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CLEAN ENERGY SOLUTIONS

Coal to Fischer-Tropsch Liquids

Presented to
NASEO Energy Outlook Conference
February 7, 2006

Outline

- Rentech, Inc.
- What are Fischer-Tropsch (FT) Fuels?
- Producing FT Fuels and Other Products from Coal/Petroleum Coke Gasification
- East Dubuque Fertilizer Plant Conversion to fertilizer + FTD
- Natchez-Adams Strategic Fuels Center
- What's needed to make first CTL plants a reality?

Rentech Inc. – The Vision

Rentech develops projects and technology that transform underutilized hydrocarbon resources (such as coal & pet coke) into valuable alternative fuels and clean chemicals while providing clean energy solutions to meet our Nation's growing energy needs.

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Rentech, Inc.

- Founded 1981 and headquartered in Denver, Colorado
- American Stock Exchange symbol “RTK”
- Past 24 years have developed its form of Fischer-Tropsch Technology with 20 patents and converts synthesis gas to Fischer-Tropsch liquids
- 2005, expanded the vision and are active developers
- Credit Suisse is financial adviser for financing projects

Fischer-Tropsch – 2005

- Hans Fischer and Franz Tropsch discovered the chemistry in 1923
- Germany commercialized the technology in WWII
- Today the future is bright

SASOL
- 160,000 b/d+
- Feedstock - Coal

Petro SA
- 22,500 b/d+
- Feedstock - Natural Gas

Shell
- 15,000 b/d+
- Feedstock - Natural Gas

Sasol Oryx Project
- 34,000 b/d
- Feedstock - Natural Gas
- Online 2006

Fischer-Tropsch is a proven technology to transform underutilized *hydrocarbon resources* into valuable alternative fuels and chemicals.

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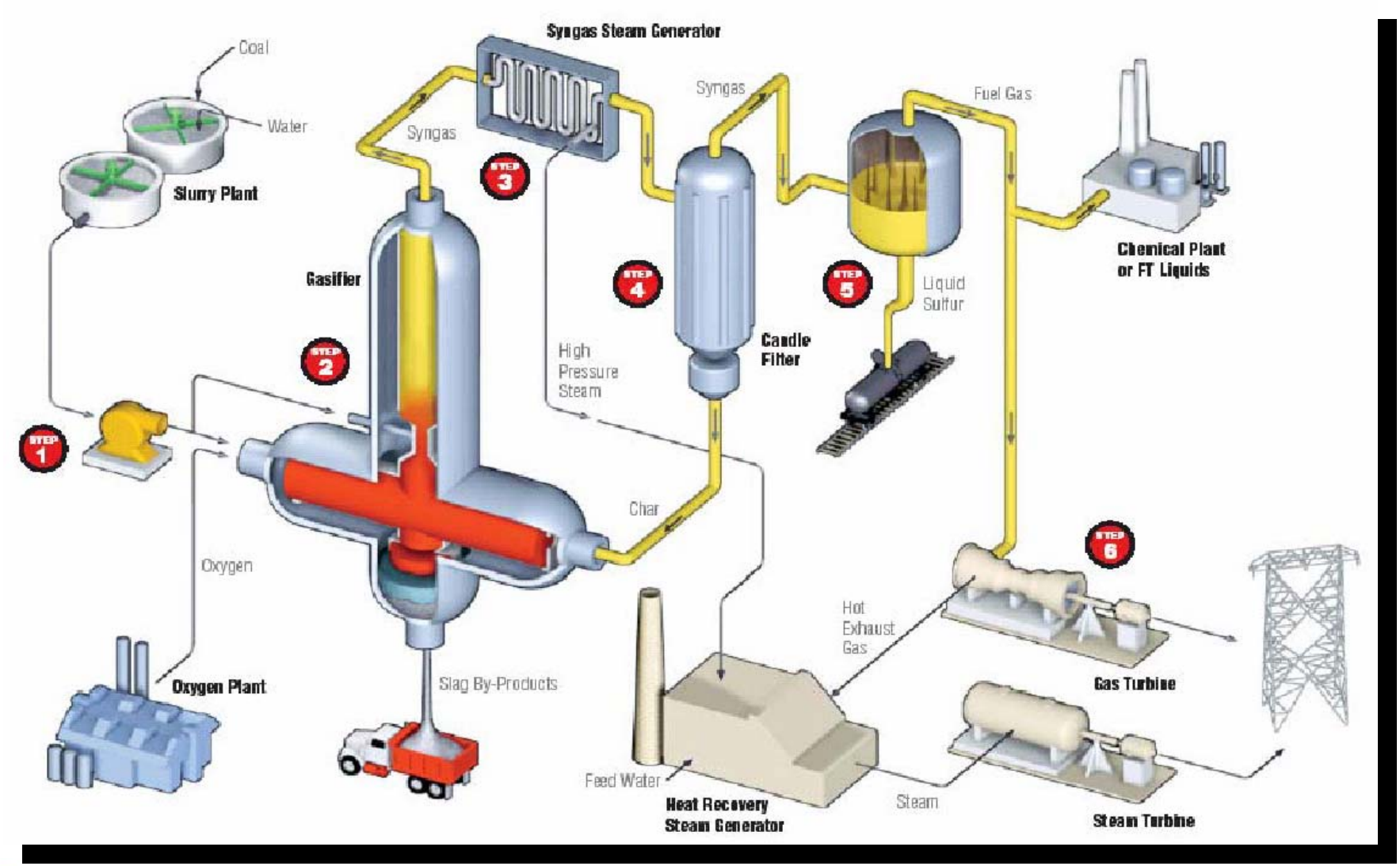
Gasification – The First Step

A Look Inside the Process



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What can you make from coal/pet coke gasification?

Hydrogen + Carbon Monoxide (H_2+CO)

Coal → Coal Gasification → Syngas

Ammonia Fertilizers

Ultra-Clean Transportation Fuels

Electricity (IGCC)

Methanol/DME/Propylene

Synthetic Natural Gas

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Value-Added Choices For Coal

1 Ton of Illinois Coal $30/ton

Combustion

Gasification

Gasification

Gasification

Gasification

Electric Power Production — **$70.00**

Electric Power and Synthetic Natural gas — **$109.00**

FT Fuels and Electric Power — **$124.00**

Poly-Generation

Fertilizer, FT Fuels and Electric Power (Rentech Patent) — **$149.00**

Value

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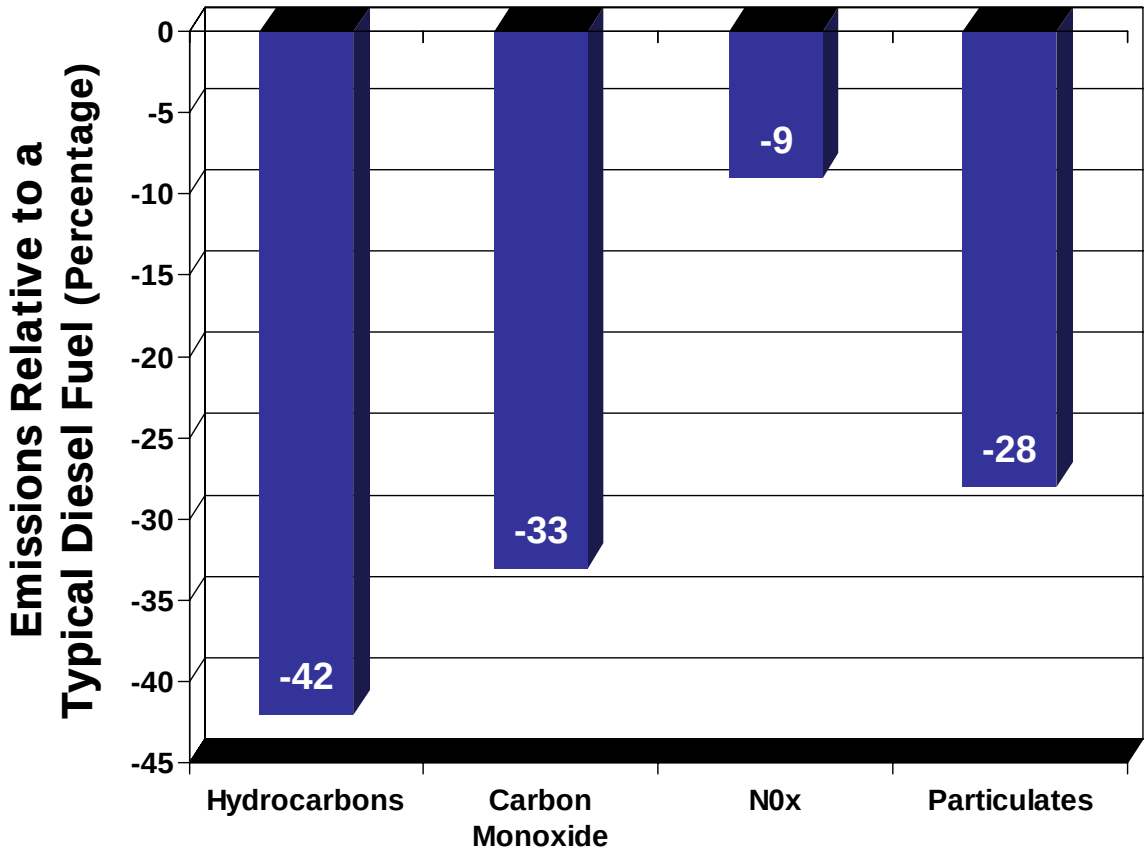
FT Basic Products

Ultra-Clean FT Diesel Fuel

- **Biodegradable**
- **<1ppm sulfur**
- **High cetane**
- **Stable long storage life**



FT Diesel

Conventional Diesel

Source: An average of several government funded studies by NREL & SwRI

Fischer-Tropsch (FT) Drivers

FT Slurry Reactor
Synhytech, 1992

- Large secure resource base available – coal
- No new product delivery infrastructure required
- The fuels meet all new and foreseeable worldwide environmental regulations, long shelf life.
- Direct increase to nation's fuels supply
- Enhances the production of other energy-intensive products such as power and chemicals – ***poly-generation***
- Economically viable in today's market

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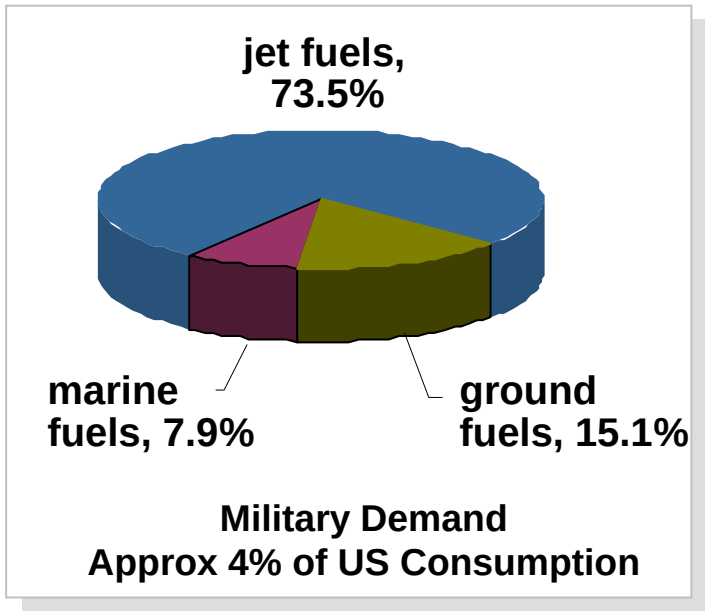
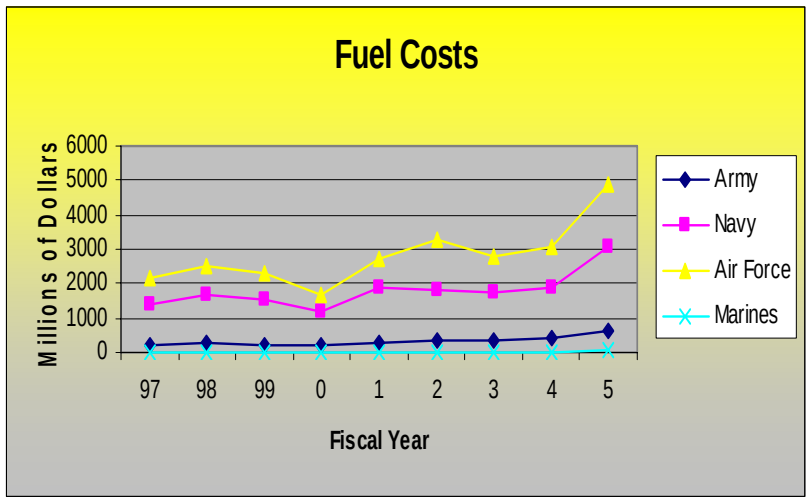
DoD Concerns

- Secure and reliable sources of energy
  - Dependent on foreign oil
  - Becoming dependent on foreign refined fuels
- Supply chain vulnerability
  - Dependent on mega refineries - Gulf Coast
  - Natural disasters or terrorist threats
- Need for cleaner fuels
  - DoD exempt from some EPA regulations



Ref: DESC Help Book



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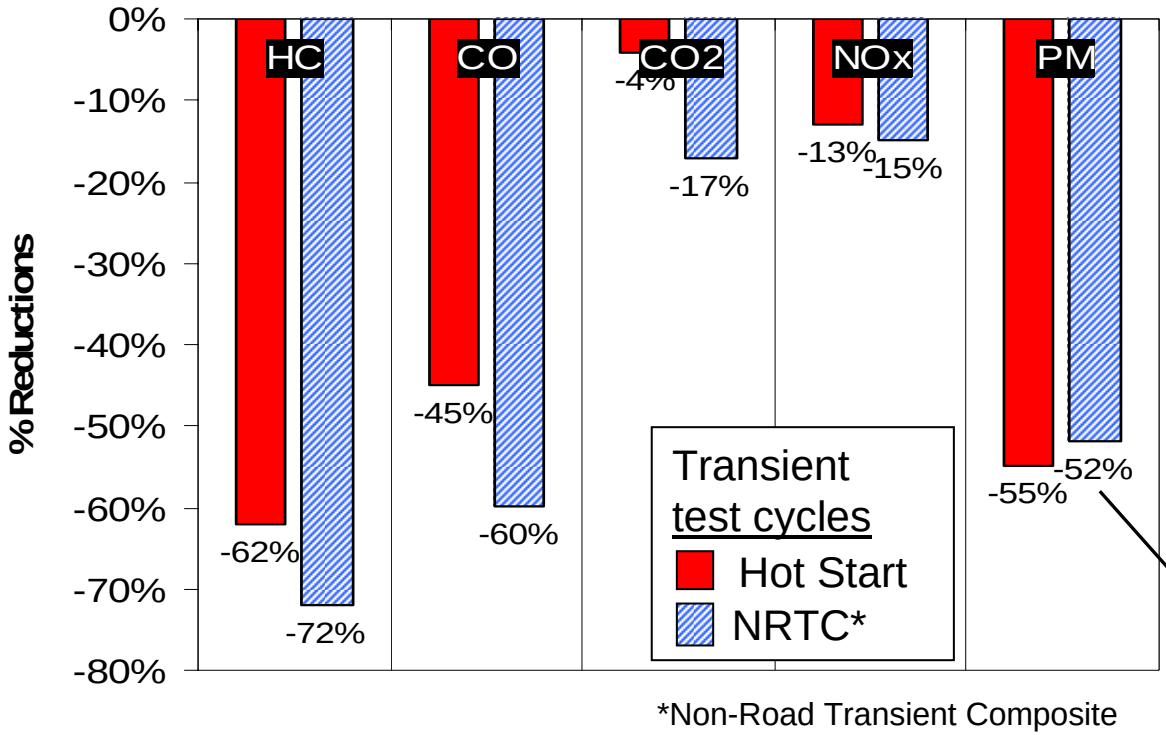
Reduced Exhaust Emissions with FT Fuel Compared to EPA Low-Sulfur Diesel Fuel



*Non-Road Transient Composite

Over 50% reduction in particulate emissions in transient mode.

FT fuel burns more completely and emissions are significantly cleaner than EPA certified low-sulfur diesel fuel tested in 6.5L diesel engine.

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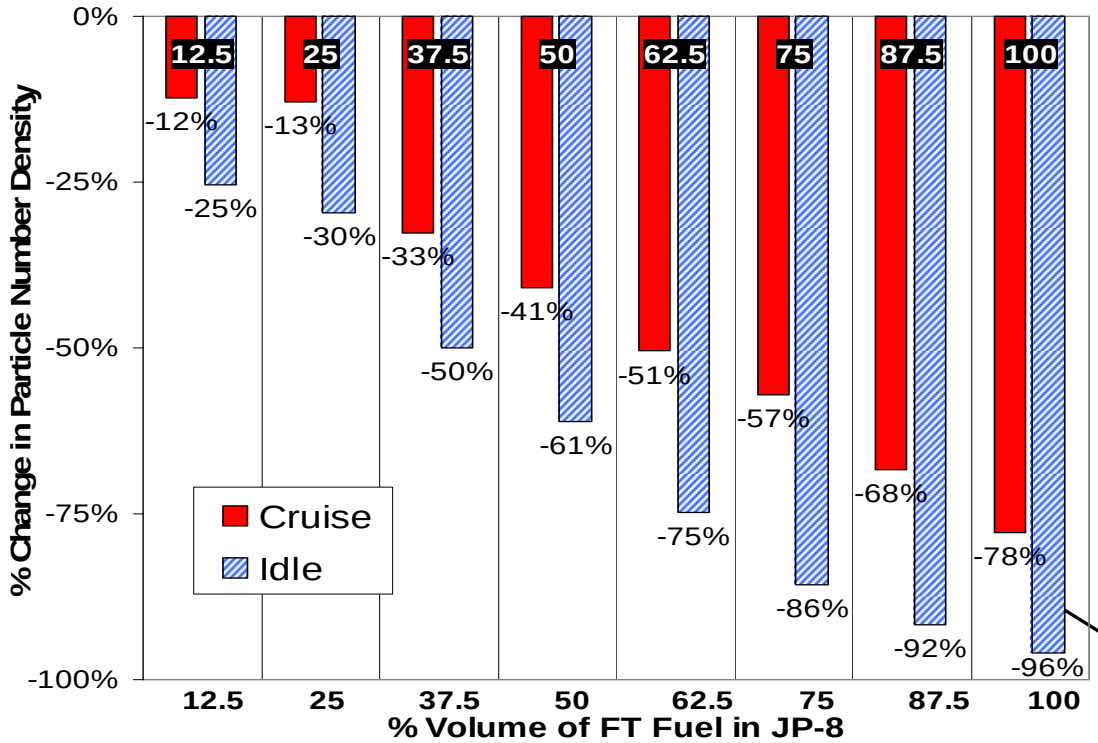
Reduced Particulate Emissions with FT Fuel Relative to JP-8



96% reduction* in particulate emissions at idle conditions.

Even moderate fractions of FT fuel blended in JP-8 significantly reduce exhaust emission particulates in T63 turbine engine testing.

** Note: Results are highly dependent on engine model/year and composition of baseline fuel.*

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The Economic Viability of a CTL FT Facility

A Wyoming Business Council Study

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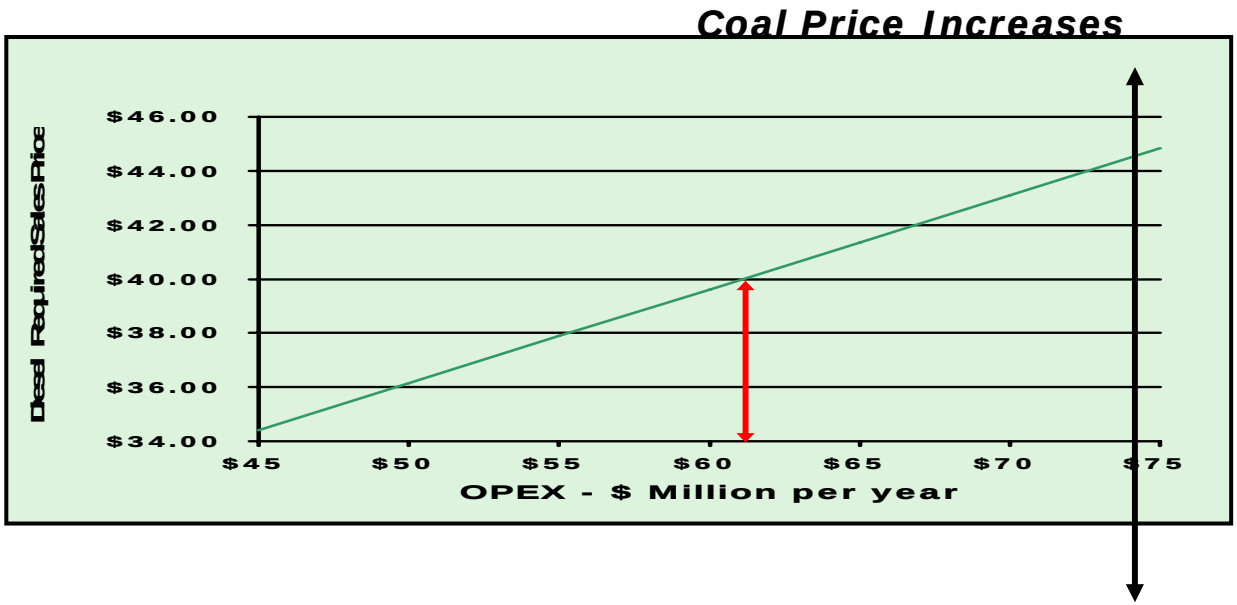
Base Case Project Description

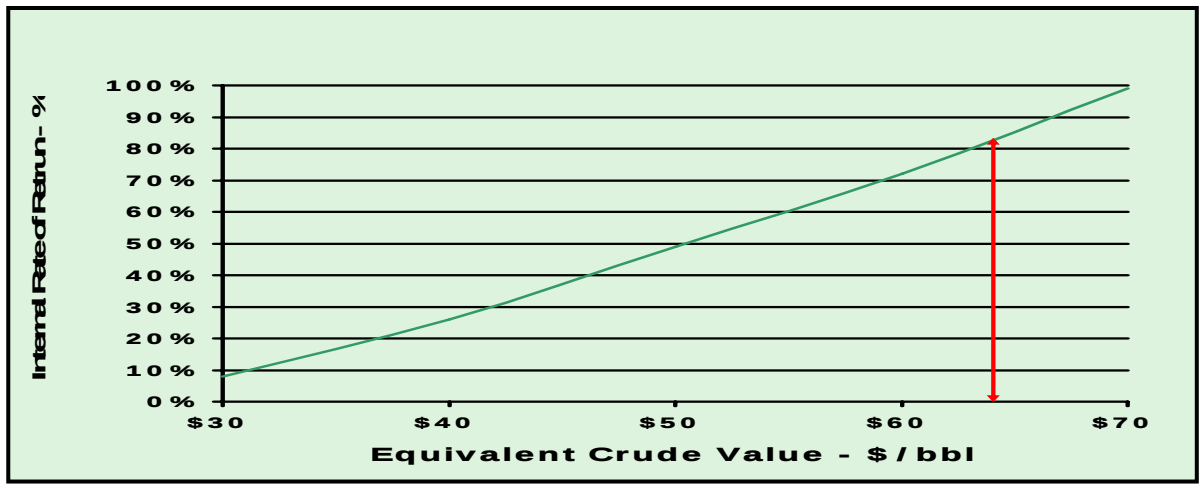
- Single train facility capable of producing 10,000 barrels per day of FT diesel, FT jet and FT naphtha plus 104 MW of excess power for export
- Developed using Future Energy dry gasification technology (Shell, GE and Conoco-Phillips also considered)
- Engineering, procurement and construction (EPC) capital costs of $740 million with all-in costs, including interest during construction and leveraged financing of $840 million
- Coal requirements of 2.6 million tpy of 8,400 btu/lb PRB sub-bituminous coal
- Planning, permitting and construction over a 4 year period

OPEX Sensitivity



Crude Price Impacts

Using the Revised Assumptions



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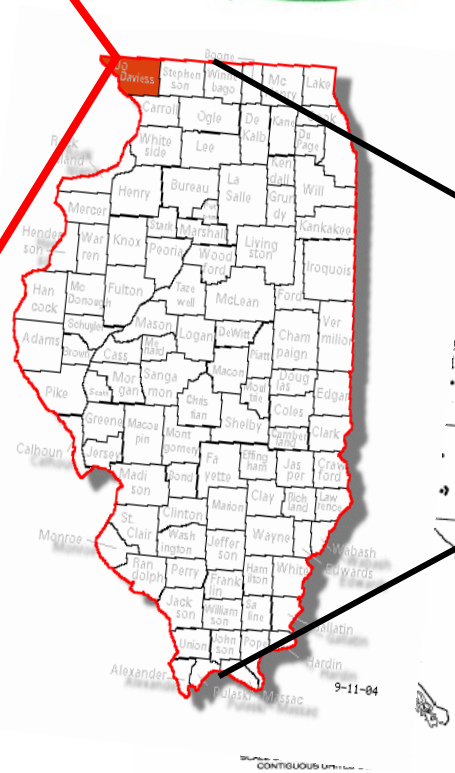
The Future

Rentech Projects in the U.S.

Royster-Clark Nitrogen

East Dubuque AGRI-ENERGY CORPORATION



The Heart of the Corn Belt
The Heart of the Coal Country
On the Mississippi River
Operating Since 1965
Upgraded in 1998
830 tons/day

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East Dubuque Plant Polygeneration

Estimated Inputs and Production

Coal feedstock	5,200 TPD
Ammonia Production	920 TPD
FT Liquid fuels	5,800 BPD
– **247,000 gallons per day**	
Electricity Production	195 MW (e)
Electricity Export	75 MW (e)
Estimated Cost	$837 Million

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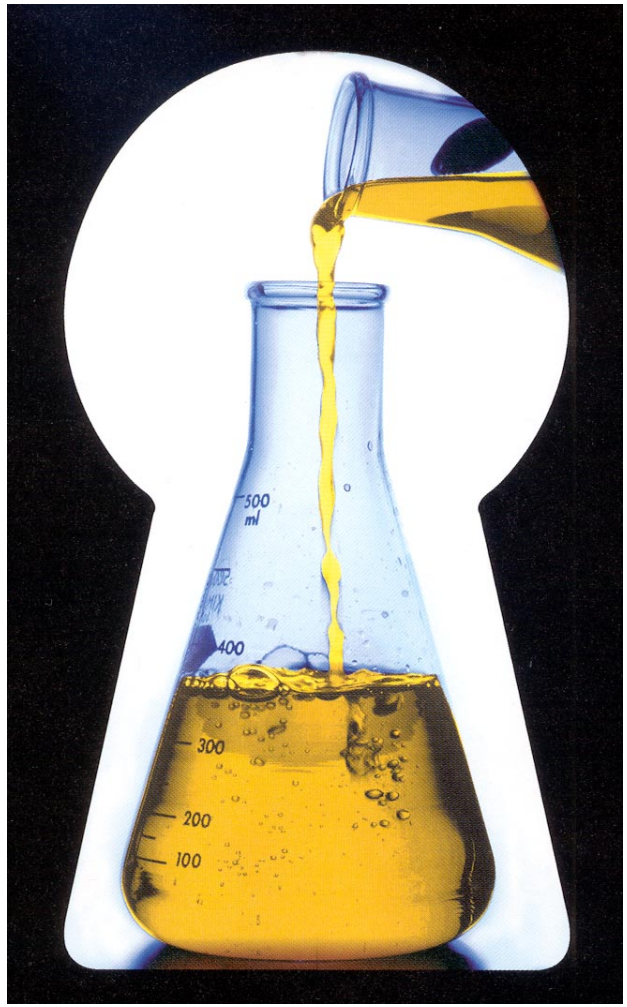
Polygeneration Efficiency

- Standard pulverized coal power plant: 35% Efficient
- Combined cycle natural gas power plant: 45% Efficient
- Coal gasification to produce fertilizer, ultra-clean fuels & electricity: 50% Efficient

Can Bio-diesel Complement FTD?

- Can enhance FTD
- 2 - 10% blends improve lubricity
- Bio-diesel / FTD blend reduces the cost of Bio-diesel and expands its market



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Benefits

- Maintain 109 current employees
- Create 120^{+} new union / salaried plant jobs, total plant jobs 229
- Over 1500^{+} union construction jobs
- Create 150^{+} new union coal mining jobs
- Food security: Provide competitively priced fertilizer to Midwest farmers
- Frees up 11.5 bcf natural gas for residential use

HISTORIC Natchez ON THE MISSISSIPPI

Natchez-Adams County Development Authority

Natchez-Adams Strategic Fuels Center

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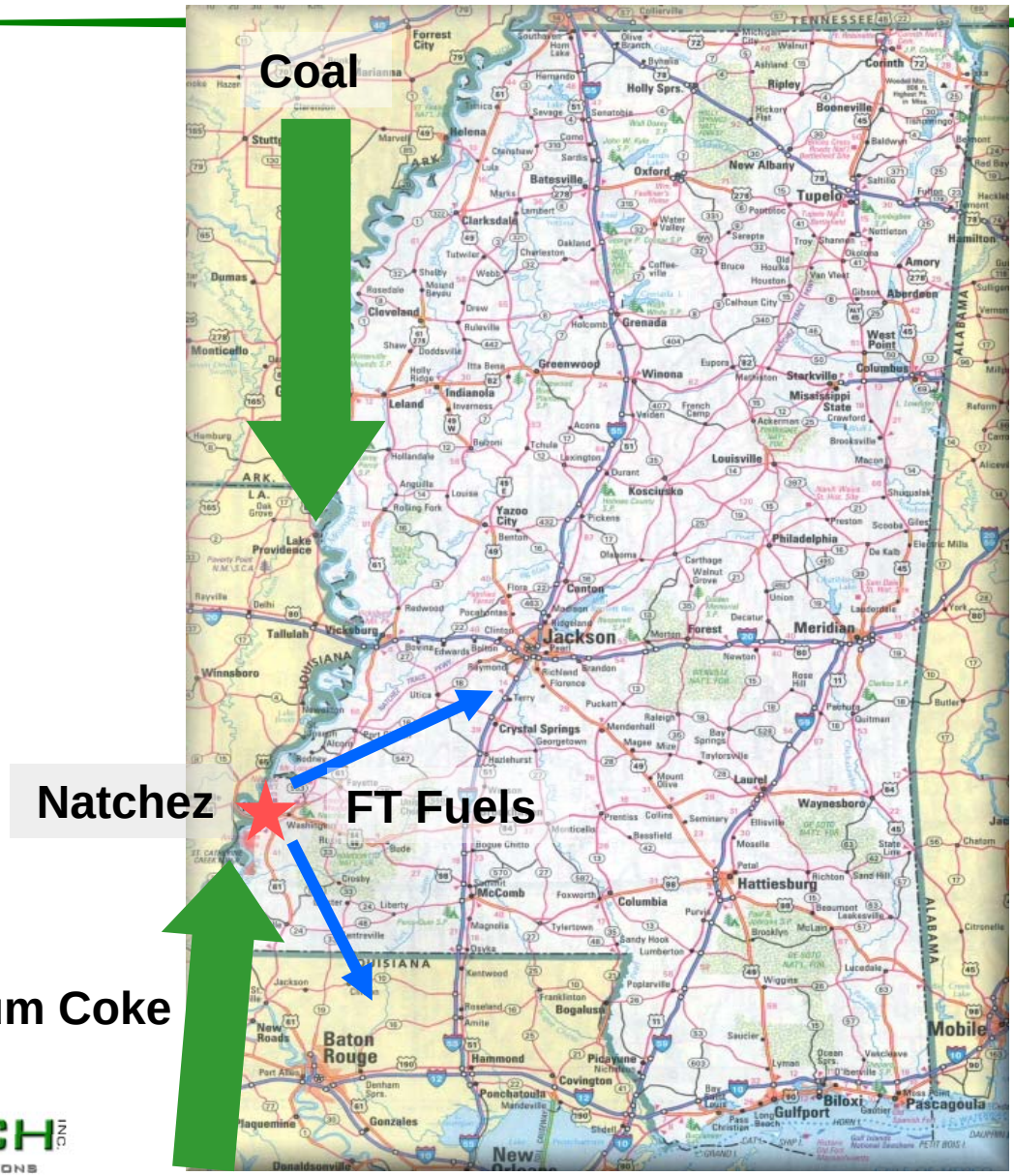
Secure Domestic Feedstock for Facility



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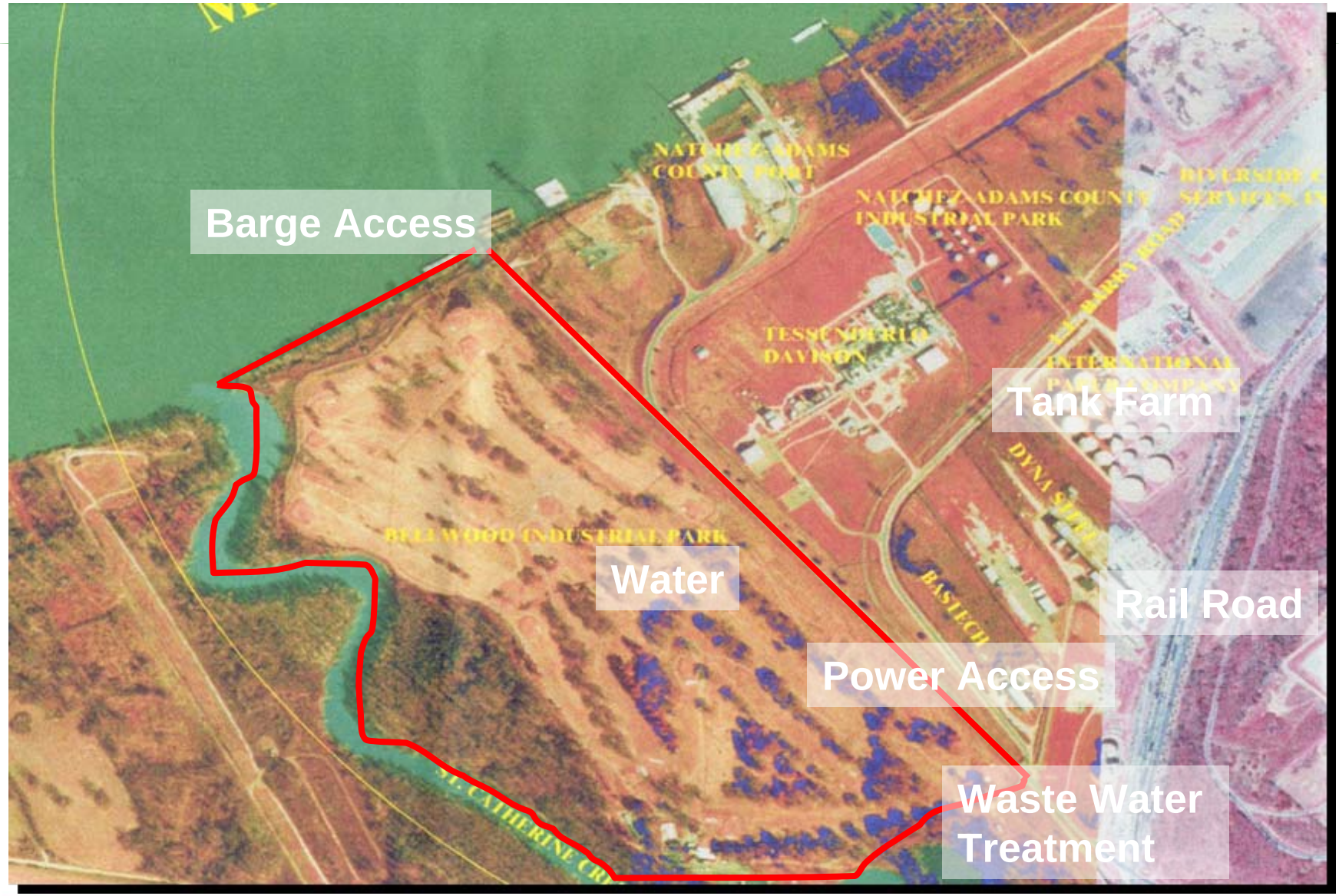
Site



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Natchez-Adams Strategic Fuels Center

- 5200 tons of coal/petroleum coke per day
- 10,000+ barrels FT per day
- The fuels are available for local use and in time of disasters (Katrina and Rita)
  - Fuels for first responders
  - Can provide strategic fuels for DoD
- First plant planning to fully sequester the CO_2 emissions producing an estimated additional 1 million barrels of crude from old Mississippi oil producing properties
- Site has the room to expand

Benefits

- 200 full-time, good paying plant jobs with full benefits
- 1,500 construction jobs at peak during for 2½ year construction time
- Clean fuel for First Responders, Agricultural Community and US Military
- FT diesel has a very long shelf life so it can be stored
- Stable priced fertilizer for farmers
- Plant generates its own electricity so not dependent on grid during natural disasters. Can export power based on market need.
- Environment–low emissions, carbon sequestration

Financing

- Estimated $850M – 1B investment
- Plant construction will be “project financed”
  - Private limited liability company formed to own the Natchez plant
  - 25-27% equity, 70% debt with non-recourse financing raised on financial markets, 3-5% public funding
  - Revenues from contracts for sale of FT fuels, steam, electricity, and fertilizer pay the debt

Concept Plan to Jump Start Construction

- If Fast Track Project – 2010 production date for FT fuels/fertilizer possible
  - Using the same reference plant as Illinois
  - Saves $$ and 18 months to two years on the schedule
  - Existing site with key infrastructure
    - Barge, Rail, Tank Farm, Power and supportive City

What is needed to make CTL successful?

- Long term coal supply agreement
- Long term product off-take agreements
- Implementation by DOE of “self-pay” loan guarantees as provided in EPACT 2005
- Remove cap from EPACT 2005 investment tax credit for industrial gasification plants (currently $650M for all projects)
- Extend fuel excise tax credit from 2009to 2015