BRUKS®

GREEN CIRCLE – *starts here!*

BRUKS Rockwood gets the wood moving at the world's largest wood pellet mill.

In Cottondale, Florida, sixty miles north of Panama City's world port and sparkling white beaches, Green Circle Bio Energy Inc. has built its new wood pellet mill. It's the world's largest, with a capacity of 500,000 tons per year. The high energy, low emission pellets it will produce are destined for bulk export to Europe, where industrial power plants are steadily converting from coal-fired production to biofuels in order to meet stringent 2020 Kyoto Protocol commitments.

Getting the wood in

Green Circle's production process starts here - in the woodyard and wood handling area. That's where the Total Fiber Handling system from BRUKS Rockwood goes into action. The system is customized for Green Circle's needs and has a number of unique features.

"Although this is the biggest pellet mill in the world, some of the woodyard and wood handling equipment is about 50% smaller in scale than the average pulp or paper mill," says Desmond Smith, Vice President of BRUKS Rockwood's West Coast Office.

Most pulp mills stockpile about 4 million cubic meters of chips – Green Circle's chip pile capacity is about half that. Consequently, the stacker/reclaimer is built to a smaller scale. The debarking drum and chipper, however, are standard production size.

Green Circle uses mainly pulp-quality Southern Yellow Pine roundwood from local sources but the woodyard is fully equipped to receive wood chips, sawmill residue, bark or any other form of raw wood furnish.

"The truck dumper and hopper are designed to handle a mixed bag of material and to accommodate future load sizes," explains Ken Upchurch, BRUKS Rockwood's Inside Sales and Aftermarket Manager. *"The truck dumper capacity is 120,000 lbs. gross vehicle weight. Right now that's as much as 40,000 lbs. more than load limits on Georgia, Alabama and Florida roads, but with fuel prices steadily climbing, those limits could go up over time."*

The truck dumper is designed for 2 million life cycles and can rise to a 63 degree angle in less than two minutes. The hopper is a hefty16 feet wide and can handle 5,000 ft3 of material. It's located 100% above ground, which required less excavation and saved on installation cost.

Roundwood is offloaded by mobileunloader onto a conveyor which brings the logs to the infeed of a Fulghum drum debarker. Bark is collected on a conveyor below the debarker. The wood arrives with 50% moisture content and the system is designed to handle it as is, but what isn't used immediately is staged in the large woodyard (about 40 acres) to be pre-drie using nature's energy – the sun.

Small chips, big impact

The debarked logs go to a drum chipper which was developed by BRUKS Klockner to produce micro-wood chips for the pelletizing process.

"Chips for pelletizing are much smaller than the conventional 30 mm chips used for pulp and other processes," explains Smith. "They're only about 10 to 15 mm in length. The pelletizing process changes the nature of the fiber and the result is a denser material than natural wood that burns much hotter and cleaner."

The BRUKS Klockner drum chipper eliminates the need for one stage of chipping by creating a chip that is consistent and ready for drying and delivery to the hammer mill. This is achieved due to the fact that the drum chipper combines chipping with a screen plate ensuring maximum and consistent chip reduction. Unlike a disc chipper, which would not be able to produce a consistent 3/8" chip, the drum chipper and screen combination ensures a large percentage of 3/8" or less chips. Using the tiny chips saves significant energy and time compared to starting out with conventional chips, which would require another process to reduce them down to pelletizing size. The micro-wood chips can be dried and pressed into pellets without an intermediate grinding stage.

Set on automatic

"One of the main advantages of the whole wood handling system is that it's fully automated," says Ken Upchurch. *"Once the material is loaded at the debarking drum or truck dump, an operator is not involved again until the material enters the pelletizing process. When the process needs materials, a signal is provided to the stacker/reclaimers and the machine will begin to supply material automatically. This allows for 24-hour operation without on-board personnel and helps Green Circle keep their operating costs at a minimum."*

Everything that comes into the woodyard eventually passes through the distribution, screening and hogging tower. At this point the operation splits into two separate streams – "white wood" or chips and "brown wood" or bark.

"The screen and hog tower has been designed to handle the worst case material for the area," says Upchurch. *"This provides the plant with a great deal of flexibility should material supply conditions change in the future."*

The bark is hogged and screened to remove sand and will be used to fire the biomass energy system that provides the heat for the chip dryers. The chips form the chipper pass through the tower on their way to storage.

Tubulator traffic

The BK-CT Tubulator conveyors are the lifelines of the wood handling operation – 90% of the conveying occurs via Tubulator. The shiny steel tubes crisscross the yard, transporting chips and bark on a cushion of air. A closed conveyor system of steel tubes operating with a rubber belt that runs at high speed on top of an air cushion provided by fans, the Tubulator has a capacity of up to 30,000 cu.ft. of wood chips per hour. It is easy to install, low maintenance, low noise level, dust-free and can cover 75 to 250 feet between supports.

Outdoor chip storage capacity at Green Circle is 24,000 tons and is achieved via a BRUKS Rockwood fully automated Circular Stacker Reclaimer. The system stacker and reclaimer is fully automated and provides 100% live storage volume. Operation is controlled by the plant control room via their DCS.

Bark storage capacity is 4,000 tons and is also achieved via a fully automated BRUKS Rockwood OCR Circular Stacker Reclaimer. The OCR was designed by Rockwood to provide an affordable means for automated storage and reclaim of small storage volumes as is often required for pellet plant and biofuel energy plants.

The OCR and its bark reclaim belt are located above grade allowing unobstructed access to the equipment, a major advantage for maintenance personnel who can maintain the equipment without working in confined spaces.

Fueling the future

This is the second pellet plant BRUKS Rockwood has supplied and the company is currently involved in the preengineering and equipment selection in several more, including many small biofuel energy plants which require very similar materials handling systems.

Says Smith, *"BRUKS Rockwood has the equipment and experience to supply fully automated or semi-automated biofuel related projects depending on the budget and needs of their clients. We fully intend to continue participating in more biofuel energy projects in the future".*

"We began focusing on the energy-sector – both fossil fuel and biofuel fuel derived energy – about three years ago," says Steven Bennett, President and CEO of BRUKS Rockwood and founder of the Rockwood company, recently acquired by BRUKS. *"This partnership has brought together decades of materials handling experience and technology including complete wood fiber preparation and handling systems along with total bulk handling and storage systems for fossil fuels. We intend to leverage that for the future and participate fully in the booming energy sector."*

For more information visit our website: www.rockwood.net

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