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Interviews

Gerardo Chiaia - Logoplaste

Ignazio Capuano - Cepi

Jonas Gustavsson - AFRY

Topics

Wood in construction

Supply chain hero - Containerboard

Stitching fashion with the thread of sustainability

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PUBLISHER
AFRY Management Consulting

Saara Söderberg
saara.soderberg@afry.com

Roland Lorenz
roland.lorenz@afry.com

afry.com

linkedin.com/showcase/
afry-management-consulting

EDITORIAL TEAM

Tomi Amberla, Soile Kilpi,
Paula Marjanen, Saara Söderberg,
Sanna Sosa

AUTHORS AND SUPPORTING EXPERTS

Carl Benedict, Sandra Bowhay,
Frank Goecke, Stefan Kucher,
Petteri Pihlajamäki, Esa Sipilä,
Sanna Sosa, Lucja Wanicka

João Cordeiro, Jani Kaskinen,
Soile Kilpi, Juhana Litja,
Sami Pastila, Henna Poikolainen,
Abigail Speak

EDITORIAL STAFF

Filip & Grimm
Raquel Ogando,
Dean Jackson, Tim Pohlmann

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Editorial

Dear reader,

You are holding the very first issue of AFRY Insights Bioindustry. It is my great pleasure to introduce you to our new client magazine focused on topical affairs in the ever-changing world that impact business in the bioindustry. Rather naturally, the theme for the maiden issue revolves around sustainability and "Making Future".

"Forest-based industries play a key role in the transition to a sustainable, climate-friendly bioeconomy," says Cepi Chairman Ignazio Capuano in the joint interview with AFRY President and CEO Jonas Gustavsson. The two leaders strongly agree on the transition requiring quite a bit of innovation and drive for cost-efficient solutions to replace prevailing products with climate-friendly solutions.

Industries exploiting bio-based raw materials are thriving on the trends of sustainability, circular economy and carbon neutrality. In this issue, you will gain some insight into the resilient cartonboard industry essentially based on circular economy, the role of forests in carbon storage and substitution of fossil based products with bio-based products along with the use of wood in construction. Gerardo Chiaia, CEO of Logoplaste introduces in an interview their bio-based plastics business and sustainability-driving innovation.

AFRY has entered into a long-term collaboration with Gapminder Foundation in which AFRY's expertise will be put to use to obtain Gapminder's goal of providing more people with greater knowledge of the world we live in. The next focus will be put on increasing understanding of UN's global goals for sustainable development. Put yourself to the test with the first question in this magazine!

With the merger of ÅF and Pöyry, and the rebranding of the joint company to AFRY in 2019, we have become an international engineering, design and advisory company, globally driving sustainability in the energy, infrastructure and industrial sectors. Bringing our combined expertise and solutions to tackle the major challenges facing the world today is at the heart of our work. It is at the core of AFRY. We are determined to strive for the best, because "We don't care about making history. We care about making future."

Enjoy reading!



Saara Söderberg
Vice President
AFRY Management Consulting



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more with less**
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Bioeconomy – the new normal

Brussels, Stockholm, Helsinki, Dusseldorf... getting together in person is not easy these days. However, since meetings have gone digital in a big way, even an interview with long-time partners AFRY and the Confederation of European Paper Industries (Cepi) can be as easy as switching on the webcam. AFRY Insights had the pleasure of joining a screen-to-screen exchange with Cepi Chairman Ignazio Capuano and AFRY's own CEO, Jonas Gustavsson as they discussed their perspectives on the emerging bioeconomy.

"It simply takes common sense to understand how big the potential of bioindustry is in our efforts to mitigate climate change. However the idea is not fully understood by everyone. This is why we need to construct a new narrative to describe and to discuss it", says Jonas Gustavsson. For several years now, Cepi and AFRY have been working closely together as partners, particularly in the areas of innovation and bioeconomy. But if reaching circular bioeconomy is common sense, how are these partners stepping up their support of the transition to bioeconomy?

"Forest-based industries are playing a key role in the transition to a sustainable, climate-friendly bioeconomy. We provide fossil-free alternative solutions for many sectors: media, packaging, healthcare and hygiene, but also and increasingly for textiles. Cellulose-based materials might even replace the graphite used in portable technologies and the virtually limitless possibilities in biorefineries help us champion bio-based green chemistry, too. We are also the largest industrial generator and user of renewable energy in Europe", says Ignazio Capuano,

underlining the importance of economic strength for the political implementation of a bioeconomy strategy.

"Since 2010, we have invested twice as much as the other manufacturing sectors, and our investment has gone into Europe's bioeconomy, with 5 billion euros having been invested in 2019. Looking to the future, the European paper industry's vision is to actively contribute to the EU 2050 climate neutrality targets, combined with a 50% increase in added value by 2050, which is possible under the right conditions. We are fully committed to this goal. By achieving our 2050 vision, we would become the European hub for the bio-based economy, integrating wood fibre, bio-based products, and circular economy. This would be an unbeatable combination for a greener and more resilient European economy."

So, what about AFRY? Since ÅF and Pöyry joined forces more than one year ago, the new company AFRY has been a leader within the pulp and paper sector, as well as providing solutions and advice for the energy, infrastructure and industrial sectors. "We at AFRY see pulp and paper as the core of the core in our company. We have expertise in so many different sectors and areas, and right now the key is to take the right decisions to meet the challenges of our time, influenced by megatrends such as sustainability, climate change, urbanisation and digitalisation", says Jonas Gustavsson. "And it is this wide scope in combination with our high-end strategic management consulting that allows us to provide the deep cross-sector expertise that can translate into the best value to our clients. So, more than anything, we want to expand and invest further. Why? Because our work is an important part of the transition to bioeconomy and, at the same time, it is good business."

"Good business", the right cue even from another point of view, for without economic growth and enhancing industry's competitiveness it is almost impossible, even for politicians, to implement the pioneering reforms needed to unlock the full transition to bioeconomy. This is even more challenging if reforms have to be supported by the population. Based in Brussels, Cepi represents its members at the European institutions. At European level, the EU's Green Deal governs the transition to bioeconomy. The EU's Green Deal is the political programme of the von der Leyen Commission, which sets a target to reach a climate-neutral economy in 2050. As a result, we have seen the European Commission propose a climate neutrality law this year, formalising a legally-binding commitment to reduce greenhouse gas emissions to net zero by 2050. The Green Deal also foresees major initiatives impacting circularity, recyclability and sustainability of products on the EU market according to the Circular Economy Action Plan 2.0. "The role of the bioeconomy, thanks to skilful advocacy by Cepi, has been recognised within this ambitious climate neutrality plan, but will need to be further consolidated. Cepi is already working on elements that could become part of a modern Forest Strategy for Europe", explains Ignazio Capuano.

From screen to screen, the interdependence of climate change issues quickly becomes clear, as does the need for all sectors of the economy and society to make a contribution towards building a better future. "With the young generation getting involved in the climate debate, not only is the discussion becoming more dynamic, but there is also a big hope that things will change. Of course, on the one hand I can understand a certain disappointment and even demotivation in people who



Ignazio Capuano



Jonas Gustavsson

expect more action from world leaders, because driving a circular bioeconomy requires brave political leadership. On the other hand, I see big companies starting to act, to change their products and services. And with people starting to buy climate-friendly products, things also start to change. In this respect, taxes and regulations also remain powerful tools for driving change”, says Jonas Gustavsson. “For companies, this change of course requires quite a bit of innovation and drive for cost-efficient solutions to be in a position to replace prevailing products with climate-friendly ones.” – “Exactly. To reach completely fossil free value chains, companies will need a plan for innovative solutions, with clear milestones for a timely and cost-efficient decarbonisation of the European energy system”, adds Cepi Chairman Ignazio Capuano.

“But the great thing about our time is that sustainable solutions now go hand in hand with driving financial performance. More and more, it is becoming clear that as a company you can only be profitable and grow if you are compliant, have sustainability targets and offer sustainable solutions. And this is why I trust that the change will come”, says Jonas Gustavsson.

If everyone has to be involved in solving the problem, how do leaders involve their employees and business community in their sustainability strategy? “As Cepi chairman, I can count on the support of a strong Board of Directors, consisting of 32 leading CEOs in the pulp and paper industry. The sustainability related decisions that we make have a direct impact on reality”, says Capuano.

“Cepi is a confederation of national pulp and paper industry associations that are able to engage each and every company at national level – covering 95% of the European production and 22% of the global production. Sometimes, finding common ground can take more time but we prefer working ambitiously on shared positions instead of opting for the easy way out of the 'lowest common denominator'. This has also gained Cepi a reputation among our stakeholders as a reliable and dynamic player.”

For Jonas Gustavsson, the question of AFRY’s sustainability strategy has different aspects. “One thing is for sure: we at AFRY will have a disruptive sustainability agenda, internally and externally. The merger has given us the opportunity to re-evaluate what the company stands for on a more fundamental level and we are currently in the process of finding ways to further measure sustainability in our company and identify how we can quantify our impact in all our products and in all the different segments we are operating in. We are finding out how we make sure that we as a company act in a sustainable way and how we can enable our employees to make a difference. At AFRY, we know that in order to attract the best people, sustainability will become even more important. We will be a loud voice, both in terms of knowledge and in terms of capabilities and delivery of sustainable solutions. That much is clear.”

Would the world be a better place without plastic packaging?

Think about this:

- a. If a piece of steak is sealed in plastic, it will extend its shelf life by up to 26 days.
- b. If cucumbers are wrapped in just 2 grams of stretched plastic, they will last up to 11 days longer.
- c. The CO₂ emissions involved in making the piece of plastic to preserve the cucumber amount to less than 10% of the total CO₂ emissions created to grow and deliver it to the supermarket in the first place.

Carbon footprints are broadly proportionate to the mass of a material and as plastic is a strong, light-weight material and can be stretched very thin, it has got about half the density of glass and approximately the same density as paper. As a result, the CO₂ footprint of plastic is actually quite small and when comparing the CO₂ emissions created in the production of plastic vs. glass or vs. paper, the emissions ratio of plastic is in fact more favourable. In fact, some scientists suggest that if we banned all plastic packaging and used only paper, glass and metal, the amount of materials and energy required to package our food would multiply and the amount of CO₂ emissions generated would be about 3 x greater, also taking into account logistic related emissions.

Plastic has a lower CO₂ footprint, plastic is cheap, it can be used as primary packaging, it can be easily moulded into shapes and it does not break or crack. In fact, plastic does the job of packaging very effectively. So what is the problem with plastic? The problem is that plastic does not reabsorb itself into the environment. Therefore, if there is no strong system to support plastic collection and reuse, it may end up being discarded by the consumer. 80% of plastic pollution is created by individuals littering our streets, countryside and oceans.

So how do we solve this?

Keeping plastic in the packaging system and reusing it is key, but not all countries have invested in systems that allow for this. At present,

there are huge differences between countries when it comes to their recycling systems - even within the EU. A study by PRE (Plastic Recyclers EU) shows that in Germany 95% of PET bottles are collected and recycled, this compares to only 24% in Bulgaria.

In order to address the shortfall in collection rates in many countries, the EU has set ambitious targets. For example, the EU has set the target that by 2030, 30% of the materials used in PET bottles must be derived from recycled PET. Individual governments are also applying measures to increase recycling, for example in the UK, the government has determined that as of April 2022, a tax of £200 per tonne will apply whenever a minimum quota of 30% recycle is not reached in any food related plastic packaging application.



Packaging companies will be pivotal in achieving these ambitious targets. They need to do this, whilst also managing to produce attractive, effective and economic packaging for demanding FMCG clients. Logoplaste is an example of a rigid plastic packaging company which, since its foundation in 1976, has been focused on leveraging the benefits of plastics for its clients whilst minimizing its environmental footprint. Logoplaste is the pioneer of wall to wall packaging - the W2W concept - locating Logoplaste's facilities inside the client's production sites; it is the innovator of the Ecover bottle and one of the first ever companies to manufacture a bottle made entirely out of recycled plastic. In addition to this, Logoplaste is proud to have set up a closed loop recycling stream to allow for the introduction of opaque PET plastic bottles into the Brazilian UHT milk market. Logoplaste is also a key member of the "Digital Watermarks Holy Grail 2.0" project which seeks to add watermarks to plastic packaging to facilitate the sorting and recycling of post-consumer plastic.

Our investment banking experts at Pöyry Capital were lucky enough to catch up with Logoplaste CEO Gerardo Chiaia to pose some questions relating to their approach and numerous successes in the field of sustainability.

What achievements in the area of environmental sustainability are you most proud of at Logoplaste?

We are very proud of our innovation capabilities at Logoplaste, particularly of the work we have done for the past 15 years in lightweight programmes. Some of them have become world standard in the industry; they are based on biomimicry concepts and led to developments such as the Ecover and Vitalis bottles.

And we are of course very proud pioneers of the wall to wall model where our

manufacturing sites are connected to our clients by a hole in the wall. This allows for a just-in-time packaging supply, eliminates secondary packaging and allows us to optimise the weight of the packaging supplied. The removal of logistics associated with transport and delivery of empty bottles translates into a significant reduction in the carbon footprint associated with plastic bottle production. To quantify this: our annual worldwide CO₂ emissions savings vs. the next best alternative is 15 529 tonnes of CO₂/year, which is equivalent to 8 500 flights/year from London to New York, on a Boeing 747, or planting 721 000 trees/year to offset the same amount.

We are also very proud to have recently launched "Mission Zero +" in cooperation with the Biomimicry 3.8 Institute to build a manufacturing plant that is carbon neutral, regenerative and generates a positive impact for employees, local eco-systems and communities.

How do you balance the financial imperatives of being a profit driven company with the sustainability objectives of Logoplaste?

I am a strong believer that for a company to survive, it must have a social utility. This is the only way for sustainable growth and a fair economy. Environment and economy go hand in hand and cannot be separated.

Our financial imperatives and our sustainability objectives are linked. It has always been part of our DNA. Innovation plays a critical role in achieving the balance between sustainability and profit and we are, and always will be, an innovation-driven company.

What in your view is the biggest misconception about plastic packaging?

Plastic packaging has a bad image because it is not managed properly, it does not absorb itself back into the environment and therefore it needs to be effectively managed and recycled. Plastic packaging has a bad reputation because it is visible and is defined by the waste created when not managed properly. A big misconception is that alternative packaging substrates are more environmentally friendly, although



Gerardo Chiaia

their production often consumes more energy, they are also difficult to recycle, have more mass and have a higher carbon footprint when compared to rigid plastic packaging. When plastic is collected, it can be recycled.

What are your views on bioplastics - do they present a viable alternative? Will they become common place?

Here we need to have a clear understanding of what is considered a bioplastic. Bioplastic, biodegradable plastic and compostable plastic are often used as synonyms and this is incorrect.

Bioplastics are synthetic, non-biodegradable plastics derived from renewable sources (bio-based). The properties and performance are identical to their fossil versions and their recyclability is similar, meaning they can be incorporated in established recycling streams without causing any damage. Biodegradable/compostable plastic requires a separate disposal infrastructure, if included in the existing collection system it becomes polluted. From Logoplaste's perspective, it would

make more sense to use recycled raw materials or to design bio-based plastics that are compatible with the existing collection and recycling streams, rather than building entirely new biodegradable/compostable plastic materials, products, and disposal infrastructures from scratch.

What particular challenges, if any, make it difficult for Logoplaste to achieve its sustainability goals? How is Logoplaste resolving them?

There is no global collection system to ensure we recycle at a rate of 100%, which means that there is insufficient recycled raw material available.

Consumer education to encourage a change of habits is required so recycling becomes an ingrained practice globally. Logoplaste is leading many teaching activities and we have now launched a campaign in local schools in Portugal so that we engrave the need to recycle everything in kids' minds.

Logoplaste's ethos is "We work today for a better tomorrow". If you were to reflect forward say 5 or 10 years, what do you envisage

to have changed regarding the packaging that Logoplaste and its competitors produce?

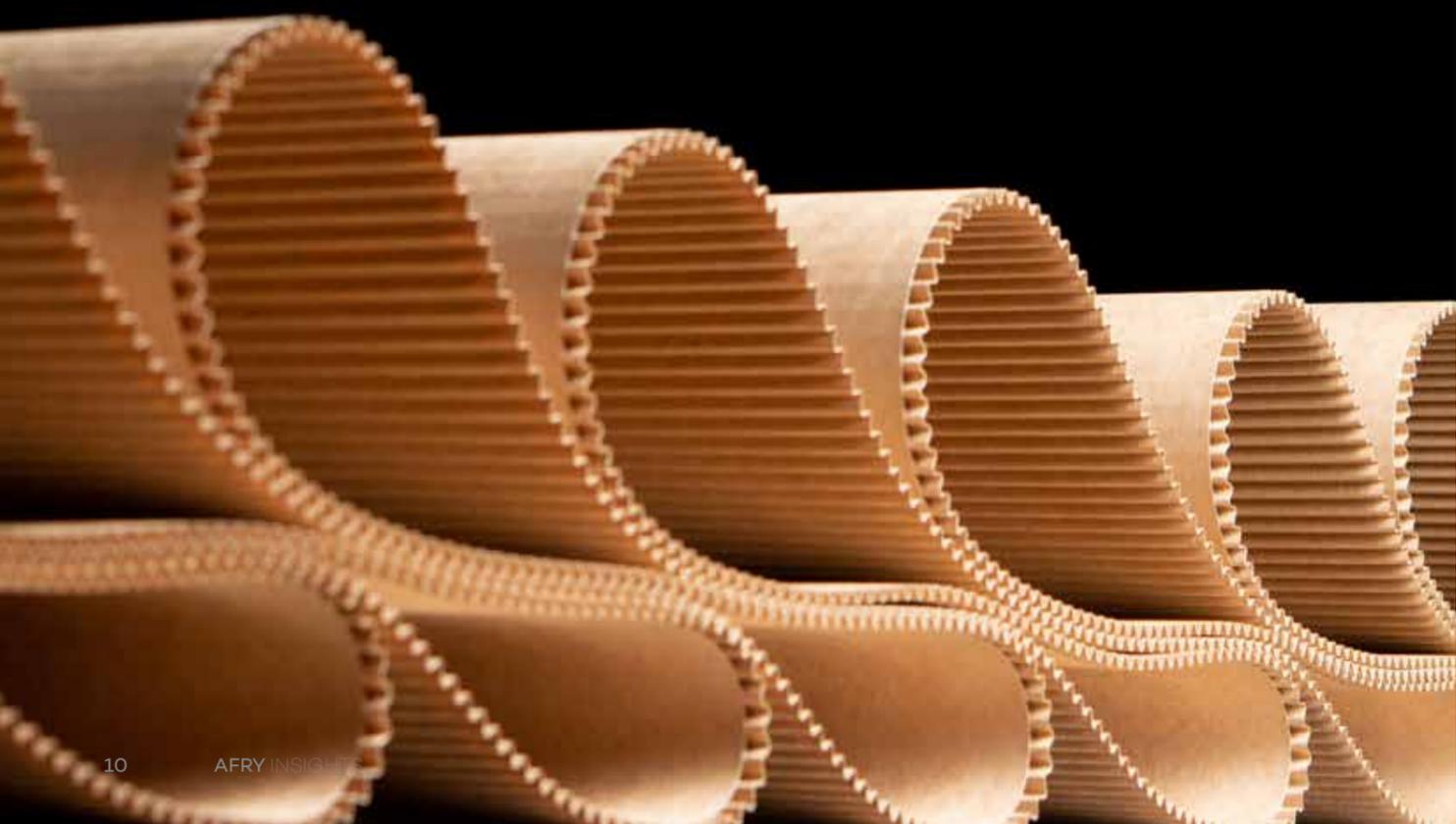
I would say 10 rather than 5 years; our vision is to have from 50% to 100% of plastic packaging made from recyclable material and our new manufacturing sites will be neutral or have positive CO₂ emissions.

It is not only the manufacturing and operational side of Logoplaste which focuses on creating positive steps for the environment. This runs through the ethos of the entire organisation even up to the Finance Division, which in June successfully introduced an amendment to our loan, where it linked the interest rate payable to the CO₂ savings the company achieves. It is the first of its kind in the leveraged loan market. Basically the cost of the loan goes up or down, based on the CO₂ savings achieved. This is another ground breaking step.

Logoplaste is leading the way in the field of sustainable commerce and proving to us all that plastic packaging, when manufactured and managed effectively, does indeed play a valuable role in all of our lives.

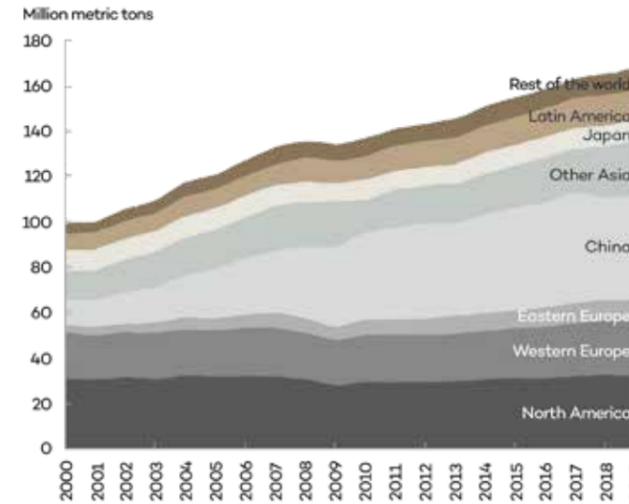
Supply chain hero – Containerboard

Brown containerboard shipping boxes are the unappreciated heroes of the global supply chains. With the growth of online shopping, containerboard boxes have stepped out from warehouses and behind the scenes of supply chains, to people's front porches and unboxing videos.



At the same pace of growing consumption of goods in the world, the containerboard segment has become the largest segment of the pulp and paper sector with a consumption of 165 million metric tonnes per year globally. China is the largest containerboard manufacturing region with over 90 million metric tonnes of installed capacity – quite the growth from 34 million tonnes of installed capacity in 2010, with demand close to reaching a double-digit growth rate since 2000. The Western markets of Europe and North America are equally large containerboard consuming regions with a demand of 32 million metric tonnes each and growing.

Global containerboard demand growth



Movers and makers

With the growing market demand, the manufacturing companies of containerboard and containerboard boxes have grown in equal measure. In China, the growth strategy has focused on building up new capacities. The leading players, Nine Dragons and Lee & Man, have grown their capacity by 60% since 2011, and have invested in huge containerboard mills with 2-4 million tonnes of capacity at one site. The Chinese containerboard market has stayed in the hands of domestic companies that pursue aggressive organic growth strategies, yet rely much on recycled fibre materials imported from other regions.

In North America, until recently, the containerboard sector's growth strategy was driven by inorganic growth. Since 2000, the North American containerboard market share of the top 5 players has increased from 53% to 78%. M&A activity remained strong until 2018, when in the latest "needle-moving" acquisition, WestRock acquired Kapstone. Over the past 3 years, we have seen a ramp up of new builds and machine conversions of declining newsprint and publication paper machines into containerboard production. These conversions have ultimately attenuated the industry's consolidation level from its previous peak, yet the North American containerboard industry is by far the most consolidated market in global comparison.

Resilient, sustainable and versatile

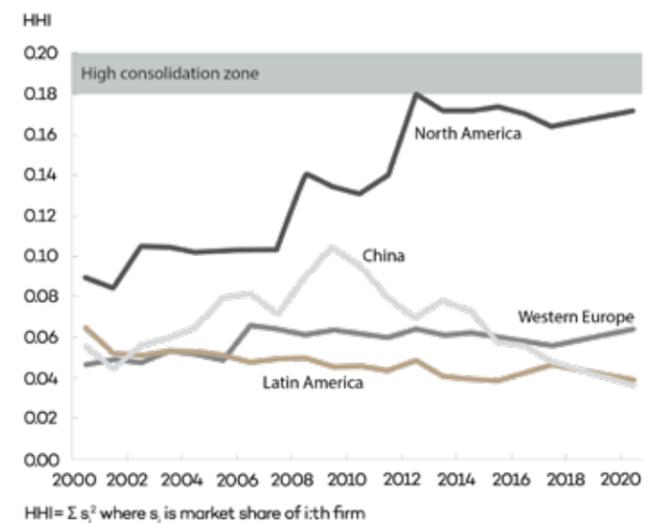
Containerboard consumption has stayed resilient through demand disruptions, even though the demand has a high sensitivity to manufacturing industry conditions,

during a recession and recovery. All the major economic depressions like the 2008-09 global financial crisis and the COVID-19 pandemic, have negatively impacted containerboard markets across global regions. But in the absence of other economical, solid performing and sustainable packaging solutions, containerboard demand is bound to recover and show its resilience and sustainability yet again.

The seemingly simple brown box has not only been resilient, but also adapted to the growing pressure such as more sustainability, the evolving needs for added functionalities and eCommerce packaging.

The brown boxes have started to take new shapes and becoming "right-sized" for eCommerce shipments. In markets like China, where easy recycling is an imperative, eCommerce box packages that do not require tape are commonplace functional innovations developed for the needs of the eCommerce channel and the closed-loop fibre value chain.

Containerboard sector consolidation: Herfindahl-Hirschman index (HHI)



Both in eCommerce and brick-and-mortar channels, corrugated boxes continue to evolve with the macro-trend of light-weighting to conserve fibre resources, save cost throughout the supply chain, and to align with many brand owners' packaging-related sustainability initiatives.

Needs for added marketing "pop" and retail-ready packaging solutions have been answered by containerboard manufacturers by adding white liner on top. AFRY estimates that in the European retail environment 30-50% of the boxes are retail-ready packaging formats with white/printed surface, which also help retailers save labor costs and improve shelf-stocking efficiency.

Containerboard box manufacturers have answered the need for packaging and product sustainability by innovation in coatings added on the top layer of containerboard to absorb ethylene from produce to extend shelf life, or to obtain water resistance for fish and other protein that is packaged.

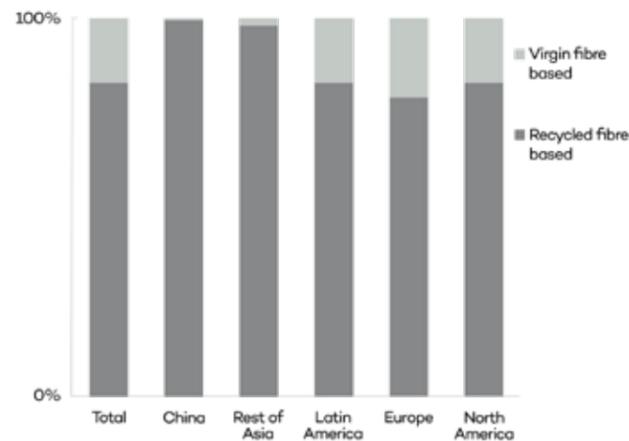
Closed-loop champion

Containerboard is perhaps one of the most “closed-loop” products in the world. 83% of the containerboard boxes in the world are manufactured out of recovered fibre based furnish, mainly using old corrugated boxes, which are collected and shipped to mills to be processed into containerboard again.

Driven by increased online shopping and deliveries, residential curbside collection of old corrugated boxes has been growing, which is also negatively impacting the quality and cost of recovered fibre material available to containerboard mills. Mixed paper represents about a quarter of containerboard fibre furnish in Europe. The composition of mixed waste used in containerboard manufacturing is changing as the consumption of newspapers, magazines, and print, in general, continues to decline.

Containerboard mills continue to innovate around fibre raw material. Globally, on average, recovered fibre represents over half of the manufacturing costs for linerboard. Investments in trash handling, fibre cleaning, and screening have enabled mills to process lower quality or contaminated recovered fibre materials and improve fibre yield to maximise the utilization of every fibre. Some mills have been able to include even paper coffee cups and other foodservice items in their fibre portfolio to allow for more fibre sources.

Global containerboard manufacturing capacity by fibre type



China implementing the National Sword program to restrict waste paper flow into China has changed global recovered fibre flows. A complete recovered fibre import ban to China is expected in 2021, leaving the 90 million tonne Chinese containerboard industry, which has been relying on close to 30 million tonnes of imported recovered fibre, in need of new ways to secure fibre raw material to supply boxes to the Chinese manufacturing sector.

Processing the old corrugated containers into a pulp format before shipping them for consumption in China has emerged as an option for the Chinese containerboard mills to import needed fibre raw material. Pulp lines able

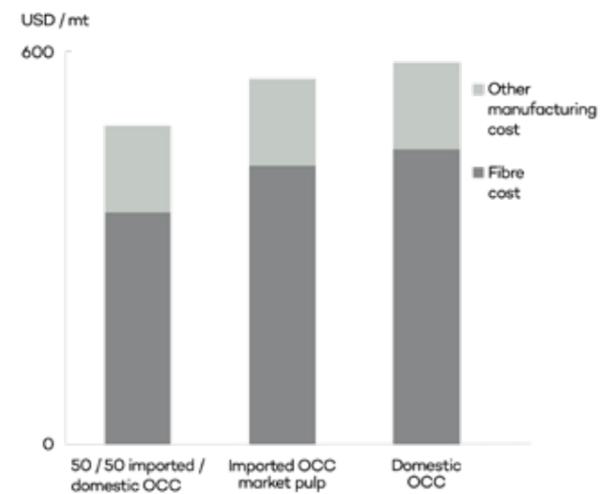
to process old corrugated containers into pulp are being built in North America as well as in South East Asia, in countries like Laos, Myanmar, Malaysia. Importing OCC pulp can add over USD 70/tonne on Chinese board mills' cost structure, but without fibre raw materials, there won't be containerboard production.

Wood fibres can be reused about six times in paper and board making. Hence, the fibre loop needs fresh virgin fibre to keep turning. Two thirds of the global virgin fibre based containerboard capacity is located in North America amid the vast southern softwood fibre basket and caters both to the large scale domestic market, as well as to export market needs for higher strength and higher quality boxes for applications such as banana boxes in Latin America. Russia has one of the world's largest untapped softwood fibre baskets in the world, and is in close proximity to the fibre-starved Chinese market. Going forward, Russia may emerge as another key source of virgin fibre based containerboard to the global markets, especially to China.

Count on me

Containerboard boxes are a cornerstone of global manufacturing and supply chains. Economic growth, as well as eCommerce growth, have attracted large scale organic and inorganic investments. However, the sector is not protected from economic downturns. Through the reliance on the demand that containerboard boxes

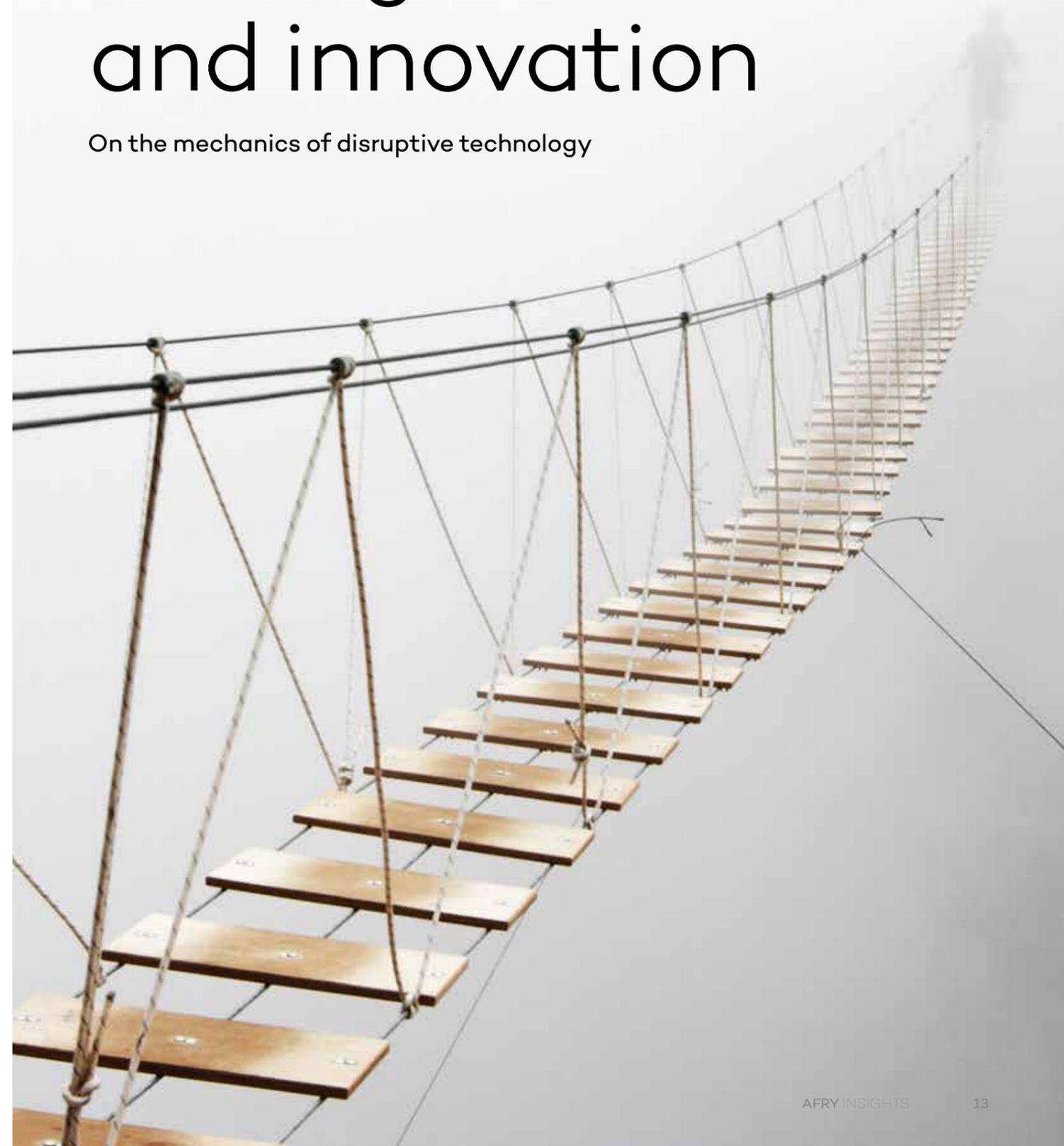
Testliner manufacturing cost in China – different fibre furnish options



meet, and through the alignment with the macro trends of sustainability and the reduction of plastic waste, containerboard boxes and their manufacturers are well positioned to stay relevant, to continue to grow, and to navigate the changing landscape of market demands and fibre input disruptions.

Foresight and innovation

On the mechanics of disruptive technology



“An idea is like a virus, resilient, highly contagious. The smallest seed of an idea can grow. It can grow to define or destroy you.”
- Cobb in “Inception”

As – for the majority of us – the innovative power of ideas is normally too abstract to understand, innovations sometimes seem to come as a sudden surprise to us, be it in behaviour or in products. While for Cobb (Leonardo Di Caprio), the inspiring words from the irresistible Hollywood motion picture “Inception” make sense for the plot, they do mislead us a bit when it comes to innovation. The “new normal” in our days has illustrated that a virus can in fact be much more disruptive than an idea. In terms of ecological change, COVID-19 has had much more impact than all our ideas and approaches that were supposed to speed this change up. But these words still do make a lot of sense, for innovations do not look for ways, they create them – just like a virus. And those who do not or cannot change, no matter if on-screen in the movies or off-screen in real life, will eventually lose the freedom to change in a self-determined way. But do these disruptive events really emerge overnight?

To be or not to be

To give an answer, let us take a step back: “As we may think” – the famous essay of US engineer Vannevar Bush – inspired Ted Nelson and Douglas C. Engelbart in the 1960s and 70s to develop the hypertext and the user interface as well as the human-machine interaction with the personal computer, innovations that fundamentally changed the world we live in today. But Bush’s ideas went back to the late 1930s. And he wrote his essay in 1945.

In the 1980s, video seemed to have killed the radio star all of a sudden (as the famous disco song deplored), as did iTunes and Napster with the compact disc a few years later. But in fact, all these ideas usually grow gradually, they do

not pop up overnight. And beyond that, there is usually more than just one protagonist that causes the disruption. To develop its full potential, an innovation needs some supporting actors, an equally powerful and disruptive set of technologies or a platform. And even strategy has to play a certain role.

Think e.g. of the iPhone. There already were touchscreens in the 1990s and mobile phones were “Connecting People”, as the slogan went at Nokia, which dominated the segment for more than a decade. But the combination of a touchscreen, a cutting-edge operating system, gesture control and the iTunes shop made the iPhone a game changer paving the way for the mobile internet, photography, gaming etc.

Even today, some might be overwhelmed when they read about Open AI’s GPT3 writing poetry, recently even an article in The Guardian, about GPT3 coding apps and programmes as well as designing user interfaces on demand. But remember, almost three years ago, an algorithm called AlphaGo Zero, developed by a certain company called Google, managed to learn the world’s most complex board game, Go, on its own in less than a day and to beat the world’s best players after less than a month. While all this is fairly recent, the development of artificial intelligence already goes back to the 1980s. This also applies to immersive technologies normally referring to Augmented Reality or Virtual Reality, to the IoT and Blockchain: It is just that most people do not have it on their radar (if they have got a radar at all).

And this is where AFRY’s expertise and its revolutionary Foresight concept comes in. Foresight means that our management consultants with their huge professional expertise

are able to combine our industry insights and data with cutting-edge technologies like the “Futures Platform” to create a strong and broad radar, on the basis of which they can then elaborate credible scenarios that categorise trends and phenomena and their likely effects on any specific industry.

“We work daily with globally leading organisations that apply novel methods of foresight, horizon scanning and scenario work as an integral part of their strategy, as well their everyday operations. During the last 12 months, there has been a strong signal from these organisations to build continuously adapting and automated AI-based foresight systems and solutions. These organisations realise that information related to technologies of the future is vast, and that it should cover all domains, industries and ecosystems, and also be easy to convey and work with. At the same time, things are moving fast, leaving less time to spend on developing foresight, planning and strategies. One way to overcome this situation is through applying the right technology and tool set, with a sufficient and well-targeted leadership and lots of facilitation work.”
- Saku Koskinen, Foresight Expert and Partner at Futures Platform

“Predicting future trends is what we do here at AFRY Management Consulting. We have done hundreds of industry analyses for the bioindustry and collected a vast amount of data. By combining data and examining external trends, we can provide accurate and useful results to our clients.”
- Tomi Amberla, Senior Principal, Head of Biorefining Practice at AFRY Management Consulting

Paper market outlook through 2035

Urbanisation, digitalisation and growth of eCommerce are shaping our world. The outbreak of COVID19 pandemic has changed our societies and created a new normal for our everyday lives. Transformation to circular bioeconomy creates new demands for our industry and opportunities to existing and new stakeholders. How does your business strategy respond to the transition?

AFRY Management Consulting's latest World Paper market survey up to 2035 is available in November 2020 in a completely renewed format. Three developments enhance the report this time. Annual forecast updates will now be available. On top of the written report, all market information and updates will be available through a digital platform in order to access the data more easily. Furthermore, this report will incorporate a separate specialty papers section.

ANALYSIS AND SYNTHESIS

Driving forces of the paper industry
Demand trends through 2035
Paper industry structure – key players, industry concentration, pricing power
End uses
Trade flows and net trade
Production trends and growth

PRODUCT AREAS

Graphic papers
Tissue paper
Packaging paper and paperboard
– Containerboards
– Cartonboards
– Sack paper
Specialty papers

GEOGRAPHIC COVERAGE

Global, by region and main countries
About 80 countries and country groups

DELIVERABLES

Tool via AFRY Smart online service
Executive report

Contact

Christoph Euringer
christoph.euringer@afry.com
Timo Suhonen
timo.suhonen@afry.com
afry.com/marketreports

Advancing circularity in bioeconomy



Global forest base
4 billion ha, i.e. 31% of the land area.
5 million ha annually lost, but the rate of loss has slowed.
1.1 billion ha managed for production.
Area of planted forests is increasing.

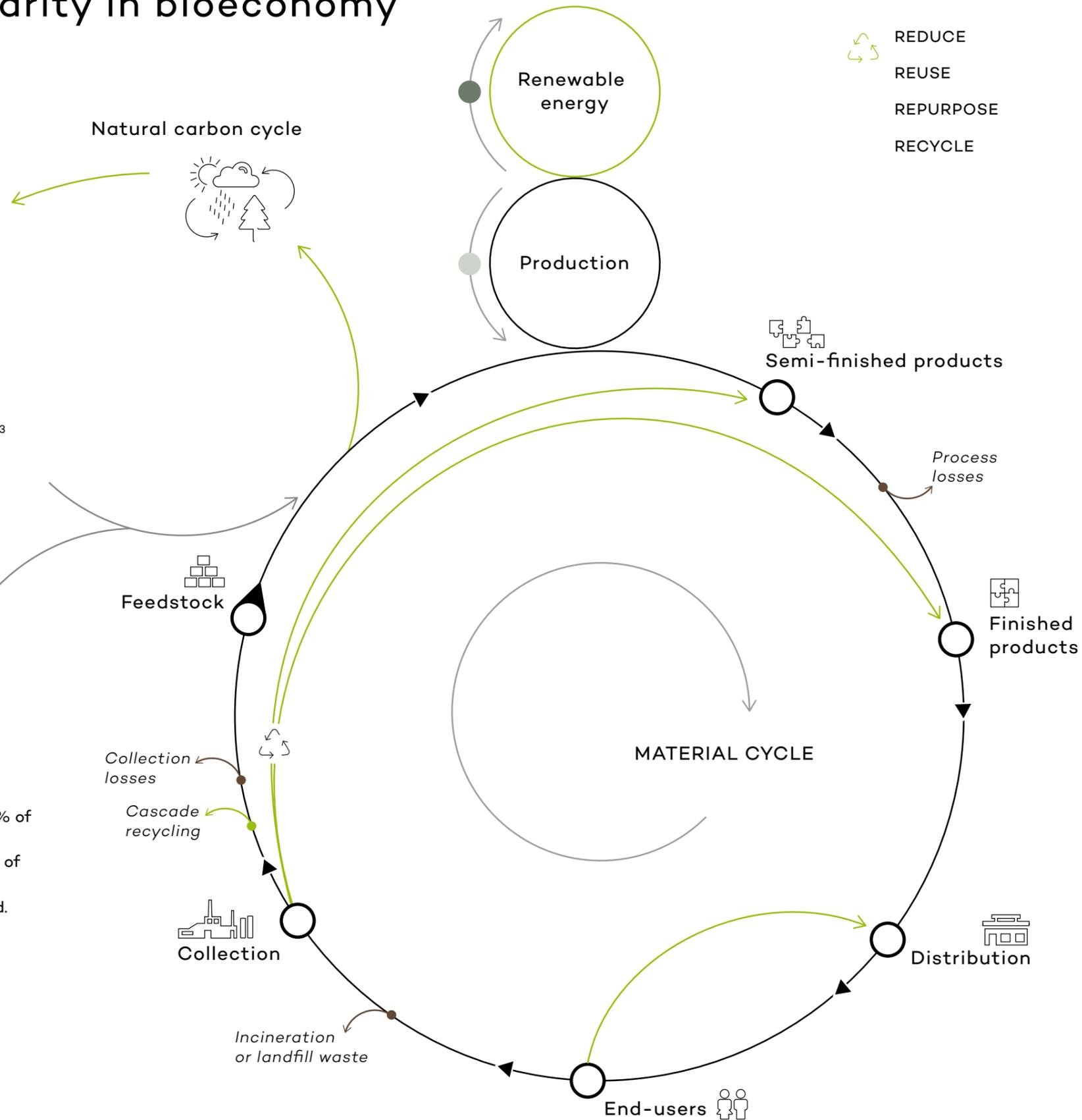
Total growing stock **557** billion m³
Global harvesting **4** billion m³

51 % industrial roundwood
49 % fuelwood

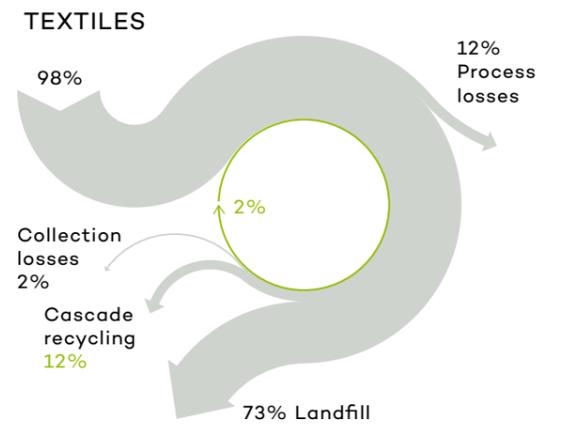
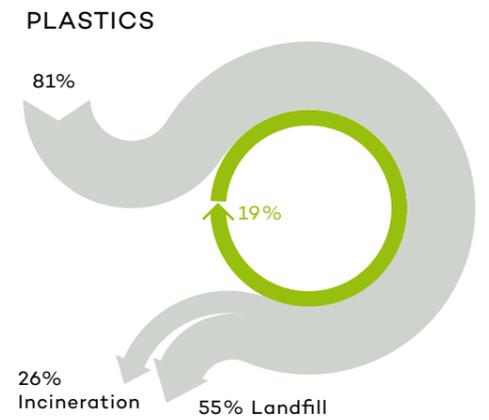
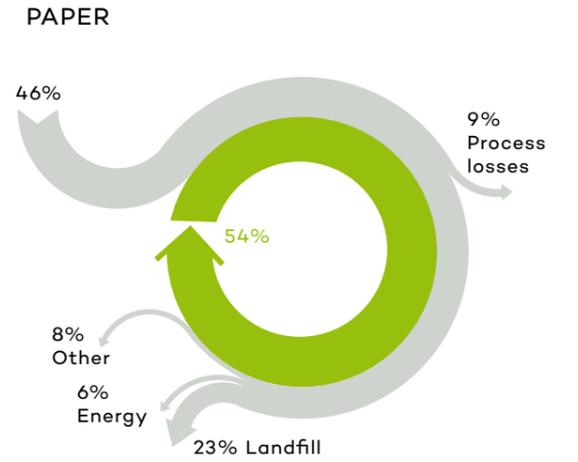


Global agricultural area 4.9 billion ha, i.e. 37 % of the land area.
32% of the agricultural land is in production of crops and 68% in livestock production.
Some 20% of the cultivated area is irrigated.

32 % crops
68 % livestock



Examples of material cycles in selected industries



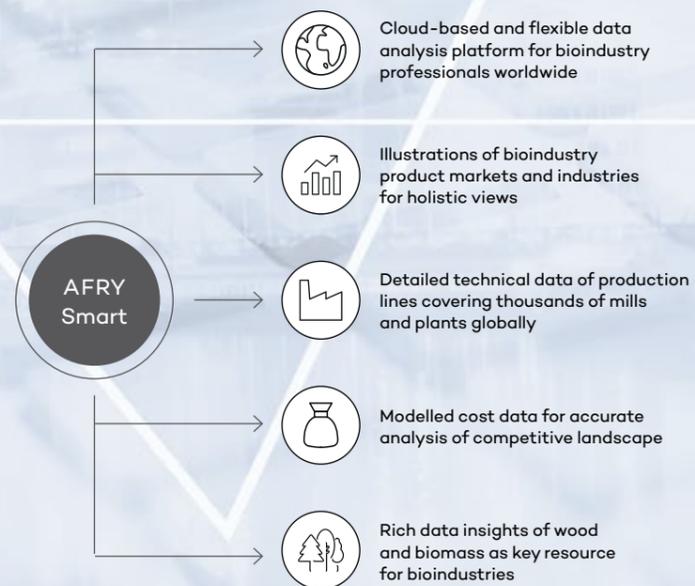
Source: AFRY Management Consulting, FAO, Geyer et al, Ellen MacArthur Foundation

AFRY Smart

A data platform for global bioindustries

For two decades, AFRY Management Consulting has been providing online business intelligence services for the global pulp and paper industry, working together with numerous long-term key clients.

The latest version of AFRY Smart will be published in December 2020, offering a modern data tool that enables users to drill into data in a flexible and highly visual manner. In combination with the advanced version of the AFRY Smart tool, new datasets will continuously be made available – covering e.g. wood and biomass, new bioproducts, solid wood and converting – in addition to our traditional core of pulp and paper.



Find out more and contact us for a demo today! afry.com/AFRYsmart

Wood in construction

Wood is one of the longest standing building materials in existence - the first timber home was built more than 10 000 years ago. New product developments in wood products combined with advances in engineering have led to a revival of wood and wood-based panels used in construction in recent years.

Globally, lumber, engineered wood products and wood-based panels used in construction only account for <5% (in volume) compared to other building products such as cement, steel, ceramic and flat glass. In Europe, wood products used in construction account for >10% compared to other building products, an increase of more than 25% in the last five years. Changes in building regulations, higher awareness of sustainability aspects as well as cost and time benefits have led to the strong growth and development of wood products in construction.

Underlying demand drivers in both residential and commercial construction help to gain an understanding of the future demand outlook of wood products and wood-based panels in construction. Recent construction development including new build and renovation in both Western Europe (WEU) and Eastern Europe (EEU) has been positive; in the last four years (2015 to 2019) commercial construction in WEU grew by 2-3% per year while residential construction grew by 2.5%-3.5% annually. In EEU, commercial construction grew by 5.0% annually, over the last four years, while residential construction grew by 1.5%-2.5% annually.

Prior to the COVID-19 pandemic, both commercial and residential

construction in WEU were projected to increase by 2-3% and 1-2% respectively per year until 2025. In EEU, both commercial and residential construction were projected to increase by 4-5% and 1-2% respectively annually until 2025.

Builder's pain

It is expected that the COVID-19 crisis will impact both the construction activity and the outlook in Europe in the short and medium term. In the short term, construction activity is declining at its fastest rate since the financial crisis. In the medium term, in the next 1-2 years, construction activity in WEU is projected to decline by 2-3% in commercial and by 3-4% in residential construction. Commercial construction in EEU is expected to decline by 3-4% annually while

residential construction will drop by 6-7% per year. Beyond 2021, it can be expected that residential construction will regain its foothold more quickly, while commercial construction will take slightly longer to recover.

Engineered wood products (EWP) such as cross laminated timber (CLT) and laminated veneer lumber (LVL) are also used in construction and have received a high level of press coverage thanks to changes in building regulations in Europe. This has led to higher investments in new production capacity. All in all, demand volumes for wood-based panels used in construction are still significantly higher than for both CLT and LVL combined. In Europe and North America more than 65 million m³ of wood-based panels are used in construction while only 8 million m³ of engineered wood products

(glulam, CLT and LVL) are used in construction, which represents 89% and 11% respectively.

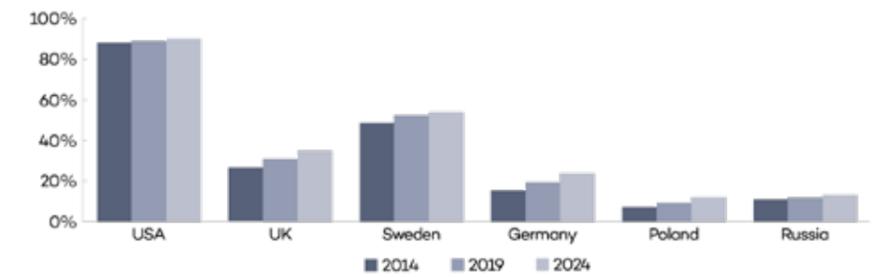
For many years, residential construction was the main driver for lumber and wood-based panels. Close to 90% of residential buildings in North America are manufactured using these products. In North America, wood products are increasingly also used for commercial buildings as changes in building regulations and codes were applied in 2018.

In Europe, Nordic countries such as Finland and Sweden have the highest share of wood products in residential construction, however other countries such as the UK and Germany are catching up, supported by changes in building regulations and codes. All in all, the outlook for wood products in residential construction is positive, the share of prefabricated houses (using PB and OSB) is also increasing, benefitting from highly automated production technologies and processes and pre-assembling of wall, flooring, ceiling and roofing elements off-site.

Made from wood

Apart from residential construction, commercial construction will become an even more important driver for wood products demand.

Wood products share in residential construction in selected countries

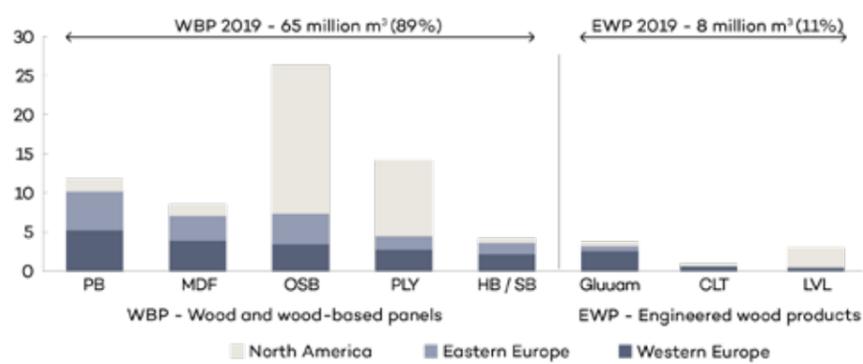


All in all, demand outlook in Europe for wood-based panels in construction is positive, projected to increase from 32 million m³ to 38 million m³ by 2024 (base case scenario).

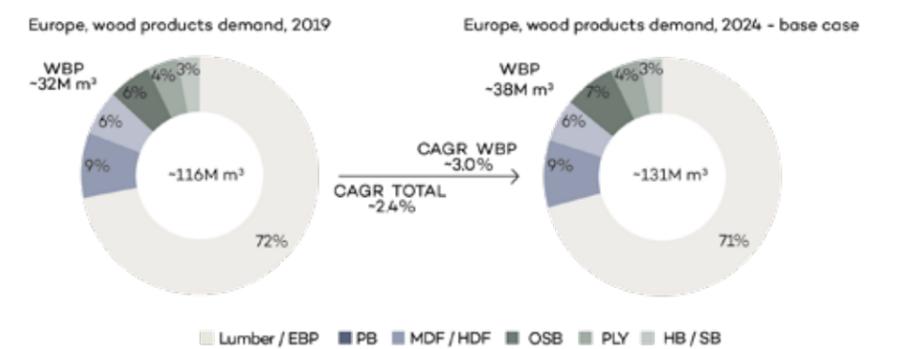
Wood-based panels and other wood products such as engineered wood products (EWP) could complement each other, potentially as "hybrid products" which would benefit both product categories. All in all, the

addressable market for wood products in construction is increasing and the substitution potential as well as volume with non-wood products is substantial. Only time can tell which products will win the race in construction. However, the upside opportunities for wood-based panels are high as panel products are available and will likely benefit from the green agendas of many governments and home builders.

WBP and EWP demand in construction in Europe and North America 2019



Wood and wood-based panel demand in Europe in 2019 and 2024



Stitching fashion with the thread of sustainability

Lucja Wanicka
lucja.wanicka@afry.com

A good few years ago, my mother took me to our local fabric store. I had set my sights on sewing a new skirt and picked out a black peachskin fabric - a slightly heavy fabric but soft to the touch. After tracing the pattern, cutting the fabric and of course, sewing the skirt, I remember that I felt so rewarded finally wearing my creation.

Clothing was once seen as a necessity that shielded us from the elements. Today the clothing we wear is seen as a form of self-expression. What we wear is who we are.

In the last 15 years, the production of clothing has more than doubled, but the number of times we wear our clothing has seen a dramatic decline. It was three decades ago when low-cost, fast fashion propelled into mainstream. Its catalyst? Synthetic fibres. Retailers started to market numerous "micro-seasons" in order to boost sales. Manufactured quickly and on a tight budget, these items of clothing are usually not made to last, and "cheap" ultimately comes at a cost not borne by the consumer. In a given year, more than half of the fast fashion produced is disposed of, and three quarters of all clothing made globally either ends up in a landfill or is incinerated. Looking fashionable isn't looking very good.

In more recent years, consumers have become more aware of the environmental impact of their wardrobe. With their buying power, consumers are exerting pressure on the fashion industry to improve its environmental footprint and commit to more sustainable practices.

This is changing the way brand owners and retailers operate and impacting the rest of the textile value chain too. There is more emphasis on establishing sustainable

textile fibre procurement practices, environmental labelling as well as adherence to multiple certification schemes. And the most recent focus? Recycling of textile fibres and sustainable fibre production.

But classifying and quantifying which fibres are more sustainable than others is no straightforward task. Is cotton more sustainable than polyester? What about semi-synthetic fibres? It gets a bit tricky.

Historically, natural fibres such as cotton were the dominant type of fibre used for textiles. But cotton requires arable land which could otherwise be used for food production. In addition, cotton is also a water intensive crop sensitive to its environment. With that in mind, it is unsurprising that the production of cotton has not increased much since the late 1980s. The marginal increase that we do see is attributed to increases in yield and genetic modification. However, the use of GMO is not accepted by many and it is only organic cotton that is gaining market share.

Today, the most common type of fibres used in textiles are synthetic fibres, in particular polyester. Although polyester is comparatively inexpensive and durable, its major drawback is that it is oil-based. According to Forbes, nearly 70 million barrels of oil are used each year to produce polyester around the world.

And should your polyester T-shirt end up in a landfill, it will take more than 200 years to decompose.

In the last decade, the production of semi-synthetic man-made cellulosic fibres (MMCFs) such as viscose and lyocell, have considerably increased. MMCFs are predominately made from trees that do not require arable land and have a low water footprint. Moreover, MMCFs are not oil-based and are mostly biodegradable. These fibres offer the fashion industry a viable option in the quest for more sustainable solutions.

Having said that, more solutions are emerging. Like novel textile fibres which are produced using alternative feedstocks or with improved processes. Some even have enhanced functionality. Perhaps you have already come across items of clothing made from plastic PET bottles, agricultural waste or even an old pair of jeans? Indeed, the fashion industry is undergoing a transformation - from its traditional linear system towards a circular economy.

Although the majority of novel textile fibres are still in early stages of development, commercialisation is accelerated by partnerships in the value chain. Typically, these partnerships are between novel textile fibre producers, usually start-ups, and well-established, global brand owners. It comes as

Key qualities and advantages of different fibres:



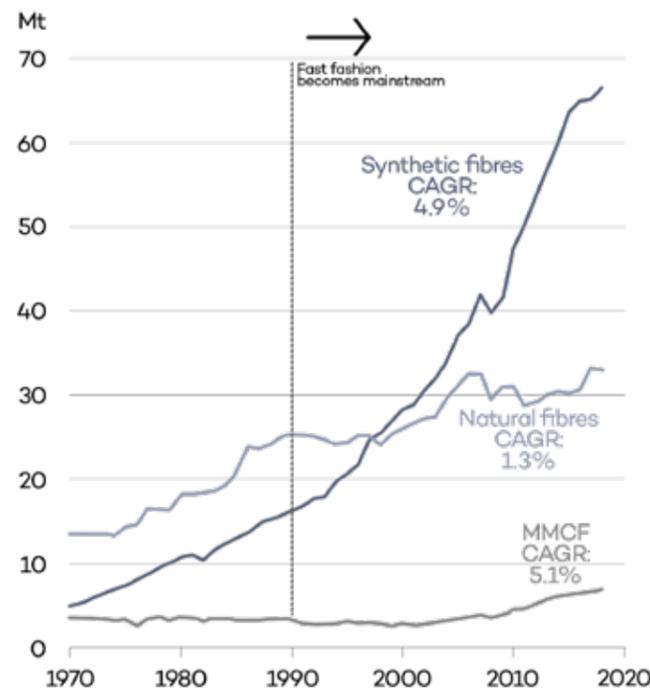
Cotton	Polyester	Man-made cellulosic fibres
Natural	Oil based	Wood based
Intensive agriculture	Synthetic	Renewable forests and plantations
High water footprint	High energy requirement	Low water footprint
Moisture absorbing	Moisture wicking	Moisture absorbing
Biodegradable	Durable	Mostly biodegradable
Sensitive skin friendly	Quick drying	Sensitive skin friendly
Warm and soft	Resistant to wrinkles	Soft and silky
Susceptible to colour fading	Less colour fading	Vivid colours

no surprise then that industry players such as Aditya Birla, Lenzing, Metsä Fibre, Sateri, Södra and Suzano, are taking note, and more importantly, taking action. All are hard at work developing fibres for threads that will stitch the fashion industry towards sustainability.

At AFRY Management Consulting, we could help you spin your fibres into this much-needed thread. We support our clients in identifying business opportunities across the textile value chain. We are particularly active in assessing the maturity of novel textile fibre technologies, in modelling the competitiveness of MMCFs vis-à-vis other fibres, and in discussion with brand owners on their renewable textile fibre needs.

One last thought. Have a look at what treasures you have in your closet. When the lockdown hit earlier this year, I finally got around to sorting out my closets. Hanging, fifth from the left, was a denim shirt which my mother bought me when I was still in primary school. The tag reads, "100% cotton, Age 13". And right next to this shirt, my new favourite dress. And its tag reads, "100% lyocell (TENCEL)".

World textile fibre demand



What if all decisions were based on up-to-date facts?

This year has seen the launch of a collaboration between AFRY and the Swedish Gapminder Foundation, an NGO founded in 2005 by Ola Rosling, Anna Rosling Rönnlund and Hans Rosling, authors of the best-selling book Factfulness.

What would we do if it suddenly became clear that a shift in our position on fundamental questions about life, society and economy was necessary? Well, this might be the case...

What Gapminder discovered, by measuring people's knowledge about the world through fact-based questions, is that the majority of people get a lot of questions wrong – even within their own field of expertise.

"The world is so complex, and we need to see the bigger picture when we make decisions. If we want to change work on the climate to improve how we do things, it will not be enough to look at one aspect of society. We are pretty interested in what AFRY is doing differently from the others and we have a lot to learn from AFRY. It feels very good to partner up, because it looks like the experts at AFRY are actually more knowledgeable than the other groups we have met, in many different ways. There are also a lot of areas where we do not have expertise but AFRY does, which we want to combine with our Gapminder method to create really meaningful material."

Anna Rosling Rönnlund
Vice President of Gapminder

Gapminder believes that we must all form a habit of double checking our knowledge, questioning it, trying to detect misconceptions and striving for more fact-based decisions. As a general trend, they have observed that people have systemic misconceptions about many parts

of society, health education, infrastructure, climate and so forth. The aim of the long-term partnership between AFRY and Gapminder is to identify knowledge gaps around the major societal issues of our time and to increase public knowledge of our world and global development.

How and why?

From the outset, Gapminder has promoted a fact-based world view and worked to make statistics and data more accessible so that more people can easily access an accurate understanding of the world we live in.

"For us as an engineering and design company we need to really make our decisions based on facts. And the need for facts has never been as big as right now."

Jonas Gustavsson
CEO of AFRY

Developing fact-based questions to test the public with is one tool Gapminder uses to achieve their objective and identify the most important areas to highlight. Gapminder's first knowledge test with 13 questions on global development has been used by over 1 million people around the world. Through the collaboration with AFRY, a new test is currently in development, with AFRY experts identifying subject areas, fact checking materials and providing advice and explanations.



What share of world land surface is covered by forest?

- A 3%
- B 13%
- C 31%

For the solution please turn the magazine to the right.

The Gordian knot

Current CO₂ markets and policies embrace carbon in forests, but do not recognise CO₂ benefits of substituting bioproducts for fossil based products with bioproducts. This undermines the role of the forest sector in climate change mitigation.

Growing forests removes large quantities of CO₂ from the atmosphere and stores it in trees and soil. When forests are managed sustainably, part of this carbon is stored, for a shorter or longer period, in various forest products. These products substitute fossil based products, they can be re-used and recycled, and at the very end of the cycle, they can be burned thus replacing fossil fuels.

A recent study published by Cepi indicates that the positive climate impact of this sector in Europe amounts to around 800 million tonnes of CO₂ equivalents annually, which corresponds to 20% of all fossil emissions of the European Union. Half of this impact relates to increased CO₂ storage in forests, another half to the substitution of forest based materials and energy by fossil based products and biomass.

The storage impact is well recognised, but the substitution impact is not included in carbon policies and markets. This is the Gordian knot that needs to be untied in order to capture all benefits of the forest sector in climate change mitigation.

It's bio, baby!

Forest products have a low carbon footprint, and they reduce demand for materials, products and energy that are fossil based. Concrete or plastic are examples of these materials. The existing climate reporting and policies do not take into consideration this kind of cross-sectoral impact. It is important to recognise that the forest based sector is a circular bioeconomy, which facilitates a simultaneous increase in carbon sinks and storage in

forests, and a range of substitution benefits provided by forest based products and bioenergy. The circular bioeconomy encompasses the production of renewable biological resources and waste streams into value added products, which can be recycled and maintained in the economy for several cycles with minimum waste. The circularity is based on sustainable forest management, which also provides large socio-economic benefits and facilitates biodiversity protection. Conserving forests for carbon storage would only terminate this circularity and substitution benefits, and result in increased fossil based emissions to meet the market demand.

A question of design

The policy imperfection is also embedded in carbon markets. Current market platforms take the CO₂ in forests into account, but they do not recognise the positive substitution impact of forest based products. While CO₂ stored in the forest has a value, the reduction in CO₂ emissions facilitated by forest based products and bioenergy does not have any value on these markets. This leads to massive-scale sub-optimisation in the long term from a climate perspective. CO₂ accumulation in forests is encouraged, resulting in lower forest growth and wood harvest over time. In the long term, when forests will become very old, this will lead to zero forest growth, harvest and substitution impact. Taking Europe as an example, this imperfection within the carbon market could, in theory, reduce the positive climate impact of the forest sector from 800 million tonnes of CO₂ equivalents to zero in the very long term.

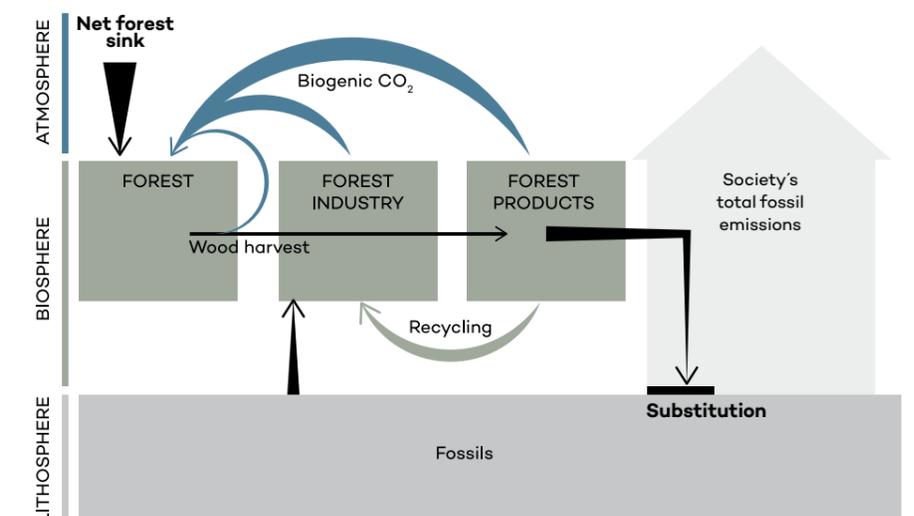
How can this Gordian knot be untied? It is obvious that climate policies and carbon markets should embrace the positive impact of product substitution based on the circular bioeconomy. Forests should not be seen only as carbon storage, but also as a sustainable source of non-fossil, renewable and recyclable materials for a range of uses, and carbon benefits of forest based products should be recognised. This circular flow and related positive climate impact can be enhanced over time based on sustainable forest management and afforestation of land areas that do not have competing uses.

Put a tree on it

Alongside policy development, market based solutions can be created to encourage product substitution to reduce CO₂ emissions. In order to recognise substitution impacts, they need to be quantified. This calls for systems for tracking carbon along the supply and delivery chain of forest products from forests to end use markets. Such systems can be based on Blockchain or similar technologies, supported by participants of the value chain collaborating and sharing data on product flows. These technologies can be used to develop an open, distributable ledger to record

the flow of carbon along the whole chain, from harvested wood to the processing and end use of a product. The participants, including industries, would greatly benefit from developing this technical solution, which would facilitate quantification of substitution benefits.

The Gordian knot, that prevents the forest and forest based industry sector from taking its full role in climate change mitigation, needs to be untied. With well-designed policies and efficient carbon markets, the benefits of a circular bioeconomy can be maximised, and development towards a carbon neutral global economy accelerated.



Advanced biofuel markets

Attractive opportunities for new entrants

 Esa Sipilä
esa.sipila@afry.com

Changing energy and climate policies in the EU have discouraged investments in advanced biofuel production prior to the Renewable Energy Directive revision (RED II) launched in 2018.

The Renewable Energy Directives (RED II) sets specific targets and limitations for liquid biofuels use for 2021-2030, which each member state needs to adopt into national legislation by the end of this year. For the first time at the EU level, RED II defines a binding subtarget for advanced biofuels, which refer to fuels made from a specific list of sustainable feedstocks - including lignocellulosics, algae, municipal solid waste, among others. The EU Green Deal is likely to bring another wave of changes also to RED II, but the ambition level is not expected to decline.

AFRY supports the Finnish government

AFRY has been at the forefront of advanced biofuel development for over a decade. In addition to our engineers, who have unmatched experience in advanced biofuel investment projects, our management consultants have been advising, for instance, the Finnish government on which is the most feasible and cost-efficient way to implement RED II into national law. Finland was one of the first countries to revise biofuel policies and to introduce advanced biofuel blending mandates through to 2030. As a follow-up to the successful advisory in road transportation, AFRY will have the privilege to continue supporting the Finnish government in autumn 2020, this time evaluating the possibilities to introduce a similar blending mandate also for aviation fuels.

Liquid biofuels - robust reduction enablers

RED II targets correspond to a liquid biofuel demand of almost 40 million tonnes in the EU by 2030, of which advanced biofuels contribute as much as 10 million tonnes. However, the biofuel demand in Europe is not limited to what is set forth in RED II. Emission reductions in the transport sector are also defined in the Effort Sharing Regulation (ESR), which aims at 30% overall greenhouse gas emission savings for all sectors outside the emission trading system, such as transport, buildings, agriculture and waste sectors. Liquid biofuels are among the few existing and robust means to lower these non-ETS emissions, which has made several member states to consider

implementing significantly higher biofuel blending rates than RED II in order to meet the Effort Sharing Regulation targets. Finland has a biofuel blending mandate of 30% in road transportation fuels for 2030, while Sweden has been discussing even more ambitious targets above 60% for the diesel pool.

AFRY's team has developed proprietary demand models for the biofuel outlook in specific EU countries. Eight leading countries - Germany, France, Italy, the UK, Spain, Poland, Sweden, Finland - alone represent close to 50 million tonnes of the demand for liquid biofuels in 2030, more than the entire EU-28 RED-targets.

European refiners predict significant investment

FuelsEurope, the European petroleum refining industry association, launched its fresh view on low carbon liquid fuels in June 2020. The publication is an outcome of a 3-year project and represents the views of 40 companies operating refineries in the EU. FuelsEurope members cover almost 100% of the petroleum refining capacity in the EU, and more than 75% of motor fuel retail sales. FuelsEurope's views are very much in line with AFRY's projections on future demand. The association predicts biofuel production based on hydrotreated vegetable oils (HVO) to double from 5 to 10 million tonnes between 2020 and 2030 in the EU, whereas lignocellulosic fuels production is expected to reach up to 4 million tonnes by 2030, representing EUR 25 billion in capital investments. Should the rate of adoption of electric vehicles exceed current trajectories, it would only make biofuel targets more achievable. Electric vehicles are primarily targeting passenger cars, whereas the largest volumes of advanced biofuels are used in heavy transport.

Existing producers up for attractive margins

The EU demand for advanced ethanol and drop-in fuels cannot be met with currently announced projects, even globally. In advanced ethanol production, only few flagship projects have been pursued

throughout the world, facing major challenges in ramp up, capacity utilisation and production economics. However, hopes are high for the second wave of investment projects that are due for commissioning in the next 2-4 years. Simultaneously, the advanced drop-in biofuels are getting a lot of attention as they lack the drawbacks related to blend wall, lower energy content and taxation. As the HVO feedstocks are increasingly limited, more lignocellulosic projects are needed throughout Europe. Many wood-based drop-in fuel technologies are still under development. The same flagship projects are triggering investment decisions and, have thus got quite a solid foundation.

Despite the strong market outlook, first of a kind advanced biofuel projects struggle to succeed with project-based financing. The investment costs of wood-based pyrolysis or gasification technologies are comparable to greenfield pulp mill investments, and advanced biofuels have their own pricing mechanisms, which are not pegged to conventional first generation biofuels. Owing to the turmoil in EU and national policies, producers face difficulties in securing long-term off-take contracts. Owing to the challenges in the supply ramp up, advanced biofuel business is expected to generate attractive margins to producers who can reach stable production with a high utilisation rate.

All in all, advanced biofuels have a very strong market outlook owing to EU policies and premium pricing. The demand for liquid biofuels will grow by over 30 million tonnes in Europe in the coming decade, creating a supply challenge and opportunities for new entrants. The challenges lie in first of a kind technologies and the bankability of the projects, which are both areas where AFRY is pleased to support our clients.

Increase profitability by doing more with less

Stefan Kucher
stefan.kucher@afry.com



Global resource use is growing rapidly at an unsustainable rate

Current economic development is consuming resources at an unprecedented speed and the manufacturing industry needs to act responsibly. Industrial producers are facing constraints as raw materials are getting scarcer, partly boosted by recent events and an increasing trend towards regionality in sourcing. Simultaneously, demographic changes are putting pressure on the volumes.

Create value from sustainability

Increased global demand calls for improved resource efficiency, requiring companies to pursue sustainability in everything they do, establishing ways to boost competitiveness using less resources. The adoption of sustainable practices into production processes when applied correctly can create a clear path towards resilience and profitability. Untapped opportunities within resource use and productivity improvements are enormous and sustainability initiatives do not need to come at high costs. On the contrary, they represent great opportunities also to increase performance, reduce operational risk and improve the engagement of the staff. At the same time, they require a significant change in the way companies are operating.

How can companies prosper while doing more with less

How can companies become more efficient and reduce costs, using less resources, creating less waste and drive their workforce towards a sustainable partnership? Traditionally, and especially in continuous production, productivity increases are evaluated against the previous period. This approach tends to materialise incremental improvements, but will always have its limitations since it typically focuses on select areas and lacks the perspective to maximum asset capability with the lowest possible material use, energy consumption and minimised time losses and waste. In the traditional way, there will always be heritage limitations since the obvious efficiency gains have been captured while others are often overlooked.

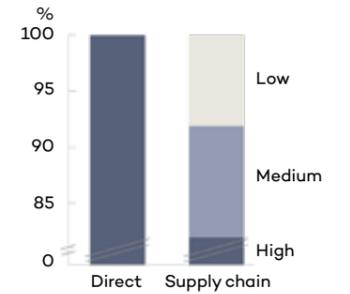
Unlocking the opportunities within sustainable production

A holistic approach to redesigning operations and underlying processes across the value chain including consideration to up- and downstream stakeholders is key for improved sustainability and prosperity. By launching effective and coherent implementation programmes with the target of improving resource utilisation and reducing environmental impact, bringing people and processes to the centre of attention, will elevate the whole operation to new levels. However, it is rather critical to combine sustainability and resource efficiency with business performance. The focus must go beyond manufacturing processes including the application of digital tools and involving the operative organisations at early stage, engaging them in the process from the planning to the eventual implementation of the change. This will not only increase the job satisfaction of the staff, but can also unlock new ideas and opportunities for the entire organisation.

AFRY experience

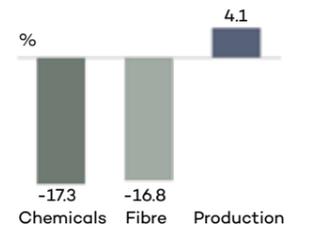
We at AFRY have been supporting our clients in the improvement of their operational efficiency by enabling them to challenge and change operating procedures, management processes and maintenance operations. We also assist our clients with technical process improvements and problem solving, utilising our proven methodology, which initially reveals the difference between current and potential performance. All this is based on sound analytics and process insights into operations, supply chain and organisation. It enables the capture of the identified opportunities through a robust change management capability combined with thorough technical and operational expertise.

Nature dependency in forest industry



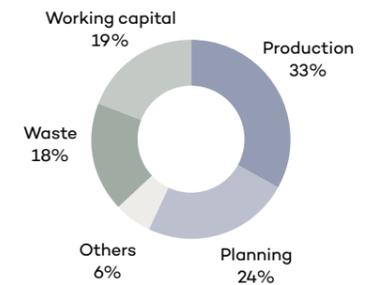
High dependency on natural resources especially in the forest industry directly and in the downstream value chain. Risk in total is increasing as higher demands are putting stress on the supply and demand system.

Fibre and chemical reduction



Another successful project in the pulp and paper industry achieving a reduction in fibre consumption of 16.8 %, while at the same time reducing chemical consumption by 17.3 % and increasing total production volume by 4.1 %.

Waste savings example



Waste reduction for a global producer of nonwoven materials. Quite demanding products with the specific downside that internal recycling and waste utilisation is forbidden, due to the fact that the fibres are bonded with heat and injection of latex as bonding agent. Throughout the successful project we managed to reduce the production waste by 18 % as part of the holistic improvement project.



AFRY
ÁF PÖRY

Making Future