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Turning Coal into Liquid Fuel

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First developed by Germany during World War II, the Fischer-Tropsch (FT) process offers America a chance to utilize its vast domestic coal supply, increase refining capacity, and produce a cost-efficient and clean fuel.

Dallas Headquarters:
12770 Coit Road, Suite 800
Dallas, TX 75251
972.386.6272
Fax: 972.386.0924
www.ncpa.org

Washington Office:
601 Pennsylvania Avenue NW,
Suite 900, South Building
Washington, DC 20004
202.220.3082
Fax: 202.220.3096

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The process can be used to transform natural gas, biomass or coal into liquid fuels; but for America, coal is the most viable feedstock. The coal-to-liquids (CTLs) process changes coal into a synthetic gas which is then converted into combustible liquid fuels. Diesel and kerosene (jet fuel) are the final products.

Increased production of CTLs in the United States would provide a number of benefits.

Benefit: Cleaner Energy. CTLs are less polluting than traditional fossil fuels. According to the University of Kentucky:

- Compared to ultra-low sulfur diesel as a transportation fuel, liquefied coal emits 60 percent fewer hydrocarbons per gallon,
- 10 percent less nitrous oxides, and
- 55 percent less particulate matter.

In short, increased CTL use can reduce the health effects and premature mortality from air pollution and help reduce smog in big cities.

Benefit: More Stable Energy Prices. Rentech, a primary U.S. patent-holder of the technology, produces CTL fuel in Colorado at a cost of $45 per barrel. Though this cost is comparable to the current price of crude oil, the price of American coal is less volatile. Price stability makes CTL a valuable option for certain transportation needs. According to a 2001 Energy Department study:

- The price of coal-derived diesel at the pump would be about $1.24 per gallon before taxes.
- If every gallon of diesel currently consumed were CTL, users would spend an average of $30 million a day less on fuel.
- At that price, every American who switched to CTL-fueled diesel cars and trucks would save $1,082 per year in fuel costs, on average.

One of the primary reasons for gasoline price volatility in the United States is a lack of refining capacity. Conventional refineries in the United States currently use 10 percent (1.4 million barrels per day) of their capacity to produce jet fuel and 30 percent (4.6 million bpd) for diesel. Domestic CTL production could free up much of this refining capacity for gasoline production. This would significantly decrease America's vulnerability to both supply and price shocks.

Benefit: Secure Energy Source. A number of nations produce fuel through the FT process. China, Qatar and South Africa lead the world in current production and new capacity under construction. [See the figure.] While Qatar turns natural gas into liquid fuel, both China and South Africa use coal. South Africa supplies 30 percent of its transportation fuel in this way. The United States has more coal than any other nation, with currently estimated reserves of 270 billion tons. CTL production utilizing coal would increase the nation's energy security.

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America uses approximately 1.1 billion tons of coal annually — or about 3 million tons per day. Given that it takes approximately one-half ton of coal to produce a barrel of CTL diesel:

- It would require 2.3 millions tons per day to replace all domestically refined diesel.
- That would increase annual coal demand by 839 million tons, or 83 percent.
- The increased demand would still leave America with nearly 100 years of coal reserves — but the supply is even greater, since the FT process can utilize "junk" coal that is unusable for most purposes.

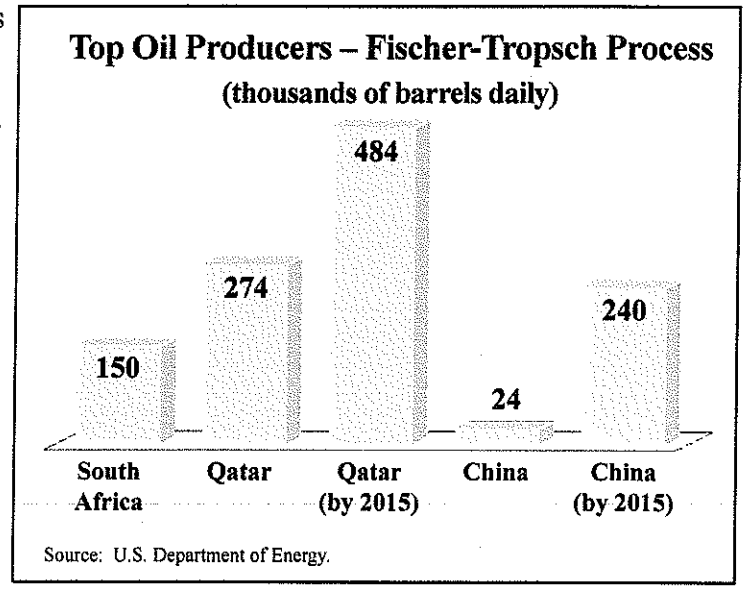
In addition to domestically refined fuel, America imports a substantial quantity of diesel and jet fuel.

- America imports 500,000 bpd of diesel and 20,000 bpd of jet fuel.
- One, average-sized CTL plant (50,000 bpd) could replace all imported jet fuel, or cut diesel imports by 10 percent.

Benefit: Clean Electric Power. CTL production discharges excess steam that can be used to produce electricity. Electricity produced as a by-product of CTLs is incredibly clean. Such power generators emit 41 percent to 78 percent less regulated pollutants than similar-size traditional fossil fuel-fired electric plants. For example:

- A proposed plant in Frackville, Penn., would produce 5,000 bpd of diesel and generate 49 megawatts of electricity.
- Almost 3 percent of the electricity generated from oil could be displaced with 100 plants the size of the one proposed in Frackville, or 10 plants producing 50,000 bpd.

Roadblock: Low Oil Prices. The main hindrance to CTL plants in the United States has been economics. A CTL plant is a long-term investment which requires sufficiently high oil prices to make it worthwhile. Until recently, oil prices have simply been too low for CTL production to be profitable. However, many analysts believe the era of low oil prices is over. The fact that America lacks viable alternatives to imported fossil fuels when oil prices rise again is encouraging industry to finally attempt to develop CTL plants.



Roadblock: Uneven Playing Field. CTL offers extensive benefits compared to other alternative energy sources. CTL fuel is both cleaner and, at current prices, less expensive to produce than either ultra-low sulfur diesel or biodiesel. Unlike ethanol, it needs no special infrastructure for transportation and delivery. Unfortunately, the U. S. Department of Energy does not recognize CTLs as alternative fuels — meaning producers don't get the same tax breaks as officially designated alternative fuels. A neutral government policy would allow CTLs to compete on an even playing field.

Roadblock: Environmental Activists. The United States currently has a number of demonstration plants that produce less than 1,000 bpd. However, it has become difficult to build new FT plants. Some new projects have been denied construction permits due to objections by environmental interest groups.

Most recently, the Air Force planned to build a number of FT plants around the country with the goal of meeting half of its jet fuel needs with CTL fuel by 2016. It planned to develop a 30,000 bpd plant for Malmstrom Air Force Base in Montana in partnership with a private company. The Air Force would have provided land; the company would have financed and operated the facility. The plant had the support of Gov. Brian Schweitzer (D), an ally of President Obama. But, despite enthusiastic support from the state and the Air Force, the Obama administration recently canceled the project under pressure from environmentalists.

Removing the Roadblocks. The Energy Department should recognize CTL as an alternative energy source. Coal-to-liquids will not move America completely away from fossil fuels, but it offers greater energy security now while nonfossil-based transportation fuels and technologies are developed for the future.

Nicholas Ducote is the Wyly junior fellow and H. Sterling Burnett is a senior fellow, with the National Center for Policy Analysis.