Torrefaction: Producing a Coal Alternative for Electric Power Generation

BioEnergy Conference Oakland University
Joseph J. James
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www.agri-techproducers.com
Torrefaction: Producing a Coal Alternative for Electric Power Generation

Agri-Tech Producers, LLC

Technology: Torrefaction
Feedstocks: Woody waste, Bio-crops, Ag-waste, etc…
Output: Renewable coal alternative, Biochar
Size Range: 5TPH Output
Commercial Status: Prototype since ’08 / Commercial in Fall ‘11
Projects Installed: Prototype since ’08 / Commercial in Fall ‘11
Target Market: US and EU, Other coal-burning entities, Farmers
Competitors: Thermya, Topell, Wyssmont Company
Torrefaction: A Technology to Enhance & Densify Biomass

– Untreated biomass may be 50% water, it’s bulky and it’s not the most efficient or useable fuel or bio-feedstock. Torrefaction:
  • Drives off most of the water
  • Reduces the bulk
  • Makes a better co-fire fuel to burn with coal
  • Makes superior briquettes and pellets

– Torrefaction, applied at or near the point of harvest:
  • Reduces transportation costs of biomass, per BTU
  • Produces a more valuable biomass shipment
ATP’s Torrefaction Process

- Auto-Thermal – Makes Own Process Heat
- Auger Driven
- Variable Temperatures and Residency Times
- Treats Wood and Plant Biomass
- No Pre-Drying Required
- Industrial Strength – Operates 24/7
Schematic of ATP’s Torrefaction Machine
ATP’s Team

- Manufacturing Partner: The Kusters-Zima Corporation
- Small Staff – Columbia, SC-Based
- Technology Source: NC State University
- Utility Relations: EPRI, US and EU Utilities
- Federal Agency Partners: DOE, US Forest Service, EPA
- Business Partners: Several Collaborators
ATP’s Manufacturer: The Kusters Zima Corporation

101 Zima Park Drive / I-85 Business
Spartanburg, S.C. 29301
Tel: (864) 576-0660

8.74 Acres (35,362 Sq. Meters)
Building Constructed in 1969
80,128 Total Manufacturing Sq. Ft.
(7,444 Sq. Meters)

Kusters Zima has over 40 years experience in engineering and manufacturing machinery for many various industries.

• Complete Metal Fabrication including Welding, Cutting, Forming and Piping.
• Machining Capabilities that include CNC Turning and Vertical Milling Centers.
• Complete Mechanical and Electrical Engineering with the latest Software Versions of SolidWorks and AutoCad.
• Complete Mechanical and Electrical Assembly and F.A.T. for Production Machines and Prototypes.
• Installation and Start-up Supervision.

Complete Manufacturing

• Water & Waste Water Equipment
  Grit Removal & Washing
  Course & Fine Screenings
  Classifiers
  CSO Screens
  Dewatering

• Carpet & Textile Equipment
  Continuous Preparation
  Dye Washers & Scour Ranges
  Steamers
  Liquid Dispensing
  Water & Dry Lint Removal Systems

• Contract Sales
  Piece Parts & Components
  Customer Specific Design & Build
  Build to Print

KUSTERS - ZIMA
Equipment Status

• Prototype Operational for Two Years (NC State Campus)
• Commercial Unit Operational – August 2011
• Will Produce Tonnage for Utility Test Burns
### TORRE-TECH® 5.0 Specifications

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<tr>
<th>System Dimensions</th>
<th>IP (FT)</th>
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*Agri-Tech Producers, LLC*
Summary Analysis

• See EPRI’s Fall 2009 Test (4-Ton Sample)
• All Recent Results are Very Favorable
• Modest Success in Making Pellets Without Binder
• Planning Tests With Low-Cost Binder to Increase Strength and Water Resistance
Torrefied Wood Pellets
The Electric Power Research Institute, Inc. (EPRI) conducts research and development relating to the generation, delivery and use of electricity for the benefit of the public. An independent, nonprofit organization, EPRI brings together its scientists and engineers as well as experts from academia and industry to help address challenges in electricity, including reliability, efficiency, health, safety and the environment. EPRI also provides technology, policy and economic analyses to drive long-range research and development planning, and supports research in emerging technologies. EPRI's members represent more than 90 percent of the electricity generated and delivered in the United States, and international participation extends to 40 countries. EPRI's principal offices and laboratories are located in Palo Alto, Calif.; Charlotte, N.C.; Knoxville, Tenn.; and Lenox, Mass.
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