SUSTAINABLE FOREST MANAGEMENT IN SCANDINAVIA – UPM THE BIOFORE COMPANY

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ISCC Technical Committee Wood 2017
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Roots run deep
UPM today

**UPM BIOREFINING**

**UPM ENERGY**

**UPM RAFLATAÇ**

**UPM PAPER ASIA**

**UPM PAPER ENA**

**UPM PLYWOOD**

pulp, plantations, biofuels, timber

BIOCHEMICALS

BIOMPOSITIVES

SALES €10 BILLION • PERSONNEL 19,300 • SHAREHOLDERS 85,000 +
Purpose
We create value by seizing the limitless potential of bioeconomy.

Vision
We lead the forest-based bioindustry into a sustainable, innovation-driven, and exciting future.
The competence, integrity and drive of our people make us unique.
Finland is covered by lakes and boreal forest

Facts and figs

- Total area of Finland is 33.8 million ha
  - Land area in Finland is 30.4 million ha
  - Forest land area is 26.3 million ha (87%)
- Very fragmented ownership structure with 600,000+ private forest owners
  - Average estate size is 33 ha
  - Average harvesting area 1.5 ha
  - Annual regeneration harvesting area is 0.63% of the total forest area
- Finnish forests grow around 104 million m³/a
- Annual cuttings are 55 - 65 million m³
Characteristics of long rotation vs. short rotation land use

**BOREAL FORESTRY**
- Long rotation time from 60 to 80 years
- Continuous forest cover, mosaic structure
- High biodiversity
- Native tree species mixed stands
- Natural multipurpose
- Low intervention intervals
- Minor or no use of plant protection products
- Low erosion risk

**AGRICULTURE**
- One year rotation
- Seasonal cover
- Low biodiversity
- Non native and/or GMO species monoculture
- Single purpose
- High intervention intervals
- Continuous and significant use of plant protection products
- High erosion risk
Climate change and forests
Finnish example

Climate change is a global challenge that can be mitigated with the growing forest stock

- **Growing trees remove carbon** from the atmosphere - forests form a significant carbon sink.
- **Greater growth than harvesting** together with forest regeneration ensure that the carbon sink or storage effect are not weakened.
- **Active forest management increases growth rate** and enhances carbon sink effect.
- **Renewal of forests** is a continuous process.

![Growth and use of Finnish forests 1995-2025](image)
Non-managed or a well-managed forest?
We ensure that all wood we use is sustainably sourced

UPM uses about **28 million cubic metres of wood** at its various businesses globally.

Wood is sourced mainly from **privately-owned forests**. More than **20 000 wood trade transactions** made annually.

We know the **origin of the wood** we use.

All of UPM’s wood and fibre supplies are covered by **third-party-verified chains of custody**.
UPM’s Wood Sourcing and Forestry is based on sustainable forest management

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Description</th>
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<tbody>
<tr>
<td>50 mio</td>
<td>TREES ARE PLANTED ANNUALLY</td>
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<tr>
<td>100%</td>
<td>OF WOOD AND WOOD FIBRE ORIGIN IS KNOWN AND COMES FROM ACCEPTABLE SOURCES (CONTROLLED WOOD)</td>
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<td>84%</td>
<td>OF WOOD AND WOOD FIBRE COMES FROM PEFC/FSC CERTIFIED FORESTS – TARGET 100% BY 2030</td>
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<tr>
<td>Active</td>
<td>BIODIVERSITY PROGRAMS AND CO-OPERATION WITH NGO’S</td>
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<tr>
<td>All</td>
<td>FOREST SITES ARE REGENERATED AFTER UPM ACTIVITY</td>
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<tr>
<td>No</td>
<td>DEFORESTATION</td>
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<tr>
<td>Full</td>
<td>COMPLIANCE WITH EU TIMBER REGULATION</td>
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Managing the whole value chain from seedlings to wood deliveries to the mills

650 forest professionals, 120 locations
A network of over 300 entrepreneurs employing about 2,000 people
The wood based product market is an economic mechanism that mitigates climate change, and sustains forests and forest carbon sink effect when done in a responsible way.
Biofuels and biochemicals are natural evolutionary steps in wood based value creation.
UPM Lappeenranta Biorefinery

Key facts

- **Feedstock**: Pulp production residue Crude Tall Oil
- **Products**: Renewable Diesel & Naphtha
- **Side streams**: Turpentine, Pitch and Sodiumbisulphate
- **Production capacity**: 100 000 metric tonnes/a
- **UPM patents** and applications: 200
Crude Tall Oil – Residual oil from pulp industry

UPM BioVerno Renewable Diesel process is a direct continuation of pulp production – Our aim is to utilize wood and the related residual streams to full extent.
UPM Lappeenranta Biorefinery – biofuels and biomaterials for many sectors

- Bio-based aroma chemical for fragrance industry
- Renewable fuel or applications in Chemical industry
- Reducing agent in pulp and chemical industry
- Renewable gasoline component in road transport
- Feedstock for bioplastics production or biochemical use
- Renewable drop-in diesel for road and marine use
- Bio-based aroma chemical for fragrance industry
- Renewable fuel or applications in Chemical industry
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- Renewable drop-in diesel for road and marine use

- Turpentine
- Pitch
- Sodium bisulphate
- UPM BioVerno naphtha
- UPM BioVerno diesel

Renewable wood-based chemicals

Raw materials from UPM’s own pulp production: Crude tall oil

Biorefinery processes
Verified sustainability adds value

- Sustainability is a key value driver for UPM: **wood based sustainability** certified biofuels and biomaterials are highly valued by customers
- Sustainability **certification verifies** sustainable operations, compliance and **traceability throughout the chain**

Forest certification >80 %: FSC, PEFC
Chain of custody 100 %: FSC CW, PEFC DD
EU-RED certification 100 %: RSB EU RED, ISCC EU, FIN national RSB Global and ISCC PLUS compliance for bioproducts
UPM BioVerno – Top of the line sustainable biofuel

- Circular economy
- Sustainable forestry
- No food/feed competition
- No direct or indirect change in land use
- Significantly less tailpipe emissions
- 80% less CO$_2$ emissions
- NOx, PM
Certification aspects for solid biomass

- For solid wood based feedstock, the certification standard needs to be applicable for:
  - High number of suppliers and transactions
  - All forest based streams independent of the end use
  - Long lead time due to long rotation
  - Mass balancing of batches

- Sustainability standard for wood based feedstock should complement the existing forest and chaining of custody certification schemes, and avoid unnecessary and double auditing

- Sustainability standard’s need to respond to the needs of different sectors in a world where new bio based solutions are created
Driving cleaner climate