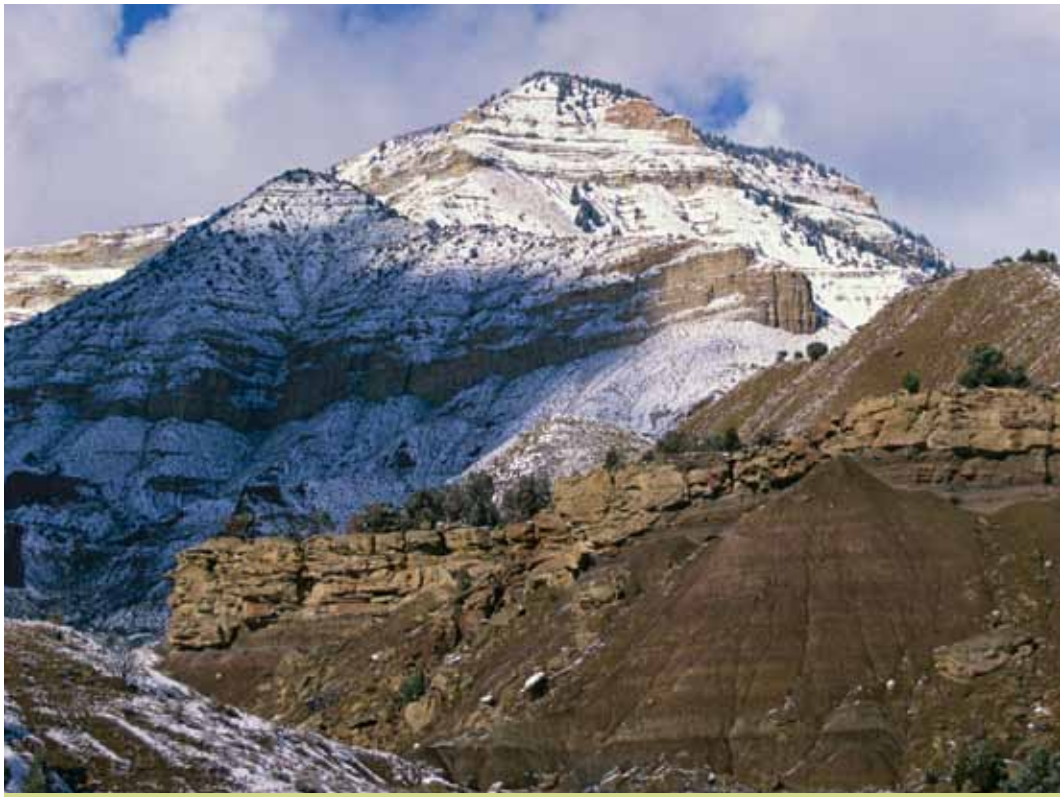
Fuel Facts



These wildlands near Parachute, Colorado, could be replaced with an enormous complex of huge, pollution-spewing power plants unless Congress acts to protect the American West from risky dirty fuels development.

"Producing 1 million barrels of oil shale per day could require as much electricity as powering approximately 7 million homes."

Repower America with Clean Energy: Don't Choose Dirty Fuels Such As Tar Sands, Oil Shale or Liquid Coal

The United States stands at an energy crossroads. We now face a choice: to develop dirtier unconventional sources of transportation fuel derived from fossil fuels—at an even greater cost to our health and environment—or set a course for a more sustainable energy future of cleaner, renewable fuels and other clean transportation solutions to fuel our cars, trucks, and airplanes. America needs clean energy solutions, not dirty fuels such as tar sands, oil shale, and liquid coal.

The United States, as the number-one consumer of oil in the world, is the primary driver behind the development of dirty fuels in North America. But unconventional fuels emit high levels of global warming pollution in the production process, and they will only continue our dependence on carbon-based fuels and perpetuate an unsustainable level of transportation emissions. Dirty fuels emit as much as three to five times the global warming pollution in the production process as conventional oil production. Moreover, each of the unconventional fuels comes with its own set of serious risks to our health, to our environment, and to the bottom line of businesses that invest in high-carbon fossil fuels.

Instead of developing even dirtier fuels, the U.S. should cut greenhouse gas emissions in half by increasing fuel efficiency, reducing miles driven, and rapidly transitioning to environmentally sustainable low-carbon fuels.

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NRDC
THE EARTH'S BEST DEFENSE

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Canadian tar sands

The oil industry is strip-mining and drilling millions of acres of Boreal forest and wetlands in Alberta, Canada to extract and produce low-grade petroleum fuel for the United States. Tars sands oil production requires a web of open pit mines, upgraders, refineries, and pipelines, which spread far beyond the Boreal forest. These facilities create habitat fragmentation and toxic waste holding ponds, as well as air, water, and global warming pollution.

In Canada, tar sands are found under an area of Alberta's Boreal forest and wetlands that is larger than the state of Florida. These sands contain approximately 10 percent crude bitumen—the tarlike substance that can be converted to oil. Today, most tar sands oil production results in open-pit mines—some as large as three miles wide and 200 feet deep. But the bulk of the established reserves (82 percent) are deeper and will be extracted by injecting high-pressure steam into the ground to soften the bitumen so it can be pumped to the surface. The environmental and social impacts of tar sands extraction and conversion of the bitumen to fuel are severe and include:

- **Global warming pollution from tar sands production that is as much as three times as high as conventional oil production per barrel.** Oil companies and government have discussed possibilities for carbon capture and disposal in the tar sands region, but government officials found that carbon capture technology offers only limited solutions to reducing greenhouse gas emissions.[1]

- **Serious impacts on the health, water, and land of local Aboriginal communities.** Already, communities have experienced polluted water, water reductions in rivers and aquifers, declines in wildlife populations such as moose and muskrat, and loss of fish habitat.

- **Strip mining and drilling that destroy Boreal forests and create toxic waste.** Strip mining and drilling in the tar sands requires such a complex infrastructure that nearly every part of the forest will be within a few hundred yards of an industrial intrusion. In the strip-mining, up to four barrels of water from the Athabasca River are taken to produce one barrel of tar sands oil. Much of this water ends up as toxic slurry held in over 65 square miles of waste "ponds."[2]

- **Boreal forest destruction, fragmentation, and tar sands toxics, which threaten migratory birds.** Combining the various estimates of the loss of birds from mining and in situ operations, NRDC projects a cumulative impact over the next 30 to 50 years ranging from a low of about 6 million birds lost to as high as 166 million birds lost.[3]

- **Air and water pollution (including global warming pollution) in the United States from new pipelines and refinery expansions built to process additional tar sands oil.** Seventy-five percent of the 1.34 million barrels being produced daily in Canada is exported to the United States and tar sands operators are aiming to expand production to more than 4.5 million barrels per day by 2020.[4] U.S. refineries primarily in the Midwest already take and refine Canadian tar sands oil. Oil companies are proposing new pipelines, refineries, and refinery expansions in the Midwest and the Gulf Coast regions to expand in order to handle more tar sands oil—a move that would not only lock the U.S. into a dirty fuels infrastructure, but would also add to the already serious concerns about air and water pollution in these regions.

Oil shale

Extracting oil from shale involves heating a certain type of rock to high temperatures and turning it to liquid—in essence, speeding up what takes nature millions of years to accomplish. While not proven to be a good source of gasoline without considerable additional processing, oil from shale can be used for diesel, kerosene, and jet fuel. The oil industry has been chasing after profitable ways to heat oil shale while it is still underground, so that it can be pumped out of the ground like other oil. Research is ongoing—but no commercial production is currently happening in the United States.

The vast majority of the world's oil shale reserves are found in the Green River formation, a geological area that covers 16,000 square miles in northwest Colorado, northeast Utah, and southwest Wyoming. In the Green River formation, seven out of every ten acres are public land, managed by the federal government on behalf of the American people.

Despite high costs, perhaps insurmountable technical hurdles, and profound and unavoidable impacts to the environment, the promise of

domestic oil shale remerged with help from former Vice President Cheney's Energy Policy Task Force and the Energy Policy Act of 2005 (EPAct). Among other things, EPAct called for the creation of a regulatory framework that would promote and govern the development of commercial oil shale leasing on public lands. In advancement of these goals, the Bush Administration issued regulations governing the commercial leasing of oil shale in November 2008, even though the industry is still in the research stage. These rules were promulgated despite the U.S. Interior Department's own assessment that the agency had no practical means to assess the impacts of a future oil shale industry: "Because there is no commercial oil shale industry in the United States, there is [sic] no data available on what, if any, extraction process will be commercially viable, and thus there is uncertainty about the precise impacts from commercial oil shale development."[5]

Despite this level of uncertainty, oil companies are determined to proceed with oil shale regardless of the potential impacts. These impacts are not insignificant:

- **In the western United States, an enormous complex of huge coal-fired power plants would likely be needed to produce the energy required for oil shale development.** Producing one million barrels per day will require the energy equivalent of roughly 10 giant new power plants and five giant new coal mines.[6]

- **Large coal-fired power plants and the production of dirty fuels would further increase levels of greenhouse gases.** Producing and using oil shale would create far more greenhouse gases—more than twice as much as conventional fuel on a life-cycle basis.

- **One of the many unknowns in the oil shale production process is how much water will be required.** Producing one million barrels of oil per day could require up to 300,000 acre-feet of water per year, enough to supply up to 365,000 families of four for one entire year.[7]

- **Oil Shale production will require an entire industrial city of roads, pipelines, and drill rigs potentially spread out over thousands of acres—acres that are now important habitat for a wide array of sensitive wildlife, including elk, great horned owls, and bald eagles.** In some areas, wells could be drilled into the landscape every 25 feet for miles, completely occupying the surface and destroying wildlife habitat—turning the area into an industrial wasteland. Hilly areas would have to be leveled, while nearly all vegetation would be removed. Oil shale operations would forever change the wild nature of these lands.

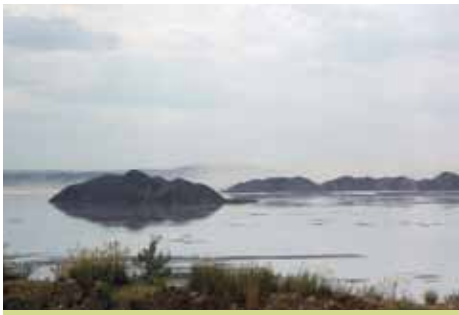
Liquid coal

Coal can be broken down into a petroleum-like product by reassembling its basic molecules to form a liquid fuel. This process is extremely energy, water, and emissions intensive. On a lifecycle basis, liquid coal produces nearly double the global warming pollution as conventional petroleum fuel. Even so, industry continuously seeks public subsidies so that it can transform millions of tons of coal into high carbon fuel. A mature liquid coal industry would have severe consequences which are discussed below.

Liquid coal facilities are expensive, requiring substantial taxpayer subsidies. According to a 2008 RAND study, a first generation liquid coal facility is estimated to cost $100,000 to $125,000 per barrel of daily production capacity.[8] Thus a 50,000 barrel per day facility might exceed $6 billion in capital costs. Failure under a variety of scenarios would leave taxpayers with enormous stranded investments. Yet all of this risk supports very little reward. The environmental disadvantages include:

- **Liquid coal produces nearly double the lifecycle global warming pollution as conventional petroleum fuels.** This doubling of emissions means that running a hybrid vehicle on liquid coal would result in as much pollution as running a Hummer on gasoline. Advocates propose managing these emissions through carbon capture and storage (CCS). This is not a viable option since CCS does not improve tailpipe emissions. At best it would produce fuels as dirty as petroleum. At this time when we must significantly reduce transportation sector emissions. We will not achieve our climate objectives if we squander limited resources on technologies that are no better- and potentially much worse than today's.

- **Coal mining—and particularly surface or strip mining— poses one of the most significant threats to terrestrial habitats in the United States.** According to the same 2008



Tar sands surface mining in Canada creates huge tailing "ponds" filled with toxic slurry. Some of these ponds are so enormous that they can be seen from space with the naked eye.

The race to tap dirty fuels threatens tlandscapes in both the United States and Canada. In Canada, only 10 percent of the water taken from the Athabasca River is returned to the river, with the majority of it either used or diverted to toxic waste ponds.

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The tar sands industry consumes enough natural gas every day to heat roughly 4 million American homes.

Underground *in-situ* mining of tar sands requires major industrial facilities that mar the surrounding landscape.

RAND study noted earlier, achieving 3 million barrels per day of liquid coal production could require up to 50 percent more coal mining above today's levels. Forty-six western national parks are located within 10 miles of an identified coal basin, and these parks could be significantly affected by future surface mining in the region. In addition, the Appalachian region, which already is suffering from widespread destruction to its forests, wildlife habitat, landscapes, watersheds, and communities from mountaintop removal coal mining, would experience even more environmental and economic harm from this large increased mining.

Policy recommendations for creating a clean energy future

A clean energy future requires policymakers to make wise investment decisions with taxpayer funds. Congress should resist subsidizing dirty fuels with unacceptable environmental attributes and focus on cleaner transportation options.

Avoid and eliminate high carbon fuel subsidies: Subsidies for high carbon fuels are often embedded in broader legislation. Congress should remain vigilant against dirty fuel subsidies in large legislative packages. Prior supports for dirty fuels include long term government procurement contracts, grant funding, favorable tax treatment, loans, and loan guarantees. Additionally, Congress should repeal tax subsidies that have already passed. These include the Internal Revenue Code section 179C refinery expensing option for tar sands and oil shale.

Implement Section 526 of the Energy Independence and Security Act of 2007 (EISA): The administration should expedite implementation of section 526, which prevents federal agencies from contracting for fuels with higher lifecycle greenhouse gas emissions than conventional petroleum resources. And Congress should resist attempts to weaken or repeal this provision.

Establish and strengthen vehicle and fuel performance standards: The Federal government should adopt a national low carbon fuel standard (LCFS) to gradually reduce the carbon intensity of all transportation fuels. This policy would not only discourage dirty fuel production, but would also facilitate the production and use of clean fuels. Additionally, policymakers should continue strengthening performance standards for vehicles that increase fuel economy standards beyond those set in EISA, as well as adopt new vehicle and aviation greenhouse gas emission standards.

Invest in clean transportation options: A combination of demand reduction and alternative technologies can provide ample energy supply while reducing greenhouse gas pollution. Policymakers should focus on clean vehicle technologies such as plug-in electric hybrids, demonstrably environmentally sustainable biofuel, and ways to reduce miles traveled including efficient infrastructure and public transit. Where appropriate, clean technology incentives should be performance based, providing greater support for higher environmental performance.

[1] CBC News. "Secret advice to politicians: oil sands emissions hard to scrub." November 24, 2008. http://www.cbc.ca/news/pdf/foip-scan.pdf.

[2] The Pembina Institute. "Mining vs. In Situ Fact Sheet." May 2010. http://pubs.pembina.org/reports/mining-vs-in-situ.pdf.

[3] Wells, Jeff, Susan Casey-Lefkowitz, Gabriela Chavarria, Simon Dyer. *Danger in the Nursery: Impact on Birds of Tar Sands Oil Development in Canada's Boreal Forest.* NRDC. 2008. http://www.nrdc.org/wildlife/borealbirds.asp.

[4] Canadian Association of Petroleum Producers. *2008 Canadian Crude Oil Forecast.* Alberta, Canada: CAPP, 2008, http://www.capp.ca/default.asp?V_DOC_ID=1285 (accessed Dec. 2, 2008).

[5] 73 Fed. Reg. 69453

[6] Bartis, James T., et al. "Oil Shale Development in the United States: Prospects and Policy Issues," Rand Corporation. 2005, p. 23.

[7] Potential Ground Water and Surface Water Impacts from Oil Shale and Tar Sands Energy-Production Operations," Argonne National Laboratory, Report ANL/EVS/R-06/9. October 2006.

[8] James Bartis et al. *Producing Liquid Fuels from Coal.* RAND Corporation. 2008.