



Mid-South Engineering Company

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Torrefaction

By: Kimble Garrett

Torrefaction is considered to be a pre-treatment technology to make a biomass more suitable for co-firing with coal applications. Torrefaction is a thermal process operated between 200°C and 300°C in the absence of oxygen. Torrefaction processes are usually carried out near atmospheric pressures. Torrefied biomass exhibits increased brittleness, improved grindability, decreased moisture content, increased calorific values and hydrophobic nature, which improves its properties as a suitable fuel and enable increased co-firing rates.

While torrefaction is not new, the ability to reliably torrefy biomass in large volumes to a degree suitable to allow densification in a cost-effective manner is not only new, but full of challenges. Companies claiming to have such systems are announced regularly but many are only able to produce bench-top systems with little or no documented test results to back up their claims.

Mid-South Engineering has been investigating various torrefaction systems for our clients since 2007. During this time we have conducted first-hand inspections of many of the systems that are commercially available. Our diligence in conducting these investigations and verifying test results and material characteristics has provided our clients with the evidence needed to proceed with full-scale production facility designs.

Our experience in torrefaction comes from our traditional customers interested in producing energy products, from existing facility owners wishing to reduce their use of coal, and from government and research institutions wishing to better understand the capital and operating costs for full scale production facilities as well as the risks and challenges.

Mid-South Engineering was recently contracted by EPRI (Electric Power Research Institute) to conduct an in-depth study on torrefaction. The target of the study was to explore the viability in developing small, energy efficient integrated torrefaction plants, which could be field deployable to reduce the transportation cost for torrefied chips/pellets-briquettes production.

The study included analysis of 2 plant concepts at 2 different operating rates. Each facility option was designed to source raw material using either wood chips or herbaceous (Switchgrass and Miscanthus) feed stock. The technical and economic information developed provided EPRI with the data they needed to move forward with plans for a scale production facility.

Mid-South Engineering is well suited to assist customers in the evaluation of new technologies like Torrefaction. Our experience with biomass handling and processing together with our experience in producing quality pellets allows us to assist our customers in making good decisions; decisions that can and will change the future.



**Wood Chips before
Torrefaction**



**Wood Chips
Torrefied**



“The Barn” built in the 1930’s to house Welsh ponies, serves as Mid-South’s offices.

Key Planning Points to a Successful Project

By: John Westerman

How is a project defined as successful? Depending upon the party involved, the definition may be viewed from different perspectives. For the equipment vendor it may include the equipment supplied performing as expected or better, the customer/owner being satisfied with the results, and making a reasonable profit. For the installation contractor the above is true and would also include a job that resulted in safety of all employees. For the owner, a successful project would probably always include the finished project functioning as planned, total cost coming in on or under budget, the project starting up and functioning within the planned schedule and all activities being performed safely. As a consulting firm, it is always our desire for our projects to result in success. Realizing that projects can be very complex, can involve various personnel and personalities, and are implemented by different means, planning ahead is always paramount for a successful project, and below are some key planning points that need to be considered for your next project.

1. Properly define the scope and cost of the project up front.

Properly identifying the entire scope and cost of a project is the primary key for success. Scoped out items, or items that have been accounted for that require attention (money, time, or both) during a project, establish the basis for your project budget and they also help to define the overall time schedule of the project due to someone having to devote some work effort in that area. For projects that require certain financial returns, scoped out items and their associated cost help to define if the project provides the return on investment necessary to receive funding. If an item is not properly identified as requiring some attention during the course of the project, extra money, extra time or both may be added to the project. During the time of identifying the scope, it is also valuable to consider future plant plans and growth as you implement the project and not back yourself into a corner regarding future plant considerations.

The scope of the project should include all items required to meet the needs/benefits of the project. Most often, the main equipment centers or obvious construction activities are easy to define, but it's important to not forget to scope out the items that aren't always as obvious.

Some of these items include identifying underground utilities modifications (water, gas, electrical, fire protection, etc.), identifying if existing utilities (electrical, air, hydraulics, steam, etc.) are adequate, estimating dirt work revisions, identifying permitting requirements, and how the work could impact operations and future plans. A properly defined scope sets the game plan for the project. It is of most value in directing the project. Once the scope has been defined, estimating the cost of the project can proceed. With the scope and cost estimate in hand, the path forward has direction and the project requirements have definition.

2. Allow adequate time to perform the project properly

Allowing proper time to implement a project requires some forward thinking and planning. Realizing that full project funding may not always be available as timely as desired, committing some resources early on may prove beneficial to a successful project. Efforts in this area may include assembling the project team to identify project requirements and to move the project forward, evaluating alternative solutions, getting the project submitted or approved early on, getting the permit process underway or behind you, getting design guidelines defined, or ordering long lead time items. Rushing a project will inevitably produce some errors or cause some less than desirable decisions to be made. Delaying a project, on the other hand, could result in missing a fabrication opening, could lead to higher costs for materials and labor, and could result in change in project personnel that have been key to the project development. Moving forward with a good project team that makes timely decisions and keeps the project on track pays dividends in the end.

Some key questions to consider under this item are: Have we allowed adequate time for engineering, procurement, construction, and start-up? Have we allowed adequate time for permit approvals, owner reviews and approvals, and enough time for decision makers to make decisions? (Making good decisions in a timely manner contributes to the overall schedule and success of a project). Have we allowed adequate time for equipment deliveries and construction outages? Will the outages be planned around other major mill outages to reduce overall downtime and have those dates been identified? Will adverse weather delay construction activities and has this been accounted for?

See next Issue for continuation



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