TRANSGAS

Adams Fork Energy

America's First Synthetic Premium Grade Gasoline Plant

Project Highlights

Integration of Only Commercially-Proven Technologies from World-Class Firms

- Technology partners include ExxonMobil, ThyssenKrupp Uhde, Linde Group and Haldor Topsoe
- Guaranteed performance and full compatibility of all system components with minimized construction cost risk

Proven Technology to Make Ultra-Clean Premium Gasoline

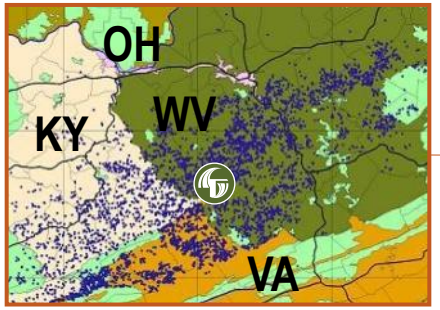
- One ton of coal feed stock into $300 in revenue
- 2.3 million tons per year of 12,000 Btu/lb bituminous thermal coal
- 250 million gallons premium zero sulfur gasoline
- Superior environmental performance of our gasoline compared to crude refining

Environmentally Sound Into the Future

- Fully permitted as a minor source
- Adams Fork was designed as a replicable project
- Emission profiles substantially less than conventional technologies
- Future regulation compliance should not pose problems

Location, Location, Location

The Adams Fork site is located in the most supportive community in the most supportive mining state in U.S. (Mingo County, WV)



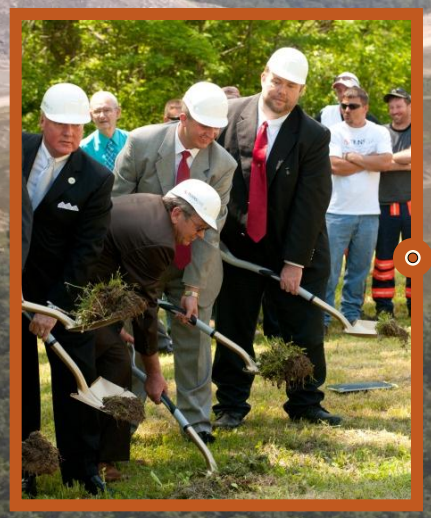
- Adams Fork is located within 75 miles of over 150 million tons per year of production (each dot is an active coal mine)

- Actual Adams Fork plant site
- Adams Fork has a 50-year lease from Mingo County, WV

- Site is able to enjoy a supply of coal with conveyor and/or truck delivery, enabling "minor source" permitting due to PM 2.5 thresholds
- Proximity to compliance coal supply allows delivery by conveyor and trucks minimizing the greatest threat to gasification permitting - dust

Mingo County, West Virginia
Site of Adams Fork Energy

Construction Progress



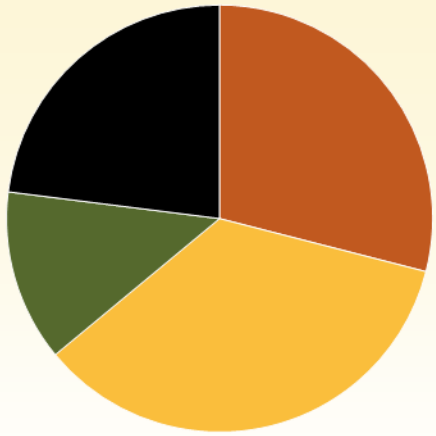
CSAPR & Low Sulfur Gasoline

The Cross-State Air Pollution Rule (CSAPR), requires 27 states to significantly improve air quality by reducing power plant emissions that contribute to ozone and/or fine particle pollution in other states.

Sulfur in gasoline kills pollution control equipment in cars which produce 3 times more pollution than coal plants.

Northeast states' study shows that lower sulfur in gasoline would allow all but PA to exceed or meet their requirements.

Sources of NOx



Ozone Transport Region State	Comparison NOx Reductions (tons/year)		Health Benefits	
	CSARP	10 ppm S Gasoline	Avoided School Days Lost	Avoided Mortality
Connecticut	6	-3,100	2,257	1.2 - 5.8
Delaware	15	-800	697	0.4 - 1.8
DC	0	-300	364	0.2 - 0.9
Maine	0	-1,500	441	0.5 - 1.5
Maryland	-375	-5,000	5,582	2.7 - 12.6
Massachusetts	41	-5,300	3,700	2.1 - 9.3
New Hampshire	-156	-1,300	612	0.3 - 1.6
New Jersey	-286	-6,700	7,297	3.9 - 17.5
New York	-1,160	-13,500	10,559	5.4 - 24.1
Pennsylvania	-15,110	-10,700	8,496	5.8 - 26.5
Rhode Island	0	-900	700	0.4 - 2.0
Vermont	0	-800	160	0.1 - 0.5
Virginia	-43	-1,700	6,684	3.2 - 14.6
OTR Totals	-17,068	-51,600	47,549	26.2 - 118.7

NOx Reduction Cost per Ton
Coal SCR $14,000 – Turbine SCR $19,120 – 10 ppm Gasoline $7,000

"Assessment of Clean Gasoline in the Northeast and Mid-Atlantic States", NESCAUM Nov 2011

Transgas Process Difference

Crude refineries are extremely complex and have a higher operations requirement than coal to gasoline plant.

The ExxonMobil MTG path results in the most direct path with the least amount of post product refining.

The single product focus allows smaller plants.

Crude

Distillation

Hydro-Cracking

Catalytic Reforming

Hydro-Treating

Hydro-Treating

Blending

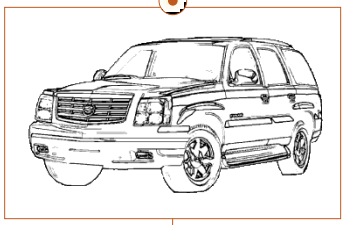
80-30 ppm Sulfur

Coal

Gasification

Synthesis

Zero Sulfur



Improved Performance Lower Pollution

"The finished gasoline produced by the MTG technology are high quality and contain neither sulfur nor nitrogen."

ExxonMobil

TransGas Clean Gasoline Specification

Uhde | **MTG Product Specification** | Code: UAN (for QMHA) | Page 1 of 1

1 PRODUCT SPECIFICATION

1.1 Products

1.1.1 Gasoline

The given composition is preliminary and has to be confirmed during BE.

Property	Specification	Unit	Test Method
Paraffins	53	vol%	
Olefins	12	vol%	
Napfthenes	9	vol%	
Aromatics	26	vol%	
Total	100	vol%	
Benzene	0.3	vol%	
Sulfur	nil		
RON	92		
MON	82		
RVP	7.6 (0.52)	PSI (bar)	

B.L. Conditions	Min.	Norm.	Max.	Mech. Design	Units
Pressure		5			bar a
Temperature		45			°C

1.1.2 Liquefied Petroleum Gas LPG

The given composition is preliminary and has to be confirmed during BE.

Property	Specification	Unit	Test Method
C_4	62.81	mol%	
C_3H_8	34.08	mol%	
C_3H_6	2.16	mol%	
C_{5+}	0.84	mol%	
C_2H_6	0.08	mol%	
COS	0.0001	mol%	

B.L. Conditions	Min.	Norm.	Max.	Mech. Design	Units
Pressure		12.5			bar a
Temperature		45			°C

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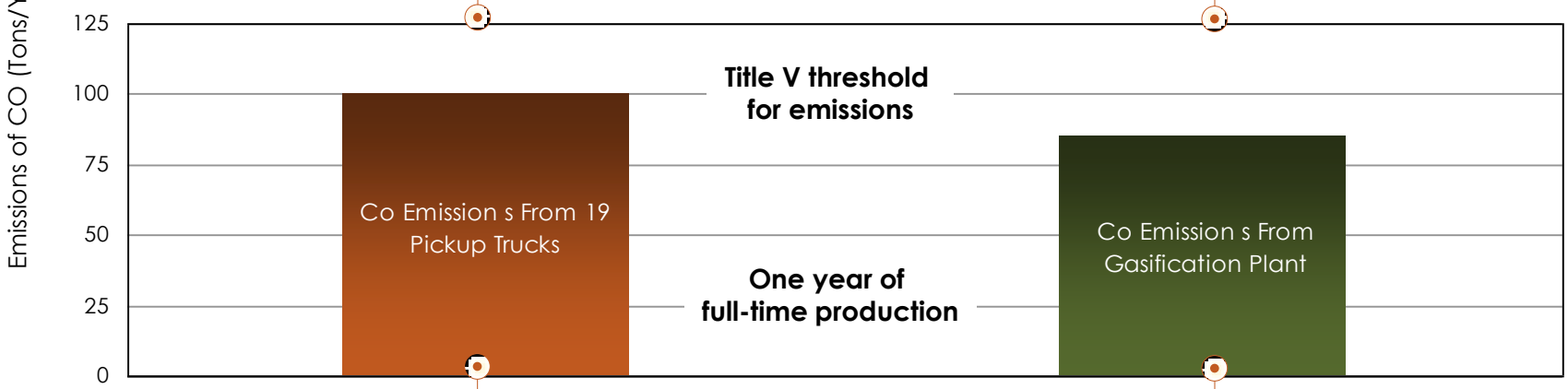
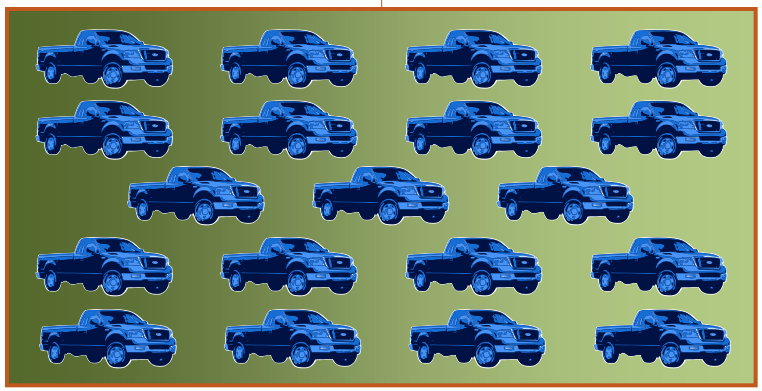
Sulfur	Nil

Vehicle Emissions vs. Title V Thresholds

19 Pickup trucks operating 24/7 at 48 MPG will trigger the EPA title V threshold

Our coal gasification facility which consumes a one mile trainload of coal every 24 hours does not trigger the title V pollution threshold





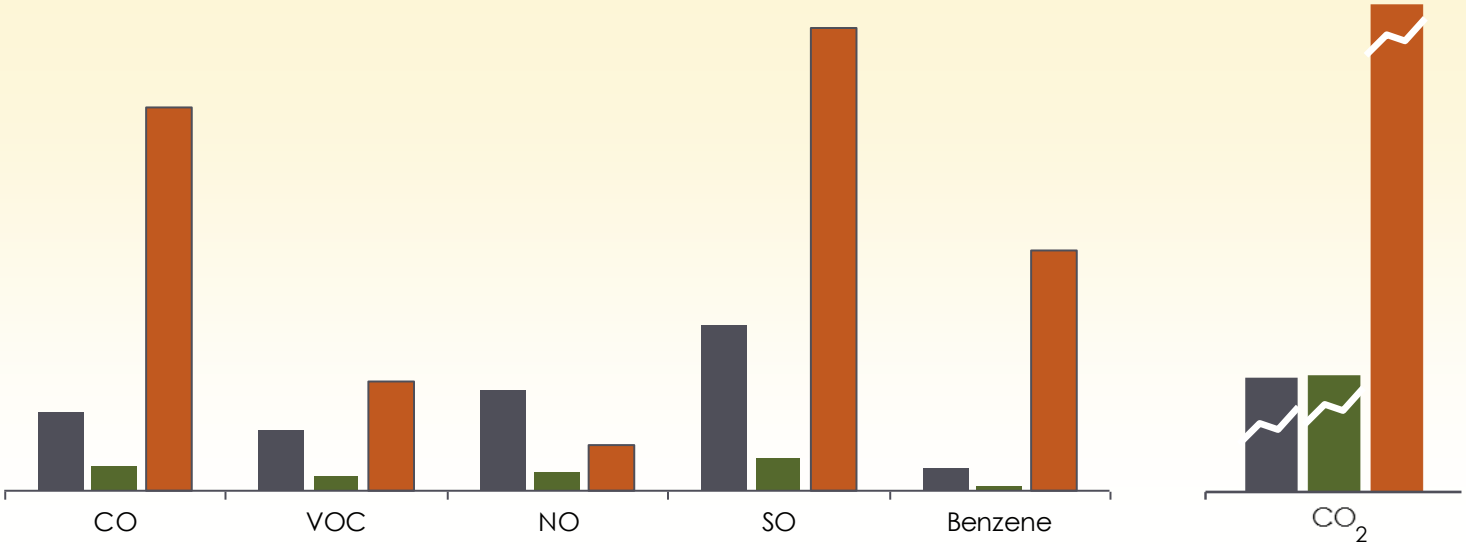
Relative Plant Emissions

TRANSGAS coal to gasoline plants produce minimal hazardous air emissions.

TRANSGAS gasoline is lower in hazardous volatile organic compounds like benzene and has zero sulfur and nitrogen.

TRANSGAS Plant Emissions

Relative to Other Gasoline Production Processes



	Known Health Hazards (tons/barrel)					Inferred Hazard (tons/mmBtu)
	CO	VOC	NO_X	SO_2	Benzene	CO_2
Crude (Refinery)	0.00003080	0.00002390	0.00004030	0.00006660	0.00000012	0.04890000
CTG (TGDS Process)	0.00000970	0.00000600	0.00000700	0.00001320	0.00000002	0.05000000
Corn Ethanol	0.00015420	0.00004370	0.00001870	0.00018640	0.00000646	0.21000000

Crude values based on DOE EIA and NETL data, CTG values based on WV Air Permit maximums, Corn ethanol values based upon EPA RFS2 modeling data, Princeton University research, Nebraska PSD permit CP07-0011 for a 65mmgal/year ethanol plant and the EPA compliance order for ADM's ethanol plants.

Our Partners: Overview

Industrial Contractors Inc.

- Construction lead for only other gasifier project in US
- Experience in refinery and heavy industry construction and maintenance

Uhde ThyssenKrupp

- Inventor of Prenflo PDQ gasifier technology, which will provide the raw syngas
- Over 101 gasifiers have been designed, built and put into operation by Uhde

THE LINDE GROUP Linde

- Air separation technology as well as the syngas cleanup
- Independently removes saleable CO2, sulfur and mercury
- Expert in hot gas cleaning system design and construction

HALDOR TOPSOE CATALYSING YOUR BUSINESS

- Methanol production technology, with over 40 world class methanol plants designed and constructed
- Converts clean syngas into methanol

ExxonMobil Research & Engineering

- Methanol to gasoline technology
- Will produce sulfur-free 92 octane gasoline
- ExxonMobil scientists discovered the MTG chemistry in the 1970s

Alliance Partner

CB Richard Ellis and TransGas Development Systems are finalizing negotiations for a co-developemnt partnership

CBRE
CB RICHARD ELLIS

- CB Richard Ellis 104 years continuous operations in 2010, founded in San Francisco in the aftermath of the 1906 earthquake
- World's largest commercial infrastructure services firm with over 31,000 employees in 450+ offices in more than 60 countries
- $37.6 billion investment capital managed raised $4.8 billion in 2010 alone with more than $2 billion to deploy at year-end.
- Project Management – 2,900+ professionals, 30,000 projects annually
- Clients include 80 of the Fortune 100
- CBRE Infrastructure focuses on energy, environmental & logistics infrastructure.

E*TRADE FINANCIAL · GSA U.S. General Services Administration · Bank of America Higher Standards · ExxonMobil · United States Postal Service · SIEMENS · BB&T · Orange County Government Florida · HCA · GSA · TIAA CREF · EDS · Hertz

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