

The End of Coal

Special Report

Coal is by far the dirtiest form of fossil fuel we use, but it's also the most readily usable fuel that we still have in relative abundance. Coal provides about one-quarter of the total energy the world uses.

Worldwide electricity production is 40 percent powered by coal. Two-thirds of the steel industry relies on it for fuel, and that coal must be high-energy "black coal."

Like oil, the best deposits of coal are highly concentrated. The major deposits of coal – about 90 percent – are located in just six countries: the United States, which has the most, plus Russia, India, China, Australia and South Africa.

The United States has roughly 496 billion tons of demonstrated coal reserves, 27 percent of the world total, and thus is often called "the Saudi Arabia of coal." Our coal endowment has been widely estimated to be a 250-year supply. But that estimate was based on a USGS study from the 1970s which assumed that 25 percent of the known coal could be recovered with current technology and at current prices.

But today, the USGS believes that only 5 percent is recoverable with today's technology and at current prices.

This startling conclusion came from a 2007 study by the National Academy of Sciences. The researchers looked at updated surveys from the USGS and determined that some of the old assumptions were wrong.

"There is probably sufficient coal to meet the nation's needs for more than 100 years at current rates of consumption," the study said. "However, it is not possible to confirm the often-quoted assertion that there is a sufficient supply of coal for the next 250 years."

Similarly, a separate study of world coal reserves in March, 2007, which was conducted by a German consultancy called the Energy Watch Group (EWG), found that the United States doesn't have nearly its claimed 250-year supply of coal. Indeed, EWG claims that in terms of energy content, the United States passed its peak of coal production in 1998.

The distinction is based on the fact that various types of coal contain different amounts of energy. Anthracite (also known as black coal) from Appalachia and Illinois has 30 megajoules of energy per kilogram (30 MJ/kg), but it has long been a tiny fraction of our overall coal production, and has been in decline for over half a century.

Our supposedly vast reserves are mainly of lower-quality bituminous coal, delivering 18 to 29 MJ/kg, and subbituminous coal and lignite (brown coal), delivering a mere 5 to 25 MJ/kg.

For comparison purposes, EWG translated the energy content of the coal produced into tons of oil equivalent. In terms of volumes of stuff mined, they found that U.S. coal production can continue to grow for about another 10 to 15 years. But in terms of energy, which is the only metric that really matters, U.S. coal production peaked in 1998 at 598 million tons of oil equivalent, and had fallen to 576 million by 2005.

Just as we have burned through the world's best sources of oil, we have burned the best sources of coal. The remaining coal we produce will be of progressively lower quality, and will be progressively more expensive to transport due to the escalating cost of diesel.

In a replay of the well-worn debate about oil reserves, it appears that the global reserve numbers for coal have been vastly overstated. The information we've had for the world, like the U.S. data, is decades old and unreliable, and modern reassessments by nice, transparent countries like Germany and the United Kingdom have resulted in 90 percent reductions.

The reserve numbers from Asia are particularly suspect, some dating back to the 1960s. China hasn't reduced its reported reserve numbers in more than a decade, even though we it has produced some 20 percent of its reserves over the past 15 years.

In fact, for the past 20 years, all major coal-producing nations that have updated their reserve numbers have adjusted them downward. And in the past 25 years, the global total reserve estimate has been cut by 60 percent.

The EWG report concludes, "The present and past experience does not support the common argument that reserves are increasing over time as new areas are explored and prices rise." Take a look at the data:

- Total global reserves stand at about 900 billion tons
- The world's largest producer of coal is China, which will likely peak between 2012 and 2022, followed by a steep decline.
- The next-largest producer is the United States, which will likely peak between 2020 and 2030.

Based on this scenario, the EWG estimates that the absolute peak of global coal production will occur around 2020, about 10 years after peak oil.

If you're an energy investor, this information is paramount to making wise investment decisions.

Shrinking coal reserves, social and political movements to phase out highly-pollutive coal-fired power plants, and a reduction in production costs for natural gas and renewable energy are gradually putting the kibosh on new coal-fired power production.

And you better believe that this is already starting to translate into huge opportunities for those seeking to profit from the end of coal.

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