

Veracel Celulose

Bioenergy generation



Background and drivers

Like any other modern chemical pulp mill, Veracel's pulp mill generates a surplus of electricity from wooden biomass. Veracel, a joint venture of Stora Enso and Fibria in southern Bahia, receives renewable raw material from its fast-growing eucalyptus plantations close to the mill.

More precisely, the main energy source for the pulp mill's bioelectricity comes from organic matter called black liquor, a by-product of the pulp-making process. Black liquor consists of water, pulp-cooking chemicals and organic matter derived from wood. The pulp-cooking chemicals are separated and reused, while the organic matter is burned in the mill's boilers to run the turbines and generate electricity.

Project summary

Veracel has supplied electricity to the national grid in Brazil since 2006. The decision on whether to buy, produce or sell electricity is based on comparing the spot energy price to the biomass cost.

In the Brazilian electricity market, hydropower plays a main role. Seasonal variation in rainfall means that, during some months of the year, the supply of hydropower declines, and the demand on alternative electricity sources goes up. Veracel's electricity supply helps to balance the energy mix. The pulp mill curbs CO₂ emissions by reducing the use of fossil fuels, as most of the complementary electricity supply in Brazil comes from oil and gas plants.

Veracel also uses wood chips to generate electricity. Black liquor fuels around 95 per cent of Veracel's bioelectricity and wood chips around 5 per cent.



Eucalyptus wood chips and other by-products help to power Veracel's pulp mill.

VERACEL'S
BIOELECTRICITY
GENERATED
BY BLACK LIQUOR

95%

VERACEL'S
BIOELECTRICITY
GENERATED
BY WOOD CHIPS

5%

Best management practices

Veracel's renewable raw material comes from fast-growing eucalyptus plantations – using native tropical forest is not any kind of option. Instead, the company actively preserves and restores native tropical forests in the areas it operates.

Today, Veracel owns around 210,000 hectares of land in the south of Bahia. It has planted close to 91,000 hectares with eucalyptus and more than 105,000 hectares are set aside for preservation.

The remaining area either consists of infrastructure (for example, roads and the nursery) or is available for planting eucalyptus.

Harvesting operations on tree plantations produce biomass residues that could be used for bioenergy generation. However, Veracel leaves bark, branches, stumps and leaves on the field to protect the soil's physical properties and to reduce nutrient losses. Only debarked logs are transported to the mill. The decomposable organic material left within the plantation is important in the humid tropics, where soil nutrient pools are often poor due to high temperatures and precipitation.

Challenges and difficulties

Apart from the biomass that preserves the soil surface on plantations, other by-products could be used for energy purposes. These are mainly wasted fibres from the mill's dry machine screening system and bark that remains on the logs after mechanical debarking during harvesting. After natural water removal, they could work as an additional bioenergy feedstock in the mill. However, instead of electricity generation, they are currently processed into bio-fertilizers and reused in Veracel's plantations during the planting of new trees.

Outputs, results and lessons learned

Veracel wants to constantly monitor and revise its processes in order to identify both bottlenecks and opportunities in bioenergy generation.

Bioelectricity is important for Veracel and helps the company reduce its energy costs. It also brings additional revenues when sold to the national grid. On top of this, substituting electricity generated by fossil fuels with bioelectricity prevents CO₂ emissions.

Despite Veracel's own electricity surplus, the mill still needs some fossil fuels in its processes, mainly related to preparing the "white liquor" used in the pulp-cooking process. The most viable solution to reduce Veracel's CO₂ emissions originating from fossil fuels is to substitute the use of heavy/residual oil in the lime kiln by less polluting natural gas. This will happen when Veracel is connected to the national gas pipeline by July 2011.

Wood gasification technology is a future opportunity in the forest industry. When wood gasification becomes feasible, operational and safe on large-scale operations, Veracel may be able to produce even more renewable bioenergy from eucalyptus within its processes.



Veracel uses fast-growing plantations for its raw materials while conserving native tropical forest.