

# KL Process Design Group

Unleashing Natural Sugars for Tomorrow's Strategic  
Energy Plan



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# Who is KL Process Design Group?

- Randy Kramer, President
- Dave Litzen, Vice President, Engineering

Plant Operations

Engineering

Project Management

Marketing

# KL Process Design Group

Advanced Biofuels Project Development

- Cellulose Based Ethanol
- Grain Based Ethanol and New Construction
- KL Capacity

# Cellulose-Based Ethanol

- The 1.5 MGY demonstration plant is operating today with the commercial technology to roll out in 2008



# Grain-Based Ethanol & New Construction

- Midwest Renewable Energy

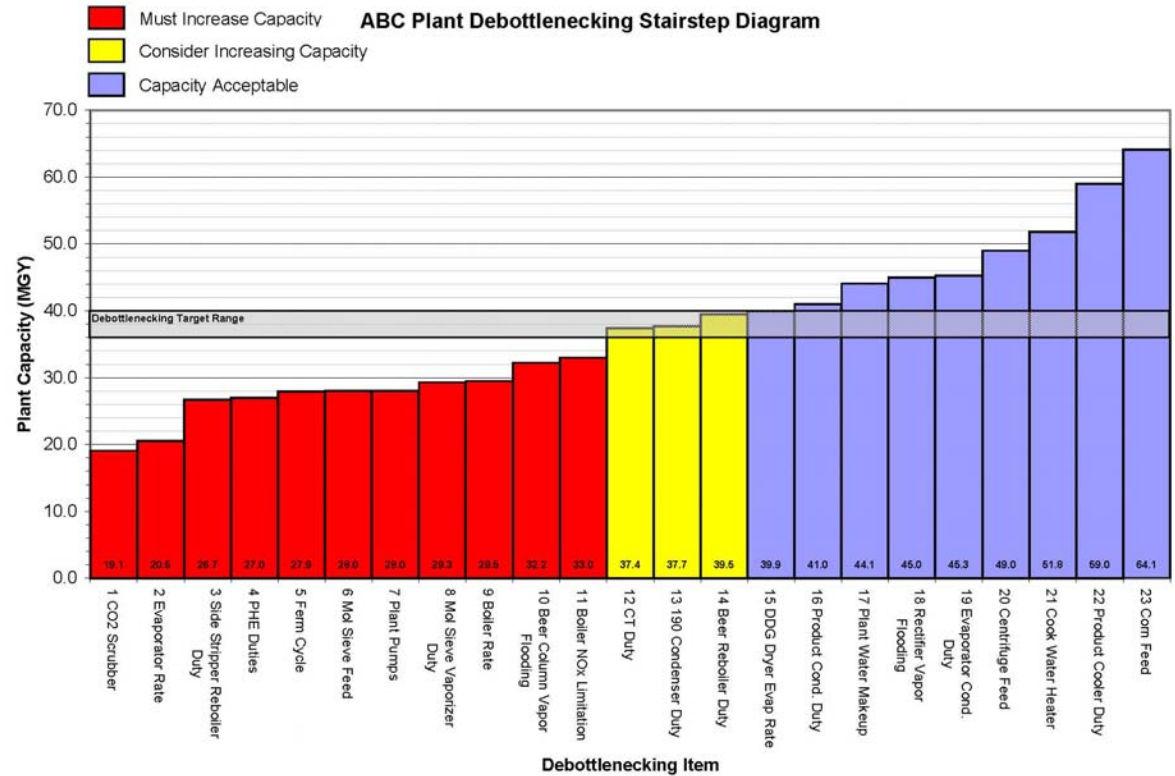


- North Country Ethanol



# KL Capacity

- Capacity
- Energy





27 MGY to 110 MGY Expansion in Sutherland, NE



1.5 MGY Cellulose-Based Ethanol Plant in Upton, WY



25 MGY to 36 MGY Expansion in Rosholt, SD

## Didion

45 MGY KI Capacity Improvement and review in Cambria, WI



20 MGY KL Capacity Improvement and review in Goodland, KS



110 MGY New Construction in Buffalo, NY

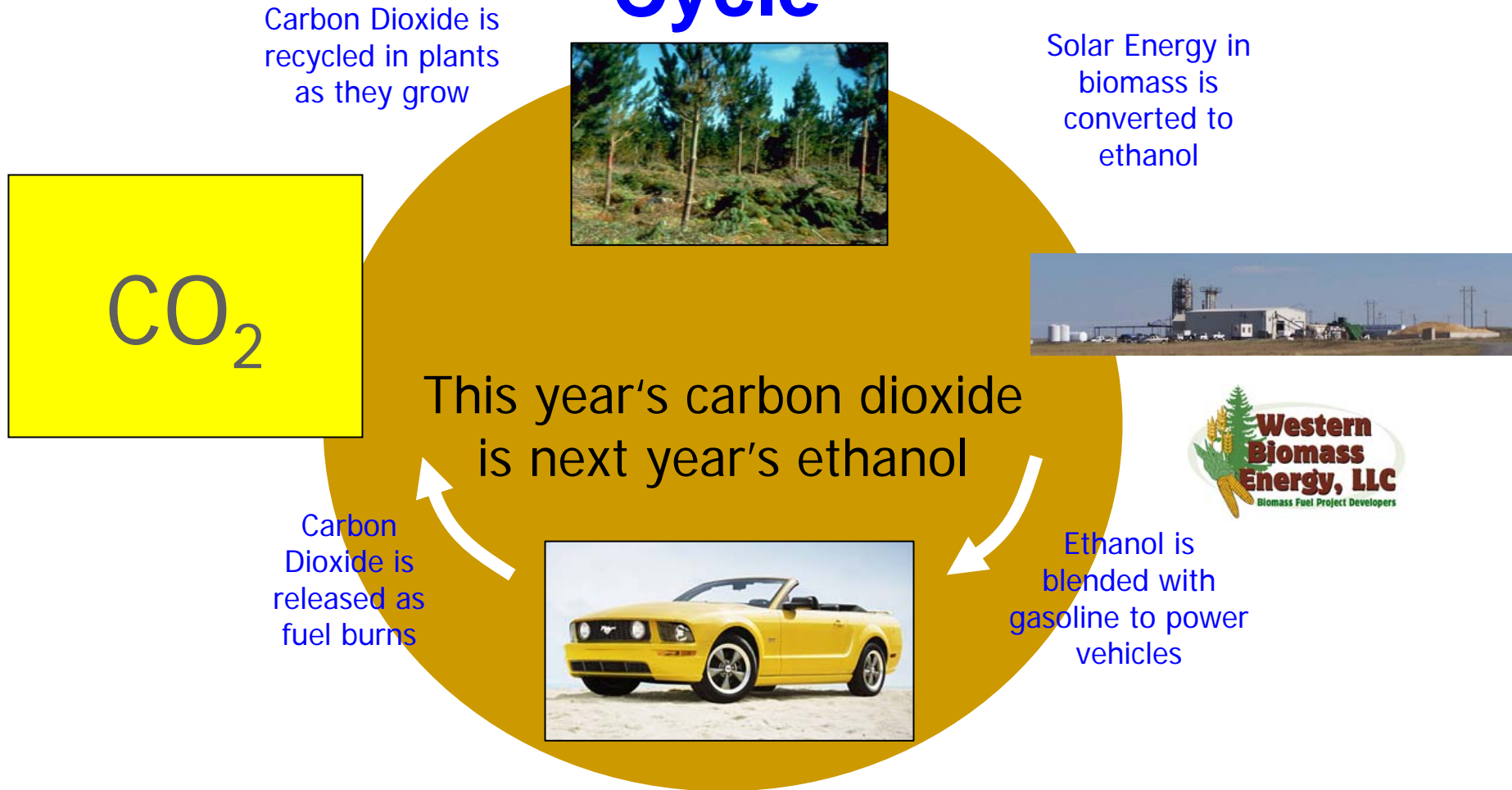


55 MGY New Construction in Ershinek, MN



25 MGY New Construction in Greybull, WY

# Ethanol is today's fuel for working within the Carbon Cycle





# KL Reality

- Western Biomass Energy
  - Operating biomass ethanol plant
  - Paves the path to a process design



# KL Vision

- Subsequent projects are 5MM gal/year
  - ❑ Unit Operation based to keep the footprint small
  - ❑ Co-location to existing wood waste industry
    - Lignin co-product
      - ❑ Burned for steam and/or power generation
      - ❑ Developing uses in polymer industries
  - ❑ Develop biomass infrastructure

Lignin Co-product

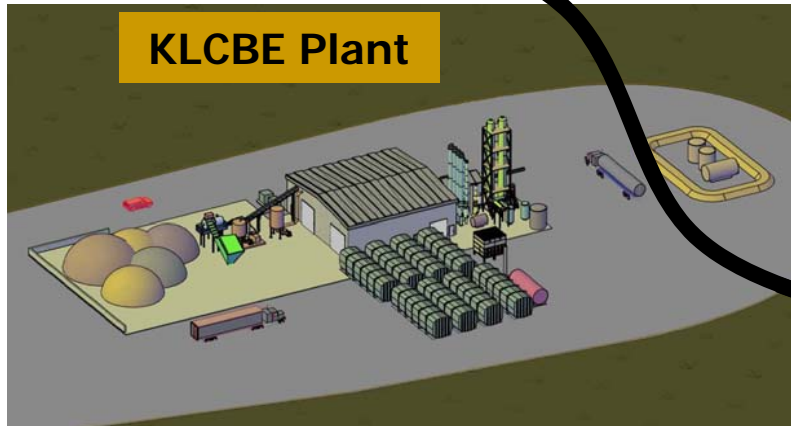


# KL Vision

**Gasoline Terminal**



**KLCBE Plant**



- KLCBE Business Model Principles:
  - Locate near fuel terminal
  - Locate near feedstock supply
  - Splash blend ethanol enroute to fuel outlets (one 5 MMGY KLCBE plant can supply 11 retail outlets)



**Retail Station**



**Retail Station**

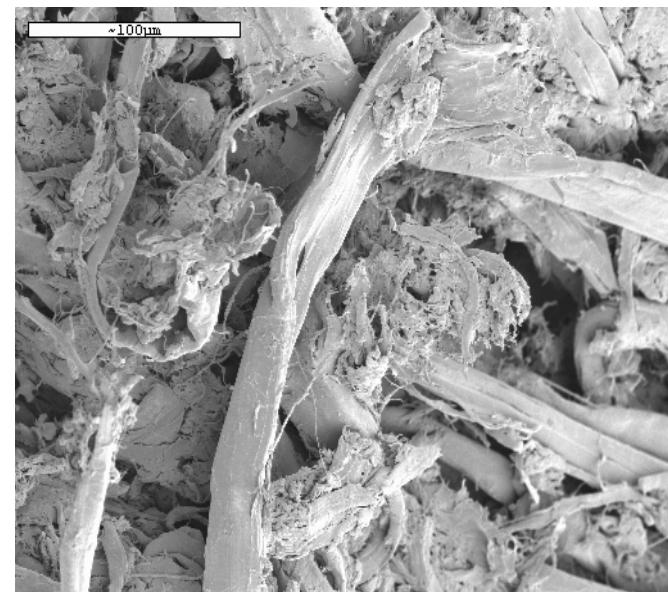
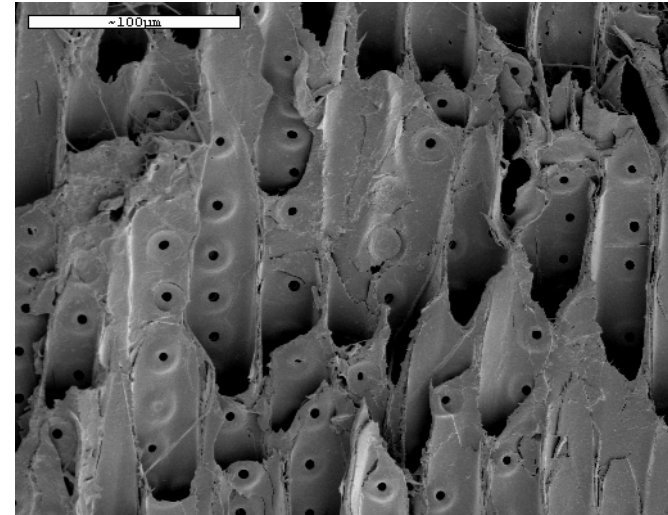


**Retail Station**



# KL Advanced Biomass Conversion

- Thermo-mechanical pretreatment
  - Maximize the exposure of cellulose fibrils to enzymatic attack
- Enzymatic Conversion of cellulose to glucose
  - Partnership with Novozymes USA



# Hurdles to Overcome

- Placement of ethanol generated from National Forest back into Energy Bill
- Continue with process evolution to minimize water and energy use

# Factors for Success

## ■ Cooperation

- ❑ We can create a use for wood that was at one time classified as waste
- ❑ We have to understand the timber industry and how it has worked in the past
- ❑ We are working with industrial partners to get the cellulosic ethanol industry out of the future and into the present



# Contact Information



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