

GREENING EUROPE FORUM (GEF) ROUNDTABLE **THE RISE OF THE BIO-BASED ECONOMY**



Summer 2012

Media Partner

Europe's World

CleanStar Mozambique Fact Sheet

The Problem

Every day, hundreds of millions of women in the developing world are forced to feed their families using charcoal-burning cookstoves. The noxious combination of carcinogens and pollutants in cooking smoke lingers in poorly ventilated living quarters, leading to underweight births, cancer, respiratory diseases, and increased rates of infant mortality. Household indoor air pollution causes an estimated two million deaths per year and sickens millions more – mostly infants and small children.ⁱ The equivalent of smoking two packs of cigarettes daily, this health threat is as critical as poor sanitation and AIDS, and greater than malaria.ⁱⁱ In addition to the impact on global health, nearly a third of Africa's seven million square kilometers of forest has already been burned for charcoal,ⁱⁱⁱ stripping the continent of vital biodiversity and greatly contributing to the projected 6.7 billion tons of greenhouse gasses that household energy use in Africa is expected to emit into the atmosphere by 2050.^{iv}

The Solution

CleanStar Mozambique (CSM) is pioneering a new, sustainable business model that will drastically improve both the environment and human lives. Thousands of smallholder farmers in Sofala province will transition from charcoal production and slash-and-burn agriculture to cultivating a diverse range of crops and trees, which will significantly improve their income and nutrition levels while rehabilitating degraded soils and enhancing biodiversity. Whatever the families do not consume themselves, they can sell to CSM. The company will operate a local food and ethanol cooking fuel production facility and produce a range of food products as well as an ethanol-based cooking fuel made from cassava. These products, as well as clean-burning ethanol cook stoves, will be sold into urban markets.

The Benefits

CSM is a highly integrated business that will create economic, social and environmental value at every point along its value chain. Rural smallholders in Sofala province will experience improved nutrition and income increases of at least 300% while planting millions of trees and enhancing biodiversity. Urban households in Maputo will experience cleaner air, a reduced disease burden and lower energy costs while reversing deforestation by transitioning from charcoal to ethanol. By 2014 the venture will involve 2,000 smallholders over 10,000 acres (4,000 hectares), supply 20% of Maputo households with a clean and cheaper alternative to charcoal and thus protect 9,000 acres of indigenous forests per year. The company will also employ approximately 1,000 people in Mozambique. From a commercial standpoint, CSM is replicable and scalable across large parts of the developing world, offering the promise of widespread development impacts and significant reductions in global greenhouse gas emissions. By helping establish proof-of-concept in Mozambique, Novozymes intends to catalyze the development of agriculture, food and ethanol industries in developing countries, creating new, sustainable, bio-based markets.

The Partners

Novozymes and CleanStar Ventures have jointly founded CSM. As the world leader in industrial biotechnology, Novozymes provides enzymatic and microbial solutions to many industries, including food, agriculture and biofuel. CleanStar Ventures is an environmental venture development group with particular expertise in agroforestry and biofuels. Novozymes and CleanStar Ventures have joined also forces with ICM (US-based world leader in ethanol production plants), Dometic (Sweden-based business that produces the world's leading ethanol cookstove), and Bank of America Merrill Lynch (world leader in carbon finance). The day-to-day management team leading CSM has decades of experience in agriculture, bio-processing and business development, including many previous projects in sub-Saharan Africa.

www.cleanstarmozambique.com

ⁱ Biomass Fuels and Respiratory Diseases: A Review of the Evidence (<http://pats.atsjournals.org/cgi/content/full/5/5/577>)

ⁱⁱ On Cookstoves, Research Paves Way to Action (<http://rael.berkeley.edu/node/716>)

ⁱⁱⁱ Africa's burning charcoal problem (<http://news.bbc.co.uk/2/hi/africa/8272603.stm>)

^{iv} Impacts of Biomass and Petroleum Energy Futures in Africa (<http://www.caei.com.ar/es/programas/africa/05.pdf>)

THE RISE OF THE BIO-BASED ECONOMY

Report of the Greening Europe Forum (GEF) roundtable
co-organised by *Friends of Europe* and Novozymes

with media partner *Europe's World*

Summer 2012

Brussels

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EXECUTIVE SUMMARY

Faced with a crisis in the Eurozone, the European Union (EU) must rethink its political mechanisms and the structure of the European economy. As part of its Greening Europe Forum, *Friends of Europe* brought together experts from multiple fields to debate the necessary steps towards creating an economically, socially and environmentally viable bio-based economy.

The shift to a more sustainable economic base is a global challenge and Europe will do its part. However, if not properly developed and maintained, Europe's bio-based economy risks falling behind its global partners and competitors as a result of fragmented and weak policies. Overall, a more integrated approach to the bio-economy is needed, one which includes government, industry, civil society actors, farmers, consumers, and so on.

Though there are many potential benefits of the bio-based economy, future sustainability is at risk if it is not carefully defined and suitable policies are not crafted. In order to determine which products are environmentally sustainable and which not, a system needs to be put in place with parameters for new markets, standards and certifications.

While the bio-based economy can provide new innovations, jobs and environmental sustainability, it is essential to carefully consider how to utilise resources to the best effect while creating a balance between food, feedstock, energy and industrial use. Furthermore, considering the planet's limited amount of biomass, bio-based energy technologies should be used intelligently and in tandem with other renewable energy sources.

As the bio-economy takes shape, it will be essential for actors all along the global value chain to consider how to best combine efforts and engage in dialogue in order to increase resource efficiency and reduce and recycle waste. European capacity for innovation in the way that it organises policy and efforts to promote the bio-economy must be nurtured and tailored to meet the needs of the global bio-based economy.

Finding sufficient financing is going to be an enormous challenge, with some estimates calling for upwards of an additional \$4tn per annum to be invested in the bio-economy. Though it is not currently obvious where this funding may come from, efforts are being made to streamline different European funding mechanisms and the advantages of public-private partnerships and cross-sectoral collaboration are being considered.

GREENING EUROPE FORUM (GEF) ROUNDTABLE

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RECOMMENDATIONS

“The rise of the bio-based economy” roundtable made specific recommendations to policymakers on how to stimulate the development of the bio-based economy. The recommendations are grouped into four areas:

1) Communication and raising awareness

The concept and objectives of the bio-based economy should be clearly set out by EU policymakers and a public and consumer awareness campaign be launched to inform the European public as to what the bio-based economy entails and its benefits for European and global society.

2) Ensuring sustainability

The EU should produce a scientifically-assessed land use strategy that clearly identifies the sectors and resources most relevant to the bio-based economy, including an assessment of necessary imports. Greater emphasis in policy should be placed on common methodologies and standards for sustainability criteria with respect to resources, residue collection and life-cycle analyses for bio-based products.

3) Supporting the bio-based value-chain

The entire value chain of the bio-based economy should be examined and tailored to the needs of European society. Closing the gap between research and commercialisation of bio-based products and processes will aid in setting out clear objectives for the various actors involved.

The EU must seek to comprehend the most efficient and effective uses of biomass and incorporate this understanding into policies aimed at creating a level playing field for all biomass applications based on greenhouse gas emissions and resource efficiency. Dedicated efforts must be made to avoid competition in Europe for biomass resources and to encourage the development of different technologies in order to combine their advantages in a sustainable way.

a) Ensuring the supply of feedstock and infrastructure developments

Currently, the lion's share of funding and policy support for the bio-based economy goes towards biofuels and energy creation. The allocation of resources for the bio-based economy should be better balanced between food, feedstock, energy and raw industrial materials by reviewing regulatory frameworks and incentives. In addition, innovation is required in organisational infrastructures and the development of new business models for the bio-based economy, as well as in technological advances.

Refocusing EU support towards chemical and material production as well as research and innovation in non-energy areas will provide a broader and more stable foundation for the bio-based economy and serve to distance the EU's policies from the negative connotations associated with first generation biofuels.

b) Support finance for bio-refineries

The participants support the development and construction of industrial plants for bio-based and innovative production, in particular bio-refineries. Funding for pilot projects in this area requires the integration of many sources, including the Common Agricultural Policy, the Common Fisheries Policy, the Cohesion Policy, the Renewable Energy Policy, Horizon 2020, and relevant EU Innovation Partnerships, as well as an increase in public-private partnerships. It was stressed that public funding for initiatives in the bio-based economy should be greatly increased.

c) Promoting demand for bio-based products

The participants agreed that the EU should continue implementation of the Lead Market Initiative (LMI) for bio-based products. The activities of the LMI include encouraging green public procurement and the promotion of certification schemes for these products. The current policy deficit in this area should be examined and the creation

of a favourable public policy framework should be accelerated in order to even out the competitive advantage of the entrenched fossil-based economy. This means creating markets for bio-based products, changing import levies, creating and improving logistical support, removing policy and technical barriers, and promoting research and sustainable processes.

4) Implementing a roadmap for Europe's Bio-economy Strategy

The European Commission must go beyond the strategy set out in “Innovating for Sustainable Growth: A Bio-economy for Europe,” adopted on 13 February 2012, and develop a clear and concise roadmap for the implementation of the bio-based economy.

The European Commission, with input from the member states, industry and business leaders, regions of Europe and civil society representatives, should avoid duplication of efforts and create comprehensive and coherent policies on the bio-based economy. As agreement is reached, the Commission should strive to incorporate political and economic mechanisms in a cross-sectoral and holistic way into a common bio-economy policy.

Benefits of the bio-based economy

According to Bloomberg New Energy Finance, the development of Europe's advanced biofuels industry could:

- Create up to a million jobs between 2010 and 2020 – most notably in rural areas;
- Generate up to €31bn of revenues internally in the EU27 per year by 2020;
- Reduce GHG emission from gasoline related road transport by 50%;
- Increase energy security by substituting more than half of all gasoline and save €49bn on oil import. This is particularly relevant with crude oil well beyond 100\$ a barrel today and with IEA forecasting that EU oil dependence will reach 95% by 2035;
- Diversify farmers' revenues and reinvigorate rural communities.

"The bio-based economy is a double-edged sword," noted introductory discussant [Stephan Singer](#), Director for Global Energy Policy, World Wildlife Fund (WWF) European Policy Office. "It can provide innovation and jobs while reducing emissions

"The bio-based economy is a double-edged sword."



[Stephan Singer](#), Director for Global Energy Policy, World Wildlife Fund (WWF) European Policy Office

but at the same time, we must remember that we only have one planet and not enough space to meet our growing demands.” As the world’s population grows, so too does the demand for the efficient use of bio-based resources, he added.

Though still in early stages of development, noted **Maive Rute**, Director of Biotechnologies, Agriculture and Food, European Commission Directorate General for Research and Innovation, there are many opportunities for the bio-based economy in Europe and beyond.

“Right now in the EU,” agreed **Lars Christian Hansen**, President Region Europe, Novozymes, “we have an underutilised agricultural sector, with abundant residues available to us. We also have forest residues and municipal solid waste that can be used as an additional source of biomass. These are all materials that we can use to enhance our economy by creating higher-value products.”

“There are many opportunities for the bio-based economy in Europe and beyond.”

Maive Rute, Director of Biotechnologies, Agriculture and Food,
European Commission Directorate General
for Research and Innovation



One of these opportunities is the possibility of deriving novel products from traditional industries, continued Rute. For example, clothing fibres made out of forest residues can be used to produce ‘tree-shirts’ and other textile products by the pulp and paper industry. “In Europe,” she underlined, “forest resources and residues are underused. In the north of Europe, forests are still expanding and 40% of the biomass grown there annually could be used in sustainable production cycles.”

In addition to creating novel products, research and innovation in the bio-based economy can result in common products with new qualities, as the examples of biodegradable plastic bags made of agricultural residues and a new process for

producing plastics out of slaughterhouse sludge – driven by research projects under the EU's Seventh Framework Programme (FP7) – demonstrate.

The final example Rute offered was that of a Coca-Cola bottle made of plant material, showing that widely used consumer products continue to join the bio-based economy. However, she cautioned, in order to promote efforts such as this, new markets, standards and certifications must be created in order to determine which products are environmentally sustainable and which not.

“As the EU is faced with an increasingly uncertain economic future, the current EU priority is to restore growth and create jobs. Yet, we hear little about the role industry can play in achieving this priority. The bio-based economy is one sector that can concretely contribute to achieve this objective while addressing other societal challenges at the same time,” Hansen said. Novozymes and other European companies have been working for many years to solve the “holy grail of biotech” – breaking down cellulosic material in order to create commercially competitive applications for biomass. Now that this goal has been achieved, a bio-based economy built on solid science and policy is becoming closer to a reality, he stressed.

“The current EU priority is to restore growth and create jobs. The bio-based economy is one sector that can concretely contribute to achieve this objective while addressing other societal challenges at the same time.”

Lars Christian Hansen,
President Region Europe, Novozymes



At the heart of this reality is the bio-refinery utilising renewable inputs to create or replace many of the products traditionally provided by refineries using fossil inputs. “These bio-refineries are appearing in greater numbers around the world,” he concluded, “and a range of different materials from corncoobs to algae to municipal waste are being converted into a variety of products.”

Defining a clear direction for the bio-based economy

“Any discussion on the bio-based economy must be very clear and explicit when it comes to defining what the bio-based economy actually is and should be,” said co-moderator **Giles Merritt**, Secretary General of *Friends of Europe*.



“Any discussion on the bio-based economy must be very clear and explicit when it comes to defining what the bio-based economy actually is and should be.”

Giles Merritt, Secretary General of *Friends of Europe*

“We should be clear about the issues,” agreed **David Baldock**, Executive Director of the Institute for European Environmental Policy (IEEP). “The bio-economy is one thousand challenges and one thousand opportunities. It must be considered as such and not as a single sector.”



“The bio-economy is one thousand challenges and one thousand opportunities. It must be considered as such and not as a single sector.”

David Baldock, Executive Director of the Institute for European Environmental Policy (IEEP)

In order to properly exploit the growing potential of the bio-based economy, policymakers and other stakeholders need to prepare thoroughly to understand the technical, political and macro-economic implications of this paradigm shift.

“We need to go into a lot of detail,” he underlined. “Much of what we need to learn to create a functioning bio-economy is simple knowledge and simple common sense.”

To illustrate this point, he offered a recent project undertaken by the IEEP on straw. Though straw is a basic and common resource, it is surprising how little precise information is available about its uses. Developing and following through on small and specific projects of this type is the foundation of the bio-economy. “Let us not skip the work phase,” he concluded. “If we do not do the work, we will get the bio-based economy wrong and frankly, we have not done the work.”

Though there are certainly some very beneficial applications for biotechnology in many sectors, it behoves policymakers and other key players in the growing bio-economy to carefully describe and share expectations and capabilities amongst themselves and with the European public. “The bio-based economy does not have a lot of support because of the lack of public awareness,” Baldock noted. “We should be clear about what it is and what it means to investors, researchers and the public. Right now, it is not clear and it will not progress on this basis.”



“We in the European Commission cannot do this alone. As long as the member state governments are in control of implementation, we need to work together to accomplish the best steps towards the bio-based economy.”

Markus Holzer, Head of Unit, Bioenergy & Biomass, European Commission Directorate General for Agriculture and Rural Development

With better research and communication, it will be possible to avoid another controversy such as the one in recent years over the indirect land use change (ILUC) impacts of biofuels on greenhouse gas emissions.

Moreover, noted discussant Anne Snick, Coordinator at Flora, Network for Gender and Sustainable Economy, before effective cooperation can be induced between the myriad of actors, European policymakers must ask tough questions and define the needs and purposes of the new paradigm.

One of these questions is whether the bio-based economy should be defined as a concept that will serve to keep existing infrastructure running or a new way to define functions and the manner in which Europeans consume and live. For example, The European Commission is currently working on a project to substitute chemically-made plastic bags with biodegradable ones. This is one possible solution to the waste generated by plastic bags that addresses the issue of pollution but does not go so far as to question the underlying assumption that people should use these bags.

“We replace and innovate, but I think that the best innovation would be to become more sustainable.”

Judith Merkies MEP, Member of the European Parliament Committee on Industry, Research and Energy



“We must consider the consequences of our actions,” stressed **Judith Merkies MEP**, Member of the European Parliament Committee on Industry, Research and Energy. “We must ask ourselves if we want to continue at our current consumption levels, with the addition of a ‘certified bio’ label on our products or if we want to redefine our way of life in a more sustainable manner.”

Another area that needs to be defined is innovation. Should EU policy focus on technical innovation and improving production processes? Or should it also include functional and social innovation in order to address the root causes of over-consumption of resources? “We replace and innovate,” Merkies said, “but I think that the best innovation would be to become more sustainable. We are much too blindly focussed on technology when what we need to do is change our current consumption paradigm.”

Part of this shift in consumption patterns should include new ways of developing demand in the bio-based economy, added **Markus Holzer**, Head of Unit, Bioenergy & Biomass, European Commission Directorate General for Agriculture and Rural Development. “We must convince people that they can and should

change their habits,” he stressed. “We must do this in a holistic way and not by developing various solutions in our individual silos.” This shift could include a role for policymakers, for example when it comes to the promotion of certification of bio-based products and to public procurement rules favourable to bio-based products.

What role for biofuels?

“Early support for road transport biofuels in OECD was a mistake because there are other options for clean supply such as renewable electricity and we need the land for highly efficient biomass for other purposes where there is no alternative to fossil fuels presently such as aviation and shipping” noted Singer. “Biofuels should not be used for road transport, as they require too much land to produce. Instead, we should focus efforts on other areas of innovation.” The electrification of cars, for example, could be a more fruitful avenue to meet the EU’s 20-20-20 goals¹, as well as the allocation of biofuels to those sectors that will be more difficult to de-carbonise such as aviation and shipping, he concluded.

“We are facing very stiff global competition today. Europe has developed new research and development policies but it would be very serious if the fruits of these policies were to be harvested by non-European countries.”

Xavier Beulin, President of the Fédération Nationale des Syndicats d'Exploitants Agricoles (FNSEA)



While the application of bioenergy in the aviation and shipping sectors is certain to become a reality, introductory discussant **Xavier Beulin**, President of the Fédération Nationale des Syndicats d'Exploitants Agricoles (FNSEA), believes that the EU’s objective of 10% renewables in transport by 2020 is easily achievable with biofuels, though the EU may need to wait for more innovation in 2nd or even 3rd generation biofuels.

¹ The EU’s 20-20-20 goals call for a 20% increase in energy efficiency, 20% reduction of CO₂ emissions, and 20% use of renewables, including 10% of liquid biofuels for use in road transport by 2020.

“Though many attacks are being made against the non-food use of agricultural land,” he noted, “farmers in Europe utilize a much greater amount of agricultural space for other motives than bioenergy, for instance the urbanization process.” Furthermore, he concluded, Europe is currently using only 2.5% of its land resources for biodiesel and bioethanol production, a process which also provides one kilogramme of meat product for every litre of biodiesel produced, thus increasing its productivity and reducing Europe’s dependency on imported animal feed and products.

Rather than seeing the discussion as a “food vs. fuel” debate, it seems increasingly possible to combine the two, noted [Marcel Wubbolts](#), Chief Technology Officer, DSM, the Netherlands. “I think we can use our agricultural land for both food and fuel,” he said. “After using agricultural waste as fertiliser, we have found that 25% of biomass can be removed from the land and used for other purposes without affecting soil quality.”







“Looking at value chains will require new partnerships and consortia that share common goals. What we should strive for is a holistic approach.”

Marcel Wubbolts, Chief Technology Officer, DSM, the Netherlands



Willem Sederel, Sabic Innovative Plastics, the Netherlands and Jean Sentenac, Axens, France

The bio-based economy must consider more areas than just biofuels, the participants agreed. “Currently,” noted [Michael Carus](#), Managing Director of the Nova-Institut, Germany, “most of the support for the bio-based economy goes towards biofuels and energy creation. This existing policy is a barrier for the bio-based economy, we need a level-playing field for all bio-based products.”

Finding the right balance

The four sectors of the bio-economy: food, feed, bioenergy and biofuels, and raw materials for industrial use, are not linked, nor are they balanced. With due consideration for policy and process, however, this unbalance can be reconciled within the framework of a bio-based economy, Carus underlined.

The current framework leads to an unequal allocation of biomass and investments, both in terms of sector, with subsidies and funding being offered to biofuel producers in the EU, and in terms of geography, where investors see more promise in the political and economic frameworks being adopted in North America and Asia.

“On our planet we have limited biomass,” he noted, “so we need to be clever to use what we have in the correct manner.” He suggests four criteria to be applied to various sectors in the discussion on how to prioritise biomass use.

Firstly, sectors with the highest resource efficiency should be given precedence. Following this, decision makers should seek the highest greenhouse gas reductions possible. Thirdly, it should be considered which sector will benefit most from the bio-economy's impact on employment, innovation and added value. Finally, biomass should be used only in areas which cannot easily adopt other sources of renewable energy, such as solar and wind.

Considering these criteria, he concluded, the sector most suited for biomass use is industry. EU policy, however, has set aside the lion's share of financial support for the energy sector, while industrial production, except for some innovation funds, receives very little.

“The region of the world that is most ready to create and implement a level playing field for the bio-based economy will profit the most from its development.”

Michael Carus, Managing Director
of the Nova-Institut, Germany



This uneven distribution of support funds for bio-based activities can be quite extreme, as in the case of Germany, where subsidies to the biofuels and biogas sector account for in between 25% and 80% of turnover (2012), he continued. The funding peak was in 2009. With such a highly subsidised energy sector, industrial producers and other claimants are unable to fairly compete for land and resources.

With studies having been conducted to describe in detail the hurdles to the smooth operation of the bio-economy, the next step is to craft new policy instruments that will allow actors in the bio-based economy to develop a level playing field for all biomass applications. “The region of the world that is most ready to create and implement a level playing field for the bio-based economy will profit the most from its development,” he concluded.

“One of our main concerns is to meet the demand for renewable energy and raw materials dedicated to non-food products,” noted Beulin. “At the same time, this production should be in a sustainable framework. We can combine economic, environmental and social performance in agriculture through EU directives and international agreements.”

A closer look at the bio-based value chain

The European experience with bio-ethanol serves to teach a lesson about the importance of understanding how global value chains will function in the bio-economy. “Once we have understood how the global supply chain operates, we can determine where to find added value and where mistakes are being made,” noted Baldock of the Institute for European Environmental Policy (IEEP).

While the EU is leading the world in innovation in biotechnology, much of this technological innovation is being exported, to the detriment of the European bio-based economy, stressed Hansen of Novozymes. “In fact,” he added, “Europe has all of the necessary elements to launch the bio-based economy.” Even though the EU has the resources, technology, innovation and research, industrial base, and workforce, these elements are not sufficient without the correct infrastructure and a value chain tailor-made for the bio-economy.

“We may never make
an ideal agenda but
we can start with a common
agenda at least.”

Roel Bol, Programme Director for the Bio-based
Economy, Dutch Ministry of Economic Affairs,
Agriculture and Innovation



“We are facing very stiff global competition today,” agreed Beulin. “Europe has developed new research and development policies but it would be very serious if the fruits of these policies were to be harvested by non-European countries.”

This value chain begins with agricultural residues, Hansen continued, adding that agriculture, often considered a problematic issue in the EU policy debate, is actually a potent opportunity, if the EU’s policy framework can be tweaked to

accommodate the needs of the bio-based economy. The importance of residues and land use strategies must be reflected in the Common Agricultural Policy (CAP), with a much stronger voice being given to local actors to determine which land is suited for which purposes and to prioritise the use of residues, the roundtable agreed.

In order to achieve this prioritisation, Europe must consider the bio-economy as a web made up of multiple sectors that all need to be supported, said Karin Metzloff, Executive Director, European Plant Science Organisation (EPSO). In addition, cross-sectoral collaboration must be encouraged and facilitated so as to create a cohesive space for collaboration all along the value chain.

The rise of the bio-based economy is a process that involves many players: companies, knowledge providers, NGOs, governments and also consumers. “Looking at value chains will require new partnerships and consortia that share common goals,” Wubbolts stressed. “What we should strive for is a holistic approach.”

“As we build new value chains and networks, we need to address the issue of organisational innovation,” noted [Roel Bol](#), Programme Director for the Bio-based Economy, Dutch Ministry of Economic Affairs, Agriculture and Innovation. “We are looking at situations where the chemical industry has to do business with the agricultural industry, or with the paper industry. They all have different languages but they need to be able to understand each other.”

As new organisational structures arise, actors in the bio-economy will need to consider different chains on a detailed level, Baldock said. “We must strive to get all the stakeholders in a certain chain out of their silos and into the same room,” he added. In this way, measures like cascading – assigning resources to the highest value activity and prioritising waste usage down the value chain – can be implemented in more efficient ways.

Markus Holzer of the European Commission Directorate General for Agriculture and Rural Development indicated that the EU's fragmented policy and implementation mechanisms need to be united if the bio-based economy is to become a reality. While funding mechanisms exist, ineffective collaboration between the EU institutions and member state governments, as well as between the various Directorates-General in the European Commission must be overcome in order to move forward with a coherent common bio-economy strategy.

“We in the European Commission cannot do this alone,” he concluded. “As long as the member state governments are in control of implementation, we need to work together to accomplish the best steps towards the bio-based economy.”

“We may never make an ideal agenda but we can start with a common agenda at least,” agreed Bol. To achieve this agenda, EU policymakers need to agree on coherent policies on the national and EU levels and to decide which existing policies – whether energy policy, the CAP, the Horizon 2020, or others – could serve as starting points for this agreement.

What can the EU do?

Faced with stiff competition from abroad and a fragmented and loose-fitting policy framework at home, it behoves the EU to step up and play a stronger game in order to reap the benefits of the bio-based economy, the roundtable agreed, highlighting several areas in which the EU could adopt a stronger and more cohesive approach to the bio-economy. “It is absolutely essential that Europe ensure food and energy independence,” Beulin underlined. “This should be a priority for the EU.”

In order to ensure this independence, said Rute, the European Commission is proposing to speed up technological development for the sustainable use of biomass and waste through the Horizon 2020 Framework Programme for Research and Innovation, which is slated to replace the Seventh Framework Programme (FP7) in 2014.²



² For more information on the Horizon 2020 Framework Programme for Research and Innovation: <http://ec.europa.eu/research/horizon2020>

In addition to the resources of the Horizon 2020, she continued, various relevant EU Innovation Partnerships are working to link the various actors involved in the bio-economy and DG Research is in discussion with industry representatives to develop public-private partnerships in the bio and green chemistry sectors. “When it comes to operational issues,” added Bol, “we should stimulate and support small and medium enterprises (SMEs) as it is these businesses that are responsible for a lot of innovative new techniques and ideas.”

“From a policy perspective,” Hansen noted, “the EU must concentrate consistency and connecting the dots across the value chain, from the farm to the customers: the reform of the CAP to incentivise supply and processing of agricultural residues and waste; Horizon 2020 to support large scale demo bio-refineries through public private partnerships; renewable energy policy to provide stable and long-term policy frameworks for advanced biofuels; industrial policy to build green markets and support performance standards; and structural funds to invest in rural green infrastructure and innovation.

Part of this policy framework must tackle the issues of market creation and sustainable consumption, continued Maive Rute.

“From an industry perspective,” agreed Wubbolts, “sustainability is a big business driver and has helped us expand our customer base.” DSM, a global company active in the production of 2nd generation biofuels, operates principally across the Atlantic as the EU has fallen behind the US in terms of market incentives and infrastructure for the bio-based economy.



(FAO), Nella Mikkola, General Committee of Agricultural Cooperation of the EU Organisation for Economic Co-operation and Development (OECD) and Karin Metzloff,

“While the outlook for the EU’s bio-based economy is far from grim, we in Europe need to stimulate innovation, meaning new business development. This will take some time to show progress. We need more than ten years of commitment to this in Europe,” he concluded.

Singer indicated other areas that need to be addressed by the EU in order to have an orderly transition to a bio-based economy. Research and development budgets across Europe have been declining for several years, he said, adding that money must be found to bolster these budgets.

Singer also recommended that more specific guidelines should be given by the European Commission as to which direction the bio-economy should take.

“Much remains to be done in terms of life-cycle analyses of bio-based products and standards creation before we can move confidently forward with the bio-based economy,” added Maive Rute.

Financing the bio-based economy

There are numerous technical, strategic and commercial challenges that need to be overcome before any large-scale commercialization can succeed. The most pressing challenge for all bio-based industries is to improve the economics of production through upscaling and industrialisation.

The industry is willing to invest and is already doing so but it cannot act significantly or rapidly without conducive policies and government support given the substantial risks of the investments and the relative pricing of fossil fuels to the current economics of bio-based production.

In a study conducted by PricewaterhouseCoopers (PwC), it was estimated that, in order to finance the development of the bio-based economy and provide sustainable resource use for a projected global population of 9bn by 2050, global investments in the bio-economy would need to be increased by \$4tn per annum, noted [Isabelle Spiegel](#), Director Strategy Group / Sustainability, PwC.

“The EU’s share in the necessary investments for the bio-economy is equal to an additional \$1tn per annum, or roughly 5% of EU GDP,” she added. “As it stands now, with the several billions of euros the EU is currently investing, we can see that we are nowhere near the necessary levels of financing.”

Though there already are several funding mechanisms and initiatives to support the development of biotechnology and renewable resources, these existing programs will not be sufficient if they continue to be isolated from each other. “The key factor of success will be to consider a more structured and holistic approach to financing on the European and global scale and to involve actors along the entire value chain,” she said.



“As it stands now, with the several billions of euros the EU is currently investing, we can see that we are nowhere near the necessary levels of financing.”

Isabelle Spiegel, Director Strategy
Group / Sustainability, PricewaterhouseCoopers (PwC)

“The European Commission has produced substantive initiatives to address the question of funding for the bio-economy,” added Holzer of the European Commission Directorate General for Agriculture and Rural Development. The CAP, for instance, offers subsidies for production and rural development, while the Horizon 2020 will provide funding for research and innovation.

Though these initiatives, in tandem with the European Commission’s bio-economy strategy³, demonstrate the EU’s resolve to address this issue, in terms of actual numbers, the current financing opportunities for the bio-based economy fall short of what is needed by an order of magnitude, stressed Merkies MEP. “I commend the Commission for its strategy,” she said, “but I wonder when we will see some more concrete action taken to facilitate the rise of the bio-economy.”

³ ‘Innovating for Sustainable Growth: A Bio-economy for Europe,’ adopted on 13 February 2012. Full text: http://ec.europa.eu/research/bioeconomy/pdf/201202_innovating_sustainable_growth.pdf

The measures in place are insufficient to meet the challenge, agreed Holzer. “We need to explore other options than public funding from individual sources,” he continued. “The European Commission cannot do it on its own, nor can the member states, nor the private sector. We need to integrate all sources of funding into a comprehensive approach.”

There will need to be an increase of public-private cooperation, agreed Spiegel, noting that in the private sector, increasing numbers of companies have been leaning towards sustainability in order to create more business opportunities. “There are simply not enough resources available at low enough cost for some companies, so they are looking at new and sustainable ways of doing business. New business models are emerging with many opportunities of business for companies. One of the roles of policymakers is accelerating the change by supporting SMEs and other companies in this,” she concluded.



Participants continue the discussion during the networking lunch

Conclusion

The bio-based economy is not a panacea. As it develops further, more issues will arise that will require innovative solutions and a generous and cooperative approach from all stakeholders. Moreover, the successful shift to a bio-based economy requires rethinking the way in which the EU and other global actors organise their economic and environmentally sustainable activities – from fossil fuel use, to innovation and research, to recycling waste and residues. Achieving a practicable bio-economy is not about changing gears, it is about changing lanes, opting for new perspectives on sustainable economic growth and choosing the correct technical and political avenues for development.

Overcoming the EU's systemic reluctance to change, bolstered by a deficit of imagination, is no small challenge in itself. The first step is to overcome some of the traditional boundaries between different interest groups and to champion the cause in a holistic way, recognising that nothing significant will be achieved by any one group acting unilaterally. Businesses, policymakers, consumers and civil society must work together.

At the heart of the vision of the bio-economy lays an alternative to the current global economy's addiction to oil, and a much needed source of economic growth and rural development in which Europe is well positioned to take a global lead.

ANNEX I — List of Discussants

Mika Aalto, Director, Forest and Chemical Industries, Finnish Funding Agency for Technology and Innovation (TEKES), Finland

Antonia Andugar, Senior Policy Advisor, Environmental Issues, General Committee of Agricultural Cooperation of the EU (COPA-COGECA)

Martin Austin, Managing Director, TransformRx

David Baldock, Executive Director, Institute for European Environmental Policy (IEEP), United Kingdom

Xavier Beulin, President, Confédération Nationale des Syndicats d'Exploitants Agricoles (FNSEA), France

Gauthier Boels, Head of Research and Development, REALCO

Roel Bol, Programme Director Bio-based Economy, Ministry of Economic Affairs, Agriculture and Innovation, the Netherlands

David Boxer, Director, Institute of Food Research, United Kingdom

Ana Maria Bravo-Angel, Director Public Affairs, Genencor International

Geert Cami, Co-Founder & Director, *Friends of Europe*

Michael Carus, Managing Director, Nova-Institut, Germany

Nicolas Denis, Partner, Sustainability and Resource Productivity, McKinsey & Company

Joyce D'Silva, Director, Public Affairs, Compassion in World Farming, United Kingdom

Olivier Dubois, Senior Natural Resources Officer & Leader Energy Team, Food and Agriculture Organization of the United Nations (FAO), Italy

Joanna Dupont-Inglis, Director Industrial Biotechnology, European Association for Bioindustries (EuropaBio)

Daniel Fraile Montoro, Senior Policy Officer, EU Climate and Energy, Climate Action Network Europe (CAN)

Nathalie Furrer, Director, *Friends of Europe*

Andrew Hagan, Director, Head of Chemicals Industries, World Economic Forum, Switzerland

Lars Christian Hansen, President Region Europe, Novozymes

Edwin Hecker, Managing Partner, Schuttelaar and Partners

Markus Holzer, Head of Unit, Bioenergy, Biomass, Forestry and Climatic Changes, European Commission Directorate General for Agriculture and Rural Development

Karen Johnstone-Hobbs, Counsellor, Science & Technology, Mission of Canada to the EU

Manfred Kircher, Member of the Advisory Board, Cluster Industrielle Biotechnologie (CLIB-2021), Germany

Robert Kleiburg, Chief Operating Officer, ECN, the Netherlands

Hans Langeveld, Director, Biomass Research, the Netherlands

Albert Markusse, Managing Director, Suiker Unie, the Netherlands

Judith Merkies MEP, European Parliament Committee on Industry, Research and Energy

Giles Merritt, Secretary General, *Friends of Europe*

Karin Metzloff, Executive Director, European Plant Science Organisation (EPSO)

Nella Mikkola, Policy Advisor, Rural Development and Forestry, General Committee of Agricultural Cooperation of the EU (COPA-COGECA)

Christine Moeller, Policy Officer, Economic Assessment of Climate Policies, European Commission Directorate General for Climate Action

Clemens Neumann, Director General, Ministry of Food, Agriculture and Consumer Protection, Germany

Kåre Riis Nielsen, Director, European Affairs, Novozymes

James Philp, Policy Analyst, Industrial and Environmental Biotechnology, Organisation for Economic Co-operation and Development (OECD), Directorate for Science, Technology and Industry, France

Jaroslav Pietras, Council of the European Union Directorate General for Environment, Education, Transport and Energy

John Roy Porter, Professor of Arable Systems Ecology, University of Copenhagen, Denmark

Marie-Christine Ribera, Director General, Comité Européen des Fabricants de Sucre (CEFS)

Edward Ricketts, European Advisor, United Kingdom Biotechnology and Biological Sciences Research Council (BBSRC)

Ton Runneboom, President, Biorenewables Business Platform, the Netherlands

Christophe Rupp-Dahlem, Programs Director, Plant-Based chemistry, Roquette Frères, France

Maive Rute, Director, Biotechnologies, Agriculture, Food, European Commission Directorate General for Research and Innovation

Bruno Schmitz, Head of Unit for New Renewable Energy Sources, European Commission Directorate General for Research and Innovation

Bernd Uwe Schneider, Head of Staff of the Scientific Executive Board, Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences

Willem Sederel, General Manager, Sabic Innovative Plastics, the Netherlands

Jean Sentenac, Chairman and Chief Executive Officer, Axens, France

Stephan Singer, Director for Global Energy Policy, World Wide Fund for Nature (WWF) European Policy Office

Anne Snick, Coordinator, Flora Network of Expertise on Resilience

Patrick Sorgeloos, Professor and Head of Department, Faculty of Bioscience Engineering, Ghent University

Isabelle Spiegel, Director Strategy Group / Sustainability, PricewaterhouseCoopers, France

Nikolaus Tacke, Director European Government Affairs, The Coca-Cola Company

Menno van der Veen, Professor, Faculty of Applied Sciences, Delft University of Technology, the Netherlands

Jacco van Haveren, Programme Manager Biobased Chemicals, CatchBio, the Netherlands

Johannes van Kasteren, Professor, CAH Dronen University of Applied Sciences, the Netherlands

Marc Van Montagu, Founder & Chairman, Institute Plant Biotechnology for Developing Countries (IPBO)

Hasso von Pogrell, Managing Director, European Bioplastics, Germany

Niklas von Weymarn, Chief Research Scientist, VTT Technical Research Centre of Finland

Peter Wehrheim, Head of Unit, Climate Finance and Deforestation, European Commission Directorate General for Climate Action

Marcel Wubboldts, Chief Technology Officer, DSM, the Netherlands

ANNEX II — Programme

09.00 – 09.30

Welcome coffee and registration of participants

SESSION I

WHY MOVING TOWARDS A BIO-BASED ECONOMY?

09.30 – 11.15

Moving to a bio-based economy could be a powerful tool to respond to the continuing demand for energy, chemicals and materials while boosting economic growth and employment and contributing to environmental protection. To unlock the innovation potential of the bio-economy, the European Commission is proposing a European action plan up to 2020. But what technical and commercial challenges need to be overcome if a large-scale shift towards bio-based industries can succeed? Is a bio-based economy a silver bullet for Europe's environmental and natural resource problems, or could it have negative socio-economic and environmental effects? How can Europe ensure it retains its technological leadership and avoid it is implemented first in other regions like Asia and the US?

Co-moderated by **Giles Merritt**, Secretary General of *Friends of Europe* and **Hans Langeveld**, Director of Biomass Research, the Netherlands

INTRODUCTORY DISCUSSANTS INCLUDED:



Xavier Beulin

President of the Fédération Nationale des Syndicats d'Exploitants Agricoles (FNSEA)



Michael Carus

Managing Director of the Nova-Institut, Germany



Lars Christian Hansen

President Region Europe, Novozymes



Maive Rute

Director of Biotechnologies, Agriculture & Food, European Commission DG for Research and Innovation



Stephan Singer

Director for Global Energy Policy, WWF European Policy Office

11.15 – 11.45

Coffee break

SESSION II HOW TO MAKE IT HAPPEN?

09.30 – 11.15

Among the major obstacles to a bio-based economy is the lack of financing. Governments need to encourage investment in biotechnologies by creating markets and smartly regulating the industrialisation process. Agriculture will be core to the bio-based economy: Europe's 1.22bn tonnes of yearly agricultural residues could be sustainably harvested without altering land-use patterns and in the future municipal waste could be use of the same purposes. How could the Common Agricultural Policy and other EU funding instruments be used to unlock this potential? Can public procurement of bio-based products be used as a tool, and could public spending be directed towards public-private partnership and demonstration projects across Europe? What can the EU and its member states do to create a clear political commitment and better policy coherence?

Co-moderated by **Giles Merritt**, Secretary General of *Friends of Europe* and **Hans Langeveld**, Director of Biomass Research, the Netherlands

INTRODUCTORY DISCUSSANTS INCLUDED:



David Baldock

Executive Director of the Institute for European Environmental Policy (IEEP)



Roel Bol

Programme Director for the Bio-based Economy, Dutch Ministry of Economic Affairs, Agriculture and Innovation



Judith Merkies MEP

Member of the European Parliament Committee on Industry, Research and Energy



Markus Holzer

Head of Unit, Bioenergy & Biomass, European Commission DG for Agriculture & Rural Development



Isabelle Spiegel

Director Strategy Group / Sustainability, PricewaterhouseCoopers (PwC)



Marcel Wubboldts

Chief Technology Officer, DSM, the Netherlands

13.30 – 14.30

Lunch

ANNEX III — List of Observers

(For the List of Discussants, please see page 30)

Nour Amrani, Manager Public Affairs & Public Relations, Novozymes

Bela Atzel, Assistant Policy Officer, European Commission, Joint Research Centre

Yvonne Barcelona, Secretary General, European Coil Coating Association (ECCA)

Winston Beck, Consultant, Kreab Gavin Anderson

Catherine Berens, Policy Officer, Food and Healthcare Industries, Biotechnology, European Commission, Directorate General for Enterprise and Industry, the Netherlands

Douwe-Frits Broens, Biobased Business Adviser, Wageningen University

Antoine Brossier, Director General, European Solvent Industry Group (ESIG)

Attilio Caligiani, European Affairs Advisor, Schuttelaar and Partners

Tomasz Calikowski, Project Officer, Biotechnologies, European Commission, Directorate General for Research and Innovation

Paula Campos, Communication Assistant, European Commission, Directorate General for Research and Innovation

Julio Cardoso, Policy Officer for International Aspects of Sustainable Industrial Policy, European Commission, Directorate General for Enterprise and Industry

Dirk Carrez, Managing Director, Clever Consult

Stefanie Chirico, Interim Policy Officer, European Commission, Directorate General for Health and Consumers

Jarka Chloupkova, Brussels Correspondent, Profi Press, Czech Republic

Pierre Conrath, Sustainability and Public Affairs Manager, International Association Serving the Nonwovens & Related Industries (EDANA)

David Crikemans, University Lecturer, International Politics, University of Antwerp

Ed D'Hooghe, Manager, Innovation Programme, European Chemical Industry Council (CEFIC)

Sian Davies, Assistant Director, British Agricultural Bureau

Chantal de Cooman, Director Chemical Performance, European Chemical Industry Council (CEFIC)

Thierry de l'Escaille, Secretary General/Chief Executive Officer, European Landowners' Organisation (ELO)

Barbara Debusschere, Environment Journalist, De Morgen

Pierre Dechamps, Adviser, Energy and Climate Change, European Commission Bureau of European Policy Advisers (BEPA)

Cristina Degano, Institutional Relations Officer, Chemtex Italia

Alain Deletroz, Vice President Europe, International Crisis Group (ICG) Brussels Office

Mireille Delprat, Adviser, Sustainable Development, European Commission Directorate General for Research and Innovation

Nathalie Devriendt, Project Manager Bio-energy, Flemish Institute for Technological Research (VITO)

Onur Durmus, Manager Global Environmental Affairs, Tetra Pak International

Jamie Fortescue, Managing Director, European Starch Industry Association (AAF)

Elvira Grassi, Programme Manager, European Commission, Directorate General for Agriculture and Rural Development

Frans Green, Managing Director and Partner, Aspect Consulting

Gerfried Gruber, Member, Agriculture, Rural Development and Environment (NAT), European Economic and Social Committee (EESC)

Veronique Guérin, Director, Fédération Nationale des Syndicats d'Exploitants Agricoles (FNSEA)

Roman Haken, Member, Agriculture, Rural Development and Environment (NAT), European Economic and Social Committee (EESC)

David King, Head of International Relations, Société des Agriculteurs de France (SAF), France

Irena Krasteva, Chief Executive Officer, New Bulgarian Media Group Holding (NBMG), Bulgaria

Jan Kretzschmar, Liaison Officer, Energy & Environment, The Liaison Agency Flanders-Europe (VLEVA VZW)

Eveline Lecoq, Policy Officer for Biotechnologies, European Commission, Directorate General for Research and Innovation

Janusz Luks, Chief Executive Officer, Central Europe Energy Partners (CEEP)

Abhijeet Malik, EU Business Development Adviser, PricewaterhouseCoopers

Tim Mittermayer, Bio-economy Counsellor, Permanent Representation of the Netherlands to the EU

Elena Mengon, Assistant, Autonomours Province of Bozen & South Tyrol, Italy

Felix Mittermayer, Economic Advisor for the Food Chain, European Commission, Directorate General for Health and Consumers

Ward Mosmuller, Director Public Affairs, DSM, the Netherlands

Florian Nitzinger, Assistant, Demeter International, EU Liaison Office

Herbert Oberhänsli, Head of Economic and International Relations, Nestlé, Switzerland

Valery Oknyansky, Counsellor, Permanent Mission of the Russian Federation to NATO

Lumi Ollila, Trainee, European Federation of Waste Management (FEAD)

Márton Pálmai, Brussels Representative, MOL Hungarian Oil and Gas Corporation

Antoine Peeters, Manager, European Association for Bioindustries (EuropaBio)

Eleonora Pinna, Trainee, European Commission, Directorate General for Health and Consumers

Andreea Lorena Plesea, President Executive, European Project Environment

Daniel Rahier, Senior Advisor, Sprim Consulting

Jose Antonio Ruiz, Advocacy Officer, ExxonMobil Petroleum and Chemical

Peter D. Schellinck, Chairman, Schellter Strategy Consultants

Andreas Schmidt, Policy Officer - Coordination Agri Team, European Commission, Directorate General for Trade

Annette Schneegans, Research Programme Officer, Crop Plant Production System and Crop Plant Biology, European Commission, Directorate General for Research and Innovation

Dorota Sienkiewicz, Health Equity and Policy Coherence Coordinator, European Public Health Alliance (EPHA)

Andreas Sommer, European Affairs Manager, Bunge

Monika Sormann, Senior Policy Advisor, Department of the Economy, Science and Innovation, Flanders Government

Mark Stalmans, Scientific External Relations Manager, Procter & Gamble

Agnieszka Stasiakowska, Policy Analyst, European Commission, Directorate General for Research and Innovation

Arij van Berkel, Director of Innovation Chemicals, Netherlands Organisation for Applied Scientific Research (TNO), the Netherlands

Marina Tamagnini, European Public Affairs Advisor, Novamont

Arij van Berkel, Director of Innovation Chemicals, Netherlands Organisation for Applied Scientific Research

Guido van Gorp, Assistant European Affairs, Air France KLM

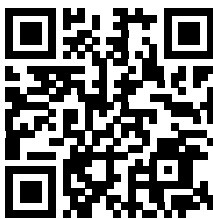
Christian Vanden Bilcke, Head of Office, United Nations Environment Programme (UNEP)

Robert F. Vandenplas, Managing Director, Belgoprocess NV

Barend Verachtert, Deputy Head of Unit, Biotechnologies, European Commission, Directorate General for Research and Innovation

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Matthew Willis, Managing Director, FTI Consulting Belgium



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