Winston Salem
Southern Legislative Conference 2009
Experience North Carolina's Piedmont

Range Fuels is the Leader in Biofuels Is Real and "Now" And is Focused on the South

Range Fuels is the Leader in Biofuels, Is Real and "Now" and Focused on the South

- Company background
- Industry background
- Strategic advantages
- Technology development
- Development plans
  - Near-term commercial Soperton Plant
  - Longer-term strategy / rollout

Company Background

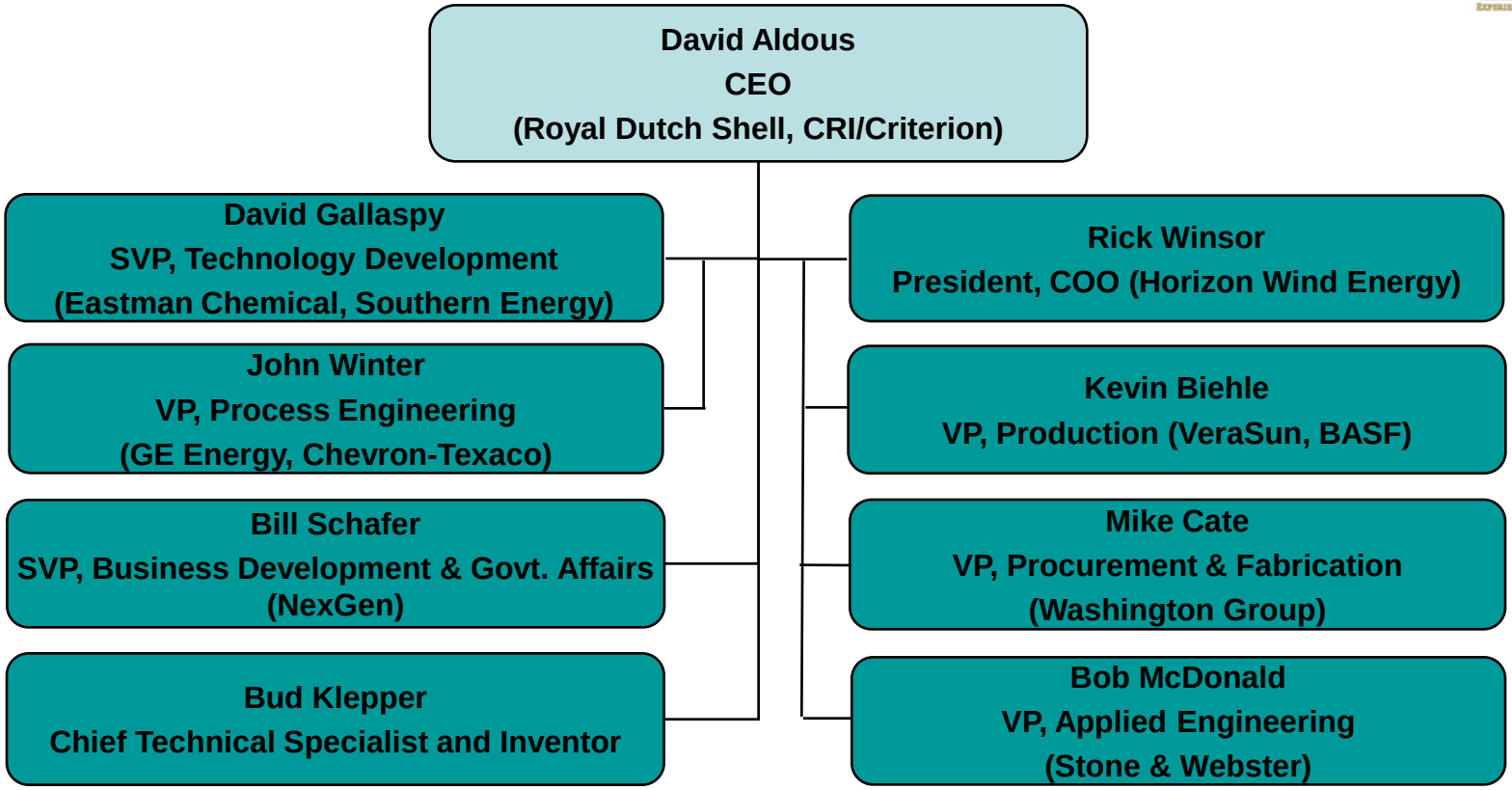
- Cellulosic biofuels founded by Khosla Ventures
- Over eight-years bench and pilot-scale plant operating experience
  - Over 25,000 hours on pilot-scale facilities
- World's first commercial cellulosic biofuels plant
- First phase of commercial plant fully financed
- Additional sites and partnerships secured

Range Fuels' Vision

Three E's

- ***ENERGY*** independence
- ***ENVIRONMENTAL*** benefits
- ***ECONOMIC*** benefits

Diverse, Experienced Management Team



- **~100 employees**

Strategic Advantages

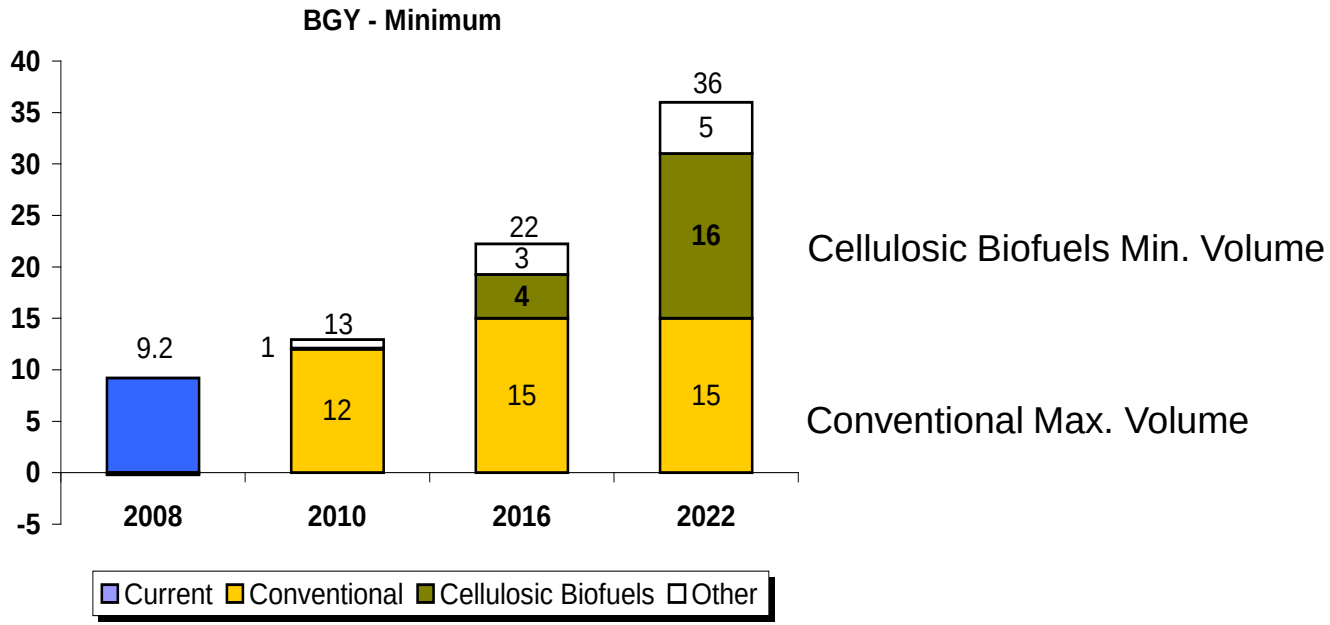
- Superior differentiated technology
- Feedstock flexibility
- Feedstock advantage of woody biomass and dependable procurement
- Highly scalable business model with replicable plant modules
- Environmentally friendly production process
- Experienced management team and strategic investors and partners

Range Fuels' Strategy

- First to market
  - First commercial cellulosic ethanol
  - Capture best plant locations
  - Rapidly expand production capacity
- Premier producer
  - Operational excellence
  - World-class project management
  - Focus on technology advancements
    - Improve yields and efficiencies
    - Competitive capital costs
- Pursue continuous improvement

Industry Background - Increasing Biofuels Demand

- 2007 U.S. Energy Bill signed into law
  - 36 BGY “renewable fuels” mandated by 2022
    - Includes 21 BGY “advanced biofuels,” 16 BGY from “cellulosic biofuels”



Source: Renewable Fuels Association

Increasing Biofuels Support

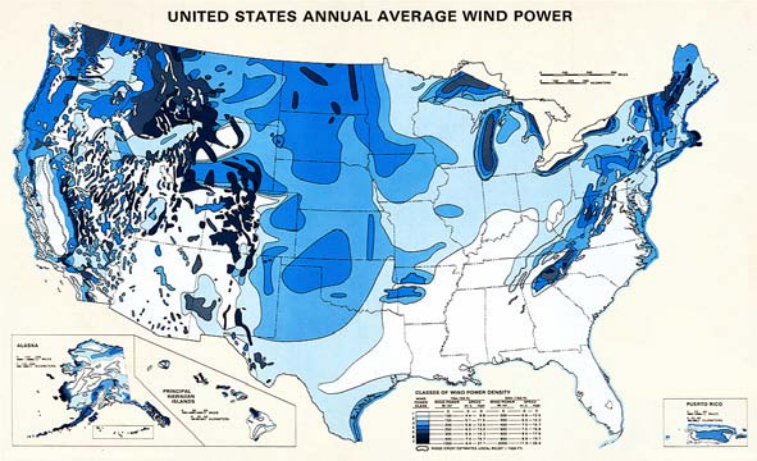
- 2005 Energy Policy Act Title XVII
  - Established aggressive support for renewables
- 2007 Energy and Independence Security Act
  - RFS with emphasis on growth in cellulosic biofuels
- 2008 U.S. Farm Bill
  - Programs targeted to all facets along the biofuels supply chain
    - Growers
    - Harvesters
    - Transporters
    - Producers

Limitations of Current Technology

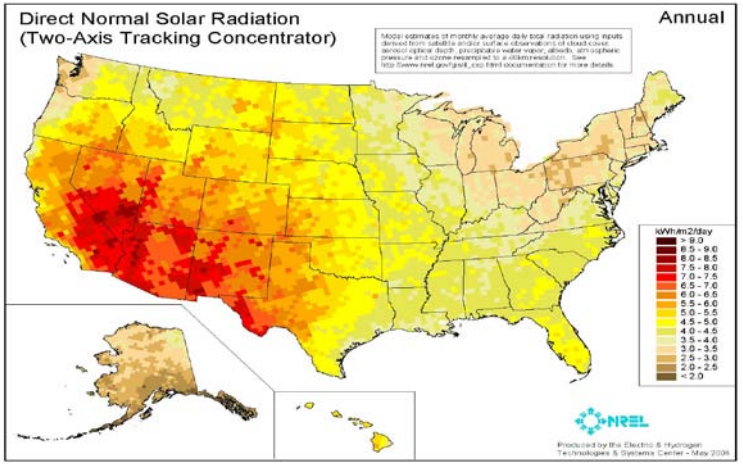
- Current production technologies use corn or sugarcane
  - Limited max. capacity (U.S. corn 15 BGY); high cost
  - Import tax of $0.54/gallon for Brazilian ethanol
- Food versus fuel
  - Low land efficiency for fuel production
  - Sharp increase in feedstock prices
  - Depleting water tables
  - Wide price fluctuations due to weather
  - Resistance from grocery and livestock industries
- Lower fossil energy ratio
  - Corn at 1:1.4
  - Sugarcane at 1:8
  - Cellulosic ethanol at 1:10

The Southeast's Advantage is Biomass

Wind-Power

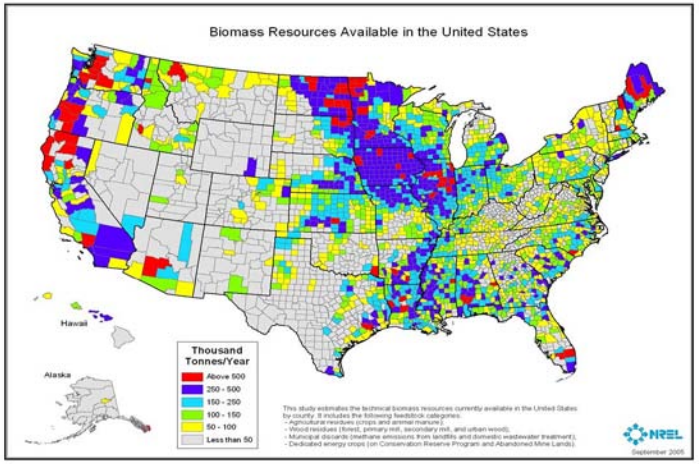


Solar



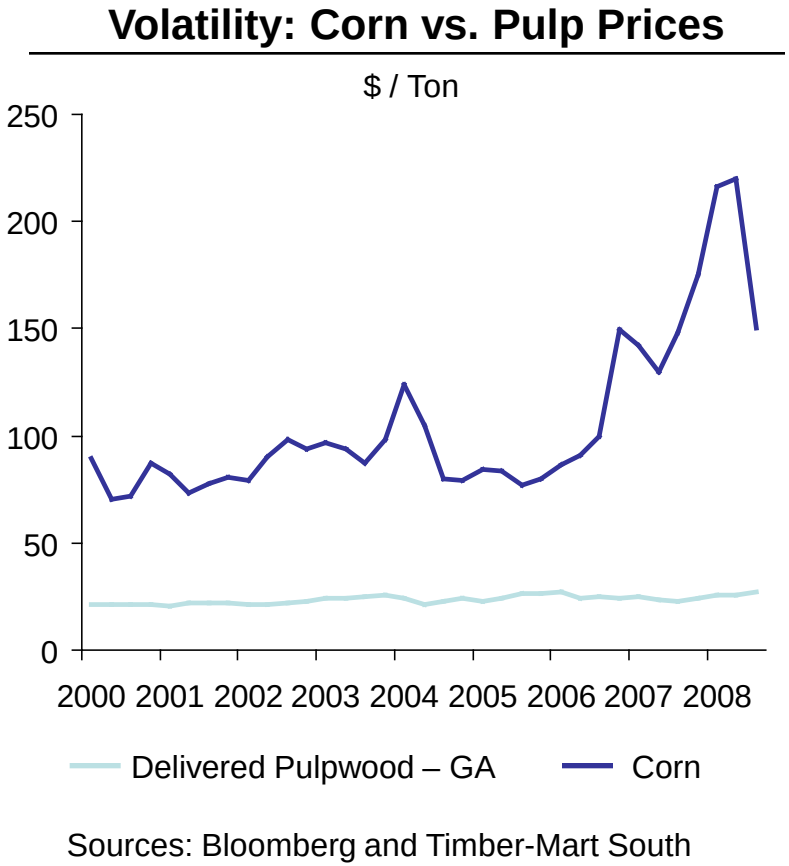
Biomass

- The Southeast also has the existing infrastructure to supply biomass – similar to farming in the Midwest



Strategic Advantages

- Cheaper, less volatile feedstock
- Flexible “high volume” feedstock supply
  - — Wood chips
  - — Municipal waste
  - — Industrial waste
  - — Manure
  - — Switchgrass
  - — Corn stover
  - — Olive pits
  - — Coal
- Environmentally friendly

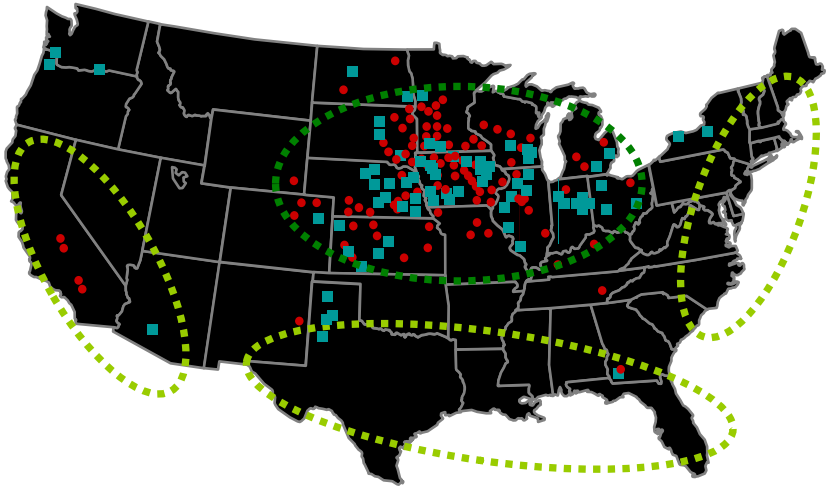


Sources: Bloomberg and Timber-Mart South

Stable Pricing, Large Availability Using Woody Biomass

- Over 650 MM tons of “low cost” woody biomass available annually
- High land efficiency for cellulosic crops; low water and fertilizer inputs
- Cellulosic availability fits demand; fewer transportation issues
- Less competition for feedstock as paper mills decline

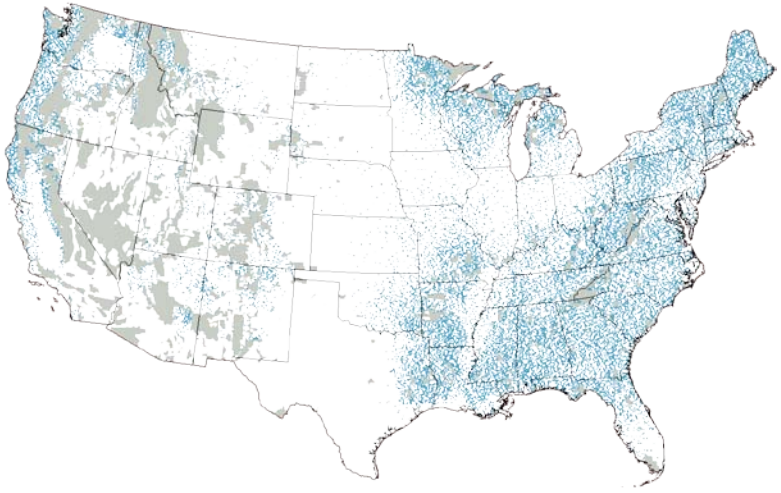
U.S. Ethanol Biorefinery Locations



- Biorefineries in Production
- Biorefineries under Construction
- Corn-Ethanol Production
- Major Gasoline Consumption

Source: Renewable Fuels Association

Non-Federal Forest Land Density, 1997

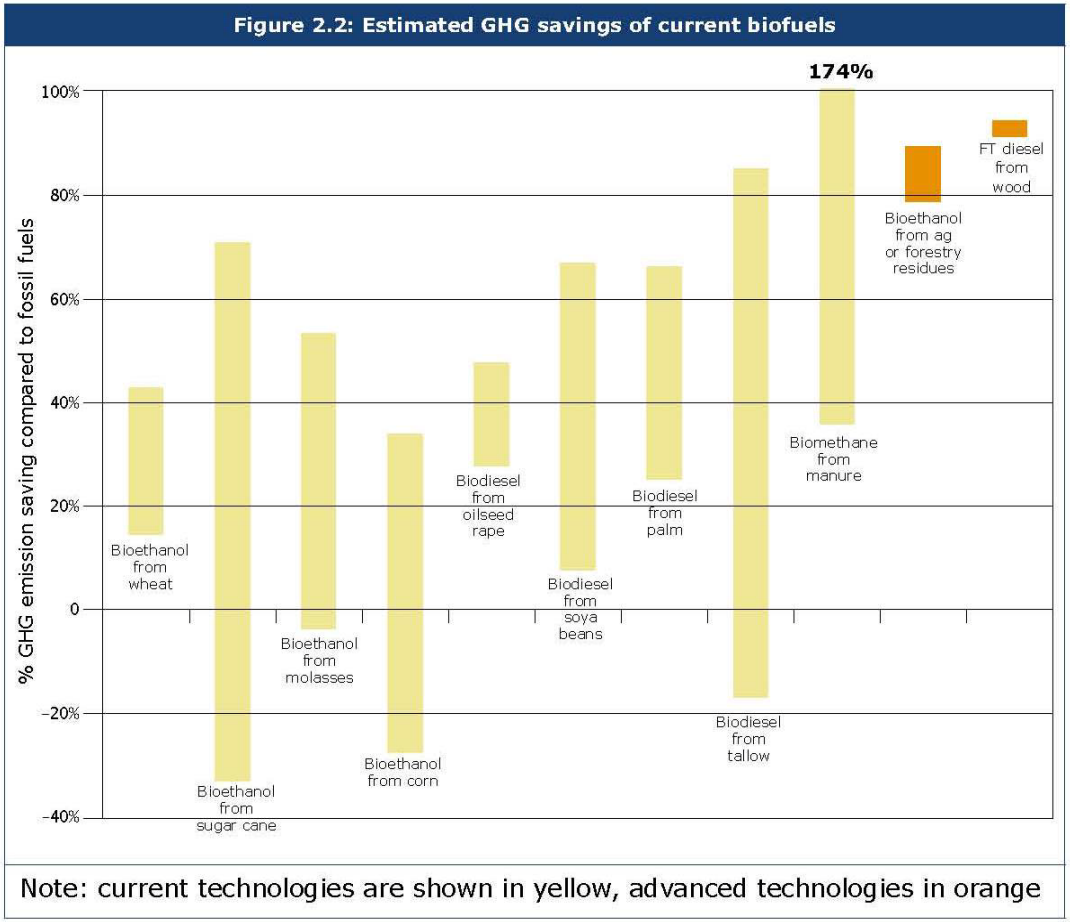


- 25,000 acres of Forest Land per dot
- 95% or more Federal area

Source: U.S. Department of Agriculture

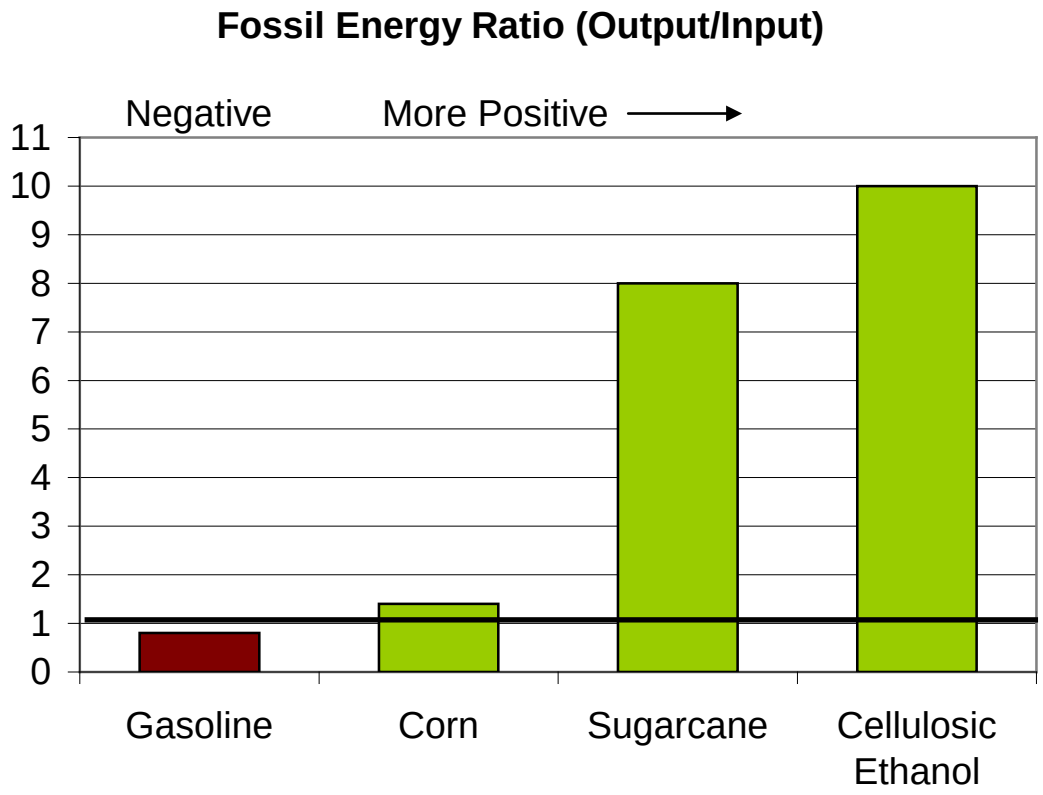
Environmentally Friendly Production Process

- Significant GHG savings



Source: Renewable Fuels Agency, The Gallagher Review of the effect of the indirect effects of biofuels production, July 2008

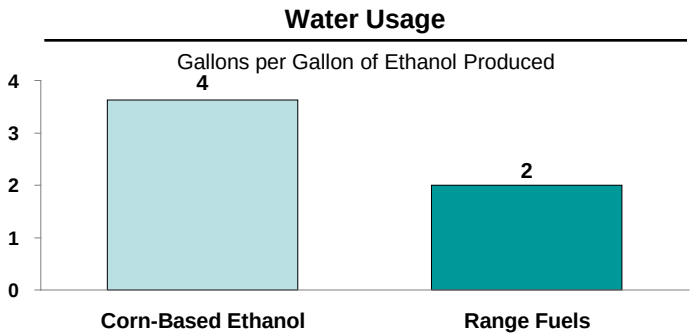
Environmentally Friendly Production Process

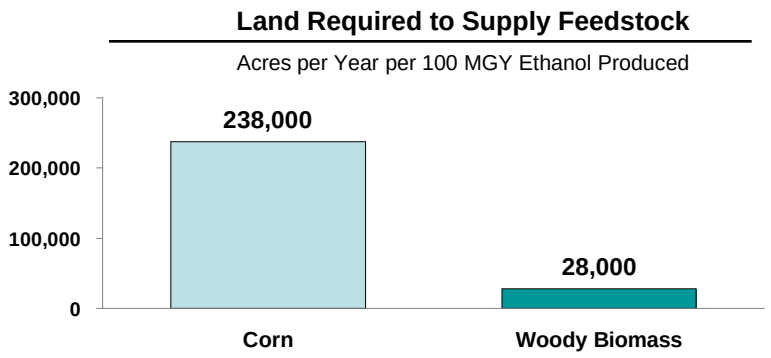


Sources: Argonne National Laboratory, "Energy and Greenhouse Gas Emissions Impacts of Fuel Ethanol" Presentation, August 23, 2005, and the Brazilian Reference Center on Biomass, "Brazilian Sugarcane Ethanol: Lessons Learned" Presentation, December 2005.

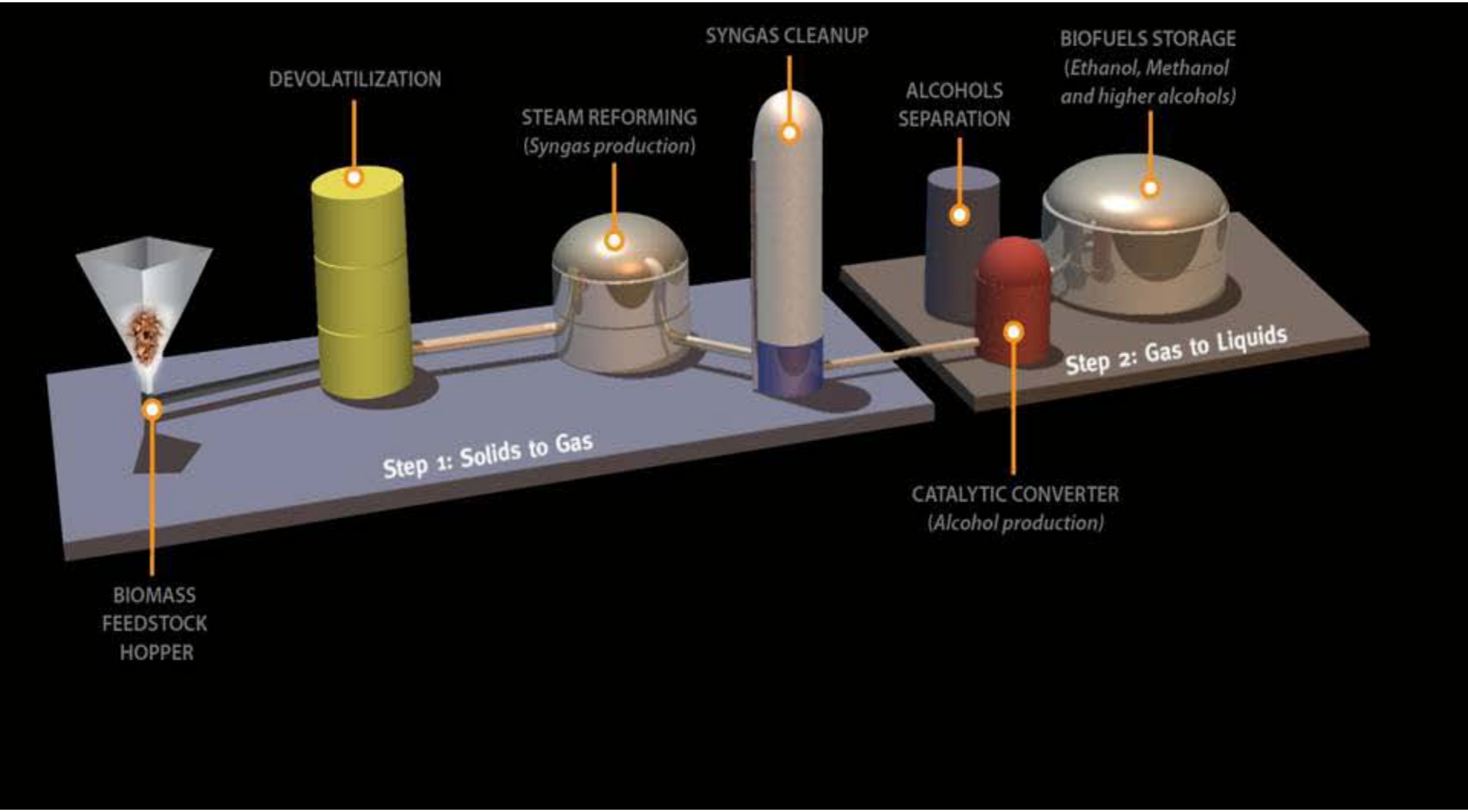
Environmentally Friendly Production Process

- Thermally self-sustaining process
  - Excess process heat is recycled
  - Minimal outside thermal energy use
- Soperton: minor emissions source permit
  - Minimal and manageable by-products
- Water use competitive with advanced corn ethanol plants
  - Reduces purification costs and impact
- Material land use benefits
  - Polyculture “compatible”
  - Better yields, biodiversity, low impacts and inputs
  - Uses non-food feedstock





Technology Development - Process Description



Technology vs. Competition

	Range Fuels	Bio-Chemical Processes
Feedstock Cost	Ability to utilize lowest-cost feedstock	Locked in to initial feedstock
Feedstock Flexibility	Can vary by type, size, mix, moisture content; polyculture compatible	Enzymes feedstock-tailored; non-trivial to switch feedstock
Yield (gallons/ton)	Ability to process entirety of biomass	Challenged by ability to process only a portion of biomass
Water Usage	Competitive with advanced corn ethanol plants	Dilute solutions for fermentation increase total water usage
External Dependency	Low	Dependent on supplier enzyme costs; High energy costs
Product Options	Multiple syngas derivatives	Limited by enzymes

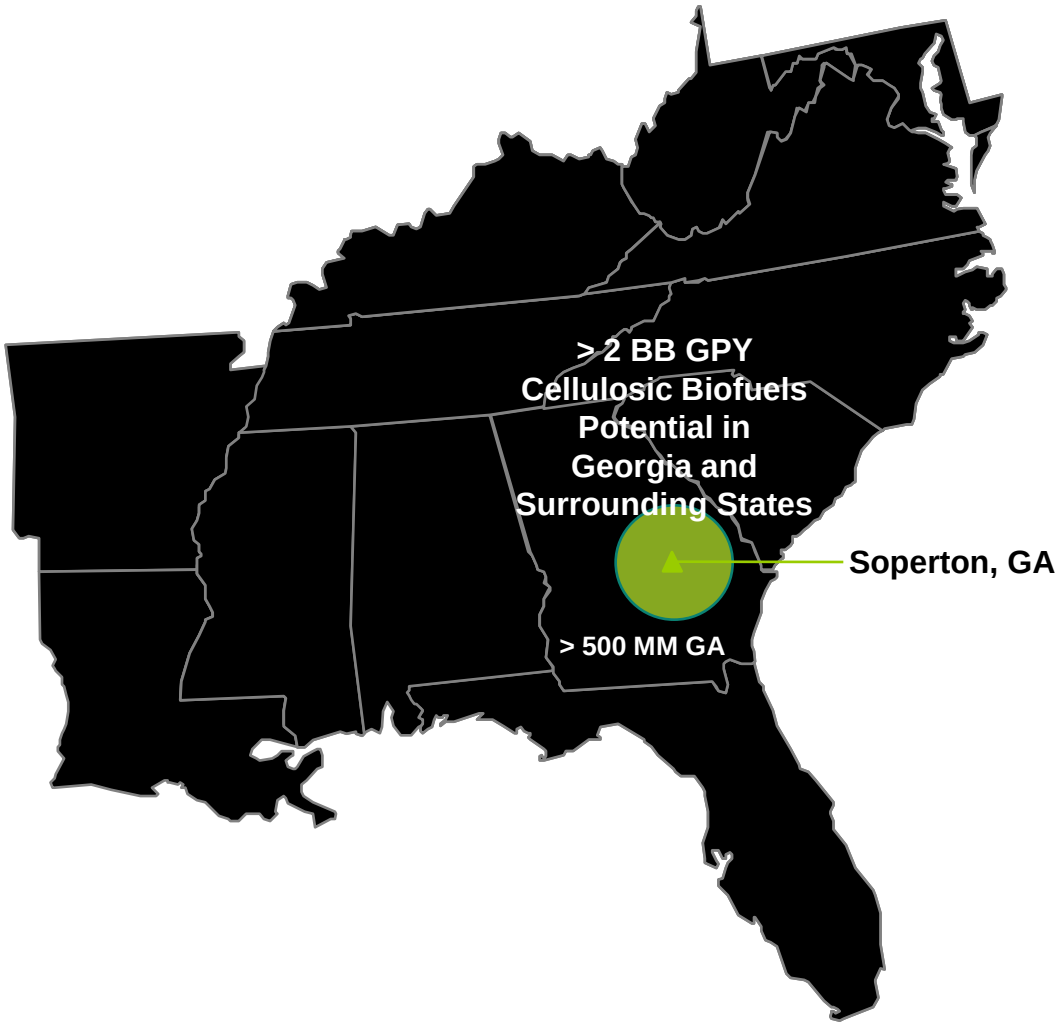
Technology Development

- 4 generations of biomass conversion testing
- Pilot-scale
  - K2A Optimization Plant
    - Consistent ethanol production across all systems
    - ~ 5,500 hours on wood feedstock
    - > 2,200 hours alcohol production
- Catalyst Systems
  - CC10s (2)
  - CC100
  - ~ 30,400 test hours
  - CC400
  - CC1000

K2A Optimization Plant

CC1000 Catalyst Reactor

Development Plans



Soperton Plant Development and Status

- Phased Construction
  - Phase I < 10MM GPY
  - Full build-out permitted to 100MM GPY
- Status
  - Phase 1 construction completion scheduled Q1 2010
  - Phase 1 operation scheduled Q2 2010
  - On schedule

Soperton Plant Status

Corporate Strategy / Rollout

- Rapid replication and scale – balanced approach
  - Cost reduction
  - Speed
  - Quality
- Optimum use of standardization and modularity
  - Lower costs through replication, design standardization
  - Modularity where advantageous, scale economies where industry standard
- Team with proven partners
  - AMEC
  - Merrick
  - Emerson
  - Price Biostock
  - TransMontaigne