CMPC EnMS: EXPERIENCE & BEST PRACTICES

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CMPC Pulp
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A Global Leader in P&P

CMPC is a P&P company, established in 1920, that produces solid wood products, pulp, paper and packaging products and tissue in Latin America.

CMPC Figures

Tissue 34%

Pulp 51%

Paper 15%

Sales $5,763

Paper 6%

Tissue 13%

EBITDA $1,485

Pulp 81%

Tissue 14%

Assets $14,770

Paper 10%

Pulp 76%

1 Source: CMPC. Figures for the LTM as of June, 2018 (USD million)
2,3 Source: Hawkins Wright, RISI

Competitive

BEKP & BSKP

Cash Cost

Investment

Grade Company

Fitch: BBB (stable)

Moody’s: Baa3 (stable)

S&P: BBB- (stable)
CMPC ENERGY INPUTS

32,500 GWhe
38 Industrial Sites
8 Countries

Biomass 24,383 GWhe
75%

Natural Gas & LPG 3,864 GWhe
12%

Fuel Oils 1,674 GWhe
5%

Others 2,608 GWhe
8%
CMPC Energy Inputs per Business

- **Tissue**
  - 17 Sites
  - 3,074 GWh
  - 10%

- **Wood**
  - 6 Sites
  - 1,329 GWh
  - 4%

- **Packaging**
  - 11 Sites
  - 2,029 GWh
  - 6%

- **Pulp**
  - 4 Sites
  - 26,115 GWh
  - 80%

2017 Data
At CMPC we want to be more efficient and competitive in the markets we participate, thus securing the sustainability of our processes and activities.
ENERGY MANAGEMENT SYSTEM IMPLEMENTATION AT CMPC

2013: PHASE I PULP (3 SITES)

2016: PHASE II TISSUE, WOOD & PACKAGING (25 SITES)
CURRENT STATUS

IMPLEMENTATION PROCESS

Stage 1
ISO 50001 Gap Analysis & Action Plan

Stage 2
EnMS Model Design

Stage 3
EnMS Implementation

Stage 4
EnMS Internal Audit

Stage 5
ISO 50.001 Certification

8 SITES  |  4 SITES  |  10 SITES  |  2 SITES  |  4 SITES
CMPC started working in the beginning of 2013 in the EnMS implementation process of the 3 Mills of Pulp in Chile and obtained the certification ISO 50001 in October 2014.

<table>
<thead>
<tr>
<th>Pulp Mill</th>
<th>Production [Ton/year]</th>
<th>Product</th>
</tr>
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<tbody>
<tr>
<td>Laja</td>
<td>360,000 70,000</td>
<td>Bleached Softwood Kraft Pulp, Unbleached Kraft Pulp Sack Kraft Paper</td>
</tr>
<tr>
<td>Pacifico</td>
<td>500,000</td>
<td>Bleached Softwood Kraft Pulp</td>
</tr>
<tr>
<td>Santa Fe</td>
<td>1,490,000</td>
<td>Bleached Eucalyptus Kraft Pulp</td>
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Annual Energy Consumption: 17,324 GWhe
After defining the EnMS base lines, a goal of reducing 20% the consumption of external energy sources per unit of produced pulp was established for the year 2020.

**Focus of developed projects**

- Biomass quality improvements, electricity savings (motors and lighting), steam savings and residual heat recoveries.
- Fuel use improvements and energy monitoring systems upgrades.
- New technologies for the use of: black liquor, fuel oil, biomass and insulation improvements.

Until 2016, 32 energy efficiency projects were developed in relation to the EnMS, with a total investment of 12.6MM USD and an energy saving impact of over 137 GWh.
Pacifico’s project “Steam use reduction via White Liquor preheating with heat recovered from the Black Liquor outlet” received the prize for best energy efficiency project within the Gold Seal price, given by the Chilean Ministry of Energy.

This project provided the following benefits:

- Medium pressure steam (MPS) use reduction
- Cold water use reduction
- Availability of MPS to generate electricity

### Results

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<tr>
<td><strong>Thermal Energy Savings</strong></td>
<td>53.1 GWh/year</td>
</tr>
<tr>
<td><strong>Electricity Generation</strong></td>
<td>17.3 GWhₑ/year</td>
</tr>
<tr>
<td><strong>Economic Benefit</strong></td>
<td>1.1 MM USD/year</td>
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How is our Information Infrastructure defined?
**RESULTS**

CMPC has achieved a **22% of improvement** of its energy performance of its 3 certified Pulp Mills in 3 years.

**PHASE I PULP**

<table>
<thead>
<tr>
<th>ENERGY COSTS SAVINGS</th>
<th>TOTAL INVESTMENTS</th>
<th>TOTAL ENERGY SAVED</th>
</tr>
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<tr>
<td>40,2 MM USD</td>
<td>12,6 MM USD</td>
<td>5,000 GWhe</td>
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Between 2014 & 2017

IN PROJECTS, TRAININGS & MAINTENANCE OF THE EnMS

Between 2014 & 2017
RECOMMENDATIONS & BEST PRACTICES

Organizational
• Continuous and explicit Management support, ensuring resources
• Dedicated Energy Management Leader with support in every business
• Clear Energy Policy with ambitious goals
• Energy teams definition at the beginning of each implementation process
• Consideration for local cultures and legislations
• i-Cel

Resources
• CMPC Operating Model
• Integration with existing management systems (ISO standards, Lean, TPM)
• Procedure standardization if possible
• Energy monitoring tools as early as possible
• Minimum competencies establishment, trainings and awareness
• External implementation consultancy support