

Oil: Please, Sir, May I Have Some More?

There are some potentially large sources of additional crude oil and/or oil substitutes. While hope remains for these technologies, they are all problematic.

1. Tar Sands. Alberta, Canada, has large, shallow deposits of heavy tar-like oil mixed with sand. Recoverable reserves are roughly equivalent to Saudi Arabia's total reserves. This oil is strip mined, like coal. It has to be extensively processed to be separated from the sand and refined into usable products. The technology is not difficult, but the process is polluting and uses large quantities of water and methane that are needed for other purposes. Consequently, it is only viable in a world of energy scarcity, and requires extensive environmental remediation. (One of the projects covers 58 sq. mi.—that's roughly as large as the City of St. Louis)ⁱ Thus, while a possible energy reserve in a world of scarcity, it is not a way to return to the low price energy world of the recent past.ⁱⁱ

2. Oil Shale. Centered around Northwest Colorado there is a deposit of kerogen in shale rock. Kerogen can be heated to become oil, hence the name "oil shale." Estimates of this reserve range up to the equivalent of 2 trillion barrels of oil. This is almost double the estimate of total current world oil reserves.ⁱⁱⁱ To date, however, it has not proven technologically feasible to recover this oil. Hope exists for a future technology, but it may not work; even if it does, it will be costly, involve a significant energy offset,^{iv} and be environmentally problematic. While possibly a source for fuel needed at any cost for strategic purposes, it does not currently look like a solution to the wider energy problem.^v

3. Coal Synfuels. Several processes, some known for decades, can be used to make gas and liquid fuel from coal. They yield high grade fuel, and new processes under development hold the hope of being more efficient and less polluting than are current refining processes. They require large new plants that are 20-25% more expensive than standard plants, however. The process also releases huge amounts of greenhouse gasses, exacerbating global warming. Thus, coal synfuels are a technologically possible alternative to oil, but will be expensive and problematic from a climate change perspective^{vi}

4. Biofuels. These will be discussed in their own white paper. The main biofuel of interest to Missourians is ethanol. Currently, ethanol is best made from sugar cane, but in Missouri, we make it from corn.^{vii} Ethanol is chemically a viable replacement for gasoline. It has a number of issues that are solvable technologically. But when it comes to applying those solutions on the huge scale of the fuel distribution system, the challenge is more daunting. One significant problem involves the diversion of farmland from food production to fuel production. We are already experiencing increased food prices as a result^{viii}. Another is that the process requires huge amounts of water that are not always available.^{ix} The overall conclusion is that ethanol looks good as an oxygenating fuel additive, but cannot be produced in the huge amounts needed to serve as a gasoline replacement.

Thus, although alternatives to oil exist, all are problematic and expensive. None are a way to return to the cheap energy days of the 20th Century.

ⁱ Viewed and calculated on Google Earth. To see for yourself, type “Ft. McMurray, Alberta” into the search box on Google Earth.

ⁱⁱ Nersesian, Roy. (2007). *Energy for the 21st Century*. Armonk, NY: M.E. Sharpe.

ⁱⁱⁱ *BP Statistical Abstract of World Energy*,

^{iv} The more energy you must use to extract, process, and transport an energy reserve, the less net energy you get from doing so.

^v Petroleum. *Wikipedia*. Viewed online 10/17/2007. [Http://en.wikipedia.org/wiki/Petroleum](http://en.wikipedia.org/wiki/Petroleum).

^{vi} Jonsson, Patrik, & Venkataraman, Bina. “From Milk to Meat, US Food Prices Spike Upward.” *Christian Science Monitor*, June 13, 2007.

^{vii} Gillam, Carey. Ethanol Craze Endangers U.S. Plains Water: report. *Reuters*. 9/20/2007. [Http://uk.reuters.com/article/environmentNews/idUKN2044379220070920](http://uk.reuters.com/article/environmentNews/idUKN2044379220070920).