

Fermentation of liquor at the AustroCel Hallein pulp mill for advanced bioethanol production



BIOFIT Policy Conference
19.01.2022

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Introduction

Location of AC pulp mill



View on the pulp mill

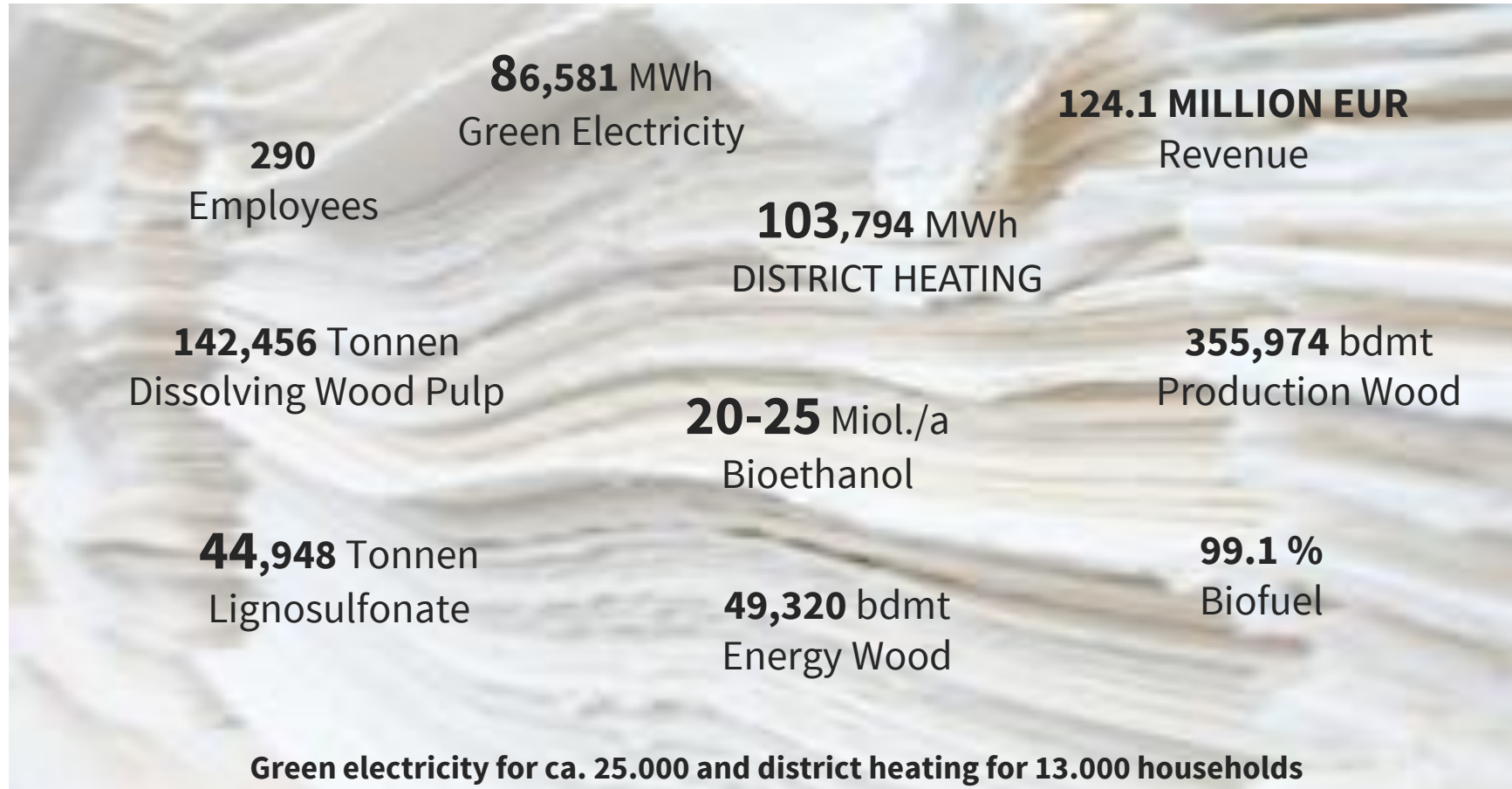


History

1890	Foundation of the Pulp Mill : The Kellner-Partington Paper Pulp Co. Ltd.
1917 – 1979	Norwegian Era in possession of BORREGAARD
1979 – 1995	Hallein Papier AG in possession of German PWA and the Austrian State Bank
1995 – 1999	Takeover of PWA by Swedish SCA and incorporation into SCA FINE PAPER
1999 – 2000	New foundation of MODO PAPER AB with the Fine Paper Divisions of SCA and MoDo
2000	Purchase of MODO Paper AB by the Finnish Group METSÄ-SERLA
2001	Name change to M-real Corporation and M-real Hallein AG
2006	Launch of a Biomass Combined Heat and Power Plant
2009	Stop of Paper Production
2011	Sale to the Schweighofer Group and renamed to Schweighofer Fiber GmbH
2013	Transition from the production of paper pulp to Viscose Pulp (60 Million Euros investment)
2014 – 2016	12 million Euros of investments in bioenergy from bleaching filtrates (Winner of the Austrian Energy Globe)
2017	Takeover by TowerBrook and renamed to AustroCel Hallein GmbH



Key Facts



Dissolving Wood Pulp

From Wood to Textiles



Utilization of Side Streams



Wood chips

After cooking

Before bleaching

After bleaching



Brown liquor
(Lignin + sugars)



Filtrates/Rejects

Filtrates

- spruce wood is composed of:
 - cellulose 44%
 - hemicelluloses 28%
 - lignin 28%

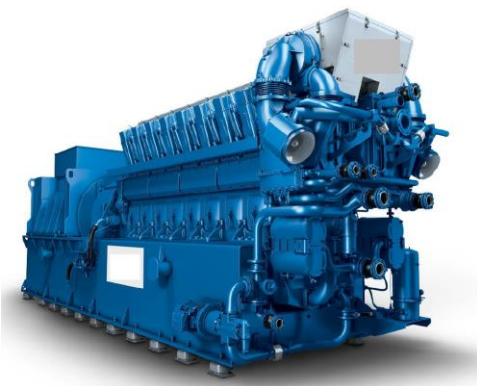
Green Energy

Energy fr. Bleaching Filtrates + Biomass CHP

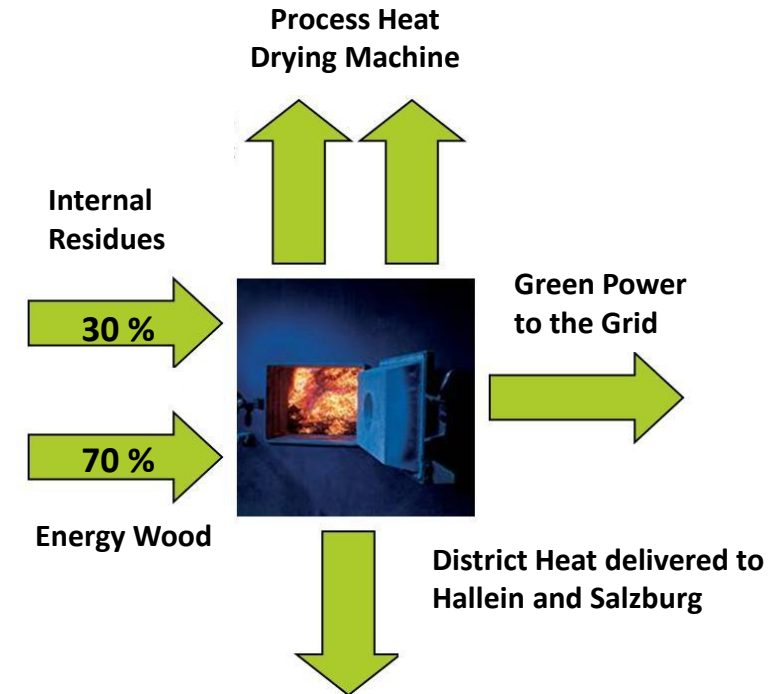
Filtrates



- Biogas production
- capacity around 2.000 m³/h.



- **5,125** horse power bio gas motor



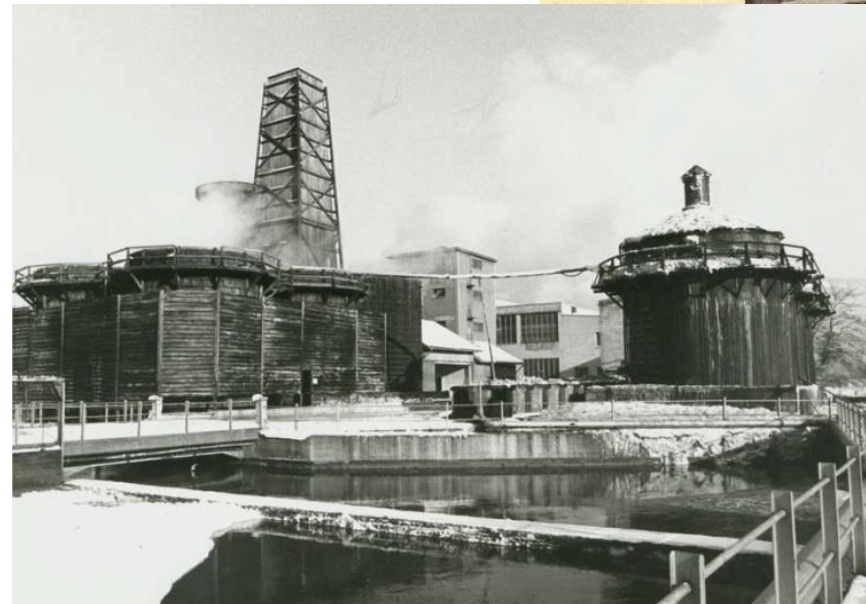
- Year of construction: 2006
- Capacity: 33 MW thermal
- Green energy: 60 GWh p.a.
- District heating: 100 GWh p.a.
- Fuel requirement: 15 t/h
- Internal combustibles: sludge, bark, wood dust, rejects
- External combustibles: forest wood chips, forest wood logs
- CO₂ reduction: 45,000 tonnes p.a.

Bioethanol (2G)

History

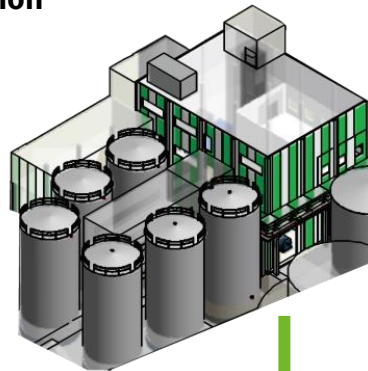
Timeline

- 1941-1988: bioethanol production from brown liquor (6000 l/day)
- Long-Standing process experience with brown liquor and biotechnology
- **Calculable technological risks**
- 2007 – 2009: technical Pre-Project and Feasibility Study
- **Economic feasibility - Termination of paper production hindered product realisation**
- 2011: conversion to dissolving wood pulp
- **Higher ethanol yields due to increased liquor amount and sugar content**



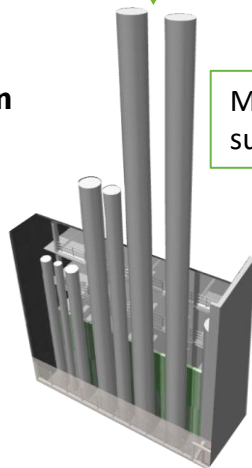
Integration and Process

Fermentation



Fermented slurry,

Distillation



Integrated bioethanol production

Mash, ethanol free,
sugar reduced

Brown liquor from pulp production

Fresh cooking liquor

Prior situation

Pre-concentrated brown liquor



Evaporation plant

Concentrated brown liquor

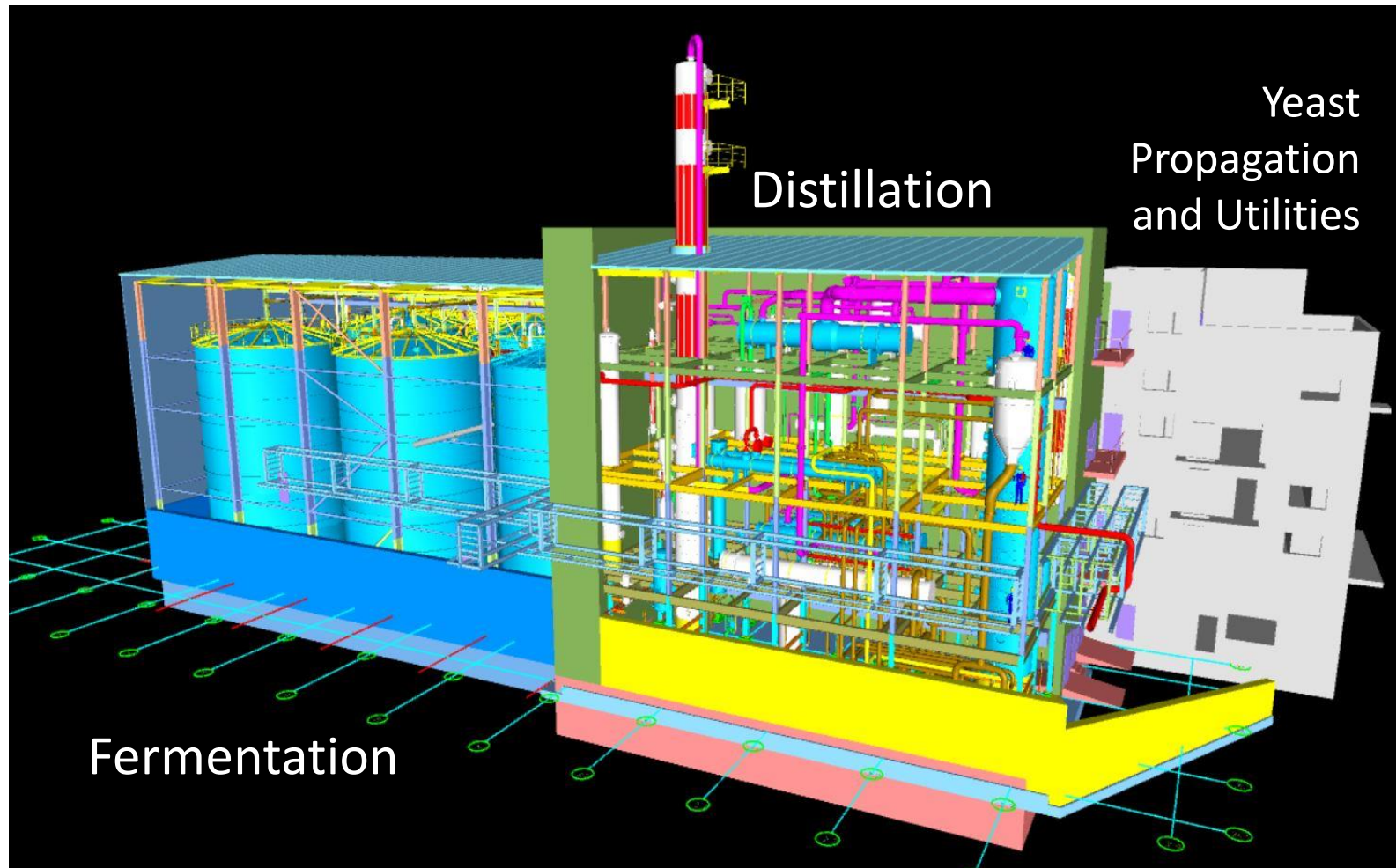


Filling station

ethanol 99,9 %
Ca. 20.000.000 litre/a

Recovery of chemicals
Energy
Selling of concentrated brown liquor

Bioethanol-Layout



Bioethanol Production site



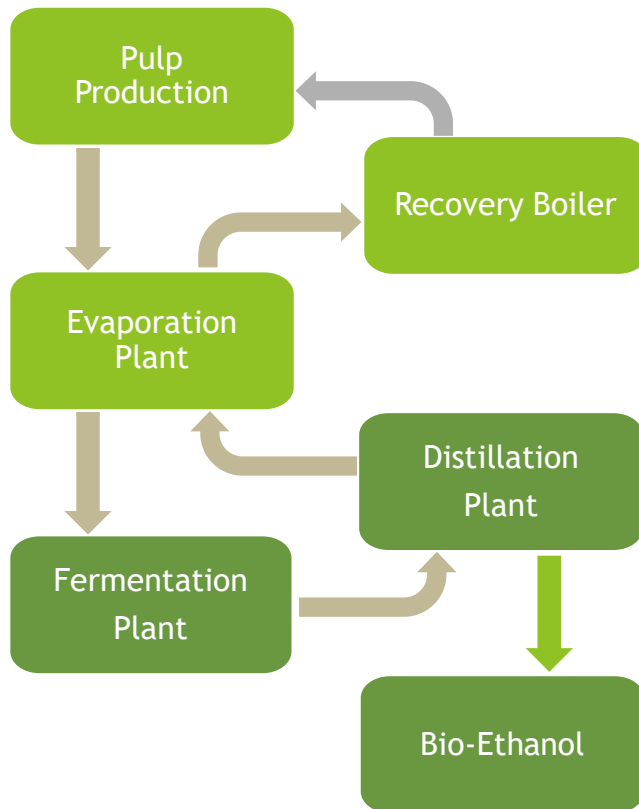
Research and Innovation

- In-house fermentation and distillations trials+analytics
- In-house Biotechnology expertise
- Continuous Analysis and Control of process parameters and their influence on ethanol yield
- Pilot unit to validate laboratory results and for optimization
- Cooperation and collaboration with universities and external research
- Integrated energy concept

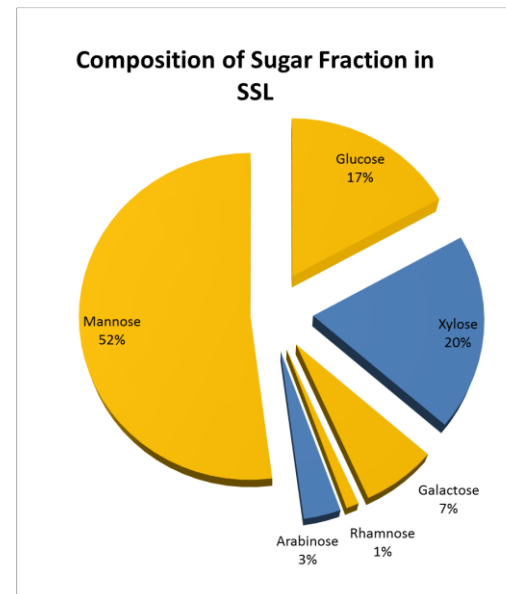


Summary

Integrated into Brown Liquor Cycle



42,000 thousand euros
bio fuel from brown liquor
up to 35 Million Litres p.a.



- Long-term agreement with OMW secured investment

**1% of Austria's
Gasoline Demand**



Legal Basis

EU- Directive 2018/2001

- Obligation of EU to substitute Fossil Transportation Fuels by Advanced Bio-Fuels
- From 2022: 0,2%, 2025: 1%, 2030: 3,5 % of the fossil transportation Fuel in Europe need to be replaced by Advanced Bio-Fuels

AustroCel fighting the climate change



Don't talk, just do it !