Gasification Project Development
From Concept to Execution

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Concept—3Party Covenant

Federal Government

Federal Loan Guarantee

PUC

State Utility Commission

Equity Investment

Owner

Assured Revenue Stream

Federal

Government

Owner
Timeline—Research & Policy

- May ‘03 IGCC financing research project conceptualized
- June ’03 funding commitments from DOE, EPA and foundations
- July ’03 began study of 3Party Covenant financing program to stimulate IGCC

- Feb. ’04 draft working paper 3Party Covenant financing proposal
- Feb. ‘04 Harvard symposium with leading experts (inc. Jim Rodgers)
- July ‘04 Final working paper on IGCC 3 Party Covenant proposal

- Jan ‘05 National Gasification Strategy (SNG technology)
- Feb.-- May ‘05 Senate Energy Committee testimony
- June ’05 legislation passes Senate Energy Committee
- August ‘05 Congress passes Energy Policy Act of 2005
Timeline—Development

- March ’06 Formation of development partnership—Leucadia/E3/Johnston
- Oct. ’06 Governor’s public announcement of Indiana SNG project
- Nov. ’06 IURC petition & initial testimony
- Feb. ’07 appropriations for Federal Loan Guarantee (FLG) program
- March ’07 Second Project in LA publicly announced
- Oct. ‘07 DOE FLG final rule
- Development begins on MS SNG project
- Sept. ‘08 DOE FLG solicitation
- Dec. ‘08 FLG applications submitted
- March ‘09 Legislation passed in IN
- June ‘09 selection of projects for FLGs (IN & MS)
- CCS grant solicitation and awards (MS & LA)
- Environmental permitting/finalization of off-take contracts
Lessons Learned

- Academic research can lead to policy action and commercial application
  - Requires more than just publishing a paper
  - Good ideas, lots of effort to publicize, luck

- Must adapt to changing circumstances / understanding
  - IGCC vs. SNG
  - Capital cost acceleration
  - Political dynamics

- Must have considerable staying power
  - Financial resources
  - Patience
  - Risk tolerance

- Good idea not enough to carry the day
  - Always someone opposed (environmental, industry, political)
  - Motivations of stakeholders difficult to predict
  - Must constantly repeat policy arguments
Good Public Policy

- Energy Technology
  - Unlock clean hydrocarbons from coal & petcoke
  - Use abundant domestic resources
  - Advanced technology that can meet commercial realities
  - Hedge natural gas price and supply concerns

- Loan Guarantee Program
  - Lower interest rate/higher leverage = lower cost
  - High credit to protect federal government (state regulatory role)
  - Equity investment and development knowhow

- Environmental
  - Minimal emissions of regulated air pollutants
  - 90% CO₂ capture
  - Use and sequestration of CO₂ through EOR
  - Path for continued coal use
**U.S. Natural Gas Supply Uncertainty**

**World Proved Natural Gas Reserves**

“In the long run, yes, we are moving toward a gas OPEC” *Algeria Oil Minister*

“We are trying to strengthen the cooperation among gas producers to avoid harmful competition” *Libya* (Source: *Wall Street Journal*, April 10, 2007)
Consumer Savings Demonstration

- Long-term contract for SNG offers considerable value as physical hedge
  - Reduced volatility
  - Solid fuel cost-based price
  - Local production

- Nonetheless, demonstrating economic benefits remains important
  - Decision makers justification
  - Political considerations
  - Regulatory approval

- Third party assessment for credibility

Early Economic Assessment by Carnegie Mellon Professors Showed IN Project Benefits
CO₂ Considerations

- Must be addressed for project success
  - Environmental opposition / delay
  - Commercial risk
  - Project economics

- Gasification technology solves capture element, but uncertainty remains regarding sequestration

- EOR is key for timely deployment
  - Economic solution
  - Proven technology
  - Solves permitting, liability and pore space ownership issues with other sequestration
  - Significant early mover advantage

CO₂ is permanently sequestered when used for EOR because CO₂ that returns to the surface in produced oil is separated and re-injected. Ultimately, all of the CO₂ remains trapped in the depleted oil field. Terms of CO₂ sales contracts will require appropriate monitoring and verification by the EOR operator to ensure permanent sequestration.
Equity Partner is Key to Development Success

- Must see acceptable risk-return trade-off
- Financial commitment
- Knowledgeable about technology and development
- Tolerant of development risks, timing
- Long-term investment outlook
Don Maley
Leucadia National Corporation

- Current CEO & President in place since 1978
  - Together own about 20% of stock
  - Most shareholders are long-term investors

- Financial
  - New York Stock Exchange Company (LUK)
  - Assets: $6.1 B (June 30, 2009)

- Value investor
  - Investments in a number of industries, domestically and internationally
  - Copper mine in Spain, Iron ore mine in Australia, Fiber optics and a utility in the Caribbean
  - Plastics, timber, biomedical, real estate (including Biloxi, MS casino) and winery companies in the United States

- Past holdings
  - Financial firms such as FINOVA (funded 90% by Berkshire Hathaway/10% by LUK, managed by LUK)
  - Insurance companies such as Colonial Penn
Project Portfolio

- **Lake Charles**: petroleum coke to methanol
  - $1 billion in tax exempt bonds; CCS grant
  - Air permit issued
  - Output to a major U.S. chemical company

- **Indiana**: coal to substitute natural gas (SNG)
  - $1.9 billion federal loan guarantee
  - Legislation for 80% of SNG to be sold to state agency under 30 year contract

- **Mississippi**: petroleum coke to SNG
  - $1.7 billion federal loan guarantee; CCS grant
  - Long-term off-take contracts under negotiation with regional utilities

- **Chicago**: coal/petcoke blend to SNG
  - $10 million state grant for engineering & cost study
  - Legislation patterned after Indiana in development for SNG purchase
Gasification Business Model Considerations

- Flexible technology with many applications
  - Power (IGCC)
  - Chemicals
  - Fertilizer
  - SNG

- Superior environmental performance

- IGCC vs. SNG tradeoffs

- High capital cost --- need for revenue certainty

- Physical hedge
  - Price certainty
  - Reduced volatility
  - Utility supply portfolio
* EIA AEO 2000 forecasts natural gas wellhead prices in real 1998 dollars. That forecast was converted to HH equivalent by adding $0.32/mcf to the price (the average differential according to EIA) and inflating the price at 2.5% to current year.
Superior Environmental Performance

1. Emissions based on average Indiana emission rates (lb/mmBtu) as reported under EPA acid rain program and multiplied by coal heat input equivalent to SNG plant.
Why Now?

- First mover advantages
  - Limited federal incentives
  - Most attractive EOR opportunities (see next page)
  - Best opportunity for long-term off-take agreements
  - Capture value from byproduct sales

- Favorable economic conditions
  - Construction in favorable cost environment
  - Low interest rates with federal financing support

- Political support for clean energy technologies
Investment Considerations

• Product/technology

• How to build for acceptable cost
  - Construction management
  - Cost over-run risk management

• Appropriate return given risks
  - Development, construction, operation
  - Downside protection vs. upside potential

• Management / sharing of risk
  - Equity risks (development, construction, operation)
  - Debt / government guarantor risks (Off-take credit, technology, sponsor capability)
  - Customer (commodity)
Long-Term Value Investment Objective

- **Downside protection**
  - Long-term off-take agreements
  - Creditworthy counterparties
  - Cost-based revenue formulas

- **Upside potential**
  - Byproduct sales
  - Incremental capacity

- **Advantaged financing and incentives**
  - Federal loan guarantees
  - Tax exempt bonds
  - Grants

- **Stable long-term annuity income**
  - Predictable returns
  - Accelerated tax depreciation plus leverage provides upside potential through tax lease or tax partnership