Torrefaction: Producing a Coal Alternative for Electric Power Generation

BioEnergy Conference Oakland University

Joseph J. James

President, Agri-Tech Producers, LLC

www.agri-techproducers.com

Torrefaction: Producing a Coal Alternative for Electric Power Generation

Agri-Tech Producers, LLC

Presenter
Joseph J. James
President

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

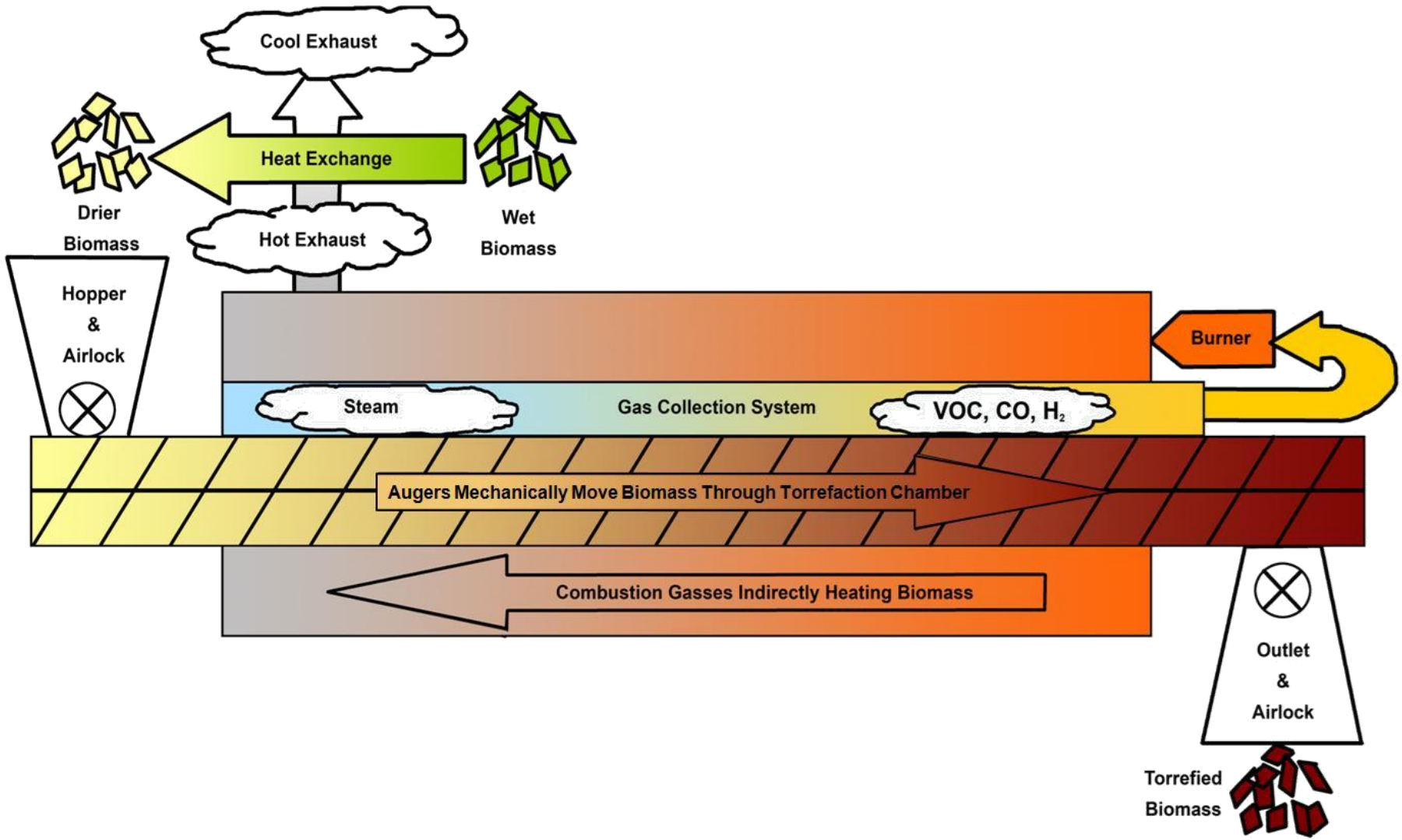
Torrefaction: A Technology to Enhance & Densify Biomass

- **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



Agri-Tech Producers, LLC

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.**

KUSTERS ▪ ZIMA

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

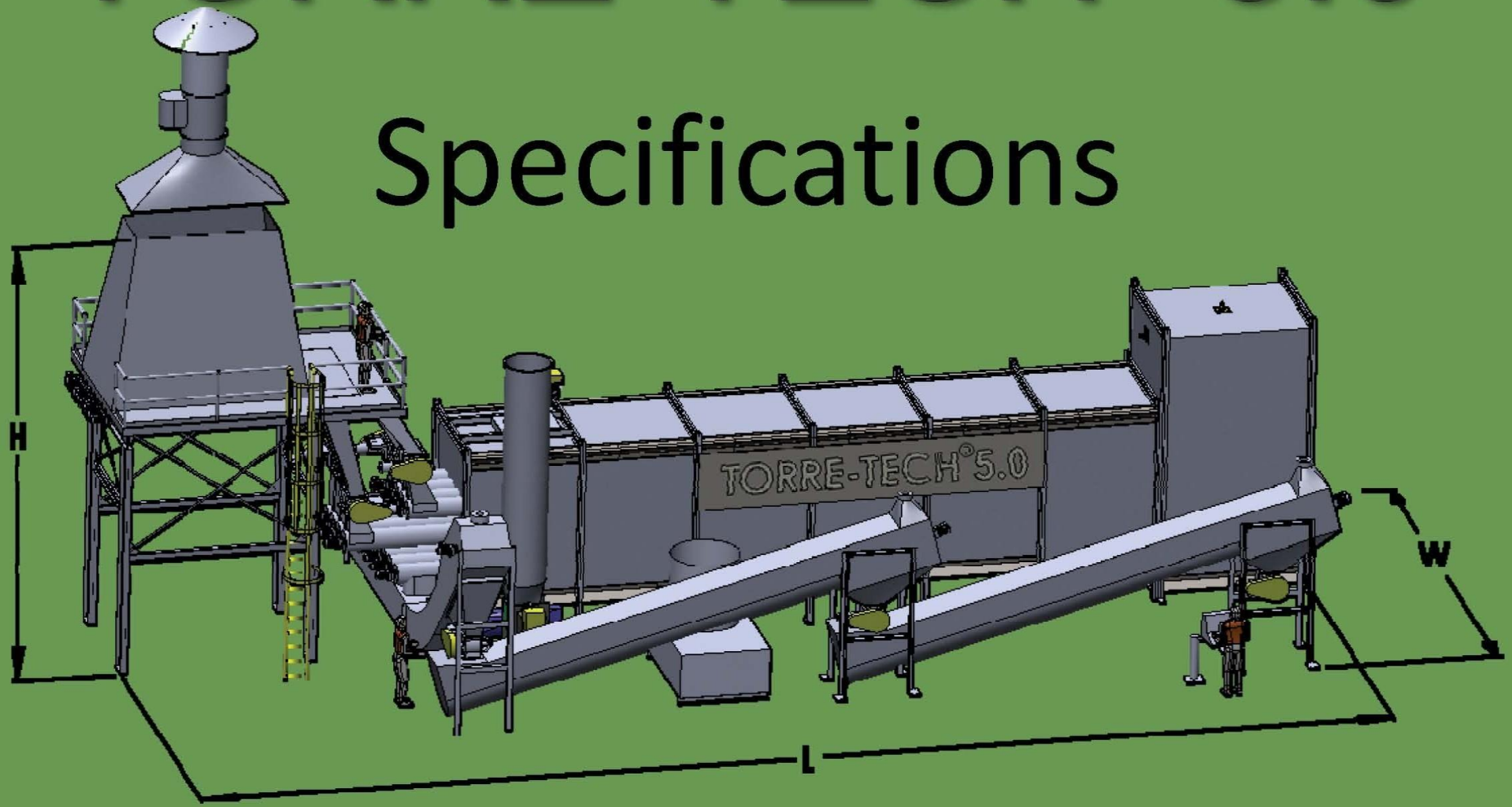
• Contract Sales
Piece Parts & Components
Customer Specific Design & Build
Build to Print

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



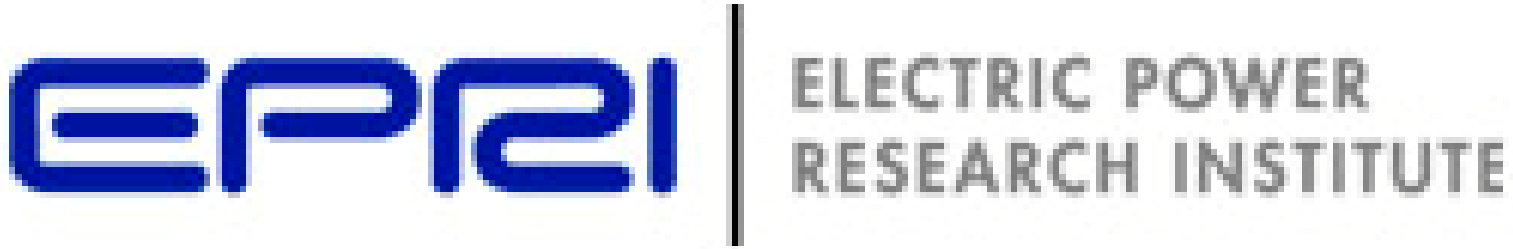
System Dimensions:	IP (FT)	SI (M)
Length (L)	80	24.0
Width (W)	32	9.8
Height (H)	30	9.0

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.

Torrefaction: Producing a Coal Alternative for Electric Power Generation

BioEnergy Conference Oakland University
Joseph J. James
Agri-Tech Producers, LLC
(803) 462-0153
josephjjames@bellsouth.net