TECHNOLOGY FOR A SUSTAINABLE TOMORROW

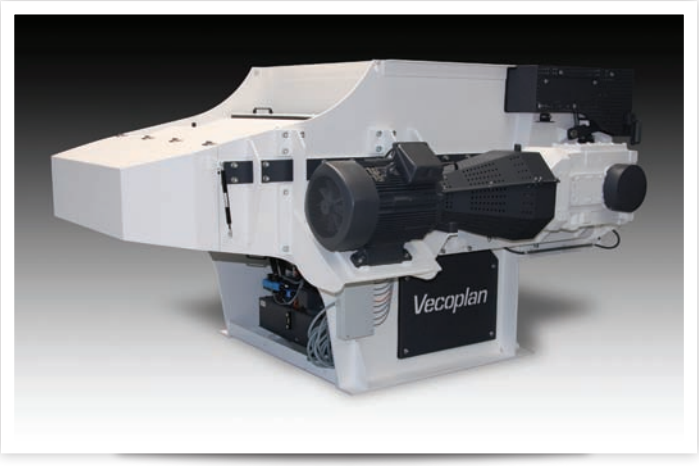
FOCUS

VECOPLAN MIDWEST - PELLET MILL STARTUP

SO YOU WANT TO MAKE PELLETS?

Vecoplan®

So You Want To Make Pellets?



Producing wood pellets in the US seems to be the new rage, with new large capacity plants being announced in every news publication on a weekly basis. This summary will attempt to help you determine if this is an industry you want to invest in.

The Pellet Process:
Typically any raw material will require some form of processing prior to being pelletized. This can range from debarking if using whole logs (round wood) to shredding or grinding of pallets, ag products, or MSW. Once the product is shredded or ground, it could require further processing through a hammer mill, depending on how it was received. If the raw material is wet (over 15%) it will need to be dried. After sizing and drying if needed, the product is now ready to be pelletized. Pellets can be made in a wide range of diameters and bulk densities, which is typically determined by the end use of the pellet. The die specifications can be changed, allowing for multiple sizes to be produced from the same mill. In most cases pellets will exit the pellet mill hot (100-170 degrees) and must be cooled. This is done with a pellet cooler by pulling ambient air through the pellets. Once the pellet is cooled to ambient temperature, the pellets are screened to remove any fines that may have been created during the process. The pellets are now ready to be packaged, stored or sold in bulk.

Starting Up - Some Things To Consider

When developing a business plan the following things should be considered top priorities.

- What feed stock will be used?
- How much of this feed stock can be obtained at a price point that works within your business model?
- What is the incoming moisture content?
- What is your target market, residential fuel, industrial grade fuel, animal bedding, feed, etc.?
- What is your market area?
- Do you intend to sell your end product wholesale or retail?
- What is the market volume potential for the end product in your target market area?
- What is the value of your end product wholesale and retail in your target market area?
- What volume do you plan to produce?

It is our experience that there are two types of pellet plants. At this time we will define them as a GREEN PLANT and a DRY PLANT.

Green Pellet Plants

A green plant is a facility that will receive its raw materials with a moisture content higher than 15%. This could be in the form of sawdust, wood chips, or even whole logs. For a plant that pelletizes products other than wood this could be spent grains, ag products, ethanol plant residue, MSW etc.

This type of plant will require a drying process which can add considerable cost to the initial project as well as added operating cost. When considering a green pellet plant, bear in mind that raw material can be received at a moisture content as high as 50%. These products must be dried to something below 15% prior to the pelleting process. A typical conversion rate for wood is 2 to 1 therefore for every ton that is delivered to the plant, you will have ½ ton available after drying to produce pellets. If you intend to use wood to fire the burner for the dryer you will consume an additional 25% of the incoming material as fuel. This becomes very important as it pertains to the actual raw material cost. For example if you are to pay $35.00 per ton for incoming raw materials, your actual cost becomes $70.00 per ton after drying. If a portion is to be used for fuel, your cost per ton now goes to $78.75 per ton.

Example:

2,000lbs in at $35.00 per ton, produces 1,000lbs out = $70.00 per ton.
At $70.00 per ton, this equals $.035 per lb. If you consume 25% for fuel to fire the burner you will have consumed 250lbs at a cost of $.035 per lb for fuel or another $8.75. You now have 750lbs left from every ton that is delivered to the plant with which to produce pellets at a cost of $78.75 per ton.

Building a Green Pellet Plant:

A good average to consider when building a Green Pellet Plant from start to finish is approximately 1.2 to 2 million dollars per desired ton per hour.

Example:

You want to build a 6 ton per hour plant. The cost of construction and equipment will come in somewhere between 7.2 and 12 million dollars. It doesn't take very long to understand that in order to pay for and create profit, a Green Pellet Plant must produce large volumes (tons per hour) in order to provide the required return on investment.

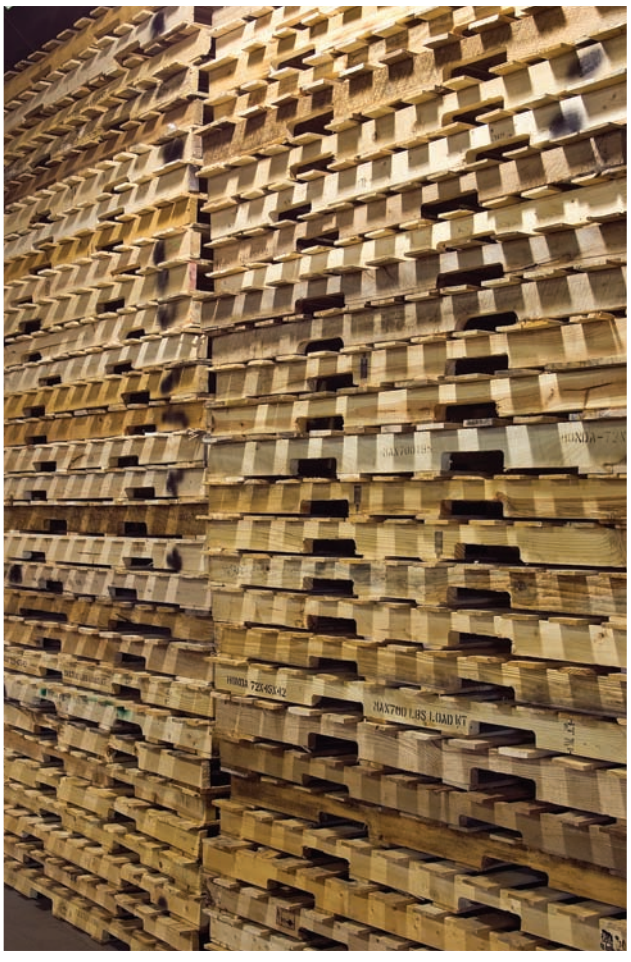
*Note: $ based on 2012 estimates

Dry Pellet Plants

When considering a dry pellet plant, keep in mind that raw material will be received at a moisture content of 15% or less. In this case, no drying is required which substantially reduces the investment on the front end as well as creating a defined raw material cost.

Building a Dry Pellet Plant:

A good average to consider when building a dry pellet plant is $500,000.00 per desired ton. It is our experience that if you can acquire dry raw materials for a cost of $45.00 per ton or less, a plant producing as little as 2 tons per hour can be profitable (assuming you are able to market the finished product for at least $125.00 per ton).
A dry pellet plant will have maintenance cost of approximately $5.00 to $7.00 per ton and will have electric cost between $7.00 and $10.00 per ton.



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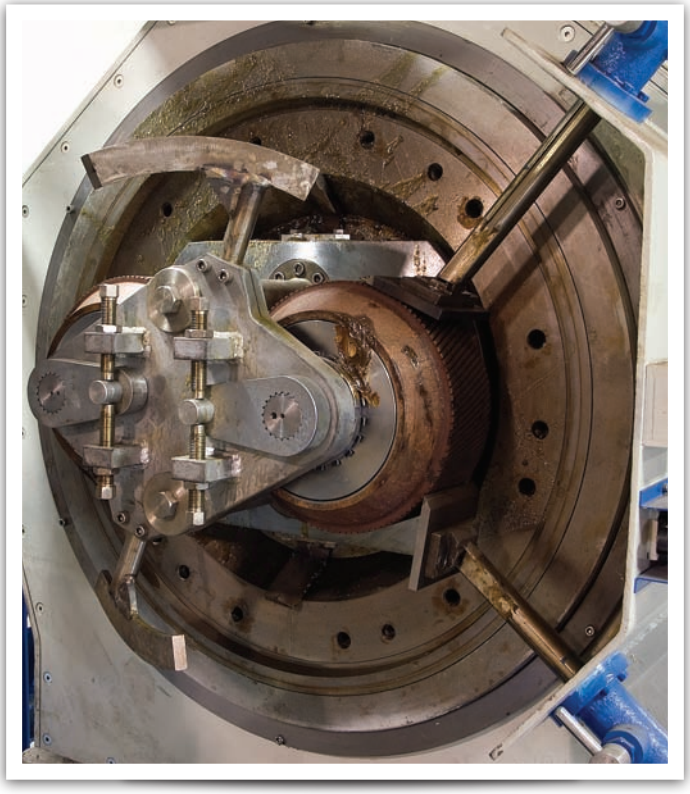
Pellet Mill Sizing

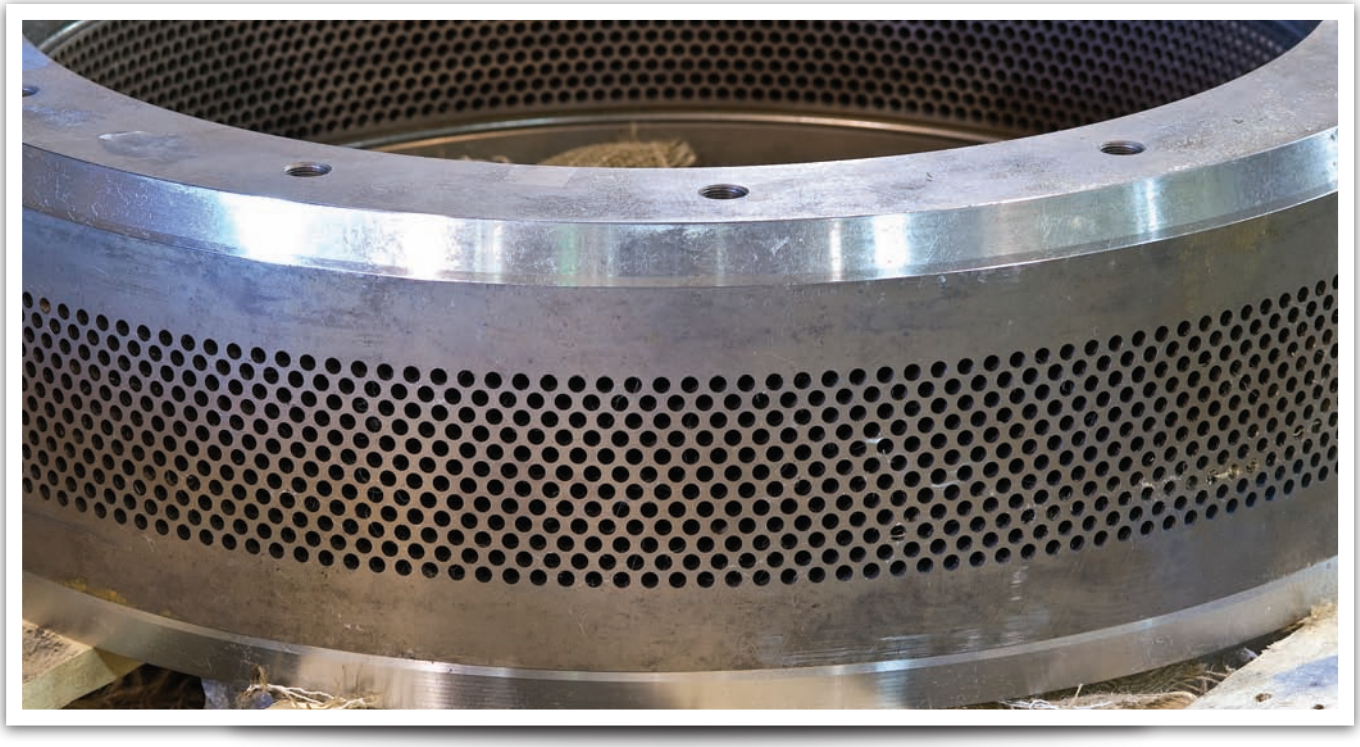
Pellet mills come in a wide range of sizes and HP. When determining the needed size of a pellet mill it is typical to relate the size needed by desired throughput and the pelleting characteristics of the product being pelletized. For example, when pelleting wood, a good average to use is 1HP for every 20lbs of throughput; therefore, if you want to produce 2,000lbs per hour you will need a 100HP pellet mill. When pelleting products such as feed, the conversion average is 1HP for every 120lbs. Therefore the same 100HP pellet mill will produce 12,000lbs per hour if pelleting feed vs 2,000lbs per hour pelleting wood.



HP in relation to die diameter is considered when pelleting the various feed stocks or raw materials. Typically as the HP goes up so too does the die diameter. For example, a 100HP pellet mill will typically have a 16" diameter die, whereas a 300HP mill will have a 22" diameter die. There are of course various sizes both smaller and larger than 16" and 22". Historically when sizing the pellet mill, it is best to submit a sample of your raw material along with your desired throughput requirements to the manufacturer. They should be able to give you back a pellet that meets your desired bulk density and recommend the proper mill and HP to accomplish your required throughput.

Small Pellet Mills:

There is another range of pellet mills that has yet to be mentioned. These are the mills that are typically seen in universities or in very small plants who are using the finished product in-house for pellet appliances such as a pellet stove. These type mills typically range from 15HP to 30HP and function much the same as the larger mills with the exception that they produce much smaller volumes per hour. This type of mill would also be used when various products are being tested, due mostly to the fact that small dies are cheaper than the larger production units. This type of mill ranges in cost from $30,000.00 for just the mill to upwards of $100,000.00 with a small cooler and control panel.



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COMPLETE PELLET PRODUCTION SYSTEM OVERVIEW

PowerPellet™
SYSTEMS
FROM
VECOPLAN MIDWEST

TECHNOLOGY FOR A SUSTAINABLE TOMORROW

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