UPM – THE BIOFORE COMPANY

AIMING HIGHER

WITH BIOFORE

Investor presentation
November 2017
UPM today

UPM BIOREFINING
Pulp
Biofuels
Timber

UPM ENERGY
Electricity
generation and
trading

UPM RAFLATAC
Label
materials for
product and
information
labelling

UPM SPECIALTY PAPERS
Label papers,
release liners,
office papers
and flexible
packaging

UPM PAPER ENA
Magazine
papers,
newsprint and
fine papers

UPM PLYWOOD
Plywood and
veneer
products

UPM BIOCOMPOSITES

UPM BIOCHEMICALS

WOOD SOURCING
AND FORESTRY
Global businesses – local presence

UPM’s sales by market 2016
EUR 9,812 million

- 13% North America
- 63% Europe
- 18% Asia
- 6% Rest of the world

- 54 production plants in 12 countries
- 12,000 customers in 120 countries
- 19,300 employees in 45 countries
- 85,000 shareholders in 40 countries
- 55,000 suppliers in 70 countries
# UPM in transformation

## Business portfolio
Increasing share of businesses with strong long-term fundamentals for profitability and growth

## Operating model
Promotes value creation

<table>
<thead>
<tr>
<th>Sales</th>
<th>2008</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>100%</td>
<td>80%</td>
</tr>
<tr>
<td>Plywood</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Raflatac</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Sawmilling</td>
<td>20%</td>
<td>20%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sales</th>
<th>EUR 9.5bn</th>
<th>EUR 9.8bn</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBIT 7)</td>
<td>EUR 513m</td>
<td>EUR 1,143m</td>
</tr>
<tr>
<td>ROE 8)</td>
<td>3.5%</td>
<td>10.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Net debt</th>
<th>EUR 4.3bn</th>
<th>EUR 1.1bn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market cap</td>
<td>EUR 4.7bn</td>
<td>EUR 12.5bn</td>
</tr>
</tbody>
</table>

7) excluding special items for 2008, comparable figures for 2016

## Business performance
Continuous improvement in financial, social and environmental performance

## Disciplined capital allocation
Driving value creation
Competitive businesses with strong market positions
Operating on healthily growing markets

Growth drivers:
- Private consumption
- Sustainability
- Population growth
- Urbanisation
- E-commerce
- Construction
- Transportation

UPM PLYWOOD
- Plywood, veneer ~3%

UPM PAPER ENA
- Graphic papers ~4%

UPM Specialty Papers
- Label papers ~4%
- High-end office papers ~4%

UPM RAFLATAC
- Self-adhesive labels ~4%

UPM BIOREFINING
- Pulp ~3%
- Biofuels strong
- Timber ~2%

UPM ENERGY
- Electricity ~1%

By comparable EBIT 2016
Demand trend growth, % pa
Increasing share of businesses with strong long-term fundamentals for profitability and growth

Sustainable growth
- UPM Biorefining
- UPM Raflatac
- UPM Specialty Papers
- UPM Plywood
- UPM Energy

Maintaining strong cash flow
- UPM Paper ENA

Sales 2016

<table>
<thead>
<tr>
<th>Year</th>
<th>Investment</th>
<th>Capacity Closures and Divestments</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Pulp +70,000 t</td>
<td>420,000 t magazine, 160,000 t fine</td>
</tr>
<tr>
<td>14</td>
<td>Pulp +100,000 t</td>
<td>460,000 t magazine</td>
</tr>
<tr>
<td>15</td>
<td>Pulp +170,000 t</td>
<td>345,000 t news</td>
</tr>
<tr>
<td>16</td>
<td>Pulp mill efficiency improvement</td>
<td>280,000 t news</td>
</tr>
<tr>
<td>17</td>
<td>Renewable diesel +120m litres</td>
<td>305,000 t magazine</td>
</tr>
<tr>
<td>18</td>
<td>Specialty papers +360,000 t</td>
<td>128,000 t magazine</td>
</tr>
<tr>
<td>19</td>
<td>Label stock expansion</td>
<td>195,000 t magazine, Hydropower</td>
</tr>
</tbody>
</table>

Starting with 170,000 t of pulp and expanding to 30,000 t of pulp in 2019.

Expanded for 200 t magazine, 13,000 t fine, and 260,000 t magazine.

Pulp and paper production for 2019.
Value creation through sustainable growth and cash generation

Sustainable growth
- Commercial success
- Cost efficiency
- Focused growth investments
- Product mix development

Maintain strong cash flow
- Commercial success
- Cost efficiency
- Efficient use of assets, including restructuring
Growth initiatives – focused growth projects have contributed well to UPM’s profits and returns

Current ongoing focused growth projects
- Kymi pulp mill expansion 2
- Raflatac expansions in Poland and Finland
- Kaukas pulp mill expansion 2
- Chudovo plywood mill expansion

Long term growth opportunity in pulp
- Agreement with the Government of Uruguay to establish a competitive operating platform in Uruguay

New biomolecule businesses
- Evaluation of building a biochemicals refinery
- Lappeenranta Biorefinery reached designed capacity and generates a good financial return
Focused investments are delivering growth

<table>
<thead>
<tr>
<th>Division</th>
<th>Product Line</th>
<th>CAGR 2011–2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPM Biorefining</td>
<td>Pulp, Biofuels</td>
<td>+3% New business</td>
</tr>
<tr>
<td>UPM Raflatac</td>
<td>Standard products, Films and specials</td>
<td>+4%</td>
</tr>
<tr>
<td>UPM Specialty Papers</td>
<td>Label materials, Cut-size</td>
<td>+4%</td>
</tr>
<tr>
<td>UPM Plywood</td>
<td>Plywood</td>
<td>+3%</td>
</tr>
</tbody>
</table>

Average delivery growth 2011–2016
Business area long-term targets compared with realised returns

<table>
<thead>
<tr>
<th>UPM Energy</th>
<th>UPM Biorefining</th>
<th>UPM Specialty Papers</th>
<th>UPM Paper ENA</th>
<th>UPM Plywood</th>
<th>UPM Raflatac</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROCE % *)</td>
<td>ROCE %</td>
<td>ROCE %</td>
<td>FCF/CE %</td>
<td>ROCE %</td>
<td>ROCE %</td>
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<tr>
<td>30</td>
<td>28</td>
<td>26</td>
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*) UPM Energy shareholdings valued at fair value

Long-term return target
Group financial performance

**Comparable EBIT**

- **2011:** 600 EURm
- **2012:** 700 EURm
- **2013:** 800 EURm
- **2014:** 900 EURm
- **2015:** 1000 EURm
- **2016:** 1100 EURm
- **LTM:** 1200 EURm

Target: EBIT growth

**Comparable ROE**

- **2011:** 4%
- **2012:** 6%
- **2013:** 8%
- **2014:** 10%
- **2015:** 10%
- **2016:** 12%
- **LTM:** 12%

Target: 10%

**Net debt and leverage**

- **Net debt EURm:**
  - **2011:** 3750 EURm
  - **2012:** 3000 EURm
  - **2013:** 2250 EURm
  - **2014:** 1500 EURm
  - **2015:** 750 EURm
  - **2016:** 0 EURm
  - **LTM:** 0 EURm

- **Net debt/EBITDA (x):**
  - **2011:** 3.0
  - **2012:** 2.5
  - **2013:** 2.0
  - **2014:** 1.5
  - **2015:** 1.0
  - **2016:** 0.5
  - **LTM:** 0.0

Target: EBIT growth

Comparable figures for 2014 – 2017, excluding special items for earlier years
5-year cumulative cash flow – disciplined capital allocation in action

Strong operating cash flow
EUR 5.9bn

Focused investments
EUR 1.9bn

Deleveraging
EUR 2.1bn

Attractive dividend
EUR 1.9bn

Industry-leading balance sheet
Net debt / EBITDA
0.41x
Capital allocation – maintaining capability for future opportunities

1. Maintain strong balance sheet, investment grade metrics
   *Net debt/EBITDA 2x or less*

2. Attractive dividend
   *30-40% of operating cash flow per share*
   Capex in attractive focused growth projects
   *IRR exceeds ROCE targets*

3. Capex in attractive larger growth opportunities
   *IRR exceeds ROCE targets*
   M&A, if the opportunity and timing are right
   *IRR exceeds ROCE targets*

4. Additional shareholder distribution selectively
   *balance long term free cash flow cycles*
Strong cash flow and balance sheet

Operating cash flow

- Free cash flow
- Operating cash flow
- Q3/17 operating cash flow EUR 486m
- Working capital decreased by EUR 54m

Net debt

- Net debt EURm
- Net debt / EBITDA (trailing 12 months)
- Q3/17 Net debt / EBITDA 0.41x
Dividend

Dividend policy

- UPM aims to pay an attractive dividend, 30–40% of operating cash flow per share

Dividend for 2016

- EUR 0.95 (0.75) per share, totalling EUR 507m
- 30% of 2016 operating cash flow
Low investment needs in existing assets allow growth projects with modest total capex

**Focused growth investments**
- Good returns and fast payback
- Low implementation risk
- Financed from operating cash flow

**Low replacement investments**
- Asset quality in all businesses, e.g. large competitive pulp mills
- UPM Paper ENA

**Modest total capex and attractive returns**
Q3 2017 – excellent quarter and further steps in transformation

- Comparable EBIT increased by 12% to EUR 351m (314m)
- Good growth in deliveries and strong operational efficiency with no significant maintenance activity
- Operating cash flow was EUR 486m (506m), net debt decreased to EUR 623m (1,479m)
- UPM transformation continues with new initiatives for future growth
Q3 2017 – Good market demand

**UPM BIOREFINING**
- Good demand, pulp deliveries +5%, strong growth in biofuels
- Pulp prices higher
- No significant maintenance

**UPM PAPER ENA**
- Graphic paper deliveries –1%
- Seasonally low fixed costs, including maintenance
- Fibre costs higher

**UPM ENERGY**
- Electricity deliveries –7%
- Hydropower generation recovered to normal level, below last year’s high level

**UPM RAFLATAc**
- Good demand globally, deliveries +9% driven in particular by developing markets
- Input cost inflation in sales margins

**UPM SPECIALTY PAPERS**
- Good demand, deliveries +3%
- Significant progress in product mix, higher release liner deliveries
- Input cost inflation mitigated

**UPM PLYWOOD**
- Good demand, deliveries +4%
- Modest input cost inflation in sales margins
Comparable EBIT by business area

- **UPM Biorefining**
  - EURm: 180
  - % of sales: 30

- **UPM Energy**
  - EURm: 120
  - % of sales: 60

- **UPM Paper ENA**
  - EURm: 120
  - % of sales: 12

- **UPM Specialty Papers**
  - EURm: 50
  - % of sales: 12.5

- **UPM Raflatac**
  - EURm: 50
  - % of sales: 12.5

- **UPM Plywood**
  - EURm: 25
  - % of sales: 20

- **UPM Energy**
  - EURm: 120
  - % of sales: 60

- **UPM Paper ENA**
  - EURm: 120
  - % of sales: 12

- **UPM Specialty Papers**
  - EURm: 50
  - % of sales: 12.5

- **UPM Raflatac**
  - EURm: 50
  - % of sales: 12.5

- **UPM Plywood**
  - EURm: 25
  - % of sales: 20

- **UPM Energy**
  - EURm: 120
  - % of sales: 60

- **UPM Paper ENA**
  - EURm: 120
  - % of sales: 12

- **UPM Specialty Papers**
  - EURm: 50
  - % of sales: 12.5

- **UPM Raflatac**
  - EURm: 50
  - % of sales: 12.5

- **UPM Plywood**
  - EURm: 25
  - % of sales: 20
Comparable EBIT in Q3 2017 vs. Q3 2016

Prices increased more than variable costs. Growth in deliveries continued. Currencies had a negative impact.

Growth in deliveries in Biorefining, Raflatac, Specialty Papers and Plywood. Pulp prices increased.
Outlook for 2017

- UPM’s profitability improved significantly in 2016 and is expected to continue on a good level in 2017. Comparable EBIT is expected to increase in 2017 compared with 2016.
- Demand growth is expected to continue for most of UPM’s businesses, while demand decline is expected to continue for UPM Paper ENA. The focused growth projects continue to contribute to UPM’s performance.
- Following a deflationary environment in recent years, 2017 is expected to show modest input cost inflation. UPM will continue measures to reduce fixed and variable costs to mitigate this.
- Q4 2017 is expected to include more maintenance activity than Q3 2017 in UPM Biorefining and UPM Paper ENA.
Responsibility is good business

“We believe that customers, investors and other stakeholders value responsible operations that keep risks under control and add to our business opportunities, thereby increasing the company value.”

MORE WITH BIOFORE

Creating value through products and innovation

Creating competitive advantage and long-term value by efficiency

Risk mitigation by responsible value chain and production
Creating competitive advantage and long-term value by engagement

Safety

Per million hours

Lost-time accident frequency

5-year change: -76%

Employee engagement

Manager effectiveness

Employee engagement

5-year change: +9

Productivity

Sales per employee

5-year CAGR: +4% pa

EUR million
Creating competitive advantage and long-term value by efficiency

Case: UPM Changshu mill in China

- **Water**
  - −60%
  - Per tonne of paper

- **Energy**
  - −30%
  - Per tonne of paper

- **Waste to landfill**
  - −60%
  - Per tonne of paper

- **Certified fibre**
  - 85%
  - In 2015

- **COD in effluent**
  - −75%
  - Per tonne of paper

- **SO₂ emission**
  - −90%
  - Per tonne of paper

2015 compared to 2005

Source: UPM
Consistent long-term work receives external recognition

UPM in sustainability indices

Global Compact LEAD

Member of Dow Jones Sustainability Indices

In Collaboration with RobecoSAM

CDP’s Climate Change Program: A- score

Sustainable and Responsible (SRI) investors form a significant part of UPM’s shareholders

SRI, % of total institutional shareholders

Source: Nasdaq, September 2016
Market pulp consumed in growing end-uses – supply of alternative white fibres declines

Global paper and board production

- Market pulp consumption in growing end-uses
- Mixed collection crowding out white recycled fibre
- Stressed supply of white recycled fibre

- Graphic papers
- Containerboard
- Cartonboard
- Tissue
- Specialty
Case: Market pulp consumption in growing end-uses

Fibre consumption in tissue, cartonboard and specialty end-uses

- White integrated pulp: 10 million tonnes
- White market pulp: 30 million tonnes
- Other fibres (RCP, mechanical pulps…): 85 million tonnes

5% demand increase in tissue, cartonboard and specialty end-uses

Increase in market pulp consumption: +1.5 million tonnes

Source: Pöyry, Hawkins Wright, UPM
UPM Biorefining

Case: Stressed supply of white recycled paper

5% fall in global graphic paper production

-2

Fall in market pulp demand

+3

Market pulp to replace fall in white recycled paper supply

+1

Net increase in market pulp demand

125

-7

Million tonnes

Source: Pöyry, UPM
Case: Mixed collection crowding out white recycled fibre

UPM Biorefining

White RCP grades
Mixed RCP
Old corrugated boxes

5% point increase in mixed collection share

+4

Market pulp to replace fall in white recycled paper

Million tonnes

Source: Pöyry, UPM
Summary of pulp demand outlook

Increase in end use ... 

- Decline in Graphic papers
- Healthy growth in other White Papers & Boards
- Strong growth in Containerboards (brown fibre)

... will drive fibre demand in coming decades 

- Growth in Market pulp vs. decline in Integrated pulp
- Declining White RCP
- Demand of Brown fibre may overwhelm the supply

Estimated growth of White RCP + Integrated Pulp + Market Pulp is still conservative (~1 Mt/a)

Source: UPM, Pöyry, RISI
White fibres in different stages of life-cycle; 64 Mt capacity closed within 2000–2015

- **Hardwood pulp** capacity has experienced strong net growth after 2000 and is expected to continue growing.
- **Softwood** has faced closures as much as hardwood. New demand in China is turning decline into a slow growth.
- **White RCP** was the fastest-growing fibre in Europe and NA in early 1990’s. After recession capacity has been in decline due to very high collection rates and diminishing supply of graphic paper.
- **Mechanical** pulp continues to decline along with graphic papers.
- **Non-wood** pulps consumed mostly in China are under pressure due to environmental reasons.
- **Sulphite** has been in decline for decades.

Source: Pöyry

Note: Including both market and integrated pulp
Demand-supply drivers of pulp market

**Short term**
- End use demand
- Re- and destocking of inventories

**Long term**
- Sustainable, renewable and recyclable
- Food product safety
- Replacing plastics

**Demand**
- Population growth
- Urbanisation
- Middle class expansion
- Aging demography
- E-commerce

**Supply**
- Decline of graphic paper production and scarcity of recycled fibre

- Maintenance stoppages
- Production issues
- Capacity closures
- Conversions
- New mill starts
- Debottleneck investments

- Availability of competitive mill locations
- Plantations, sustainable wood raw material
- Water availability
- Infrastructure
- Conversions
- End use demand
UPM Biorefining
Chemical pulp market prices

Pulp market prices, EUR

Pulp market prices, USD

Source: FOEX Indexes Ltd, ECB
Potential pulp mill in Uruguay could be a competitive alternative – time schedule is several years

Phase I: Discussions with the Government of Uruguay: prerequisites for a possible pulp mill investment

Phase II: Development of infrastructure
- Pre-engineering
- Permitting
- Necessary conditions
  - est. 1.5-2 years

Phase III: Investment Decision
- Potential UPM Investment Decision
- Investment Project Development of Infrastructure
  - est. 2.5 years
Establishing a competitive operating platform in Uruguay

**Current operations**

- Plantation base at the littoral
- Fray Bentos pulp mill
  1.3 million tonnes
- ~100 km of river barging for outbound logistics
- Sea port in Nueva Palmira
  loading half vessels
- Ocean vessels to pulp markets

**Uruguay prospect**

- Plantation base at Rio Negro basin
- Potential new pulp mill
  about 2 million tonnes
- Railway with high technical standards
- Deep sea port in Montevideo
  loading full vessels
- Ocean vessels to pulp markets
UPM Biofuels in existing and future end-use

Fuel retail

Dedicated green fleets

Marine/Aviation
UPM Biorefining

UPM Biofuels business evolving

- UPM enters Biofuels
- Evaluate technologies, define business case
- Investment decision 2012
- Build Lappeenranta Biorefinery and Biofuels organization
- Establish Bioverno as a benchmark product and brand in biofuels
- Commercial start 2015
- Technology and Business case proven
- Biocrude concept shaping
- Start evaluation of future growth opportunities

2010

2020
Significant emission cuts needed in transportation sector

EU’s greenhouse gas reduction targets cannot be met without significant emission cuts in transport – actions needed in all sectors

- 80% by 2050
- 60% by 2040
- 40% by 2030

25% of total emissions in Europe from transport

Drop-in biofuels are a solution for GHG reduction in all transport sectors

Electric vehicles can be applied in light-duty road transport

Transport emissions by sector
Cost competitive and flexible asset base

Power generation breakdown

Condensing power

Flexible hydro production with optimisation opportunities

Nuclear as reliable base load with world-class availability performance
### UPM Energy’s power generation assets

<table>
<thead>
<tr>
<th>Description</th>
<th>MW</th>
<th>EURm</th>
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<tbody>
<tr>
<td>Hydropower holdings</td>
<td>565</td>
<td>723</td>
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<tr>
<td>Nuclear power OL1 and OL2</td>
<td>580</td>
<td>1,031</td>
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<tr>
<td>Nuclear power OL3 under construction</td>
<td>(500)</td>
<td>178</td>
</tr>
<tr>
<td>Condensing power</td>
<td>190</td>
<td>8</td>
</tr>
<tr>
<td>UPM Energy’s shareholdings in total, valued at fair value</td>
<td>1,335</td>
<td>1,940</td>
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<tr>
<td>UPM own hydropower assets</td>
<td>160</td>
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<tr>
<td>UPM Energy’s in total (excl. OL3)</td>
<td>1,495</td>
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<td>UPM Energy capital employed</td>
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<td>2,267</td>
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In addition to its own power generation, UPM Energy sources electricity from part owned energy companies at full cost (cost-price principle)
UPM Energy

Cost efficient generation enables robust profitability also in challenging market environment

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<tbody>
<tr>
<td>Comparable EBIT, EURm</td>
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<td>186</td>
<td>202</td>
<td>181</td>
<td>116</td>
<td>22</td>
<td>12</td>
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<tr>
<td>% of sales</td>
<td>45.0</td>
<td>39.9</td>
<td>43.5</td>
<td>43.6</td>
<td>32.7</td>
<td>27.5</td>
<td>18.3</td>
<td>30.5</td>
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UPM Raflatac
Self-adhesive labels in end-use

PHARMACEUTICALS  WINE, SPIRITS & CRAFT BEVERAGE  FOOD  HOME & PERSONAL CARE  DURABLES

TRANSPORT & LOGISTICS  RETAIL, OIL & INDUSTRIAL  A4 & CUT-SIZE  SECURITY & BRAND PROTECTION  TYRE
Leading position in a growing market

The self adhesive labelstock market
- > EUR 8bn global market
- ~ 4% p.a. growth
- Private consumption driven

UPM Raflatac
- #2 globally
- Business in 120 countries
- > 8,000 customers
- 3,000 people in six continents

UPM Raflatac market shares
- EMEIA: 75% (25%), 25%
- Americas: 85% (15%), 15%
- APAC: 90% (10%), 10%
Continuing growth

1. Capturing the market growth in the current markets and product areas
2. Increased distribution coverage and customer reach
3. Wider product portfolio
4. M&A when opportunities emerge

Enabled by scalable operating platform & efficient investments
UPM Specialty Papers

Focus on global Labelling materials, Packaging in Europe and Office paper in APAC

LABELLING MATERIAL

PACKAGING

OFFICE PAPER APAC
Our end use markets are growing

**LABELING MATERIAL**
- CASE: Siliconized release liner market, 44 Bn m²
- CAGR 5%
- 2014: 44, 2020E: 60
- 9%
- 3%
- 3%
- 2.5%
- 4%
- 4%

**PACKAGING**
- Paper flexpack, k tonnes
- CAGR 2%
- 2015: 2,370, 2020E: 2,702
- 5%
- 0%
- 0.5%
- 3%
- 2%

**OFFICE PAPER ASIA**
- Asian cut size market, million tonnes
- CAGR 2.5%
- 2015: 4.6, 2020E: 5.2
- 6%
- 3%
- 0%
- 0.6%
- 5%

- CHN 1%
- JPN 6%
- KOR 3%
- SEA 1%
- AUS 0.6%
- OTH -2%

~$12 Bn
~$58 Bn
~$4 Bn
Mkt value
UPM Specialty Papers

Global release liner market: Applications

- **Label**: 49%
- **Tapes**: 13%
- **Industrial**: 11%
- **Hygiene**: 9%
- **Food & bakery**: 5%
- **Graphic film**: 5%
- **Medical**: 3%
- **Envelope**: 2%
- **Others**: 3%

**48.6 Bn m²**

**Product functions:**

Release liner carries the adhesive and face material
- Prevents the adhesive from sticking permanently
- Important and often critical feature of a layered construction

Source: AWA
Historically Home & Office end-use has been the most resilient to structural changes.

Despite the digital alternatives personal preferences (way of working and learning), regulation (archiving) and lack of common standards have mitigated the change.

A moderate decline has taken place in Direct marketing end-use.

Paper based marketing is still recognized to be the most effective medium for retailers and cataloguers.

Steady decline in Magazine Publishing circulation and pagination, however number of titles increasing.

Publishers still rely heavily on the revenues from print.

Newspaper publishing being historically the most vulnerable to structural changes but remarkable differences between countries.

Monetizing digital circulation for Magazines and Newspapers continue to be challenging.

Source: Euro-Graph
Paper price vs. cash cost of marginal cost producer

EUR/t

Sources: PPI, RISI, Pöyry
Graphic paper prices

Sources: PPI, RISI
UPM Plywood

UPM Plywood in end-use

Construction  Vehicle flooring  LNG shipbuilding
Relevant high-end market offers meaningful growth potential

Relevant market ~5 million m$^3$

- High-end demanding applications & customers
- Medium range standard products
- EMEA region
- Global LNG business

- Europe is net importer of plywood
- Imports focus mainly on standard products in mid-low ranges

Source: FEIC; FAOSTAT; UPM
Biofuels and biochemicals are natural evolutionary steps in wood based value creation.
Biochemicals biorefinery targeting to produce bio-MEG, bio-MPG and lignin from hardwood

**BIOREFINERY PROCESS**

**STEP 1: SUGAR PULPING**
Disintegrating wood into sugars, lignin and green energy

**STEP 2: CHEMICAL CONVERSION**
Conversion of sugars into targeted biochemicals

- **Bio-Monoethylene glycol (MEG)**
- **Bio-Monopropylene glycol (MPG)**
- **Lignin**

**BIOMASS**

- 40% Cellulose
- 30% Hemi-cellulose
- 25% Lignin

**SUGARS**

**GREEN ENERGY**
Biochemicals products are sustainable and competitive drop-in alternatives for brand owners

- **Mono Ethylene Glycol (bMEG)**
  - Existing fossil-based market
  - Market demand > 26 mio tons
  - CAGR >3%
  - Application examples:
    - Textiles
    - Bottles & Packaging
    - Deicing fluids

- **Mono Propylene Glycol (bMPG)**
  - Existing fossil-based market
  - Market demand >2 mio tons
  - CAGR >5%
  - Application examples:
    - Composites
    - Pharma & Cosmetics
    - Detergents

- **Lignin**
  - Performance chemical
  - Application driven
  - Strong IP position
  - Application examples:
    - Wood resins
    - Plastics
    - Foams & Coatings
The Biofore Company