

UPM Biofore — Beyond fossils

Pulp & paper industries moving to biobased chemicals

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IEA Bioenergy eWorkshop 'Contribution of sustainable biomass and bioenergy in INDUSTRY TRANSITIONS' towards a circular economy', October 20th 2020



Future beyond fossils is a key driver for UPM going forward



MEGATRENDS

- Population growth
- Urbanisation
- Higher living standards
- Digitalisation

2 billion

middle class consumers in Asia

UPM SOLUTIONS

- Sustainable forestry and land use
- Resource efficiency
- Circular economy
- Responsible business conduct
- Renewable materials
- Replacing fossil-based materials













UPM BIOREFINING

Pulp Plantations Biofuels Sawmills Wood Sourcing and Forestry

UPM ENERGY

Hydro-, nuclearand thermal power (incl. shares in energy companies) Electricity generation and trading

Optimisation services

UPM RAFLATAC

Label materials for branding and promotion, informational labels, and labels with functionality

UPM SPECIALTY PAPERS

Labelling materials, release liners, flexible packaging papers, office and graphic papers

UPM COMMUNICA-TION PAPERS

Extensive product range of graphic papers for advertising and publishing as well as home and office uses

UPM PLYWOOD

WISA® Plywood and veneer products for construction and industrial applications

UPM BIOCHEMICALS

Wood-based biochemicals for variety of industrial uses

UPM BIOMEDICALS

Wood-based products for biomedical applications

UPM BIOCOMPOSITES

UPM ProFi decking products and UPM Formi granules



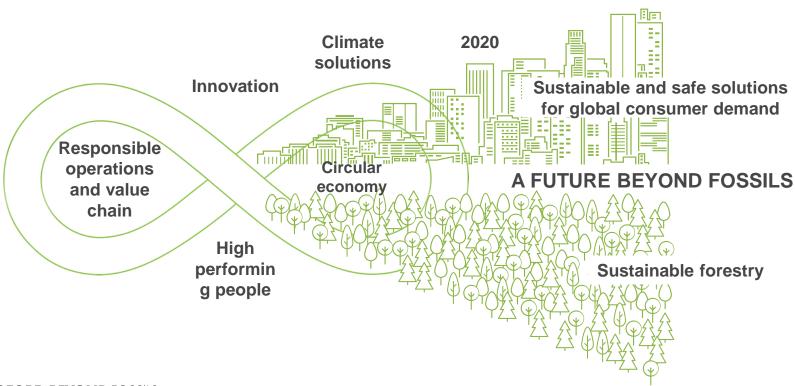
UPM

EUR 10,238 million



We create value and business opportunities that go beyond fossils





How we use land – and what we use if for – is critical to climate change and biodiversity



The challenge:

Balancing the needs for

- Food production
- Livelihood
- Infrastructure and mobility

With the challenges of

- Higher temperatures, drought, rising sea levels, extreme weathers
- Loss of biodiversity



Forest industry creates an economic incentive for forest growth





Renewable raw material



Economic interest

to ensure forest growth

Increased demand for sustainable solutions and materials

Carbon sinks

Planting new trees for every cut one



4



We follow strict principles in all forestry and wood sourcing operations



100%
traceability
covered by a
third-party
verified Chain
of Custody

Guaranteed sustainability by FSC® and PEFC™ certifications

Forest biodiversity preserved

100% from sustainable sources

No wood from tropical rainforests or forests converted to plantations

We take concrete actions to ensure forest growth

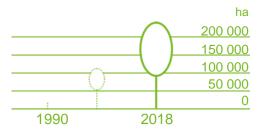


100 new trees every minute



We plant 50 million trees every year **100 trees** per minute

New carbon sinks



UPM plantations

In Uruguay a new carbon sink of 24M tonnes in 25 years

with no effect on food production or natural forests – plantations established on former grasslands

Our responsibility agenda is guided by the Biofore strategy and contributes to UN's SDGs



Goals where we can have the biggest positive impact through our operation, products and solutions, or where we aim to minimise our negative impact.



Driving long-term value creation – mitigating climate change



UPMBIOFORE-BEYOND FOSSILS



We act through FORESTS
Climate-positive forestry



We act through EMISSIONS 65% less CO₂ emissions



We act through PRODUCTS
Innovate novel products







SPECIALTY PACKAGING MATERIALS

Label materials Specialty papers

HIGH VALUE FIBRE

Forests

Pulp

MOLECULAR BIOPRODUCTS

Biofuels

Biochemicals

Communication papers

Plywood

Energy



A NEW ERA OF GROWTH

Creating new business in wood-based biochemicals

EUR 550 million investment at Leuna, Germany



Industrial scale biorefinery



Alternatives to fossil materials in various consumer-driven end-uses



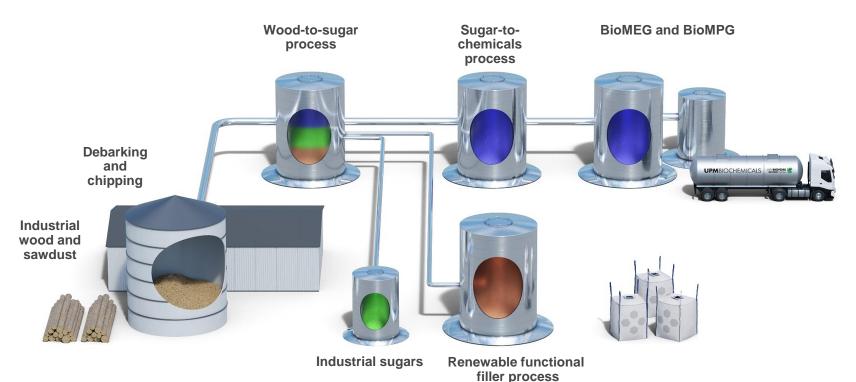
Total annual capacity of 220,000 tonnes



Scheduled to start up by the end of 2022

Unique technology converting wood to drop-in and unique performance biochemicals





Attractive location in Germany and efficient value chain



- UPM is a responsible local producer with an entirely European value chain
- Chemical Site Leuna provides existing processes, logistics arrangements and infrastructure for various services and utilities
- Strong chemicals cluster in Germany with proximity to customers and suppliers
- Good availability of sustainably sourced hardwood from forest thinnings and residues of sawmills
- Innovation-friendly environment with strong universities, institutes and skilled potential employees





Renewable drop-in alternatives for replacing fossil-based chemicals

- The global MEG market is more than 30 million tonnes; current based on nonrenewable raw materials
- Direct fit into customers' processes and the existing recycling infrastructure
- Renewable glycols, BioMEG and BioMPG, ready to be converted into various industrial products and everyday consumer goods
- End use examples are PET-bottles, packaging, textiles, pharma, deicing fluids, composites, detergents

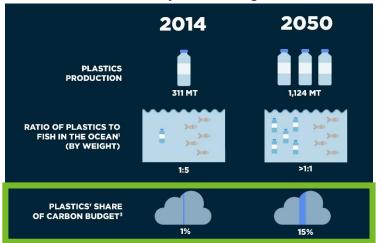


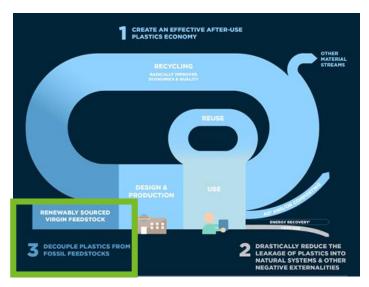
Circular ecomomy - key to manage increased future volumes



Ellen MacArthur Foundation:

The New Plastics Economy – Rethinking the Future of Plastics, 2016

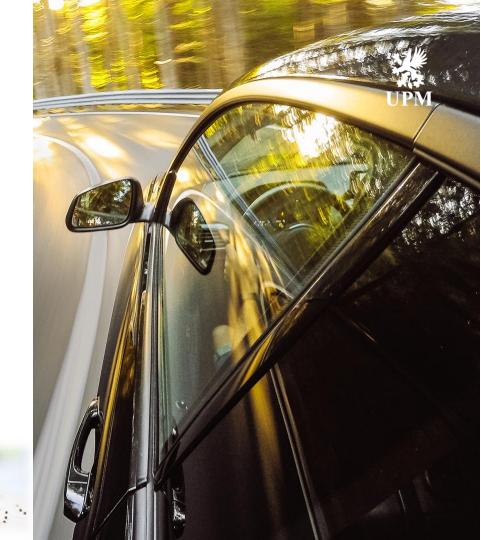




- Bioplastics will not necessarily solve the waste problem, as the products might be identical
- However, renewable chemicals will be needed to compensate for recycling losses and to de-carbonize the value-chain

For a lighter and more sustainable future – UPM's renewable functional fillers

- Unique combination of material properties to address current needs of rubber industry
- Suitable for premium automotive rubber applications
- Exchange of traditional filler systems significantly reduces compound weight while drastically increasing the renewable materials content and reducing CO₂ footprint



Renwable Functional Fillers















BIOCHEMICALS INVESTMENT **UPM Leuna**









Industry leader in responsibility



MEMBER OF

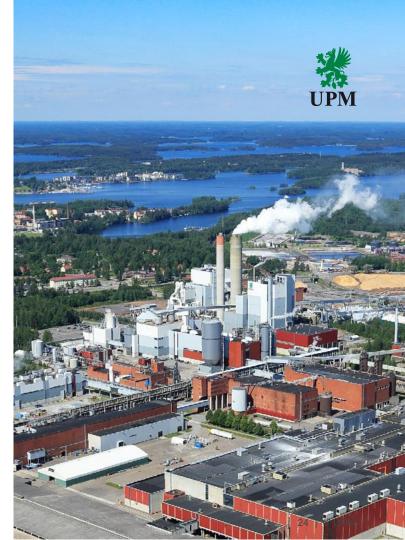
Dow Jones Sustainability Indices

In Collaboration with RobecoSAM (











UPMBIOFORE BEYOND FOSSILS