

Alvarez Forestal S.A.

Reocin, Cantabria, Spain



Alvarez Forestal S.A. is a forestry company belonging to Armando Alvarez S.A, a family owned group of companies, that operates in the Cantabrian Coast in Northern Spain. The parent company had a long experience in forestry sector in supplying forestry products to pulp mills and other industries when Alvarez Forestal was founded in 1970. From the very beginning the new company has focused in growing and harvesting forests of fast growing species, such as *Pinus radiata* and *Eucalyptus globulus*

Eucalyptus globulus is quite possibly the ultimate wood species for pulp production with high yields, rapid growth and good fiber characteristics. Favorable characteristics mean high volumes, and high volumes mean large quantities of by-products: branchwood and bark, which make a perfect source for energy biomass. In 2012 Alvarez Forestal opened a biomass fired power plant - first of its kind in Cantabria - to power their own operations and serve the grid, by using the forest residues as a fuel source.

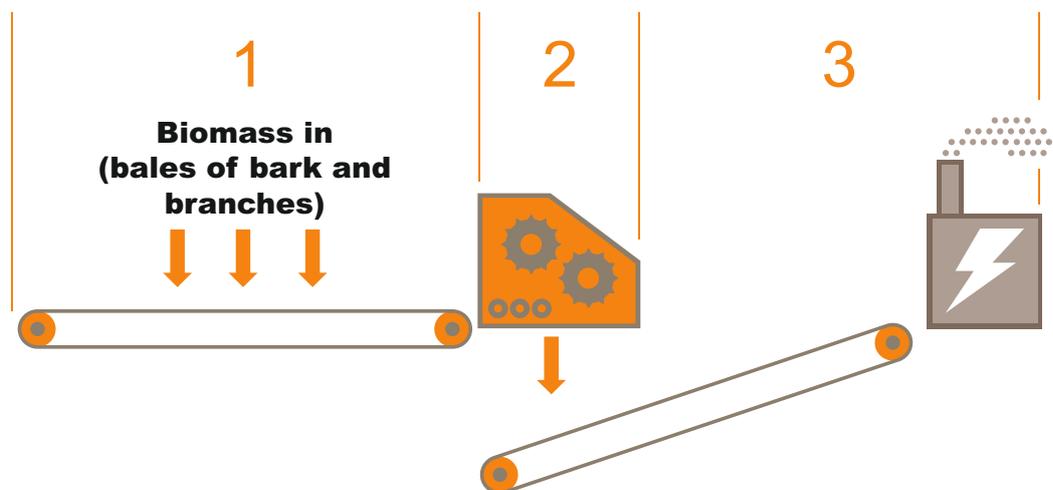
Tree trunks are debarked while harvested, in the forest. Bark and branchwood is bundled into 2,5 m long bales (0,7 m diameter), which are then

transported to the power plant. At the plant the bales are loaded on the Saalasti Feeder, and they are fed into the jaws of Saalasti Chipper 1212H (installed in 2012). The process produces high energy content fuel chips in particle size P63. The chips have an average moisture content of 60 %, which means about 2,9 MWh/t in energy content.

As anybody involved with eucalyptus bark knows, it isn't easy to process. There is the high embedded sand content – a result of rapid growth on silt – that causes wear and tear in processing machinery, and there is the fact that eucalyptus bark simply resists any cutting force. With special solutions tailored by Saalasti in close cooperation with Alvarez Forestal, the bark is processed into clean cut particles with minimized characteristic "fluffy" texture. Such fluffiness would be a negative feature in subsequent process: conveying, warehousing, combustion, etc.

The hard work of optimizing the machine performance must have paid off: in the spring of 2015 Alvarez Forestal commissioned a second machine from Saalasti, identical to the one already running at the factory.

Biomass processing system



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| 1 | Saalasti Feeder: <ul style="list-style-type: none">- Size 1200 x 12500 mm- Noise red. tunnel 2150 mm- Metal detector | Loading by excavator with grapple |
| 2 | Saalasti Chipper 1212H: <ul style="list-style-type: none">- Installed in 2012- Main drive power 1 x 630 kW- Cutting tools: chipper knives- Capacity 67 ART/h*- Particle size: P63 | Feedstock: Eucalyptus globulus bark and branches
Chipper is specially optimized and modified for high capacity processing of eucalyptus bark |
| 3 | Discharge Conveyor: | To the power plant (bubbling fluidized bed type, 36 Mwt, 10 MWe) |
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