

FT Fuels from Low Ranked Coals - An Economic Proposition

Panel Presentation
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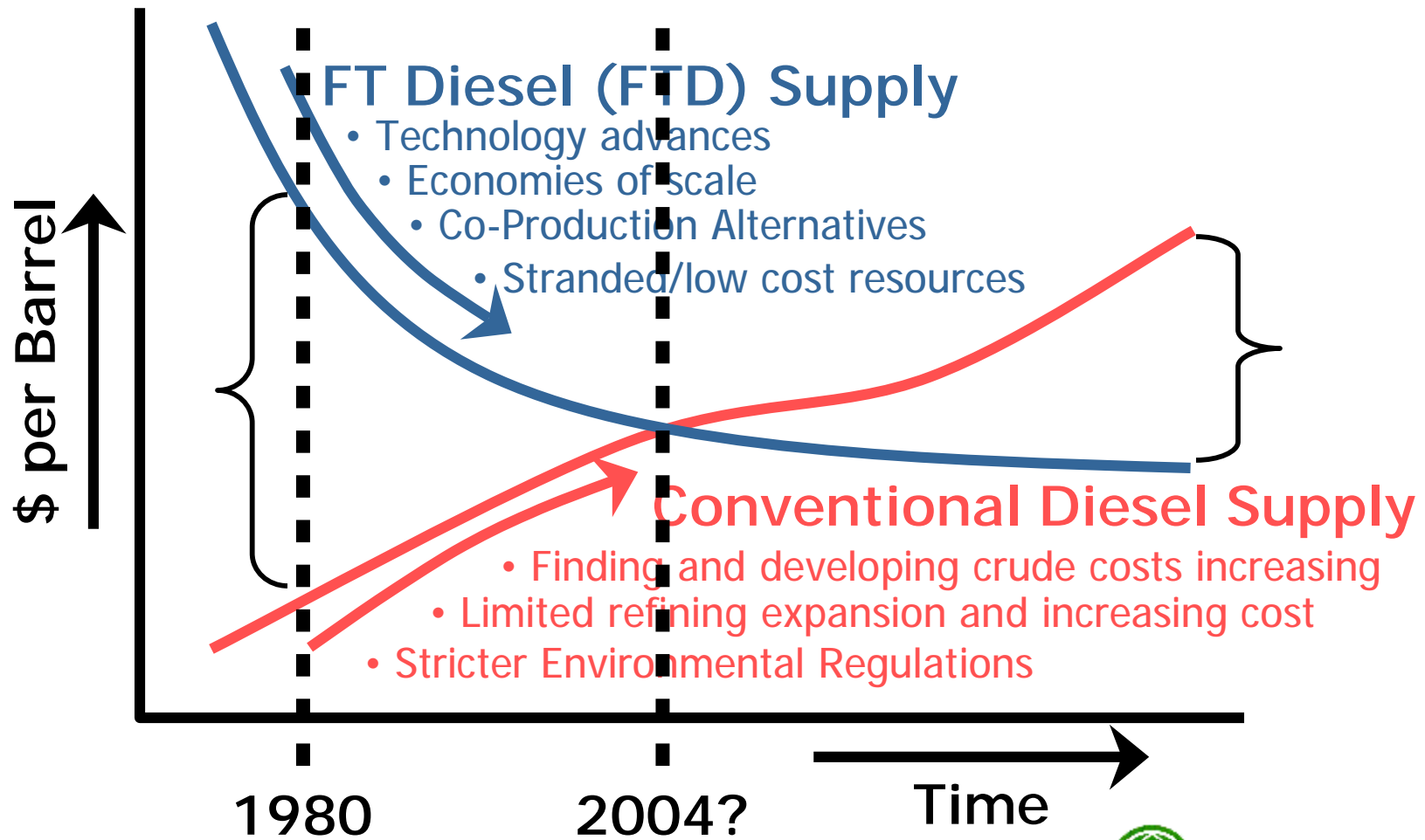
Rentech's Vision

To develop projects and commercialize technologies transforming underutilized energy resources into valuable and clean alternative fuels, chemicals and power

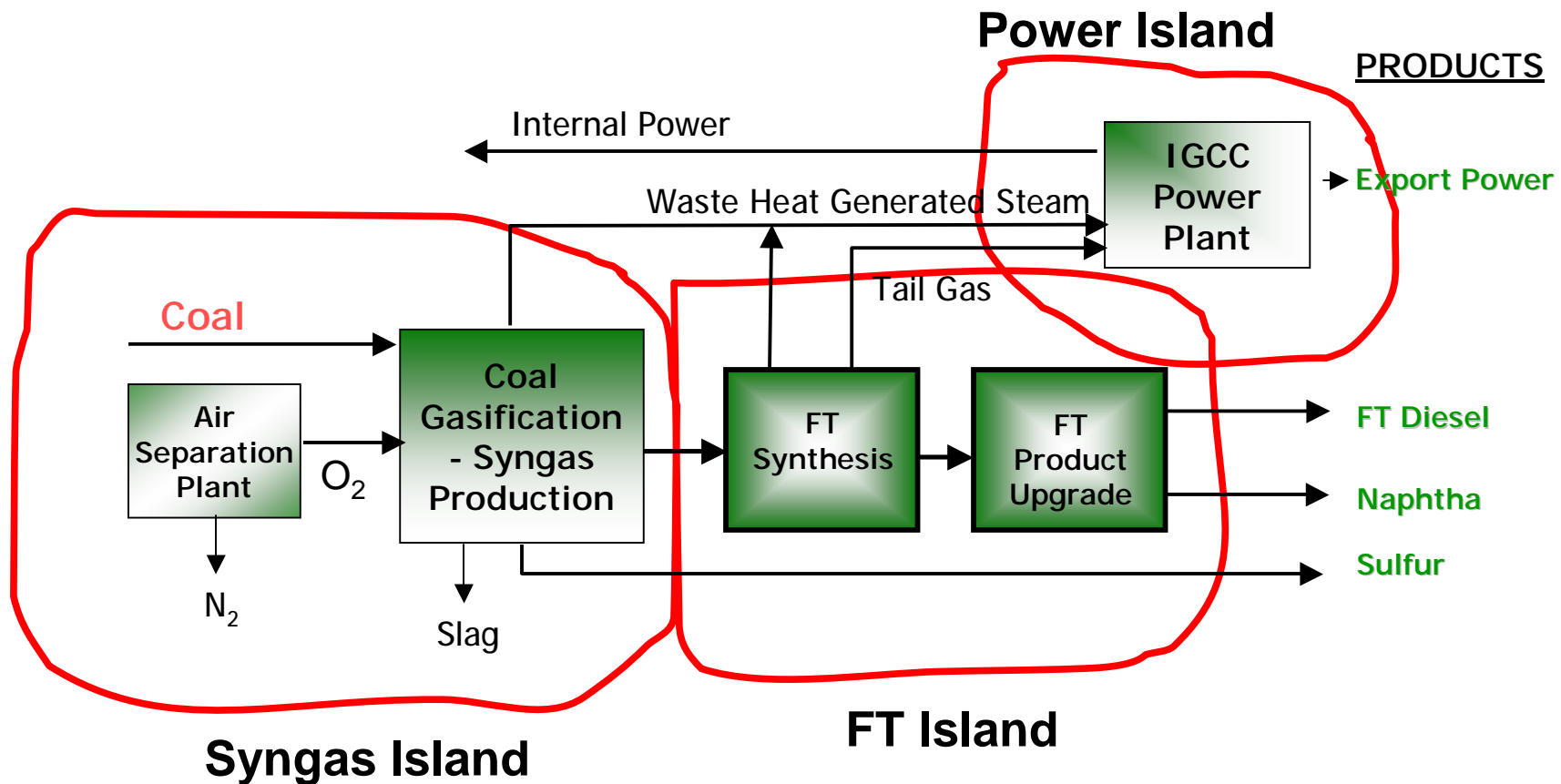
- n A 24 year old Fischer-Tropsch (FT) gas-to-liquids technology developer (FT = GTL = CTL)
- n Currently holds 19 patents covering various aspects of FT conversion
- n Has operated 4 pilot plants and one semi-commercial facility and has been vetted by several of the world's largest energy companies.
- n Its iron-based catalyst technology best suited for conversion of coal and petroleum coke



FT Comes of Age



Simplified Co-Production Facility



Base Case – Single Train

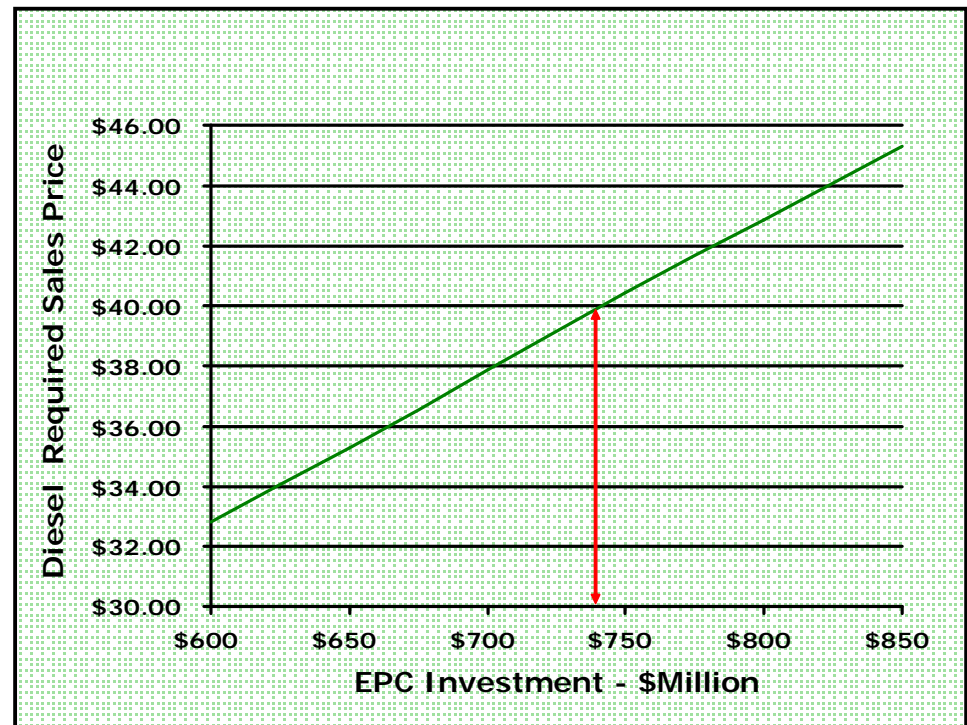
- n Smallest economically attractive configuration to minimize CAPEX
- n \$40 per bbl required selling price for diesel equal to \$28-30 crude
- n Low cost coal critical for long term economics
 - Trade-off for GTL vs CTL
- n Coal moisture content may restrict gasification alternatives

EPC Capital	\$740 MM
Coal Feed	7,650 tpd
Net Power	104 MW
Total Fuels	10,200 B/D
FTD Production	8,560 B/D
FTD RSP*	\$39.96 /bbl
IRR @ \$63/bbl	75 %

* RSP – Required Selling Price

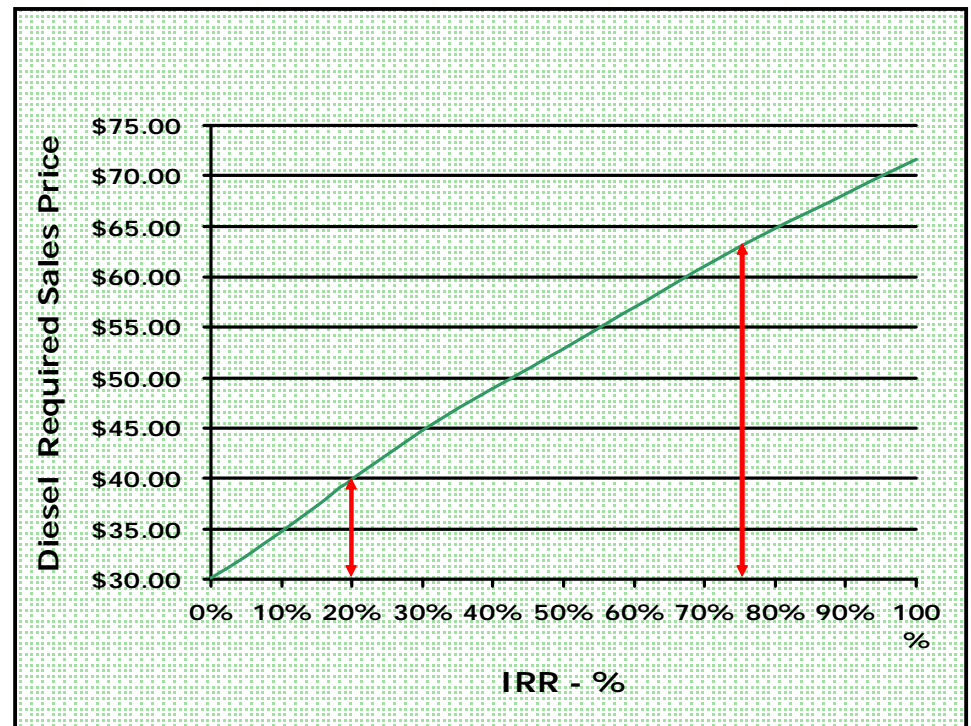
EPC Capital Cost Sensitivity

- n Base Case EPC is \$740 million
- n RSP changes roughly \$2.50 per barrel for every change in EPC cost of \$50 million
- n Project less sensitive to changes in CAPEX than changes to OPEX



IRR Target Sensitivity

- n Base Case target is 20% IRR after-tax
- n RSP changes roughly \$2.50 per barrel for every 5% change in IRR
- n A 15% target would require a \$37.19/bbl diesel price
- n Assuming today's diesel price of over \$63 per bbl, the IRR would be >75%



Economies of Scale are Great

Modular design supports expansion when desired with increasing economic benefit

No. of Gasifiers	Coal kTPD	FT Fuels bbl/day	Power MWHr	EPC \$Million	RSP \$/bbl	IRR @ \$63/bbl
6	7.7	10,200	104	740	39.96	75
7	8.9	11,890	120	820	37.19	86
12	15.3	20,400	212	1,370	34.94	95
14	17.9	23,780	244	1,520	32.64	109

Comparison of One-Through Production Cases

Low-Cost Power Co-Production

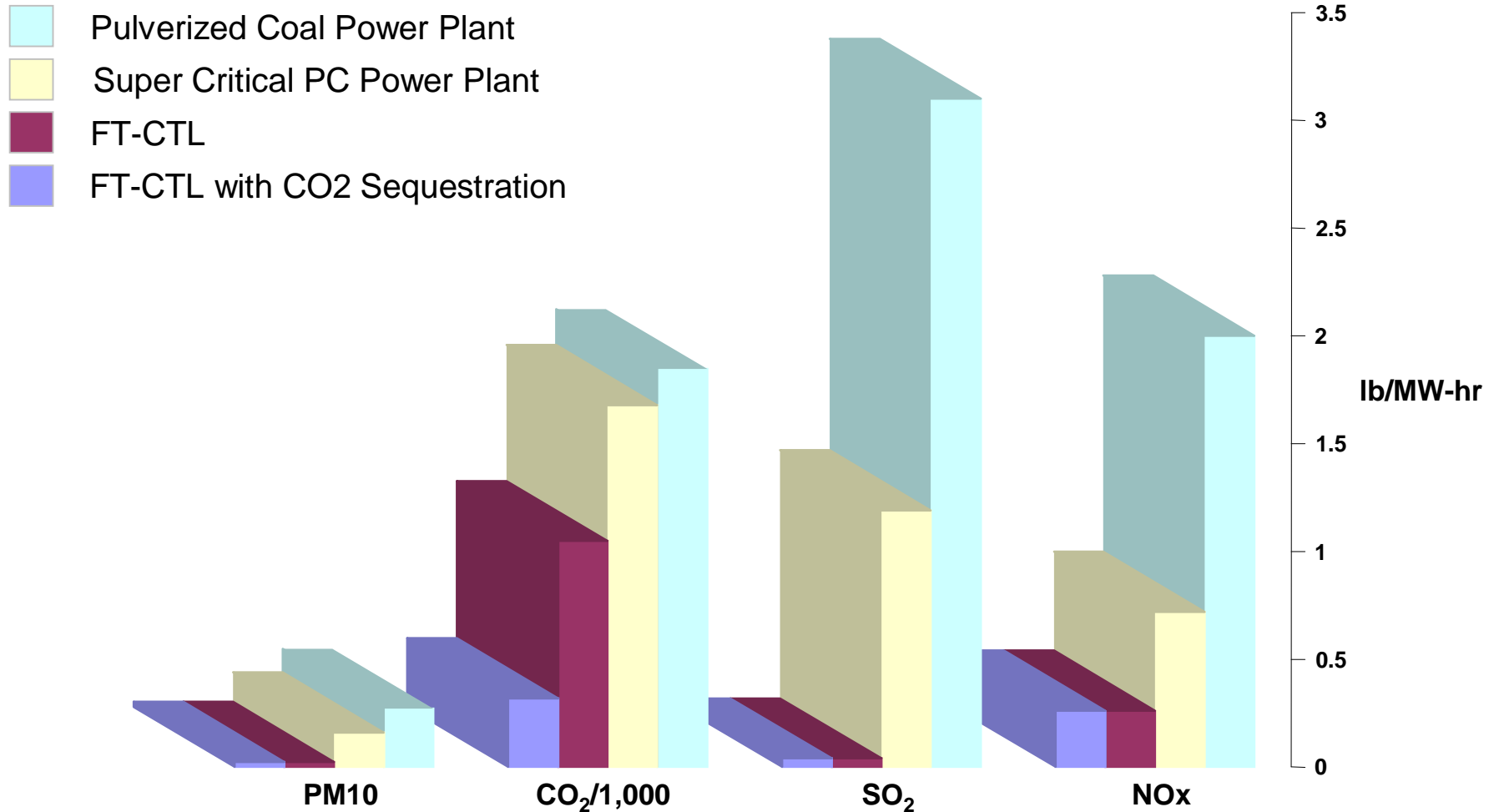
- n Excess power generation is possible by adding extra gasification and diverting the extra syngas to increase the feed to the gas turbine. Naphtha can also be used.
- n CAPEX for incremental power is in the \$1,000 per KW range compared to \$1,200+ per KW for typical IGCC

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6	7.7	10,200	104	740	39.96	75
7	8.9	10,200	197	835	35.94	77
6	7.7	8,560	161	760	40.29	73

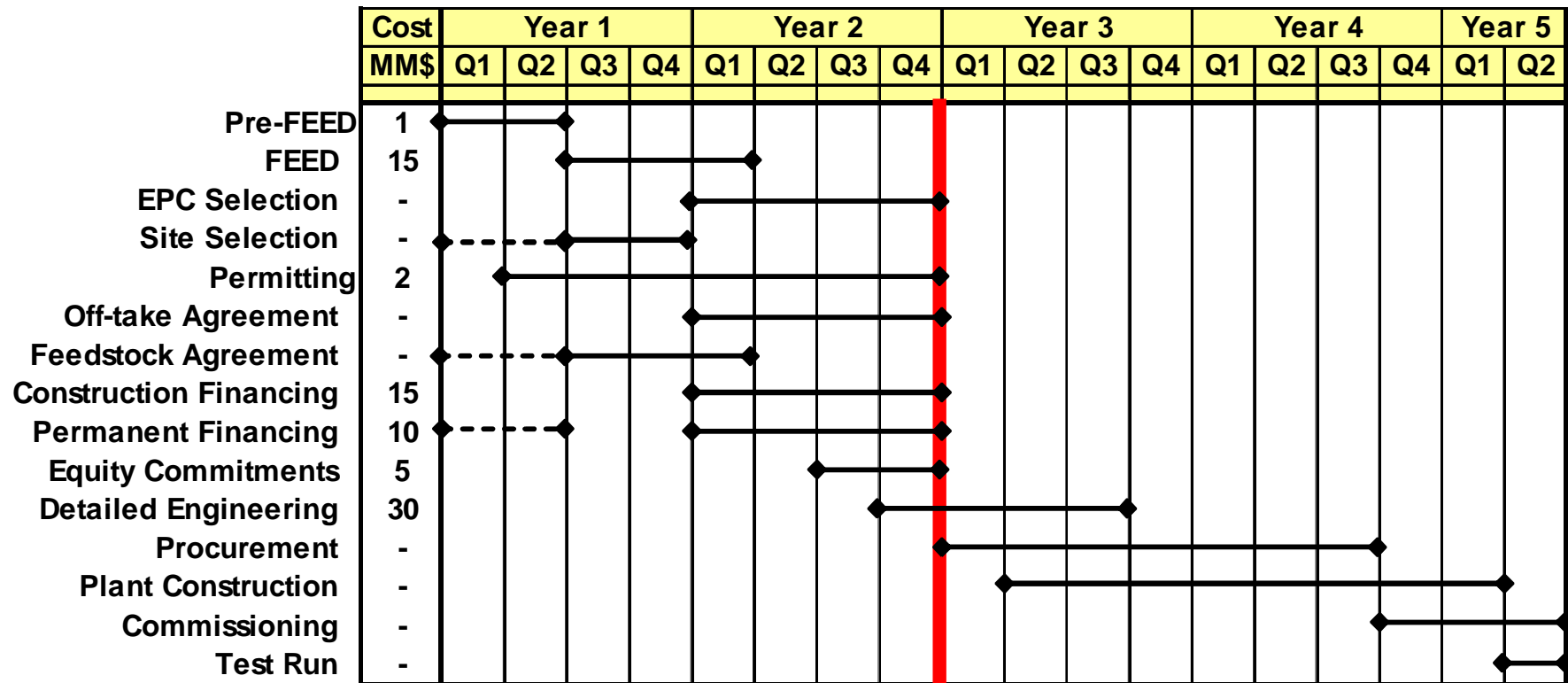


Emissions Comparison

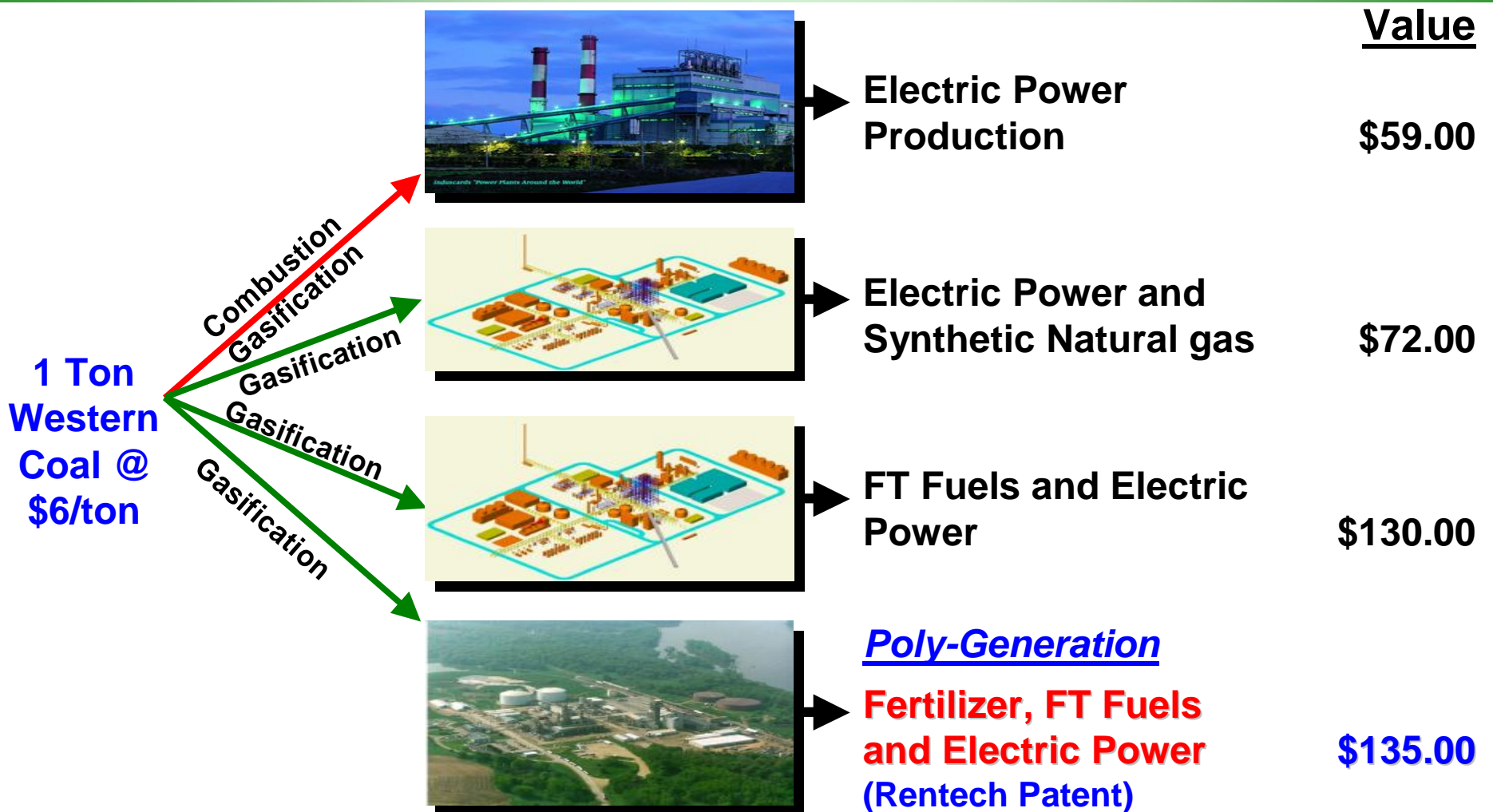
Syn-gas make equals 535 MW Power plant



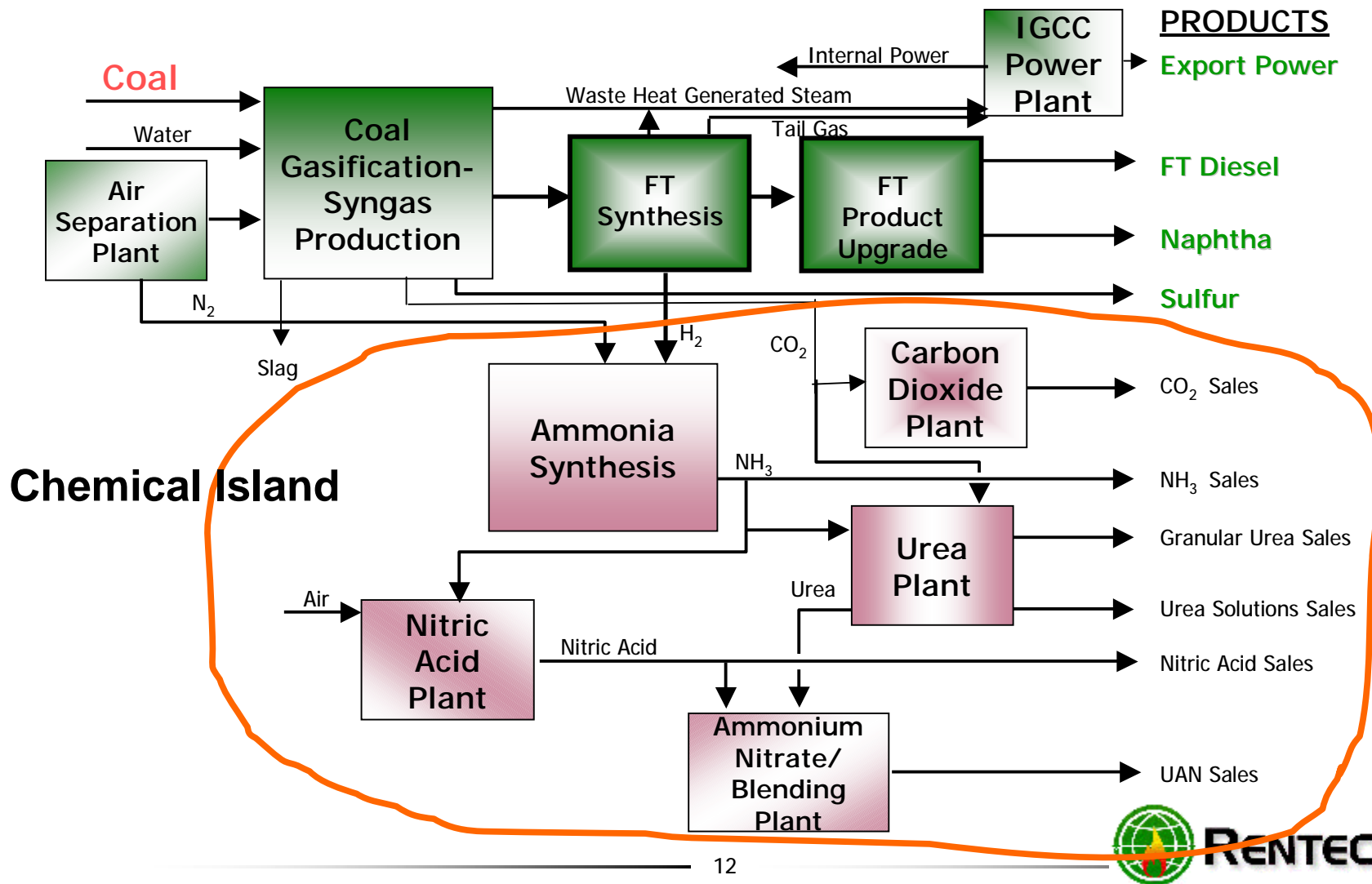
Timeline for Moving Forward



Value-Added For Poly-Generation



The Poly-Generation Add-on



Poly-Generation with Ammonia

n Assumes production of explosive grade Ammonium Nitrate

- Alternatives could include split for traditional agricultural products

n Economies come from incremental gasifier and utilization of otherwise vented nitrogen stream

EPC Capital	\$1,100 MM
Coal Feed	8,925 TPD
Net Power	70 MW
Total Fuels	10,200 B/D
FTD Production	8,560 B/D
AN Production	1,600 TPD
FTD RSP	\$29.03 /bbl
IRR @ \$63/bbl	75 %

Royster-Clark Nitrogen Natural Gas to Coal Conversion



“Coal to Corn,” a partnership with the State of Illinois supported by The American Farm Bureau, The Fertilizer Institute and The National Corn Growers Association

AFFORDABLE FERTILIZER FOR AMERICA’S FARMERS FROM COAL

n Project Location

- East Dubuque, Illinois

n Project Size

- 5,700 BPD of FT liquids
- 920 TPD of ammonia
 - UAN, Ammonia, Urea
- 75 Mw of export power

CTL is Economically Attractive Today

- Economics are good when crude is above \$30/bbl
 - Low-cost western coals excellent resource for co-production facilities
 - Poly-generation of chemicals can further enhance economics
- Financing the large capital investment for a first mover facility is the greatest hurdle



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