

GREEN BOND REPORT 2022



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Leader in responsibility

Our consistent responsibility efforts have received recognition from several third parties.

Dow Jones Sustainability Index: The only forest and paper company in the Dow Jones European and World Sustainability Indices (DJSI) for 2022–2023.

MSCI ESG ratings: An AAA rating in the assessment. MSCI ESG Research provides ESG ratings on global public companies, according to their exposure to industry-specific ESG risks and ability to manage those risks relative to peers.

CDP Programme: One of the only 12 Triple A list companies globally for our significant actions to mitigate climate change, prevent deforestation and enhance water security.

S&P Global’s Sustainability Yearbook: Gold Class distinction in The Sustainability Yearbook 2022 by S&P Global as one of the top-scoring companies in our industry.

EcoVadis: The highest possible Platinum level for our sustainability performance for which only 1% of over 90,000 companies assessed globally attain.

Bloomberg Gender-Equality Index (GEI): UPM is among the 484 public companies globally and one of the three Finnish companies in this index. The GEI lists the companies most committed to transparency in gender reporting and advancing women’s equality.



Executive summary

Sustainability is an integral part of our Biofore strategy.

We have ambitious, science-based targets and a solid track record of concrete action to both mitigate climate change and safeguard biodiversity. We source our raw materials from sustainably managed forests and process them into climate-positive products that help our customers achieve their sustainability goals.

Sustainability also has an important role in our financing. We established a Green Finance Framework in November 2020, which received the overall rating of Dark Green from CICERO Shades of Green. We have issued three Green Bonds: EUR 750 million in November 2020, EUR 500 million in March 2021 and EUR 500 million in May 2022.

In this report we present the allocation of the proceeds and impacts achieved of these three bonds.

Detailed information on the final allocation of the second EUR 500 million bond and the allocation of the third EUR 500 million bond proceeds can be found on pages 8–16. Details of the previously issued bonds can be found in the Green Bond Report 2020 and Green Bond Report 2021. Links to the reports can be found below.

This reporting is based on the green finance portfolio as at 31 December 2022. We have used a portfolio approach but share also bond by bond information. Impact reporting is presented at the portfolio level.

We have reported our EU Taxonomy-eligible and Taxonomy-aligned activities in the Annual Report 2022 and have also made an internal assessment on the eligibility and alignment share of the use of proceeds of the issued bonds.

Green Bond portfolio

EUR 1,750m

using Eligible Assets and Projects from the following categories:

Sustainable forest management

- 792,000 certified hectares
- 2.4 million tonnes carbon sink
- Positive impact on biodiversity



Climate-positive products and solutions

- 1,632 patents
- 183 trademarks
- Bio-based solutions to replace fossil-based materials



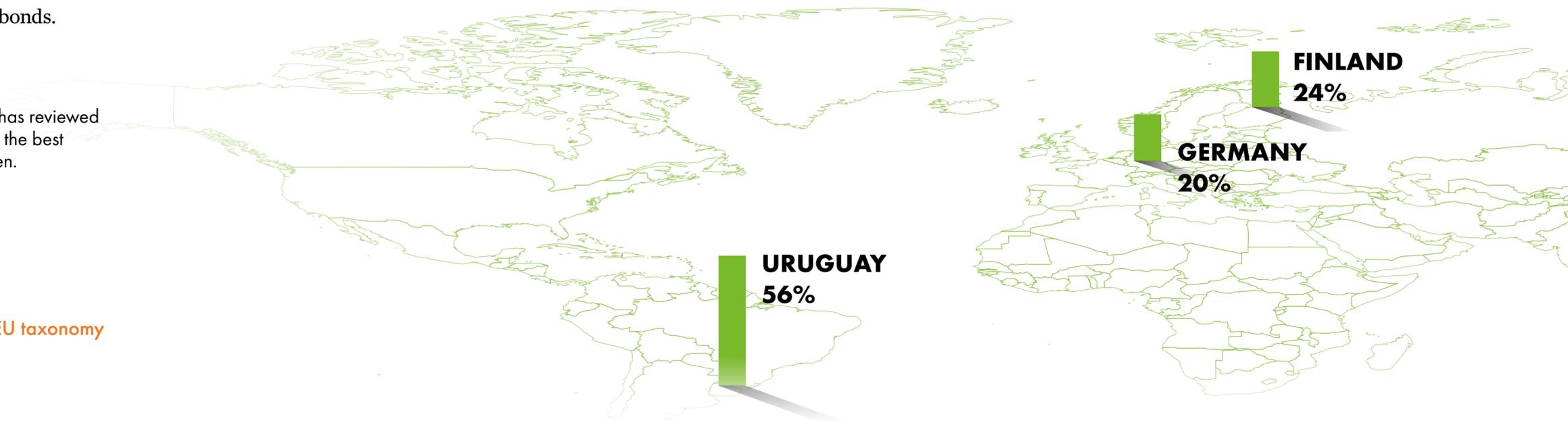
Hydropower

- 836 GWh hydropower generation



The second-party verifier CICERO has reviewed our Green Finance Framework with the best possible rating, CICERO Dark Green.

- > [Green Finance Framework](#)
- > [CICERO second-party opinion](#)
- > [Green Bond Report 2020](#)
- > [Green Bond Report 2021](#)
- > [UPM Annual Report 2022](#)
- > [UPM Responsibility Statement](#)
- > [UPM Annual Report 2022 – EU taxonomy](#)



Green Bond Summary

Annual carbon sink 2022

2,400

tonnes CO₂e /EUR 1 million
(calculated for the Sustainable forest management, EUR 975m)

or

1,400

tonnes CO₂e /EUR 1 million
(calculated for the whole nominal value of the bond portfolio, EUR 1,750m)

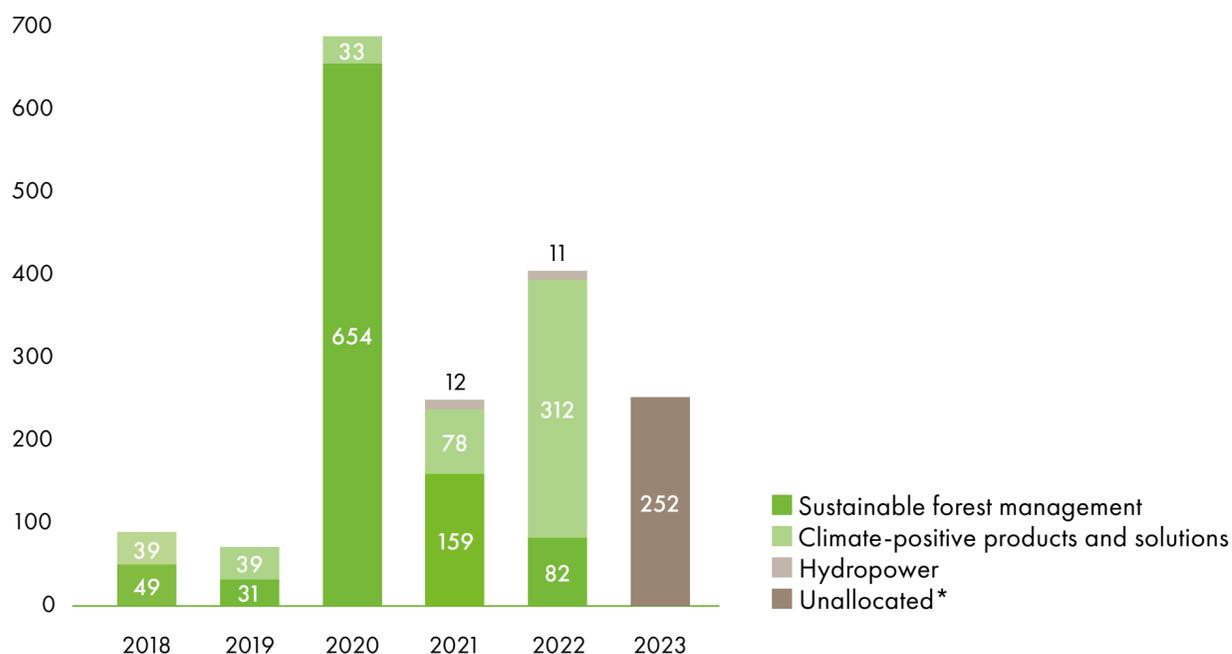
Green Bond Allocation 31 December 2022

EUR 1,750 million Proceeds

EUR million (%)



Allocation per year per category (EUR million)



*Estimated to be allocated in 2023 to the same categories as used in the previous allocations.

EU Taxonomy

In 2022, we conducted a thorough evaluation of the alignment of taxonomy activities based on the sustainability requirements defined in the regulation. We also re-evaluated some of the previous identified eligible activities. The assessment and its results are based on the current knowledge and available interpretation of the regulation. In 2022, UPM's total Taxonomy-aligned turnover was 8% of the total sales, 26% of the total capital expenditure and 17% of the total operational expenses as defined in the Disclosures delegated act.

The taxonomy eligibility and alignment evaluation of the use of proceeds of the issued Green Bonds have been based on the 2022 assessment. The main categories used that are fully taxonomy aligned are capitalised forest regeneration costs during the growth cycle and the capitalised investment in the Leuna project. The carrying value of the forest assets used in the EUR 750 million bond allocation could not be reliably assessed and was therefore considered as non-aligned.

Taxonomy-eligibility and alignment of the Green Bond portfolio in total calculated from the allocated proceeds

40%

We act through forests

We act through products

We act through emissions

Green Bond Summary

Green Bond portfolio allocated proceeds and impacts				
Issuer	UPM-Kymmene Corporation			
Bond type	Senior, unsecured			
Listing	Euronext Dublin			
Second-Party Opinion	CICERO			
Nominal value total	EUR 1,750 million			
Nominal value per bond	EUR 750 million	EUR 500 million	EUR 500 million	EUR 500 million
ISIN	XS2257961818	XS2320453884	XS2478685931	XS2478685931
Bond Ratings	Baa1 Moody's, BBB Standard & Poor's	Baa1 Moody's	Baa1 Moody's	Baa1 Moody's
Issue date	19 November 2020	22 March 2021	23 May 2022	23 May 2022
Maturity date	19 November 2028	22 March 2031	23 May 2029	23 May 2029
Coupon	0,125%	0,500%	2,250%	2,250%
Proceeds allocated	EUR 1,498 million/86%	EUR 750 million/100%	EUR 500 million/100%	EUR 248 million/50%
Unallocated proceeds	EUR 252 million/14%	`-	`-	EUR 252 million/50%
Look-back period	1-3 yrs	2-3 yrs	1-2 yrs	1-2 yrs
Re-financing*	EUR 930 million/53%	EUR 750 million/100%	EUR 125 million/25%	EUR 55 million/11%
Financing*	EUR 820 million/47%	`-	EUR 375 million/75%	EUR 445 million/89%
EU Taxonomy alignment	40%	12%	60%	80%
Geographical split	56% Uruguay, 24% Finland, 20% Germany	77% Uruguay, 23% Finland	43% Uruguay, 16% Finland, 40% Germany	19% Uruguay, 44% Finland, 36% Germany

Proceeds of the bond portfolio allocated to Cicero Dark Green categories.

Categories used	EUR 1,498 million	EUR 750 million	EUR 500 million	EUR 248 million	Impact indicators	Related SDGs
Sustainable forest management	EUR 975 million	EUR 672 million	EUR 222 million	EUR 82 million	<ul style="list-style-type: none"> 792,000 hectares of certified forest Carbon sink of UPM's own and leased certified forests 2.4 million tonnes of CO₂ equivalents and 1.4 million tonnes of CO₂ equivalents for the whole bond portfolio Positive impact on biodiversity measured in UPM's own forests in Finland and land in Uruguay by selected indicators 	 
Forest assets carrying value	EUR 592 million	EUR 592 million				
Sustainable forest management costs	EUR 216 million	EUR 80 million	EUR 88 million	EUR 48 million		
Plantation acquisitions	EUR 114 million		EUR 112 million	EUR 2 million		
Nursery investment	EUR 21 million		EUR 21 million			
Forest assets and land acquisitions	EUR 32 million			EUR 32 million		
Climate-positive products and solutions	EUR 501 million	EUR 78 million	EUR 278 million	EUR 144 million	<ul style="list-style-type: none"> 1,632 patents and 183 trademarks in Biochemicals, Biofuels, Biomedicals and Biocomposites businesses at the end of 2022 This represents the amount of patents and trademarks that generated costs during the period of 2018-2022 Biochemicals plant investment will offer new bio-based solutions that replace fossil-based solutions for the material sector 	 
R&D costs in biobusinesses	EUR 208 million	EUR 78 million	EUR 76 million	EUR 53 million		
Biochemicals refinery investment	EUE 293 million		EUR 202 million	EUR 90 million		
Hydropower	EUR 22 million			EUR 22 million	<ul style="list-style-type: none"> Generation of 836 GWh renewable hydropower 	 
Hydropower costs	EUR 22 million			EUR 22 million		

*Costs occurred prior to bond issuance: re-financing, costs occurred after bond issuance: financing

Note: Carbon sink information is based on a recent study by the Natural Resource Institute of Finland for UPM's own and leased assets in Finland and Uruguay.

Note: Figures presented in this report are rounded and therefore the sum of individual figures might deviate from the presented total figure.

We create a future beyond fossils

We supply sustainable materials for everyday consumer needs, reliable carbon-free energy to electrify society and renewable fuels to decarbonise traffic.

Biofore strategy drives our transformation as a frontrunner in biomaterials. We seek sustainable growth. High performance, innovations and world-leading responsibility are the cornerstones of our strategy. We enable our customers and consumers to make more sustainable choices. We create value by providing solutions for a future beyond fossils.

Our transformation has taken place for more than 10 years, at an increasingly fast pace. We have an agile operating model and nurture a culture of high performance and integrity. We are a world-leading company in responsibility.

Our renewable and recyclable products meet the everyday needs of consumers at the same time as addressing many global challenges such as climate change and resource scarcity. Many of our products offer sustainable alternatives to fossil raw materials and energy, for example replacing fossil plastics in consumer products, steel and cement in construction or fossil fuels in traffic, aviation and electricity markets. Furthermore, we provide our customers with entirely new solutions, creating new innovative growth businesses.

We are currently in an intensive growth phase building a world-class pulp mill in Uruguay and a next generation biochemicals refinery in Germany. We are a shareholder in the new OL3 nuclear power plant unit in Finland. We are also conducting the basic engineering of a potential new biofuels refinery that would scale up our successful biofuels business. These transformative growth projects represent significant future earnings growth for us. They are set to further improve our business mix with higher margin, higher-value businesses.

Sales in 2022

EUR 11,720m

Company ratings

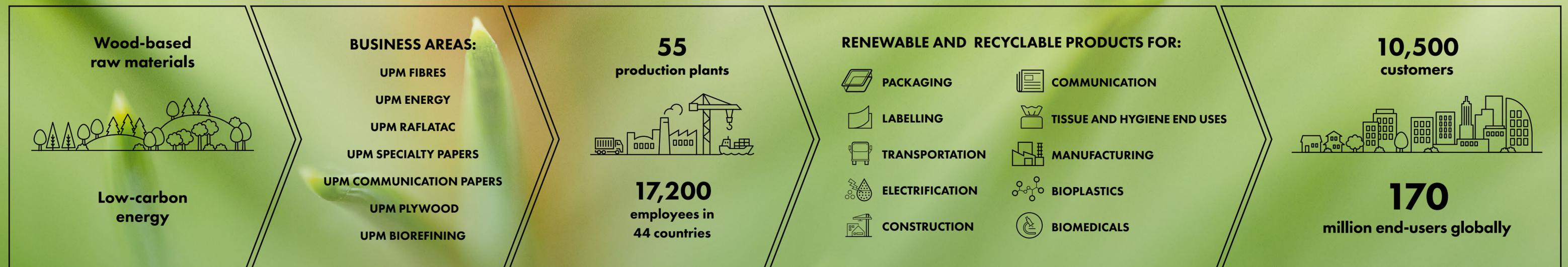
**Moody's
Baa1**

with stable outlook

**Standard & Poor's
BBB**

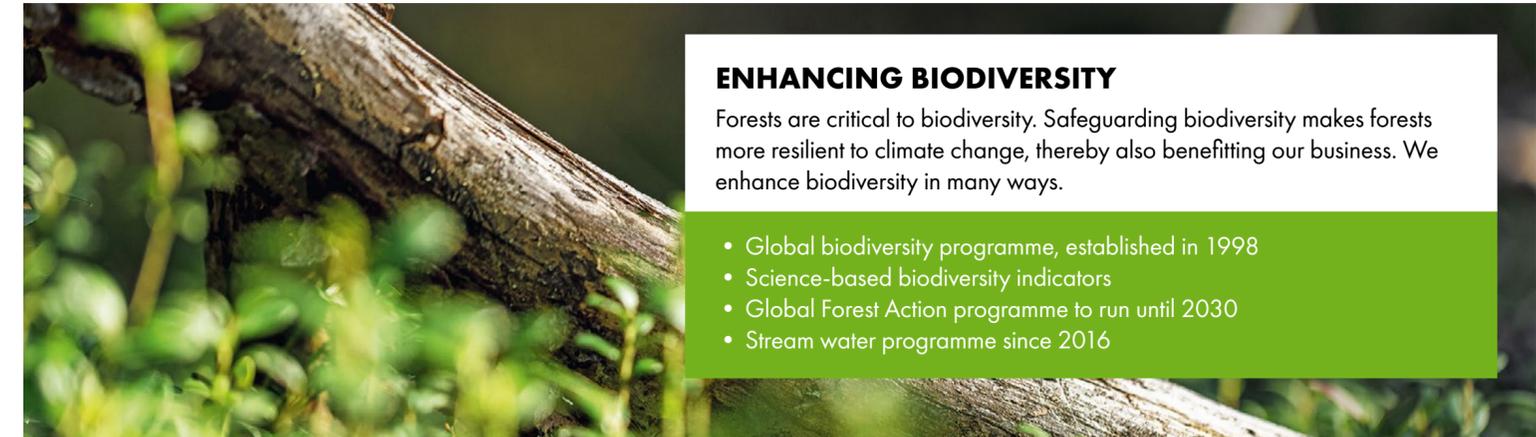
with positive outlook

THIS IS UPM



Sustainable choices

We are transforming the world of materials by providing sustainable alternatives to fossil-based products. Forests play a key role here: they are a source of renewable raw materials for a broad range of products, from everyday necessities to ground-breaking innovations. Growing forests are one of the biggest carbon sinks on the planet, second only to oceans. They are also critical to biodiversity and water systems. In everything we do, we care about the prosperity and wellbeing of people, local communities and the societies around us.

ENHANCING BIODIVERSITY

Forests are critical to biodiversity. Safeguarding biodiversity makes forests more resilient to climate change, thereby also benefitting our business. We enhance biodiversity in many ways.

- Global biodiversity programme, established in 1998
- Science-based biodiversity indicators
- Global Forest Action programme to run until 2030
- Stream water programme since 2016



ENABLING SUSTAINABLE CHOICES

People make important purchasing decisions and we provide products that are better for society. Credible product information supports the preferred choices. We provide sustainable solutions and create a future beyond fossils.

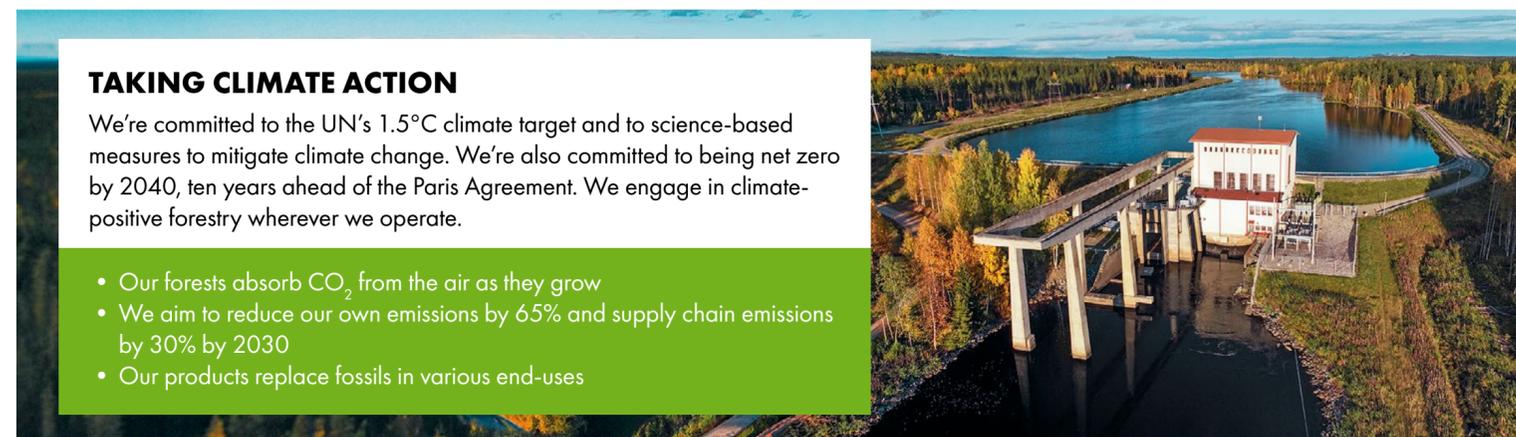
- Renewable and recyclable materials
- Responsible supply chain
- Sustainable product design concept
- Eco-labelled products
- Responsibility across product lifecycle



ADVANCING A CIRCULAR BIOECONOMY

We use all raw material streams efficiently and reduce, reuse and recycle whenever possible. Cross-industry collaboration provides a greater impact.

- Products made from side streams, residues and recovered materials
- Recyclability integrated in sustainable product design concept
- Efficient use of resources
- Circular use of materials, nutrients, and water



TAKING CLIMATE ACTION

We're committed to the UN's 1.5°C climate target and to science-based measures to mitigate climate change. We're also committed to being net zero by 2040, ten years ahead of the Paris Agreement. We engage in climate-positive forestry wherever we operate.

- Our forests absorb CO₂ from the air as they grow
- We aim to reduce our own emissions by 65% and supply chain emissions by 30% by 2030
- Our products replace fossils in various end-uses



BUILDING THRIVING COMMUNITIES

We are committed to developing the vitality of the communities around us. We invite an active and open dialogue, anticipate and manage the impacts of our operations and contribute to the sustainable development of the communities.

- Financial and social impact on communities
- Transparency of impacts
- Promoting diversity and inclusiveness
- The Biofore Share and Care programme

Allocated categories



Sustainable forest management

Our business is based on sustainable forest management. We grow and harvest wood to produce renewable and recyclable materials and products.



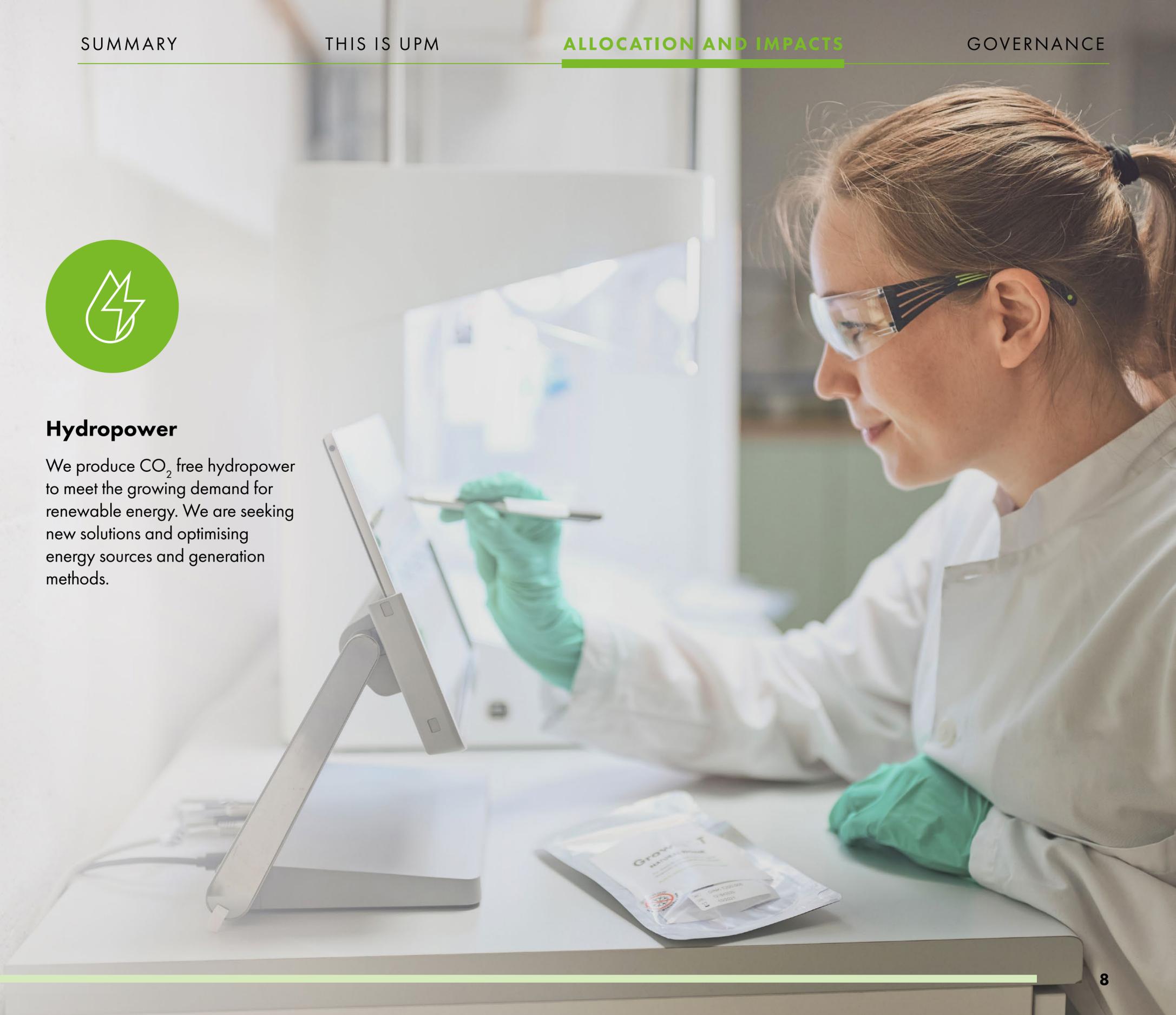
Climate-positive products and solutions

We are developing innovative, high-quality products from wood-based biomass. Many of our products offer sustainable alternatives for fossil raw materials and energy, for example replacing fossil plastics in consumer products, steel and cement in construction or fossil fuels in traffic, aviation and electricity markets.



Hydropower

We produce CO₂ free hydropower to meet the growing demand for renewable energy. We are seeking new solutions and optimising energy sources and generation methods.





Sustainable forest management

Our business is based on sustainable forest management. We grow and harvest wood to produce renewable and sustainable materials and products.

ICMA CATEGORY

Environmentally sustainable management of living natural resources and land use



Use of proceeds – EUR 500 million Green Bond issued in May 2022

Sustainable forest management includes acquisition, maintenance and management of forest certified under the FSC™ (Forest Stewardship Council™, FSC N003385) and the PEFC (the Programme for the Endorsement of Forest Certification, PEFC/02-44-41).

The total amount used for this category was EUR 82 million, all used in 2022. EUR 48 million was allocated to sustainable forest management costs. These include, but are not limited to, sub-contracted activities, such as land preparation, planting, fertilising, as well as costs related to leased plantation areas and the operation of nurseries. The main part of sustainable forest management costs are related to plantations in Uruguay.

EUR 32 million was allocated to the acquisition of new forest assets and land in Finland and EUR 2 million to the acquisition of new plantations in Uruguay.

Commitments and targets

By managing our forests sustainably, we safeguard the availability of wood, protect biodiversity and mitigate and adapt to climate change. We take a holistic approach to sustainable forestry wherever we operate, adhering to the following commitments:

- Third-party verified and credible certification systems for all our forests
- Third-party verified and certified chain of custody systems to ensure 100% wood traceability
- No wood from tropical rainforests or from forest plantations that have been established by converting natural forests
- No operations in areas where the rights of indigenous peoples are endangered
- No plantation operations in water-stressed areas
- Strong stakeholder engagement

- Focus on UPM’s 2030 responsibility targets: Climate-positive land use and positive impact on biodiversity

Our impacts

Forest certification

Finland and Uruguay are our main wood sourcing regions. At the end of 2022, we owned 827,000 hectares of forest land in Finland and Uruguay of which 792,000 is certified. 35,000 hectares are in the process of certification as the land was acquired recently. Most of the forest land is in Finland, totalling 522,000 hectares. In Uruguay, we have about 305,000 hectares of eucalyptus plantations, grasslands and conservation areas. We lease 167,000 hectares in Uruguay and manage about 1.4 million hectares of private forest in Finland and 33,000 hectares in Uruguay.

We also promote forest certification to private forest owners and our other customers. We have established the FSC group certification scheme which covered approximately 540,000 hectares in Finland and over 13,000 hectares in Uruguay in 2022. We actively participate in developing forest certification on a national and global level. We maintain active dialogue with the FSC and PEFC organisations and participate in national and international working groups for certification development.

Forest carbon sink

We are committed to climate-positive forestry. To ensure that our forests remain carbon sinks, they need to grow more than we use them. We are improving the health, growth and carbon sequestration of our forests. The annual carbon sink from owned and leased forests in Finland and Uruguay has averaged 2.4 million tonnes of CO₂ equivalent over the past five years.

The main reason for the decrease compared to last year was the development of calculation methodologies both in Finland and Uruguay. Our aim is to constantly improve the accuracy of carbon accounting using a science-based approach. The carbon calculation method in Finland was updated for UPM’s 2022 calculations to take peatland soil carbon better into account, which resulted in higher emissions from peatland soils. To improve soil carbon models for Uruguay, we initiated a

792,000 hectares certified forest land

Five years annual average carbon sink of 2.4 million tonnes of CO₂ equivalents

We act through forests

project with the Natural Resources Institute Finland (Luke) with actual measurements on the ground in 2022. The project’s goal is to gather detailed information on the local conditions and enhance the science-based approach of soil carbon modelling. Thus, soil carbon is not included in the 2022 calculations for Uruguay. We expect to have an improved model in use for our 2023 carbon calculations.

Role of plantations and improving biodiversity in Uruguay

Uruguay’s native forests are all protected. The country is located within a temperate climate zone with no rainforests. Plantations are established on former grazing lands classified for commercial forests. The Uruguay Forestry Act sets strict rules for plantation design and structure. These include rules on location, tree types and identifying suitable forestry soils for plantation development, as well as safe zones around roads, native forests and waterways.

Eucalyptus availability for the new pulp mill in Uruguay is secured through our own and leased plantations, as well as through wood sourcing agreements with private partners. Our plantation areas in Uruguay cover 472,000 hectares of UPM’s own and leased land.

The biodiversity values of the area are assessed before the plantation is established, and all valuable biodiversity hotspots and native forests are protected. At present, the network of formal conservation areas covers nearly 19,000 hectares. Our biodiversity programme has been implemented at plantations since the early 1990s and since 2020, we have used three key indicators to measure our impact on biodiversity:

1. **Developing the nature conservation area network**
2. **Maintaining and enhancing endemic and threatened species populations in conservation areas**
3. **Controlling and decreasing the invasion of exotic woody species populations in conservation areas**

In 2022, for example, the majority of species indicators from the last five years showed a positive trend of occurrence compared to the last 15 years.

Sustainably managed plantations are highly productive, acting as a carbon sink while enhancing biodiversity. We have created a permanent carbon storage of 55 million tonnes of CO₂ equivalent in 30 years with no effect on food production or natural forests.

UPM’s first forestry research centre specialising in eucalyptus plantations began operations in Paysandú, Uruguay.

Our plantation operations are also strengthening rural regions and communities through increased opportunities for education and employment, as well as through developing services and infrastructure.

Enhancing biodiversity in Finland

We are continuously working to enhance biodiversity in our forests. We promote biodiversity as part of our everyday forest management and through conservation and collaborative stakeholder projects. Based on indicators developed in co-operation with researchers, we monitor our biodiversity development.

In 2019, we set a target of having a positive impact on the biodiversity in our own forests in Finland. In 2022, we added a new indicator on the amount of deadwood, thus expanding our list of biodiversity indicators from eight to nine indicators:

- Tree species
- Forest age
- Forest structure
- Protected areas
- Valuable habitats
- Habitation restoration
- Species and habitat projects
- Amount of deadwood
- Indicator development

In 2022, all quantitative indicators showed a positive trend. The share of broadleaved trees increased and the protected area continued to grow.

Forest Action: the forest responsibility programme

In 2022, we launched our new global forest responsibility programme. The global Forest Action programme encompasses responsibility actions under five primary pillars: climate, biodiversity, water, soil, and social contribution.

As an example, we use many solutions for managing the impact of forestry on water resources. Our main harvesting approach is to leave untouched buffer zones along watercourses and aquatic habitats. Healthy forests are an essential asset to clean water throughout a country. Our forest inventory system is updated annually on the location of important habitats and waterbodies in relation to timber harvesting activities.

> [More about UPM Forest Action programme](#)

Case examples



New forestry research centre in Uruguay

The time-consuming work needed to breed the best seedlings to create the highest-quality trees requires considerable research and development expertise. UPM's first forestry research centre specialising in eucalyptus plantations began operations in Paysandú, Uruguay in 2022. At the centre, we can enhance the applied research that we have been conducting in Uruguay for over 30 years.

The centre's research work is mainly focused on developing genetic materials with high productivity, optimal wood quality and tolerance to the pests and diseases that can affect plantations. The new centre contains state-of-the-art laboratories and equipment, as well as specific greenhouses and nurseries for various research and development purposes.

Around 60 employees, including agronomists and experts in genetic improvement, health, forestry research and wood quality, work at the research centre. We have been promoting the research projects of post-graduate students in Uruguay for a number of years. With this centre, we can offer better facilities and opportunities to students and professors to develop their projects.



Deadwood as a measure of biodiversity

In 2018, we set the target of positive impact on biodiversity in our forests in Finland while efficiently producing high-quality wood raw material. In 2022, we set a new target to double the amount of deadwood in our commercial forests from the current level of about 5 cubic metres to 10 cubic metres per hectare.

In UPM's protected areas and commercial forests where a specific nature management target has been set, the deadwood target is 20 cubic metres per hectare. The new targets are part of our forest responsibility programme, UPM Forest Action.

The indicators used to measure biodiversity are based on comparing natural forests with commercial forests. Studies have shown that one clear difference between these two types of forests is the amount of deadwood. More than a fifth of Finland's forest species—fungi and insects in particular—depend on deadwood at some point in their lives. Buffer zones for bodies of water also increase the amount of deadwood.

The amount of deadwood in UPM's forests is based on data from the National Forest Inventory (VMI) of the Natural Resources Institute of Finland (Luke). We will also study the accumulation of deadwood and its impact on biodiversity in co-operation with Luke.

> www.upm.com/responsibility/forests

**ICMA CATEGORY**

Eco-efficient and/or circular economy adapted products, production technologies and processes



Climate-positive products and solutions

We are developing innovative, high-quality products from wood-based biomass. Many of our products offer sustainable alternatives for fossil raw materials and energy, for example replacing fossil plastics in consumer products, steel and cement in construction or fossil fuels in traffic, aviation and electricity.

Use of proceeds – EUR 500 million Green Bond issued in May 2022 and final allocation of use of proceeds of EUR 500 million Green Bond issued in March 2021

Climate-positive products and solutions include financing the development, operations, maintenance and expansion of the production of climate-positive products and solutions.

The total amount used for this category for the Green Bond issued in March 2021 was EUR 168 million and for the Green Bond issued in May 2022, EUR 144 million, all used in 2022. The un-allocated funds, EUR 168 million, of the Green Bond issued in March 2021 were allocated to the investment in a first-of-its-kind biochemicals refinery in Leuna, Germany. EUR 90 million of the Green Bond issued in May 2022 were also allocated to the same investment. The facility is currently under construction and once ready, it will enable a switch from fossil-based raw materials to wood-based sustainable alternatives in textiles, plastics, PET bottles and packaging of pharma or cosmetics products, for example.

For the Green Bond issued in May 2022, EUR 53 million was allocated to the R&D costs of UPM Biochemicals, UPM Biofuels, UPM Biomedicals and UPM Biocomposites businesses.

Commitments and targets

UPM's three Biofore Base research centres accelerate the development of bio-based products. The new Leuna Biofore Base in Germany works in connection

with the upcoming biochemicals refinery and specialises in developing new molecular bioproducts.

The centres focus on research, piloting and analytics enabling seamless collaboration with customers, value chain partners and research organisations such as universities. They work closely with UPM's mills, businesses and business-specific research centres in various countries.

Our 2030 responsibility targets and our contribution to the UN Sustainable Development Goals are integrated into our R&D activities and product development. We want our products to create value for our stakeholders during the entire product lifecycle. In 2022, we further implemented our Sustainable Product Design concept.

> [More information on our website](#)

Our impacts

Biochemicals – Ramping up new business

The ongoing new-to-the-world biorefinery investment will open completely new markets for us, with large growth potential. The biorefinery will produce a range of 100% wood-based biochemicals, the main products being bio-monoethylene glycol (BioMEG), bio-monopropylene glycol (BioMPG) and renewable functional fillers (RFF), with a total annual capacity of approximately 220,000 tonnes.

While recycling has become the mainstream choice for sustainable materials, UPM's biochemicals made from renewable raw materials will offer a missing link to achieve a sustainable circular bioeconomy: rubber and plastics based on renewable chemicals. Our glycols and RFFs work well in existing production and recycling processes, and will support the transition from oil-, gas-, and coal-based materials to bio-based solutions.

For example, according to our calculations, RFFs have over a 90% lower CO₂ footprint than industrial carbon black. When used in combination with bio-based rubbers and plasticisers, they enable final compounds to contain up to 85% renewable substances.

At the end of 2022, we had 1,632 patents and patent applications and 183 active trademarks in our biobusinesses portfolio globally.

We act through products

The EUR 750 million investment at Leuna is rapidly taking shape, in anticipation of start-up by the end of 2023.

Biofuels – Green growth with advanced biofuels

We offer our customers ways to replace fossil raw materials and reduce their carbon footprint with wood-based advanced biofuels. Our UPM BioVerno diesel offers a low-emission solution for transportation by significantly decreasing the amount of greenhouse gas emissions compared to fossil fuels. UPM BioVerno naphtha works identically to fossil-based naphtha and can be used both for plastics and as a low-emission biocomponent for gasoline.

Our operations are based on a circular bioeconomy and our raw material, crude tall oil, is a residue from pulp production. Our production process and development focus aims at further emission reductions and material efficiency. Advanced biofuels play an important role in UPM's Biofore strategy by offering innovative and sustainable alternatives to fossil-based products.

We are currently investigating growth opportunities in biofuels and biochemical feedstock. In January 2021, we began conducting the commercial and basic engineering study for a next generation biorefinery in Rotterdam, in the Netherlands. We are studying several residue-based feedstocks and technologies for the most valuable end uses in the transport and petrochemical sectors. The use of green hydrogen is also being studied as part of the technology concept. The planned biorefinery would enhance material efficiency with solutions based on the use of waste and residues without compromising global food production or biodiversity.

Biomedicals – Advancing innovations

UPM Biomedicals develops and supplies innovative and sustainable wood-based biomedical products for clinical and life science applications. The main component in our products is high-quality nanocellulose, refined from birch wood. All products are animal-free.

We actively collaborate with universities, research centres and key industrial partners in the fields of high-throughput drug screening, personalised medicine, cell therapies, 3D bioprinting, tissue engineering and advanced wound care. More than 520 patents and patent applications protect our existing and future products.

In life sciences, our main products are GrowDex[®], a range of hydrogels for 3D cell culturing, and GrowDase[™], an enzyme to release the cells from the gel. GrowInk[™] is a range of bioinks for 3D bioprinting, used in areas like cancer research, where models of tumours can be printed to test their response to different treatments. The ultimate goal is to print organs or tissues that could, in the future, be transplanted into patients.

In the clinical field, many Finnish healthcare professionals and hospitals already use our CE-marked FibDex[®] wound dressings. In 2022, we launched a new clinical investigation for superficial dermal burns led by experienced plastic surgeons in the university hospitals of Uppsala and Linköping in Sweden.

Biocomposites – The best in class

UPM Biocomposites is creating circular economy solutions through the manufacture of innovative composite materials and decking products.

UPM ProFi utilises European post-consumer plastic waste and post-industrial label waste to manufacture high-quality composite decking. The label production side streams from UPM Raflatac and its customers, with the waste collected and delivered to Germany where the composite decking is manufactured. The UPM ProFi Piazza product range is made with up to 75% recycled materials and offers best-in-class performance. We are a member of the EU Circular Plastics Alliance, which aims to increase the EU market for recycled plastics to 10 million tonnes by 2025. UPM Formi creates and manufactures wood-based biocomposites, enabling a reduction in the carbon footprint of the end product by up to 80% when compared to similar products made from fossil-based materials. The composite materials are suitable for various end uses, including kitchenware, personal care and acoustic devices.

Case examples



UPM Biochemicals to collaborate with Dongsung Chemical Company

A world beyond fossils took a significant step forward in 2022, as we entered into commercial partnership with the South Korean company Dongsung Chemicals. Together, we are aiming to bring sustainable biochemicals to global markets.

The initial focus for Dongsung is to replace fossil-based mono-ethylene glycols, used to make shoe soles for global sports brands, with UPM BioPura™. For manufacturers like Dongsung, a leading Asian provider of polymers for the shoe industry, UPM's wood-based biochemicals present an opportunity to advance their net zero commitments and to achieve a competitive advantage.

Renewable materials in footwear are already being commercialised and demand will continue to increase further in the fashion and shoe industry. Whilst sports shoes are the first objective, UPM and Dongsung intend to extend their collaboration into other sectors, including automotive interior materials and adhesives. The rising demand for electric vehicles is driving a consumer expectation that, not only should they deliver zero emissions, but the whole vehicle should be made from environmentally sound materials.



UPM Biochemicals and HAERTOL Chemie to develop new sustainable coolants

UPM Biochemicals and HAERTOL have formed a strategic partnership to produce a new range of carbon neutral engine and battery coolants that will help automotive manufacturers reduce their CO₂ footprint. The partnership accelerates the introduction of renewable materials into the automotive market and reduce fossil resource consumption.

UPM's renewable bio mono-ethylene glycol (Bio-MEG), UPM BioPura™, is produced from sustainably sourced, certified hardwood obtained in the regions around Leuna in Germany. The biomass does not compete with food resources and is carbon negative, therefore enabling the first ever carbon neutral coolant to be produced.

MEG is the main ingredient in every coolant (92-95%). Replacing fossil-based coolants with a new product based on renewable materials but with the exact same functionality is a complete sustainable transformation.

UPM BioPura™ will enable HAERTOL to offer their customers, leading global automotive brands, a viable option to significantly reduce their Scope 3 emissions by switching to a renewable, drop-in ingredient.



Hydropower

We produce CO₂ free hydropower to meet the growing demand for renewable energy. We are seeking new solutions and optimising energy sources and generation methods.

ICMA CATEGORY
Renewable energy



Use of proceeds – EUR 500 million Green Bond issued in May 2022

For the EUR 500 million Green Bond issued in May 2022, we have now for the first time used the renewable energy category and hydropower cost. This category includes the acquisition, maintenance and refurbishment of hydropower plants owned and operated by UPM Energy.

The total amount used for this category was EUR 22 million, of which 53% was used in 2021 and 47% in 2022. EUR 12 million was used mainly for operating and maintenance of hydropower plants. EUR 10 million was used for the Kuusankoski hydropower plant renovation and modernisation, including new turbines.

Commitment and targets

We are committed to continuous improvements in energy efficiency and to an increased share of renewable and low-emission energy. We are seeking new solutions and optimising energy sources and generation methods. Our energy portfolio consists mostly of energy sources that do not cause fossil CO₂ emissions.

Our impacts

UPM Energy has eight hydropower plants. Most of UPM's hydropower plants were built between the 1930s and 1950s and extensive renovations have been realised in the past few years. In early 2023, we completed the extensive renovation and modernisation of the Kuusankoski hydropower plant, ensuring another 40 years at minimum before the plant has to be renovated again. The average energy production volume is expected to increase from the current 180 GWh to 195 GWh.

Renewable hydropower generates flexible power

Weather-independent hydropower provides quick balancing power for an electricity system that is growing more and more on intermittent solar and wind power. Hydropower plant production can be started, adjusted and stopped quickly and used to balance production and consumption. Furthermore, hydropower is a cost-effective way to produce electricity. Hydropower plants have a long service life with low operating costs.

Stream water programme to restore biodiversity

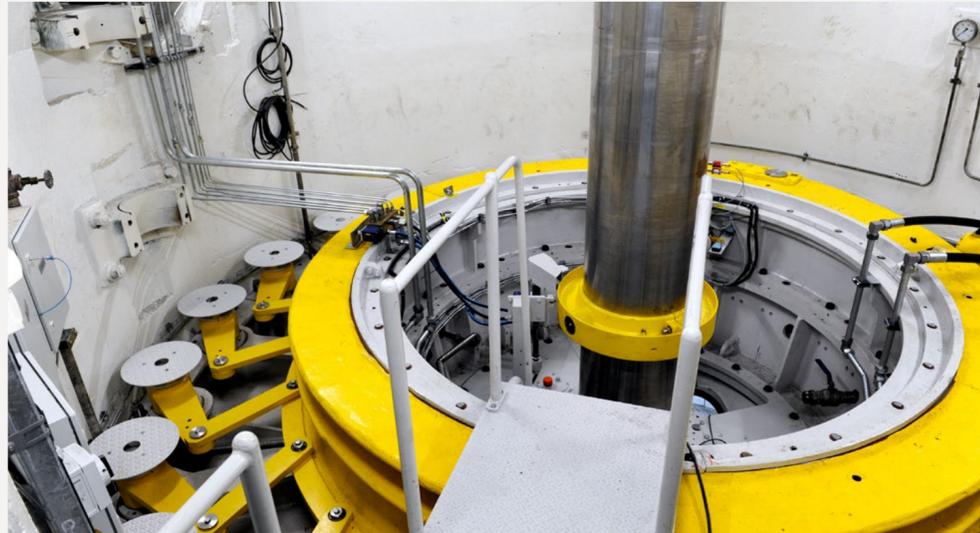
Emission-free hydropower does, however, impact the environment by altering river flow rates and their ecosystems. We have taken voluntary measures to restore migratory fish stocks, in addition to statutory levies on fisheries, to mitigate the production impacts. There are many unnecessary migratory barriers such as defunct dams in Finland, and by removing them, biodiversity can be restored.

UPM's stream water programme strives to remove obstacles to fish migration and restore fish stocks all around Finland. Several projects have already been completed and new potential projects are actively being sought and identified. In 2022, we restored the Sapsokoski and Arvajankoski rapids as part of our stream water programme. The projects reopened over 150 km of routes for migratory fish.

To steer our activities and to measure our impact on biodiversity, we have launched a new indicator with a target of 500 km of obstacle-free streams by 2030. By 2022, we reached 174 km in total.

In 2022, we generated 836 GWh hydropower through our own hydropower plants.

Case examples



Kuusankoski hydropower plant renovated

From 2019 to early 2023, we have gradually renovated and modernised the Kuusankoski hydropower plant in Finland.

The project was carried out one turbine-generation unit at the time so that the work did not impact the plant's normal energy generation. All three turbines were renewed, and the generator units modernised during the renovation. Additionally, the plant's own reserve generator was replaced with a more powerful one. The new automation system enables more effective control of the plant, improving especially the efficiency of controllable power generation, which is critical to the balance of the grid.

Technology has improved so that modern turbines and generator units generate significantly more power from the same amount of water. The average energy production volume is estimated to increase by more than 8% from the current annual volume of 180 GWh to around 195 GWh. This is roughly equivalent to the amount of electricity used by 800 electrically heated single-family houses in a year.



We will significantly increase our carbon-free electricity generation and use low-emission energy sources in our energy-consuming businesses.

Governance



**UPM Green Finance
Committee—internal
governance**

**Independent auditor
—external review
and assurance**

Governance

We established a Green Finance Framework in November 2020. The framework is based on the 2018 version of the Green Bond Principles published by the International Capital Markets Association (ICMA) and the 2020 version of the Green Loan Principles, published by the Loan Market Association (LMA), the Asia Pacific Loan Market Association (APLMA) and the Loan Syndications and Trading Association (LSTA), respectively.

The framework was reviewed by the second-party verifier CICERO and received the best possible rating, CICERO Dark Green. The review also included an assessment of the governance structure of the framework, which was rated to be excellent. We have designed and implemented a process to ensure that only projects aligned with the criteria set out in the Framework will be selected for Green Finance Instruments. We have also established a Green Finance Committee, including members from Treasury, Responsibility, Investor relations and Finance. We have a Green Finance Register for Green Finance Instruments issued by UPM for the purpose of monitoring the Eligible Assets and Projects and the allocation of net proceeds from Green Finance Instruments. The Green Finance Register forms the basis for impact reporting.

The Green Finance Committee has approved the final allocation of Eligible Assets and Projects and the impact reporting for the issued Green Bonds. We published previous Green Bond Reports in April 2021 and April 2022. In 2023, we plan to update our Green Finance Framework and the related second-party opinion.

- > [UPM as an investment/Debt](#)
- > [Green Finance Framework](#)
- > [CICERO second-party opinion](#)
- > [Green Bond Report 2020](#)
- > [Green Bond Report 2021](#)

GREEN FINANCE FRAMEWORK

Use of Proceeds

- Sustainable forest management
- Climate-positive products & solutions
- Pollution prevention & control including waste management
- Water & wastewater management
- Energy efficiency initiatives
- Renewable energy

Project Evaluation and Selection

Process designed and implemented to ensure Eligible Assets and Projects are aligned with eligibility criteria

Green Finance Committee

- Treasury
- Responsibility
- Finance
- IR

Management of Proceeds

Green Bond Register monitoring the Eligible Assets and Projects and allocation of net proceeds from Green Bonds. Excess proceeds to be held in accordance with UPM's liquidity management policy, which ensures that proceeds are not used for fossil fuel related investments.

Reporting

UPM will annually publish a report on the allocation and impacts of Green Bonds issued under this framework

Allocation report

- List of Eligible Assets and Projects
- Case studies and descriptions
- Amounts invested in each category



Independent Practitioner's Assurance Report

To the Management of UPM-Kymmene Corporation

We have been engaged by the Management of UPM-Kymmene Corporation (hereinafter also the "Company") to perform a limited assurance engagement on selected information described below for the reporting period ended 31 December 2022, disclosed in the UPM-Kymmene Corporation's Green Bond Report 2022 (hereinafter also the Selected Information).

Our conclusion

Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that the Selected Information for the reporting period ended 31 December 2022 has not been prepared, in all material aspects, in accordance with the UPM-Kymmene Corporation's Green Finance Framework.

When reading our assurance report, the inherent limitations to the accuracy and completeness of the Selected Information should be taken into consideration.

Our assurance report has been prepared in accordance with the terms of our engagement. We do not accept, or assume responsibility to anyone else, except to UPM-Kymmene Corporation for our work, for this report, or for the conclusions that we have reached.

Selected Information

The scope of our work was limited to assurance over the information presented in UPM-Kymmene Corporation's Green Bond Report 2022 on page 5 table 'Green Bond Summary' covering under it the use of proceeds in section 'Categories used' and the impacts in section 'Impact indicators' (the Selected Information) as of 31.12.2022.

Practitioner's independence, qualifications and quality control

We have complied with the independence and other ethical requirements of the International Code of Ethics for Professional Accountants (including International Independence Standards) issued by the International Ethics Standards Board for Accountants (IESBA Code), which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior.

PricewaterhouseCoopers Oy applies International Standard on Quality Management (ISQM) 1, which requires the firm to design, implement and operate a system of quality management including policies or procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Management's responsibility

The Management of UPM-Kymmene Corporation is responsible for preparing the Green Bond Report 2022 in accordance with the Reporting criteria as set out in the Company's Green Finance Framework. The Management of UPM-Kymmene Corporation is also responsible for such internal control as the management determines is necessary to enable the preparation of the Green Bond Report 2022 that is free from material misstatement, whether due to fraud or error.

Practitioner's responsibility

Our responsibility is to express a limited assurance conclusion on the Selected Information in the Green Bond Report 2022 based on the procedures we have performed and the evidence we have obtained. We conducted our limited assurance engagement in accordance with the International Standard on Assurance Engagements (ISAE) 3000 (Revised) "Assurance Engagements Other

than Audits or Reviews of Historical Financial Information". That Standard requires that we plan and perform the engagement to obtain limited assurance about whether the Selected Information is free from material misstatement.

In a limited assurance engagement the evidence-gathering procedures are more limited than for a reasonable assurance engagement, and therefore less assurance is obtained than in a reasonable assurance engagement. An assurance engagement involves performing procedures to obtain evidence about the amounts and other disclosures on the Selected Information in the Green Bond Report 2022. The procedures selected depend on the practitioner's judgement, including an assessment of the risks of material misstatement of the Selected Information.

Our work consisted of, amongst others, the following procedures:

- Making enquiries of relevant UPM-Kymmene Corporation management to assess to whether the reporting has been prepared in accordance with the UPM Green Finance Framework;
- Assessed the design of the processes and internal controls for managing, recording and reporting the Selected Information;
- Inspected minutes of the Green Finance Committee to confirm that the allocation of proceeds to eligible assets had been considered and approved according to the process described in the Green Finance Framework;
- Making enquiries of employees from various organisational levels of the Company with regards to whether the reporting has been prepared in accordance with the UPM-Kymmene Corporation Green Finance Framework;
- Performed substantive testing on a sample basis from original documents and systems to test the existence and accurate allocation of green bond proceeds per eligible assets as disclosed in the table Allocated Proceed and Impact of the Green Bond Report 2022;
- Evaluating the evidence obtained.

This report, including our conclusions, has been prepared solely for the Board of Directors of UPM-Kymmene Corporation and the green bond investors in accordance with the agreement between us, to assist the Board of Directors in reporting on UPM's green bond performance and activities. We permit this report to be disclosed in the UPM-Kymmene Corporation's Green Bond Report 2022 in respect of the reporting period ended 31 December 2022, to assist UPM-Kymmene Corporation in responding to their governance responsibilities by obtaining an independent assurance report in connection with the Selected Information.

Helsinki 4 April 2023

PricewaterhouseCoopers Oy
Authorised Public Accountants

Tiina Puukkoniemi
Partner, Authorised Public Accountant (KHT)
ESG Reporting and Assurance

Appendix: Impact calculation methodology

Accounting of impacts

More detailed information about all our responsibility indicators are disclosed in our Annual Report 2022 and in our [GRI content index](#) which are available on our website.

We follow sustainability reporting standards published by the Global Reporting Initiative (GRI) to measure and report on corporate responsibility at the Group level. Our corporate responsibility reporting in 2022 has been prepared in accordance with the GRI Standards.

In addition to GRI Standards, we have included a few additional indicators to the assurance scope, such as UPM biodiversity indicators.

Standard disclosures for 2022 in English with a reference to external assurance in the GRI content index have been externally assured by an independent third party, PricewaterhouseCoopers Oy. Furthermore, we are committed to the principles of inclusivity, materiality and responsiveness, as defined in the AA1000 AccountAbility Principles Standard (2008).

Forest indicators

The sustainability forest management indicator is based on hectares certified by the PEFC and/or by the FSC™ by third-party auditors. Certificates can be downloaded from [UPM Certificate finder](#).

UPM has commissioned carbon calculations of its own and leased forests in Finland and Uruguay. The calculations are based on internationally approved calculation models and they are executed by the Natural Resources Institute Finland (Luke). The same methods are used in international greenhouse gas inventories. However, they contain uncertainties and are developed further.

The calculations include the carbon balance of both trees and soil and cover the protected areas. In Finland, tree carbon balance is calculated as increment minus drain. In Uruguay, tree carbon balance is

calculated as the difference in carbon stored in growing stock between two years. Soil CO₂ balance is calculated in both countries with the Yasso07 model. The model uses litter fall quantity and quality, weather data and initial soil carbon stock as input values.

In 2022, soil was not included in the Uruguay calculations due to ongoing updates in the method. UPM together with the Natural Resources Institute Finland (Luke) is working on a soil carbon project to improve the accuracy of soil carbon calculations in Uruguay, and the updated method should be ready for 2023 calculations.

Climate science develops fast and we are actively supporting the work to create more reliable and accurate methods to calculate the carbon impact of forestry together with climate science experts.

> Luke

The indicator on carbon sink per EUR 1 million (see page 4) has been calculated based on the results of the carbon sink calculations for Uruguay and Finland (five years annual average carbon sink of 2.4 million tonnes) for the year 2022 divided by the proceeds of all three bonds in the area of sustainable forest management (EUR 975 million).

Biodiversity indicators have been developed by UPM in co-operation with various third parties. More about indicators here:

> UPM Biodiversity indicators

Indicator for climate-positive products and solutions

A solid patent portfolio boosts our competitive edge. The number of patents and trademarks which generated costs during a certain time period and for certain businesses is used as an indicator. The number is reported by UPM IPR.

We are committed to a climate-positive product portfolio. Many of our products are already proven to be climate-positive. In the future, we aim to scientifically verify the climate impacts of all our products. We initiated a study on climate-related substitution and the carbon storage effects of our products with two research institutes, the German IFEU and the Finnish Environment Institute (SYKE), which was finalised and published in 2022.

To assess the environmental performance of products of the future biorefinery in Leuna, Germany, a Life Cycle Assessment (LCA) study has been carried out. The LCA study conducted by UPM covers all the products from the biorefinery and enables UPM to provide environmental footprint data for the customers of the biorefinery, and to further develop the products and processes. LCA is a scientific method for analysing the environmental impacts of products. The LCA study was carried out in accordance with ISO standard 14040 and 14044, and the latest CML impact assessment methods were applied. A cradle-to-gate system boundary has been applied. The data collection is based on supplier design, process simulation and pre-commercial trials data and represent current best knowledge of the UPM's biorefinery process. Part of the production process is the uptake of biogenic carbon during growth of the feedstock beech wood. This removal is taken into account in the CO₂ footprint calculation including biogenic carbon. A critical review with independent party DEKRA Assurance Services GmbH, has been conducted.

> IFEU/SYKE study

