

## **C2 Biofuels, LLC**

### *“Licensing Cellulosic Ethanol Technologies”*

Georgia Environmental Conference  
Savannah

August 22-23, 2007



Presentation Overview:

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- The Problem
- Why Cellulosic Ethanol Now?
- Process Description
- C2 Biofuels Company Overview

## The Problem

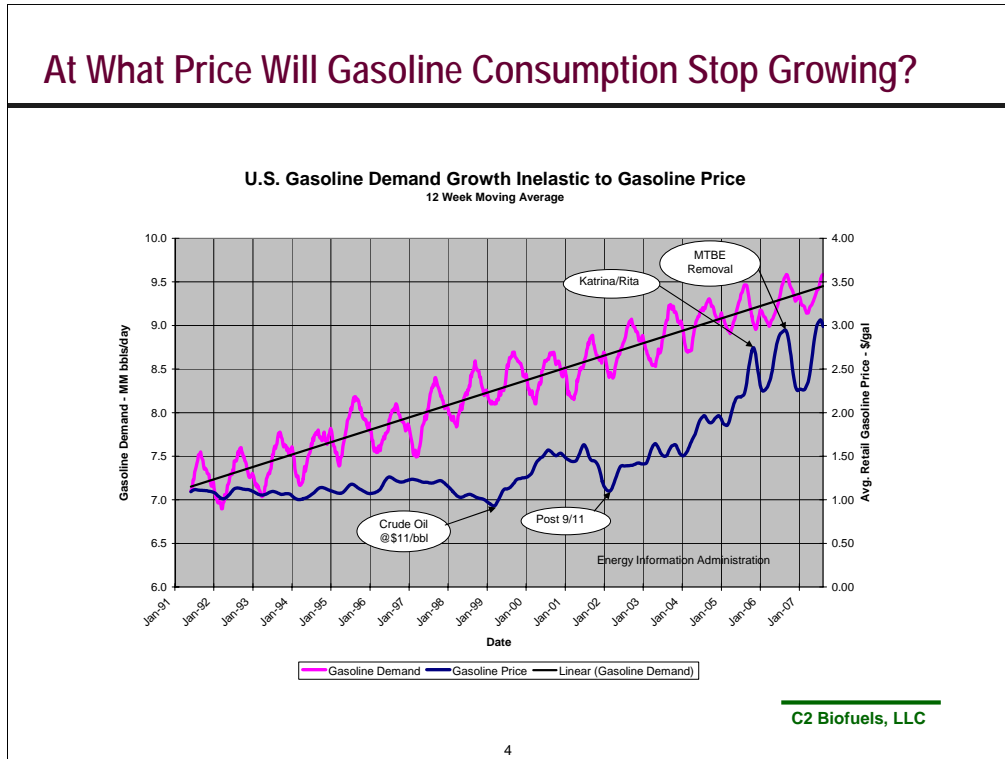
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- Increasing U.S. Dependence on Petroleum
- Gasoline Prices on the Rise
- Rising Greenhouse Gases from Fossil Fuels
- Undesirable Consequences of Petrodollars
- An Unsustainable Path*

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## At What Price Will Gasoline Consumption Stop Growing?



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Not so fast!

The pink oscillating curve shows a trend of increasing gasoline consumption from 1991 to present

The low point in each cycle is the first week in January, the high point is Labor Day

It's notable that the last five year period where gasoline prices have increased from just over a dollar per gallon to \$3 per gallon, there with no apparent change in consumption growth.

In fact, this year, our growth rate is actually slightly above the trend line.

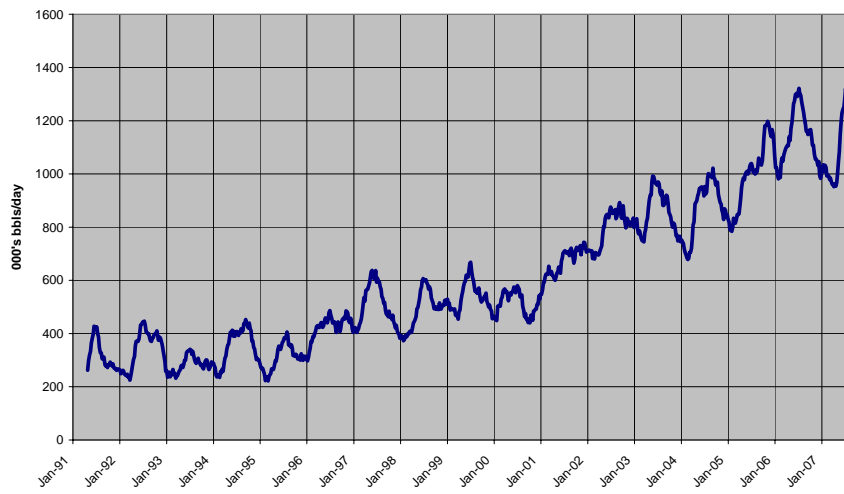
The growth rate seems a modest 1.6% per year which equals about a medium size refinery worth of growth each year.

Unfortunately, we're out of domestic refinery capacity, so we're importing the incremental quantities.

So, at what price will gasoline consumption stop rising? I don't know, but it's higher than \$3/gal.

## Gasoline Imports Are Rising – Refinery Limits

U.S. Gasoline Imports  
12 Week Rolling Avg



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## Why Cellulosic Ethanol Now?

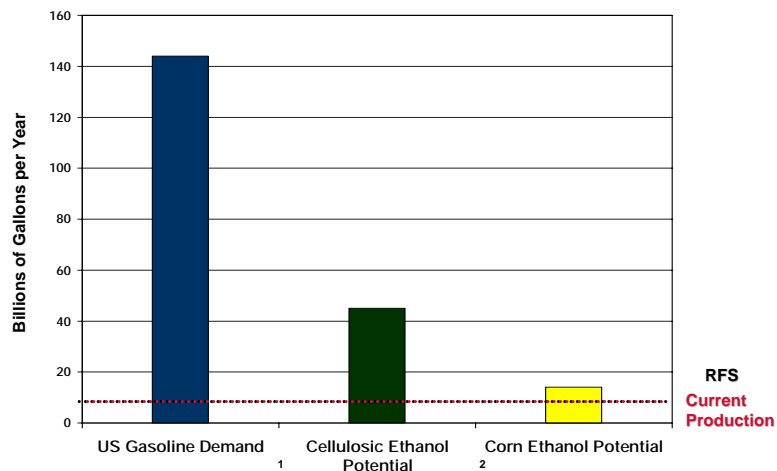
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- ❑ Rules of Have Changed
  - Crude Oil above \$40/bbl
  - Advances in Biocatalysts
  - Availability of Georgia's Forestry Resource
- ❑ High Impact Alternative Transport Fuel
  - Few Other Short to Medium Term Options
  - Relatively Minor Infrastructure Changes
- ❑ Multiple Supporting Drivers
  - National Security
  - Environmental Stewardship
  - Positive Economic Impact

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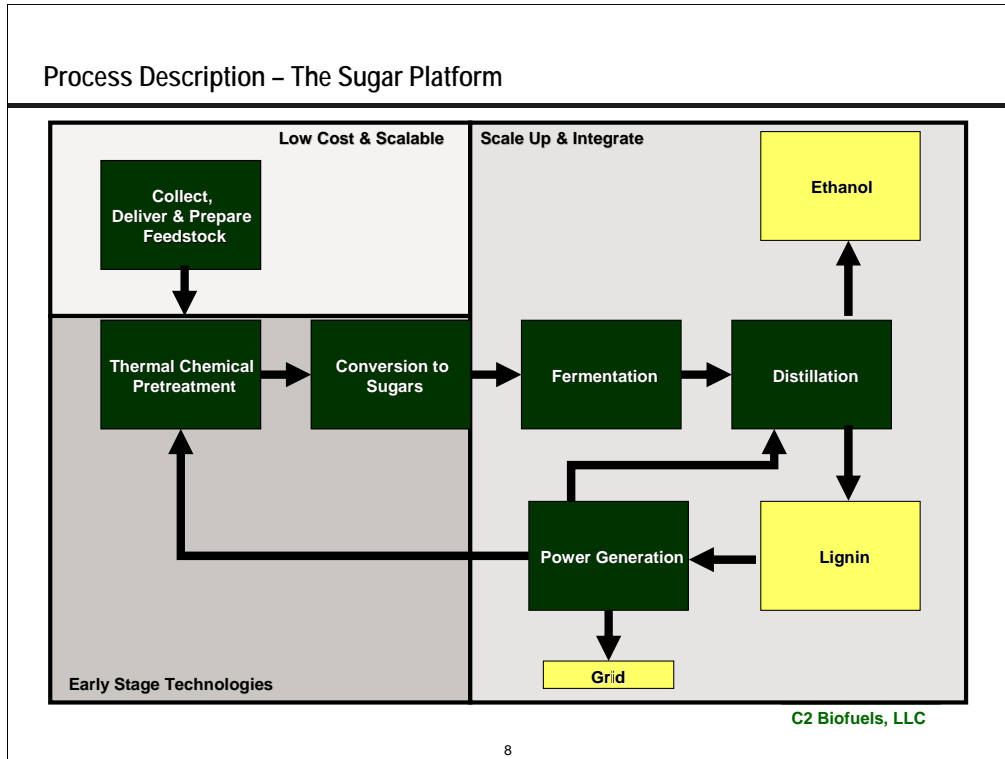
## Cellulosic Ethanol is Scalable



<sup>1</sup> Source: Energy Information Administration

<sup>2</sup> Source: Biomass as Feedstock for a Bioenergy and Bioproducts Industry: The Technical Feasibility of a Billion-Ton Annual Supply April 2005

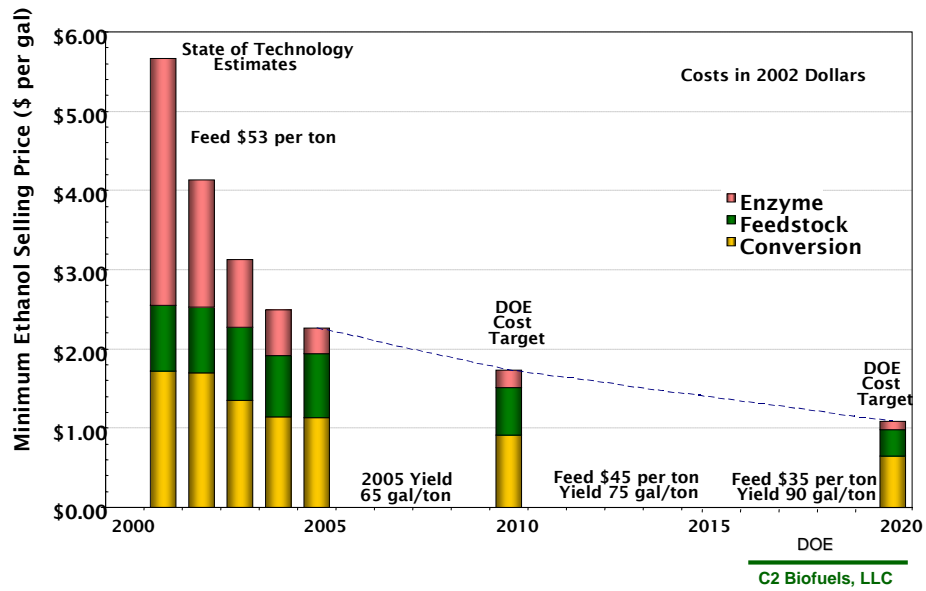
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Process Optimization (Environmental Control and Simple)

Tree Composition to specific pretreatment options

## NREL's Estimated Cost History and Targets



## Commercialization

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- Significant Progress
- Scalable Feedstock at Low Cost
- Multiple Technologies
  - Pretreatment
  - Hydrolysis (Enzyme Cost)
  - Fermentation
- Scale-up from Lab to Commercial Size
  - Multiple Steps Required
  - Capital Intensity & Elapsed Time

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## Markets

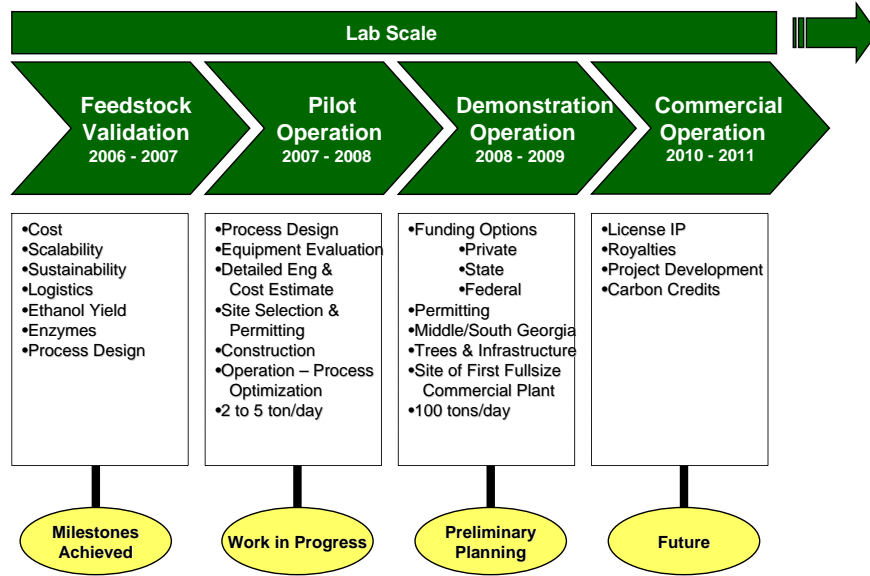
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- Full Production Volumes Consumed in Regional Market with Minor Infrastructure Changes (E10)
- Federal RFS Provides Preference for Cellulosic Ethanol
- State Incentives Promote Ethanol Use
- Long Term Pricing Will Track Wholesale Gasoline
  - Upward trend expected with Substantial Upside
- Carbon Credits on Horizon with Substantial Upside

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Road to Commercialization



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