CO-GENERATION IN SAPPI’S PULP & PAPER MILLS

Co-Generation Workshop –
Industrial & Commercial Use of Energy
Cape Peninsula University of Technology
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Presented by: Dave Long
Sappi Management Services
Sappi - What do we manufacture?

Coated *woodfree* graphic paper, coated *specialty* paper, uncoated papers, kraft papers and chemical and market *pulp*. Sappi is the world’s leading producer of high quality *coated fine paper* (4.2 million metric tons).
Fine Paper mills in South Africa

Enstra Mill
200,000 tons uncoated fine paper
100,000 tons pulp

Stanger Mill
110,000 tons coated fine paper and tissue
60,000 tons pulp

Adamas Mill
40,000 tons uncoated fine paper

Total fine paper capacity in SA: 350,000 tons/year
Forest Products operations in Southern Africa

Plantations/forests: 550,000 hectares

Cape Kraft
60,000 tons kraft

Usutu (Swaziland)

510,000 tons pulp
240,000 tons kraft
140,000 tons newsprint

Ngodwana

510,000 tons pulp
240,000 tons kraft
140,000 tons newsprint

Saiccor

600,000 tons chemical cellulose (dissolving pulp)

Tugela

390,000 tons kraft
350,000 tons pulp
Total fine paper capacity in EU: 2,640,000 tons/year – Market leader
Sappi Fine Paper North America Operations

- **Cloquet Mill**
  - Minnesota
  - 300,000 tons coated fine paper
  - 410,000 tons pulp

- **Muskegon Mill**
  - Michigan
  - 170,000 tons coated paper

- **Somerset Mill**
  - Maine
  - 760,000 tons coated fine paper
  - 490,000 tons pulp

- **Westbrook Mill**
  - Maine
  - 30,000 tons coated specialty paper

- **Allentown Sheeting Facility**
  - Pennsylvania
  - 100,000 tons sheeting capacity

Total fine paper capacity in NA:
1,260,000 tons/year
Joint-venture in China

34% ownership of Jiangxi Chenming Paper Company

Jiangxi Chenming
350,000 tons/year
light-weight coated fine paper
Energy Costs..........
Energy costs

Sappi Group 1H08 Energy Usage
(% split based on US$ consumption)

- Natural Gas: 30%
- Coal: 20%
- Purchased Electricity: 26%
- Oil: 10%
- Biomass & Other: 14%

- 1H08 energy bill = US$255 million; an increase of US$30 million on 1H07
- Sensitivity: 1% energy input cost change = US$6 million impact on operating income
Sappi’s Energy costs

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<table>
<thead>
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<tbody>
<tr>
<td>Fibre (wood &amp; pulp)</td>
<td>47%*</td>
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<tr>
<td>Chemicals</td>
<td>25%</td>
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<tr>
<td>Purchased Energy</td>
<td>16%</td>
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<tr>
<td>Other</td>
<td>12%</td>
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<tr>
<td>Total Manufacturing Costs</td>
<td>100%</td>
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* Wood lignins and wood waste are energy inputs.
Generation Investment per Decade

Decades from 1950's

MW

EU - MW
SA - MW
NA - MW
Sappi’s Oldest – Hydro in Westbrook, Maine

Sappi Westbrook, Maine, USA

Built in 1913 by S.D. Warren Company
Gross Head = 52 feet
3 x 800 kW @ 11kV, 60 Hz
Station Capacity = 2400 kW
Sappi Gratkorn, Austria

Built in 1925 by Voith Company
Gross Head = 8 m
2 x 2625 kW
Station Capacity = 5250 kW
Gas Turbines in Lanaken, Belgium and Gratkorn, Austria

Sappi Lanaken, Belgium

Aero derivative
40 MW<sub>e</sub>
HRSG for paper drying
Sappi’s Power Generation

**Sappi’s Turbines**
- 5 Hydro
- 2 Gas
- 31 Steam
- 14 sites
- 7 Countries
- **804 MW**
Sappi’s Power Generation

Sappi's Power Generation

- Condensing, 157 MW
- Gas, 102 MW
- Hydro, 8 MW
- Back pressure, 538 MW
Recent Investments

Sappi Alfeld, Germany

T/G 6
Re-built in 2007
88b, 525 °C
8b back-pressure
17,2 MW @ 8510 rpm
Sappi’s newest – Amakhulu Project, Saiccor

Sappi Saiccor, KZN

T/G No. 5
July, 2008
85 b, 490 °C
Extraction & back-pressure
46 MW @ 3000rpm
Generation Investments in Sappi, Southern Africa

Sappi's Turbines - SA

![Graph showing the installation year and steam pressure of Sappi's turbines in Southern Africa. The graph includes data points for installation years ranging from 1950 to 2020, and steam pressures ranging from 1.5 to 6.3 bar.](image-url)
Sappi's Gratkorn Mill, Austria with CHP

Hydro power plant

External grid (outside supplier)

100 %

100 %

100 %

12,7 %

21,5 %

45,9 %

58,6 %

4,6 %

2,6 %

2,8 %

75,7 %

100 %

Natural gas

Mill

Year 2012

Steam

Electricity

fuel oil

bark, sludge, bio

black liquor

coal
Sappi’s Power Generation Opportunities in SA

Existing Assets

• Enhanced forest waste collection
• Black Liquor and waste combustion improvements
• Re-engineer steam ranges for generation
• PNCP and MTPPP
• CDM

Opportunities for New Investments

• Sappi SA is low on power self-sufficiency
• Rural, dispersed sites
• Sophisticated, hi-tech infrastructure
• HP boilers + generation to replace LP

What is needed?

• Clarity of policy and direction
• Simplicity of commercial terms
• Equitable risk distribution
• Incentives for investing in non-core assets
Why not Wind?
Paper Making Without Fuzzy Logic…………..
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