Policy Incentives to Stimulate Investment in Conversion of Coal to Liquid Fuels

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History of Synthetic Fuels

- Germany had 9 indirect and 18 direct liquefaction plants during WWII, which produced 4MTons/yr fuels meeting 90% of the nation’s requirement.

- South Africa developed 3 CTL facilities during 1950-80 which produced 10MTons/yr fuels meeting 40% of nation’s requirement at their peak production.

- China is developing a 1MTons/yr direct liquefaction plant for 2007.
Synthetic Fuels in U.S.

- Synfuels program was started in 1979 by President Carter in an effort to use coal, shale, and tar sands to produce synthetic liquids and synthetic gas.

- U.S. Synthetic Fuels Corporation (SFC) was established in 1980 as part of Energy Security Act.

  SFC’s Production goal was 500,000 b/d capacity by 1987 and 1.5 million b/d capacity by 1992

  The total cost for the program went up to $88 billion instead of the original $3 billion commitment. It was funded from “windfall profits tax” on oil companies that made profits from deregulation of domestic oil production.

(Source: Copulos, 1985)
Synthetic Fuels in U.S.

- U.S. SFC was a quasi-public corporation which had the authority to contract with private firms for projects using indirect financial incentives such as loan guarantees, price guarantees, guaranteed purchase, and direct investment.
- The Board chose projects based on industry proposals responding to specific goals and avoided Congressional role in picking projects.
- SFC managed to sponsor four projects: Great Plains Coal Gasification, two shale projects, and Exxon Donor Solvent
- Ultimately the SFC failed because of plummeting oil prices.

(Source: Copulos, 1985)
Challenges for F-T CTL today:

- Price/Market risks
- Technical risks
- Safety and environmental risks
History of Oil Price

2004 Dollars

- OPEC 10% Quota Increase
- Asian Econ Crisis
- Series of OPEC Cuts 4.2 Million Barrels
- PDVSA Strike
- Iraq War
- Asian Growth
- Yom Kippur War
- Arab Oil Embargo
- U.S. Price Controls
- 9/11

Avg U.S. $20.94
Avg World $22.86
Median U.S. & World $17.18

1947 - 2004
### Comparison of World Oil Price Forecasts, 2010-2030

(2004 dollars per barrel)

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<th>Forecast</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
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Source: EIA, Annual Energy Outlook 2006
Importance of Market/Price Risks

From the previous two slides, we can clearly see that

- Prior to 2005, it was rare that oil was priced at levels to make coal liquids economically viable.
- Many of the forecasts of future oil prices have oil in ranges that render coal liquids uneconomic.
- The bottom line – private investments will not happen without some form of price protection.
Policy Alternatives to be Evaluated

- An investment guarantee, such that the federal government would guarantee some percentage of the investment in the event the plant could not produce fuels at market prices.
- A purchase guarantee, such that the government would agree to purchase the product at some minimum price. The purchase guarantee would not obligate the plant to sell to the government.
- A purchase contract wherein companies would bid for a purchase price at which the government would acquire all the plant’s production.
- A fixed subsidy per gallon such as is now available to ethanol and bio-diesel.
- A variable subsidy in which the subsidy would be a function of the oil price, rising as the oil price falls and falling as the oil price rises.
Analysis of Alternatives

- Monte Carlo simulation will be used to estimate the risk reduction to the private sector and the expected cost to the government of each alternative.

- All the options being considered rely on private sector investments with some form of price insurance provided by the government.
Risks of Doing Nothing

- The “Oil Shockwave” simulation experiment in 2005 indicated that taking a small amount of oil off the world market could cause prices, at least in the short term, to rise to $160/bbl.
- Supply disruptions of this type, which are likely in the future, will impose severe economic costs on our country.
- Is it better to pay some up front costs in implementing alternatives such as coal liquids, or pay more severe costs down the road?
“The real lesson here [is that] it only requires a relatively small amount of oil to be taken out of the system to have huge economic and security implications.”

-Robert M. Gates
Oil Shockwave National Security Advisor

(source: Oil Shockwave, Oil Crisis Executive Simulation)