

COGENERATION AT SUZANO MILLS

September | 2024





Agenda

- Company Overview
- Suzano Mills
- Cogeneration
- Big numbers

INSIDE Suzano

Since 1924, dedicated to bio-based solutions from renewable sources

Our Purpose

RENEWING LIFE INSPIRED
BY TREES



Who we are

- With a 100 years history, Suzano is the world's largest producer of market pulp and one of Latin America's biggest paper producers
- A net revenue of USD 8bn in 2023

Our people

- More than 21K employees and more than 28K contractors in Brazil
- 300 employees at our international offices

We count on

- 1.2 million eucalyptus seedlings planted/day
- 1.6 million hectares of planted forests* + 1.1 million hectares of conservation areas
- Brazil: 13 mills + 1 joint operation (Veracel)
- Finland: Woodspin mill (joint venture Suzano + Spinnova)

worldwide

- Suzano supplies over 100 countries
- Offices in Argentina, Austria, Brazil, Canada, China, Ecuador, US, Finland, Israel, Singapore and Netherlands
- Technology centers in Brazil, Canada, China and Israel

Our business

We impact the lives of over 2 billion people around the world with our renewable products. We achieve this with Innovability; the pursuit of sustainable solutions through innovation.



PULP

13,45 M TON/YEAR*

pulp is the basis for our products

PAPER AND PACKAGING

1,2 M TON/YEAR*

printing and writing papers, packaging paper, paper for straws and cups

CONSUMER GOODS

280 K TON/YEAR*

toilet paper, tissue and paper towels, diapers and sanitary pads

NEW BUSINESSES

lignin, fluff pulp and textile from microfibrillated cellulose

* Installed production capacity



Long term strategic vision



1.

Continue being an industry reference in efficiency, profitability and sustainability, from forest to client

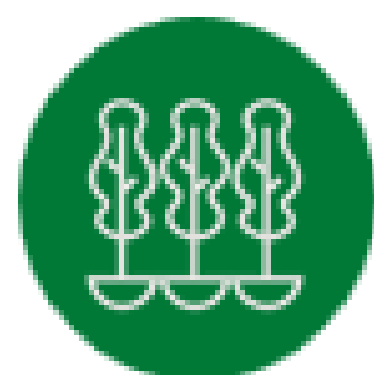
2.

Be a transformational agent in the expansion into new markets for biomass

3.

Be a reference in sustainable and innovative solutions for the bioeconomy and environmental services based on planted trees

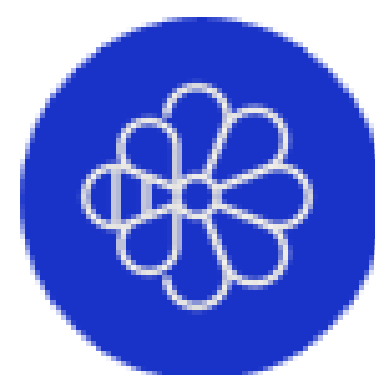
OUR AMBITIONS



Play a leading role in sustainability



Expand boldly into New Markets



Advance in the links of the chain, always with competitive advantage



Maintain relevance in Pulp, through good projects

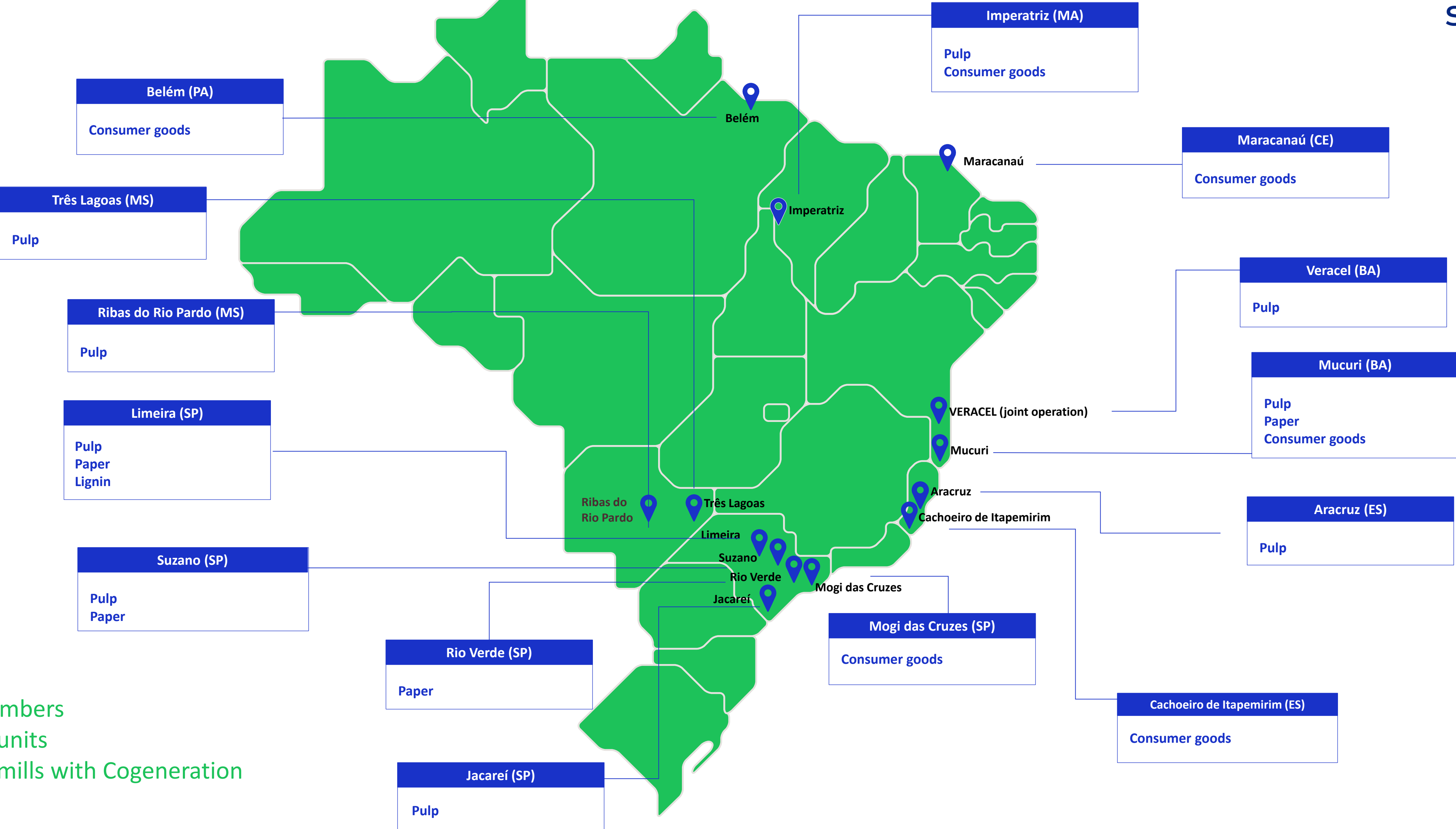


Be "Best-in-Class" in the Total Pulp Cost vision



SUZANO MILLS

Our mills in BRAZIL



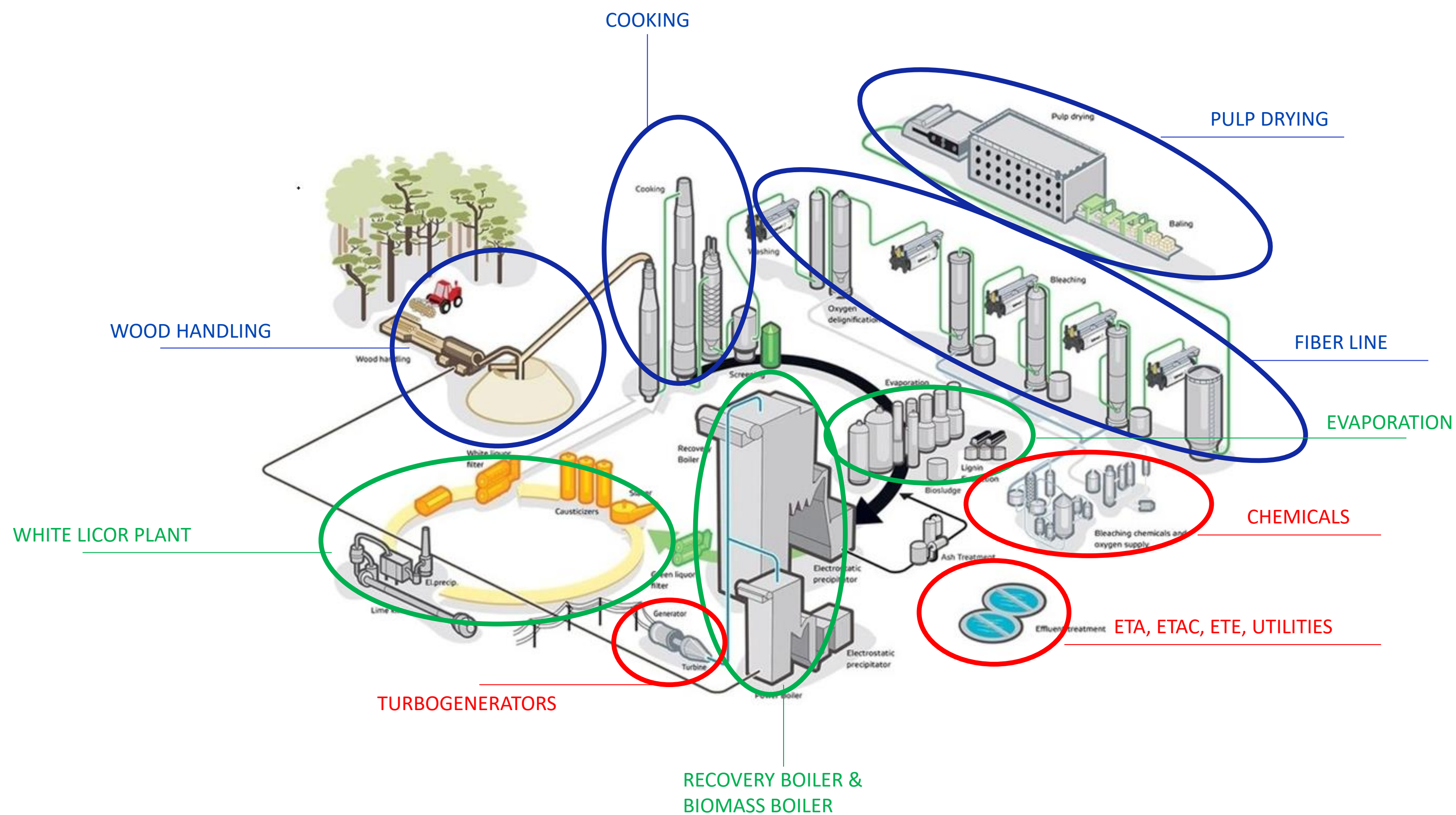
Big Numbers

- 14 units
- 08 mills with Cogeneration



COGENERATION

Pulp Mill – Kraft process



PULP AREAS

- WOOD HANDLING:
- COOKING
- FIBER LINE
- PULP DRYING

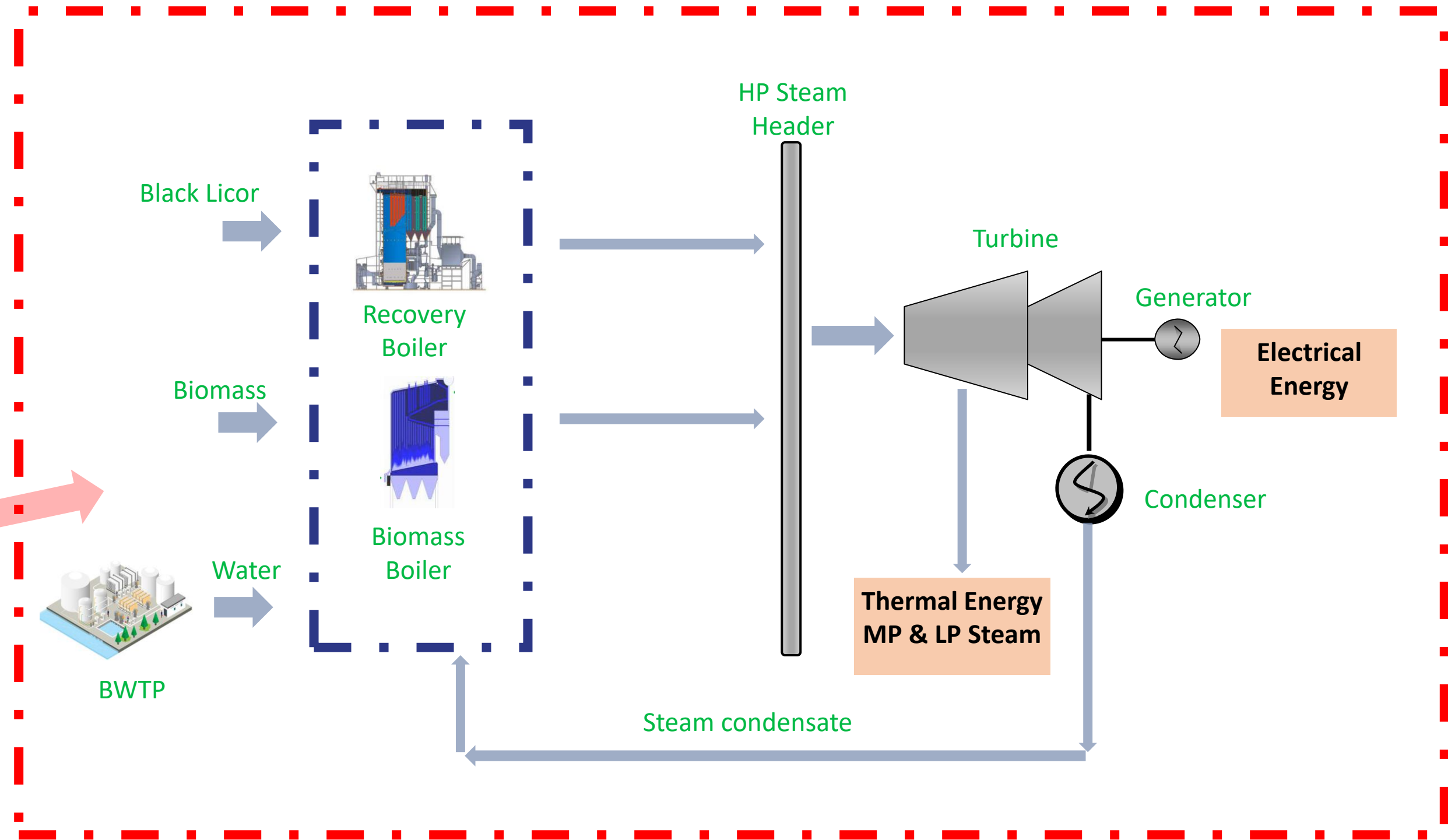
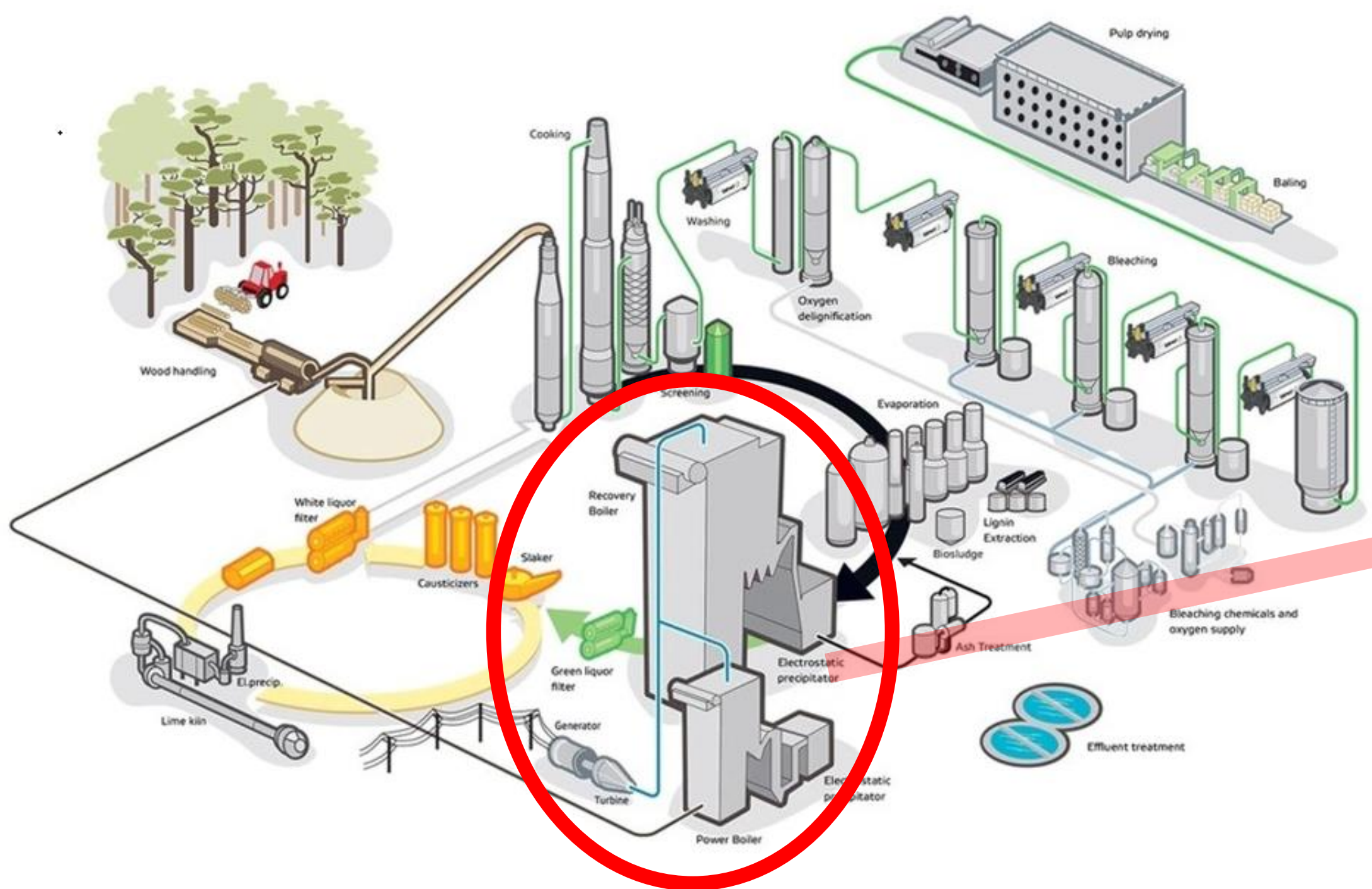
RECOVERY AREAS

- RECOVERY BOILER
- BIOMASS BOILER
- EVAPORATION
- WLP

ENERGY & UTILITIES AREAS

- TURBOGENERATORS
- CHEMICALS
- UTILITIES

Pulp Mill – Cogeneration Area



Cogeneration in Pulp Mills – main definitions

Cogeneration at Suzano Mills

- The cogeneration cycle in the Pulp mill is the Rankine cycle (steam cycle).
- Biomass and black licor are the renewable fuel used to heat the water and generate steam at the boilers. The HP steam feeds the steam turbine where, the thermal energy of the high pressure steam is converted into mechanical energy and then into electrical energy. After the turbogenerator, steam is condensated back and feed the boilers.

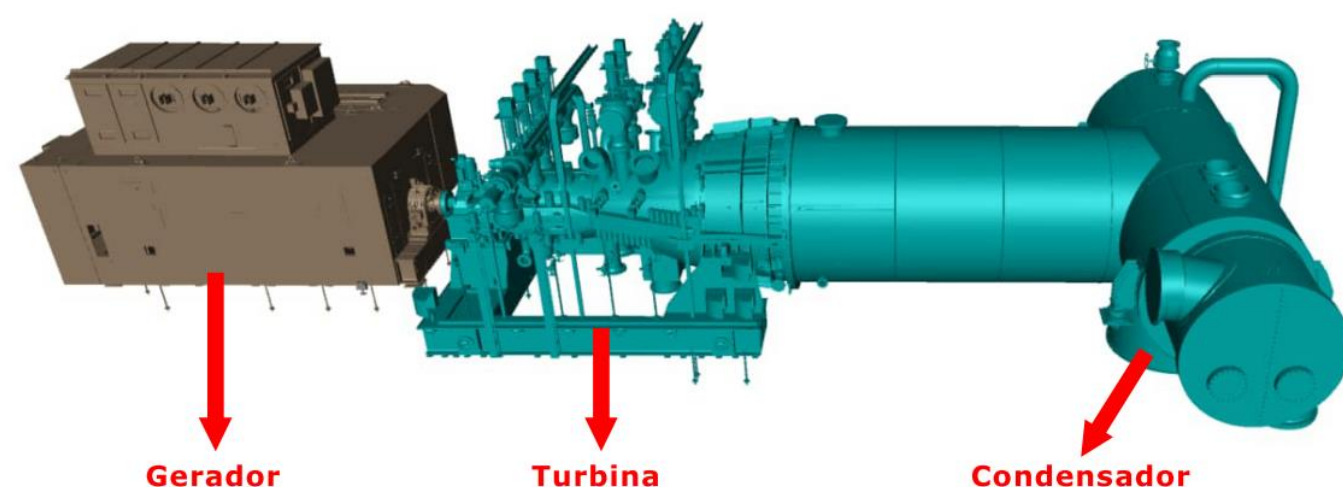
Steam generators at the Pulp Mill

- Recovery Boiler: Uses the black licor as fuel and generates more than 90% of the total amount of steam in the mill
- Biomass Boiler: Uses biomass as fuel and generates approximately 10% of the total amount of steam in the mill
- Auxiliary Boiler: Uses natural gas as auxiliary fuel and is used only in specific mills

Steam turbogenerator at the Pulp Mill

- In general we have two types of steam turbogenerators that are used in combination at Suzano mills:
- Condensation turbine: the main purpose is to produce electric power and condensate the steam back to feed the boilers.
 - Backpressure turbine: the main purpose is to produce electric power and thermal energy (MP and LP steam) to be used in the mil.

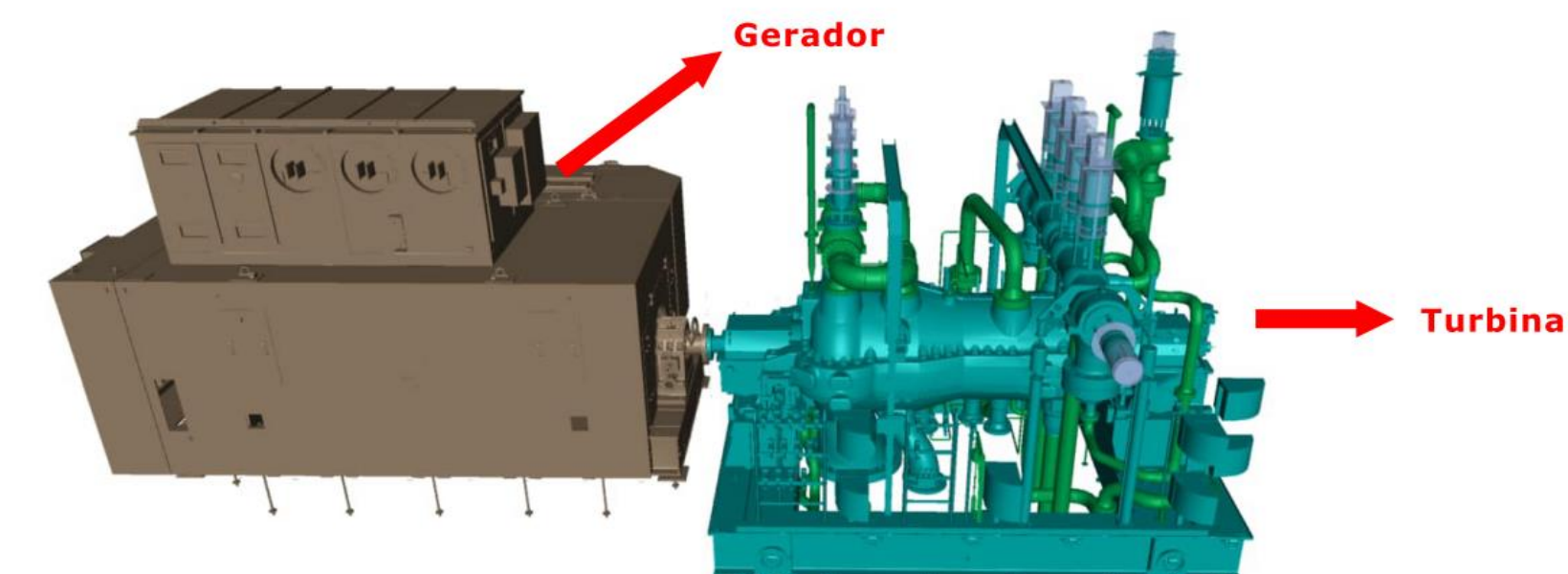
TG1 & TG3 – Condensing turbine



Pressure and temperature levels in Suzano Mills:

- HP Steam: 50 a 100 barg / 400 a 515 °C
- MP Steam: 9 a 12 barg / 190 a 210 °C
- LP steam: 3,5 a 4,5 barg / 160 a 170 °C

TG2 – BACKPRESSURE turbine



Advantages and challenges in implementing Cogeneration Systems



Advantages

Reduction of GHG emissions

- Cogeneration, especially when it uses renewable fuel sources, contributes to a significant reduction in greenhouse gas emissions.

Renewable energy generation

- The use of biomass as a fuel for cogeneration increases the share of renewable sources in countries' energy matrix.

Water conservation

- Some cogeneration systems use water more efficiently, reducing consumption and environmental impact.

Waste reduction

- Cogeneration can use biomass waste from the pulp and paper industry itself, reducing waste disposal.

Challenges

Initial CAPEX

- Implementing cogeneration systems requires a high capital investment, which can be an initial challenge for some companies.

Fuel Management

- A constant and reliable supply of fuels, such as biomass, is essential for the efficient operation of cogeneration.

Integration with Existing Processes

- Integrating cogeneration with existing industrial processes can be complex and require adaptations to the plant.

Regulations

- Companies must be aware of the environmental and safety regulations related to the implementation of cogeneration systems.

THANK YOU



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