Based Industries Joint Undertaking 2.0 as part of the new Horizon Europe programme.
- Encourage the uptake of bio-based products in strategic sectors instead of fossil.
- Increase demand for bio-based products by promoting their value, through awareness raising, public procurement, labelling, etc.
- Biomass sustainability implies actions behind words, e.g. engaging customers, motivating farmers and foresters to apply sustainable practices and creating viable business models.



How to account for biogenic carbon of forest biomass?

Jenny Walther-Thoss, WWF, Germany

There is a fundamental difference and disconnect between carbon reporting and carbon accounting of forest products. The IPCC reports forest related emissions under the AFOLU (Agriculture, Forestry and Other Land Use) sector and reflects zero emissions for biomass in the energy sector. This is often interpreted that forest biomass is carbon neutral. However, *accounting* also needs to consider how forests are impacted (even if they are separated in official carbon reporting).

WWF’s position for carbon accounting is that for forest products, all relevant biogenic carbon emissions and sinks need to be considered, through dynamic modelling of carbon fluxes and impacts. None of the current carbon accounting methods (see figure) includes all factors.

Jenny Walther-Thoss pointed to the time horizon in renewable carbon cycles, with a distinction between short-term versus medium- to long-term greenhouse emission savings, while reductions are crucial in the next 20 years.

She argued that we need a global harmonised and comprehensive approach, with global warming potential (GWP) of biomass integrated into carbon accounting and included in all sustainability certification, and incentives based on correct carbon accounting.

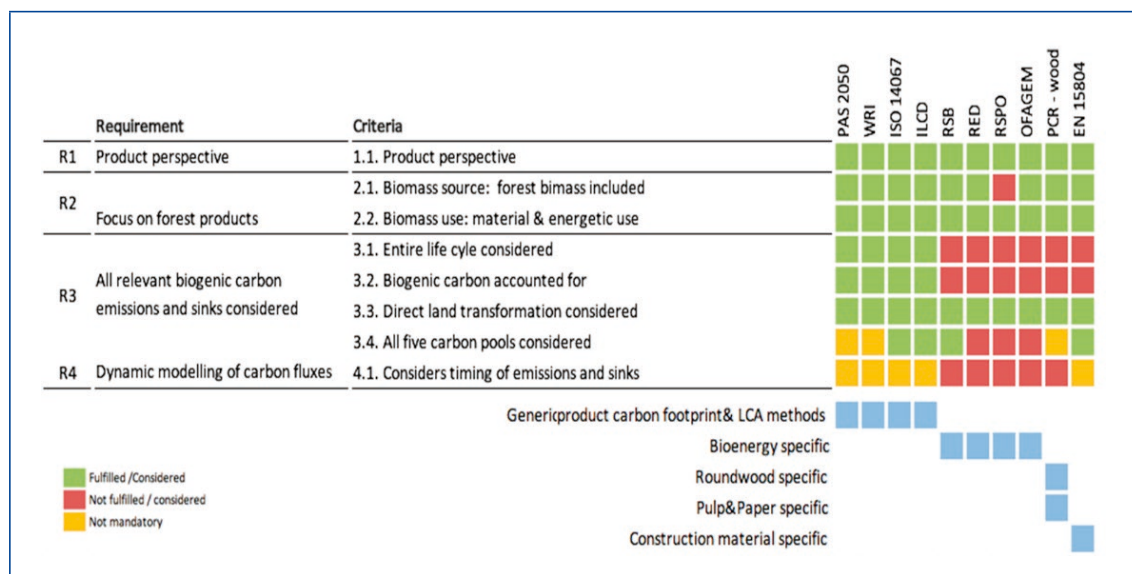


Figure 10: WWF evaluation of accounting methods. Source: WWF



Position of Solidaridad towards the bioeconomy

Katie Minderhoud, Solidaridad, the Netherlands

The Solidaridad Network is a global civil society network. Its main objective is facilitating the development of socially responsible, ecologically sound and profitable supply chains considering:

- producer level: sustainable land use, better living and working conditions, food security and dynamic producer organisations;
- fair and transparent trade;
- corporate social responsibility (including the biobased economy);
- conscientious consumption.

Sugarcane, palm and soy are some of the commodities in focus. Solidaridad operates through 8 regional centres in 44 countries.

Planetary boundaries are a key starting point. Land and biomass are limited resources and the bioeconomy is not necessarily an ecological alternative when considering the current consumption patterns and ways of doing business. The development of the bioeconomy is faced by the same major challenges such as global population growth, the negative effects of climate change on ecosystems, the loss of biodiversity and the dwindling fertile cropland and deforestation. Accordingly, caution should be taken in different ways as the bioeconomy develops.

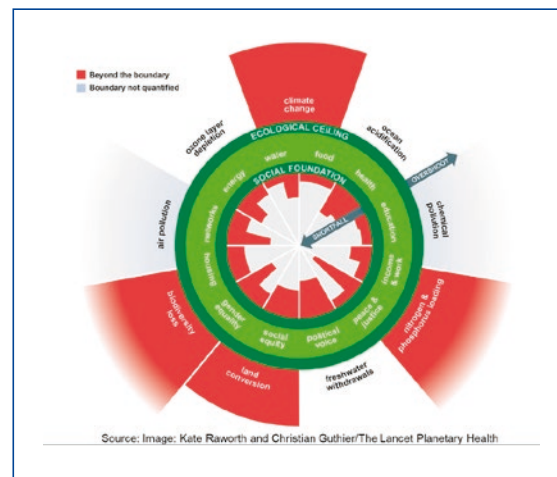


Figure 11: "Doughnut" of social and planetary boundaries. Source: World Economic Forum

It is critical to understand "sustainability" as a place- and context-specific negotiation of interests/needs and trade-offs. The bar (standards/frameworks) can be set by outsiders, but reality will unfold by accepted governance (formal/informal) in place. The ambition should be geared towards an inclusive and resilient economy which serves societies' needs and protects the natural resource base. Real empowerment is about information and the ability of local actors to manage their resources. Restoration and combating soil degradation are key issues.

The core aim is to find the mechanisms that need to be in place to enable this local process of collaboration, balancing trade-offs, and investing in technology and infrastructure which enables reduction of carbon footprint and supports restoration of our environment.

WORLD CAFÉ ROUND 1: WHAT ACTIONS ARE NEEDED FOR PROGRESSING TOWARDS A SUSTAINABLE, CIRCULAR BIOECONOMY

The audience was split up into 6 groups of around 15 people, which were assigned specific topics and key questions to be addressed. Each group had a moderator and a rapporteur. The group session started with a brief input from an invited expert, after which the central questions were discussed. The table below shows an overview of the moderators, rapporteurs and experts providing input per group. The discussions were held under Chatham House rules, so that nobody would be cited *ad personam*.

The first one-hour World Café had the following key questions:

- What research is needed to address sustainability and how can governance contribute to gaining support for sustainable biobased systems and supply chains?
- What are the top priorities to align international sustainability criteria, to move beyond controversies on biobased systems and enable developing sustainable biobased systems?
- What are the roles, responsibilities and resources required?

Group	Input	Moderator	Rapporteur
1A	Glaucia Souza, Univ. Sao Paulo <i>Topic: scientific context of governance</i>	Gerard Ostheimer, below50	Jessica Chalmers, SAN
1B	Floor van der Hilst, Utrecht Univ. <i>Topic: science & governance: beyond Greenhouse Gases</i>	Jim Spaeth, US DOE	Kees Kwant, Rv0.nl
1C	Sergio Ugarte, SQ Consult <i>Topic: Governance approaches: results from the STAR-ProBio project</i>	Luc Pelkmans, IEA Bioenergy	Andrea Camia, EC-JRC
1D	Rolf Hogan, RSB <i>Topic: is certification good enough?</i>	Göran Berndes, Chalmers Univ.	Kevin Fingerman, Humboldt State Univ.
1E	Guido Rutten, IDH <i>Topic: landscape approach, all inclusive?</i>	Uwe Fritsche, IINAS	Ulrike Eppler, IINAS
1F	Jinke van Dam, consultant <i>Topic: territorial/jurisdictional approach: what's new?</i>	Gustaf Egnell, Swedish Univ. Agri. Sciences	Martin Junginger, Utrecht Univ.

After the World Cafés, the rapporteur of each group reported to the plenary. This was moderated by Göran Berndes (Chalmers University).

Main conclusions of the World Café 1 discussions

Q1: Research needs and contribution of governance

Research needs to address sustainability:

- A common element brought up several times is that a lot of research has already been done, and that the focus should be more on **implementation**, as well as **data collection** and **monitoring**. This implies taking stock of impacts and capturing **evidence-based lessons learned** to inform implementation. Complementary to this, model based *ex-ante* analysis of future risks and opportunities can provide information critical for development of policy and strategic planning. Quantification of experiences and interpretation is important and should be transparent.
- Agreement is needed on how to deal with **biogenic carbon** in different situations. This includes considerations of the timing of carbon emissions and uptake in ecosystems and of net GHG savings achieved when biobased products displace fossil fuels and other GHG-intensive products. While the timing of net GHG savings is a relevant issue for all mitigation options, biobased products and systems are special in that they (as with other land-based options) are part of the terrestrial carbon cycle, which adds to the complexity of assessing net GHG savings.
- Approaches for assessing the timing of net GHG savings should be consistently applied for all mitigation options, including emerging negative emission technologies such as bioenergy combined with carbon capture and storage or use – BECCS/U.
- Next to global top-down assessments, bottom-up **local level analysis** is needed to identify realistic **biomass mobilisation potentials** for the bioeconomy (not only bioenergy). Such analyses need to consider local conditions, including stakeholder preferences, to clarify how biomass production can be increased to fulfil several objectives, including climate change mitigation. This requires a holistic view of how land-based systems contribute through carbon sequestration, carbon storage and substitution of fossil fuels and other GHG-intensive products. There can be trade-offs as well as synergies between these mitigation contributions. The re-greening of degraded land is one example of a synergistic approach that can also contribute to climate change adaptations.
- Studies show that many developing countries have significant biomass supply potentials and more research and analysis is needed to clarify how these resources can be used sustainably in the future. This is a different playing field compared to OECD regions.
- **Wider impacts** (apart from climate impact) need to be considered: biodiversity, water, healthy soils, nutrient cycles, but also socio-economic impacts, which feed into the contribution to broader **Sustainable Development Goals** (SDGs). Next to reducing climate impact, a sustainable bioeconomy can have various **co-benefits**, e.g. diversity of energy supply, improved energy access, more sustainable agricultural practices, higher implementation of sustainable forest management (with reduced risk of disturbance losses through wildfire, insect pest outbreaks), reduced land degradation, economic development in rural areas, improved waste management, and job creation. This requires more evidence, and quantification through monitoring.
- **Planetary boundaries** represent a common point of reference. While there is uncertainty and debate concerning relevance/appropriateness of some associated indicators, the concept provides a common basis for investigating and comparing biobased strategies with other sustainable development strategies. Beyond comparing one strategy against another, analyses

of interlinkages between strategies can help clarify how biobased options can integrate with other renewable options (and also changes in consumption patterns) in development pathways that become increasingly independent of fossil fuels and or other non-renewable resources.

Sustainability governance:

- Policy frameworks are needed to speed up deploying the beneficial forms of bioenergy, linked to demonstrating sustainability. However, sustainability governance of bioenergy should not be separated from other uses of biomass (i.e., broader bioeconomy). Sustainability criteria should **apply to all biomass** and not just to the portion of it used for bioenergy.
- Sustainability governance schemes should entail a set of **criteria and science-based indicators**. Various relevant approaches and tools for this have been developed at international level (e.g., the GBEP sustainability indicators for bioenergy). These approaches and tools need to be **scaled-down to local levels** and **adapted to local conditions**.
- The **engagement of all relevant actors and stakeholders** along bioeconomy supply chains is key to the successful implementation of any process and initiative aiming to ensure the sustainability of bioenergy, and the bioeconomy in general.
- A large number of sustainability criteria have been identified, which should be distilled to a **small number of key criteria** that can be used in practice, linked to the most important issues that need to be tackled. It is not possible to start from a perfect system; it is better to have a pragmatic approach and then further improve over time, being able to respond and adapt to changing information and circumstances. An important step is to make sustainability principles and indicators **operational and cost effective**.

Sustainability requirements should not be too complicated, and **over-regulation is to be avoided** as this may impose unreasonable costs on producers and consumers and create unnecessary barriers to good (low risk) projects.

- **Sustainability governance schemes** should build upon and integrate **existing relevant policies and regulations** (e.g., laws protecting forests and regulating their use, groundwater protection, waste management regulations, land tenure). Different governance approaches (certification, legal frameworks, etc.) should be considered, as well as their efficiency in specific contexts.
- It is crucial to develop and implement adequate **monitoring** systems, including remote sensing technologies, and possibly “crowd-sourcing” of data (citizen science approach).

Q2: Top priorities to move beyond controversies on biobased systems and enable developing sustainable biobased systems

The following priorities were suggested:

- High level agreements between governments, the private sector and civil society are needed on sustainability principles and criteria (with GBEP indicators, ISO 13065 and others as a starting point), based on sustainability governance for forestry, agriculture etc.
- For operationality, it needs to be defined what are the most important sustainability risks and opportunities, thereby identifying a smaller set of key criteria to address those.
- Guidelines and clear rules should be provided for implementation adapted to local circumstances, involving local actors.
- Systems/schemes should allow improvement over time. They need to be based on existing systems, e.g., for sustainable forest management, and should be evidence

based. Schemes should align with ongoing developments and discussions in agriculture and forestry, e.g. around zero-deforestation, reducing land degradation/land degradation neutrality, implementing SDGs.

- Identification of champions in government and industry, better engagement with NGOs, and communications aimed at policy-makers and the public should be increased.
- It is important to track progress and facilitate exchange of experiences. Monitoring with smart indicators as well as credible verification systems need to be implemented.
- Transparency is necessary to gain trust. The sector should openly acknowledge the limitations of the criteria. Evidence based dialogues would be needed, where local people can see benefits of such actions. Bioenergy/bioeconomy benefits are to be contrasted with fossil alternatives (status quo) in terms of climate, air pollution, water, rural development, etc.
- A level playing field needs to be provided between different biomass applications, but also with fossil fuels. Introducing a price on carbon, as well as removing fossil fuel subsidies will likely change drastically the conditions for bioenergy and other biobased products and systems.

Q3: required roles, responsibilities and resources

- The **research** community's role is to advance knowledge, explore methodological issues, and provide science-based information and data. However, in a situation where implementation is high on the agenda, its role will likely reduce in comparison to industry and governments.
- An important role, also in the future, is to challenge world views and narratives that do not reflect empirical evidence and conclusions from science-based activity, including systematic reviews.

- **International organisations** can guide country policies, facilitate information dissemination and lessons sharing, and work towards agreements on high-level criteria and indicators to deal with biomass sustainability. They can also engage with other developing regions (particularly Africa, Asia).
- **NGOs** can play an advisory role, pointing to specific risks, but also to opportunities.
- **Local actors** (including agriculture, forestry sectors, but also local communities) need to be involved in the dialogue and implementation of indicators at the local level. This requires cross-sectoral dialogue over the value chain.
- **Policy makers** drive the process providing clear, long-term stable policy within a roadmap for at least 10-20 years. They need to make informed decisions and provide an enabling environment, thereby aiming for a good balance between stimulating and regulating. Government's role is three-fold:
 1. making fiscal reforms to create a level playing field for more sustainable products and services;
 2. setting up public procurement to stimulate demand for biobased products and fuels;
 3. implementing sustainability requirements and effective enforcement.
- The bioenergy community is central to the deployment of a sustainable bioeconomy, but there are many other actors in the broader bioeconomy. Ambassadors will be needed to tell the story, also speaking out on difficult issues. Private industry needs to learn from successful examples and embrace corporate responsibility. Involving financial institutions/ investors for 'green financing' will be key for deployment in the market.

WORLD CAFÉ ROUND 2: A COLLABORATIVE WAY FORWARD

The second round of World Cafés followed the same procedure as the first, splitting up the participants in 6 groups and starting with a short input. Names of moderators, rapporteurs and experts providing input are shown in the table below. The one-hour session had the following key questions:

- Who should be included in the future dialogue?
- Which events, fora etc. could be used to continue the dialogue?
- What are the next steps, and which contributions are foreseen by workshop participants?



Group	Input	Moderator	Rapporteur
2A	Peter Holmgren, FutureVistas <i>Topic: REDD+ and beyond</i>	Floor van der Hilst, Utrecht Univ.	Jinke van Dam, consultant
2B	Tim Olsen, Calif. Energy Commission <i>Topic: regulatory experiences: government view</i>	Renato Godinho, Biofuture Platform	Gerard Ostheimer, below50
2C	Lauri Hetemäki, European Forest Inst. <i>Topic: Forest bioeconomy governance</i>	Jenny Walther-Thoss, WWF	Gustaf Egnell, Swedish Univ. Agri. Sciences
2D	Jessica Chalmers, SAN <i>Topic: Agriculture sustainability governance</i>	Patrick Lamers, NREL	Michela Morese, GBEP
2E	Toshi Masuyama, IRENA & Gianluca Sambucini, UNECE <i>Topic: Role of international organisations fostering bioeconomy governance</i>	Andrea Camia, EC-JRC	Adam Brown, Energy Insights
2F	Olivier Dubois, FAO <i>Topic: towards sustainable bioeconomy guidelines</i>	Kees Kwant, RVO.nl	Sergio Ugarte, SQ Consult

After the World Cafés, the rapporteur of each group reported to the plenary. This was moderated by Uwe Fritsche (IINAS).

Main conclusions of the World Café 2 discussion

Q1: Who to include in future dialogue?

Future dialogue should in principle involve all stakeholders of bio-based value chains (feedstock production, conversion, distribution, end-use), but also include policy-makers and the societal side:

- feedstock producers: agriculture, landowners, forest owners, forest managers, landscape management, waste sector
- industries:
 - existing biobased industries, food & agricultural industries, waste processing
 - chemical industries, energy companies, oil & gas industries,
 - SMEs and industry in general (as energy consumers)
- financial institutions, investors
- major fuel users: vehicle/fleet owners, automotive industry, aviation sector, maritime sector
- standardisation and certification organisations
- policy makers, cities/municipalities/ local governments
- innovation agencies
- international cooperation, also with developing countries
- development agencies, South-South cooperation, indigenous people
- workers and trade unions, civil society (e.g., churches)
- environmental groups, NGOs (consumer organisations, social, environmental)
- major education institutions (incl. high schools & universities), scientific communities, research organisations
- general public, citizens (urban and rural).

Feedstock producers are key to the whole bioeconomy story; however, they are often taken for granted and not sufficiently involved. It is important to better understand and consider their points of view.

The required much larger-scale deployment in the coming years needs strong involvement of the **private sector**, with emphasis on **financing** and business models. This requires a stable policy framework, i.e., **policy-makers have a crucial role**.

Dialogue is needed with **critical voices** ("meet the opposition"): what are real risks, what is actual practice, and how can sustainability governance help de-risking? Social and local economic opportunities should be brought forward more prominently, also towards developing countries.

It was often mentioned that **younger generations** needed to be more involved as they would be in the driver's seat in the coming decades to steer the transition to a low-carbon economy.

There was a call for more **transdisciplinary research** which includes stakeholders in the process.

Q2: Which fora, events to continue the dialogue?

- The main message that was expressed was to step out of one's own circle, beyond the bioenergy community: Bioenergy is to be considered part of the bioeconomy. We need to reach a wider audience and explain what biomass can mean for society and the economy.
- Dialogue will be needed at global, national and local levels. Several events organised by IEA, OECD, CEM, BioFuture Platform, or GBEP can form a basis for such dialogues, as well as other events related to sustainable development or sustainable finance. The 'Global Landscape Forum' was highlighted

several times in the workshop, as well as fora organised by the UN, FAO, WTO or the World Economic Forum. Private sector events are also relevant, as well as reaching out to international finance institutions (EBRD, World Bank, EIB).

- The role of 'ambassadors' will be crucial. Events that connect stakeholders from different global regions to share best practice can be productive. Of interest are roundtables dedicated to sustainable feedstock/biomass production, such as RSB, FSC, RSPO, RTRS, or Bonsucro.

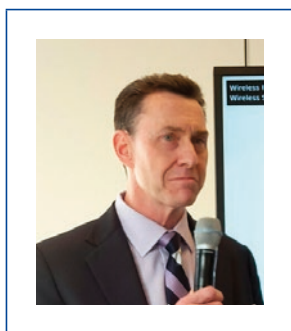
At the regional level, we need effective discussions that trigger action, no 'broad declarations'. This includes dedicated workshops and dialogues at regional and local level defining good practices and sharing lessons learned. Platforms can be set up to facilitate stakeholder involvement. Good practices can also be shared with governmental organisations. Dedicated meetings with members of parliament and key officials can also make a difference.

The bioeconomy/bioenergy sector should not be afraid to meet opposition and have a sensible discussion or dialogue on sensitive issues in a transparent way. And finally, the sector needs to adapt to new ways of communication (social media).

Q3: Next steps

- Good **communication** is key: messages need to be understandable, and wording should be compelling but correct and based on facts. Modern ways of communication should be employed. More efforts are needed on communication and consensus building with mainstream media and the public, especially young people. The first target can be schools, groups of farmers, local communities, but also communication to real decision makers needs to be improved.
- The bioeconomy should be linked to economic development, market trends and consumer behaviour, and its role in achieving SDGs needs to be emphasised.
- Inspirational **case studies and stories** need to be identified, as well as champions to present the message. Good examples should be much more visible, and experiences shared through the communication efforts mentioned earlier. Real life demonstration is the best tool to showcase.
- Future **dialogue** between stakeholders should be facilitated, to create coalitions across value chains, but also to engage actors beyond the bioeconomy (off-takers).
- Sustainable bioeconomy **guidelines** are already being developed, and this needs to be continued, enforced and disseminated to stakeholders.
- The bioeconomy is to be included in national (climate) **roadmaps**, with intermediate targets of what role of biobased products/ bioenergy is needed by 2030.
- Help is needed for policy-makers to develop good **policy frameworks** and incentives. Policies that impact different areas (agriculture, forestry, climate, environment, etc.) should be harmonised, when appropriate. Bioeconomy initiatives can also link to objectives such as reducing risks of forest fires, fighting deforestation and land degradation.

CONCLUDING SESSION



Jim Spaeth, chair of IEA Bioenergy, concluded the workshop, highlighting several key points: **Creating trust** that biomass can be applied in a sustainable way is crucial. This

requires **credible governance** systems, with a regionalised approach; further **transdisciplinary** science, monitoring and analysis; engaging and collaborating with a wider range of stakeholders, and particularly involving the private and financing sector; and most importantly doing a much better job in **communicating** that bioenergy and the bioeconomy are near term opportunities – with due respect to ecological boundaries – and bringing forward good practice examples and approaches providing positive contributions to the SDGs.

In addition, Jim noted that there is **time sensitivity** to this work. Energy systems are evolving rapidly and if the above key steps are not significantly achieved in the next five to ten years, bioenergy will lose out on being a key contributor to this energy transformation.

In the coming years, IEA Bioenergy Task 45 will organise additional dialogues to discuss approaches and implementation strategies for sustainable biobased supply chain management building further on the outcomes and conclusions of this workshop.

ACKNOWLEDGEMENTS

The workshop sessions were moderated by Uwe Fritsche, Kees Kwant and Göran Berndes. Other people involved in the organising committee are Luc Pelkmans, Renato Godinho, Gerard Ostheimer, Michela Morese, Olivier Dubois, Jeffrey Skeer⁺, Jim Spaeth, Andrea Rossi, Floor van der Hilst, Martin Junginger, Inge Stupak, Simone Landolina and Paolo Frankl. The contributions of these and the invited speakers, World Café moderators and rapporteurs are gratefully acknowledged. A special thanks goes to the Netherlands Enterprise Agency (RVO) for hosting the event, and particularly Kees Kwant and his colleagues for taking care of all practical issues before and during the workshop.

Luc Pelkmans, the Technical Coordinator of IEA Bioenergy, prepared the draft text in collaboration with Uwe Fritsche and Göran Berndes, and with input from the different speakers and rapporteurs. Pearse Buckley, the IEA Bioenergy Secretary, facilitated the editorial process and arranged the final design and production.

+ We wish to pay a special tribute to Jeffrey Skeer of IRENA, who was involved in the Organising Committee of the workshop, but who very unexpectedly passed away in early April 2019.

Jeff, you were a wonderful colleague to make the case for sustainable bioenergy. We will miss your passion and drive, and, not the least, your warm companionship. We would like to express our condolences to your family, friends and IRENA colleagues.



Courtesy of the European Biomass Conference (EUBCE)

IEA Bioenergy

Further Information

IEA Bioenergy Website
www.ieabioenergy.com

Contact us:
www.ieabioenergy.com/contact-us/