

# UPM's climate approach

Taking tangible, science-based action to mitigate climate change





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A major step toward a fossil-free future:  
UPM invests €1.3 billion in a next-  
generation biorefinery for wood-based  
biochemicals in Leuna, Germany.



# Introduction

At UPM, we renew the everyday – and that includes how we respond to the climate crisis.

The demand for sustainable, circular, and low-carbon solutions is growing – and redefining the role of materials in a future-fit economy. We are reshaping the materials economy, reducing emissions, and building resilience in a changing world.

We also help our customers reduce their environmental footprint through renewable, circular, or low-carbon solutions. We enable sustainable everyday choices and the transition from fossil-based materials to renewables across multiple value chains.

UPM's climate actions are rooted in science, aligned with global frameworks, and driven by impact. In line with the Paris Agreement, we are committed to limiting global warming to 1.5°C and achieving carbon neutrality by 2040 – a full decade ahead of the Paris timeline.

Climate action is embedded in our strategy, operations, and products. We co-create sustainable products with our customers. We see the climate challenge not only as a risk, but as a powerful driver of innovation, collaboration, and transformation.

# Drivers of transformation

The accelerating impacts of climate change demand a fundamental shift in how businesses operate—driving innovation, resilience, and sustainability across industries. We use scenario planning to assess climate-related risks and opportunities and to strengthen long-term business resilience. This work is embedded in our

annual strategy process and draws on the expertise of the scientific community, including collaboration with the Finnish Meteorological Institute (FMI) and the use of internationally recognized climate scenarios.

## Identifying transition impacts

We have conducted a company-wide assessment of transition risks and opportunities across our businesses using three International Energy Agency (IEA) scenarios:

- **Current Policies Scenario (CPS)**, a projection that assumes continuation based on existing energy and climate policies, without any new or strengthened measures
- **New Policies Scenario (NPS)**, a projection accounting for existing, planned and announced climate policies
- **2°C Scenario (2DS)**, a projection restricting global warming to well below 2°C

These scenarios help evaluate how shifts in regulation, markets, competition, and customer expectations could affect operations and financial performance. In low- and medium-emissions scenarios (NPS/2DS), transition impacts dominate. We have identified transition risks related to regulation, price, availability of raw materials, and energy.

For example, distortion in the raw material (wood)

market due to unpredictable regulation, subsidies, or EU policies resulting in national legislation could have a significant impact on UPM's financial performance.

We are well positioned in these futures, thanks to a flexible business portfolio and a strong focus on renewable, wood-based products that offer alternatives to fossil-based materials.

## Physical impacts of climate change

In high-emissions scenarios, physical climate impacts become more pronounced. We have worked with the Finnish Meteorological Institute, FMI to assess these risks in four key regions of operation: Finland, Germany, Uruguay, and China. The original analysis from 2019 was updated in 2024 using the latest CMIP6 global climate models and three Shared Socioeconomic Pathways:

- **SSP1-2.6 (low emissions)**
- **SSP2-4.5 (medium emissions)**
- **SSP5-8.5 (very high emissions)**

The updated report also includes observed weather changes from 1961 to 2023. The findings show a statistically significant increase in seasonal temperatures across all regions. Hot extremes are expected to become more frequent, with increased drought risks – even in areas with rising annual precipitation. For example, winter precipitation is projected to increase in Finland, while summer

precipitation is expected to decline in Germany. Extreme precipitation events are likely to intensify in all regions.

➤ **More about the report from:** [helda.helsinki.fi](https://helda.helsinki.fi)



## Ensuring water availability

Since 2011, UPM has mapped all pulp and paper mills using the Water Stress Index (WSI). In 2019, we adopted the WWF's Water Risk Filter to assess both basin-related and operational water risks. In 2020, the tool was upgraded to include climate scenario simulations for 2030–2050. We used this to update our water risk analysis with 2020 operational data, covering our water intensive production sites.

The analysis concluded that most UPM production sites are located in areas of low to medium basin risk across all climate scenarios. The exception is the UPM Changshu paper mill in China, which is projected to fall into a high-risk category by 2030 under low and medium scenarios. This is due to increasing risks related to water scarcity, flooding, water quality, and biodiversity. However, the mill has made significant progress in water efficiency, such as wastewater recovery and reuse. The mill has been recognized as a State Level Water Efficiency Front Runner by the Chinese government.

## From opportunities to strategic planning

Despite the risks, our scenario work also identifies opportunities. In transition scenarios, the growing demand for renewable materials positions us to benefit from our sustainable forestry practices and circular product innovations. In physical risk scenarios, enhanced forest growth or increased hydropower potential may offer regional advantages.

By integrating the insights into strategic planning, we ensure that our strategy is resilient, science-based, and responsive to a wide range of future developments.



# Committed to international frameworks and initiatives

Climate change is not something that can be solved alone. Therefore, we are basing our work with internationally recognized frameworks and initiatives, including:

- The Paris Agreement
- The Climate Pledge
- The Science Based Targets initiative (SBTi) > making sure that we have comparable and science-based methods for inventorying our emissions and setting our targets aligned with others who are also driving the transition.
- UN Global Compact Forward Faster Initiative

## Alignment with the Paris Agreement

**The Paris Agreement** sets a global goal to limit warming to well below 2°C – and preferably to 1.5°C. UPM has committed to the 1.5°C pathway and is actively reducing emissions in line with this ambition. Our strategy focuses on decarbonizing energy use, improving efficiency, and transforming our product portfolio to support a low-carbon future.

## Other initiatives

As a signatory of **The Climate Pledge**, UPM has committed to reaching carbon neutrality by 2040 – ten years ahead of the Paris Agreement timeline.

UPM's climate targets are validated by the **Science-Based Targets initiative (SBTi)**, confirming that they are aligned with the latest climate science. Our targets cover Scope 1, 2, and 3 emissions, and are supported by a clear decarbonization roadmap.

As part of **UN Global Compact Forward Faster Initiative**, UPM has pledged to set net-zero emissions targets in line with the SBTi and thus, UPM's net-zero approach will be aligned with recognized international carbon accounting and assurance standards when these are finalized.

These frameworks ensure our approach is credible, science-based, and globally comparable.



Marking a decade since its adoption, the Paris Agreement remains a historic turning point in global climate action, uniting nearly 200 parties in the ongoing effort to limit warming to well below 2°C, with continuing efforts to stay within 1.5°C during this decisive Decade of Action.





# Our climate commitment

Our climate commitment is built around three key action areas:



## We act through forests.

Forests and forest biodiversity are critical for mitigating the effects of climate change. We ensure that our forests and plantations continue to act as carbon sinks, remain resilient and diverse in changing climate conditions, and thrive for future generations.



## We act through emissions.

Minimizing the use of fossil fuels and raw materials is the most important way to mitigate climate change. We favor renewable and other carbon-neutral energy sources and produce CO<sub>2</sub>-free hydro and nuclear power in Finland. We are also committed to reducing emissions in our supply chain.

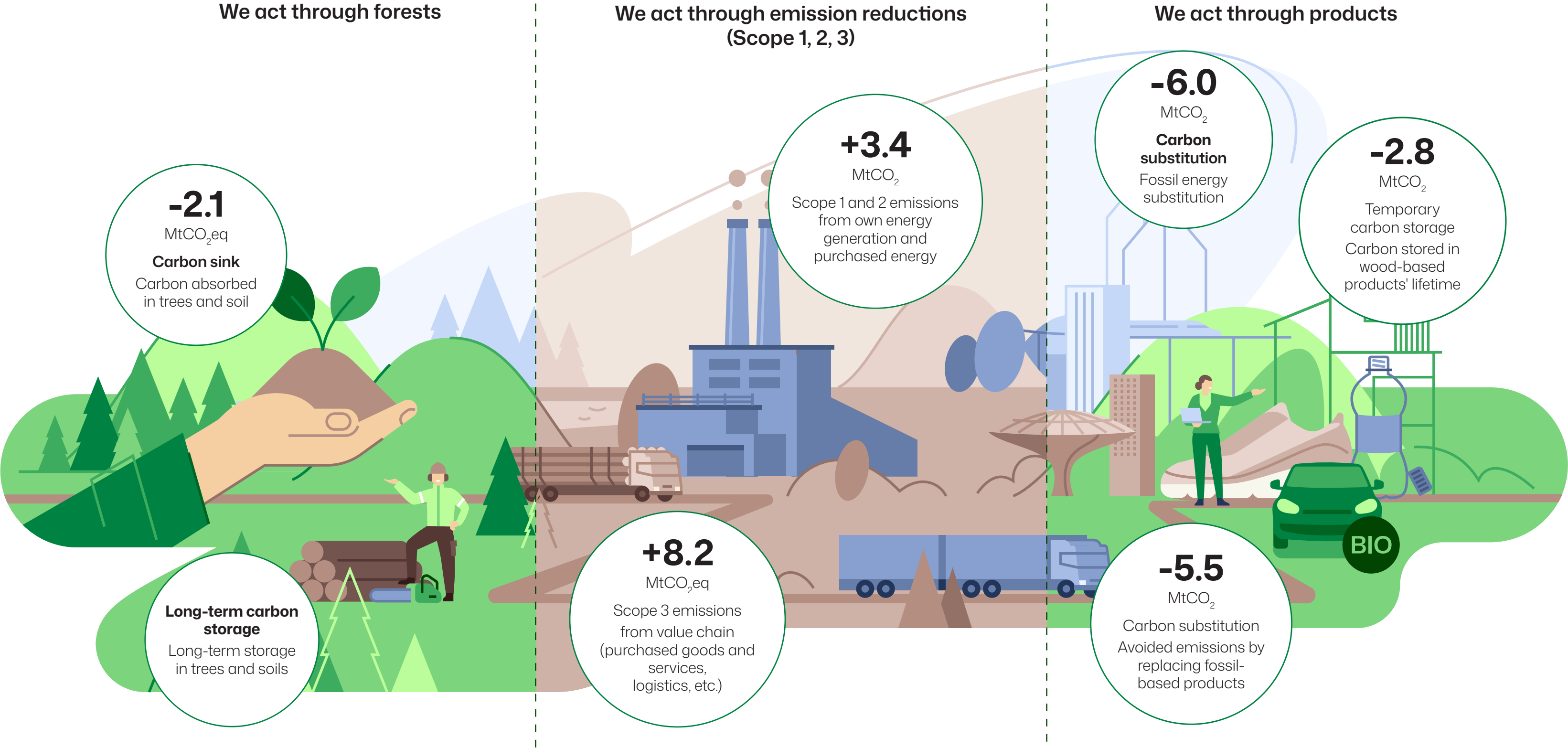


## We act through products.

Innovating new products that are not based on fossil raw materials is at the core of our strategy. We develop safe and sustainable products that offer alternatives to fossil materials. As we accelerate growth, we're investing in renewable fibres, advanced materials, and decarbonization solutions – including biochemicals, biofuels, and CO<sub>2</sub>-free energy – to help drive the transformation toward a low-carbon future.



# Towards net-zero emissions



Here’s what the numbers in the picture reveal and why they matter:

- We act through forests:** Trees and soil absorb carbon and act as long-term carbon storage. This means that they bind CO<sub>2</sub> from the atmosphere, marking a negative in our carbon calculation.
- We act through emission reductions:** Emissions from our own operations and those of our supply chain increase the amount of CO<sub>2</sub> in the atmosphere, marking a positive in our carbon calculation.
- We act through products:** By replacing fossil-based products and fossil-based energy, we reduce emissions, marking a negative in the carbon calculation. Our products act as temporary carbon storage over their lifetime, binding CO<sub>2</sub> from the atmosphere. In 2024, the annual carbon stock of our products sold increased compared to the previous year, marking a negative in the carbon calculation.

The carbon sink is calculated annually by the Natural Resources Institute Finland. The temporary carbon storage of UPM's wood-based products is estimated based on a scientific report by The Finnish Environment Institute (SYKE) and the German Institut für Energie- und Umweltforschung Heidelberg (IFEU). All figures are from 2024.



# Climate targets and action in practice

Our approach is based on the solid foundation and ambitious targets.

Strategic oversight is embedded at the highest level, with the Board of Directors reviewing and approving climate-related objectives and plans. Set targets and climate-based measures are integrated into the Performance Share Plan for senior management. Additionally, we have integrated sustainability into our financing by issuing four green bonds. As early as 2020, we tied a revolving credit facility to long-term CO<sub>2</sub> reduction and biodiversity targets.

## Climate targets

UPM's targets are regularly reviewed to reflect evolving climate science and regulatory expectations.

Our climate ambition comes to life through concrete action – in our forests, in our operations, and in the products, we bring to market.

Together, these actions form the backbone of our transition to a low-carbon future – and demonstrate how climate strategy becomes everyday practice at UPM.

- We manage our forests and plantations sustainably, ensuring they act as long-term carbon sinks while supporting biodiversity and ecosystem resilience.
- At the same time, we're transforming our energy systems and production processes to reduce fossil CO<sub>2</sub> emissions – from electrifying operations to switching to renewable and low-emission energy sources.
- And through innovation, we're expanding our portfolio of climate-positive products, including renewable fibres, advanced materials, and biobased alternatives that replace fossil-based inputs.





# We act through forests

Forests and forest biodiversity are critical for mitigating the effects of climate change.

We ensure that our forests and plantation areas continue to act as carbon sinks, remain resilient and diverse in changing climate conditions, and thrive for future generations while also providing renewable raw materials that can replace fossil resources.

### Climate action in practice

We plant around 40–50 million seedlings each year, ensuring that every harvested tree is replaced and that forest regeneration remains a core part of our approach. Our harvesting is carefully planned to maintain forest growth and carbon uptake.

To better understand and improve the climate impact of our forests, we work with expert partners like the Natural Resources Institute Finland (LUKE). LUKE calculates the carbon sink of our owned and leased forests and plantations in Finland, the United States, and Uruguay. These calculations

include both tree biomass and soil carbon and are reported annually as five-year averages.

We also continuously refine our methods to reflect the latest science. For example, in 2024, we updated the calculation method for our plantations in Uruguay to improve accuracy. This commitment to science-based measurement helps ensure our forests remain resilient, diverse, and effective carbon sinks – even as climate conditions evolve.

We have identified biodiversity-sensitive areas and integrated efforts to maintain or enhance biodiversity into our forest operations. We take action to restore habitats, develop sustainable forestry practices and improve the monitoring and measurement of biodiversity impacts. We collaborate with various scientific and professional organizations, including the Natural Resources Institute Finland, the University of Minnesota and the University of the Republic in Uruguay.

➤ [More about the calculations from: Forest and climate](#)

## ➤ Targets

- For forestry, we are committed to climate-positive land use in our own and leased forests. For forests to remain carbon sinks, growth must exceed harvesting and the goal is to maintain these forests as a carbon sink.
- In terms of biodiversity, we are working to create a positive impact on forest ecosystems and have developed monitoring systems to track progress.

## ➤ Results

- The latest five-year average of –2.1 mt CO<sub>2</sub> eq, confirming the forests’ role in absorbing carbon.
- We monitor progress against our biodiversity target with specific key performance indicators and results indicate overall positive development. We continuously explore more exact methodologies and tools, such as eDNA.



# We act through emission reduction

Reducing fossil CO<sub>2</sub> emissions is one of our most important action areas for mitigating climate change.

UPM's energy strategy focuses on improving energy efficiency and increasing the share of renewable and CO<sub>2</sub>-free energy. Most of our energy portfolio already consists of low-carbon sources such as hydropower, nuclear power, and biomass-based combined heat and power (CHP) generation at mill sites. When feasible, renewable electricity is also prioritized in power purchases.

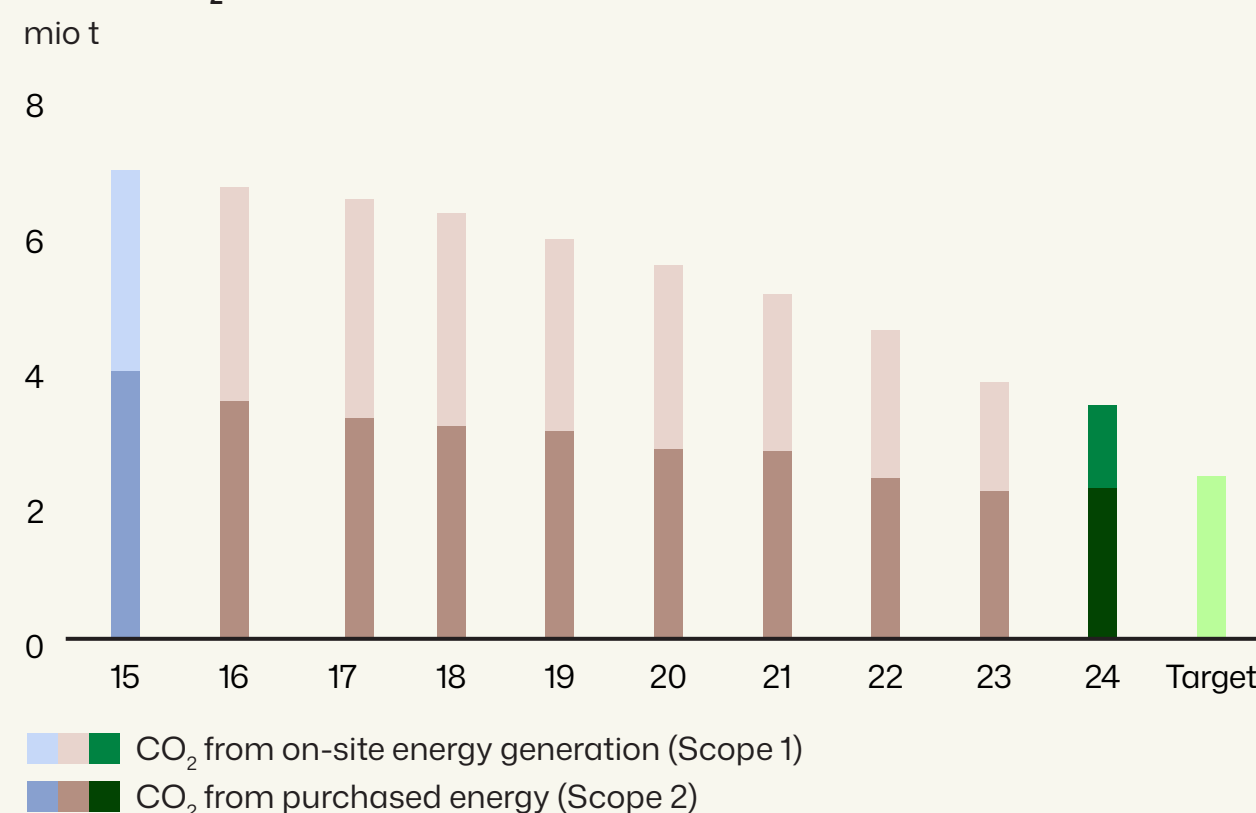
Beyond our own operations, we are addressing emissions across our entire value chain. For materials and logistics, we have a “-30 by 30” program, which aims to reduce these emissions and emphasizes collaboration with suppliers and partners to design and deliver low-carbon products and solutions. Scope 3 emissions – those from purchased goods and services, upstream logistics, and downstream distribution – account for the majority of the UPM's total carbon footprint.

## Climate action in practice

One of the most tangible examples of UPM's emissions reduction activities are the electrification of heat and steam production at our paper mills in Finland and Germany. In 2023, we began installing eight electric boilers across several sites. These boilers replace fossil-based fuels – primarily natural gas – with electricity, much of it CO<sub>2</sub> free. In Finland, these upgrades are expected to reduce fossil fuel emissions by approximately 50,000 tonnes per year, while also enhancing energy flexibility and security of supply. We are also decarbonizing our logistics.

➤ [More about the activities from: Energy efficiency at UPM](#)

### Fossil CO<sub>2</sub> emissions



As of 2022, we have operated a fleet of seven LNG-fueled vessels. These ships are operated by UPM Logistics under long-term time charter agreements and serve routes across Europe. The vessels consume significantly less fuel than the previous fleet, helping reduce emissions and fuel consumption while also supporting customers' climate goals.

These projects are tangible examples of investing in scalable, low-carbon technologies that deliver measurable climate benefits across our operations and supply chain.

## ➤ Targets

- To reduce emissions from own fuels and purchased electricity by 65% from 2015 levels by 2030
- To cut supply chain emissions by 30% from 2018 levels by 2030
- Separate targets for energy efficiency and fuel usage.

## ➤ Results

- For scope 1 and 2 emissions -50% (-45%) in 2024 compared to 2015 and -9% compared to 2023
- For scope 3 emissions -22% in 2024 compared to 2018, but +1ppt compared to 2023



# We act through products

We design and innovate renewable, circular, and low-carbon alternatives that help replace fossil-based materials and reduce emissions across value chains.

We take a deliberate approach to sustainable product design. Our Sustainable Product Design concept considers sustainability throughout the product lifecycle. We address environmental and social impacts from material selection through production, use, reuse and recycling. It guides us from the earliest stages of development, ensuring that every new product delivers a clear sustainability value. We work closely with our customers throughout – turning shared ambitions into real-world innovations that respond to global trends and expectations.

### Putting product innovation into practice

In 2025, we celebrated 10 years of renewable fuel production at our Lappeenranta biorefinery. This facility produces advanced biofuels from crude tall oil – a residue of our pulp

production – offering a sustainable alternative to fossil diesel. Over the past decade, our renewable diesel has helped reduce transport emissions and supported the shift toward cleaner mobility in Europe (see next page).

We're also building the future of fossil-free materials through our biochemicals business. Our Leuna biorefinery in Germany is the first of its kind – producing wood-based biochemicals that can replace fossil-based ingredients in plastics, textiles, packaging, and more. These materials offer a lower carbon footprint and open new pathways for sustainable innovation across industries (see next page).

Together, these examples show how we're turning our innovation strategy into action – creating renewable solutions that store carbon, reduce emissions, and support the transition to a circular, low-carbon economy.

## ➤ Target

- To develop decarbonization solutions

## ➤ Result

- Decarbonization solutions accounted for 8% of total sales in 2024, reflecting meaningful progress in providing products contributing to climate goals.



# Cases



## ■ UPM Biochemicals

### Mitigating climate change with wood-based innovation

Our wood-based biochemicals offer sustainable, competitive, high-quality solutions for various industries and applications. They can be fully integrated into existing production and recycling processes, transforming the entire chemicals value chain toward renewable circularity.

Our products are in a unique position to help our customers and major global brand owners decarbonize their raw material supply. Our new biorefinery in Leuna, Germany, will create new market opportunities and significant growth potential for us and our customers.

The biorefinery will convert solid wood into next-generation biochemicals, bio-monoethylene glycol (BioMEG) and Renewable Functional Fillers (RFF). It will also produce bio-monopropylene glycol (BioMPG) and industrial sugars. End-use segments for renewable glycols include packaging, PET bottles, coolants, textiles, composites, pharmaceuticals, cosmetics, and detergents. Lignin-based RFFs provide a sustainable alternative to carbon black and precipitated silica in a wide range of rubber and plastic applications.



## ■ UPM Biofuels

### 10 years of renewable fuel in Lappeenranta

UPM Biofuels celebrates ten years of successful operations at its Lappeenranta Biorefinery, the world's first commercial-scale facility producing advanced biofuels from wood-based residues. The refinery has been at the forefront of developing renewable alternatives to fossil-based fuels and materials, driving the decarbonization of the transport and petrochemical industries.

The biorefinery produces approx. 130,000 tonnes per year of UPM BioVerno™ renewable diesel and naphtha using crude tall oil (CTO), a residue of pulp production. The diesel reduces life cycle greenhouse

gas emissions by over 80%\*) compared to fossil diesel and is suitable for all diesel engines. Naphtha, which is used in applications such as packaging, textiles, and automotive components, offers a sustainable alternative to fossil-based raw materials in the plastics value chain.

Looking ahead, our focus is on further developing the Lappeenranta refinery, advancing proprietary feedstock technologies, and qualifying and commercializing biofuels derived from crude tall oil for jet engine fuels.

\*) Over the lifecycle of the fuel. The methodology for calculating life cycle emissions and emissions reduction complies with the European Union's Renewable Energy Directive II (2018/2001/EU).

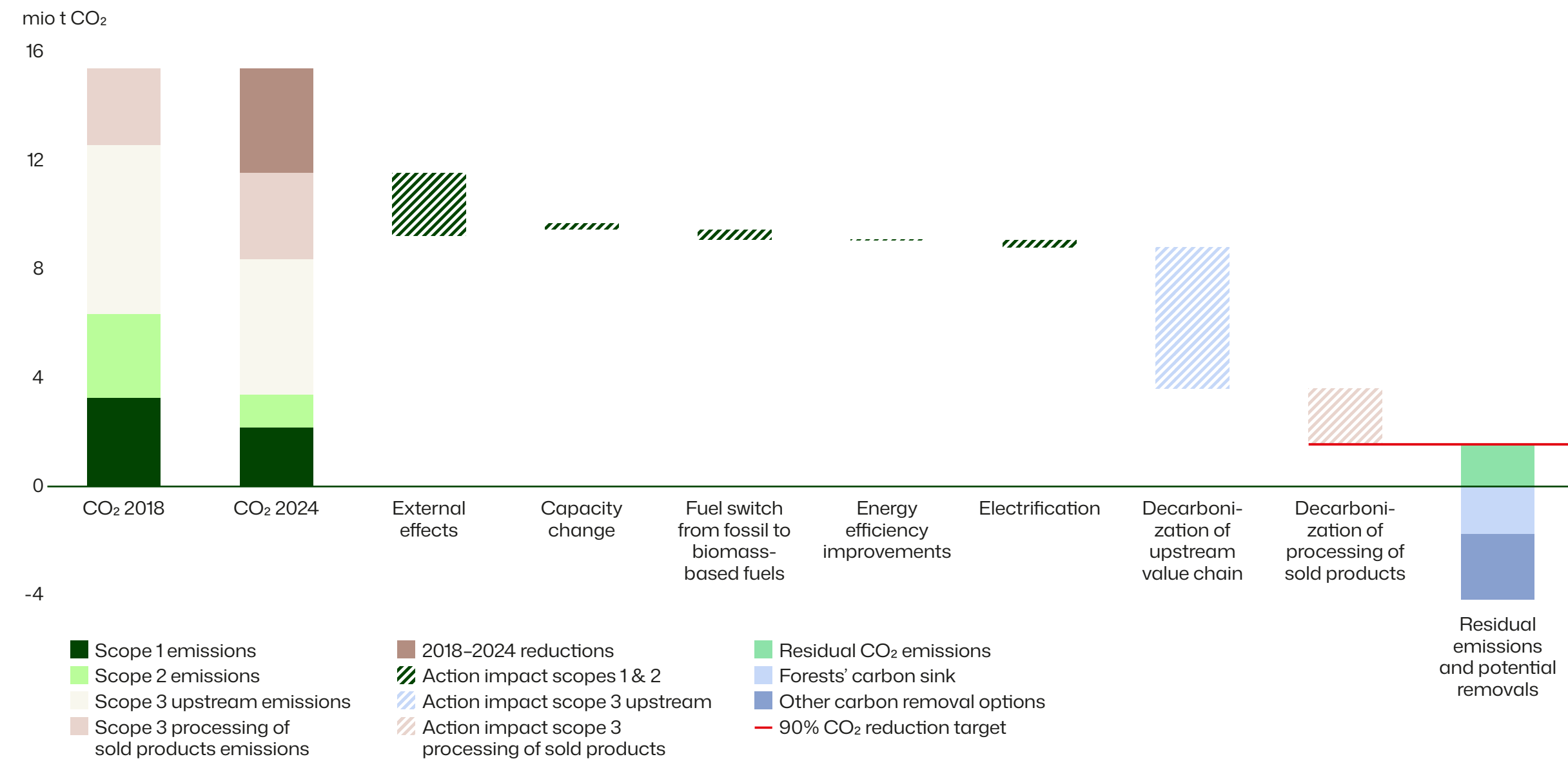


# Pathway to net-zero

We're on a journey to net-zero – and we know it's not a straight line. It's a phased, science-based approach that's fully embedded in our business strategy and built to deliver real impact.

We believe that meaningful climate action depends on collaboration – not just within our company, but across our entire value chain. That's why we engage actively with a wide range of stakeholders, from customers and suppliers to policymakers, investors, and local communities.

To explore UPM's climate efforts in more detail, feel free to reach out via [sustainability@upm.com](mailto:sustainability@upm.com) or [ir@upm.com](mailto:ir@upm.com)



UPM's path to net-zero is expected to be based on the decarbonization levers shown in the graph above as an indicative roadmap

To get there, we're transforming how we use energy across our mills and production sites, shifting to renewable and low-emission sources where feasible. We're investing in processes that reduce emissions and improve material efficiency. Our decarbonization levers – from energy efficiency and electrification to biogenic fuels and hydrogen – are already shaping our operations. We also recognize the role of external factors, like the decarbonization of electricity grids and broader market shifts. These will help accelerate our progress.

Forests are a big part of the picture too. Through sustainable forestry and responsible land use, we're enhancing carbon sequestration and supporting biodiversity. Finally, we're evolving our product portfolio to offer renewable and circular alternatives that help our customers cut their own carbon footprints. There will always be residual emissions, and those could be more than balanced by the potential carbon sinks of our forests, product-related impacts like temporary carbon storage or other carbon removal options.

We track our progress every year and report it transparently. Our net-zero approach will be aligned with recognized international carbon accounting and assurance standards when these are finalized.

To make all this happen, we're building strategic partnerships. It's how we ensure that climate action isn't just sustainable – it's scalable and economically sound. And because these actions are built into our strategy, they're creating long-term value for our business and the business of our customers..



