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Oil Shale Fact Sheet

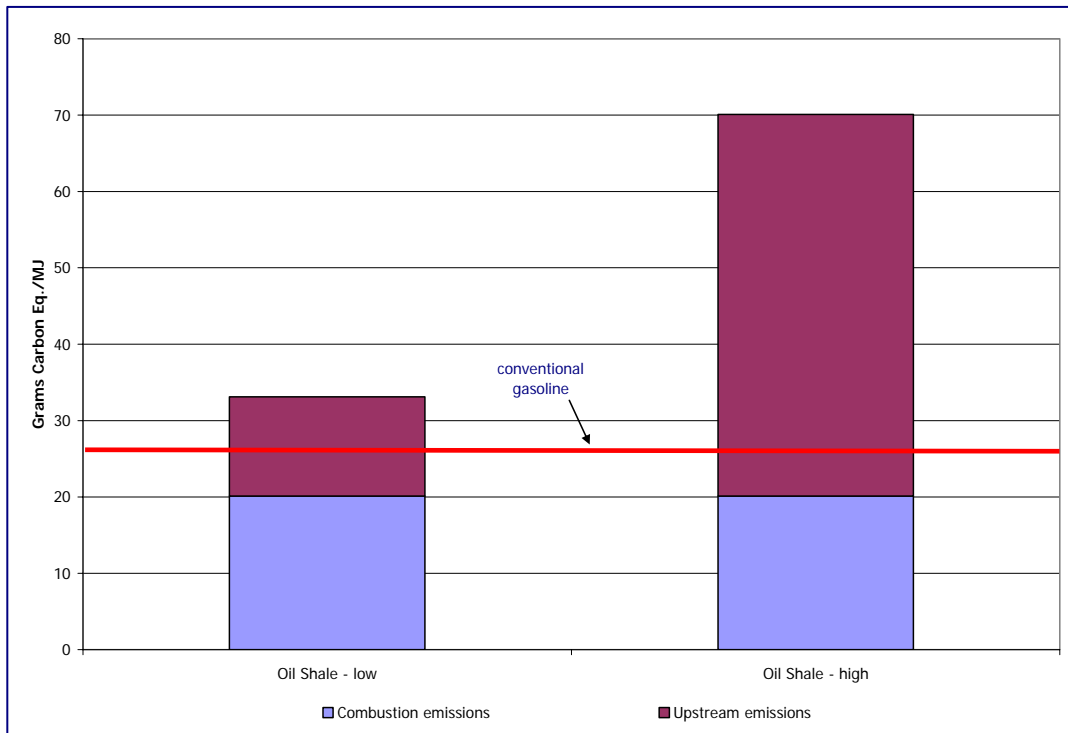
Oil Shale Production & Global Warming

“For us, as a company, the scientific debate about climate change is over. The debate now is about what we can do about it. Businesses, like ours, should turn CO2 management into a business opportunity and lead the search for responsible ways to manage CO2, use energy more efficiently and provide the extra energy the world needs to grow.... With fossil fuel use and CO2 levels continuing to grow fast, there is no time to lose.”

- Jeroen van der Veer, CEO, Shell

- **Climate change is a global phenomenon with well-documented and serious local impacts.** Those impacts affect the both ecosystems and the welfare of citizens in the United States and the nation’s Western states in particular. In addition to its other disruptive direct effects, commercial oil shale development can be expected to significantly contribute to global warming and exacerbate the impacts of climate change.
- **Production of oil from shale is extremely energy intensive.** Regardless of whether shale oil is produced through above-ground or in-situ methods, it is exceedingly energy intensive. Upstream energy consumption per unit of final fuel delivered is roughly 1.75 to nearly 3 times that of conventional petroleum production.¹ In fact, the Bureau of Land Management (BLM) estimated that a single in-situ project would require 2,400 megawatts of power for commercial production of 200,000 barrels of shale oil per day.² Scaling up to 1 million barrels of shale oil a day—about what the U.S. uses every hour—would require the construction of 10 new power plants.
- **The energy required to extract oil from shale will likely result in the generation of huge quantities of greenhouse gas emissions.** In preparing their environmental impact analysis, the BLM made it clear that this new power would come from coal. 10 new coal-fired power plants could generate up to 121 million tons of carbon dioxide per year. That translates into a 90% increase in the carbon dioxide emitted by all existing electric utility generating units in 2005 in Colorado, Wyoming, and Utah combined.

- Transportation fuels derived from oil shale are extremely energy intensive and have a carbon footprint that is known to be higher than conventional fuels.** Several recent studies have estimated the global warming contribution of the leading oil shale extraction technologies (upstream), as well as the emissions released when the fuel is burned (combustion). One study determines that the full-fuel-cycle emissions from the oil shale process are 21%-47% higher than those from conventionally produced petroleum-based fuels.³ The energy demands for extracting oil shale lead to significantly greater carbon emissions than conventional fuels. The following figure illustrates the carbon intensity of oil shale production for a range of extraction technologies.



Source: A. R. Brandt and A. E. Farrell. "Scraping the Bottom of the Barrel: CO2 Emission Consequences of a Transition to Low-Quality and Synthetic Petroleum Resources." *Climatic Change* (2007) 84:241–263.

"In sum, the GHG emissions from oil shale and tar sands leasing on almost 2.5 million acres of federal land constitutes a significant cumulative impact on the environment. The available data (which was ignored by BLM) does not support the agency's conclusion that the project will not have a significant impact on climate change." - California Attorney General in comments on DPEIS

¹ A. R. Brandt (2007). Converting Green River oil shale to liquid fuels with ATP and ICP technologies: A life-cycle comparison of energy efficiency and GHG emissions. Presentation to 27th Oil Shale Symposium, Colorado School of Mines, (Golden, CO) October 17th, 2007. Available at http://abrandt.berkeley.edu/shale/Brandt_Converting_Green_River_oil_shale_to_liquid_fuels.pdf.

² BLM, Draft Programmatic Environmental Impact Statement at 4-14.

³ A. R. Brandt (2008). Converting Oil Shale to Liquid Fuels: Energy Inputs and Greenhouse Gas Emissions of the Shell in Situ Conversion Process. *Environmental Science Technology*.