



## Ethanol from Coal

Posted by [Robert Rapier](#) on February 11, 2008 - 11:00am

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The handwriting has been on the wall on this issue for a couple of years. In fact, I first mentioned it in March 2006 in [Improving the Prospects for Grain Ethanol](#). Here is an excerpt of what I wrote:

This is an option that most environmentalists will abhor. However, it is the one most likely to take place in the short-term. The natural gas input into ethanol production is a serious long-term threat to economic viability. Since natural gas is a fossil fuel, and supplies are diminishing, it will put upward pressure on the price of ethanol over time. However, if the energy inputs could be produced from coal, ethanol prices would be insulated from escalating natural gas prices.

Using coal might also lessen the significance of the EROEI debate. If you take 1 BTU of (cheap) coal, and you get back 0.8 BTUs of (more valuable, liquid) ethanol, then EROEI doesn't have the same significance as when you use natural gas to produce ethanol. You converted the BTUs into a readily usable liquid form. This argument may be valid from an economic point of view, but it ignores the fact that coal is still an inherently dirty energy source. If coal remains abundant and cheap, coal economics will beat natural gas economics, but coal will increase the rate at which we put carbon dioxide into the atmosphere. If we come up with a viable method of sequestering the carbon dioxide produced at the power plant, then we might have a temporary economic solution (although we are still using up a non-sustainable fuel in the process).

Now I am not going to tell you that I think this is a good idea. I am just telling you what I think is going to happen. And a few days ago a friend sent a link that says Iowa is considering a couple of new coal plants for some ethanol plants, acknowledging the superior economics of coal as fuel:

[Iowa needs \\$2 billion in coal-fired electricity production to supply power for ethanol; critics say coal use "ungreens" ethanol](#)

Two coal-fired electricity plants, in Marshalltown and near Waterloo, have been proposed in Iowa to provide electricity for the growing collection of Iowa ethanol plants. Critics say that ethanol's need for coal-powered electricity makes the case that it is not a green fuel.

Alliant Energy, co-owner of the Marshalltown project, said that **the needs of the**

**ethanol plants can only be solved at this point in time by nuclear, natural gas or coal, and that natural gas is not economical** while nuclear has been taken off the table due to environmental concerns. The proposed plants would cost \$1 billion each.

Last week, Xethanol Corporation announced that it would invest \$500,000 in Consus Ethanol for its cogeneration project that would provide power for its **ethanol production process from waste coal, that would have a \$0.48 per gallon cost advantage over comparable ethanol plants in the Midwest powered by natural gas.** The Pittsburgh-based facility will distribute fuel to East Coast markets, which have higher prices for ethanol.

On the subject of using coal as the source of BTUs for ethanol production, there are two things that stand out. First, the current process of using natural gas to produce ethanol makes little sense, since you can use natural gas directly in a [CNG vehicle](#). You gain little or nothing by turning a BTU of natural gas into a BTU of ethanol (plus some animal feed). However, coal can't be used directly as automotive fuel, so one can make the argument of upgrading the quality of the energy source by turning some of coal's BTUs into ethanol.

Second, the cost of energy per BTU is far lower for coal. The current price of natural gas is \$8 per million (MM) BTUs. However, [according to the EIA coal sells for about \\$40/ton](#), or 2 cents a pound. The energy content of bituminous coal [is about 12,750 BTU/lb](#), which calculates out to \$1.57 per MMBTU. (Just double-checked my numbers, and found that [the EIA reported that coal prices in September 2007 were \\$1.78 per MMBTU](#), so I was in the ballpark).

So, the economics are going to drive ethanol producers toward coal as their fuel of choice. And some [have already been driven there](#). I predict we will see a lot more of this in the future, especially in light of [my previous essay on the economics of corn ethanol](#). Plug in coal at \$1.57/MMBTU instead of natural gas at \$8, and it makes a huge difference. But for ethanol producers who do go this route, don't pretend that what you are doing is clean or renewable.



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