02 INSIGHTS

02 Paul Mines, CEO of bioplastics producer Biome Bioplastics

04 Lucy Frankel, environmental and communications director at plant-based compostable foodservice packaging company Vegware.

06 Tom van Aken, CEO of renewable chemicals company Avantium

08 Veronica Chou, Founder of eco apparel brand Everybody & Everyone.

09 Emmi Berlin, Head of Communications at textile fibre specialist Spinnova.

11 Peter Vanacker, President and CEO of renewable diesel producer Neste Corporation.

13 Noel Morrin, Executive Vice President, Sustainability, at pulp, paper and forest product company Stora Enso.

14 Kaya Kaplancali, Co-Founder at plant-based toy specialist Bioserie.

16 Jason T. Gammack, Chief Commercial Officer at Inscripta.

18 David Kirk, molecular biologist turned science communications consultant specialising in synthetic biology.

20 INSPIRATION

20 Fashion heavyweights unveil sustainability initiatives to G7.

22 Finnish chemical group to participate in development of 100% bio-based chemicals for paper and cardboard production.

23 How BBI JU has built the model for the successful expansion of Europe’s growing bioeconomy.

25 Total announces plans to double its capacity of recycled PP for the automotive industry.

26 DATA

26 Consumer research: It’s hard to be sustainable.

28 Bioeconomy research: Interventions supporting the SDGs.

29 Contact Materials research: Not enough information available.

30 LEADERS DIRECTORY
Citizens across the globe are also waking up to the fact that they need to change their daily habits in order to have a more positive effect on the environment. This is leading consumers to seek alternatives to conventional materials from their favourite brands to enable them to counteract waste at home and also help to boost the bioeconomy.

A strong bioeconomy will help to draw on the power of bioscience and biotechnology and transform the way we address challenges in chemicals, food, materials, energy and fuel production, health and the environment. Building a circular bioeconomy with support from synthetic biology is also set to be a prominent trend in the future. The potential benefits are significant, as we develop low-carbon, bio-based products and processes that will improve daily lives across the globe.

The World Business Council for Sustainable Development has recently released a report to show that the bioeconomy industry could be a $7.7 trillion opportunity for business by 2030. It also maintains that the industry will establish the circular bioeconomy as a nature-based solution that addresses pressing environmental issues like resource scarcity and helps to tackle marine pollution.

Plastics in the ocean is one major cause of marine pollution and has led to many brands seeking alternatives to conventional plastics, which has helped the packaging industry to promote compostables. The packaging industry is not the only sector turning to sustainable materials, the textile industry is also going down this road, which has led to brands, retailers and suppliers investing in green initiatives. This trend is not going away anytime soon and is likely to continue into 2020. Many bioeconomy stakeholders agree with this assertion. In fact, in this Insight section of this report, I caught up with key figureheads within the bioeconomy community to find out what they are focussing on for the next year and the opportunities and challenges they face. I also caught up with a few of the speakers who spoke at our SynBio Markets conference in November in Berlin, Germany.

We look forward to covering all these issues and more throughout 2020.

Thanks for reading,

Liz Gyekye
Deputy Editor, Bio Market Insights
What will be your company’s main focus for 2020?

We have a number of projects and products, such as new materials for coffee and nutrition pods, that have come through their development cycles and have either already launched or are about to launch. It’s going to be an extraordinary year as we ramp-up production in the US and Europe to supply these projects and as we support our customers in their own transitions to bioplastics.

What are the biggest challenges facing the bioeconomy sector in regards to:

Bio-based plastics

The full externalities of the cost of oil-based plastics, such as CO₂ emissions and pollution at their end-of-life, are not currently being factored in. This means the higher pricing of bio-based plastics is preventing their ubiquitous immediate adoption. However, there are a variety of fast-growing, non-commodity niches where the

“There is an increasing understanding that recycling is going to be an important aspect of the circular economy, however there are many applications (e.g. packaging contaminated with food waste) in which compostable or biodegradable plastics will provide the only realistic solution to our huge waste problem.”
price vs. performance equation works and in which companies such as Biome can prosper.

**Circular economy**
The media has exposed the paucity of global recycling (<15%) and the developed world’s reliance on dumping waste in developing countries. There are no simple answers to this global (350mtpa), fast-growing plastics problem. There is an increasing understanding that recycling is going to be an important aspect of the circular economy, however there are many applications (e.g. packaging contaminated with food waste) in which compostable or biodegradable plastics will provide the only realistic solution to our huge waste problem. Consumers are demanding change.

**How will Biome respond to these challenges?**
We are working with our customers to deliver materials and products with better performance and inherent processing capability. This is allowing them to develop increasingly sophisticated packaging that works for both the brands and customers they serve.

We are also active in explaining to the market, legislators and public just how bioplastics work in the circular economy. Some of our fun and engaging video explainers on this can be found at thinkbioplastic.com

**What are the biggest opportunities for your business?**
Plastics remain in the global spotlight for their environmental damage on disposal and their CO₂ emissions during manufacture. According to Mordor Intelligence’s ‘Bioplastics Market – Growth, Trends and Forecast (2019-2024)’ report, the global market for bioplastics is predicted to grow by more than 20% compound annual growth rate over the next five years.

We have recently raised additional growth funding so have big plans over the next year and beyond. We plan to scale-up both our current sales and manufacturing activities, as well as our ground-breaking research and development into the production of bio-based and biodegradable hetero-aromatic polyesters.

**What one thing would you like the bio-based industry to do better and why?**
I’d like the bio-based industry to do a better job at framing the argument with governments, media and the public as to why the bio-based sector is essential in delivering a global transition to a low-carbon future. I think we can do so much more in explaining that bioenergy and biomaterials have an essential place in delivering on zero-carbon ambitions, and that broad growth of the sector is required to achieve some of the scale advantages that currently accrue to the petro-based industry. It’s a compelling story and we need get better at describing it.
Lucy Frankel
environmental and communications director at plant-based compostable foodservice packaging company Vegware.

What will be your company’s main focus for 2020?

We work with local trade waste operators to help collect our client’s used Vegware and food waste for commercial composting. This is the big part of our innovation – working with the waste sector to increase the trade waste collections for our products.

We want to continue this work. So, one of our key focuses for next year will be to work together with the waste sector in order to help our products access suitable organics recycling.

In 2012, when our environmental team started forging links with the waste sector, compostable packaging was only accepted in commercial waste collections in 2% of UK postcode districts. Now, around 40% of UK postcodes have Vegware-approved trade waste collections. We are working very hard to increase this percentage further and we are also proud of the progress that we have made so far.

Elsewhere, we are also working hard to promote clear and concise labels on our products about how to recycle them. For example, we are trying to make this an instantly recognisable thing in order to clarify what bin our products should go in, for instance. In fact, our standard messaging for all our products states “commercially compostable where accepted”.

We try and help our clients with their composting initiatives when we can, and the “Green Leaf band” marking on our packaging plays a role in reducing contamination and ensuring waste is properly recycled.

The Green Leaf band, a stylised version of the Vegware logo, has a repeating leaf pattern that’s bold, striking, and easily identifiable as compostable.

Although we are based in the UK, we have clients all around the world and we sell to around 70 countries worldwide. It’s not just all about composting collections. We are also working together with the manufacturers of machines (e.g. onsite composting compliances). This can be good solutions for particular kinds of clients.

What are the biggest challenges facing the bioeconomy sector in regards to:

Compostables

There are a lot of misunderstandings surrounding compostable packaging and prejudices against compostable packaging. In fact, there is a lot of noise within the industry. Pragmatically, you have to understand as a human being that some industries are growing fast at the detriment to other parts of the packaging industry. So, there are a lot of people who are seeing sales of traditional plastics decrease and they are hitting out at the materials that are taking that trade. We do see a lot of noise out there in the trade press and on LinkedIn with a lot of people lashing out. We also see people making various statements that are not necessarily backed up with facts. It’s frustrating, but it is also quite time consuming to counter assertions that are baseless. All in all, these assertions do take time to respond to. This is something experienced by people working with these novel materials.

The Bio-based and Biodegradable Industries Association (BBIA)
is great at countering spurious statements with calm facts and research. The BBIA is doing a fantastic job with collating all the research on compostable packaging with reports and papers on this subject. In essence, the BBIA is a wealth of resource.

All in all, one has to remember that it is a great thing to use renewable resources and move away from using finite materials. No matter what happens to the material at the end of use, you have to remember that there are sustainability benefits for not using something finite to create a product.

Renewable PLA that goes to incineration gives off fewer toxic gases than conventional plastics. Even if it doesn’t get to composting, there are still benefits to PLA being used and incinerated compared to conventional plastics being used and incinerated. It’s worth cutting through the noise and looking at a lot of scientific studies on compostable materials and seeing what the opportunities are.

There was a position paper that we put together for the UK’s ‘Resources and Waste Strategy’. We said we only think that compostable packaging is the best option in 5 to 8% of plastic packaging applications, for example.

Vegware will never make a water bottle because we know that PET is doing a good job there, especially in relation to recycling infrastructure. So, we are not going to get involved in that area because we know that PET is working for that application. However, this material does not work for food waste disposals when you have half a soup left in plastic-lined containers. That’s not got any quality recycling options. So, those are the type of applications that we are interested in. Compostables have a key role in the nexus between packaging and food, but we are not trying to be a solution to other applications.

**Circular economy**

We tend to have a very positive experience with our client base. There are a lot of people who are delighted to make the small changes to their procurement and to switch materials and to use Vegware or plant-based materials in their supply chains. There is a huge focus on this at the moment, especially in Europe and the US. We are seeing a huge shift from island nations as well. For example, places like the Seychelles have banned expanded polystyrene and the Caribbean is making similar changes as well. You have busy tourism economies in both places. You have hotels with lots of ‘food-to-go’ offered. Conventional materials that have limited waste options are causing big disruptions to their lives.

Elsewhere, the EU’s Single-Use Plastics Directive is a big direction of travel in Europe. In tandem with changing the materials, a lot of foodservice people are looking at reuse. We are seeing our clients using a mixture of reusable cups and using our foodservice items to serve meals. A lot of our clients are using a combination of reusable cups and compostable food containers. We are seeing a shift in the market with more of these businesses implementing those circular economy strategies.

**How will Vegware respond to those challenges?**

It can take up a lot of your time and day fighting incorrect statements about the compostable industry. You have to draw the line at where you can change somebody’s mind and where you are actually just wasting your own time. We have a ‘don’t feed the trolls’ policy.

We never go out being negative about other people’s companies. So, we don’t pick fights. We just want to be positive about what we are doing to make sure that we can back it up. If people pick fights with us, we will only respond in a calm and concise way just to show the basis of what we are saying. We try and not get involved in ongoing spats. It’s not good for anyone’s cholesterol.

**What one thing would you like the bio-based industry to do better and why?**

It’s got to be done down to legislation. A really great example is Italy. A few years ago, they made some major changes to their waste system. The Italian government mandated all supermarket shopping bags to be compostable. This system has worked absolutely beautifully because the government was really strict on how it got mandated and how it got the right message out. It’s a good legislation for people doing the right thing.

In Italy, they also have enormous food waste facilities where they have a really miniscule amount of contamination. In contrast, in the UK, for example, even dry, mixed recycling bins have large amounts of contamination (around 20-30%). It’s a common recycling stream that everybody uses, but basically misuses. I know that the UK is focusing on this through its Resources and Waste Strategy, but we could do better. Yet, there are changes coming that will help.
What will be your company’s main focus for 2020?

Our focus is on commercialising and scaling our technologies in renewable polyesters. To be specific: completing the engineering of the first FDCA production plant and drive our most advanced technology to the point where PEF will become commercially available for a growing group of converters and brand owners. By the end of 2020 we plan to make the final investment decision to build a 5 kta FDCA flagship plant. We believe that PEF is going to be a major polymer, and we will unlock this enormous market by starting to sell PEF in high-value market segments, such as high-barrier films and specialty bottles. We have developed winning technologies for producing plant-based FDCA and MEG, the two monomers required to produce PEF, as well as our Dawn biorefinery technology to produce second-generation sugars that will open up a broader range of feedstock options. We look forward to see how consumers, retailers and brands respond when they can access sustainable, circular and high-performance materials!

What are the biggest challenges facing the bioeconomy sector in regards to:

Bio-based chemicals

The challenge is market adoption as price points need to cover initial capital investments and initial production which by default is going to be sub-scale. The first plant investment decisions are tough to make when the reference point is the established fossil base that is commoditised and produced at enormous scale. A level playing field is required for change. Sometimes, the initial higher costs of manufacturing represents a hurdle for players to engage. Consumers can drive the transition by weighing sustainability arguments in their purchase decisions; this drives retailers and brand owners to use fossil-free and circular products. Government plays a role too, as they put a price on carbon and mandate the usage of sustainable products, while incentivising innovative companies to come to the market with more sustainable solutions. I find it interesting to see how fast the landscape is changing, now that climate breakdown has become the most urgent problem of our generation and waste problems have become so visible.

Circular economy

It seems that people in the chemical and plastics industries believe the circular economy is about reusing and recycling of petroleum-based materials. I recognise this will be a step forward compared to today’s linear economy, but it is evident this will not result in a truly circular economy as many materials cannot be recycled, petroleum-based plastic will continue to accumulate in nature and we will continue to rely on huge volumes of virgin fossil feedstock. Change is required in the feedstock and in the materials we produce and use: by shifting to renewable carbon sources and by using materials that are recyclable and that degrade...
“Change is required in the feedstock and in the materials we produce and use: by shifting to renewable carbon sources and by using materials that are recyclable and that degrade when they would end up in nature.”

How will Avantium respond to those challenges?

Firstly, we are a technology company focused on creating technologies starting with plant-based carbon for the sustainable production of circular materials. We bring together advanced chemistry, technology and scale-up by attracting creative minds and talents from all over the world. Secondly, we partner with like-minded companies in the value chain to get access to expertise, capabilities, feedstock, assets, markets and capital. Thirdly, we look to attract capital from investors that have a long-term horizon and that are looking to make an impact on solving some of the most pressing issues, such as climate breakdown, resource scarcity and waste streams.

What are the biggest opportunities for your business?

Our opportunities are massive when we consider the imperative to change. With PEF we have a new polymer that scores on

(i) performance, (ii) mitigating climate breakdown (because it is made from renewable feedstock) and (iii) is suitable for recycling. It ticks all the boxes. We have a technology (DAWN) to take forestry and agricultural residuals and produce industrial sugars for the chemical industry, a technology (RAY) to produce one of the largest building blocks to polyesters (MEG) from a plant-based source and a technology (Volta) to convert CO₂ to high value and eventually commodity chemicals and fuels. Ultimately, we are replacing non-sustainable fossil-derived plastic materials that cause very harmful effects on our natural systems, with circular products made from renewable carbon – with an emphasis on new polymer performance characteristics. Together, this represents a massive economic opportunity and even more importantly, significant positive environmental impact.

What one thing would you like the bio-based industry to do better and why?

Getting products to the market in a successful manner, simply said we need more success stories. There is only a limited number of companies that have succeeded in commercialising renewable chemicals and plastic materials and managed to excite consumers, investors and other stakeholders. I believe this can be achieved by a more careful selection of molecules and entry markets – just look at all the failures in 2G ethanol. The demand for sustainable products has not changed, in fact the drivers for change have only become stronger. Markets are waiting for our industry to start delivering.
Insights

What will be your company’s main focus for 2020?

One major goal we have is to continue our path in becoming a more bio-based apparel brand. This means researching, developing, adopting and helping to support new material science technologies. This goal will continue to fuel our research and development around green chemistry and textile dying technologies that are alternatives to petroleum-based industry standards.

What are the biggest challenges facing the bioeconomy sector in regards to:

Bio-based textiles
Many of the really exciting technologies are just not scaled yet. The parts of the bio-innovation supply chain are often not vertically integrated so it’s up to the brand and a few dedicated vendors to string it all together. To be truly sustainable in the bio-fibre space we also need to understand where all the inputs are coming from as some inputs are more sustainable than others.

Circular economy
Consumer habits are a big part of creating a circular economy. As a brand we supply an end-use option and we are working to create a viable recycling collection system. At this time, there are many recycling technologies, such as my family’s mechanical recycling system, but also chemical recycling, some of which are not yet scaled. We are dedicated as a brand to keep working on this difficult and complex issue and understand that first and foremost, products have to be designed with circularity in mind.

How will Everybody & Everyone respond to those challenges and market challenges?

Everybody & Everyone are aligned with many strong partnerships, and is committed to continue to partner with leading science and technologies to support and move forward in material science developments. We believe that material science breakthroughs will make our world cleaner.

What one thing would you like the bio-based industry to do better and why?

I think we are at a time where consumer and industry education is the key to transitioning to a bio-based economy. If the bio-based industry would apply the same kind of marketing push that was exhibited in the 1950s and 60s around petroleum products towards the advancement of clean bio-products, then I believe demand would dramatically increase.

Veronica Chou
founder of eco apparel brand Everybody & Everyone.
What will be your company’s main focus for 2020?

Spinnova will be focusing on product development collaboration with its brand partners, in other words making prototype fabrics and applications out of the fibre, to find out what it can best be used for. We just secured €11m of financing, which will help us get to commercial phase in the next few years. Commercialising our fibre product is very much related to the prototyping, which takes quite a lot of time and resources. We’re very lucky to have big brands helping us on this journey though! Hopefully, we will be seeing a number of public introductions of new concepts.

What are the biggest challenges facing the bioeconomy sector in regards to:

Bio-based textiles
I would guess that the challenges lie in scaling up an innovation from laboratory scale to piloting production and big volumes, to make the kind of environmental impact that most bio-based textiles are meant for. In addition to technical ability, innovators need financing to make those big steps. Hopefully, the investment world moves more and more away from linear economies to climate-change fighting, deep tech investment.

Circular economy
In the textile industry, circularity faces the same kind of challenge as bio-based textile development – there are a number of recycling technologies, but they are all emerging and none are globally scalable, at least not yet. Again, scaling needs investment, and the textile industry also needs to invest in moving away from a linear ecosystem to circulating what already exists.

How will Spinnova respond to those challenges?

We have created a fully scalable technology and have proof of concept from our pilot facility in Finland. We’re quite confident that when we’re ready to reach commercial scale volumes, investment will not be a problem.

What are the biggest opportunities for your business?

The versatility of our fibre comes with so many business opportunities that we don’t even know all of them yet. Incidentally, our application development has started with apparel, but huge possibilities lie within e.g. the home textile space as well as industrial, automotive and medical industries.

What one thing would you like the bio-based industry to do better and why?

Networking and pioneering co-creation with various external interest groups have worked for us – next up, as we approach commercial stage, we will work on our commercial ability such as enhance our sales and marketing early on.

“We just secured €11m of financing, which will help us get to commercial phase in the next few years. Commercialising our fibre product is very much related to the prototyping, which takes quite a lot of time and resources.”
COMMERCIALISING THE BIO ECONOMY FROM LAND TO BRAND

600+ ATTENDEES  1000+ MEETINGS  100+ SPEAKERS  50+ PARTNERS

Plastics  Apparel  Coatings & resins  Homecare & domestic products  Textiles  Packaging  Biodesign & future materials  Cosmetics & personal care

“Great opportunity to understand the complexity of the bio economy markets and to interact face to face with key players in the field. Highly recommended!”

Ivana Esposito, Process Development Engineer, Shell
Insights

The climate crisis and global waste challenges are enormous challenges. We should see each other as collaborators, working towards combating common targets with multiple solutions.

Peter Vanacker
President and CEO of renewable diesel producer Neste Corporation.

What will be your company’s main focus for 2020?

Neste’s strategy is guided by our purpose of creating a healthier planet for our children. We are committed to combating climate change and driving circular economy and aim to become a global leader in renewable and circular solutions. In 2020, we will continue working towards that strategic goal through helping transport and cities, and aviation. We will also help the polymers and chemicals sectors to make their businesses more sustainable. With our renewable fuels and other products and solutions, we help our customers to reduce their greenhouse gas emissions and replace fossil crude oil with renewable and recycled raw materials.

What are the biggest challenges facing the bioeconomy sector in regards to:

Bio-based chemicals
The biggest challenge is to support the chemicals sector in making the transformation from the fossil-based economy to bio-based and circular economy fast and in large enough scale. And with transformation, we mean that the industry players should aim to transform their offering with renewable solutions and start introducing those to the markets already in 2020. Achieving that requires collaboration among various value chain partners and true commitment from all.
Based on our experience and the partnerships we have already established, forerunner companies are solid in their commitment and already taking steps towards this transformation.

**Circular economy**
The challenges with regard to circular economy are similar to those connected to renewable chemicals. However, there is an additional challenge with regards to circular economy: even though there are already available drop-in solutions, such as Neste’s renewable solutions, we need to do more than that. We need to build an ecosystem that truly enables circularity of materials and circular economy – and to achieve that, we need to develop new value chains, technologies and supportive legislative infrastructure.

**How will Neste respond to those challenges?**
We are joining forces with forerunner companies sharing Neste’s drive for sustainability as well as renewable and circular economy. We have already established several partnerships to develop solutions to support this large-scale transformation. Together we have reached some major milestones: we have, for example, produced bio-based polypropylene and polyethylene with a production partner at an industrial scale and seen brands develop climate-friendlier offerings based on them.

We have also announced partnerships in the area of chemical recycling of difficult to treat waste plastics to complement mechanical recycling solutions. In addition, we are preparing for a commercial-scale demonstration project in which we will test chemical recycling and process liquefied plastic waste to produce chemicals, fuels and raw materials for new plastics.

**What are the biggest opportunities for your business?**
Consumers and brand owners are now painfully aware of the climate crisis and the plastics waste challenge. These are topics that have monumental global significance. And the clock is ticking: the world needs solutions, delivered faster and bolder. All good solutions for decreasing emissions are needed – on land, air and in every sector imaginable. Therefore, we should not put one solution against one another. We must implement both small and large solutions as soon as possible because if we don’t act now, soon it will be too late.

In addition to acting now, it is important that we act together. Collaboration with sustainability-oriented companies provides us with the biggest opportunities to develop solutions to tackle these issues with speed and at large scale.

With like-minded, forward-looking companies committed to making a positive sustainability impact together, we can develop both our and our business while contributing to solving these global challenges.

**What one thing would you like the bio-based industry to do better and why?**
Different solutions providers and solutions should cooperate, not compete with each other. The climate crisis and global waste challenges are enormous challenges. We should see each other as collaborators, working towards combating common targets with multiple solutions. The bio-based industry and all its actors should search for more opportunities to collaborate. We should realise that our common goal is to reduce fossil-based climate emissions while developing solutions to keep carbon circulating as efficiently as possible in society.
What will be your company’s main focus for 2020?

Stora Enso’s promise for a renewable future is based on sustainability, innovation and having the technological capabilities to meet the demands for a greener world. We believe that everything that is made from fossil-based materials today can be made from a tree tomorrow. We focus on speed-to-market to make an impact and to be the first out with new products and services. We focus on offering timely support to our customers as they respond to changing consumer trends, thus helping lessen dependence on fossil-based materials and decreasing the burden on the environment.

What are the biggest challenges facing the bioeconomy sector in regards to:

Bio-based apparel
Currently, only around 7% of the world’s textiles are wood-fibre based. However, the demand for wood-based textile fibres is growing faster than that for all other types of textile fibres. Stora Enso’s dissolving pulp is used in the production of viscose staple fibres that then in turn become the yarn that serves to create clothes, knitwear or decorative fabrics. Thanks to this unique versatility, and ability to blend easily with many fibres, viscose is already a prominent raw material in the textile industry. With its renewable raw material, Stora Enso can ensure a sustainable raw material for the textile value chain that can be traced back to its origin. Stora Enso’s dissolving pulp for textiles is based on fully traceable wood from sustainably-managed forests. Continuous work is also ongoing in order to create more cost-efficient processes that use increasingly less energy and chemicals. In the long run, all this will help address concerns about the sustainability of “fast fashion” which generates a lot of waste currently.

Circular economy
The world needs a new approach to materials. There is an increasing demand for raw material that is renewable, recyclable and fossil-free. For business, circular bioeconomy means innovation. To transform from a linear to circular economy, we need to leverage new business models such as product-as-a-service and renting or leasing, create take-back systems and service businesses around products and, most importantly, we need to innovate.

How will Stora Enso respond to those challenges?

For Stora Enso, circular bioeconomy is an exciting opportunity. With a renewable material as the starting point, we look into innovative ways of increasing the value and extending the lifecycle of the material. We work on circular design, and our different business divisions have synergies which support the business case for circular economy. We also work in partnerships and innovate and look for circular solutions together with customers and our value chain.

What are the biggest opportunities for your business?

Replacing fossil-based and other non-renewable materials with renewable, circular bioeconomy solutions. This requires circular design, innovation and co-creation with customers and the whole value chain. We also have great opportunities in unlocking the synergies between our different businesses. For example, we have been exploring recycling paper cups for magazine paper production at our Langerbrugge Mill in Belgium. We have also joined alliances such as Ellen MacArthur Foundation and Alliance Gobelet Carton to collaborate with the wider circular ecosystem.

What one thing would you like the bio-based industry to do better and why?

We need to continue to keep sustainability and innovation on top of our business agenda, as it is today. This a necessity for competitiveness. As an industry we can strengthen the communication on how our industry drives the circular bioeconomy and how we lead the journey towards carbon-neutral society. This is a challenge for all of us and we can amplify this message together. As a bioeconomy business we also have a responsibility to ensure that biodiversity is protected when sourcing virgin fibre.

Insights

Noel Morrin
Executive Vice President, Sustainability, at pulp, paper and forest product company Stora Enso.
Insights

What will be your company’s main focus for 2020?

Due to our recognition in the bioplastics industry we have been receiving inquiries from several large companies who are accelerating their plans to transition some of their products and components from conventional plastics into bioplastics. We will be diversifying into working with such established brands and companies (both inside and outside the toy industry) by leveraging our bioplastics materials and manufacturing technology. We’re already developing a few relationships to design and manufacture bioplastic products and components using our proprietary bioplastics technology.

What are the biggest challenges facing the bioeconomy sector in regards to:

Bio-based toys

Although interest in renewable/bio-based materials and negative publicity on plastics pollution seem to be getting more traction with mainstream consumers, awareness about bioplastics is still very low. Misconceptions about biodegradability, compostability and other bioplastic-related matters still persist. Furthermore, due to relatively higher cost of
bioplastic raw materials, gaining sales traction in consumer space for bio-based toys is still a challenge.

**Circular economy**
Although circular economy concepts and related arguments are becoming more popular – or more fashionable – in some circles, we fear that mainstream public understanding and acceptance of circular economy concepts remain elusive. Despite honest efforts from many public and private institutions, coherent and easily digestible information for the general public remains rare. Circular economy concepts and its vision need to be recognised and accepted by the public, otherwise it risks remaining an academic pursuit and a corporate PR fad for more years to come.

**How will Bioserie respond to those challenges and market challenges?**
We will maintain our marketing communication to consumers so it is coherent and easily understandable. When making comparisons between oil-based plastics and plant-based plastics, we are putting more emphasis on toxicity to humans and to the environment. As a company we’re working on generating more revenue streams using our proprietary technology so that we’re less dependent on our branded bioplastic toy business.

**What are the biggest opportunities for your business?**
From an optimistic point of view, there is an enormous upside when mainstream brands and industries transition to bio-based materials and the circular economy. Rather than staying in a single track of bioplastic baby toys we will use our own technology and expertise to partner with like-minded brands and companies so we can accelerate the adoption of bioplastics in both industry and consumer spaces.

**What one thing would you like the bio-based industry to do better and why?**
Communications to consumers and to the mainstream public. Without consumer buy-in it is not possible to move the needle from its current undeserved dismal position. Communicate the vision and the urgency. Touch the hearts of consumers, their minds are too confused and polluted.
What did you think about the 2019 SynBio Markets conference?

The conference is awesome. Getting together individuals who see the opportunity, who want to drive the future and talk openly about the challenges helps to move this field forward. It’s good to come together as a group and clarify what our message is, so that we can move forward with a common voice when we leave the conference.

One of the recurring themes we have heard in this industry is about public perception. What can this industry do to make sure that the process is transparent to get consumers on board with what synbio offers?

I think that storytelling is a powerful way to bring messages to people. I think with storytelling, we can be transparent with the science. As we discussed on stage, fear, uncertainty and doubt, drive people to a place where they don’t want to listen. In addition, the stories that were told to scare people drove them to that place. As an industry, we need to mint our stories and we need to own our stories. Those stories need to resonate with numerous groups of individuals.

Community is a faith. Scientists have traditionally avoided in engaging with communities of faith. So, what does that do? That has put a divergence within that message. So, the message then becomes whatever the message that community wants to generate. So, we have to tell stories that have world real impact. For instance, look at antibiotic resistance. It’s an issue that addresses everybody. Infections that you can’t cure, and superbugs, for instance, these are real world issues. The synthetic biology community is committed to finding solutions for these real-world issues. This transparency comes through by telling the stories and being transparent and being honest and open about what the potential risks are, as well as the benefits.

If you overhype things, people don’t believe you. If you say these are the risks and we are mitigating these risks and you have that transparency and openness, I think this industry will go a long way.

Where do you think regulation should go in this area?

The regulation question is an interesting question. Regulation has two thrusts. It can be used to drive innovation. For instance, if you think about carbon taxation, the more you tax someone on the use of carbon, the more they will seek alternatives to carbon. So, there is an element of regulation that can be a ‘forcing’ function to drive innovation and to drive markets in a certain direction. There is also an element of regulation that is focused around control to ensure that these technologies are not used for secondary purposes that are bad or potentially dangerous. And, you also have a transparency element that comes in there to justify why your technology shouldn’t be regulated or if it is regulated, ‘this is how you define this regulation’.

Regulation plays an interesting role in synthetic biology. In relation to synthetic biology, it’s a bit of a Wild West right now. We need to understand what should be regulated and how we want to drive the industry by using regulation for that. The carbon tax is a great example of the latter.
Of course, from a business perspective, you can have too much regulation come on board which can stifle innovation. We don't want to find ourselves in that position. This is where we need to work with legislators, regulators, and folks who are involved in policy to educate them on what thoughtful regulation means.

Where do you think we will be in five years with this area?

If you would have asked me a year ago if Burger King would start selling non-meat burgers, I would looked at you like 'are you crazy?' Burger King is all about the beef. This new product is not core to their brand. That magnitude of change in such a short period of time tells me a couple of things. First, there is a demand in the market for it. The demand is coming from people who object to eating meat, as well as others who look at the 'non-sustainability' of meat. So, there is a different number of vectors out there. This tells me that the world is changing. People are accepting science as an alternative to farming. Through these demonstrations via the applicability of the science, you are going to see much more adoption and willingness to listen.

I have young children and I tell them the stories about the technologies that we are developing and how the world that they are living today is going to be looking completely different in the future.

There are many brilliant researchers across the world that have many great ideas. So, figuring out where it’s going to go, who knows? It’s up to the brilliant scientists to drive that. However, I can tell you that it will help with sustainability efforts, healthcare solutions and information and manufacturing solutions. Biology will become the driving force of our economy in the next 25 years.

How do you convince the cynical mind to change?

Storytelling is a big part of this. At the end of the day, you can’t hide from the truth. And, truths are defined by data. In addition, data can be debated. However, it is data at the end of the day. It’s a real living fact that you can drive. So, to get around scepticism and cynicism, you have to demonstrate things. It’s not just talking a good talk, but actually bringing results online that are tangible.
What did you think about the SynBio Market conference?
It’s nice that people are thinking about the problem they want to solve and that they are thinking of the consumer first, which is something we didn’t see a few years ago. They are also starting to think about communicating their technology, which I think is fantastic.

One of the recurring themes we have heard in this industry is about public perception. What can this industry do to make sure that the process is transparent to get consumers on board with what synbio offers?
Companies need to be very open and very honest. They need to communicate the potential risks and the potential failures. We need to be very open about failure. We need to put things in a concise way so people can grasp what we are saying. There is no such thing as the general public when it comes to communication, as the old saying goes. You have to know your audience and pitch your technology to them specifically and put that in a story that resonates with them in a context that they can understand.

Where do you think we will be in five years with this area?
I know what it would like it to be. I would like to see a few scale ups taking off and a few more products on the market. Companies like Ginkgo have vertical integration and are going to be leading my latter point because the supply chain is so difficult for synthetic biology at the moment.

Standardisation hasn’t fully happened yet. So, hopefully in five years’ time we will be in a place where standardisation is there and the value chains are being constructed. Those early products are on the way to help build a safer world.

In Europe, we are a little more constrained than the they are in the US or Asia. We tend to err on the side of caution in Europe and we need to really examine that. Hopefully, the next European Commission will analyse this as greener policies are adopted.
Bioengineering is the logical way to go, in terms of having your cake and eating it too when it comes to land use, and water use, for example. And, you get to produce huge amounts of food. However, having conservative attitudes to regulation is not going to help.
THE IMPORTANCE OF SCALE UP AND THE SEVEN STEPS TO SUCCESS.

EXPERT VIEW: WHAT MAKES FOR SUCCESSFUL INNOVATION?

LICELLA SUCCEEDS IN MAKING CHEMICAL RECYCLING TECHNOLOGY COMMERCIAL READY.

PROJECT FOCUS: SUCCESSFUL SCALE-UP OF THE FABIOLA PROCESS IN A LIGNOCELLULOSE BIOREFINERY PILOT PLANT.
Fashion heavyweights unveil sustainability initiatives to G7.
Earlier this year, they signed the ‘Pact’ in order to work together to mitigate the impact of the fashion industry on the environment. The group will be led by French luxury fashion house Kering.

Kering Chairman and CEO Francois-Henri Pinault launched the Pact officially to the heads of the G7 in August.

The Fashion Pact’s objectives draw on the Science-Based Targets (SBT) initiative – a partnership between CDP, UN Global Compact, the World Resources Institute and WWF.

The initiative started to take shape back in April when French President Emmanuel Macron had given Pinault a mission to bring together the leading players in fashion and textiles, with the aim of setting practical objectives for reducing the environmental impact.

The companies that have signed up to the Pack include: Adidas, Bestseller, Burberry, Capri Holdings Limited, Carrefour, Chanel, Ermenegildo Zegna, Everybody & Everyone, Fashion3, Fung Group, Galeries Lafayette, Gap Inc., Giorgio Armani, H&M Group, Hermes, Inditex, Karl Lagerfeld, Kering, La Redoute, Matchesfashion.com, Moncler, Nike, Nordstrom, Prada Group, Puma, PVH Corp., Ralph Lauren, Ruyi, Salvatore Ferragamo, Selfridges Group, Stella McCartney, Tapestry.

“With the Fashion Pact, some leading players in the fashion and textile sector are joining forces for the first time to launch an unprecedented movement.”

Fashion giants like Burberry, Chanel, Giorgio Armani, Stella McCartney, and 28 other companies, have launched a new sustainability initiative called the Fashion Pact.
Inspiration

Finnish chemical group to participate in development of 100% bio-based chemicals for paper and cardboard production.

Kemira has announced that it has joined a four-year EU funded project which aims to develop 100% bio-based chemicals, produced from renewable raw materials.

The project also aims to develop new means to improve production efficiency at pulp mills with higher utilisation of wood biomass, Kemira said in a statement.

The project, which was initially launched in May, has received €5.9 million funding from the Bio Based Industries Joint Undertaking (BBI JU) under the European Union’s Horizon 2020 research and innovation programme.

The total budget of the project is €9.6 million and it is one of several undertakings aimed at developing a sustainable bio-based industry sector in Europe. Kemira is not the only company participating in the project. A number of different organisations involved in the environmental sector across Europe are also contributing to the project, including Ecohelix, Avantium Chemicals, Metgen, Novamont Spa, Fundacio Universitaria Balmes, Graanul Biotech and Spinverse.

During the four-year project, Kemira and other project members will conduct demonstration-scale trial runs at a dissolving pulp mill in Europe.

Biotechnology company Ecohelix will provide and operate the demonstration unit and Kemira will assess the technical and economic feasibility of the bio-based offerings produced in the project.

According to Kemira, the aim is to develop fully bio-based polymeric chemistries for paper and cardboard production to complement and even replace polymers that are derived from petroleum.

“The pulp production process produces some side-streams, which have up until now been considered of low value. The project partners are looking to change this and enable a more holistic and sustainable utilisation of wood biomass,” said Veli-Matti Vuorenpalo, Manager of Global Processes and Projects at Kemira R&D.

He added: “We see that there is a great potential to improve the resource efficiency and circulation of materials in the process and to replace fossil-based raw materials with renewable ones.”
To ensure that the bioeconomy delivers the environmental and commercial benefits that we all hope it can, connections have to be built across industries and geographies and often have to overcome the challenge of entrenched ways of funding and manufacturing chemicals, materials and products. Added into this is international competition, with major investments being made in the USA, China and Brazil, making it a global race to maximise the opportunity.

Since 2014, the standard bearer for the development of the bioeconomy in Europe both from a socio-economic and environmental perspective has been the Bio-Based Industries Joint Undertaking (BBI JU), a €3.7 billion continent-wide institutional public-private partnership (iPPP) between the European Union and the Bio-based Industries Consortium (BIC) that aligns both policy and investment strategy.

In the past five years, BBI JU has played a crucial role in delivering investment that clearly states the importance and potential of bio-based industries to the future of Europe, and perhaps most crucially helps de-risk projects by providing EU funding and helping mobilise and leverage private investments. This positive focus has helped to foster a vibrant and stimulating research and innovation environment in Europe. It has broadened the bioeconomy’s presence in new value chains, sectors and geographies and opened up processes, feedstock, biomass and organisations that were not traditionally part of the bio-based economy and were not collaborating at all. Currently, more than 1100 organisations from 33 countries are part of the 101 granted BBI projects, and 40% of them are SMEs.

To give just one example of a project supported by BBI JU, AgriChemWhey is a consortium comprising 11 partners from five EU member states (manufacturers, technical specialists, councils and educational institutions) who are working together to build a first-of-its-kind biorefinery in Ireland that will turn by-products from the dairy industry into value-added products, primarily lactic acid, the major market for which is the manufacture of the biodegradable bio-plastic polylactic acid (PLA).

Anchored in the Republic of Ireland, Bill Morrissey, procurement manager with one of the companies at the head of AgriChemWhey (Glanbia Ireland), told Bio Market Insights about the project: “It started out as a supply chain contract to dispose of one of the major side streams of whey processing – whey permeate and delactosed permeate. Through our research, we have found a sustainable solution for disposing these by-products, which can add value by creating a circular bioeconomy centred on the dairy industry.” A true win-win!

The results of the institutional public-private partnership model have been remarkable – against a target of 10 new bio-based value chains they expect to deliver 113 new ones by 2020. When it comes to new cross-sector interconnections, they are on track with 143 new ones expected by 2020 far exceeding the original target of 36.

But creating the products or platforms is only part of the story; there also has to be a market for them. BBI JU helps boost large-scale production and the creation of sustainable products and materials for consumer and industrial needs.

How BBI JU has built the model for the successful expansion of Europe’s growing bioeconomy.
Once again, the results are highly impressive: by 2020 they expect to create 147 new bio-based materials versus a target of 50, 67 new bio-based chemical building blocks (vs. 5) and 65 new bio-based products (vs. 30).

Through the successful iPPP model turning research excellence into focussed innovation, BBI JU is delivering concrete socio-economic and environmental benefits across Europe.

Creating jobs. 80% of ongoing projects support the creation of new skilled jobs in the bioeconomy, many of them in rural and coastal areas. Their first seven flagship biorefinery projects alone will generate more than 3,000 direct and 10,000 indirect jobs, most of them in rural areas.

Reducing emissions. 71% of ongoing projects expect to deliver bio-based products with lower greenhouse gas emissions than the fossil-based alternatives.

Leveraging investments. The first seven flagship biorefinery projects alone are expected to generate more than 1 billion of investments from private industry well spread all around Europe with a high perspective of replication.

Enhancing sustainability and circularity. 66% of ongoing projects contribute to waste reduction, reuse, recycling, as well as turning waste and side-streams into added-value products, supporting the build-up of a circular economy. Fostering collaborations. 80% of ongoing projects increase the cooperation between academia and industry, paving the way for further bio-based developments.

The BBI JU actively contributes to the EU bioeconomy strategy which aims to create up to 1 million green jobs by 2030 especially in rural and coastal areas, increase diversification and growth of farmers’ income and decrease greenhouse gas emissions by 50% until 2030.

The achievements of this high-impact initiative for the bioeconomy in Europe are as varied as impressive. To conclude I ask Phillipe Mengal, Executive Director to try and sum up their work so far.

“When we launched BBI JU, we aimed to put Europe firmly back on the map of attractive regions where to invest in bio-based industries. We’ve not just achieved this, but we’ve made it a global leader. There’s so much to be proud of! When we set up BBI JU, one of the areas in which the bio-based industries stood out from the other public-private partnerships was the expected leverage effect. In 2014, the yearly survey of BIC towards their members announced a pipeline of investment in the European bio-based industry sector of €2 billion. The pipeline grew to €5 billion in 2017 and reached €5.5 billion in 2018. Furthermore, BIC is now observing that more and more companies located outside the EU are showing interest in joining the initiative and making investments in Europe. Moreover, our focus on the participation of SMEs and natural resource providers, brings growth and development to Europe’s often neglected rural and coastal areas. But there is still much work to be done as we further seize the opportunity of the growing bioeconomy, and I am excited to see what the next five years bring!”

If you would like to find out about how your project could be supported by BBI JU, they launch annual Calls for Proposals, open to all stakeholders: large industries, SMEs, technology providers, academia and RTOS. The process is operated under Horizon 2020 rules and thus on the principles of Openness, Transparency and Excellence. In other words, everyone can participate and the best proposals evaluated by independent experts will win. So, what are you waiting for? Take a look and see how you too could partner with BBI JU.
Total announces plans to double its capacity of recycled PP for the automotive industry.

“The Total Corbion PLA joint venture owns a plant in Thailand with a capacity of 75,000 tonnes per year of polylactic acid.”

Oil giant Total has decided to double the production capacity of its affiliate Synova to meet growing market demand for high-performance recycled materials.

By early 2021, Normandy-based Synova will produce 40,000 tonnes per year of recycled polypropylene that meets the demanding quality standards of automotive OEMs and carmakers.

“Among their many qualities, plastics help to reduce the weight of everyday items, improving their energy efficiency, and to shrink our carbon emissions. By developing the share of recycled raw materials, we provide a concrete response to the challenge of managing the end-of-life of plastics,” said Valérie Coff, Senior Vice President Polymers at Total Refining & Chemicals.

“This investment, which consolidates the acquisition of Synova in early 2019, marks a new milestone in our circular economy activities and contributes to our target of producing 30% recycled polymers by 2030 and Total’s ambition to be the responsible energy major.”

Total is a founding member of The Alliance to End Plastic Waste, an organisation that brings together around 40 member companies from across the plastics and consumer goods value chain.

They have committed more than $1 billion, with the ultimate goal of investing $1.5 billion, over the next five years to provide solutions to eliminate plastic pollution in the environment, particularly the oceans.

According to the oil firm, it is working on all forms of recycling to develop high-performance recycled polymers.

For example, Total produces Circular Compounds, polypropylene and polyethylene containing at least 50% recycled material, with the same properties as virgin grade polymers.

Total has also joined forces with Citeo, Saint-Gobain and Syndifrais to create a polystyrene recycling channel in France by 2020. The feasibility of large-scale production will be validated at the Group’s industrial sites in Carling (France) and Feluy (Belgium).

In a statement, Total said it was a ‘global leader in bioplastics’. The Total Corbion PLA joint venture owns a plant in Thailand with a capacity of 75,000 tonnes per year of polylactic acid (PLA), a 100% renewable-based bioplastic that is recyclable and biodegradable.

Recycled plastics goal
Total has set a target of producing 30% recycled plastics by 2030. Total is not the only oil giant branching into producing recycled plastics. BP beefed up the production of the latter.

It has recently developed an enhanced recycling technology, BP Infinia, that enables currently unrecyclable polyethylene terephthalate (PET) plastic waste to be diverted from landfill or incineration and instead transformed back into new, virgin-quality feedstocks.

BP plans to construct a $25 million pilot plant in the US to prove the technology, before progressing to full-scale commercialisation.

Greenpeace Oceans Campaign Director John Hocevar criticised BP’s Infinia announcement. He said: “BP Infinia will not solve the plastic pollution crisis that is devastating our oceans, waterways, and communities around the globe. This is a desperate attempt from a plastic polluter to ensure it can continue making profits off of plastics.

‘Plastic is polluting our planet and putting our health at risk throughout its entire lifecycle, from extraction to refining to use and disposal. Whether through fuelling the climate crisis or recklessly expanding single-use plastics, BP has shown once again that business as usual for the oil industry means chaos for the rest of us.”
In an era of political division, this is one story Americans can agree on: 70 percent of Republicans and 80 percent of Democrats say that sustainability is important and are trying to make sustainable choices. But despite the strong support, nearly half of consumers (48 percent) report that convenience, lack of awareness and availability are top obstacles to sustainability. Even though they’re motivated to make the change, understanding their products proves just too hard; of the consumers committed enough to read product labels, 3 in 4 (74 percent) don’t know what half of the ingredients are — and it’s not clear how or where to learn about them.

“Consumers have a craving to be environmentally-friendly and make sustainable choices, but many don’t know what ingredients make up their products, and how sustainable those ingredients are,” said Christophe Schilling, Genomatica’s CEO. “There’s a real opportunity for the industry to educate consumers to help them get over these hurdles, and for brands to market and deliver more sustainable products with greater transparency on where they come from to feed this surging demand.”

While 96 percent of all manufactured goods are enabled by chemistry, the survey showed that consumers aren’t aware that so many of their everyday products are made with chemicals derived from fossil fuels — including crude oil, coal and natural gas. Nearly half (44 percent) of consumers didn’t think disposable water bottles are made using ingredients derived from crude oil and 42 percent didn’t realize personal care products like face moisturizer contains crude oil-based ingredients.

Other key findings from the Genomatica study include:

Millennials are leading the push — but consumers feel they’re coming up short on sustainability

- Millennials are most likely to believe sustainability is important and make sustainable choices (78 percent), followed by Boomers (76 percent), Gen X (71 percent) and Gen Z (69 percent)
One in four (24 percent) consumers feel guilty or ashamed about their personal level of sustainability.

It’s still too hard to understand if a product is sustainable

- 56 percent of consumers say they look at the ingredients label when shopping for products.
- Boomers are the most likely to read ingredients label (69 percent) compared to Gen X (57 percent), Millennials (53 percent) or Gen Z (35 percent).
- 74 percent of consumers reading the ingredients label don’t know what half of the ingredients are — making it nearly impossible to understand if a product is sustainable.
- Millennials are far more likely to understand all the ingredients on the label (34 percent) compared to Boomers (23 percent), Gen X (23 percent) or Gen Z (20 percent).

Consumers are unaware that many products they use daily, from plastics to personal care products to gasoline, are made from crude oil. When they find out, they’re surprised — and disgusted.

- Nearly half (44 percent) of consumers don’t think disposable water bottles are made using ingredients derived from crude oil and 38 percent were surprised to learn that they are.
- 55 percent were surprised to learn baby sunscreen contains ingredients made from crude oil, 42 percent don’t realize face moisturizer contains crude oil-based ingredients and 66 percent weren’t happy when they found out (32 percent were “disgusted,” 34 percent were “bothered”).
- 34 percent of consumers didn’t know that plastic bags are made from crude oil-derived ingredients — and 29 percent were surprised to learn that they are.
- 11 percent of Millennials thought that gasoline did not include ingredients made from crude oil — highlighting the contrast between the few items consumers understand are fossil fuel-based and the numerous everyday products that are, but consumers don’t realize.

Consumers are opening their wallets to sustainable products — and boycotting dirty products

- One in four consumers (26 percent) say they’d look for ways to spend more money with their favourite brand if their favourite brand increased their sustainability.
- Millennials are particularly inclined to do this, with 34 percent saying they’d spend more money compared to 24 percent of Gen Z and 18 percent of Boomers.
- 46 percent of consumers say they’ve boycotted a brand before.
- 24 percent who have boycotted have done so because of unsustainable products and 23 percent due to unsustainable practices.
- Gen Z are the biggest boycotters for reasons of unsustainable products (36 percent) versus 27 percent of millennials, 21 percent of Boomers and 18 percent of Gen X.

"Nearly half (44 percent) of consumers didn’t think disposable water bottles are made using ingredients derived from crude oil and 42 percent didn’t realize personal care products like face moisturizer contains crude oil-based ingredients.”
The 26 case studies in the report reflect on the extent to which the bioeconomy interventions support the SDGs. The report identifies seven SDGs that are most covered in the bioeconomy case studies: SDG 2 (zero hunger), SDG 7 (clean and affordable energy), SDG 8 (decent work and economic growth), SDG 9 (industry, innovation and infrastructure), SDG 12 (responsible consumption and production), SDG 13 (climate change) and SDG 15 (life on land). SDG 12 is the most frequently supported Goal in the case studies. In addition, each of the 17 SDGs is addressed in at least one case study. SDG 1 (end poverty), for instance, is addressed in most African case studies as well as case studies from Argentina, Brazil, Indonesia and Malaysia. These bioeconomy interventions aim to tackle poverty by adding value to locally available biomass. In Malaysia, the intervention seeks to lift biomass producers out of the bottom 40% income group.

Many case studies address SDG 15, particularly the African case studies. Case studies from Finland and Indonesia focus on multi-purpose forestry, and one from Uruguay addresses restoration of degraded lands through implementation of good practices to improve grassland and livestock management and increasing agroclimatic capacities. A case study from South Africa examines bioprospecting while ones from Argentina and Italy analyze biorefineries. The Philippines case study shares an example of sound management of hazardous waste from agricultural activities. A case study from Colombia describes pollination ecosystem services.

The report concludes that there are a number of lessons on how to achieve a sustainable transition to bioeconomy. The report recommends a multi-stakeholder effort to achieve synergies and reduce tradeoffs between sustainability goals, underscoring that “sustainability is not something that happens automatically.”

Read the full report - Towards Sustainable Bioeconomy: Lessons Learned from Case Studies
An increasing number of Bio-based food contact materials (BBFCMs) are coming onto the market and the FSA commissioned a review of evidence relating to potential risks and other unintended consequences of replacing oil-based plastic food packaging and other food contact materials with BBFCMs.

The report, published this Autumn, found that BBFCMs can exhibit properties similar to traditional oil-based plastics, enabling comparable shelf-life performance and consumer protection. It also suggested that current risk assessment processes for establishing contaminant chemical transfer from packaging to food would be appropriate for BBFCMs.

However, the report also found that in many areas limited research has been undertaken into the development of BBFCMs derived from agrifood by-products, and the associated risks to the consumer. It also suggested that additional studies may be required to help contribute towards our understanding of these novel FCMs, ensuring future food safety and consumer protection.

Prof. Rick Mumford, Director of Science, Evidence and Research at the Food Standards Agency, said: “With an increasing number of different bio-based food contact materials coming onto the market, this review has shown that more work needs to be carried out to better identify the benefits and potential risks associated with these new materials. We will continue to work with businesses as they look to more sustainable packaging alternatives to ensure that the materials they use are safe and fit for purpose.”

Key findings from this study are:

1. Limited research has been undertaken into the development of BBFCMs derived from agrifood by-products, and the associated risks to the consumer.

2. BBFCMs can exhibit barrier properties similar to traditional fossil-based plastics enabling comparable shelf life performance and consumer protection.

3. Information on the presence of inorganic contaminants such as heavy metals, persistent organic contaminants and natural toxins in BBFCMs, and their capacity to transfer from biomass-derived BBFCMs into food, is required.

4. Polypeptide-based materials used for packaging may include substances that are known or suspected allergens or are extracted from matrices that contain allergens. The effects of processing to produce packaging materials may alter allergenicity in unpredictable ways, depending on whether the allergenic epitopes are destroyed or revealed, for example due to conformational changes of the polypeptides. Very limited information is available on the allergenicity of BBFCMs as well as the potential for transfer of allergens to food.

5. Current analytical methods and risk assessment processes for establishing contaminant chemical transfer from fossil-based plastics to food are expected to be appropriate for or adaptable to BBFCMs.

Read the full report - Bio-Based Materials For Use In Food Contact Applications
Axens
Following the acquisition of a majority stake in Heurtey Petrochem’s capital and the integration of 50% of Eurecat, Axens Group now provides a complete range of solutions including technologies, equipment, furnaces, modular units, catalysts, adsorbents and services for the conversion of oil and biomass to cleaner fuels as well as production and purification of major petrochemical intermediates. The offer also covers all of natural gas’ treatment and conversion options. Axens Group is ideally positioned to cover the entire value chain, from feasibility study to unit start-up and follow-up throughout the unit entire life cycle. This unique range of solutions ensures the highest level of performance with a reduced environmental footprint. Axens Group’s global offer is based on: highly trained human resources, modern production facilities and an extended global network for industrial, technical supports & commercial services.

www.axens.net

Capricorn Partners
Capricorn Partners is an independent European manager of venture capital and equity funds, investing in innovative companies with breakthrough technologies in Cleantech, Health-tech and ICT. The Capricorn Sustainable Chemistry Fund captures growing opportunities and innovation across the value chain, from renewable feedstocks, to sustainable solutions in a broad range of applications, including food & feed, fibers & fuels, that provide performance and value, while protecting and enhancing human health and the environment.

www.capricorn.be

Chemopolis
Greenhouse gases and global warming, particle emissions, declining forest recourses, shortage of food and water, plastics in our food chain are daily hot discussion topics in main news streams. We at Chempolis have been working over two decades to solve and to overcome these challenges and companies to turn these into highly sustainable business by using our advanced formico® biorefining technologies.

Our formico® biorefining technologies and our expertise across the entire processing chain – from biomass to end-products – enable companies to use residual biomasses to advanced liquid transportation fuels, biochemicals, bioplastics, paper and textiles with the co-production of green power while enabling societies:

• Reduce green house effect and air pollution
• Reduce the use of fossil raw materials
• Reduce the use of plastics
• Improve circular economy

And naturally improving sustainability in its all aspects – economic, environment and social.

www.chempolis.com

Croda
Croda is the name behind the high-performance ingredients and technologies in some of the biggest, most successful brands in the world: creating, making and selling speciality chemicals that are relied on by industries and consumers everywhere. With 4000+ employees, 18 manufacturing sites and Croda offices in over 30 countries we help our customers anticipate and meet the ever-changing demands of consumers. We focus on developing and delivering innovative, sustainable ingredients, to reduce the carbon footprint, that our customers can build on in our wide range of business areas: Personal Care, Health Care, Crop Care, Smart Materials, Energy Technologies, Home Care, Water Treatment and Industrial Chemicals.

www.croda.com
De Smet Engineers & Contractors

De Smet Engineers & Contractors (DSEC) is a privately held limited liability company incorporated in Belgium in 1989. It has an established reputation as a general contractor, specializing in the agro-industrial field with outstanding references in the sugar and ethanol industry. It is deeply involved in assisting Technology Providers in developing and implementing fermentable sugar production units from cellulosic materials.

DSEC provides the industry with engineering and general contracting services ranging from project conceptual engineering, Front End Engineering Design (FEED), project engineer & management (EPCM) to full turnkey construction (EPC) allowing industrial operators to concentrate on their production commitments.

www.dsengineers.com

DSM

Royal DSM is a global science-based company active in health, nutrition and sustainable living. By connecting its unique competences in life and material sciences, DSM is active in various market segments. Our purpose to create brighter lives is supported by our core value: Sustainability. Everything we do should contribute to a more sustainable world.

We are proud DSM has taken a leading role in the past in the transition from solvent borne to waterborne paints & coatings. Now, with Discovery®, DSM is starting a new revolution. In the past, the paint industry has made a major step forward on sustainability through the introduction of waterborne paints. Nevertheless, these waterborne paints still are for a large part fossil based. To fuel the next transition to plant-based paints & coatings, DSM has developed Discovery®, a new revolutionary technology which replaces fossil-based components by renewable materials.

Sustainability is increasingly becoming an important decision criterion for consumers in their buying behavior. Moving away from solvent-based paints made from fossil-based materials is the right thing to do. Why? Because every one of us has a vested interest in safeguarding the planet we all call home.

Through the unique plant-based Discovery® resin platform DSM aims to set a new, high performance standard in paint and reduce the total amount of fossil components. Discovery® solutions meet the high-performance requirements of our customers and enable them to offer a more sustainable paint to their customers, today and tomorrow.

www.dsm.com/corporate/home.html

Flanders Investment & Trade

Flanders Investment & Trade (FIT) promotes international enterprise in Flanders in a sustainable way as a key factor in the social and economic development of its region. FIT does so by supporting the international activities of Flemish companies and by attracting foreign investment to Flanders. We assist, support and stimulate companies in international business by offering tailored advice and guidance and giving information on a wide range of financial incentives. Flanders is a pole of attraction for foreign companies: thanks to its central location in Europe, its strongly developed infrastructure, its innovative clusters and numerous other strengths.

www.flandersinvestmentandtrade.com
NEN
NEN coordinates the establishment of international standards and certification schemes in the biobased economy and many other sectors. Using our broad international network, we bring together stakeholders to develop standards which help to reassure that products and services are safe, reliable and of good quality. NEN is leading the CEN Technical Committee ‘bio-based products’ (CEN/TC 411), which is developing standards supporting the development of the biobased economy. NEN manages the certification schemes Better Biomass and Biobased Content, which enable communication of important characteristics of biobased products.

Bio-based content certification enables transparent and credible communication about the bio-based content of a product, by means of a certificate and label with the percentage bio-based content. This not only involves the bio-based carbon content, but also the other elements hydrogen, oxygen and nitrogen.

Better Biomass is the international certification system for solid, liquid and gaseous biomass. The certificates are used to demonstrate the sustainability of the biomass used for energy, fuels and bio-based

www.nen.nl/Home-EN.htm

Neste
Neste creates sustainable solutions for transport, business, and consumer needs. Our wide range of renewable products enable our customers to reduce climate emissions. We are the world’s largest producer of renewable diesel refined from waste and residues, introducing renewable solutions also to the aviation and plastics industries. We are also a technologically advanced refiner of high-quality oil products. We want to be a reliable partner with widely valued expertise, research, and sustainable operations. In 2017, Neste’s revenue stood at EUR 13.2 billion. In 2018, Neste placed 2nd on the Global 100 list of the most sustainable companies in the world.

www.neste.com

UBQ Materials
The UBQ patented process converts Residual Municipal Solid Waste, destined for landfills, into the novel bio-based UBQTM Material. UBQTM Materials are certified safe, and have climate positive impact on the environment. UBQTM Materials can be used by the plastic industry in conventional processes. Other industries can also implement UBQTM Materials and UBQ actively supports such initiatives.

The UBQ solution enables the industry to effectively repurpose wasted materials, while providing a competitive and processable mean towards carbon neutrality of products and promoting the carbon footprint reduction of the industry. UBQ’s industrial pilot in Israel has commenced industrial supply. UBQ is currently setting up its first large scale plant in Virginia, USA.

www.ubqmaterials.com