Enerpulp, Portucel Soporcel group’s subsidiary for power production, is taking advantage of available biomass to generate additional “green” revenue for the company at two mills. Two new biomass boilers, recently supplied by ANDRITZ, are performing extremely well according to mill management.

**A tale of two mills: bio-generation comes naturally to Portucel**

The Portucel Soporcel group is one of Portugal’s largest generators of energy from renewable forest biomass. In the years between 2000 and 2008, the group reduced its fossil CO$_2$ emissions by 58%.

**Ideal locations**

The Setúbal site is situated just 4 km from the port town of Setúbal, making transportation of finished goods very efficient. The mill produces 526,000 t/a of bleached pulp (primarily from the preferred Eucalyptus globulus fiber).

Cacia is midway up the nation of Portugal, about 8 km from Aveiro and very close to the sea. “Cacia is in the heart of our country’s eucalyptus forests,” says Nordeste.

“The proximity of this raw material is a key advantage for us.” Cacia’s production of 280,000 t/a is primarily designed for special applications such as décor papers, specially coated papers, and tissue.

Portucel can actually trace its roots back to the start of the Cacia mill in the 1950’s,” Nordeste says. “By 1957, a team of experts made the Cacia mill a world pioneer with the production of sulphate bleached eucalyptus pulp. Our people have an innovative spirit, combined with knowledge that has been accumulating over decades.”

**Value-added pulping + energy**

The Portucel Soporcel group is responsible for about 65% of Portugal’s total electricity produced from renewable forest biomass. “Renewable energy is a key focus in the world,” Nordeste says, “and is a major focus for us. It is important for us to be players in this industry to ensure that order is maintained in the market. Forestry resources are our lifeblood. There is a potential threat if we let others control the resource, or simply burn it, before we can add value to it.”

The interest in boiler technology and services has been on the rise in the Iberian Peninsula, according to Assisi Mantilla, ANDRITZ’s Pulp Engineered Services Area Manager for the region. “We have worked for many years in cooperation with Portucel Soporcel group on their strategic investments and ongoing service,” he says. “This has given us the opportunity to continuously improve our service and spare parts availability – and to truly have a local presence in Portugal. With abundant resources and the business incentives improving, this will continue to be an active area for us.”

The ANDRITZ biomass boiler project consisted of the supply of two identical boilers with a total production capacity of 49.75 MWth. According to Jukka Kari, Project Manager, the boilers are mid-size (85 t/h, 93 bar, and 472°C). Portucel Soporcel’s scope included the civil/structural work and part of the electrification and automation. “ANDRITZ basically provided everything above the foundations from the fuel feeding conveyor to the main steam header in the turbine-generating plant,” Kari says. Contracts were signed in February 2008 and the boilers were mechanically complete in the fall of 2009.

**Value-added at Setúbal**

The group has made considerable investments in upgrading the mill in Setúbal, which was originally started up in 1964. Arantes estimates the total recent investment to be EUR 702 million for a new paper machine, new combined heat/power plant (CHP), fiberline and boiler retrofits, and the new biomass boiler.

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One of the strongest references for ANDRITZ was the new recovery boiler they installed at this mill in 2006. This recovery boiler works perfectly – like a Swiss watch! 
José Nordeste, Mill Manager, Cacia

“We use about 150,000 t/a of biomass as a fuel here at the mill,” Arantes says. “About eighty percent of our logs are debarked before entering the mill. We use special harvesting and binding equipment to gather forest waste and put it into small bundles for transport.”

In addition to providing green energy, the removal of forest waste has another large benefit: a reduction in forest fires. “In the summer, this region is hot and dry, which increases the risk of forest fires considerably,” Arantes explains. “By removing the waste from the forest floor, we actually reduce the risk and impact of fires. We do not remove everything however. Our forestry experts know well where they can remove biomass without damaging the soil.”

As for the boiler itself, Arantes has this to say: “ANDRITZ kept all the contract milestones on-time or ahead of schedule. We started up the boiler and the start-up was without difficulties. It went into service quite smoothly, which is a good indication of the cooperation between ANDRITZ and our own project team. The design of the boiler is good. There is good flexibility to burn different biomasses with different moisture.”

Recovery boiler retrofit
An ANDRITZ recovery boiler installed at Setúbal in 1990 was due for a retrofit. Portucel Soporcel group decided to have part of the boiler bank rebuilt, in addition to replacing portions of the economizers and a portion of the superheater for this 2,200 tds/d unit. ANDRITZ won the bid.

PORTUCEL SOPORCEL GROUP

With annual production capacity of 1.55 million tonnes of paper and 1.35 million tonnes of pulp, the Portucel Soporcel group is the European leading producer of Uncoated Woodfree paper, as well as the largest European producer of bleached eucalyptus kraft pulp.

The group has three mills in Portugal – Setúbal, Figueira da Foz, and Cacia. The origins of the group date back to the 1950’s at Cacia producing raw pine pulp. In 1976, Portucel (Empresa de Celulose e Papel de Portugal) was incorporated as a result of the nationalization of the cellulose industry. With a view to restructuring the paper industry, Portucel acquired Papeis Inapa in 2000 and Soporcel in 2001. In 2004, Semaipa of Portugal acquired a majority stake of Portucel.

Over the years, the group has pursued a strategy of developing its own brands, including Navigator, which is the world’s best selling brand in the premium office paper segment.

Thanks to the use of renewable forestry biomass fuel, Portucel Soporcel group is Portugal’s leading producer of energy from this source.
"We see all kinds of contaminants in the incoming biomass. You need a very robust and reliable boiler system to handle it," António Gomes, Site Project Director.

Excellent reference at Cacia
The recovery boiler at Cacia also played a key role in deciding the biomass power boiler project for ANDRITZ, according to Nordeste.

Flexibility in handling varying fuels and moistures is key. Depending on the season, Cacia’s biomass moisture ranges from 45% to 60%.

As with Geblu, the boiler project proceeded without a glitch. The boiler was mechanically complete in September 2009 and was commissioned and started up in a very smooth fashion.

The assessment of ANDRITZ? "To me it is quite simple," Nordeste says. "The equipment works well. The ANDRITZ people know what they are doing and the process knowledge is there. And, if something goes wrong, ANDRITZ has the willingness and capacity to make it right."

The Cacia power boiler utilizes a new diagnostic tool introduced by ANDRITZ. Linked via a remote connection to the mill’s distributed control system, ANDRITZ specialists take measurements and create a database of trends in order to optimize the boiler’s performance.

Heikki Lappalainen, Product Manager for Automation and Diagnostic Applications in Varkaus, Finland, explains: "In a Formula One race, the crew takes measurements of speed and time and combines this with their knowledge to determine when to bring the car in for fuel, tire changes, or other adjustments. We do that with production equipment."

The unique service from ANDRITZ combines actual measurements with expert knowledge to arrive at what Lappalainen calls "soft sensors"—predictions about fouling degree, efficiency, or other factors. "If Portucel Soporcel wanted us to, we could use the computer system to predict and give them guidance when to bring their boiler in for a pit stop," he says laughing. "Another way to say that is we can predict the optimum time between shutdowns, or how to operate the boiler most effectively until a planned shutdown."

These are not short-term, operational predictions, but rather longer term trends. "We collect data for three to six months to build a database," Lappalainen says. "Then, working with the customer, we can focus on one piece of equipment (such as the power boiler) or one particular situation. The focus at Cacia now is how to optimize the heat transfer from flue gas to steam."

ANDRITZ provides remote diagnostics for boilers, digesters, bleaching systems, and other production equipment. "Mill operators optimize day-to-day and handle the hour-to-hour situations," Lappalainen says. "We look at longer term optimization and give the operations people some new tools."

“SOFT SENSORS” AND A NEW WAY OF SEEING

The Cacia power boiler utilizes a new diagnostic tool introduced by ANDRITZ.