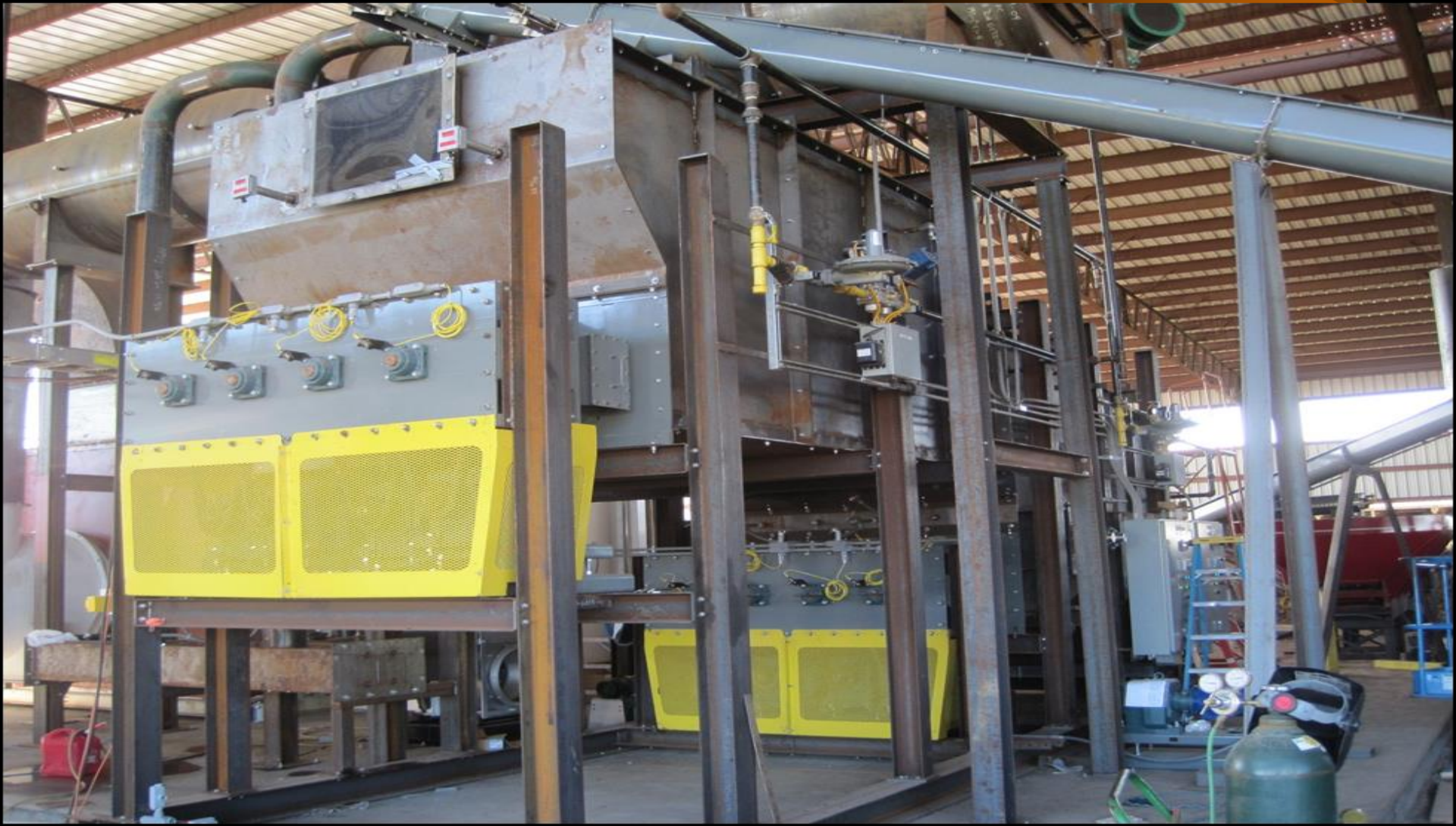


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THE BARRIERS TO DEVELOPING MANURE-BASED BIOCHAR



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BIOCHAR PROJECTS

- **Our company has been testing and processing manure-based gasification fuels for almost 10 years.**
- **During this period, the actual technical aspects of gasifying manures have not proven to be a huge issue for us, but the development of projects has been very slow.**
- **There are many reasons for the slow development of a market sector where there is such a huge need.**

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BIOCHAR PROJECTS

- **Typically, one of the big barriers when developing markets is the supply of fuel and/or the cost of that fuel.**
- **This is not the case with manure systems.**
- **But, there are numerous barriers that have greatly impacted the development.**

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BARRIERS

- **The first barrier is credibility.**
 - **Many technology providers have systems that will operate with wood, but can't process manures; but still attempt to develop manure projects – and fail.**
 - **Others claim that they can provide a viable payback on energy value alone; there are very few situations where this is possible. Unfortunately, most making this claim have never built a system.**
 - **Finally, there have been enough digester systems fail over the years that most farmers are very skeptical of any technical solution.**

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BARRIERS

- **The second barrier is knowledge.**
 - **Digester projects obtain funding because financial groups and energy companies understand the concept.**
 - **98% of the general public thinks that gasification/pyrolysis is just like incineration.**
 - **Biochar is a critical component to almost every project, yet despite the efforts of many organizations over the past 5 to 10 years, it is still relatively unknown. Almost all of the knowledge about biochar is based on research done with wood-based biochar. And this research is focused on making the optimum biochar, not something commercially viable.**

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BARRIERS

- **The third barrier is the economics.**
 - **With very few exceptions, these projects are not feasible without multiple revenue streams.**
 - **The most significant revenue stream is almost every case is the value of biochar; assuming a reasonable market price.**
 - **Establishing that market price is the most substantial barrier of them all.**

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BARRIERS

- **The final barrier is funding.**
 - **Funders want to see contracts for revenue streams – power purchase agreements, tipping fee contracts, etc.**
 - **Funders also typically want to see large projects because they have limited understanding of biomass projects. They are dependant on the expertise from people whose experience is in the public utility sector.**

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BARRIERS

- **Since commercial scale biomass projects are new, there is not much history upon which funders can base their decisions.**
- **And, when much of the value is based on environmental benefits and biochar; the economics become even harder to quantify, so their “risk” increases.**

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OVERCOMING BARRIERS

- Unfortunately, the only way to overcome these barriers is to actually install and operate systems.
- This involves either:
 - Obtaining funding as a developer and fund build/own/operate projects
 - Finding customers that are willing to spend capital dollars on a project (success in this area is usually based on the ability to find a customer in need of an urgent solution).
 - Obtain grant funding – probably the most difficult as the agencies have no concept of what it takes for commercialization; just research.

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OVERCOMING BARRIERS

- The final step to removing the barriers is establishing the market and market price for biochar once a large volume supply has been created.
- This market can't be established until a significant production capacity exists, so the initial project must come first.
- The market can be in a variety of applications, and can be a combination of different market sectors as well as size of venue – retail, farm scale, soil amendments, water filtration, feed supplement, and unique applications such as super capacitors.

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OVERCOMING BARRIERS

- But, the large scale production must come first as consistent quality must be shown; a quality that can easily be replicated in a commercial environment.