

Planet

A greener, bluer planet

For many years, our operations have been designed on a circular economy model. This means seeking closed loop solutions, maximising resource efficiency and minimising waste, including CO₂ emissions. It also means supplying packaging that protects our customers' products and avoids packaging waste and litter. In 2020, we increased our contribution by targeting Net Zero CO₂ emissions by 2050.



Packaging solutions sold as Chain of Custody certified

93.8%

Reduction of relative waste sent to landfill

-23.7%

Reduction of relative CO₂ emissions (since 2005)

-37.3%

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Key Principles

We operate a circular business model using mostly recycled fibrous raw material. The virgin fibrous raw material we use is renewable and from a sustainable origin. We reuse or recycle side streams and we use renewable energy and strive for energy efficiency where we can. This circular approach increases resource productivity, adding to our competitiveness.

Our circular business model starts with sustainable primary raw materials. Our integrated approach to producer responsibility and paper recycling means that 75% of our raw material is recycled fibre. We use organic by-products as biofuel, circulate our process waters as many times as we can and we collaborate with local organisations to find alternative uses for the rejects we receive with our recovered paper deliveries, that we cannot use in our processes.

In our product development phase, we work towards synergies within the whole value chain. For example, by designing mono-material packaging solutions, we create efficiencies in our customers' packaging lines, and we improve the recyclability of the packaging after use.

Forests themselves are a closed loop system, fundamental for local climate and water systems. When managed sustainably, they also provide raw materials for industry and employment.

Key Achievements in 2020

We have set ambitious new targets as part of our Better Planet 2050 initiative, including for Net Zero carbon CO₂ emissions, the first among our industry peers. We also increased our intermediate target to achieve a 55% intensity reduction in our CO₂ emissions by 2030, compared with 2005. In 2020, our steady progress against our CO₂ target reached a 37.3% intensity reduction since 2005, our baseline year.

[→ Read more on pages 31-32](#)

As we look to provide assurance about the sustainable origin of the raw material we use, we increased our Chain of Custody certified packaging deliveries to customers' target to 95% and reached a level of 93.8% in 2020.

[→ Read more on pages 34-35](#)

Chemical Oxygen Demand intensity levels in our water discharge were further reduced in 2020, reaching a 38.2% reduction since 2005 against our target of 60% by 2025. Although we are more a processor of water than a consumer of water, we are committed to sustainable water stewardship and introduced a water intake intensity reduction target for our paper mills of 1% annually.

[→ Read more on pages 39-41](#)

We made significant progress in reducing the amount of waste we send to landfill, achieving a 23.7% reduction of waste per produced tonne of paper in 2020, compared with 2013. We are targeting a 30% reduction by 2025.

[→ Read more on pages 42-43](#)

We completed a €134 million investment in a new recovery boiler at our Smurfit Kappa Nettingsdorf Pulp Mill in Austria, which will decrease our CO₂ emissions by 40,000 tonnes.

A new waste sludge press at our Smurfit Kappa Cali plant in Colombia decreased the waste sent to landfill by 47%.

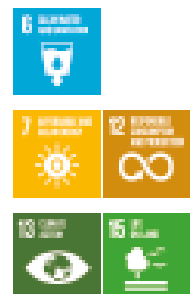
[→ Read more on page 43](#)



Delivering for SDGs

Smurfit Kappa Impacts

Smurfit Kappa has a direct impact on clean water resources, affordable and renewable energy, and forest biodiversity and ecosystems. Through our efforts to reduce the climate impact of our operations as well as our products that help our customers reduce the climate impacts in their supply chain, we contribute to the global climate action. Supplying our customers with sustainable packaging solutions that protect their products from damage and inform consumers of their contents, we are part of the responsible consumption and production chains. We have set measurable targets in all these areas.



Smurfit Kappa Supports

Smurfit Kappa supports local communities through its paper recycling operations, and is part of the infrastructures for sustainable communities. By replacing plastic packaging, our products help preventing plastic litter from entering water bodies and harming water ecosystems, and our Better Planet Packaging initiative helps raise awareness in this area.



Planet continued

Responding to our Stakeholders

Climate Change

What we believe

We are tackling our CO₂ emissions by improving our energy efficiency, as well as moving from fossil fuels to bio-based energy. In addition, we are improving resource efficiency when producing paper products and optimising the use of raw material residual streams, such as black liquor, in bioenergy production. The circular economy is an opportunity for our business as we seek to use resources efficiently, especially in energy production and the creation of innovative packaging solutions. We collect sustainability data in innovation and product design, develop supportive tools and services, and create packaging solutions for customers that lower their carbon footprint.

What our stakeholders expect from us

Paper manufacturing is energy intensive, and our stakeholders, notably customers and investors, expect us to approach climate change responsibly and provide detailed progress reports. However, we can make a significant impact in the value chain through smart packaging solutions that can significantly cut our customers' emissions.

Our commitments

Commitment #1: A 55% relative reduction in Scope 1 and 2 fossil fuel based CO₂ emissions in our mill system compared with 2005 levels by 2030. Reach at least Net Zero by 2050.

Commitment #2: Collaboration with customers to determine carbon footprints of the packaging life cycle.

Forest

Promoting sustainable forest management involves managing supplies of sustainable, renewable fibre, while protecting biodiversity and ecosystems as well as creating employment in rural areas. Wood fibres can be recycled up to eight times when producing paper-based packaging. Using both recycled and virgin fibres in production, we deliver fit-for-purpose packaging with the best overall environmental footprint. We communicate transparently about the sustainable origin of our fibres.

As growing consumption raises pressure on resources, our stakeholders increasingly place value on sustainable consumption, integrity of origin, recycling and avoiding packaging waste. Sustainable forest management and use of recycled fibres are at the core of the expectations for paper-based products.

Commitment #1: All fibre produced and purchased is CoC certified under FSC, PEFC or SFI (Sustainable Forest Initiative).

Commitment #2: At least 95% of our packaging is certified as CoC certified under FSC, PEFC or SFI.

Commitment #3: All production sites use FSC, PEFC and/or SFI CoC standards.

Water

Over 90% of the water we use is returned to nature in good condition, and the rest is emitted to the air during the process or is bound to the product. We focus our efforts on further improving the quality of water we discharge, decreasing our water intake and understanding the risks associated with water availability and use in the areas where we operate. This strategy positions us well to deliver a positive change to our processes and the environment.

Stakeholders are increasingly requesting information about our responsible water stewardship covering our paper and packaging production as well as our supply chains. Our key water footprint consists of paper manufacturing and forest and plantation management.

Commitment #1: Reduce the organic content of water returned to the environment from our mill plants (COD) by 60% compared with 2005 levels by 2025.

Commitment #2: Perform environmental impact assessments of the water use of our paper mills (where relevant) and develop water usage measurements.

Commitment #3: At least 1% intensity reduction annually of water intake by our global paper and board mill system with 2020 as reference year.

Waste

We believe the circular economy is the business model for the future, and that we have an important role to play in it. Our products are designed to prevent loss and damage to the consumer goods they protect. Our packaging is produced efficiently and is 'right-weighted' to optimise resource use and minimise waste, and it is made from 100% renewable and recyclable fibres. Once fibres are depleted they are typically used for energy generation or in agriculture.

Avoiding customers product and packaging waste, circular economy and efficient use of raw materials are material issues for our stakeholders, and many of our customers have stated objectives to reduce waste.

Commitment #1: Decrease the waste sent to landfill by 30% per tonne of product produced by our mill system compared with 2013 levels by 2030.

Progress made in 2020

Progress made: Since 2005, we have reached 37.3% reduction. In 2020, Smurfit Kappa is committed to align its CO₂ target with the Science Based Target initiative and also to support the recommendations of the Task Force for Climate-related Financial Disclosures.

Progress made: Our suite of tools that help to determine the carbon footprint of our customers' packaging were used, on average, 11,000 times a day.

[→ Read more about our progress on pages 30-33](#)

Delivering for SDGs

As an energy-intensive manufacturing business that uses natural resources, Smurfit Kappa has a direct impact on affordable and renewable energy. Through our efforts to reduce the climate impact of our operations as well as our products that can help our customers reduce the climate impacts in their supply chain, we can contribute to the global climate action.

Smurfit Kappa contributes to the realisation of the following SDG and targets:



7.2, 7.3 and 7.A 12.6 13.1, 13.3

Scope

- This priority area covers energy use, climate change and greenhouse gas emissions. Our reporting covers our operations from gate to gate.
- All CO₂ emissions from our paper and board mills relate to the production of paper and board.
- Only paper and board production is taken into account given its fossil CO₂ emissions are 80% compared with our converting operations and its subsequent contribution to fossil fuel CO₂ emissions.
- For Scope 3 emissions, we currently cover transport in Europe and Colombia only. We are currently evaluating our Scope 3 emissions in depth and expect this evaluation to be finalised latest in 2022. As we are highly integrated from the sourcing of our key raw materials to the production of our own products, we believe Scope 3 emissions are relatively low compared with our Scope 1 and 2 emissions.

Progress made: We continued to produce and purchase 99.8% of our fibres under fibre origin management systems that are CoC certified in 2020. This is within our margin of 1% variation.

Progress made: 93.8% packaging solutions sold as Chain of Custody certified in 2020.

Progress made: All production sites use FSC, PEFC and/or SFI CoC standards.

[→ Read more about our progress on pages 34-37](#)

As a paper-based packaging company that uses recycled and virgin fibres as its key raw material, Smurfit Kappa has a direct impact on ending deforestation and supporting forest biodiversity and ecosystems.

Smurfit Kappa's forestry and sustainable fibre sourcing actions impact the following SDGs and targets:



12.2, 12.4, 12.5 and 12.6 13.1 15.1, 15.2, 15.3, 15.5 and 15.8

- This strategic priority covers forest management, biodiversity, fibre sourcing and the communication of how we use sustainable fibres through certified Chains of Custody.
- Our reporting encompasses all of our own operations and products.

Progress made: Since 2005, we reached a 38.2% reduction.

Progress made: During 2020 and the first quarter of 2021, two new sites were assessed. All relevant sites have been assessed.

Progress made: New target, first reporting of our progress will be in 2022 over the year 2021.

[→ Read more about our progress on pages 38-41](#)

Water is a critical element in pulping wood and recovered paper-fibres and formation of paper. With returning the water back to the nature, Smurfit Kappa has a direct impact on clean water resources.

Smurfit Kappa's water management practices impact the following SDGs and targets:



6.1, 6.2, 6.3, 6.4 and 6.6 12.2, 12.4 and 12.6

- This priority area covers the water intake and discharge to and from our processes. The data covers all Smurfit Kappa paper and board mills discharging water produced through the process directly to water bodies. Mills that have their process water treated externally are not included.
- Only paper and board production is taken into account because this contributes to 95% of all organic discharges and 98% of total water intake.
- Our target is set against Chemical Oxygen Demand (COD) in water which is an indicator of the organic content in water.

Progress made: Since 2013, we reached a 23.7% reduction.

[→ Read more about our progress on pages 42-45](#)

As a paper-based packaging company that uses recycled fibres as its key raw material and that produces packaging solutions that are recyclable and recycled, and help to reduce waste of packaged goods, Smurfit Kappa has a direct impact on responsible consumption and production.

Smurfit Kappa's circular business model and packaging design impact the following SDG and targets:



12.2, 12.3, 12.4, 12.5 and 12.6

- This priority area covers non-hazardous waste (recovered and landfilled) and hazardous waste generated from Smurfit Kappa's manufacturing processes.
- Our target is set against waste sent to landfill from our paper and board mills per produced tonne of paper.
- The amount of hazardous waste produced in our production processes is very low and depends on local activities such as construction or change of light bulbs on site. Therefore we have no set target for hazardous waste.

Planet continued

The UN's 2030 Agenda for Sustainable Development calls for action via 17 Sustainable Development Goals, and both the Paris Climate Accord and the EU have set tough carbon targets. By 2030, the Paris Accord aims to limit climate change to under 2°C and the EU commits to reducing CO₂ emissions by 55% compared with 2005 by 2050. Achieving these requires a shift from linear to circular economic models, creating an era of opportunity and a need for innovation. At the same time, all parts of society need to set common targets. With its Net Zero ambition, Smurfit Kappa is well placed to make these targets a reality.

Circularity has been our business model since our inception, so we are in the lead as the circular economy goes mainstream. Our operations in 35 countries, and 356 production sites in Europe and the Americas, influence the whole packaged goods value chain. We drive positive change from sustainable and responsible raw material sourcing to minimising operational impact and lowering our customers' environmental footprints.

Our environmental sustainability strategy is in four main areas: Climate Change, Forest, Water and Waste. These strategic priorities cover the most material environmental aspects in accordance with our business and stakeholders expectations. They cover biodiversity, the circular economy, climate change awareness, energy use and emissions, pollutants to air, litter on land and oceans, responsible forestry, water quality and scarcity, as well as waste to landfill.

Risks and Challenges: Limits of Resources

Our challenge is to create value within natural resource limits, maximising resource productivity while minimising our environmental footprint.

Climate Change

Climate change is one of the greatest challenges facing society. Our stakeholders are looking for low-carbon alternatives, and therefore we create packaging that is circular by nature.

Climate change has the potential to impact our business operations in a variety of ways. We have identified, assessed and responded to climate-related risks and opportunities and our identified transition and physical risks, have been detailed in our CDP Climate Change response. Extreme weather patterns may affect our operations and supply chain, potentially impacting forests, water, carbon regulation and taxation, and energy availability and affordability.

Forests play an important role in environmental resilience. We therefore need to promote healthy forests and manage these resources sustainably. Drought, flooding and local restrictions on water usage may limit our access to water, so we have been conducting water risk assessments at our paper mills.

Furthermore, paper manufacturing is energy intensive, with a risk of carbon leakage if emission policies are not consistently applied. We recognise that climate change will only be slowed or stopped by a global low-carbon economy, and as we do 78% of our business in Europe, we fully support the EU Green Deal. However, to retain global

competitiveness, there must be safeguards against 'carbon leakage' – firms moving to areas with weaker carbon policies.

The Forest Fibre Industry 2050 Roadmap to a low-carbon bio economy shows a CO₂ reduction of 50%-60%, compared with 1990 levels, is possible for our sector, based on available and emerging technologies. To reach a reduction of 80% or more by 2050, break-through technologies must be available by 2030.

Scarce Resources

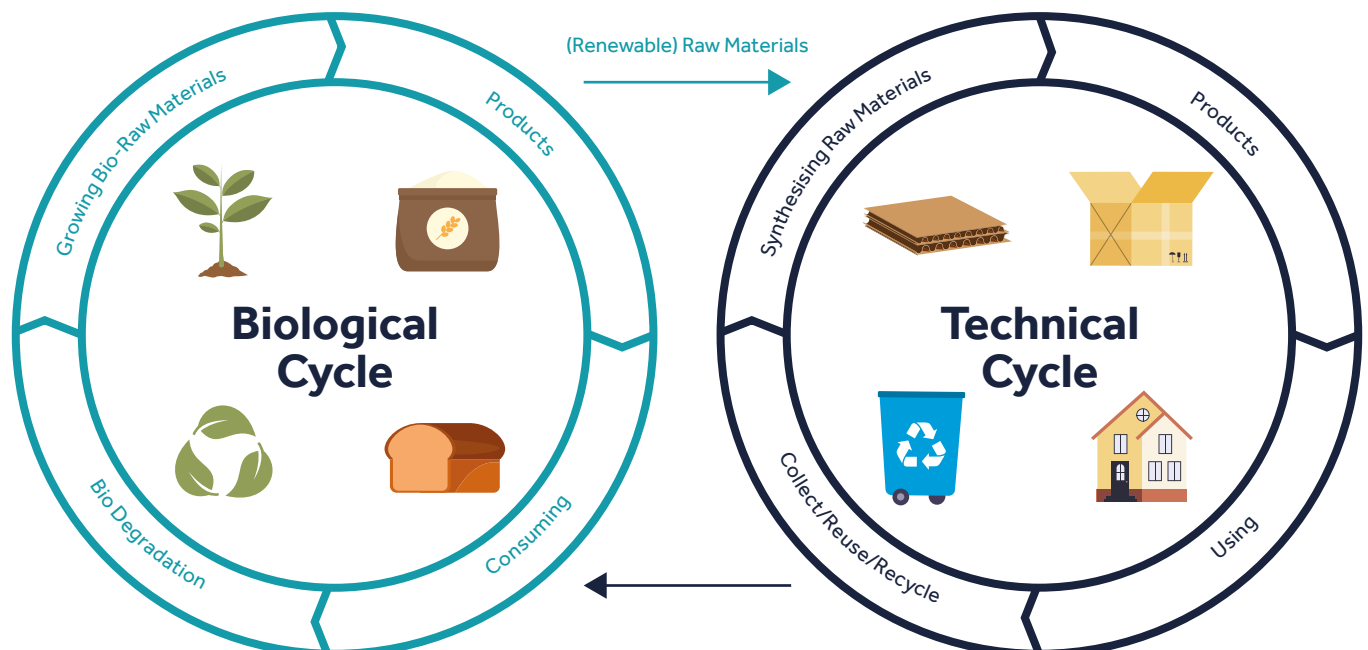
Our stakeholders expect Smurfit Kappa to use sustainable raw materials efficiently, especially forests and fibrous raw material. Halting deforestation is a particular concern for businesses supplying consumer goods and food who tackle this issue in their supply chains. Smurfit Kappa commits to only sourcing sustainable wood and fibre.

To decrease fossil CO₂ emissions we must shift to renewable energy. However, government incentives encouraging use of biomass for energy could lead to increased competition and higher raw material costs, putting paper packaging at a competitive disadvantage.

Packaging recycling and recyclability remain high interests for our stakeholders. Paper-based packaging holds a good position here with its 91.6% collection rates and 84.2% recycling rates in Europe.

Water scarcity remains a concern. Freshwater resources are not evenly distributed globally, and human activity is still degrading its quality.

The Circular Economy



Our water risk assessments and other measures confirmed that our mills' water use has no impact on water availability to neighbouring areas.

Opportunities: Embedding Circularity

A part of circularity is knowing the source of our raw materials and returning them to the production cycle. We depend on natural resources, so we aim to make our operations restorative by minimising waste and improving efficiency. We source natural materials responsibly, replacing and reusing resources and working with our partners to deliver better circular outcomes.

Using renewable wood fibres makes us a part of the biological and technical cycles of the circular economy (diagram on page 28). The biological cycle is called bioeconomy, and covers production and maximal value capture of renewable biological resources, including their reuse, recycling and sustainable return through biodegradation. The technical cycle covers the circularity of mainly non-renewable processed resources. Paper and paper-based packaging are involved in both cycles and move between them.

Part of the Bioeconomy

We also recover paper packaging from our customers, making our packaging production part of our product's end-of-life. For us, material efficiency means that we are recycling our fibres as long as possible, practically producing new packaging from old packaging. However, as a natural, organic raw material, wood fibres lose their quality after an amount of times being recycled. We exist in both bioeconomy and technical cycles of the circular economy, making us an efficient user of sustainable renewable raw material.

The virgin fibres used by the paper industry are mostly from the removal of young trees to support forest growth, or as wood chips from sawmills, both of which are fully renewable, sustainable and reusable.

A total of 75% of our raw material is recycled fibre – the remaining 25% comes from sustainably managed forests through Chain of Custody certified supply chains. Paper-based packaging has the highest recycling rate of any packaging. Trees sequester atmospheric carbon, which remains sequestered in our fibres. Forests also contribute to the water cycle by regulating climate and purifying water. They also supply local industry and provide employment.

Smurfit Kappa participates in sustainable forest management through its own forests and plantations, and by only sourcing fibres from sustainably managed forests.

Closing Loops

We continually work towards material efficiency, and aim to use all our production by-products ourselves, or by finding synergies with neighbours and local communities. Paper clippings from corrugating and converting operations are returned to our paper mills. Organic by-products – wood bark, dust and black liquor – are used as biofuel. We work with local organisations which can use other materials, for example some water treatment sludges become soil improvers in road construction, and waste ash can be used in the cement industry.

We recycle our process waters several times, and invest in best practice water treatment. Biogases from this become fuel for our Combined Heat and Power plants. At some sites we work with local communities, sending our effluent to local municipal water treatment plants, where it can replace necessary nutrients.

Reducing Leakage

Paper-based packaging collection rates were higher than for any other packaging material at 91.6% in 2018. Material leakage happens when used products are not being recycled but end up in landfill or as litter.

Paper benefits from being relatively easy for consumers to recycle. We work with municipalities and retailers to collect discarded paper packaging for recycling, and the demand for this is constantly increasing. Our fit-for-purpose packaging avoids over-packaging and waste, and we offer mono-material packaging solutions of corrugated board and paper, facilitating recycling. Eventually it returns to the biological cycle, and if it doesn't return to the recycling loop, it can either be combusted, releasing only the amount of CO₂ it captured while growing, or degrades naturally, reducing the environmental footprint of the leakage.

Ingenious Bioeconomy and Circularity Thinking

We believe all environmental improvements matter, and we encourage local solutions. Our Smurfit Kappa paper mill in Piteå, Sweden, and corrugated plants in Bogota and Medellin, Colombia, have both been creative in their efforts to work better for the environment.

Pine resin creates a sidestream of tall oil. This oil is used in the production of biodiesel, a green sustainable non-fossil fuel with lower CO₂ emissions than regular diesel. Pinewoods vary in the amount of tall oil they can produce and some of it gets lost as everything goes through the same process. At the Smurfit Kappa Piteå mill, the team came up with a range of ingenious solutions: from a camera

in the window of the recovery boiler so that the operator could monitor the amount of tall oil; to monitoring the pH balance and the temperature. The tall oil soap must be broken down to extract the useful oil, so a new tailor-made product was created to do this, increasing the extraction efficiency from 33% to 47%. More tall oil means more biodiesel.

In Colombia, two projects are using rainwater to achieve our goal of 1% reduction per year in water consumption.

At the Smurfit Kappa Medellin plant, rainwater storage has increased from 15m³ to 39m³, and is now the preferential supply for the boiler, only switching to the municipal aqueduct if this runs dry.

At Bogota Corrugated, rainwater was collected from the open vehicle area and treated before being used in the plant. €7,000 was invested, leading to 60m³ of water per month being recovered. This project won the Bogota Elite Environment Excellence Award for generating sustainable development.

Smurfit Kappa Piteå paper mill, Sweden



Climate change

Minimising energy use and moving from fossil fuels to renewable sources, including biomass, are core elements of our Climate Change strategy aimed at reducing our fossil emissions in line with the Paris Agreement, reaching at least Net Zero by 2050.

Mitigating Climate Change is the most pressing issue of our time and our strategy is to reduce fossil CO₂ emissions throughout our value chain. Our drive for energy efficiency reduces climate impact and lowers cost. Aligning our Climate Change strategy with the UN 2030 SDGs 7 (affordable and clean energy), 12 (responsible consumption and production) and 13 (climate action) which are related to climate change, our focus is on increasing our own production and energy efficiency, lowering customer carbon footprints and decreasing CO₂ emissions in our supply chain through e.g. transport optimisation. Focus on contributing to these UN 2030 SDGs and our circular business model makes us an

efficient user of natural resources such as wood and energy, and leads to optimal use of residual product streams.

As part of our Better Planet 2050 initiative, we announced our support to the recommendations of the Task Force for Climate-related Financial Disclosures and will have our intermediate CO₂ reduction target validated by the Science Based Target initiative (SBTi).

In line with the efficient resource use hierarchy, we only use wood biomass for which no higher value-added purpose exists as fuel and we also use residual products of wood such as black liquor to generate energy.

In line with our Climate Change strategy, we have set targets on reducing our CO₂ emissions by 55% by 2030. To support this, we have set a CO₂ reduction programme that focuses on energy efficiency and a shift towards renewable energy.

The key focus of our energy efficiency investments is to deliver CO₂ emission reductions, however, we support the EU general energy efficiency target with our target to improve our energy efficiency at least by 1% annually in our global paper mill network.

Next Generation Energy in France

“It’s an exciting project because it’s working for the future. Everyone knows you can generate power sustainably, but this project will prove you can keep it,” says Rémi Poirson, team leader of the HYFLEXPOWER project at the Smurfit Kappa Saillat paper mill.

“Our Group is targeting Net Zero carbon CO₂ emissions by 2050 and also Smurfit Kappa Saillat paper mill is deeply committed to using renewable energy,” says Remi. There is an issue of availability with most renewable energy sources: when energy demand is high,

the sun cannot be made to shine, or the winds to blow. Storing energy sustainably has always been a challenge for ‘green’ energy.

Partnering with ENGIE, a French energy company specialising in renewable sources, the Smurfit Kappa Saillat Mill created HYFLEXPOWER – a highly innovative and advanced combined hydrogen storage cell and turbine. The Smurfit Kappa Saillat mill will be the first mill in the world to store and generate ‘green’ energy from the national grid, with zero carbon emissions.

As a large user of energy, with its own Combined Heat and Power plant, the Smurfit Kappa Saillat mill is ideally placed for this experiment in storing sustainable energy. It has other advantages as well.

HYFLEXPOWER is a European project – the EU Horizon Framework Programme for Research and Innovation invested €10 million in it, with a further €5 million invested by a number of stakeholders. As it is a research project, these include several universities – in Greece, Sweden, Germany and London. Construction will begin in 2021, with a pilot due to commence in 2022.

“This project is the first of its kind, and will demonstrate our commitment to sustainability and sustainable energy,” concludes Remi.



Carbon Fixed in our Trees in Colombia

Every year the trees in our plantations sequester carbon from the atmosphere and store it in the growing stock.

To calculate this, we use a methodology, developed in collaboration with the Ministry of Agriculture and Rural Development (MADR), National Centre of Coffee Research (CENICAFE), and several forestry companies to quantify the growth and carbon sequestration capabilities of commercial pines and eucalyptus species grown under tropical conditions.

The model calculates the biomass and mineral composition, including carbon, in each of the compartments or organs, by simulating physical and physiological processes such as photosynthesis,

respiration, partitioning of assimilates and leaf growth, among others, based on climatic information (daily sunshine, maximum and minimum daily temperature), and the location of the plantation planting site (latitude, longitude and altitude).

Our plantations in Colombia have been established on land that has been in low-productivity use. Since the start of our forestry operations in Colombia, we have established sustainably managed tree stock which has increased the CO₂ sequestration capacity and carbon stock to a total current storage of over 9 million tonnes of CO₂ equivalents. In 2020, the biomass on our plantations sequestered in total a little

over one million tonnes of CO₂ eq from the atmosphere, a figure similar to the CO₂ eq in the wood we harvested, and stored in total 9,15 million tonnes of CO₂ eq from the atmosphere in our growing trees inventory that remains at this level year on year.

CO₂ eq sequestration (tonnes)
1,038,617

CO₂ eq storage (tonnes)
9,148,764



Progress in 2020

In 2020, we announced as the first of our peers, targeting Net Zero carbon emissions by 2050 and increased our intermediate carbon CO₂ emission reduction target to 55% by 2030, up from 40% which aligns the target with the EU Green Deal Climate strategy and the Paris Agreement objectives. To tackle climate change, we are using less fossil fuel and emitting less CO₂, promoting renewable sources and closing loops to create circularity in our production process. There are three parts to our CO₂ reduction programme:

- **Investing in efficient energy generation**
 - Investing in highly efficient Combined Heat and Power (CHP) systems; and
 - Improving the efficiency of our existing boilers.
- **Investing in efficient energy use**
 - Investing in technologies that reduce energy consumption; and
 - Re-engineering our processes and implementing smart energy efficient solutions.
- **Investing in fossil CO₂ reductions**
 - Where possible, shifting to CO₂ neutral biofuels and other renewable solutions.

Between 2005 and 2020, we achieved a 37.3% reduction of relative CO₂ emissions from our mills. Our global CO₂ emission reduction programme currently covers 100% of our operations with a focus on the paper and board operations that represent 10% of global operations but emit over 80% of our CO₂ emissions. The key achievements under energy efficiency and renewable energy during 2020 have been introduced in the following:

In 2020, we finalised an evaluation of a suitable CO₂ emission target for our corrugated operations. Our conclusion is that the current

approach to encourage any change is sufficient as the average share of a corrugated site to the Group CO₂ emissions is below 0.5%.

Energy Efficiency

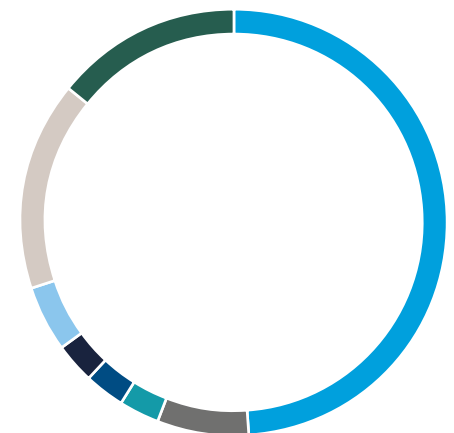
Further progressing in energy efficiency is key in achieving our CO₂ emission reduction targets. Since 2005 we have invested €850 million in more efficient energy generation, technologies that reduce the use of energy and technologies that recover energy. Examples of this are investments in e.g. Combined Heat and Power generation, and heat exchangers. These investments have improved overall energy efficiency in our paper mill system by 17%.

The 2020 key events that resulted in a 37.3% reduction of relative CO₂ emissions compared with 2005 were:

- Smurfit Kappa Nettingsdorf, Austria, started its new recovery boiler in Q2 2020 resulting in 19.6% CO₂ savings per tonne of paper.
- Smurfit Kappa Morava, Czech Republic, had a shoe press installed to improve dryness and using less energy for drying. This resulted in 11.2% CO₂ savings per tonne of paper.
- Smurfit Kappa Wrexen, Germany, had heat recovery equipment installed on both paper machines and resulting in 3.6% CO₂ savings per tonne of paper.
- In addition, grid electricity purchased in Austria, Colombia, the Netherlands and the UK are non-fossil certified, resulting in reductions of Scope 2 emissions.

The above mentioned projects are an illustration of the fact that reducing energy usage is both a strategic sustainability as well as business imperative for our paper and board mills.

Our packaging causes only 3% of the carbon footprint in the food product value chain

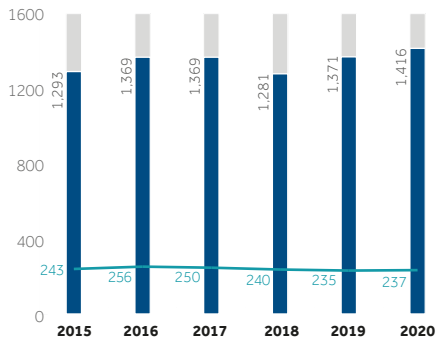


- Key:
- Food supply (farm/sea) as prepared food leaving the factory – 49%
 - Primary packaging – 7%
 - Secondary and transport packaging (Smurfit Kappa's product) – 3%
 - Factory to shop transport – 3%
 - Retail – 3%
 - Consumer shopping – 5%
 - Consumer cooling/freezing – 16%
 - Consumer cooking – 14%

Source: Inkpen, 2008

Planet continued

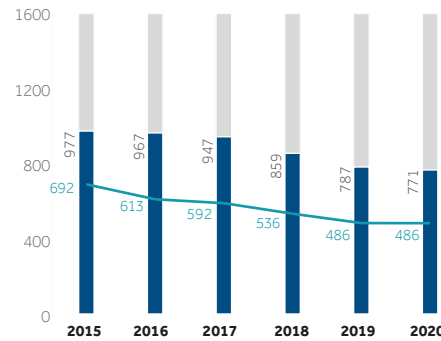
Direct Fossil (Scope 1) CO₂ Emission: European Mills



Key:

■ Absolute – (kt) ■ Specific – (kg/tonne)

Direct Fossil (Scope 1) CO₂ Emission: The Americas Mills



Renewable Energy

To reach our CO₂ emission reduction target, we are moving from fossil to renewable fuels. During 2020, our paper mills used 51.1% biofuels, compared with 37.4% in 2005.

The Smurfit Kappa Nettingsdorf mill in Austria started its bioboiler in April 2020. This further supports our shift to renewable energy. Our Smurfit Kappa Piteå mill in Sweden has had its energy production biofuel based since 2018.

As part of our sourcing strategy for grid electricity, we are shifting to CO₂ neutral energy. During 2020, our operations in the Netherlands and the UK moved to purchasing CO₂ neutral electricity from the national grid.

Working with our Customers

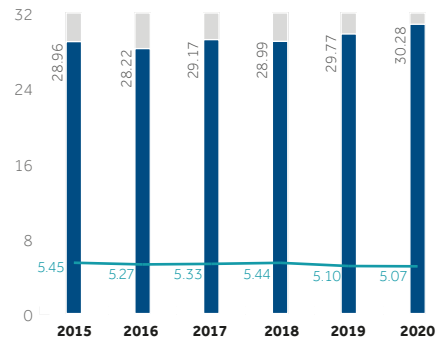
Using a suite of tools, including Paper to Box and Pack Expert, we work with customers to determine their packaging's carbon footprint. These tools provide CO₂ emissions data and other information to optimise solutions. On average in 2020, Paper to Box was used almost 10,000 times per day and Pack Expert over 1,400 times per day. Use of Pack Expert continued to grow from 2019, due to expanded use in the Americas and increased customer interest in using our research-based expertise. As we have achieved a 37.3% reduction of CO₂ emissions, these tools help use this data for our customers' benefit.

Our InnoTools suite of design software also shows customers the carbon footprint for each packaging unit and tracks its development over time.

Emissions from Transport

Since 2017, we have included emissions in our transport-related supply chain decisions. Our strategy focuses on three opportunities to decrease CO₂ emissions: maximising efficiency through payload optimisation and reducing

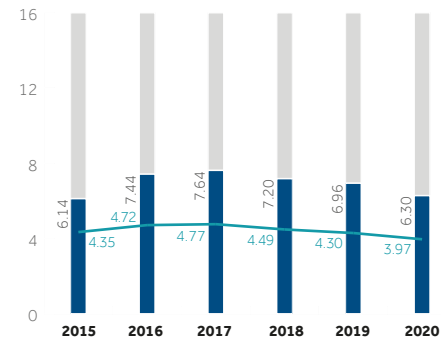
Biofuels: European Mills



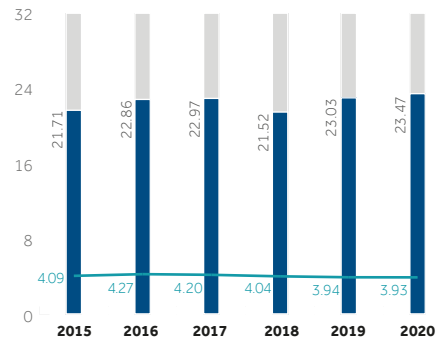
Key:

■ Absolute – (PJ) ■ Specific – (GJ/tonne)

Biofuels: The Americas Mills



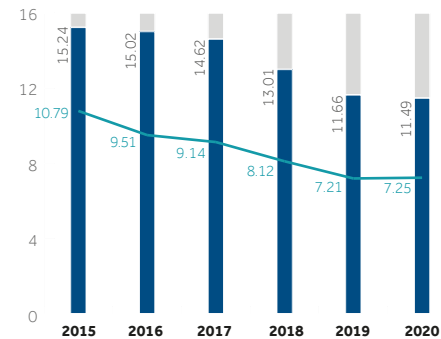
Fossil Fuels: European Mills



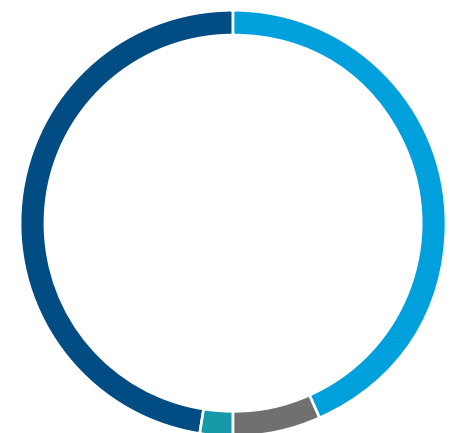
Key:

■ Absolute – (PJ) ■ Specific – (GJ/tonne)

Fossil Fuels: The Americas Mills



Direct Fuel Consumption, All Operations



Key:

■ Natural gas – 43.6% ■ Coal – 6.6%
 ■ Other fossil fuels – 2.4% ■ Biofuels – 47.4%

empty mileage; developing a good mix of road, rail and water transport; and using less carbon-intensive fuel technologies. Data management is essential. Since 2018, we have included CO₂ emission data in logistics decision-making for all our European operations which cover 78% of our business. The transport streams and scope of our reporting are described in the diagram below.

In the reported CO₂ emissions, we include the transport of wood, recovered paper and market pulp, as well as from transporting intermediate products such as reels of paper, corrugated and solid board sheets from paper mills to converting plants. In 2020, these were the equivalent of 348,000 tonnes of CO₂. We also report CO₂ emissions from delivering to customers – all road transport, representing CO₂ emissions of 106,000 tonnes. In 2020, the total of these transport-related emissions represented 453,000 tonnes of CO₂ equivalent.

Whilst CO₂ emission calculation for paper reel transport between our own mills and converting plants is accurate (representing 68% of the total volume), we also have a good estimate for emissions when reels of paper are supplied to our corrugated plants by third parties. While corrugated transport is mainly by road over shorter distances, for all remaining transport we operate a modal mix of 4% rail, 7% water and 89% road transportation, based on shipped volume.

A pilot project to measure transport emissions in the Americas region started in 2019. We have now mapped the transport streams similar to Europe and estimated the transport distances. Given that local transport emission factors are not yet available for Colombia, we have applied the European GLEC reference emission factors to the Colombian transports. The average transport distance in Colombia is 280km and the total transported volume was estimated to be 2 million tonnes. These equal 33,000 tonnes of CO₂ equivalent. This is the first year to calculate transport emissions in this pilot project and the information will become more accurate as we learn from the pilot.

Our operating companies report transport data annually, and we aggregate this in a database where emission calculation is applied based on default CO₂ emission factors from the GLEC reference model (Global Logistics Emissions Council by Smart Freight Centre).

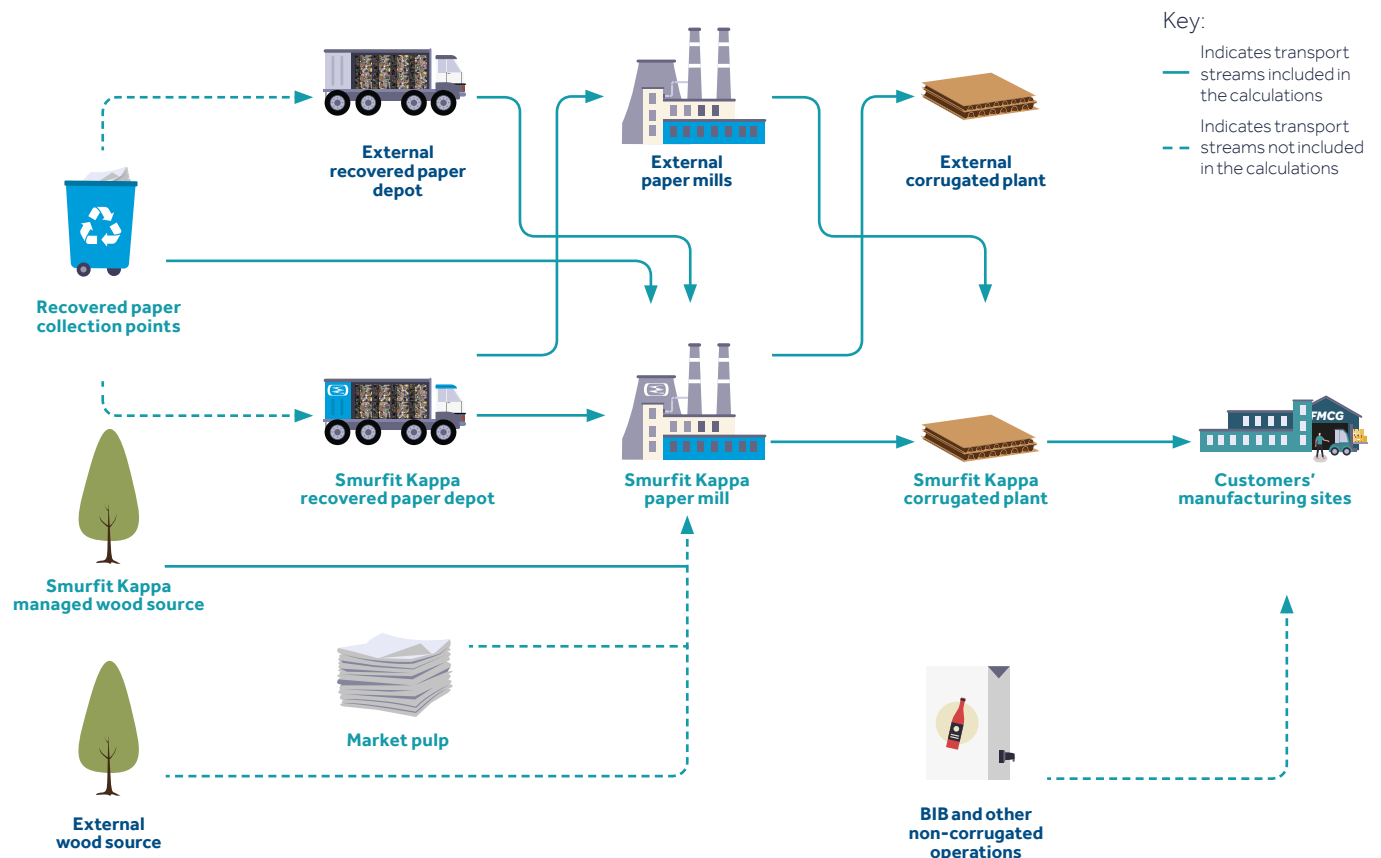
Transport De-carbonisation Strategy

We are currently evaluating our Scope 3 emissions, however, we believe that the largest contributor to our CO₂ GHG Scope 3 emissions are in the transport of our raw materials, intermediate products and the packaging we deliver to customers. Part of our Climate Change strategy is to decarbonise our transportation operations with a focus on the following key elements for paper inbound and outbound transportation in Europe:

- **Modal shift:** CO₂ reduction by shifting transport from road to lower emission transport modes. We are using developing multi modal transportation, leveraging rail, water and a wide range of multi modal transport solutions. Access to rail or waterway transportation is part of our logistics infrastructure investments.
- **Operational efficiency:** CO₂ reduction by optimising transport operations, increasing load fill and tonnage per unit, reducing empty mileage, back loading of trucks to reduce traffic and truck movements, and supply chain network optimisation to reduce transport distances between sources and destinations
- **Fuel efficiency:** CO₂ reduction by leveraging new technology, alternative fuels, and engine efficiency. As Smurfit Kappa mainly operates transportation with third-party transport providers, the strategy is to mutually set targets and monitor progress with our core external transport partners.

The decarbonisation strategy is embedded in our logistics operations and we monitor progress through key performance indicators such as CO₂ emission intensity, distance travelled, unit fill rate, and multi modal mix.

Transport Streams



➔ For complete disclosure of our energy and emissions, see pages 74-82.

Forest

Natural fibres are our main raw material and we use them efficiently. 75% of the fibres we use have been recycled. Producing corrugated packaging from recycled fibres only is not possible. To maintain an optimised recycling system we need fresh fibres and therefore virgin fibres make up 25% of our raw material supply. We source all our fibrous raw materials sustainably as Chain of Custody certified, including our recycled fibres.

Our raw material is renewable, recyclable, recycled and biodegradable. This makes us part of the bioeconomy which we have explained more in depth on page 28. As fibres can only be recycled a limited number of eight times, we also need fresh virgin wood fibres to sustain a healthy fibre recycling system. We also need virgin fibres for food safety and other technical properties of our packaging solutions.

The virgin fibres we use are primarily made of wood for pulp from certified sustainably managed forests. Smurfit Kappa sustainably manages its own eucalyptus and pine plantations in Colombia which are FSC Certified since 2003 and our forestry operations in Spain and France support small forest owners to manage their forests, certified by FSC and/or PEFC. Smurfit Kappa buys most of the virgin fibres from suppliers in Europe: Austria, the Baltic countries, France, Germany, Spain and Sweden.

Our Commitment to Sustainable Fibre

Products delivered to our customers must meet the commitments we make in our policy statements (Forestry Policy, Code of Conduct, Social Citizenship).

We source virgin fibres from certifiably well-managed forests, or at least of non-controversial origin, or certified recycled fibres. All materials must be delivered through a third-party-verified Chain of Custody certified supply chain. We accept Forest Stewardship Council® (FSC®), Programme for Endorsement of Forest Certification™ (PEFC™) and Sustainable Forestry Initiative® (SFI®) certified wood, and the Chain of Custody systems at our mills and plants also cover recycled fibre sourcing. We regard these certification schemes as the best available means to conserve forests and their biodiversity. Sustainable Forest Management certification schemes require regular monitoring of the protection of ecosystems and biodiversity. This is being monitored annually on our sites as part of the forest certification audits and auditing by independent third parties applies to our suppliers through the certified Chain of Custody.

100% of the wood we use to produce virgin paper or pulp comes, at least, from sustainable non-controversial origin, risk assessed through our FSC and PEFC Chain of Custody system and verified by a third party (FSC Controlled Wood status). 58% of this wood is also from sustainably managed forests certified under the FSC, PEFC and/or SFI schemes. 16% of the wood we use originates from our own forests and plantations.

Our objective is to increase certified wood supplies. Low availability of certified wood at competitive prices in the regions where we can economically source our wood supplies is limiting the possibility of increasing certified wood supplies. The administrative effort to achieve certified Chain of Custody status makes it often not economically feasible for small forest holders to certify their forest holdings further, limiting the availability of certified wood supplies. However, efforts to increase FSC certified supplies have started to have positive impacts on the certified wood volumes in Spain where we support forest owners, all smallholders, in achieving the FSC certification of their forests. Also, in Sweden volumes could be increased through finding better agreements with forest owners in Sweden.

Annually, Smurfit Kappa's recycling operations handle some 5.2 million tonnes of recovered paper in Europe, and 2 million tonnes in the Americas. We have a network of 18 recycled paper depots in Europe, and 26 in the Americas, using recovered paper from municipalities, retailers, industries, and our own corrugating and converting operations. All recovered fibre we use is certified Chain of Custody.

Chain of Custody

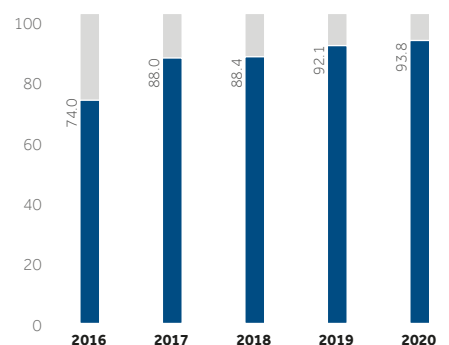
Smurfit Kappa does not source fibre from high deforestation-risk areas including High Conservation Value areas. Through supply chain transparency we ensure our sustainability commitments and fibre origins. We use robust monitoring and third-party auditing of our wood and fibre supply chain.

The best practice to deliver our commitments is through Chain of Custody certification.

Our complete paper mill system has been Chain of Custody certified under FSC and PEFC schemes in Europe since 2010, and under FSC, PEFC and/or SFI schemes in the Americas since 2015. At the end of 2020, 92.7% of our paper was produced as Chain of Custody certified, according to FSC, PEFC or SFI standards. The remaining 7% are from non-controversial fibres in accordance with FSC Controlled Wood standard, and managed through the mills' Chain of Custody certified risk assessment systems.

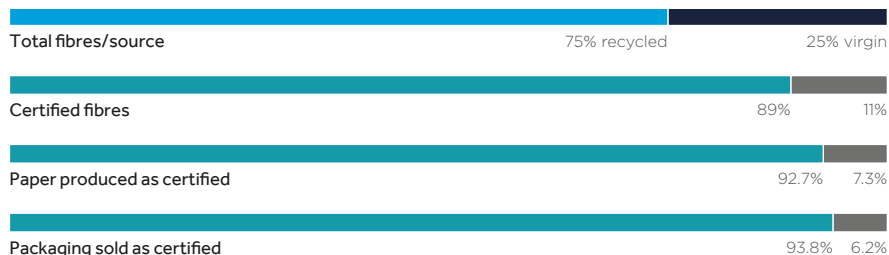
Furthermore, all our converting operations are Chain of Custody certified. We reached our target to sell over 90% of our packaging solutions as Chain of Custody certified at the end of 2016, and during 2020 this increased to 93.8%.

Share of Packaging Products Sold as CoC Certified 2016-2020



Smurfit Kappa Group

Our Certified Raw Materials



Key:

■ Certified ■ FSC Controlled wood

We have increased our targets for the production of certified Chain of Custody paper produced by our mills and packaging solutions delivered to customers to 95%, to be reached by 2025 at the latest.

During 2020, we continued our collaboration with 'Preferred by Nature' (formerly Nepcon) to keep our risk assessment and risk mitigation activities up to date. We continued training local employees in performing supplier due diligence at local level. In addition, 'Preferred by Nature' conducted a second gap analysis of the due diligence system related procedures at Group level that should prevent the purchasing of any wood-based material with a controversial origin. The outcome of this analysis will be used to further strengthen

our related policies/procedures and the implementation of our sustainable fibre sourcing policy requirements. We plan to perform a gap analysis on-site at a sample of our converting sites during 2021.

Although we source most of our wood from Europe, we source wood fibres from 36 countries among which nine are classified as potential high-risk countries: Argentina, Brazil, Bulgaria, Chile, Colombia, Indonesia, Romania, Russia and Ukraine. In Colombia, we only source from our own FSC certified plantations. Fibres sourced from the other eight countries require additional due diligence before purchasing to ensure our sourcing policy requirements are followed.

Forest and Plantation Management

All of Smurfit Kappa's own forest plantations are based in Colombia, France and Spain. All our plantations are certified, either to FSC or PEFC standards.

Colombia

Almost all the virgin wood fibre our Colombian plants need is supplied by 67,000 hectares (ha) of certified forests and plantations which we own and manage. We use nature conservation programmes with the best sustainable development principles, promoting responsible use of natural resources along with economic development and social inclusiveness. We also conform to comprehensive legal, technical and environmental regulations, subject to annual review.

Our 67,276 ha of forests and plantations in Colombia include:

- 41,722 ha of commercial plantations, of which 4,966 ha are partnerships with private landowners;
- 22,487 ha of protected natural forest; and
- 3,067 ha for infrastructure. In our commercial plantations, 58% of the land is pine, 36% eucalyptus, 4% is being replanted and 2% is dedicated to research. Our Colombian forest management programmes have been certified by FSC since 2003.

Closing a Recycling Loop in Germany

"For most companies it is a burden to collect and responsibly dispose of their own packaging. We saw it as an opportunity to achieve our sustainability goals, as well as to close our gap in raw material supplies," says Henri Vermeulen VP of Smurfit Kappa's European Recycling operations.

In 2019, as part of Germany's commitment to the European Green Deal, they made producers legally responsible for their own packaging waste. Henri's team saw this as an opportunity to close an open loop where other suppliers saw a problem.

The team developed the DUAL Recycling service, using our sustainable closed loop approach to become an even more convenient supplier for our customers. They buy packaging from us, use it, return it, and we convert it back into a valuable raw material: recycled paper fibre. This not only makes life easier for our customers, it forms part of our end-to-end sustainability

commitment. "In fact," says Henri, "it helps solve the imbalance we have in Germany in supply and demand for recovered paper: currently in Germany around 15 million tonnes of recovered paper is collected, but 17.4 million tonnes are needed. The new law helps us close this gap."

No other packaging supplier in Germany is able to do this. Our product is eminently recyclable, and our end-of-life product stewardship goals mean we have available capacity for collection and recycling. Since we use the collected product, customer fees are low, and the paper is recycled in German paper mills. This cuts down on transport miles, helping achieve our ultimate Net Zero emissions goal.

However, even with our tremendous advantages there are still challenges to overcome.

"It's now that our work really begins," says Henri, "we have to negotiate a licence to do this with all the regional authorities. But it helps that we're poised and ready to do it. Meanwhile we're assisting other producers with their DUAL schemes, as it helps everyone to use scarce natural resources efficiently and keep the valuable paper fibre in a sustainable closed loop."



Planet continued

Biodiversity and Ecosystem Conservation

A third of our Colombian forest land is dedicated to protecting forest sustainability, helping maintain the area's rich biodiversity and preserving watersheds, habitats and ecosystems.

To maintain forest biodiversity and sustainability, our principles are to:

- Conserve them, by protecting and promoting species diversity, sustaining ecosystems, and protecting water sources and habitats;
- Identify appropriate species and practices that increase plantation yields whilst protecting the environment; and
- Develop research programmes to preserve and enhance soil productivity.

Fibres for paper are efficiently produced on our plantations. We use carefully selected areas for plantations, avoiding valuable ecosystems and protected forest areas.

Protecting and promoting natural habitats is important to our approach, so in Colombia we use our own research centre as well as third-party institutions. Since 2009, we have worked with four local universities – Cauca, Nacional, Valle and Quindío – studying the flora and fauna populations in and around our forests. Examples include:

- Since 2013, a partnership with the Biology Programme of the Natural Science School of Universidad del Valle has studied the 'diversity of birds, mammals and plants in the natural forests of the forestry nucleus in Sevilla'.

- In 2014, a literature review aimed to inform conservation planning by identifying areas of special biodiversity close to the Company's plantations and natural forests in the Santa Rosa-Pereira core areas.
- During the past five years, studies developed by Smurfit Kappa identified 1,280 species in our forests. This includes 662 trees, 540 birds, 77 mammals, and one amphibian, of which 53 species are endangered. Our plantations and neighbouring protected forests form important wildlife corridors, contributing to species conservation in the Andean ecosystem, and need careful management.

Chain of Custody: Proven Trail for Sustainable Fibres

Transparency throughout the supply chain is vital to delivering our sustainability commitments. Robust monitoring and third-party auditing of our supply chain is ensuring sourced fibre complies with our sustainability principles.

Our manufacturing sites are Chain of Custody certified, and over 99% of our fibres are sourced through Chain of Custody certified supply chains. Our commitment is to deliver over 95% of our sold products as Chain of Custody certified.

Our definition of sustainable forest management comprises optimising the forest's benefits: supplying timber for our business, providing jobs and income for communities and maintaining healthy forest ecosystems that support biodiversity.

protect water bodies and supply non-wood forest products.

Production of sustainable paper-based packaging starts in the forest. The forest owners commit to manage their forests and plantations according to sustainable forest management criteria. They obtain a certification after an independent, third-party audit and follow a regular audit scheme where their forest management practices are being evaluated.

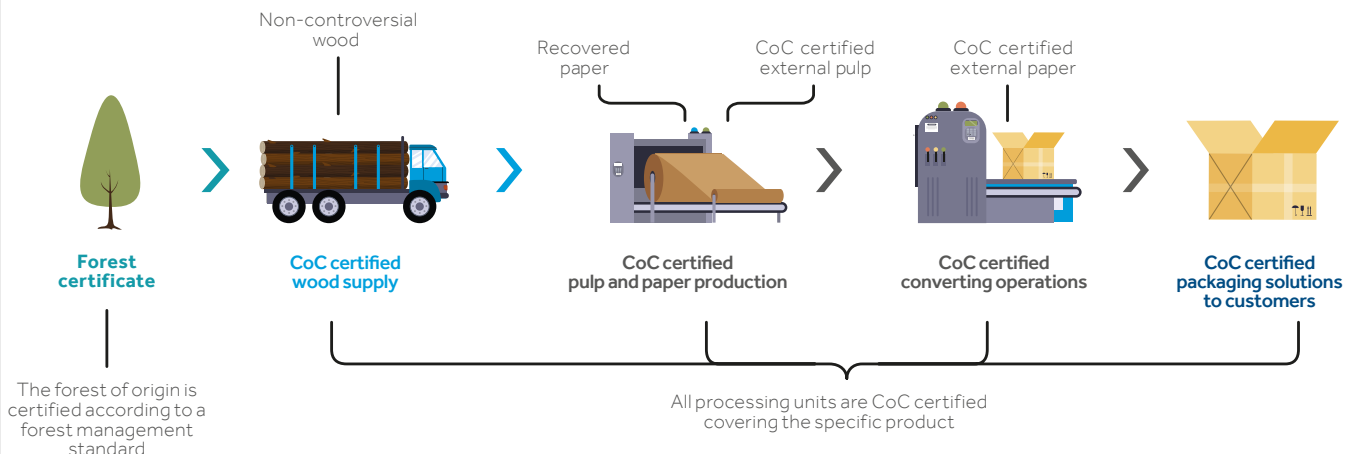
The forest certification related Chain of Custody management systems start from the harvest of the trees. Each operation and entity processing the material has its own Chain of Custody system which covers storage and use of the material, production and shipping of products, documentation of material and

product flows and communication to customers through invoices and delivery notes. In the Smurfit Kappa system, the paper production and converting operations have their own Chain of Custody certificates.

Each product carrying a forest certification scheme logo carries a licence number that can be further traced back to the supplier, producer and the origin of the raw material.

A small amount of fibres used in Chain of Custody certified products may come from non-certified forests. Evidence of these 'non-controversial' sources is required to comply with the minimum standard of sustainable forest management. Smurfit Kappa requires this portion to comply with the FSC Controlled Wood standard.

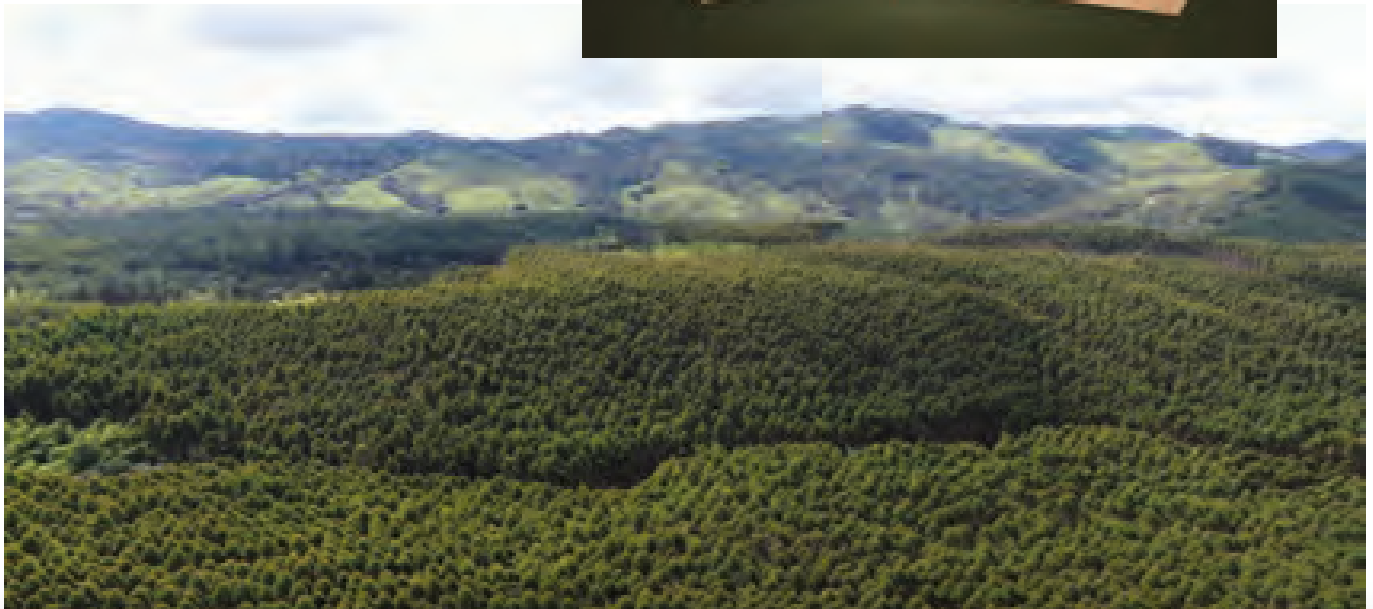
Chain of Custody (CoC) Model



We also work with neighbouring communities, engaging local people in our decision-making. This is especially important in Latin America, where indigenous people may have land rights, and livelihoods are often dependent on forests. In 2020, there were no violations reported of the rights of indigenous people.

France and Spain

In Europe, we offer forest management services through our wood supply companies in Spain and France, where we own and manage some 500 hectares of forest. In both, we follow local best practice for forest management, as certified by PEFC. Our wood-handling operations are Chain of Custody certified to FSC and PEFC standards.



Protecting the Forests in Colombia

More than half of Colombia is covered by forests. Smurfit Kappa Colombia is the custodian of 67,000 hectares of forest and plantations in the country. 22,000 hectares of this area are protected natural forests devoted to conservation and are home to over 1,200 species of flora and fauna. We know that 53 of these are endangered species, such as the Andean bear, also known as the spectacled bear.

Protecting and promoting natural habitats are an important part of our approach to biodiversity and ecosystem conservation. We do this by developing alliances with third parties, neighbouring communities and organisations, to research and promote sustainable practices. Since 2003, our Colombian plantations have been managed and certified according to the FSC Sustainable Forest Management standard.

One of the organisations we collaborate with is the World Wildlife Fund (WWF) Colombia. WWF is one of the leading global conservation organisations with 6 million members and operations in more than 120 countries across the world. Our continued work together includes many diverse projects, starting out with the Legal Timber Pact in 2009, to help reduce the illegal production of wood in Colombia. This involved the participation of the Ministry of Environment and local environmental authorities.

In 2020, Smurfit Kappa Colombia announced a new alliance with WWF Colombia, with both organisations working together to restore, expand and protect forests and ecosystems.

The alliance is a further example of Smurfit Kappa's commitment to protect the environment and communities to the highest sustainability standards. This initiative will

also support the restoration and conservation programmes that WWF Colombia carries out, working together to stop deforestation and forest degradation through the continued promotion of sustainable practices within the forestry industry, increased surveillance systems to crack down on illegal logging and working closely with Colombian national parks.

"Since 1961, WWF has worked to develop innovative solutions that protect people, communities and wildlife so we are delighted to have formed this partnership with Smurfit Kappa Colombia," tells Sandra Valenzuela, COO of WWF Colombia. Nicolás Pombo, Forestry Division General Manager of Smurfit Kappa Colombia Forest Operation adds "We are proud to be recognised for our sustainable contribution to Colombian and global forests."

Water

Using water is critical in the paper-making process. Without water, we cannot produce the paper we need for our packaging solutions.

Smurfit Kappa is mainly a processor of water, as illustrated in the diagram below. Our global operations used 144 million m³ of water in 2020. Almost all of that – 142 million m³ – was used by our 34 paper and board mills and the remainder is used by our 242 other (packaging) operations. Of the 142 million m³ used by the paper and board mills, 130 million m³ was discharged in good condition and almost 12 million m³ is evaporated in the air and will return as rainfall. We also reuse water several times, after which it is processed in our water treatment facilities and returned to public water bodies. Of the water discharged, 80 million m³ was used for processing and 51 million m³ for cooling.

Water treatment is part of the bioeconomy. We use bacteria to clean the water, and the resultant biogas fuels our on-site Combined Heat and Power plants. The water-cleaning sludges can be used for other water treatment processes, or in agriculture. We also support forests in maintaining nature’s water cycles through promoting certified sustainable forest management. For example, preserving water bodies linked to commercial forests is an indicator of sustainable forest management, while allocating protected forest land, as we do in Colombia, further supports natural water ecosystems (see Forest chapter on page 34).

Committed to Sustainable Water Stewardship Assessing Risks Related to Water

Since 2014, we have investigated the environmental impact of our paper and board mills and undertook water risk assessments across all our mills. During 2020 and early 2021, we finalised water risk assessments in two more paper mills. Due to the COVID-19 pandemic situation in countries, we have a small delay in finalising the two remaining paper mills in the course of 2021. Water risk assessments focus on three main risks – physical risk, including local water scarcity and mill equipment, regulatory risk, and reputational risk. Each assessment comprises a supporting desk study and an on-site audit of each category, including interviews with key stakeholders. Since 2018, the mills have included these assessments in their ISO 14001:2015 certification risk assessments.

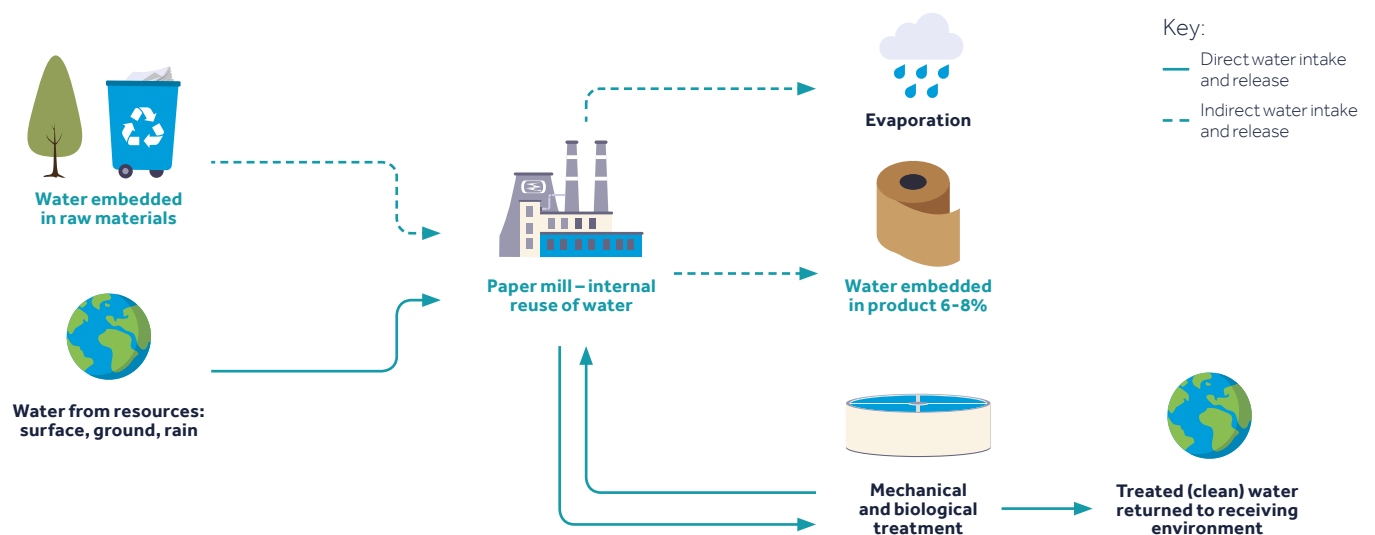
All assessments to date confirmed that our mills’ water use has no impact on water availability to neighbouring areas. Only 12% of our paper and board production and just 3% of our water intake takes place in areas of water scarcity. Nevertheless, we always use water sustainably – many of our stakeholders are concerned with local quality and expect good water management practices. Our products need to meet hygiene standards, and our paper-making technologies

require good-quality water. Together with our neighbours and stakeholders we have a common interest in good water stewardship and we will use these findings to build individual site water stewardship strategies. To manage possible changes in our mill environments, the assessments will be repeated every five years.

Since 2018, we are a signatory to the CEO Water Mandate and we are also a member of the CEPI Water Issue Group that is looking into water specific industry issues.

Our paper mills engage with their stakeholders in multiple ways. Six of our paper mills – Forney (USA), Los Reyes and Monterrey (Mexico), Nervión (Spain), Nettingsdorf (Austria) and SSK (UK) – discharge their water to the municipality water treatment system and our Morava mill (Czech Republic) shares its water treatment plant with the local municipality. This collaboration benefits all participants as the water discharge from paper mills helps to balance the nutrition needs for municipality water treatment and thus reduce the amount of water treatment nutrients. Depending on location, we participate in waterbody management and our Roermond paper mill (Netherlands) receives the phosphorus it needs for water treatment from a neighbouring baby food plant where it is a by-product of their processes.

Water in the Paper Mill





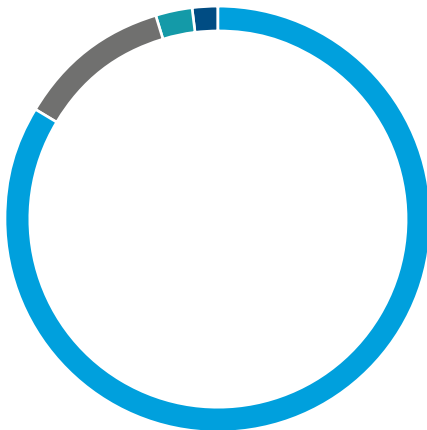
Future-proofing Water Management in the UK

“This should have been a straightforward story,” says Chris Cole, Services Manager at Smurfit Kappa SSK Birmingham UK. The plant had outgrown its 800m³ capacity water treatment reactor and wanted to future-proof the site with a 1,200m³ installation including an Internal Recirculation Reactor. The COVID-19 restrictions, however, meant that the supplier wasn’t able to visit the site to commission the installation.

“We persuaded them to let us commission it ourselves,” says Chris. The Smurfit Kappa SSK team was familiar with the technology from their current reactor and they stayed in contact with the supplier who supplied extra information and photos. Test information was provided promptly, and an industrial placement student was engaged to conduct extra tests.

“The partnership was a great success,” says Chris. “It was commissioned in four weeks, reducing COD levels in sewer discharge by 61%, increased the recycling of water in the processes and shows the Group’s commitment to chain-of-supply relationships.”

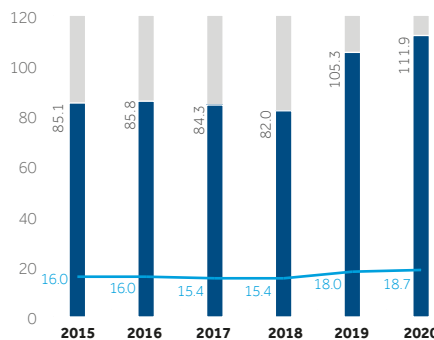
Water Sources – All Operations



Key:

- Surface – 83.8%
- Ground – 11.7%
- Grid – 2.8%
- Other – 1.7%

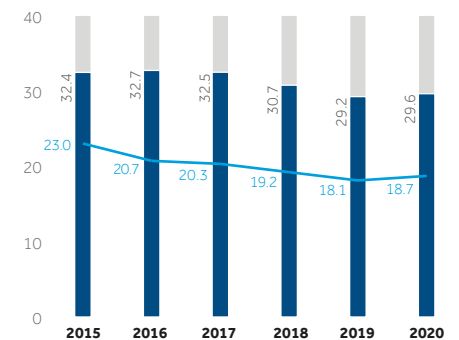
Water Intake: European Mills



Key:

- Absolute – (Mm³)
- Specific – (m³/tonne)

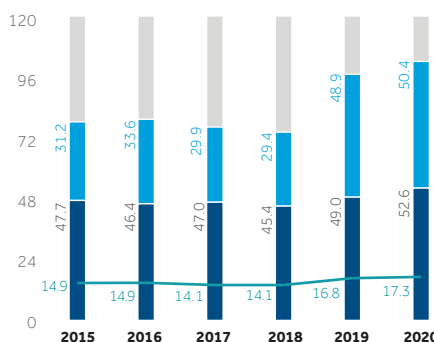
Water Intake: The Americas Mills



Key:

- Absolute – (Mm³)
- Specific – (m³/tonne)

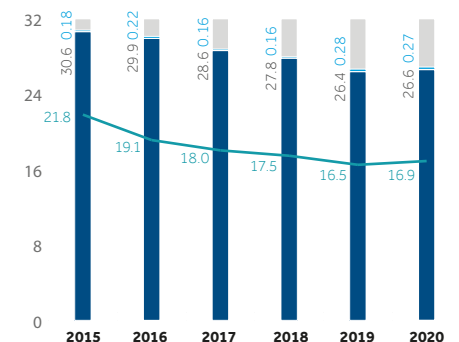
Water Released: European Mills



Key:

- Absolute process – (Mm³)
- Absolute cooling – (Mm³)
- Specific – (m³/tonne)

Water Released: The Americas Mills



Key:

- Absolute process – (Mm³)
- Absolute cooling – (Mm³)
- Specific – (m³/tonne)

Planet continued

Focus on Water Quality

For the vast majority of our operations, availability of 'fresh' water is not a concern for the foreseeable future. Nevertheless, we believe that a responsible approach to water is crucial.

We focus our efforts on further improving the quality of water we discharge and understanding the risks associated with water availability and use in the areas where we operate. We therefore continually implement best practice in our mills' water treatment. In 2020, over 96% of paper and board was produced at mills with best practice water treatment systems. This involves decreasing the organic content of process water through anaerobic and aerobic treatments before returning it to public water bodies.

To reiterate our water stewardship role we have set a new target to reduce water intake at our paper and board mills by 1% annually per produced tonne of paper.

Progress in 2020

In 2020, we made steady progress reducing our relative COD discharge from our paper and board mills. This year the progress is mainly due to our investments and projects in the Americas.

Between 2005 and 2020, the Chemical Oxygen Demand (COD) content of processed water returned to the environment has decreased by 38.2% relative to production, compared with 35% in 2019. This result is mainly due to investments in aerators in the water treatment plant at our Cali mill in Colombia. The aerators improve the oxygen conditions in the lagoon which improves the efficiency of the biological water treatment. This project started in 2019 seeing multiple changes in the water treatment plant that improves efficiency.

Progress was also made at our Smurfit Kappa Uberaba and Pirapetinga mills in Brazil. The investments made in the water treatment plant aeration at the Pirapetinga mill in 2017, continued to deliver further improvements. The Uberaba mill began to achieve results from the investments to its water treatment plant, a project that started in 2019.

In addition, investments were made at our Smurfit Kappa Barbosa and Barranquilla mills in Colombia, where new water treatment plants will start operating in 2021.

In 2020, water intake of all our operations was 144 Mm³, in comparison with 137 Mm³ in 2019. For 2020, compared with 2019, the average water intake by our paper and board mills increased to 18.7 m³ per tonne of paper produced from 18 m³, a 4% increase, mainly due to the inclusion of the Smurfit Kappa Beograd mill (Serbia) to our Group reporting, start of the new boiler at the Smurfit Kappa Nettingsdorf mill (Austria) and changes in paper type in one of the paper machines at our Smurfit Kappa Cali mill (Colombia).

Our paper mills recycle water at a high rate. At the headbox of a paper machine, the pulp consistency is around 1% in the water mix. Initially, 75-125m³ water is used per tonne of paper. We discharge 3-7m³ water – about the same amount as the intake per tonne of paper. Depending on the specific local location, we recycle 10-40 times the amount of water needed in the paper-making process, and reuse this in the paper machine before returning part to our process after treating it in our water treatment plants. Our Smurfit Kappa Zülpich (Germany) and Bento (Brazil) mills operate closed water loop systems.

A Circular Approach to Cleaner Water in Colombia

"Smurfit Kappa's new targets for water purity came at a difficult time, but we turned it into an exciting opportunity," says Mauricio Suarez, Paper Mill Superintendent at Smurfit Kappa Barbosa, Colombia.

We have set a global target of a 60% reduction of organic content in water returned to the environment by 2025. However, this target came at the same time as a planned 40% capacity increase for Smurfit Kappa Barbosa, creating a challenge.

This change meant the final effluent figures would not be known until maximum capacity was reached. After the upgrades were installed, it was found the plant has a 100m³/hour capacity – the equivalent of a town of 16,000 people.

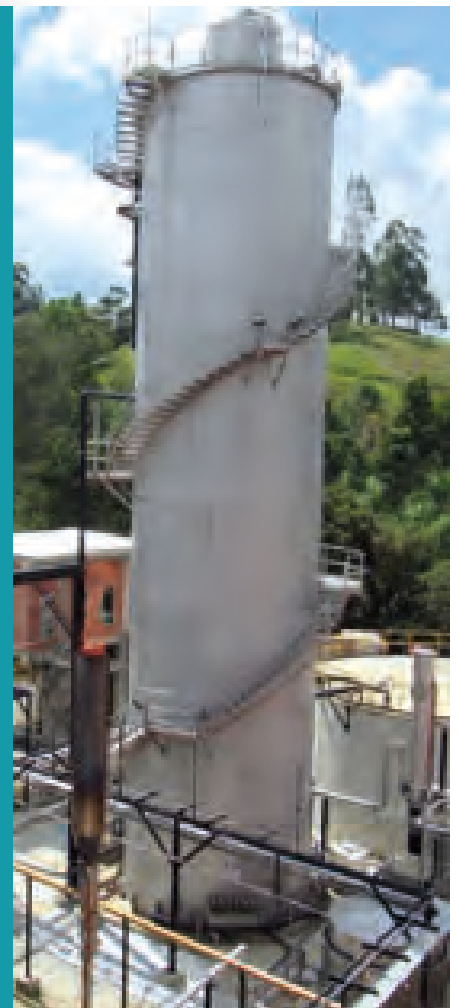
"We could have met our legal obligations in a variety of ways, but we're committed to keeping all our processes sustainable, so we wanted a biological solution," says Mauricio. "Non-biological solutions would have resulted in too much sludge going to landfill, which felt like fulfilling one environmental criterion by not fulfilling another and that is not the way we do things at Smurfit Kappa."

Mauricio and his team worked with the Paper Production Technology team to develop a range of solutions using a circular economy approach, including a homogenisation tank with chemical control, a settler, a sludge dewatering press, and a biogas removal system.

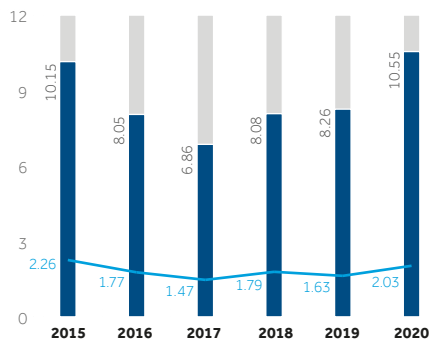
The state-of-the-art new equipment also gave us the opportunity to install a biologically based, circular self-sustaining anaerobic reactor. Although this was a more expensive solution, the environmental benefit was significant: 75% of the contaminants in the water are removed and converted from sludge into biogas, which in turn can be used to produce 'green' electricity. Altogether a really long-term sustainable solution.

Since the new installation started operating in November 2020, the water discharge quality has improved enormously and brought us a big step closer to reaching our water purity target.

"We have received many awards for sustainability," says Mauricio, "but this is the most exciting project I've worked on – the first time a paper company has installed a state-of-the-art water treatment system like this in Colombia."



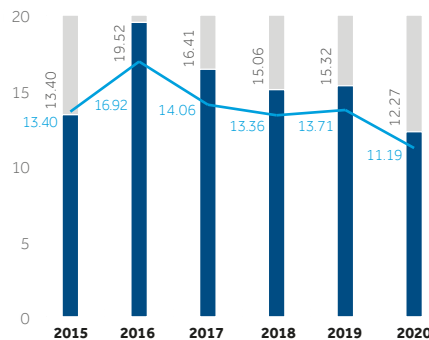
Process Water Discharges* COD (Chemical Oxygen Demand): European Mills



Key:

■ Absolute – (ktonnes) — Specific – (kg/tonne)

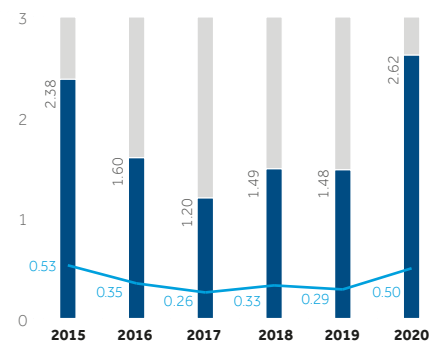
Process Water Discharges* COD: The Americas Mills



Key:

■ Absolute – (ktonnes) — Specific – (kg/tonne)

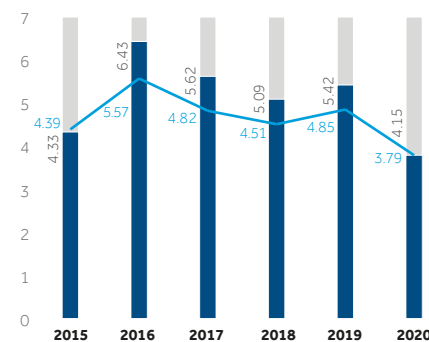
Process Water Discharges* BOD (Biochemical Oxygen Demand): European Mills



Key:

■ Absolute – (ktonnes) — Specific – (kg/tonne)

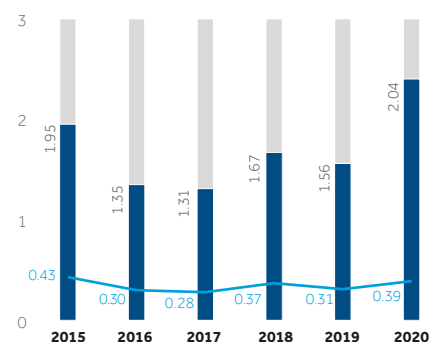
Process Water Discharges* BOD: The Americas Mills



Key:

■ Absolute – (ktonnes) — Specific – (kg/tonne)

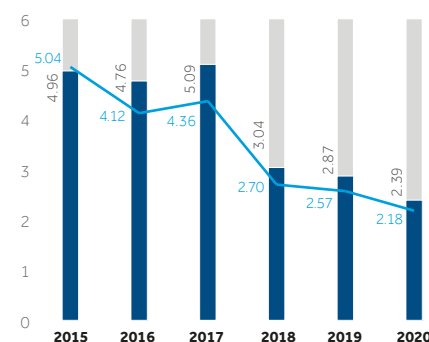
Process Water Discharges* TSS (Total Suspended Solids): European Mills



Key:

■ Absolute – (ktonnes) — Specific – (kg/tonne)

Process Water Discharges* TSS: The Americas Mills



Key:

■ Absolute – (ktonnes) — Specific – (kg/tonne)

Keeping Cool with Water in Argentina

The Smurfit Kappa Bernal mill had a challenge with reaching their daily water withdrawal permit and an increasing need for water while their production was growing. “We looked at different solutions that would fit with our equipment,” says Ana Victoria Somoza, Environmental Specialist at the mill.

The mill was hesitant to increase demand to its water treatment plant, as possible undercapacity would become an issue. Another idea was to reuse ‘white water’, which contains only leftover wood fibre but no other contaminants. The problem with this is that white water reduces the Vacuum Pumps’ performance and reduces their lifespan. In 2020, two of the five pumps were replaced by more energy-efficient vacuum pumps as part of Smurfit Kappa’s commitment to energy reduction. These only run with fresh water, potentially increasing the mill’s water intake.

“So we faced a situation in which we needed fresh water for the vacuum pumps but were not able to increase our water withdrawal,” says Ana Victoria. “We decided to look at recycling the water from our cooling towers.”

Improved water circuits which include new cooling towers mean that less fresh water is needed. This solution helped us to reach a water intake need well below our permit, and also contributed to the Group’s commitment to reduce water consumption annually.

“It’s a simple but elegant circular process,” says Ana Victoria, “Its simplicity gives us very controlled management of our water usage – we expect good results now that the new system started at the end of 2020.”



* Figures of mills releasing to the environment (mills that released water to external water treatment plants) are not reported.

Waste

Material efficiency is vital for the bioeconomy and circular economy. We continually find alternative ways to reuse, recycle and recover, to end the linear economy where products end their life cycle at landfill.

Our key raw material is wood fibre and, globally, we use 75% of recycled fibres and only 25% virgin. Our products themselves have been designed to reduce waste in packaged goods value chains. Our other raw materials have been explained in the tables on pages 74-75.

Our packaging solutions help prevent waste generated in especially food products' supply chains by protecting products from damage or spoilage. After use – at the end of its life, any paper-based packaging becomes a valuable raw material – it has the highest recycling rate of all packaging materials, supported by advanced recycling systems. As the graph on page 44 shows, 91.6% of old corrugated packaging is being collected for recycling and the industry is currently able to recycle 84.2% of its weight as recycled fibres.

Smurfit Kappa also participates in its product end of life management. Our 44 recycling depots collect recovered paper and paper-based packaging, returning it back to our paper mills, where the fibres will be recycled. It is in our interest that the products will be recycled back to the paper-making process. In addition, our packaging reduces its own impact by being 'right-weighted', using the minimum necessary material, and we are committed to offering sustainable packaging concepts to all our customers. Our product end of life is part of our material sourcing strategy and we collect used boxes to make new boxes from them. Therefore, we can say that we have fully committed to the product end of life management.

However, whilst our products are recyclable, we generate under 105kg of non-hazardous waste per tonne of paper and board, 46% of which is recovered. Because the recovered paper bales sent to us by recycling companies often contain unwanted plastic, metals, glass, textiles, sand and other non-usable materials, 54% has to be sent to landfill. On average, it takes 1,078kg of recovered paper to produce one tonne of paper and board. To reuse as much as possible, we separate unwanted elements using water, some of which is retained by the non-usable materials and can contribute as much as 55% to the weight of subsequent waste.

To minimise landfill, we reuse our own waste as far as possible. Currently, approximately 46% is recovered, and we aim to reduce the amount of waste sent to landfill by 30% per tonne of paper by 2025, compared with 2013.

Work Against Litter

Litter and reduction of packaging waste are a global megatrend. Our products are the world's most recycled packaging materials. While the paper industry in Europe generally achieves 72% recycling rates (lower than paper-based packaging's 84% recycling rate in the graph on page 44), in the US and in Latin America recycling rates of 68% and 47% have clear upward potential. This, along with our raw material's biodegradability, positions us to work with stakeholders and smart regulatory guidance towards litter-free solutions.

Eventually, our packaging returns to the biological cycle – if not to the recycling loop, then it will either be combusted, emitting only the CO₂ that the wood captured while growing, or will degrade naturally with an even smaller environmental footprint than effectively all other packaging solutions.

Progress in 2020

Our starting point is paper mill waste sent to landfill. After a Group-wide assessment in 2015, we set a target to reduce this by 30% per tonne of paper by 2025. Most waste is reject material from the recovered paper pulping and screening process. Other sources include sludge from our water treatment facilities, calcium carbonate residue from lime kilns and ash from biomass boilers.

We made significant progress against our target in 2020, reaching a reduction of 23.7% of waste sent to landfill from our paper mills per tonne of paper since 2013. The improvement from 2019 where we were at 7.1% is mainly due to our investment in sludge press at our Cali mill in Colombia with a reduction of 56 kilotonnes.

Installing a press to remove water from the sludge waste from its water treatment plant, our Cali mill has been able to significantly reduce the weight of the waste. Additionally, the dry content of the waste is now suitable for incineration which adds to the reduced waste sent to landfill. More of the project can be read in the case story on the next page and in our 2019 Sustainable Development Report.

We also made good progress at our Smurfit Kappa Townsend Hook mill in the UK, where multiple projects took place to increase the yield from recovered paper to recycled fibres, increase reject recyclability and to optimise the water treatment plant initially reducing sludge from the water treatment plant. In total, these improvements have reduced the amount of waste sent to landfill by 12 kilotonnes.

The Smurfit Kappa Forney mill in the US experienced issues with the quality of the recovered paper it received during Q1 2019 which had an impact on our progress against the target in 2019. With the issues solved, the Smurfit Kappa Forney mill has made a positive contribution to the 2020 progress.

From Landfill to Circular use in Colombia

Last year the Smurfit Kappa Cali plant in Colombia installed a new screw press to compress the sludge residue from the water treatment plant. Initial results were hopeful, but Alfredo Marin, Technical Director, has an update.

“The press is performing very well,” says Alfredo. In 2020, waste sent to landfill has halved from earlier years, and total sludge weight has reduced to one-third of the 2019 figure.

“Further good news,” says Alfredo, “is that we found ‘sludge pellets’ will burn in our coal boiler, so we can use them as biofuel, further reducing waste sent to landfill in line with the SK goal.”



Around 1% of our waste is classified as hazardous with it mostly coming from maintenance, ink sludge from printing and converting operations and per operation, the amount is small. Our hazardous waste assessment showed the key issue is correct waste classification. Due to local and national lack of clarity in hazardous waste definition, we believe it is conservatively reported in this report.

Our hazardous waste figure increased from 9,700 tonnes in 2019 to 10,000 tonnes in 2020. The annual amount varies due to maintenance, product additives and hazardous waste tanks taking over a year to fill.

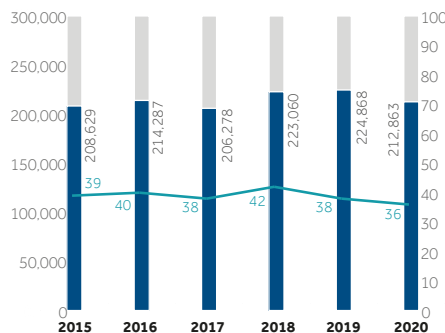
Work Towards Optimised Use of Raw Materials

Our converting operations send paper clippings back to our mills, delivering high-quality recovered fibre. Recycled paper from our corrugating and converting operations comes with minimal auxiliary materials, decreasing waste from the recovered fibre pulping process.

We continually collaborate with other industries to use our side streams, including agriculture, cement and pharmaceutical. In 2019, we joined the 4evergreen initiative that aims at supporting product design for recyclability and calls for the development of optimised collection systems and appropriate recycling infrastructures. The 4evergreen initiative brings together the whole paper-based packaging value chain from suppliers to packaging customers such as fast moving consumer goods businesses to find solutions to current and future challenges in collaboration.

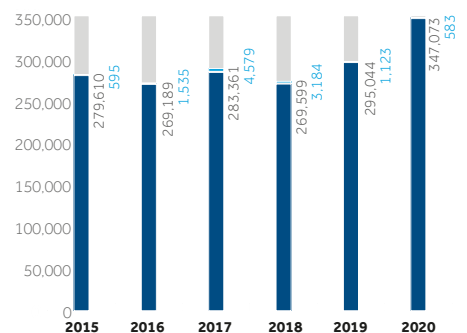
Non-hazardous Wastes

European Mills



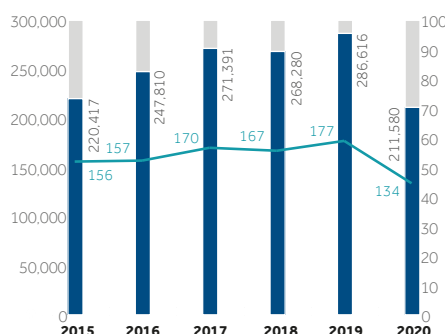
Key:
■ Waste sent to landfill (tonnes)
■ Specific (kg/tonne)

European Mills



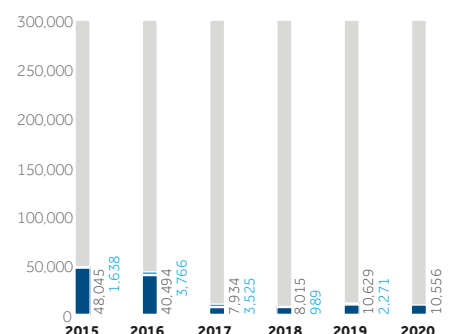
Key:
■ Waste sent to recovery (tonnes)
■ Waste sent to other (tonnes)
■ Waste sent to landfill (tonnes)

The Americas Mills



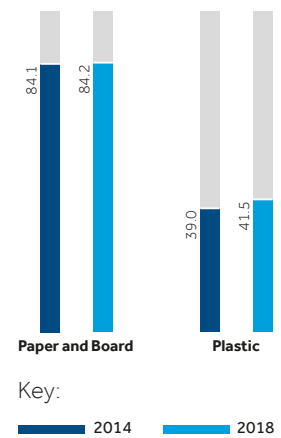
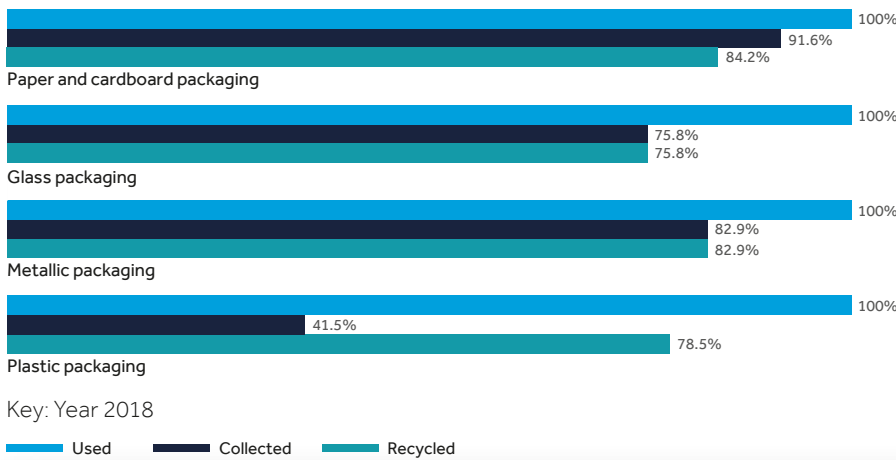
Key:
■ Waste sent to landfill (tonnes)
■ Specific (kg/tonne)

The Americas Mills



Key:
■ Waste sent to recovery (tonnes)
■ Waste sent to other (tonnes)
■ Waste sent to landfill (tonnes)

Circularity of Packaging in 27 EU Countries (%) Source: Eurostat



Corrugated Plant Waste Management in Argentina

“Naturally, we are fully committed to the Group’s target to circular economies and reducing landfill,” says Trinidad Andes, Environmental Specialist at Smurfit Kappa Coronel Suárez, Argentina.

Pamela Rey, Environmental Coordinator, continues, “But unlike many of our European colleagues we don’t have a local recycling infrastructure and we are located a long distance from recycling and landfill centres. We had to be resourceful about it!”

Like any plant, the Smurfit Kappa Coronel Suárez Corrugated generates waste from its industrial processes. However teams have worked together to sustainably manage in three main areas: non-hazardous, hazardous, and common waste.

Non-hazardous paper waste has always been recycled on site, but arrangements had to be

made with separate recycling companies to take plastic caps, stretch film and straps. Since 2020, old metal buckles are repurposed within the plant.

“We are also researching transforming cardboard dust into briquettes for fires,” says Trinidad. “But most non-hazardous waste is from the waste water treatment plant. We got the waste classified as non-hazardous in 2019, but we generate approximately 200 tonnes of it annually so it would be great to reuse it.”

“The Corrugated working team has been experimenting with creating building bricks pressed from this waste material. These were going to be tested at a local university before COVID-19 measures were enforced” says Pamela. Hazardous waste, such as oils, lubricants, electronic equipment or batteries, are stored.

Arrangements have been made with different plants or neighbouring companies to deal with these materials before they are sent to ‘security landfills’.

Waste generated by workers in the plant – common waste, recyclable, plastic, and organic waste – is separated, recycled, composted and only landfilled if no alternative solution exists. To make the best use of this, workers bring in waste from their homes so that this can be recycled too.

“The ingenuity and enthusiasm of the plant workers in coming up with these ideas and making use of the plant’s recycling opportunities, plus the encouragement and support from the Group has led to practical, locally based solutions to increase reuse, and reduce landfill to a minimum,” say Trinidad and Pamela.



An Extra Cycle in Paper Recycling in Germany

“The idea is very simple, but it gives a whole extra cycle to our circular economy,” says Siegfried Herrling, Sales Manager at Smurfit Kappa Neuburg, “And the customer is delighted with it.”

Siegfried, together with Oliver Nägele, Key Account Manager, and Jörg Meiritz, General Manager, are the team that worked closely with Topstar GmbH, a major supplier of office furniture with over 30 years of strategic partnership with the Smurfit Kappa Neuburg plant. Furniture, especially chairs, have shapes that are a challenge for damage-free packaging, so they are usually packed in polystyrene.

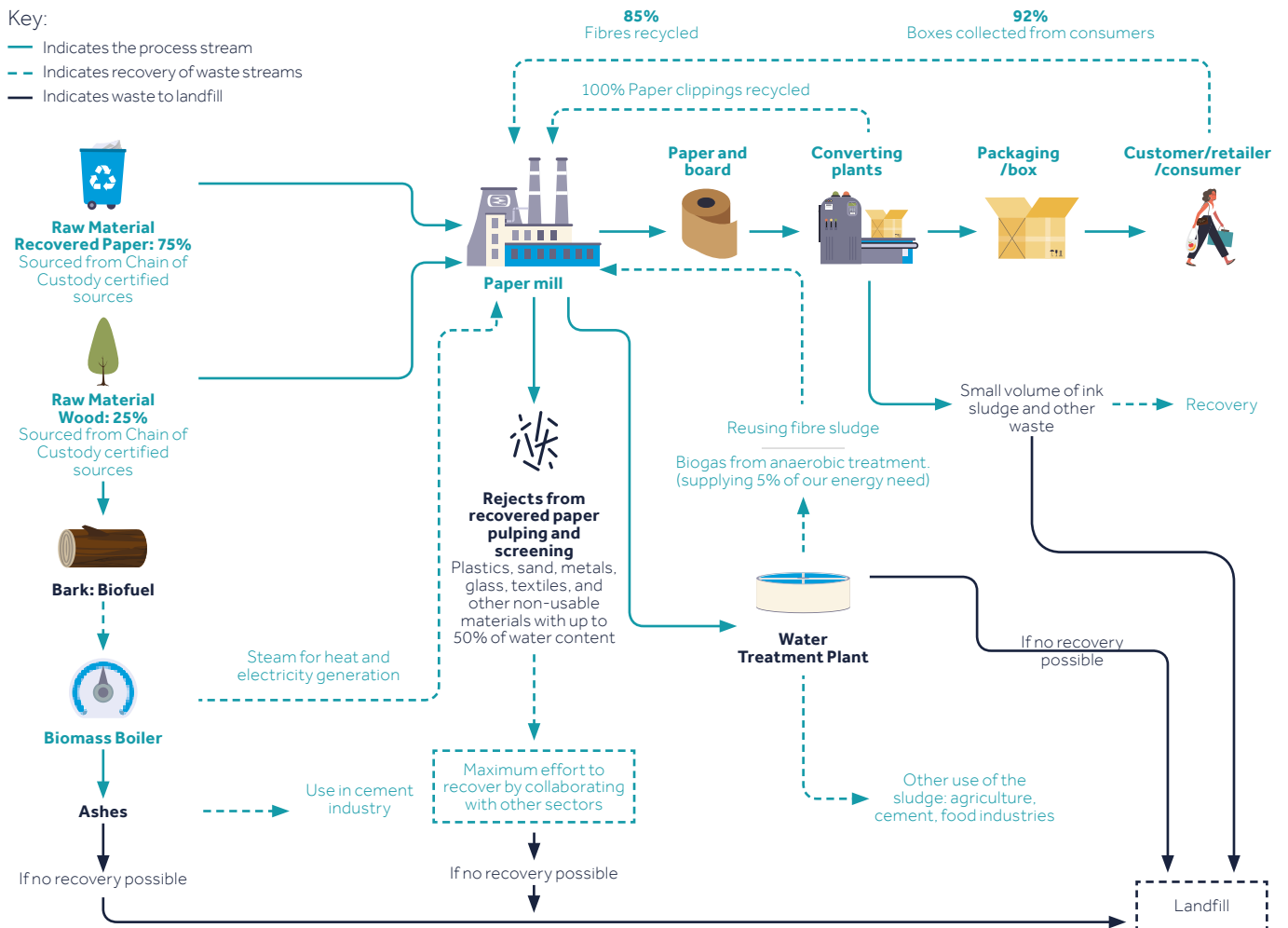
However, polystyrene is an ecologically challenging material – it has a large carbon footprint, is not easily recycled and takes centuries to biodegrade. For Topstar it had the additional problems of being messy and needing a lot of storage space: each item needs its own polystyrene shape.

A team of Topstar and Smurfit Kappa managers and product developers worked on an innovative solution using the site’s waste corrugated cardboard. Usually this would be recycled, however Topstar had the idea of shredding it and using it as packing material. It could then be packed in paper bag ‘cushions’, which would take up very little space until needed. Smurfit Kappa Neuburg provided technical support installing the

bag-making machine, and regularly supplies the extra 20% waste cardboard needed for all the bags required. That turned out to be a lot of bags – the scheme has been running since 2018, producing 2 million bags per year and promoting our circular economy model.

“It’s not just good sustainability and chain-of-supply management – it’s good business,” says Siegfried. “We now supply 100% of Topstar’s packaging needs. People in Germany are dedicated recyclers, so the bags go straight back into the paper cycle when the furniture is unpacked, as the filling is 100% corrugated – the best recycling material. The bags are made at the site, so we’ve reduced transport miles by 90% and carbon emissions by 99%. That’s 16,550 tonnes less carbon.”

Production Waste Streams



➔ For complete disclosure of our wastes, please see pages 74-82.