UPM BIOREFINING
CREATING VALUE
ON BIOMASS

Executive Vice President
Heikki Vappula
UPM Biorefining consists of pulp, biofuels, sawn timber and integrated energy production.

UPM Biorefining utilises integration synergies both in wood sourcing and in mill operations.

UPM aims to grow in Biorefining both in terms of volumes and in product diversity.

<table>
<thead>
<tr>
<th>UPM Biorefining</th>
<th>2013 (EURm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>1,988</td>
</tr>
<tr>
<td>EBITDA</td>
<td>435</td>
</tr>
<tr>
<td>EBITDA, %</td>
<td>22%</td>
</tr>
<tr>
<td>ROCE, %</td>
<td>11%</td>
</tr>
</tbody>
</table>
1 RESEARCH CENTRE
2 BIOREFINERY
3 BIOMASS POWER PLANT
4 PULP MILL
5 SAWMILL
6 PAPER MILL
UPM Biorefining
Benefits in integrated operations
Chemical market pulp* demand increases

- Growth in developing markets driven by fast urbanisation and growing middle class
- Growth in mature markets driven by increasing use of hygiene, packaging and specialty products
- The graphic paper segment feeds less white recycled fibers for the growing tissue and specialty segments
- Old capacity being closed because of financial reasons and increasingly important environmental reasons

Global demand

Source: PPPC Chemical Market Pulp Forecast, February 2014
*Bleached sulphate market pulp
85% of pulp demand is in growing end-use segments

Bleached market pulp demand by end-use and region

<table>
<thead>
<tr>
<th></th>
<th>WE</th>
<th>NA</th>
<th>China</th>
<th>ROW</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>P&amp;W</td>
<td>11%</td>
<td>4%</td>
<td>11%</td>
<td>8%</td>
<td>34%</td>
</tr>
<tr>
<td>Tissue</td>
<td>10%</td>
<td>6%</td>
<td>6%</td>
<td>10%</td>
<td>32%</td>
</tr>
<tr>
<td>Packaging</td>
<td>1%</td>
<td>0%</td>
<td>4%</td>
<td>2%</td>
<td>8%</td>
</tr>
<tr>
<td>Speciality</td>
<td>6%</td>
<td>1%</td>
<td>4%</td>
<td>4%</td>
<td>16%</td>
</tr>
<tr>
<td>Fluff</td>
<td>2%</td>
<td>2%</td>
<td>1%</td>
<td>4%</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>30%</td>
<td>14%</td>
<td>27%</td>
<td>28%</td>
<td>100%</td>
</tr>
</tbody>
</table>

= growing market segment (85%)
= declining market segment (15%)

*Source: Hawkins Wright. End use markets for bleached kraft pulp, September 2013*
UPM Biorefining
UPM has consistently developed the business

• Building own sales and marketing network
• Establish strategic sales and marketing co-operation to provide a versatile product range on the global market
• Obtain trust as a business partner based on reliable supplies, efficient logistics, advanced technical service offering and outstanding environmental performance

External pulp sales

2010 0.6m tonnes

2011 0.9m tonnes

2012 1.6m tonnes

2013 1.9m tonnes
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UPM has built a unique pulp business

Customer needs

- SW-B
- Euca
- Birch
- SW-A
- CTMP
- Other

UPM fibre

3rd party fibre

- Direct sales with a competent sales team
- UPM technical support and R&D platform
- UPM logistic platform
- Deep understanding of paper makers’ needs
- Solid reputation as a reliable and responsible partner

“SW-B” = standard NBSK, “SW-A” = premium strength NBSK
UPM Biorefining

UPM plans to expand production in its competitive pulp mills by 10%

Fray Bentos
- started 2007
- capacity 1,200,000 t of eucalyptus

Pietarsaari
- modernized 2004
- capacity 790,000 t soft- and hardwood pulp

Kymi
- modernized 2008
- capacity 530,000 t soft- and hardwood pulp

Kaukas
- modernized 1996
- capacity 740,000 t soft- and hardwood pulp
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UPM invests in Kymi mill to secure its position in the global pulp market

• Total investment EUR 160 million
  – a new pulp drying machine
  – modernisation of the softwood fibre line
  – a new debarking plant
  – improvements in the energy balance of the Kymi integrate
  – Start-up in Q4 / 2015

• Attractive investment
  – increase pulp production by 170,000 tonnes annually
  – increase revenue from by-products and residuals
  – improve resource efficiency and operational flexibility for the whole integrate

• Full pulp drying capacity allows decoupling of UPM’s pulp and paper businesses
UPM Biorefining

UPM plans to expand production in its competitive pulp mills by 10%

- Kymi expansion of 170,000 tonnes and drying capacity
- Pietarsaari expansion of 70,000 tonnes on-going
- 100,000 tonnes increase in Fray Bentos permit. Further potential both at Fray Bentos and Kaukas mills
- Longer term options being developed in Uruguay, Finland and other parts of the world
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Pulp summary

• Healthy long term demand outlook in chemical pulp

• Well prepared to respond to growing demand
  – Modern and efficient pulp mills
  – Versatile product range
  – Outstanding environmental performance
  – Commitment to grow in pulp business in long term
  – Reliable business partner

• The planned expansions of existing pulp mills in the coming three years offer attractive returns and further the decoupling of pulp and paper businesses
UPM CREATES NEW BUSINESS IN WOOD-BASED RENEWABLE DIESEL
Biofuel mandates in 67 countries
UPM is the second European company to produce renewable diesel

Biofuel mandates

- > 4%
- 1-4%
- < 1%
Large and growing markets regardless of the debate on regulation

EU 2020: 10% target in place
- Post 2020: transportation whitepaper in preparation
- Post 2020: 1G biofuels unlikely to get support

US: ethanol blending limited by blend wall
- Future winners will be drop-in fuels

Source: Hart Energy: Global Biofuels Outlook to 2025
UPM Lappeenranta Biorefinery
UPM creates new business in wood-based renewable diesel

Commercial scale investment
- EUR 150m investment, attractive return
- Product: renewable diesel
- Capacity: 100,000 tonnes/a
- UPM Patents & Applications: 150
- Commissioning: summer 2014
- Employment: 200 persons
- Contributes approximately 25% of Finland’s biofuel target
Price

**UPM BioVerno – RME**
compared with reference (RME)
- Higher energy content
- Lower GHG emissions, no indirect land use change
- No blending limit from quality
- Lower tailpipe emissions
- Fits to existing infrastructure and distribution network
- Double counting and future 2G quota

Low feedstock cost

**CTO – rapeseed oil**
compared with reference (rapeseed oil)
- Price
- Yield
- Flexible regarding feedstock

Competitive other costs

**UPM technology**
- Integration benefits in energy, raw materials and infrastructure
- Stability compared with RME
**UPM Biorefining**

Tested product – renewable drop-in diesel suitable for all diesel engines

- Engine tests done in independent research centres
  - Finnish VTT
  - German research centre FEV
- Fleet tests done with VW and VTT
- Renewable drop-in diesel suitable for all diesel engines
- Functions like any regular diesel

**RENEWABLE RAW MATERIAL**

100 %

**CO₂ EMISSIONS (VS. FOSSIL FUEL)**

-80 %

**HYDROCARBON FUEL, COMPATIBLE WITH DIESEL STANDARD EN590**

100 %
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Biofuels – next steps

• Ramp up production in Lappeenranta
  – Start-up in summer 2014
  – Prove technology and business case
  – Optimise process and broaden raw material base

• Develop technology for solid biomass

• Prepare for next steps to grow the business