A Debate Proposal for the Ethanol Lobby - Let's Get It On

Posted by Robert Rapier on August 15, 2007 - 10:15am
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Bob Dinneen, President & CEO of the Renewable Fuels Association (the same association that claims displacement of 170 million barrels of oil with 64 million BOEs of ethanol) wrote to Rolling Stone to complain about Jeff Goodell's recent critical piece on ethanol:

Letter To The Editor: Response to "The Ethanol Scam"

In the letter, Dinneen took a shot at me, writing *"As is to be expected, Mr. Goodell relied on the figures of an energy blogger for his facts."* Goodell defended me in his response to Dinneen:

> For a thorough clarification, check out oil industry engineer Robert Rapier's analysis. I know that Dinneen finds bloggers unsavory, but Rapier is among the most fair-minded and insightful critics of the energy industry I've come across.

And he pointed Dinneen to me for some answers. So, Bob Dinneen, this one's for you. Let's deconstruct the letter. Jumping past the all too predictable *ad hominems*:

Wow, I am having to jump pretty far. Farther than I thought, as the letter is laced with *ad hominems*. Four paragraphs into the letter, Dinneen is waving the flag and talking about "Mr. Goodell's Hugo Chavez." Was this really the RFA's best effort? Actually, I want to jump down and address the claim that I was most certain would be made by ethanol proponents:

> Yet another common misconception offered by ethanol novices is that ethanol is at best energy neutral, meaning it takes as much energy to produce as it yields. As is to be expected, Mr. Goodell relied on the figures of an energy blogger for his facts. Inconveniently for his arguments, the federal government has different figures. According to the Argonne National Laboratories, ethanol yields nearly 70% more energy that it took to produce. Conversely, refined gasoline contains 20% LESS energy that it took to produce.

Can you count the errors and misleading statements? First, "*ethanol yields nearly 70% more energy that it took to produce*". Then "*gasoline **contains** 20% LESS energy that it took to produce*." Are you comparing like to like, Mr. Dinneen? Of course you aren't. By your gasoline metric, ethanol also **contains** less energy than it took to produce. Why? Because you are

counting the BTUs contained in the feed as an "input" to the gasoline process, but you are not counting the crude ethanol BTUs as an input to the ethanol process. You are not comparing like to like; you are comparing an efficiency to an energy return.

If I have some quantity of energy to invest ("invest" means to consume; not to take a ride through the process as the gasoline BTUs do) in energy production, will I end up with more energy if I invest that into gasoline production, or into ethanol production? The answer is gasoline production, by a wide margin. And I have demonstrated that numerous times, using the pro-ethanol USDA's own numbers. I repeat: I am use pro-ethanol sources for my analyses. So accuse me of bias if you wish, but don't accuse me of using "different figures." I am using the same data source you are. I just didn't accept the edited version of the numbers.

I wonder if Mr. Dinneen understands how the USDA paper (Wang at Argonne is a coauthor, hence Dinneen's Argonne reference) arrived at this number? I am going to show you how they did, and cite the reports so you can check for yourself. I analyzed the reports in detail here, using USDA numbers to show that they engaged in a bit of creative accounting. You can read the analysis for yourself, but here's the executive summary.

In 2002, the USDA reported on the energy balance of corn ethanol, stating that the energy balance was 1.34 units of energy out for every unit in. As I showed, they performed a little accounting trick to get that, as the real number - when full BTU credit was taken for the animal feed co-products - was 1.27. Minor quibble, but it made me alert for more accounting tricks. And they came in a report released 2 years later.

In their 2004 report, the USDA acknowledged that they had grossly underestimated a number of energy inputs in the 2002 report. So, they corrected those numbers. But some energy inputs had gone down, and at the end of the day, the energy inputs/outputs in the 2004 report were about the same as in the 2002 report. Yet in the 2004 report, they reported that the energy ratio for ethanol in two short years had ballooned to an amazing 1.67, which is where Mr. Dinneen got his number. In light of this, it is not surprising that ethanol proponents cite amazing progress in improving ethanol's energy efficiency. After all, the government said it, so it must be true.

But let's look at the raw numbers, shall we? Look at Tables 3 and 4 in the 2004 USDA report. I will just produce it for you so you can see for yourself:

Table 3--Energy use and net energy value per gallon without coproduct energy credits, 2001

Production process	Milling process: Dry	Milling process: Wet	Weighted average
	Btu per gallon		
Corn production	18875	18551	18713
Corn transport	2138	2101	2120
Ethanol conversion	47116	52349	49733
ethanol distribution	1487	1487	1487
Total energy used	69616	74488	72052
Net energy value	6714	1842	4278
Energy ratio	1.10	1.02	1.06

Table 4--Energy use and net energy value per gallon with coproduct energy credits, 2001

Production process	Milling process: Dry	Milling process: Wet	Weigted average
	Btu per gallon		
Corn production	12457	12244	12350
Corn transport	1411	1387	1399
Ethanol conversion	27799	33503	30586
ethanol distribution	1467	1467	1467
Total energy used	43134	48601	45802
Net energy value	33196	27729	30528
Energy ratio	1.77	1.57	1.67

Table 1: 2004 USDA Report Showing the Energy Return for Corn Ethanol at 1.06.

I know that's hard to read, but here's what it says. (You can always check out the original if you think I am pulling any funny business). The energy produced in a wet mill process is only 2% greater than the energy it took to produce the ethanol. And I would point out that things like

topsoil and aquifer depletion, energy to build the ethanol plant, etc. were not part of the analysis. They said they didn't have good information on these things, so they just omitted any attempt to account for them (i.e., the actual energy return is lower than they reported).

For a dry mill process, they reported that the energy return is 1.10 - 10% ethanol energy produced - and the weighted average of the two is 1.06. Those are the raw, unedited numbers. In other words, input 1 BTU of fossil fuels, output 1.06 BTUs of ethanol. Even Mr. Dinneen can't dispute that almost all of ethanol's BTUs (even with accounting tricks) are derived from fossil fuels - hence my argument that ethanol is recycled natural gas. If you apply the ethanol subsidy only to the "produced" energy, you will be quite shocked at how expensive that created energy was. I leave that exercise to the reader.

In Table 4, to the right, you can see the "adjusted" numbers, and the energy return of 1.67. So, how did they do that?

What they have done, is they have lowered the energy inputs into the ethanol process by a great deal. And the way they did that was to change their methodology from the 2002 report. Instead of taking an energy credit for co-products, what they did was allocate energy inputs to the co-product. By doing this, they subtracted the energy inputs allocated to ethanol, and therefore inflated the energy return for ethanol. In other words, they are saying *"we didn't really use that much energy to make ethanol, we used a lot of it to make co-products. Therefore, we are only counting part of the energy inputs against ethanol production."*

But utilizing this type of accounting, I could manipulate the ethanol energy return to anything I wanted, just by allocating the energy inputs differently. You want an ethanol energy return of 3/1? Just allocate 65% of the energy inputs to the co-products. How about an energy return of infinity for ethanol? Just allocate all of the energy inputs to the co-product. It makes the co-product energy return look horrible, but it artificially boosts the ethanol energy return. And they aren't reporting the co-product energy return (who cares about that, right?), so you get an exaggerated energy return for ethanol production.

Dried distillers grains (DDGS) have become a very useful tool for the ethanol industry. When you point out that the ethanol energy balance is poor, they take a BTU credit for DDGS, just as if you could fuel your car with it. But they have now figured out that they place more of the "blame" of energy of production into the DDGS and exaggerate the energy return for ethanol. But you can't have it both ways. If the energy of production gets dumped into DDGS, it suddenly becomes a lousy co-product with an incredibly high energy cost to produce. Using the ethanol proponents' arguments about fuel quality, DDGS is an extremely low quality fuel with an extremely high energy cost.

Bottom line: Playing with the numbers doesn't change the fact that ethanol production is marginally above energy neutral. Despite Mr. Dinneen's claim that this is a "*misconception offered by ethanol novices*", it is in fact true, based on the government's own numbers. Mr. Dinneen and those who repeat the 1.67 number are misleading the public, since you can't actually achieve that without also getting a co-product with a terrible energy return.

Mr. Dinneen concludes with:

> It is entirely appropriate to have a debate about our energy policy in this country.

I agree. Here's my proposal. Three rounds, 2,000 word limit per round, with the debate hosted at the RFA site, at The Oil Drum, and at my blog. We would each have one week between entries. While I think it is appropriate to debate Mr. Dinneen, as he is making the claims, I don't really care who you line up (maybe Professer Bruce Dale is available?). On my side will be just me.

I suggest the debate resolution: "Corn Ethanol is Responsible Energy Policy." I will take the negative. If you have an alternate proposal, I would be glad to entertain it. But I insist that the debate is fact-based, and not *ad hominem*-based. All claims at RFA's site will be fair game, as will all the ethanol claims I have made.

So, how about it? If readers are interested in seeing the RFA defend their claims, or if you just relish the possibility of seeing me get trounced, let them know at info@ethanolrfa.org.

References

1. Shapouri, H., J.A. Duffield, and M. Wang. 2002. *The Energy Balance of Corn Ethanol: An Update*. AER-814. Washington, D.C.: USDA Office of the Chief Economist.

2. Shapouri, H., J.A. Duffield, and M. Wang. 2004. *The 2001 Net Energy Balance of Corn Ethanol*. Washington, D.C.: USDA Office of the Chief Economist.