
CREATING
A COMPETITIVE
ADVANTAGE
FOR ETHANOL
PRODUCTION
Growing the Bioeconomy
Iowa State University
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ALLIANT ENERGY
Interstate Power and Light
AE&E - Von Roll
FCStone
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Presentation Agenda

- Ethanol Industry at a Glance
- Energy Facts
- Natural Gas Price Outlook
- The Market Today
- An Energy Solution: Fluidized Bed Reactor
- Patented Technology Application
- Case Study: Corn Plus
- A Unique Partnership
- Other Energy-Efficiency Improvements
- Questions

Ethanol Industry at a Glance

- Currently 131[1] ethanol plants are operating in the United States
- An additional 83[1] facilities are in the construction or expansion stage
- Most not designed to optimize energy efficiency
- Many plant operators are focusing on reducing cost of production as margins fall

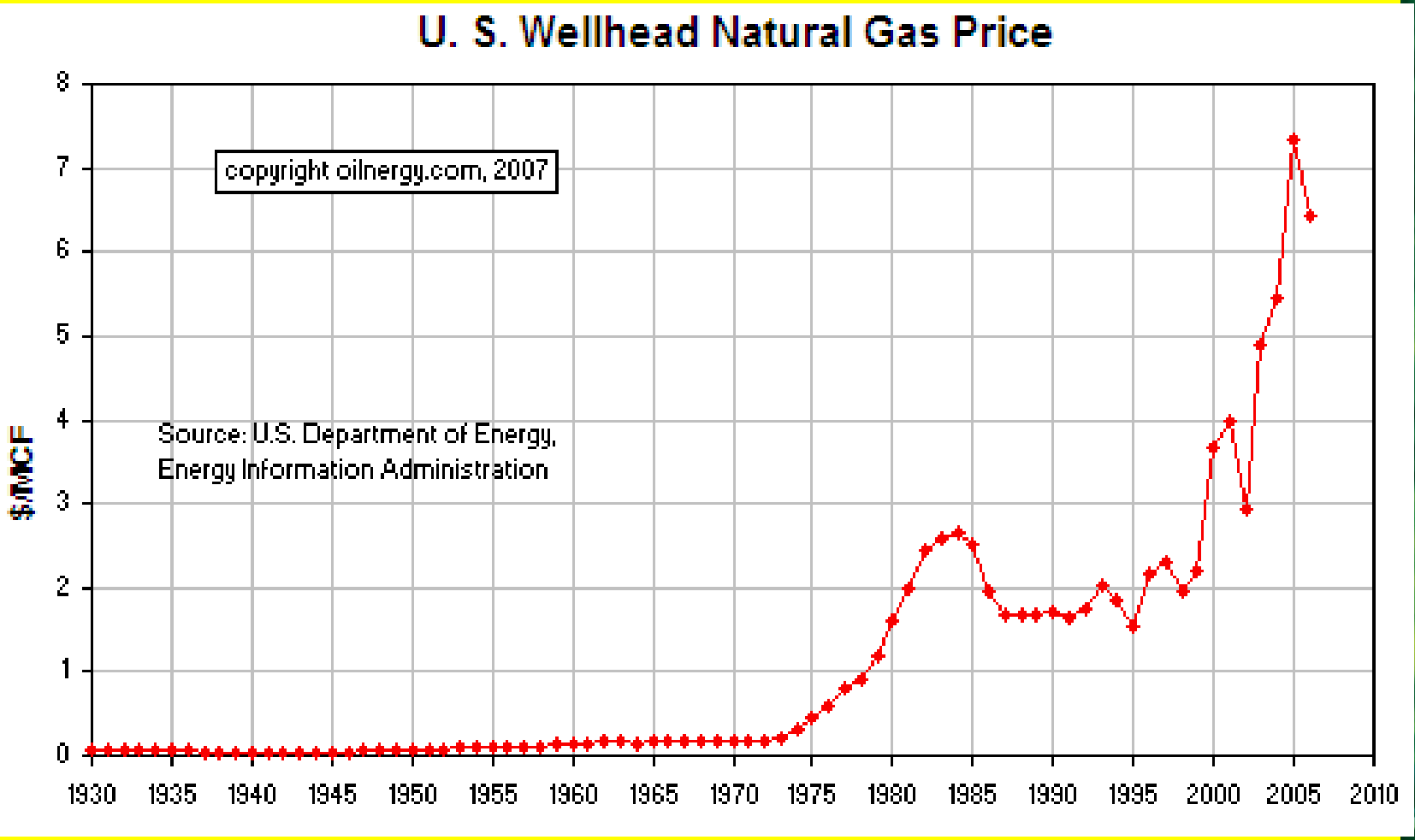
Note 1: From www.ethanolrfa.org

Energy Facts

- Energy costs for a a typical 50M gallon per year ethanol plant represent ~ 20% of the plants total annual operating costs
- For every gallon of ethanol produced, 29 cents is spent on natural gas and 4 cents is spent on electricity

Source: Biofuels Journal – May/June 2007 Edition

Natural Gas Price Outlook



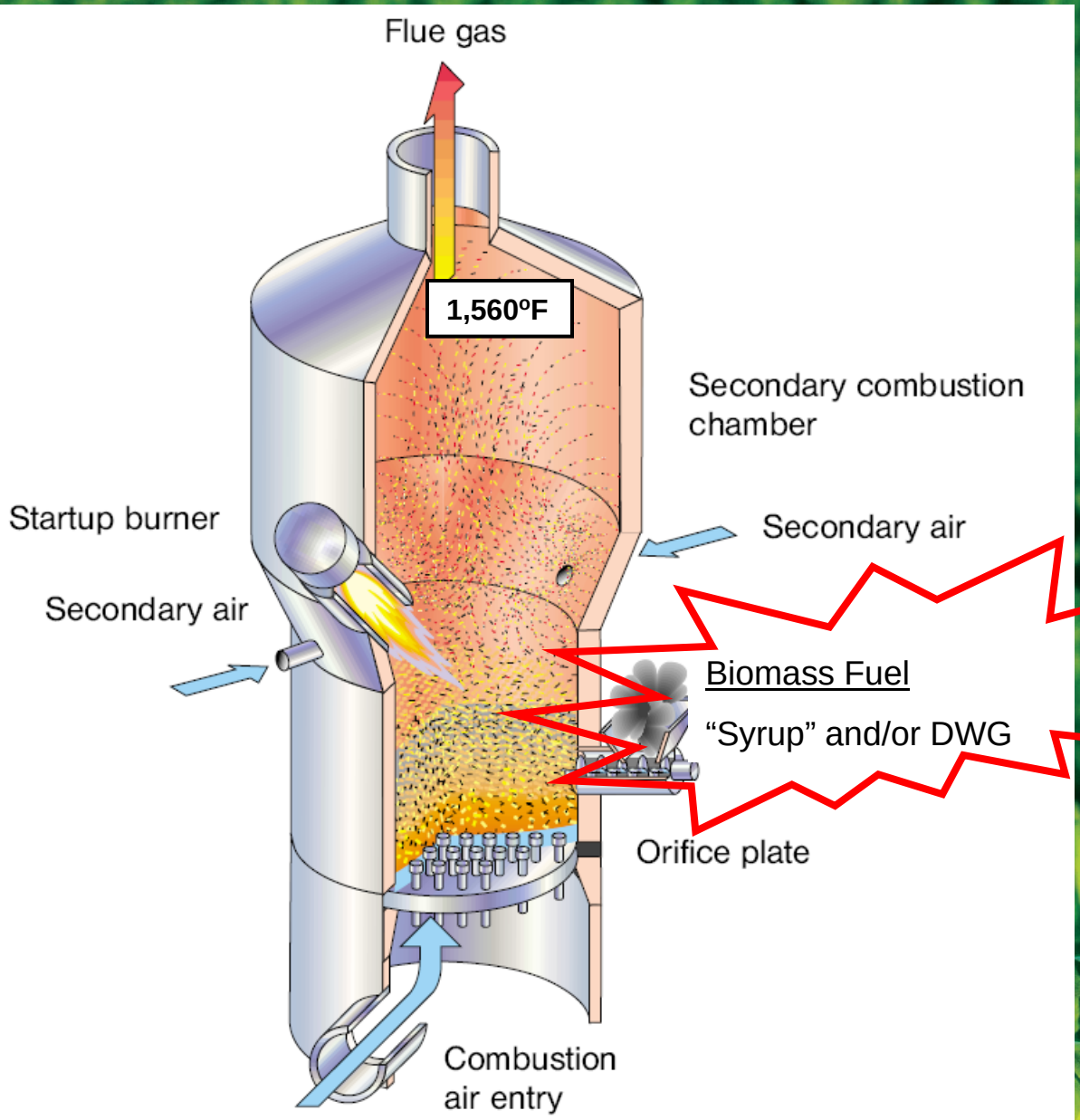
The Market Today

- Ethanol supply will exceed demand
  - *Ethanol plant margins will be negatively impacted*
- Predict a period of industry consolidation
  - *Some companies have canceled construction/expansion of plants*
- Pressure on existing plants to reduce costs, operate more efficiently
  - *Fluidized Bed Reactor option viewed as an attractive energy solution*

A Patented Process

- Three companies are co-owners of a patented process to combust ethanol plant byproducts in a fluidized bed reactor to reduce natural gas costs
  - Alliant Energy
  - AE&E - VonRoll
  - Harris Contracting Companies
- Patent #: 7,263,934
- Application of this process can significantly reduce the energy costs of an ethanol plant

The Heart Of The System: AE&E/VonRoll Copeland Reactor



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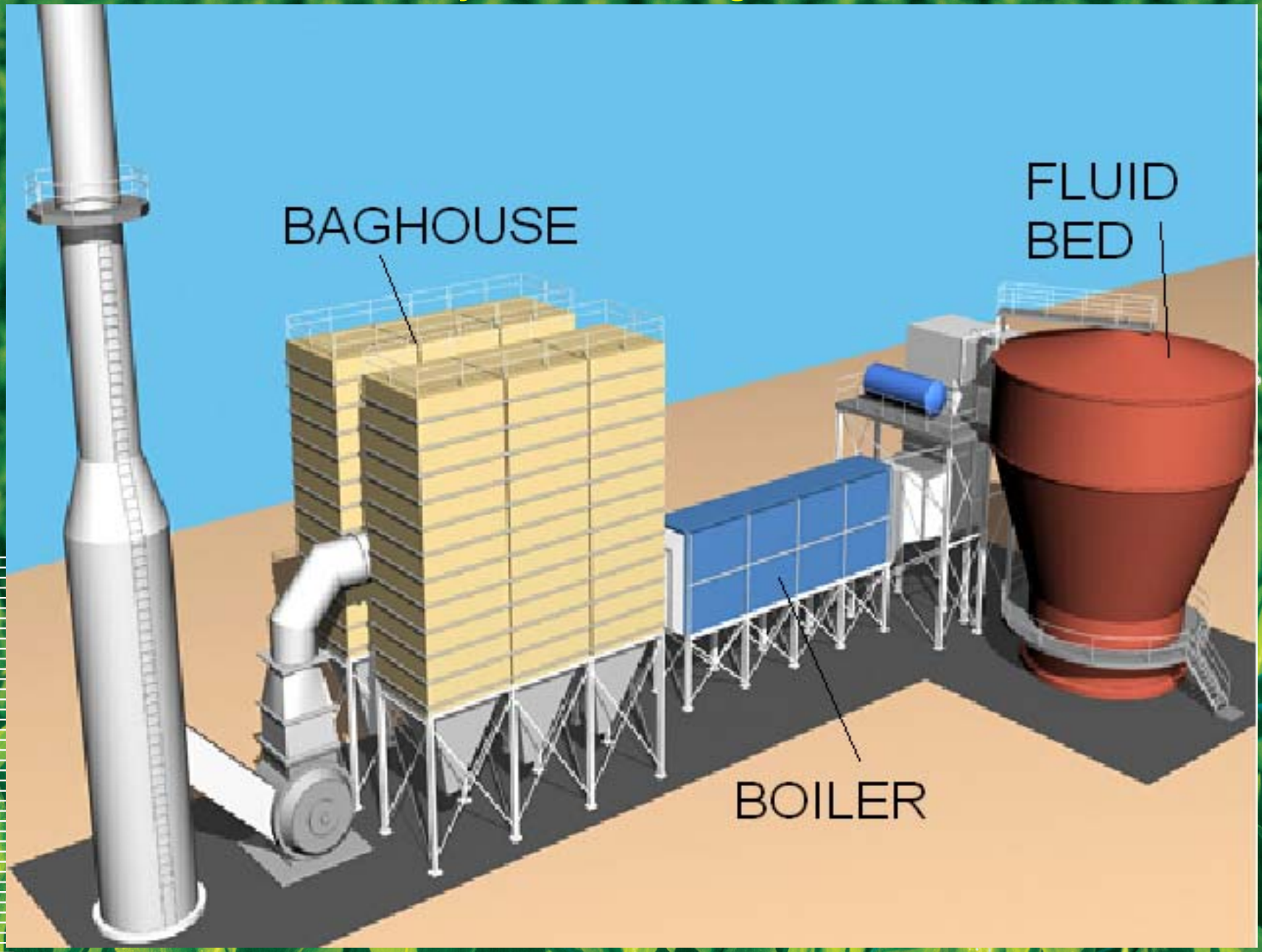
Basic System Configuration



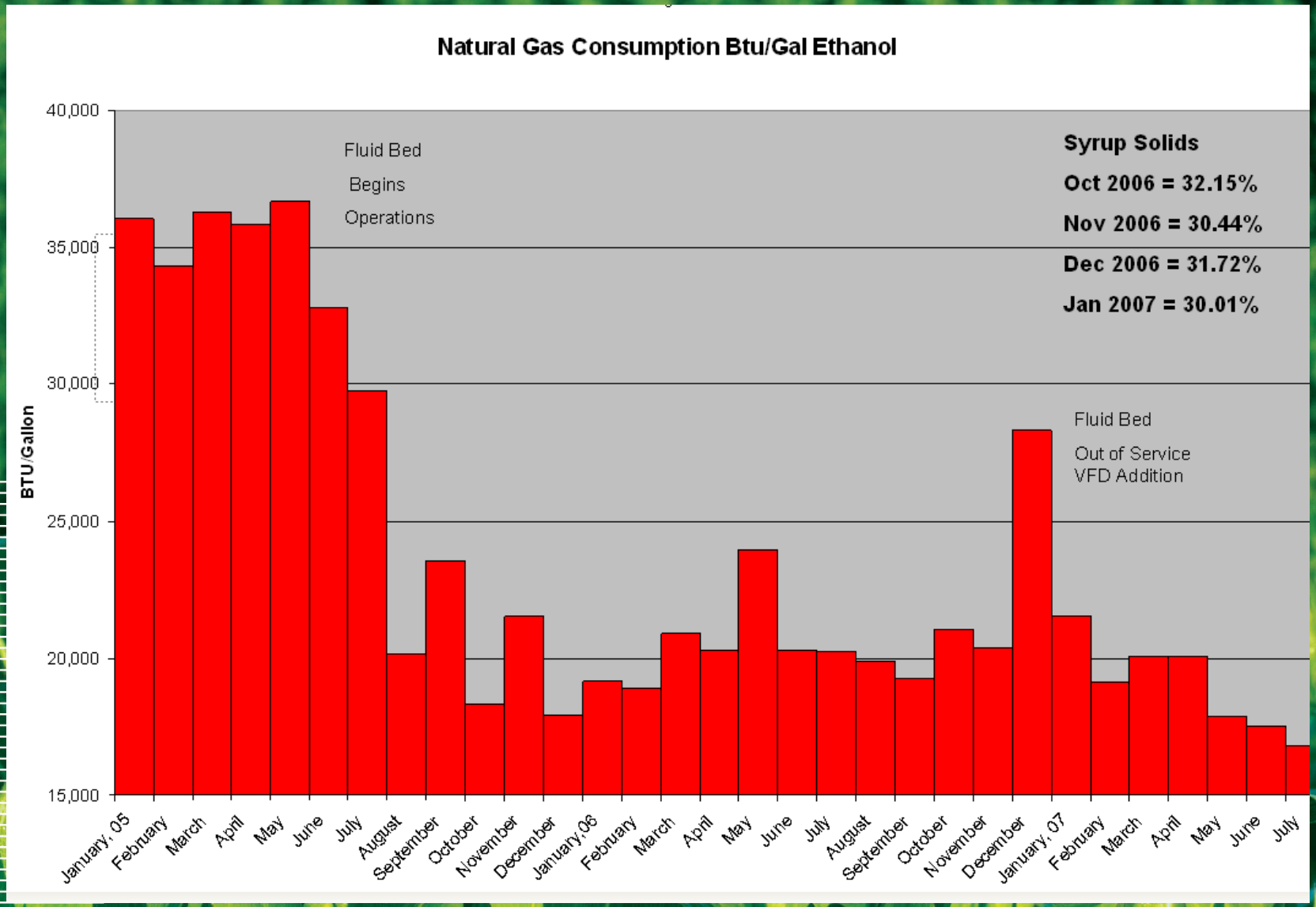
Fluidized Bed Reactor: Benefits to Ethanol Producers

- Improved energy balance - an alternative to producing ethanol using traditional energy sources such as natural gas
- Clean, efficient disposal of waste materials
- Capital and operating costs with a favorable return on investment
- Production of energy from renewables
- Recovery of usable by-products
- Emissions well below limits
- Safe, reliable, and proven operation

Case Study: Corn Plus (Winnebago, MN)

- One of the largest and oldest ethanol plants in Minnesota
- Produces 46 million gallons of ethanol annually
- FBR installed in 2003 – 1st ethanol plant in U.S. to use FBR technology with plant byproducts as a fuel source
- Uses syrup byproduct as fuel to generate 100,000 pounds of steam per hour to run the plant
- FBR satisfies about 95% to 100% of the plant's need for process steam
- Reduced natural gas usage by 52%

Corn Plus Energy Savings



A Unique Partnership

- **The partners:** Alliant Energy, AE&E/Von Roll, Harris Companies and FCStone Carbon
- Together, we provide a **suite of services** for ethanol plants that want to reduce fuel costs and harmful emissions without investing capital dollars

Fluidized Bed Reactor Technology and Equipment, Engineering and Installation

+

Marketing, Sales, Energy Audits and Analyses, Other Energy Solution Products and Services

+

Financing Options, Commodity Risk Management, Carbon Credits

=

LOW COST ETHANOL PRODUCER

Energy Efficiency Improvement Opportunities

Plant Lighting

- Is the plant's lighting system the most efficient?
- Can the lighting system be retrofitted with a control system to minimize lighting levels in unoccupied areas?

Energy Efficiency Improvement Opportunities

Compressed Air Systems

- Highest cost utility system in any industrial facility
- Identify and repair compressed air leaks (on avg. 20% of all compressed air is wasted via leaks)
- Minimize the number of compressors operating at any given time
- Minimize system pressure
- Confirm system controls are operating properly
- Consider commissioning a compressed air system audit

Energy Efficiency Improvement Opportunities

Steam Systems

- Retrofit boiler systems with feed water economizers
- Update boiler controls
- Implement a steam trap testing/inspection program performed at least annually

Energy Efficiency Improvement Opportunities

Steam Distribution Systems

- Confirm the piping and equipment systems are adequately insulated – consider the liberal use of customer-made, removable insulation blanket systems
- Consider commissioning an insulation audit

Other Energy Efficiency Improvement Opportunities

Other Opportunities

- Uncover heat recovery opportunities
- Identify opportunities for the application of new technologies
- Maximize the use of variable frequency drive systems
- Reduce overall water consumption
- Perform feasibility studies for combined heat and power applications (and other unique energy solutions)


Questions
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