



FOCUS

PELLET MARKET

LARGE PELLET MILL SYSTEMS

PELLET MILLS - INTRODUCTION

Where the Quality is made...

Have you ever thought about the different methods that pellet manufacturers use to produce the same end product - pellets? Yes, it has something to do with the dimensions of the pellet plant, but there are additional differences to consider. In the early days, engineers took known procedures from other wood treatment plants such as pulp and paper, the sawmill industry, furniture, etc. and modified them slightly. Today we know much more, and the quality standards for Pellets have become much more detailed requiring better solutions.

Basically these simple steps are required for making pellets:
Debarking – Resizing – Drying – Pelletizing

In reality, it looks a little more detailed:

Debarking – Chipping – Wet Milling – Drying
- Dry Milling – Pelletizing

All of these points now have to be considered in much more detail to design a well matched system. This is where Vecoplan can assist you with designing the most efficient pelletizing system.

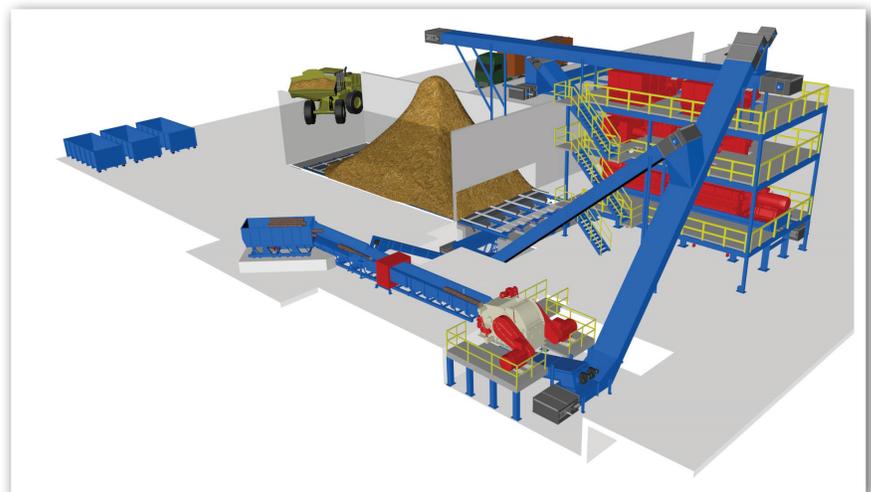
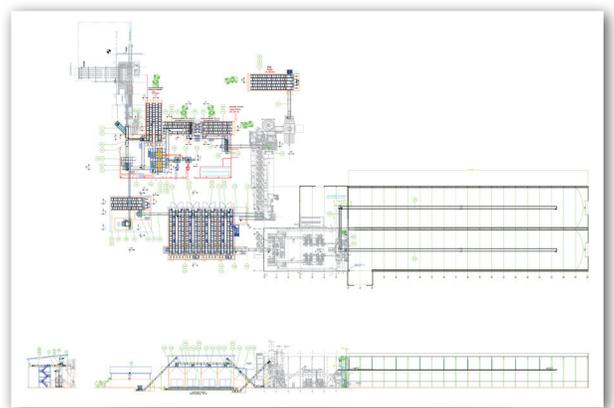
Example:

Customers requirement:

- Pellet plant for 500.000 Mt/a manufactured pellets DIN EN + quality.
- Green field placement
- Input material: Southern Yellow Pine (SYP) Logs, some white oak logs and 5% SYP wood chips from outside
- Complete pellet plant with minimal interfaces, high reliability and automatic operation where possible
- Operation time: 8000 h/a

First considerations:

- The primary point of the plant is pelletizing, where the raw, treated material is converted into pellets.
To reach a homogenous product quality and output, a high quality raw material at a homogenous condition is required (Homogenous condition in terms of moisture content and particle size).
- Since the Plant should run on “fresh” material from the SYP logs, mixed with the wood chips from outside, these sources have to be mixed and equalized to ensure the same raw material mixture. Otherwise pellet quality would suffer.
- Since the resizing equipment (chippers and mills) has a higher requirement for maintenance, the equipment will be designed with a design factor of 1,2 for not having throughput problems calculated over the day.



Vecoplan's recommendation / design:

- Debarker:
Drum debarker for continuous material debarking.
- 1" Chip Drum Chipper:
Many pellet manufacturers use a disk chipper. Vecoplan recommends the use of a drum chipper which has the advantage of a built in screen (not found in a disc chipper), providing a much more consistent chip size and quality.
- Auxiliary feed in for 3rd party wood chips:
Truck reception with the unique pendulum floor from Vecoplan provides the highest safety standards possible.
- Chip Storage:
Fully automatic storage and reclaiming system for high volumes, also provides the opportunity to mix the different sources of wood chips.
- Wet Milling:
Vecoplan utilizes wet milling (milling prior to the dryer) providing a material which is much more homogenous, yielding better results in the dryer than would be realized using conventional microchips. Although the initial investment will be higher, the lifetime costs are reduced.
- Drying:
Drum Dryers are the most efficient and affordable drying solution.
- Dry Milling:
Approximately one-third of the dried material is already below 2mm in size and can be removed via a screening process as it requires no additional milling. This screening process reduces milling costs. The remaining material is then dry milled to the desired particle size for pelletizing.



Pellet Plants are very complex systems requiring a large variety of machines and technologies. The design of the system should incorporate the abilities of each individual component interacting with each other in order to achieve a specific goal in the most efficient manner possible. It is important that the different production steps interact with each other effectively in order to get the best throughput capacity and continuous quality of the manufactured product, as well as reliability of the plant.

Although careful consideration must be taken in the design and incorporation of each individual component of the system, it requires extensive expertise and experience to create a reliable system that meshes these individual components into a cohesive single unit.



Vecoplan takes care!

As an equipment manufacturer, we know the capabilities of our machines. Further, from our decades of experience, we also know what technologies match best and combine with one another to maximize productivity. For components that we do not have in our portfolio, we work with reliable partners whose equipment quality and capacity we know.

From this huge list of equipment we design a complete Pellet Plant, customized to your needs - but that's not all. We also pay particular attention to the controls, shipping, installation, wiring, commissioning and start up - and it doesn't stop there. Our service and support expertise is second to none: Vecoplan offers 24/7 technical support, combined with our Veco+Live Service, which enables our Engineers to service your plant from all over the world, keeping down time to an absolute minimum.

PELLET MILL SYSTEM COMPONENTS - CHAIN CONVEYORS

Drag chain conveyors have an endless chain with feed dogs (cross ribs) which runs in a closed trough. This makes them suitable for transporting bulk materials. Depending on the design of the feed dogs and trough, material can be conveyed horizontally, on an incline or vertically. Bows can be installed allowing different conveyor sections to be combined.

This makes them particularly suitable for use as discharge or distribution conveyors. Material can be conveyed in the lower run as well as the upper run.



PELLET MILL SYSTEM COMPONENTS - BELT CONVEYORS

The VECOPLAN belt conveyors are available in two designs - as troughed or flat belt conveyor. Both types have a modular design. They are easy to assemble to suit your requirements and can be subsequently modified and adapted. All belt conveyors feature a particularly hard-wearing (optionally oil-resistant) rubber conveyor belt. In addition to that an adapted belt scraper system for the applied material can be installed. So we assure that our belts are always perfectly adapted to the required application.

Benefits

- First-class powder-coating
- Easy to maintain due to the design of the belt conveyor
- Option of reversing or moveable belt conveyor
- Dust-proof design with exhaustion
- Very few wearing parts
- Optional installation of a belt weigher or overbelt magnetic separator
- Troughed belt conveyor also available as „banana belt conveyor“
- Flat belt conveyor also available with elbows
- Robust pedestal bearing at tensioning and drive unit

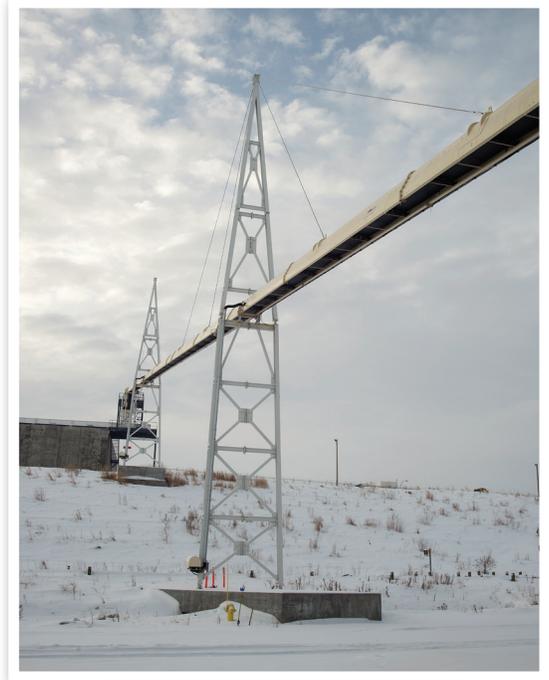


PELLET MILL SYSTEM COMPONENTS - VECOBELT™ CONVEYORS

Vecoplan's Vecobelt™ is the ideal solution for conveying and loading bulk materials into rail cars, trucks, silos, bunkers and process equipment or simply to transfer large volumes of material over long distances. Vecobelt™ moves more material, over longer distances, with fewer structural supports than traditional conveyors, while consuming less power and virtually eliminating dust or noise.

Vecobelt™ consists of a conveyor belt running on air cushions in a closed tube system. The air cushions minimize friction, which in turn reduces power consumption by up to 50%. Less friction also results in less wear, longer life and less maintenance. The decreased friction, combined with the tube enclosure, delivers virtually silent operation. Dust and spill problems are also eliminated by the almost totally enclosed system.

Vecobelt™ systems have been installed and successfully operating in a wide variety of industrial applications including biomass and cement plants, throughout Europe over the last five years.



PELLET MILL SYSTEM COMPONENTS - SCREW CONVEYORS

Bulk material needs to reach its destination well dosed, thoroughly mixed and evenly transported - screw conveyors are particularly suited for this purpose. Semi-moist and fibrous materials can also be transported. It's all a question of the design. Depending on the application, screw conveyors can have one or more shafts and can be horizontal or inclined.

Key features of screw conveyors:

- simple, compact and rugged design
- the material to be conveyed can be loaded at any chosen position
- sturdy, torsion-resistant steel construction
- full-flight welded to the screw shaft
- individual choice of materials and wear lining on request
- long service life, low maintenance

Single screw delivery rate: 5 to 1000 m³/h

Conveying diameter: 250 to 1000 mm

Double screw conveyor delivery rate: up to 1000 m³/h

Conveying diameter: 2 x 250 to 2 x 800 mm



PELLET MILL SYSTEM COMPONENTS - HAMMERMILLS

Material resizing is often required for a variety of reasons. A hammermill is the ideal solution when size reduction of material to less than 1/2" is required. As opposed to "cutting" material, a hammermill uses a milling process similar to a garbage disposal. Hammers, fixed on a rotor, spin with a very high tip speed, hit the material and throw it into milling bars, which separates the material into the fibers. A screen keeps it within the milling area until it is small enough to pass through.

Other hammermills do not have these milling bars and rely on the screen itself to grind the material, which results in very high wear (and low lifetime) of the screens.

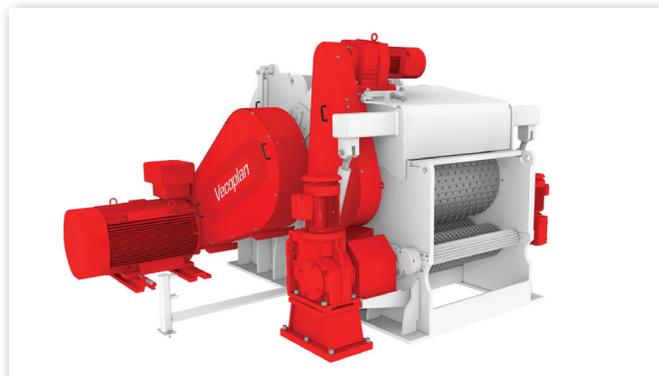
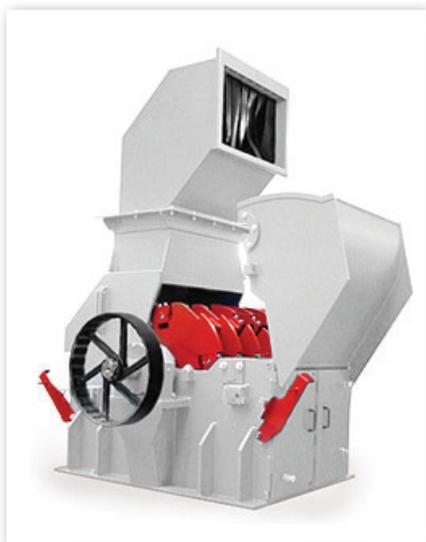
In the design of Vecoplan hammermills, special attention was given to the wear and maintenance characteristics of the machine, resulting in a technology that is optimized to keep down-time to an absolute minimum. In addition, our hammermills can be used for wet materials as well as dry.



PELLET MILL SYSTEM COMPONENTS - DRUM CHIPPERS / BARK CHIPPERS

Our horizontal drum chippers are divided into three series (small, medium, heavy-duty). With a throughput capacity of up to 15,000 kg/h, the small series is used at sawmills and carpenter's workshops for the processing of long and short pieces.

The heavy-duty series, with a throughput capacity of more than 100,000 kg/h, is used for the production of wood chips out of roundwood, slabs and splinters.



Bark is not waste!

In a Pellet Plant, even the bark coming from a debarker often is used for the furnace to generate heat energy for the dryer. To get a homogenous fuel it is necessary to control the particle size of the bark, typically to 4" minus.

The Vecoplan Bark Chipper is a modulus design. Depending on the application, the type of rotor and screens can be adjusted. It is a heavy-duty design which is easy to maintain. It can be combined with a large number of motor sizes to meet the specific requirements.

PELLET MILL SYSTEM COMPONENTS - OSCILLATING SCREENS

VSS Oscillation screens are generally the perfect solution for screening sawmill waste such as wood chips, sawdust, wood shavings (animal bedding), bark, alternative fuel (RDF), etc. with particle sizes up to approx. 100 mm (occasional overlengths up to 500 mm) into several fractions and for separating fines and overlengths from wood shavings (for production of animal bedding) or mineral fractions from old wood and for making other quality improvements to materials for recycling or thermal treatment. They essentially consist of circular oscillating screening boxes suspended on rubber mountings in a steel frame.



PELLET MILL SYSTEM COMPONENTS - DISC SCREENERS

The light version of the disc separator is particularly efficient at separating overlengths from single materials such as dry stabilate (clean fuel for power plants etc., derived from domestic waste), bark, green waste and fresh wood. It can be used for cross cuts of between 50 mm and 300 mm. To prevent jamming, the discs can be flexibly mounted with this version.

The heavy disc separator is highly effective for separating overlengths from abrasive material (domestic and commercial refuse, old wood). It can be used for cross cuts of between 50 mm and 300 mm. A horizontal belt conveyor ensures optimum direct feed at the level of the screening shafts.

Alternatively, material can also be introduced via a feed hopper in the flow direction. The disc separator consists of a solid sectional steel construction on which the screening shafts, bearings and drive elements are mounted. The separator has a segmental construction – one drive per segment. The number of segments can be adapted to suit your requirements.



PELLET MILL SYSTEM COMPONENTS - STONE TRAPS / WIND SIFTERS

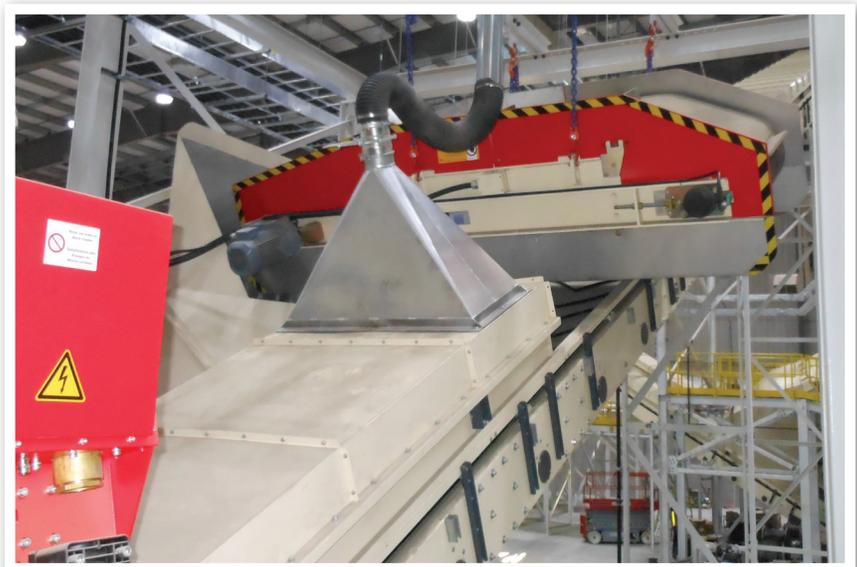
Since materials often are contaminated with foreign materials, the separation of these unwanted particles is required to protect the upstream equipment, or just to get clean main materials. Whether stone trap, heavy fraction separator or wind sifter - the function is always the same: The bulk material is accelerated upwards by air. Heavy particles remain stationary or move only slightly compared to the material for which the stone trap is adjusted. Using this difference, the device separates the material in two ways.

Vecoplan generally uses these devices as a step just before each hammermill, to protect the hammermill. The implemented air can be used for the milling process, which increases the throughput of the hammermill.



PELLET MILL SYSTEM COMPONENTS - MAGNETIC SEPARATORS

Cross belt magnetic separators are used to remove ferrous contaminants, such as tramp metals, which include nuts, bolts, wire and banding from, material being processed. Cross conveyor provides a large area of coverage for a continuous self cleaning operation. Durable, cleated belt transports ferrous contaminant objects into collection bin.



PELLET MILL SYSTEM COMPONENTS - PULL-ROD FLOOR

For the conveyance of free-flowing materials, such as sawdust, shavings, wood chips, etc., Vecoplan push/pull rod dischargers comprise hydraulically operated push/pull rods that move reciprocally across the floor of the bunker. If an upstream extraction device is activated, a hydraulic system automatically initiates a slow, backwards and forwards, reciprocal movement of several adjacent push rods. During this process, the special profile of the carriers transports the bulk material into an extraction device located at the end. One side undercuts the bulk material in the direction of the end of the bunker, the other side conveys the bulk material in the direction of the extraction device. Material from the silo is dosed in the required amounts by the discharge conveyor, or the push/pull rods themselves. The hydraulic cylinders of a pull rod discharger are mounted at the discharge point, whereas the hydraulic cylinders of a push rod discharger are mounted in the silo at the rear (opposite the discharge point).

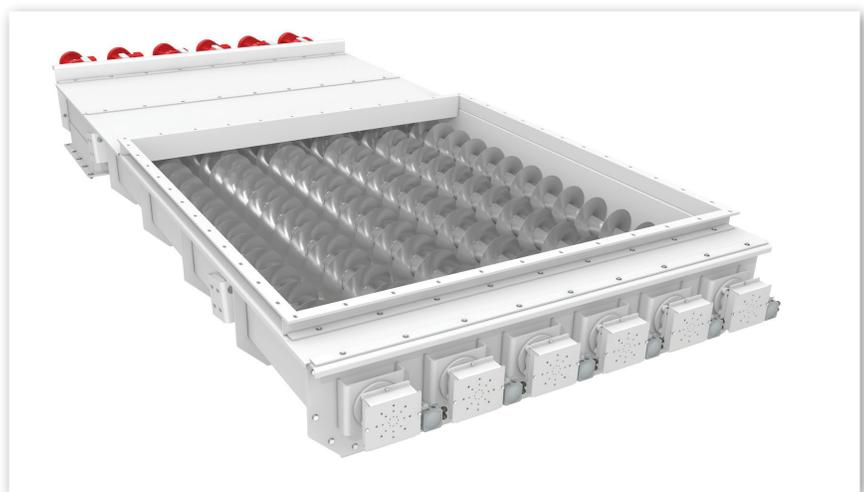


PELLET MILL SYSTEM COMPONENTS - SCREW BOTTOM BINS

The screw bottom bin is a storage and dosing device. A variable number of screws are assembled to one, combined bottom on which a bin is installed. Volumes up to 142 m³. can be stored in such a bin. Since the entire bottom is moving, bridging or clogging of the material is eliminated.

By adding VFD's to the screw motors, controllable dosing of the material to the following equipment can be maintained. Furthermore the screws can have two exits, (one on each side), which enables the option of splitting the material in two ways; at a screw bottom bin with 6 screws, three of them can feed in one direction and the other three screws would feed in the opposite direction.

The dosing bin can also be equipped with explosion vents, enabling the use with explosive materials. This device is commonly used for intermediate storage, e.g., for feeding into a dryer.



PELLET MILL SYSTEM COMPONENTS - CONTROLS

All of the individual components of a large pellet system need to work together as if they were controlled by one brain - and with an integrated control system from Vecoplan - they are! Vecoplan systems integration has a proven record of maximizing production efficiency while minimizing energy consumption and labor costs. Our expertise ranges from advanced PLC programming to Next-Generation HMI touch screen design and complete factory automation through centralized control systems integration.

Vecoplan designs, engineers, manufactures, installs, commissions, provides training and provides ongoing parts and service for complete control systems. Whether you're building a new plant, installing a new production line, upgrading an existing system, or simply adding new machines to an old line - Vecoplan can automate it.

- Optimize the functionality and reliability of existing equipment through Vecoplan controls integration
- Provide more intuitive operations via custom HMI (Human Machine Interface) designs
- Reduce labor costs by reducing training and skill level of operators
- Reduce downtime via complete system monitoring and alarm troubleshooting information
- Monitor and improve quality control and productivity through process machine trending and data archiving
- Incorporate communications between control systems and IT systems to improve planning, inventory control and quality control

Vecoplan's fully trained electrical design engineers, programmers and panel builders integrate modern control systems that meet, or exceed, all current safety and operational features required by national, regional, state, and local electrical and safety codes. These include UL 508a, NEC, OSHA, and Hazardous Location Designations. This provides you with a level of quality assurance unsurpassed in the electrical controls industry.



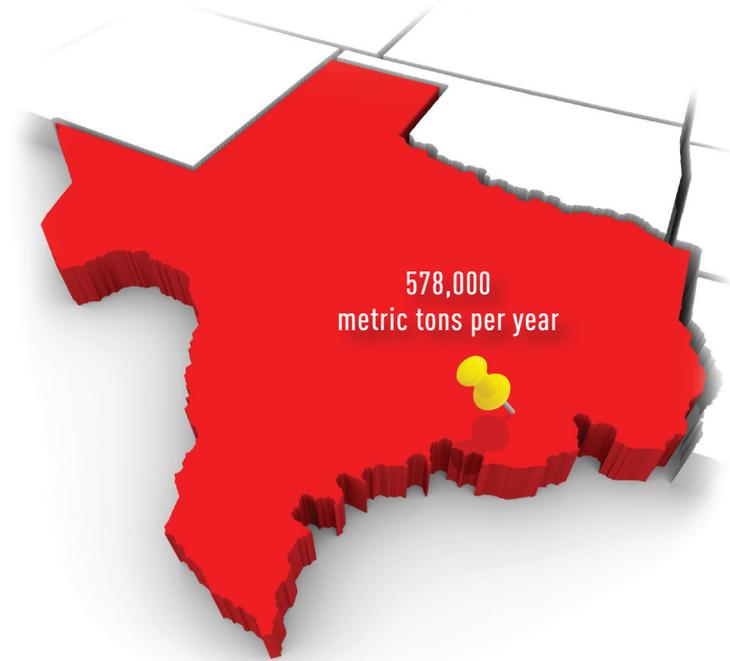
An integrated control system from Vecoplan not only makes all of your machinery work together, it makes everything work better - optimizing the overall functionality of your entire system. An optimized system is a collection of individual machines or lines that are able to communicate and cooperate seamlessly with one another to maximize the productivity and efficiency of the group as a whole. In other words, everything works in sync.

A Vecoplan integrated control system provides the communication between machines and delivers the functional cooperation between machines. This adds significant, measurable value to your plant through increased productivity and decreased operation costs. By generating interactions between machines, Vecoplan Integrated Controls expands their abilities and actually increases the capabilities of your entire system.

An integrated control system from Vecoplan not only allows individual machines within a line to speed-up, slow-down, start, and stop in response to each other, but also to react in an almost endless variety of ways based on predetermined parameters programmed into your particular control system. This begins with planning. Vecoplan engineers work closely with you to develop a plan that meets or exceeds your requirements and wishes.

GERMAN PELLETS PARTNER WITH VECOPLAN

WOODVILLE, TX



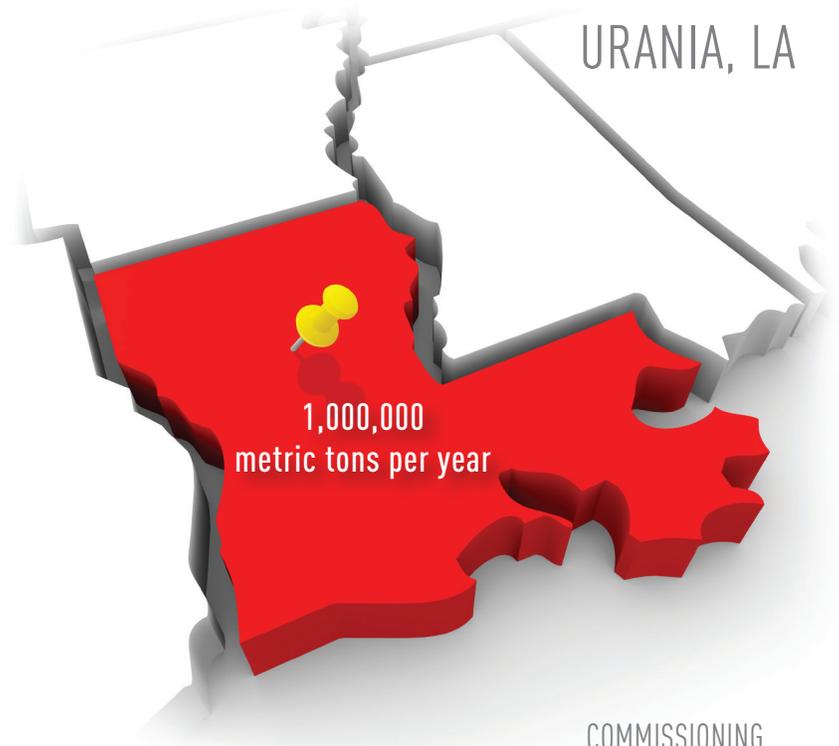
Work on the 80 hectare site in Woodville began in November 2012. German Pellets GmbH relied on its longstanding relationships with suppliers, such as **Vecoplan**[®], to equip the new site with material handling and processing machinery that has been used successfully for many years in its European plants. Due to the highly experienced team of equipment manufacturers, suppliers and contractors that was assembled by German Pellets GmbH, the entire erection period for the machinery - including commissioning - took only 5 months.

The Woodville facility is designed for an annual capacity of 578,000 metric tons. Though capacity is a very important piece of the puzzle when undertaking a project of this size and scope, the most important goal of German Pellets GmbH is to meet all the required standards for all the wood pellets leaving the plant. This can only be done with high quality and reliable machinery that produces a consistent product; therefore, **Vecoplan**[®] equipment was chosen for transporting, resizing, screening and storage of the raw feedstock and finished wood pellets.

German Pellets will produce 1,000,000 metric tons of wood pellets per year in Urania, twice as much as in its first US plant in Woodville, TX. "Pellet consumption worldwide is on the rise, especially in Europe. This means that the construction of large production capacities is necessary," said German Pellets CEO Peter Leibold. The demand from the European power plant market for the production of heat and electricity from wood pellets has risen sharply. There is also an increasing demand for wood pellets among private consumers and large-scale users, for example, for supplying heat to hospitals, schools, commercial buildings and industrial facilities.

Assembling a dedicated and experienced team to repeat the success already experienced in Woodville, TX was essential. Once again German Pellets selected **Vecoplan**[®] to be an integral part of this team, providing equipment that would receive, resize, convey, screen and store materials at various steps throughout the entire pellet manufacturing process.

URANIA, LA



COMMISSIONING

1st half: January 2015
2nd half: Summer 2015

COMMISSIONING

Summer 2013

ANNUAL THROUGHPUT CAPACITY

578,000 metric tons of wood pellets

PROCESS DESCRIPTION

Mechanical feedstock processing system designed to produce wood pellets for export to European markets

MECHANICAL PROCESS STEPS

- Receiving
- Re-Sizing
- Conveying
- Screening
- Storage

ABOUT GERMAN PELLETS

German Pellets GmbH was founded in 2005 in Wismar (Mecklenburg-Vorpommern, Germany) and has since become the leading manufacturer of wood pellets in Europe. German Pellets produces wood pellets and animal-hygiene products at 15 sites in Germany and Austria. Wood pellets are made from wood shavings and sawdust pressed into a cylindrical shape. They can be used for a wide range of applications – in private households, in industrial and commercial facilities and for the production of electricity and heat.

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VECOPLAN TECHNOLOGY GERMAN PELLETS PLANT - WOODVILLE, TX



German Pellets Plant in Woodville, TX

VECOPLAN SCOPE

Scope of supply:

- Chain Conveyors
- Belt Conveyors
- Vecobelt Conveyor
- Screw Conveyors
- Hammermills (x7)
- Bark Chippers
- Oscillating Screeners
- Disc Screeners
- Stone Traps
- Magnetic Separators
- Pull Rod Floor
- Screw Bottom Bins
- Swiveling Belt Storage
- Complete Control System

**german
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