The Oil Drum
DISCUSSIONS ABOUT ENERGY AND OUR FUTURE

National Renewable Ammonia Architecture Update

Posted by Gail the Actuary on May 15, 2009 - 10:29am
Topic: Alternative energy
Tags: ammonia, neal rauhauser, renewable ammonia, stranded wind [list all tags]

In this post, Neal Rauhauser introduces a new expanded paper on ammonia from stranded wind that his group has developed.

The first National Renewable Ammonia Architecture was published, over Nate's objection to the timing, on Christmas Eve of 2008. A mere 2,400 words and with many gaps, it still rules Googlespace, page rank #1 for anyone searching for "renewable ammonia".

We've had a bit of time since then and a good bit of luck on new data sources so we're back with an expanded, 6,500 word analysis. The new version can be found at National Renewable Ammonia Architecture Spring 2009.

The first piece was not as complete as we would have liked. We think this update will have filled in most, but not all, of the pieces an educated layman would need to begin to grasp what a might look like, and there are plenty of hooks to allow those with more detail knowledge of the fertilizer sector to begin considering how such a plan might be executed.

We've found and presented good information on pre-Haber Bosch nitrogen mining, primarily to put the nitrogen to protein mass balance problem in perspective for those who are interested in organic or non-chemical methods.

The U.S. Geological Survey and U.S. Census Bureau proved to have treasure troves of information on production volumes, suppliers, and other market forces.

We brought our carbon dioxide numbers in line with the method everyone else uses but we're still uncertain – is global ammonia production 70% coal/30% gas, or are the numbers reverse? We've dug and dug and still don't have a solid reference for this seemingly simple point. We did map all of the U.S. plants that are either in production or recently mothballed and in North America only three of twenty-nine facilities are using carbon heavy coal or petroleum coke.

Speculatively, we explored what it would take to fully free the nitrogen fertilizer industry from fossil fuel inputs, what would happen if solid state ammonia synthesis were perfected, and we hinted at an area that needs much investigation. If ammonia were entirely free of fossil fuel what could be done to accelerate carbon sequestration by fertilizing non-crop producing biomes? Much work has been done with hydrogen fuel cells and the problem has always been the source of the hydrogen more than the technology itself. An expansion of the national ammonia pipeline network to deliver renewable produced ammonia to stations that would catalytically crack it producing the needed hydrogen is another potentially attractive avenue.

We'd hoped to answer questions about the concept of a National Renewable Ammonia

Architecture. That we did, but in reviewing the finished work we see much room for better analysis – every section cries for a paper all its own, and integrating them tightly would yield a book on the topic. A less tight integration in the form of inviting essays from subject matter experts in the various disciplines is probably a good intermediate step, but we're uncertain as to who the players are for such an objective.

Always in the background is the work Alan Drake has done with the Millennium Institute regarding the validation of a national rail electrification plan. Similar efforts encompassing renewable ammonia, ammonia as a fuel, and ammonia enhanced carbon sequestration would seem to be equally valuable exercise.

We hope you'll take the time to read the entire plan, such as it is, and provide us with feedback.