

# Bioenergy Opportunities for the Upper Cumberland Region

**TREEDC -TTU Meeting**

**William A. Lee**

**CEO & Co-Founder Frontline BioEnergy**

# Biography

- Born and raised in Pikeville
- 7<sup>th</sup> Generation Sequatchie Valley
- Education:
  - Pikeville Elementary
  - Baylor School
  - UT Knoxville
- Returned to TN in 2009 after 36 years living in 12 states
- Currently reside in Soddy Daisy



**Sequatchie Valley**

# Cumberland Plateau Regional Science Fair

Awards This

## *Certificate of Participation*

BILL LEE

Pikeville Elementary School

Pikeville, Tennessee

Cumberland Plateau Science Fair

held at

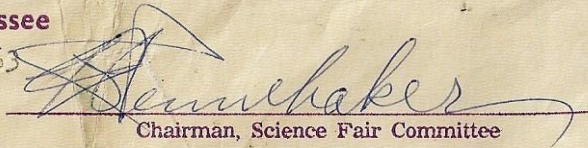
# Tennessee Polytechnic Institute

Cookeville, Tennessee

March 30, 1963



Secretary, Science Fair Committee



Chairman, Science Fair Committee

# My Corn Ethanol Career Highlights

- 19 years experience in bioenergy

- A. E. Staley
- Delta-T Corp.
- CVEC



- Policy - RFA Chairman 2004-2006
- Marketing – RPMG and E85
- Innovative leader – efficient expansions, corn oil extraction, industrial and specialty alcohols and biomass gasification

# Bioenergy Act II – Frontline BioEnergy

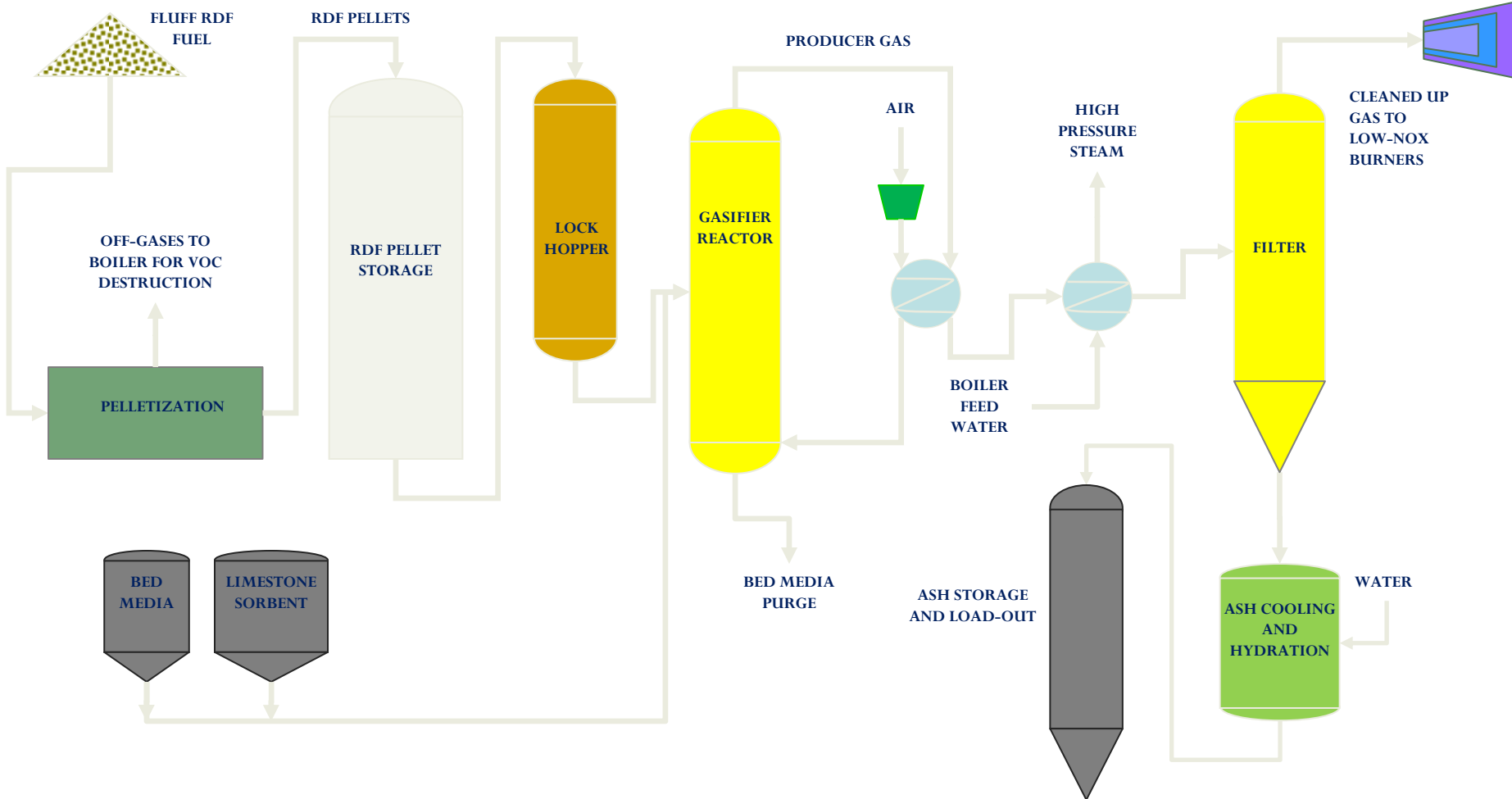
- Gasification technology and project development firm founded - 2005
- Office, labs and pilot gasifier located in Ames, Iowa
- 75 tpd commercial gasifier located at CVEC
- Technology: scalable, fuel flexible BFB gasification with advanced gas cleaning
- Partners: CVEC and SGC Energia (Fischer Tropsch Biofuels)
- Strategic focus:
  - Biomass to Liquids via thermochemical routes
  - Waste to Energy (Gasification + Combustion Turbine)
  - Biomass Combined Heat and Power
  - Repowering Coal Boilers indirectly via Biomass Gasification



*Capture the energy ⚡ Release the potential*

# Gasification System with Ash Removal

Ultra Low PM, Low Alkali, Low Chloride Gas



Copyright Protected—Use by Permission Only

## What Concerns are Driving Bioenergy ?

- Environmental – Pollution and Health
- Climate Change - GHG reduction
- National Security – Dept. of Defense
- Balance of Trade - \$500 B/yr oil imports
- Economic Development – Jobs!

And, the Success of Corn Ethanol....

# CVEC: Corn Ethanol Success Story



- Located in Benson, MN – population 3,500
- Start-up in 1996 as 15 MM gpy plant
- Now producing 50 MM gpy
- 50 good paying jobs
- Returned over \$75 million in distributions to 1,000 local member cooperative over first 14 years
- One of 204 US ethanol plants in 29 states

# Success factors behind Corn Ethanol

- **Abundant and cheap feedstocks** – corn infrastructure was well developed and MN corn was among the lowest priced in the US
- **Technology** (ethanol process was fairly well defined)
- **Policy** – led by the ag community, leverage political muscle of corn grower lobby at state and federal level. MN and NE were early leaders
- **Risk capital** – farmers were the initial investors

# Backlash: The Consequence of Success



- Starving the World's Poor!
- Worse than Petroleum!
- Indirect Land Use Change!
- Destroying the Rainforests!

Food Manufacturers, Livestock Industry, and some Environmental and Humanitarian Groups have joined with the oil industry in pushing back against the advance of Biofuels Initiatives

# There will be Bioenergy Opportunities for the Upper Cumberland but...



- **Feedstocks** – biomass feedstock systems are still developing and infrastructure is minimal
- **Technology** – many new technologies, most are commercially unproven and some are bogus
- **Policy** – states and feds are struggling with fiscal crises – tough time for new policy incentives
- **Risk Capital** – Did you say RISK! No thanks!

# What are the New Technologies?

- Cellulosic Ethanol
- Biobutanol
- Algae oil
- Green diesel
- Fischer Tropsch diesel and gasoline
- Syngas fermentation
- Plasma Gasification
- Biomass Combustion
- BFB Gasification



- IGCC
- Biogas Power
- Waste to Energy
- Waste to Biofuels
- Biomass to Chemicals
- Sweet Sorghum Ethanol

**A score of DOE Loan Guarantee and Privately-funded demonstration facilities are in construction**

# Bioenergy Assets of the Upper Cumberland

- Land that is under utilized
- Woody biomass infrastructure
- Universities/ORNL
- Motivated Communities and Economic Development groups
- Bioenergy Advocacy groups
- Local and regional developers and technology firms

# How to facilitate Bioenergy - Feedstocks

Developing competitive feedstock systems will be the key to the region's bioenergy future

- Become acquainted with alternatives that best suit the region
- Participate in field trials – Grow some!
- Explore the formation of a biomass feedstock cooperative
- Support and follow the development of feedstock processing and handling systems
- Understand the new biomass Sustainability Metrics

# How to facilitate Bioenergy - Technology

- Attend conferences
- Consult with your resources
- Identify the best types of technologies for your intended application
- Contact and meet with vendors
- Do your due diligence
- Look for actual results and credible third party validations

## How to facilitate Bioenergy - Policy

- Become familiar with existing state and federal bioenergy policies
- Join advocacy groups, e.g. **TREEDC**
- Identify and advocate for specific policies to support your initiatives
- Network and build coalitions of support from like-minded groups and individuals
- Engage the TN Agricultural community in support of TN Bioenergy

# How to facilitate Bioenergy – Risk Capital

- Fully leverage state and federal programs
- Coordinate with state and local economic development groups
- Network with and pitch to local investors
- Engage local and regional lending institutions
- Ask vendors and constructors to invest as well
- Look for opportunities to start small with a credible demonstration scale project to address perceptions of risk

# Bioenergy in the Upper Cumberland

- The concerns driving the bioenergy discussion are not going away
- The challenges facing the development of bioenergy will be solved
- Be patient, this is a good time to do the groundwork to support future projects
- If you identify a viable project, use your resources and work hard to make it happen!