### Biofuel DA---Uniqueness---2NC

#### Recent periods of high gas prices have pushed ethanol operations into the red---they’re the key factor that determine ethanol’s viability

Peter Dominici 11, Managing Director, Focus Management Group, January 14, 2011, “How Should Ethanol Producers Respond to External Conditions?,” online: http://www.ethanolproducer.com/articles/7400/how-should-ethanol-producers-respond-to-external-conditions

Ethanol producers in the U.S. are currently feeling the strain of low margins and uncertain tax incentives. The futures pricing for corn, natural gas and ethanol does not provide an outlook for any immediate relief of this strain. In fact, current forecasts of input costs and ethanol sales prices continue to show costs of corn and natural gas exceeding 90 percent of the projected sale price of ethanol. Given such market conditions, to continue to operate and generate profits, ethanol producers must look internally—to their controllable production costs and to their capital structure.

The demand for ethanol in the marketplace is currently subsidized by the U.S. government through the federal tax credit made available to the ethanol producers’ primary customers—the blenders.

The blender’s objective is to earn a profit by mixing or blending lower net-price per gallon ethanol with higher net-price per gallon unleaded gasoline, and then selling the blended fuel to customers at the higher-per gallon unleaded gasoline price. The federal tax credit, which declined from 51 cents per gallon of ethanol purchased by the blender in January 2005 to 45 cents in January 2009, has historically increased a blender’s profit when the blender’s net blended cost of a gallon of E10 gasoline is below the blender’s net purchase price for a gallon of unleaded gasoline.

Further adding to the complexity of the ethanol producer’s business model is an artificial demand side of the market. The U.S. EPA had imposed a ceiling that only allowed ethanol to be blended at a rate of 10 percent ethanol to 90 percent unleaded gasoline in every E10 gallon sold (known as the blend limit), with an annual aggregate ethanol usage ceiling imposed at 10 percent of total U.S. annual unleaded gasoline consumption each year (known as the blending ceiling). This artificially imposed demand ceiling had remained constant at 10 percent, both on the E10 blend limit and on the annual aggregate blending ceiling, since 1978. The combination of the blend limit and the blend ceiling is known in the ethanol industry as the blending wall.

The proposals discussed on including ethanol tax credits in the bill extending the Bush-era tax incentives, which was passed and signed just before Christmas, ranged from eliminating tax incentives for ethanol, to extending them at current levels for one year, to extending them for multiple years at a reduced rate of 36 cents per gallon of ethanol blended.

Over the years, ethanol producers have lobbied to have the mandated 10 percent blending limit raised to 15 percent, and recently the blending limit was raised to 15 percent in some cases. It was not mandated, however. Currently, the decision to blend beyond the current mandate of 10 percent rests with the blenders. Blenders will only blend at the higher level if an appropriate blending profit is available to them.

The recent increase to E15 is also impacted by market conditions. Gasoline that contains 15 percent ethanol can only be used in cars and light trucks sold since 2007. Therefore, even if the blending profit motive exists for blenders to blend, demand will be limited to the percentage of gasoline that is utilized by post-2006 light cars and trucks. The additional complexity in the delivery system for fuel products will also be a limiting factor. As a result, increased demand at the ethanol producer level is uncertain.

Assuming the tax credit remains at 45 cents per gallon of ethanol, raising the blending limit to 15 percent would result in an additional tax credit of 2.3 cents per gallon (45 cents per gallon of ethanol multiplied by the additional 5 percent), assuming the 15 percent blending ratio is used. In contrast, reducing the tax credit to 36 cents per gallon of ethanol reduces the blenders profit by 0.9 cents per gallon (9 cents per gallon of ethanol multiplied by the 10 percent ratio).

External Factor Outlook

Moving forward, ethanol producers will need to analyze the impact of the four variables affecting their business, in conjunction with tax credit changes, blending limit changes, and the price of corn and natural gas. Of the four variables impacting a producer’s profit, three are external—the primary direct costs of corn and natural gas, ethanol prices, and coproduct sales. One is internal—production efficiencies, including conversion rates, natural gas usage, and enzyme and chemical consumption.

The outlook through June does not look good for ethanol producers. The primary external costs to produce a gallon of ethanol (cost of corn per gallon and cost of natural gas per gallon) are projected to be greater than 100 percent of the projected ethanol sales price per gallon over the same time period. Figure 1 displays the relationship between these factors for 2010 and the forecast through June. Historically, ethanol producers do not fare well financially when their primary cost components (corn and natural gas) are greater than 90 percent of ethanol’s sale price.

Figure 2 extends the forecast period from December 2010 to December 2013. The long-term outlook is also weak as the cost of corn and natural gas per gallon of ethanol produced is greater than 90 percent of the projected sales price over that same period.

External factors do not support strong projections for earnings before interest, taxes, depreciation and amortization for ethanol producers. While commodity markets do change, the corn, natural gas and ethanol prices have not resulted in combinations that facilitate strong cash flow performance for ethanol producers since the first quarter of 2008. As a result, assuming external market conditions will improve for ethanol producers is not a viable forecast. Producers cannot look to the external market to correct their financial performance issues. Internal factors related to production efficiencies, overhead costs, and capital structure will need to be the primary focus.

#### Cellulosic ethanol isn’t viable yet on a large scale---improved economic viability’s key to expansion

Richard Matthews 12, consultant, eco-entrepreneur, green investor, owner of THE GREEN MARKET, a leading sustainable business blog, February 22, 2012, “The Biofuels Pipedream,” online: http://globalwarmingisreal.com/2012/02/22/the-biofuels-pipedream/

Second generation biofuels like cellulosic ethanol are not yet commercially available, but believers contend they may significantly alter the energy equation. Second-generation biofuels use non-food feed stock like cellulosic biomass (e.g. grasses, reeds and agricultural residue such as corn stalks). The processing of cellulosic biomass uses enzymes to breakdown the feedstock’s cellulose into sugar and it is then fermented. Alternatively, a thermo-chemical approach gasifies the biomass and then liquefies it in a process known as “biomass-to-liquid.”

Early in 2012, the Advanced Biofuels Association claimed “cellulosic ethanol and advanced biofuels industry is on the cusp of a major increase in scale that will prove critics of the effort to increase biofuels production in the US wrong.” In a recent interview, BP Biofuels North America President Sue Ellerbusch claimed that biofuel manufacturers are “right on the cusp of told you so.” Ellerbusch claims that BP is making sufficient progress that “over time we’ll have an industry that can compete head-on with fossil fuels.”

Research presented by Jeanette Whitaker of the Centre for Ecology and Hydrology in Lancaster, UK, finds that second generation biofuels hold substantially more promise than ethanol made from food-based feedstocks.

### Biofuel DA---Link---2NC

#### Sustainable low natural gas prices are the key factor enabling advanced, non-corn based biofuels to be cost-effective

Tristan R. Brown 12, practicing attorney and Seeking Alpha contributor, July13, 2012, “Advanced Biofuels And The Shale Gas Revolution,” online: http://seekingalpha.com/article/719491-advanced-biofuels-and-the-shale-gas-revolution

I teach a graduate class on biorenewables and students frequently ask me how the so-called "Shale Gas Revolution" will affect U.S. biorenewables in general and biofuels in particular. A common assumption is that biofuels will be negatively affected by this development, and I expect this view to become even more prevalent in light of Patriot Coal's Chapter 11 bankruptcy filing, which has been attributed in part to coal's inability to compete with cheap natural gas. After all, if inexpensive coal can't compete economically with shale gas as an energy source, then how can we expect our relatively undeveloped biomass reserves to fare any better? Furthermore, if biofuel producers fare best when the price of another fossil fuel, petroleum, is high, then won't they suffer when the price of natural gas is low?

While these are valid points, they ultimately fail to account for the crucial fact that many advanced biofuel pathways (i.e., those utilizing a feedstock other than corn) employ natural gas either directly as is or indirectly as a hydrogen source. The economic feasibility of these pathways should therefore increase as the price of natural gas falls due to reduced operating costs. This article quantifies the increase in the biofuel industry's economic feasibility resulting from the advent of inexpensive shale gas.

Biofuels and Natural Gas

Ethanol, which has historically been the focus of U.S. biofuel industry, is an imperfect transportation fuel due to its relatively high oxygen content. This causes ethanol to damage engines and fuel equipment unless it is blended with large amounts of gasoline prior to use ("gasohol"). It is also responsible for ethanol's low energy value relative to gasoline. Interest in the production of biobased hydrocarbons has increased greatly in recent years as a result of these deficiencies, as these can be refined to produce biobased gasoline (or "drop-in biofuels" due to their ability to utilize unmodified fuel infrastructures, unlike ethanol). Biomass contains up to 50% oxygen by weight (with the remainder comprised of carbon and hydrogen) and this must be removed during the production of biobased gasoline. While multiple deoxygenation routes exist, one of the more attractive options is to react the oxygen in biomass with hydrogen via a process known as hydrodeoxygenation, or hydroprocessing. Hydroprocessing allows the oxygen in biomass to be removed as water, leaving behind the carbon and hydrogen biomass components -- i.e., the building blocks of hydrocarbons. Steam reforming of natural gas accounts for 95% of U.S. hydrogen production [1] and this analysis therefore assumes that the hydrogen consumed during hydroprocessing is derived from natural gas.

A number of commercial-scale biofuel companies are expected to employ natural gas as an inexpensive source of hydrogen. KiOR (KIOR) produces an oxygenated bio-oil via the catalytic pyrolysis of biomass, which is deoxygenated and depolymerized (i.e., split into smaller molecules) into a gasoline blendstock via reaction with hydrogen. Honeywell International (HON) subsidiary UOP has developed a hydroprocessing route that is being used to produce both biobased gasoline and biobased diesel fuel (not to be confused with biodiesel). Ensyn-UOP joint venture Envergent will use UOP's technology to build 15 fast pyrolysis in Malaysia that will produce a bio-oil capable of being hydroprocessed into gasoline and diesel fuel. Rentech (RTK) uses natural gas and biomass and Sundrop Fuels uses biomass and natural gas-derived hydrogen as feedstocks in gasifiers for the production of a syngas that is then converted to biobased gasoline. Finally, the following U.S. producers all react hydrogen with lipids to produce diesel and jet fuels via lipids hydroprocessing:

Altair Fuels

Diamond Green Diesel [a JV between Valero (VLO) and Darling Intl. (DAR)]

Dynamic Fuels [a JV between Syntroleum (SYNM) and Tyson Foods (TSN)]

All of the above projects are notable in that they have commercial-scale biorefineries either in operation or under construction. Use of natural gas will therefore be widespread within the advanced biofuels sector in the near future.

Quantifying the Impact of Shale Gas on Biofuels

When addressing the question of how much of an impact falling natural gas prices will have on biofuel economic feasibility, it is useful to see how shale gas production has affected natural gas prices. The Energy Information Administration's Annual Energy Outlook provides natural gas price projections from before and after the advent of widespread shale gas production. The following figure shows the difference between the EIA's 2010 and 2012 AEOs:

Increased shale gas production has caused natural gas projected prices to decline significantly, especially between 2012 and 2022.

I frequently use techno-economic process models of biofuel pathways to tease out information on pathway economic feasibility. While published models are not available for all of the pathways employed by the biofuel projects listed above, they are available for fast pyrolysis and hydroprocessing, which is similar but not identical to the catalytic pyrolysis and hydroprocessing pathway employed by KiOR. For this analysis I look at the production of both biofuels [2] and commodity chemicals [3] via fast pyrolysis and hydroprocessing. While biofuel production is the nominal focus of this analysis, it is helpful to also look at the production of commodity chemicals (i.e., petrochemicals derived from biomass rather than petroleum) due to the recent trend of biofuels producers switching to chemicals production and its greater profit margins [3]. Modified Excel versions of both models are employed to calculate the 20-year internal rate of return for 2000 metric ton per day biorefineries employing each pathway under the AEO 2010 and AEO 2012 natural gas price scenarios. A higher IRR represents greater economic feasibility.

The results of this analysis show that lower natural prices resulting from increased shale gas production will have a significant positive impact on the fast pyrolysis pathway's economic feasibility:

A similar result can be assumed for the lipids hydroprocessing pathway due to the operational similarities between bio-oil hydroprocessing and lipids hydroprocessing. It is more difficult to quantify the impact on economic feasibility for the aforementioned gasification companies due to their use of natural gas and hydrogen as feedstocks rather than hydroprocessing inputs, although it is most likely positive due to their use of either natural gas or hydrogen as inputs.

Conclusion

A number of advanced biofuel projects in the U.S. employ natural gas either directly as is or indirectly as a hydrogen source. These projects will benefit from the long-term fall in natural gas prices resulting from increased shale gas production. As a result, public biofuel companies and other public companies engaged in biofuel projects such as Darling Intl., Honeywell, KiOR, Rentech, Syntroelum, Rentech, Tyson Foods, and Valero are expected to indirectly benefit from increased shale gas production. While the shale gas revolution is not alone sufficient to make these biofuel projects economically viable, their economic feasibility is greater than it was before the widespread production of shale gas. Investors (as opposed to traders) in these companies should keep an eye on shale gas production and projected natural gas prices as a result.

#### Low natural gas prices are key to feedstock flexibility---it’s a key bridge technology that builds in investor confidence---that’s the only way new biofuels projects can come online and be cost-competitive

Robert J. Johnson 12, Chief Executive Officer at Primus Green Energy, and was formerly the CEO of three advanced alternative fuels companies, July 3, 2012, “Optimistic Realism in Commercializing Biofuels,” online: http://energy.aol.com/2012/07/03/optimistic-realism-in-commercializing-biofuels/

But the theme emerging from the remarks of the more than 100 biofuel executives who spoke at the conference was that biofuel companies should execute this "go big" strategy in carefully considered steps rather than in giant leaps and that the key to staying strong is to hedge their bets at every opportunity, including by increasing the range of feedstock, product and financing options.

In other words, although the mood was one of optimism due to macro trends such as the rising price of oil and the increased energy demand from developing countries like China and India, that optimism has to be tempered with a cautious realism that is cognizant of the pitfalls attendant to bringing new technologies out of the lab and into production, including moving too fast.

Like many other conference participants, Primus Green Energy, an alternative fuels company, is pursuing a strategy of incremental commercialization, which I like to call "proving out what's most provable." Since many process technologies are multi-stage, it's often possible to bring the most developed element to market first instead of waiting to perfect the entire process.

Primus Green Energy has developed an innovative and highly efficient thermo-chemical biomass conversion process yielding a product that is a drop-in substitute for gasoline. We have a pilot plant in operation, we are constructing an integrated demo plant and we are working with Bechtel Hydrocarbon Technology Solutions on plans for our first commercial plant, on which we intend to break ground in 2013.

While we remain committed to producing gasoline from woody and herbaceous biomass, we are moving ahead with our gas-to-liquids (GTL) fuel synthesis process, which produces gasoline from natural gas, rather than waiting for our biomass gasification process to be proven out. Why? For the simple reason that our GTL process - which we term, STG+ - is ready to go and the low price of natural gas makes this option economically attractive.

The advantage of an incremental strategy is that it reduces technology risks and capital costs, generating the funds and the investor confidence to prove out the rest of the technology - in Primus' case, our proprietary biomass gasification process. We plan to integrate our biomass gasification process, which lags in development behind the STG+ process, into our production line once it is fully proven out.

As Voltaire, that Enlightenment-era proponent of the force of reason said, "The perfect is the enemy of the good" – the good in this case being natural gas that is abundant and cheap. The current price of about $2.25 per 1,000 cubic feet represents a 10-year low, and industry analysts have predicted the price could drop to below $1.00. We would be foolish not to take advantage of such an opportunity.

As journalist and author Fareed Zakaria recently noted in the Washington Post, "The United States now has, at current consumption rates, at least 75 years' worth of recoverable natural gas. More important, the United States has become the world's low-cost producer of natural gas."

The same flexibility that allows us to use biomass, natural gas or even waste methane as feedstocks also allows us to produce a variety of end products. We began as an ethanol producer, but shifted to gasoline because of the demand for a drop-in substitute. And if the market demands that we shift to diesel, jet fuel or aromatic chemicals, we can do that as well through simple adjustments to our production process.

We also are flexible in our financial strategies. As an industry, we need to recognize that current market conditions and the experience of biofuel companies that tried to do too much, too fast, particularly in going public too early, may have dampened enthusiasm among some members of the financial community.

Thus, we need to bring an "all of the above" strategy to the financial task of moving new biofuel technologies out of the lab and into production. This includes the potential for government grants and guarantees for strategic investors who will fully fund construction, as well multi-party, multi-tier project financing in which technology and commodity risks are borne by knowledgeable parties.

We also need to plan for less leverage, higher fees and rates, and more time to put deals together, as well as for the use of sophisticated financing tools such as structured insurance products and commodity hedges against price fluctuations.

Although commercializing a first-of-its-kind biofuel technology isn't easy, it isn't impossible either. To achieve success, however, flexibility at the front and back ends of the production process is critical, as is the ability to take advantage of all the tools in the financial universe. It's also important to keep in mind that the impact of your success extends far beyond the boundaries of your plant.

### Biofuel DA---Food Prices Impact---2NC

#### Expanded biofuel production causes skyrocketing global food prices

William Pentland 7-28, Chair of the Northeast Clean Heat and Power Initiative and Forbes contributor, July 28, 2012, “The Coming Food Crisis: Blame Ethanol?,” online: http://www.forbes.com/sites/williampentland/2012/07/28/the-coming-food-crisis-blame-ethanol/print/

If you believe the folks at the New England Complex Systems Institute in Cambridge, Mass., the global food supply system is stumbling into a drought-induced supply shortage that could galvanize a global food crisis far more severe than those implicated in the widespread uprisings known as the Arab Spring.

In an updated version of a paper first published in September, Marco Lagi, Yavni Bar-Yam and Yaneer Bar-Yam considered the possible consequences of the prolonged drought in the mid-western United States, the worst in half a century, on global food prices. The analysis, which relied on a quantitative model of historical food prices, concluded that the drought could amplify the impact of market speculation and corn-to-ethanol conversion policies on the impending global food crisis by an order of magnitude. To

Recent droughts in the mid-western United States threaten to cause global catastrophe driven by a speculator amplified food price bubble. Here we show the effect of speculators on food prices using a validated quantitative model that accurately describes historical food prices. During the last six years, high and fluctuating food prices have led to widespread hunger and social unrest. While the spring of 2012 had a relative dip in the food prices, a massive drought in the American mid-west in June and July threatens to trigger another crisis . . .

An update to the original paper in February 2012 demonstrated that the model previously published . . . anticipated a new food crisis by the end of 2012 if adequate policy actions were not implemented. Here we provide a second update, evaluating the effects of the current drought on global food prices. We find that the drought may trigger the expected third food price bubble . . . to occur earlier than otherwise expected, beginning immediately . . . [and] rais[ing] prices well beyond an increase justified by the reduced supply caused by the droughts.

In other words, the sky may soon fall for those poor souls who are unable to stomach the marginal increase in food prices. At risk of reiterating the obvious, malnutrition is a matter of life or death.

Everyone agrees that we should not support policies that result in food shortages. The trouble is that nobody agrees what policies are to blame. The NECSI analysis fingers biofuels first and speculators second: “The model showed that, of all the factors proposed to be responsible for the recent dramatic spikes and fluctuations in global food prices, rapid increases in the amount of corn-to-ethanol conversion and speculation on futures markets were the only factors which could justifiably be held responsible.”

### Biofuel DA---Decomposers Impact---2NC

#### Cellulosic ethanol destroys soil decomposers – that collapses all food production and ensures extinction

John Ikerd 8, Professor Emeritus of Agricultural Economics at the University of Missouri, June 24, 2008, “Rethinking the Meaning of Waste in Relation to Energy, Food, and Climate,” online: http://web.missouri.edu/ikerdj/papers/Lake%20Ozark%20-%20Rethinking%20Waste.htm

Understandably, cellulosic ethanol has become the latest political favorite in the quest for renewable replacement for fossil energy, even though its technical and economic feasibility is still uncertain. However, forages are typically used as feed for livestock, which produce meat and dairy products and trees can produce fruits and nuts – food. So, the competition of cellulosic ethanol with food production still exists; it’s just less obvious because the connections are less direct and more complex. The ethical questions are no different. Each kcal of biofuels potentially deprives someone somewhere of a kcal of food.

This would seem to leave agricultural wastes as the ideal source of bioenergy. Much of the solar energy captured by agricultural crops is left in the fields as crop residues, to be burned, buried, or to dissipate into the air as it rots. Eighty percent or more of the energy in feed grains and forages fed to livestock is excreted as livestock urine and manure, much of which fouls streams and groundwater or volatizes into the air as noxious odors and greenhouse gasses. In fact, all livestock-related activities, including feed grain production and clearing of forests for livestock forages, are estimated to account for 18-percent of total U.S. greenhouse gas emissions and approximately 80-percent of greenhouse gasses emitted by agriculture.[4] Much of the remainder of agriculture’s estimated 22.5-percent contribution to total U.S. greenhouse gas production is accounted for by deforestation, crop residues, and nitrous gasses released through soil fertilization. Clearly, using agricultural wastes for bioenergy and biomaterials could make a significant contribution to the twin challenges of fossil energy depletion and global climate change. Furthermore, if all biological wastes were truly wastes, there would be no competition with food production. No ethical compromise would be involved.

However, crop residues and livestock urine and manure are not wastes when viewed from an ecological perspective. The complex ecological system through which all bioenergy flows may be represented as a pyramid with various layers of living organisms. The bottom layer is made up of the organisms in the soil, the next layer is plants, the next is all those things that feed on plants, including insect and animal herbivores, next is the things that feed on both plants and animals, the omnivores, mainly humans, and finally the things that eat only animals, the meat-eating carnivores. A generalization exists in ecology that on average, about ten-percent of the energy available in one layer will be passed on to the next level; thus the pyramid narrows dramatically as it rises. “Not everything in the lower levels gets eaten, not everything that is eaten is digested, and energy is always being lost as heat”[5] – to entropy. So each higher level of the pyramid contains only about ten-percent as much as energy as the level immediately below it. As Aldo Leopold put it, “for every carnivore, there are hundreds of his prey, thousands of their prey, millions of insects, and uncountable plants.”[6]

A critically important layer of this living pyramid is its foundation: the billions and trillions of microorganisms in the soil, the decomposers that extract and live from the energy remaining in the wastes generated at all other levels in the pyramid, including human wastes, livestock wastes, and crop residues. All new energy enters the biological pyramid at the plants layer, made up of the solar collectors. Energy is stored by all levels of the pyramid but all the energy captured ultimately escapes into space as heat – the process of entropy. However, the inorganic nutrients – nitrogen, phosphorus, potassium, calcium – that plants must combine with carbon, hydrogen, oxygen in the process of storing energy – as carbohydrates or sugars – are continuously recycling through the pyramid, with the soil’s biological system as its foundation. Many of these inorganic nutrients become available to plants only after they have been released from wastes and stored by decomposers. The food energy that supports earthworms, bacteria, fungi, nematodes, and other decomposers in the soil is the energy left in the things that we humans call wastes. The various “wastes” reclaimed by the decomposers amount to about one-fourth of all of the solar energy currently captured by green plants. This is the energy that some now propose to extract from the energy flow to use for biofuels and biomaterials.

Everything we do affects everything else, including us. When we generate energy from wood wastes or sawdust, we are depriving the decomposers in forest soils of food and thus deprive food from forests of the future. When we generate energy from crop residues, animal manure, and other agricultural wastes, we are depriving the decomposers in agricultural soils of the food they need to make soil nutrients available for plants of the future. We humans are biological beings; we eat other biological organisms. We can’t eat the sun or digest the electricity generated by windmills, falling water, or photovoltaic cells. If wastes equivalent to ten percent of our current fossil energy use were diverted from the agricultural waste stream, it would deprive the decomposers of about 75-percent of so-called wasted energy they use to help feed agricultural crops. When we generate energy from agricultural residues and wastes, we are depriving people of food just as surely as when we generate bioenergy from food crops; the process is just a bit more complex.

The same basic ethical and ecological questions are raised by using agricultural wastes to produce biofuels and biomaterials as are raised by using corn and soybeans to produce ethanol and biodiesel. In addition, depriving the soil decomposers of their life’s energy may represent an even more serious threat to the future of humanity than does depleting the earth’s remaining fossil energy. Even if we deplete the earth of fossil energy, humanity might still learn to live from the daily inflow of new solar energy – we would still have biological sources of food. If we starve the biological foundation of the earth’s living pyramid, the decomposers, we may well have deprived future humanity of their only significant source of biological energy – their only source of food.

### Biofuel DA---Food Production Impact---2NC

#### Biofuel crops will use unsafe GM tech---contaminates and collapses the global food supply

Annie Shattuck 8, Food First, degree in Environmental Studies concentrated in Plant Biology from the University of California, April 2008, “The Agrofuels Trojan Horse: Biotechnology and the Corporate Domination of Agriculture,” online: http://www.foodfirst.org/en/node/2111

Once in the field, there is no way to prevent GM fuel crops from contaminating their food-crop cousins. Cases of genetic contamination are commonplace. In the past 2 years alone, there were at least 73 publicly documented cases of genetic contamination.xxvi Proving contamination can be difficult, making the actual amount of genetic pollution hard to judge, but likely much higher than reported. GM corn traits were even found in native corn varieties in the mountains of Oaxaca, Mexico, where GM corn was never legally grown.xxxii In fact, every commercial fuel crop so far is under consideration or has been approved for human consumption in the U.S. without long term independent testing. This includes Syngenta's fuel corn with traits from a deep sea bacteria that has never come in contact with humans, much less entered our food chain.xxxiii xxxiv

The danger of an agronomically flat, GMO world is that it leaves our food systems vulnerable to climate change events and pest and disease outbreaks. Agrofuels based on GMOs and controlled by a handful of corporate giants does not lessen our vulnerability, it worsens it. Once GM agrofuels have entered the agricultural gates they will soon escape into the wild, contaminating food crops across the globe. Nothing short of a sustained, coordinated (and expensive) international eradication campaign will reign them in.

### Biofuel DA---Southern Forests Impact---2NC

#### Large-scale cellulosic ethanol destroys Southern U.S. forests

Jeremy Hance 8, writer for Mongabay, Mongabay.com seeks to raise interest in and appreciation of wild lands and wildlife, while examining the impact of emerging trends in climate, technology, economics, on conservation and development, 10-16, 2008, “An interview with Scot Quandra of the Dogwood Alliance: Cellulosic biofuels endanger old-growth forests in the southern U.S.,” online: http://news.mongabay.com/2008/1016-hance\_quaranda\_interview.html

Cellulosic biofuel is on its way. This second generation biofuel — so-called because it does not involve food crops — has excited many researchers and policymakers who hope for a sustainable energy source that lowers carbon emissions. However, some believe that cellulosic biofuel may prove less-than-perfect. Just as agricultural biofuels have gone from being considered 'green' to an environmental disaster, some think the new rush to cellulosic biofuel will follow the same course.

Scot Quaranda is one of those concerned about cellulosic biofuel’s impact on the environment. Campaign director at the Dogwood Alliance, which he describes as "the only organization in the Southern US holding corporations accountable for the impact of their industrial forestry practices on our forests and our communities", Quaranda condemns cellulosic biofuels as dangerous to forests “by its very definition”.

The southern forests of the United States contain a wealth of biodiversity, ecosystem types, and watersheds. However, the region is also the world’s largest paper producer for everything from office supplies to packaging to fast food containers. Currently 43 million acres of what was once old-growth forest are now paper-producing plantations.

“Large amounts of carbon have been released in the industrialization of the southern forests, biodiversity has greatly suffered leaving many species endangered, ecosystem types have dwindled to smaller and smaller pockets, and watersheds have been ruined,” Quaranda says. “Despite the pressure of the paper industry, there are forests left which remain pristine. Now, however, a new threat looms.”

The new threat is cellulosic biofuels. “Tree-based biofuels, also known as cellulosic ethanol, is a product that will be produced from wood waste, pulpwood and wood chips by converting the cellulose to a liquid fuel through either a thermal or enzymatic process,” Quaranda says, adding that “cellulosic ethanol can also be created from other cellulose-rich plants like switch grass and jatropha.”

According to Quaranda sixteen bioenergy projects are currently underway in the South, one of which will be online in as early as 2009.

“The future of these magnificent forests and the people of the region whom have come to rely on them are seriously in jeopardy should cellulosic ethanol go into large-scale production,” Quaranda warns. “More forests will be cut down, a greater number of greenhouse gases will be released into the atmosphere, air and water quality will be compromised, and our already taxed water supply will be further depleted, threatening both our environment and quality of life.”

#### US forests are key to global carbon cycle stability

Natural Science, 98, America’s Amazing Carbon Sink, http://naturalscience.com/ns/articles/comment/ns\_com07.html

An article in the October 16, 1998 issue of Science (see also ABSNews.com report) by S. Fan and others presents evidence that North America's second-growth forests south of latitude 51 absorb 1.7 (SE = 0.5) billion tons of atmospheric carbon annually. This claim, which is based on a study of north-to-south and west-to-east atmospheric carbon dioxide concentration gradients, is in sharp conflict with estimates derived from measurements of forest production. According to the Food and Agriculture Organization (FAO) of the United Nations (2), forest production in the whole of North America (including the vast boreal forest, which lies north of latitude 51), is just under one billion cubic metres of harvestable stemwood per year. The FAO estimates North America's total timber harvest at just under 0.6 billion cubic metres of stemwood per year. Net accumulation of standing timber is thus estimated to be approximately 0.4 billion cubic metres per year, representing the accumulation of approximately 100 million tons of carbon. To this might be added up to 150 million tons of carbon contained in the 0.6 billion cubic metres of harvested timber on the optimistic assumption that all is converted to products which either have a life time comparable to that of a forest, or are indefinitely recycled without loss. An annual increment of one hundred million tons of carbon in harvestable timber implies an accumulation of approximately 150 million tons of carbon in whole-tree biomass (i.e., including leaves, branches and roots as well as harvestable stemwood). In addition, carbon accumulates in forest soils in the form of leaf and branch litter, dead stems and roots. The accumulation of soil organic matter can exceed that in living biomass by a factor of as much as two. Thus, based on the FAO data, one can estimate that North America's forests comprise a sink for, at most, 150 million tons each in living forest biomass and harvested wood products, plus 300 million tons in forest soil organic matter, for a total of 600 million tons annually. But this implies a North American carbon sink only one-third the size of that inferred in the Science paper. If the Science paper is correct, it implies that ground-based estimates of forest yield have overlooked two-thirds of North America's annual accumulation of timber (i.e., growth less timber harvested), or about 1.2 billion cubic metres. It might seem difficult to overlook that much wood--more than a cubic kilometer added to inventory each year. However, the undetected additional volume would be spread over 0.8 billion hectares, and would thus amount to no more than a millimeter or two in annual mean tree diameter growth, or just one or two cubic metres of timber per hectare. Given that ground-based estimates of forest yield are dependent on plot measurements made over many years, some dating back more than half a century, they may not reflect the impact on tree growth of recent changes in climate and atmospheric chemistry. As the authors of the Science paper note, a small rise in temperature, accompanied by increases in atmospheric carbon dioxide concentration, nitrogen deposition rates and precipitation may provide a more potent stimulus to forest production than has yet been generally recognized. But the results reported by Fan et al. are based on a limited data set and need confirmation with results from a more comprehensive atmospheric sampling network than that available at present. In the meantime, the study is bound to stir controversy. The United States and Canada, as signatories of the Kyoto agreement, must take steps to regulate their net carbon emissions. However, with combined emissions from fossil fuel combustion of 1.6 billion tons per year, i.e., less than the inferred forest carbon sink, both countries may be net absorbers of carbon. Whatever the true magnitude of the North American forest carbon sink, the report by Fan et al. emphasizes the central role that forests play in regulating the composition of the atmosphere. If a massive North American forest carbon sink is confirmed, it will have major and, on the whole fortunate, implications; among them that timber, a vital industrial raw material, will be in abundant supply for the foreseeable future. North America alone could, if necessary, supply all of present world timber demand on a sustainable basis. Further, the result implies that the productivity of second-growth forests in North America is so large that there is no urgent economic justification for allowing further inroads into North America's remaining stands of old-growth timber until their role both as a carbon reservoir in the global carbon cycle and in the maintenance of biodiversity has been clarified.

#### Unbalanced flow of carbon causes extinction---this is completely separate from warming

Connie Mutel, The Center for Global and Regional Environmental Research, Rebalancing the Carbon Cycle, Fall 1998, http://dwb.unl.edu/Teacher/NSF/C11/C11Links/www.cgrer.uiowa.edu/newsletters/fall1998/feature.html

Carbon. From the time when the first living organisms coalesced in a sea permeated with long-chained molecules, this element has been essential to life on earth. Like water and oxygen, we cannot live without it. Carbon’s importance arises from its crucial provision of both structure and energy to living creatures. Carbon’s very long chains and rings are the backbones of most organic molecules. Break living bodies of any sort into organs, break the organs into cells, and the cells into molecules, look inside, and you will find a string of carbon atoms. If you could somehow pull all these carbon strings from the organism, little would remain of either the organism’s form or function. But carbon also flows through organisms and, when doing so, provides the energy that allows them to laugh, play, migrate, reproduce -- to perform virtually any function that we associate with being alive. This energy comes stored in the molecular bonds that hold the carbon chains together. Think about it. If you need an energy boost, you grab a CARBO-hydrate -- a food with quickly digested and readily available carbon compounds. Given the importance of long-chained carbon compounds, it was crucial that living creatures developed mechanisms for producing these complex molecules and assuring that they could be readily transferred from one organism to another. Hence the significance of the carbon cycle, which is diagrammed in a simplified form in Figure 1. Through this cycle, carbon (in the form of carbon dioxide, or CO2) is pulled from the atmosphere by green plants, which engage the sun’s energy to form the long carbon chains (a process called photosynthesis). The carbon chains, and the energy they contain, are then handed from one creature to another as a series of meals -- from corn to pig to human, from grass to rabbit to decomposing fungi. Eventually, the molecules release their energy and break back down to emit CO2 (a process called respiration). The CO2 released into the atmosphere plays another crucial role. CO2, with other greenhouse gases, provides an insulating blanket that holds in the sun’s warmth and heats the earth’s surface to a temperature that is hospitable to life -- about 60°F warmer than it would be otherwise.

\*\*\*Continues\*\*\*

All complex carbon compounds are tiny storage vaults for the sun’s energy. We know now that those vaults can be opened to fuel a forest or our own bodies, our cars, our hospitals, and our factories. The trick is not how to do so -- it’s how to do so in a sustainable manner. It’s how to maintain the cycles so that carbon can continue to provide balanced services -- as a global temperature regulator as well as an energy source and structural building block for life on earth. CGRER’s research is directed toward further deciphering and better tending the intricacies of the carbon cycle so that the earth’s thin film of carbon-dependent life can continue to flourish.

#### Southern forests key to global biodiversity

Scott Quaranda 8, Campaign Director for The Dogwood Alliance, NGO working in the Southern US to increase corporate accountability for forestry practices, 10-16, 2008, “An interview with Scot Quandra of the Dogwood Alliance: Cellulosic biofuels endanger old-growth forests in the southern U.S.,” online: http://news.mongabay.com/2008/1016-hance\_quaranda\_interview.html

Southern forests are the most biologically diverse in North America and in many cases, the world. Unfortunately, the unique challenge that we face in the South is that 90% of the forests are privately owned and lack any legal protections.

Southern forests contain some of the most biologically rich ecosystems in North America. From the Gulf Coast, Ozark Mountains and Southern Appalachians to the pine woods and swamps of the East Coast, Southern forests house an abundance of plant and animal diversity and pristine watersheds. Many of the region's plant and aquatic species can be found nowhere else in the world.

# Southern forests contain: The highest concentration of tree species diversity in North America;

# The highest concentration of aquatic diversity in the continental United States, including the richest temperate freshwater ecosystem in the world; and

# The highest concentration of wetlands in the U.S., 75% of which are forested.

#### Extinction

Charles W. **Fowler 8**, National Marine Mammal Laboratory, Alaska Fisheries Science Center, National Marine Fisheries, Maximizing biodiversity, information and sustainability, Biodivers Conserv (2008) 17:841–855 853

This study responds to world-wide concern by scientists, policy makers and the public about the variety of observed global changes, including lost **biodiversity** and anthropogenic extinction (e.g., Millennium Ecosystem Assessment 2005a, b). Many of these changes are seen as degradation that leads to risk, not only for other species, ecosystems, and the bio- sphere, but also for humans **(including the risk of human extinction**; Boulter 2002). Such observations justify taking management action to account for ecosystems, the biosphere and the Earth. Management at the level of the biosphere cannot be ignored (Lubchenco etal. 1991; Mangel etal. 1996; Fowler and Hobbs 2002, 2003; Fowler 2003); the inherent complexity of nature cannot be ignored.

### Biofuel DA---Invasive Species Impact---2NC

#### Large-scale cellulosic ethanol causes massive invasive species outbreaks

S. Raghu 6, Illinois Natural Resource Survey, et al., September 2006, “Adding Biofuels to the Invasive Species Fire?,” Science, Vol. 313. no. 5794, p. 1742

Biofuel crops may have economic benefits, but studies of concomitant environmental risks of movement into novel habitats are seldom conducted. Although anecdotal claims of "low risk" for some species (4) may be valid, many purportedly beneficial introduced species have had long-term economic and environmental costs owing to their invasiveness (5, 6). For example, Sorghum halepense is an introduced forage grass that became an invasive weed in 16 of the 48 U.S. states in which it occurs. Even the most conservative estimate of competitive losses for cotton and soybean crops in three states is in excess of $30 million annually (7).

Several grasses and woody species have been evaluated for biofuel production, with perennial rhizomatous grasses showing the most economic promise (4, 8). Arundo donax (giant reed; native to Asia) and Phalaris arundinacea (reed canary grass; native to temperate Europe, Asia, and North America) are two C3 grasses being considered as biofuel species (8) that are invasive in some U.S. ecosystems. The former threatens riparian areas and alters fire cycles (9); the latter invade wetlands (10) and affect wildlife habitat.

The hybrid grass Miscanthus giganteus (native to Asia) and Panicum virgatum (switch-grass; native to central and eastern United States) are C4 grasses being considered in Europe and the United States (4, 11). Several Miscanthus species are invasive or have invasive potential (12); in particular, the parent species of M. giganteus (13, 14). Miscanthus giganteus is an allopolyploid that does not produce viable seed and reproduces vegetatively. However, allopolyploidy does not guarantee continued sterility (15) and vegetative propagation is often associated with invasiveness (16, 17) or directly contributes to it (18). Several other traits that make Miscanthus potentially valuable as a crop could enhance invasiveness (ability to resprout from rhizomes, efficient photosynthetic mechanisms, and rapid growth rates) (16, 19).

The U.S. native, P. virgatum, shares many traits with Miscanthus and can also produce seeds, which may give P. virgatum even greater invasive potential. Furthermore, plants native in one region can become invasive when established elsewhere (20). Escape from competitors and natural enemies may help explain the weedy nature of P. virgatum outside its endemic range (21).

Internationally, there has been little success in eradicating or even controlling an invading grass. Herbicides are used to control invasive grasses on croplands, but they are too expensive to use on rangelands, national parks, and reserves. Development of the most economical tool, biological control with a specific natural enemy, has been avoided because of the perceived risk of its expanding its host range to include commercial grasses, such as wheat, corn, barley, or rice (22).

#### Extinction

Viki Nadol 99, JD Candidate @ Valparaiso, Summer 1999, Northwestern School of Law of Lewis & Clark College, p ln

The threat of invasion by nonnative species has always existed. It is arguably a natural process that should be allowed to continue unheeded. n21 The problem with this theory is that it fails to take into account the rate at which humans are responsible for accelerating the pace of successful introductions, as compared to those that would occur naturally. n22 The last five hundred years or so demarcate an era of human expansion that has resulted in the increasingly rapid disruption and weakening of Earth's eco systems. n23 The fragile condition of these systems renders them vulnerable to the establishment of invasive species. n24 In addition, rates of introduc [\*343] tion have escalated with the advent of new modes of conveyance by trade and travel. n25 Airplanes, boats, and automobiles provide sufficiently quick and spacious travel, facilitating entry of a number of invasive species into habitat zones otherwise out of reach. n26 In the late 1950s, Charles Elton, a renowned British ecologist, warned that modern society was witnessing great historical dislocations of the world's fauna and flora. n27 Indeed, the scope of invasion is alarming, as are its effects. n28 Over 4500 invasive species are now established in the United States. n29 These species greatly threaten biological diversity n30 because they are often able to out-compete and displace native organisms. n31 As would be expected, they also add to the stress already suffered by endangered and threatened native species. n32 One study indicates that invasive species are second only to habitat destruction among the leading causes of species loss nationwide. n33 However, some experts fear that invasive species ultimately will contribute to the demise of the human population by destroying natural processes and ecosystems necessary to human survival. n34

\*\*\*To Footnotes\*\*\*

n30. See infra note 35 and accompanying text. In addition to threatening diversity, invasive species ultimately threaten survival of species as well: As the total number of species declines, plants and animals that may be important food resources, that play a critical role in the food web, or that contain medicinal qualities may disappear. Surviving species will have fewer buffers against catastrophic fluctuations in the environment. If, for example, a fish species loses many or some of its food resources, any threat or damage to the remaining food resource can be far more detrimental to the fish because alternatives have been lost. Thus homogenization of habitats and species can have far-reaching effects. Breaching Natural Barriers, supra note 22, at 8. n31. Quammen, supra note 25, at 66. As one specialist explains, invasive species outgrow, out-mature, and simply out-compete native species. Telephone Interview with Neil Richmond, Shellfish Fishery Biologist, Oregon Dep't of Fish & Wildlife (Nov. 25, 1998) [hereinafter Richmond Interview]. n32. Quammen, supra note 25, at 66 ("[A] report, from the U.N. Environmental Program, declares that almost 20 percent of the world's endangered vertebrates suffer from pressures (competition, predation, habitat transformation) created by exotic interlopers."). n33. Westley et al., supra note 6, at 46. n34. See Quammen, supra note 25, at 68. We come to a certain fretful leap of logic that otherwise thoughtful observers seem willing, even eager, to make: that the ultimate consequence will be the extinction of us. By seizing such a huge share of Earth's landscape, by imposing so wantonly on its providence and presuming so recklessly on its forgivingness, by killing off so many species, they say, we will doom our own species to extinction.

### Biofuel DA---Turns Russian Expansionism

#### Strong biofuel industry means U.S. farmers plant corn instead of wheat---drives up prices

Mil **Arcega 8**, Wheat Prices Surging to Historic Highs, VOA News, 2-27-08, http://www.voanews.com/english/archive/2008-02/2008-02-27-voa55.cfm?CFID=51850620&CFTOKEN=19587935

Wheat futures shot up this week to near the all-time high ($11.6975 a bushel) as foreign buyers scrambled to lock in supplies. A combination of bad weather, increasing global demand and export slowdowns in wheat producing countries has more than doubled the price of wheat since last year. To make matters worse, growing demand for biofuel crops such as corn means farmers are planting less wheat. For consumers it is a recipe for higher food prices. VOA's Mil Arcega reports.

#### High wheat prices guarantee Russian expansionism

Paul **Wallis**, Journalist – Australia, Opinion: Russia enters the food wars: The old collectives could be big business, Digital Journal, 8-31-0**8**, http://www.digitaljournal.com/article/259233

Russians starved through the 90s, but the big money was busy gobbling up the old state assets. Now the food shortage and the good prices are attracting altruists from hedge funds and Moscow’s idealistic Ministry of Agriculture. Russia has a very large amount of land that can be turned into cash crops. Russia has nearly six times as much land as Britain lying fallow growing weeds, abandoned. That's 35 million hectares. Another part of this revival of interest in food is that it **could well be a major next step in the return of Russia as a global power, this time an agricultural superpower.** The New York Times: Earlier reformers envisioned the collective farms eventually breaking up into family farms. But the new business model rests on a belief that Russia’s long, painful history of collectivization is destined to end in large corporate factory farms. These investments are also a gamble in a country accustomed to government control of business. Some officials have hinted at the prospect of a government takeover of the farming industry reminiscent of the Soviet era. And Russia’s minister of agriculture, Aleksey Gordeyev, speaks often of food in terms of national security. “Russia is very often perceived throughout the world as a major military power,” he told a food summit in Rome early in his tenure. “At the same time, and perhaps above and beyond anything else, Russia is a major agrarian power.” Maybe this is naïve, but a multi billion dollar industry in a sellers’ market might just have some appeal. A government takeover is about as likely as Stalin returning from the grave. Big capital in Russia is neither stupid nor badly connected, and a government takeover would be quite superfluous. The problem is that Russian agriculture is still back in the Stalin era. It’s not particularly productive, but with modern methods it could be. That would require getting rid of the antiques, which needs doing anyway, and getting some real machinery. Real cost, relative to the kind of capital available in Russia? Peanuts. One of the trademarks of Russian capitalism in the 90s was buying up old state assets like oil and gas at rock bottom prices. The world was for some reason amazed at subsequent rise of a very profitable energy industry. There’s no reason agriculture couldn’t operate the same way. Look at the costs: 1. Land is going for $1000 per hectare. 2. According to NYT, the average yield from the collectives is 1.85 tons of grain per hectare. At least one private capital venture, however, has managed 3.3, and is expecting to achieve 4.4. 3. Wheat futures for December 2008 are up around $8.99 per bushel, which is $298 per ton. That’s $1311.20 per hectare, at 4.4. Meaning even the land would more than pay for itself in one year. That’s still not a great performance by the standards of Western countries, some of which get 6+ tons per hectare, but if you add the sheer potential size of a Russian crop using the abandoned land, it could be a giant piece of the global grain market. That market is currently vulnerable. Although things are now better than they were at the height of the grain shortage, the major grain producers haven’t been producing at capacity for a variety of reasons. Russia could easily take up the slack, and also acquire a real ability to affect grain prices. Russia also isn’t known to be suffering from the water crises and droughts affecting other big grain producers. They can start with brand new industries, too, and compete effectively. Should drive the EU up the wall. Politically, this could be another **Russian move with major global ramifications.** This century may well be the beginning of **food as an economic weapon**. The ever increasing number of mouths to feed around the world adds another incentive.

Russia’s consolidation of grain trading allows it to use it as a diplomatic weapon

Mike Stones 8, managing editor of Decision News Media. He has more than 20 years’ experience of writing about food, farming and development topics, Why food is the new oil, 11-Aug-2008, http://www.beveragedaily.com/Financial/Why-food-is-the-new-oil

“Food is a weapon – don’t waste it.” This message, which featured on a Second World War poster issued by the US Office of War Information in 1943, is a lesson from history we would do well to heed.

Its significance is highlighted by the **Russian government’s** recent **announcement of plans to form a state grain trading company** which will control up to half the country’s grain exports.

The prospect of Moscow using food as a diplomatic weapon is **as chilling as it is easy to imagine**. The Russian state is no stranger to exploiting access to a key commodity to exert political power**.**

For example, Russian state oil company Gazprom has proved more than willing to manipulate natural gas sales to achieve political objectives in neighbouring countries. Only this week, crude oil prices leapt by more than a dollar reflecting fears that the conflict between Russia and Georgia could disrupt supplies from the area. State control of grain exports would also exert a truly global reach. Exporting 10.79m tones in 2006/2007, the Russian Federation is the world’s fifth biggest grain exporter, according to statistics from the United States Department of Agriculture.

However Russia enjoys relatively reliable harvests in contrast to the more weather dependent output of normally bigger exporters Argentina and Australia. For example, as the Australian drought intensifies, grain production has fallen from 25m tonnes to 9.8m tonnes in 2006 with a corresponding fall in the volume of exports. So, Russia’s plans to transform the Agency for the Regulation of Food Markets into a state organization, potentially tasked with achieving political objectives not merely commercial ones, should concern everyone. We all have an interest – whether as consumers, major food retailers or processors worried about access to reasonably-priced raw materials and governments concerned about the strategic implications.

Moscow’s plans have drawn a swift and decisive response from Washington. US agriculture diplomats have branded the development **“a giant step,” back to the Soviet era**, according to the Financial Times.

Regardless of the Trans Atlantic rhetoric, an important point is at play: Food, just like energy, is becoming an increasingly precious commodity; **the control of which confers political power**. Of course, it has always delivered power. In the past, the US has withheld food aid from regimes of which it disapproves. But for the first time in a generation, western access to plentiful supplies of cheap food is no longer assured.

### Biofuel DA---Turns Freshwater---2NC

#### Turns fresh water

Green ’08 – an environmental scientist by training, studies public policy at the American Enterprise Institute, where his primary focus is on energy and climate policy (Kenneth P., “Ethanol and the Environment,” July 29, American Enterprise Institute, http://www.aei.org/article/energy-and-the-environment/alternative-energy/biofuels/ethanol-and-the-environment/)

Ethanol and Fresh Water Consumption. What may surprise many people is how much fresh water it takes to produce ethanol. In December 2006, scientists at Sandia National Laboratory in New Mexico issued a report, Energy Demands on Water Resources, explaining that virtually all forms of energy production consume a lot of water. Petroleum refining, for example, consumes 1-2.5 gallons of water per gallon of refined product. Colorado scientists Kreider and Curtiss estimate that refining a gallon of corn ethanol today requires thirty-five gallons of water. But that is only the beginning. Kreider and Curtiss estimate that three times as much water is needed to grow the corn that yields a gallon of ethanol. That brings the tally to 140 gallons of water per gallon of corn ethanol produced.[19] If their calculation is correct, the 5.4 million gallons of corn ethanol used in America in 2006 required the use of 760 million gallons of fresh water.[20]¶ And things do not look much better for ethanol made from cellulose crops, such as switch grass. Kreider and Curtiss estimate that switch grass would require between 146 and 149 gallons of water per gallon of ethanol produced from cellulose depending on the scale of production. Thus, meeting the Bush administration's target of 35 billion gallons of renewable and alternative fuels production in the United States by 2017 with cellulosic ethanol would require about 5 trillion gallons of water per year. That is a bit more than the average annual flow of the Colorado River, which the Southern Nevada Water Authority lists at 15 million acre-feet, or a little under 5 trillion gallons.[21]¶ Ethanol and Water Pollution. In Water Implications of Biofuels Production in the United States, the National Academy of Sciences (NAS) points out that if the United States continues to expand corn-based ethanol production without new environmental protection policies, "the increase in harm to water quality could be considerable."[22] Corn, according to the NAS, requires more fertilizers and pesticides than other food or biofuel crops. Pesticide contamination is highest in the corn belt, and nitrogen fertilizer runoff from corn already has the highest agricultural impact on the Mississippi River. In short, more corn raised for ethanol means more fertilizers, pesticides, and herbicides in waterways; more low-oxygen "dead zones" from fertilizer runoff; and more local shortages in water for drinking and irrigation.

### Helium

#### No shortage

Deere 6/1—St Louis Post Dispatch (6/1/12, Stephen, With helium running short, price is ballooning, www.stltoday.com/news/local/metro/with-helium-running-short-price-is-ballooning/article\_b1b4f50d-6182-5919-95e2-93bc80cbe1a2.html)

**Burton = assistant field manager for helium operations at the Bureau of Land Management**

The Federal Helium Reserve provides 6 million cubic feet of helium a day and has been operating at full capacity for a year, Burton said.¶ At that rate, the reserve would run out of helium by 2018. But under the proposed Stewardship Act, Burton said the reserve would continue to produce helium until 2029.¶ Another helium supply exists at the Riley Ridge field in Wyoming.¶ "You hear a lot of dire predictions in the media," Burton said. "But there is a substantial amount of reserves left in the United States."¶ For the moment though, consumers can expect to pay more for balloons.¶

#### New discoveries solve

DuHamel 12—Tucson Citizen Writer (5/17/12, Jonathan, Helium potential of Arizona may help fill shortage, tucsoncitizen.com/wryheat/2012/05/17/helium-potential-of-arizona-may-help-fill-shortage/)

According to a story in the Arizona Daily Star: “The United States is running out of helium.” However, as pointed out by Arizona State Geologist Lee Allison, Arizona has helium resources that could help fill the gap.¶ Helium is used in many industrial applications such as in the manufacture of optical fiber and LCD screens, in medical imaging, and in welding.¶ A report (OFR 03-05) from the Arizona Geological Survey: “Review of helium production and potential in Arizona” is instructive (summary here, full report here):¶ Some of the richest helium-bearing gas in the world was produced from fields completed specifically for helium in northeastern Arizona in the 1960s and 1970s. All production came from fields in Apache County (Figure 1). Three fields were located in the Holbrook Basin south of the Defiance uplift about 35 miles northeast of Holbrook. One field was located in the Four Corners area north of the Defiance uplift near the small community of Teec Nos Pos. Helium-rich gas was discovered in the Dineh-bi-Keyah oil field on the northeastern flank of the Defiance uplift in the late 1960s but was not produced until 2003. Helium concentrations range from trace amounts up to 10% in the Holbrook Basin and Four Corners area. Both areas have good potential for additional discovery and production of helium. Helium content in gas is generally considered to be of commercial interest when the concentration is above 0.3%. Most of the helium produced in the United States is extracted from natural gas from fields in Wyoming, Utah, Colorado, New Mexico, Kansas, Oklahoma, and Texas. The extracted helium is processed into a crude helium product, which varies from 50% to 80% helium, and is ultimately purified to a Grade-A helium product, which is 99.995% or better. Most helium is shipped as a liquid to distribution centers in trucks from where it is sold as bulk liquid helium or gasified and compressed into tanks and small cylinders for delivery to end users.¶ On the Colorado Plateau in NE Arizona, helium is found in Paleozoic age sediments. According to AZGS, “There appears to be a correlation between … diatremes [volcanic pipes that consist mainly of breccia] and other deep-seated intrusive rocks and the presence and production of helium. Helium is often associated with carbon dioxide which is produced from wells for use in petroleum recovery. Helium is also a byproduct of oil and gas production.¶ Helium has two potential sources within the earth. First, it could be primordial. i.e., it was part of the original formation of the planet. The deep Precambrian crystalline rocks beneath the sediments on the Colorado Plateau could provide this source.¶ The second source is radioactive decay of uranium and thorium in the Earth’s crust. The isotopic composition of helium in Arizona indicates that most was derived from radioactive decay.¶ The Arizona Geological Survey estimates that the potential for additional helium discovery in the Colorado Plateau is very good. In fact, one geologist said the potential in the Four Corners region was “enormous.”

#### Spikes inev and non-unique but long-term production is inevitable---the aff has zero effect

Lundblad 9/11—The News Herald (Elizabeth, Helium shortage being felt at party supply stores, florists, [www.news-herald.com/articles/2012/09/11/news/doc504f7974c9ebc643495288.txt?viewmode=fullstory](http://www.news-herald.com/articles/2012/09/11/news/doc504f7974c9ebc643495288.txt?viewmode=fullstory))

The lack of supply has sent prices soaring.¶ Last week the price of a tank of helium went up by $100, Hannan said. Four years ago he was paying roughly $70 for a tank, now it’s more than $200.¶ “Helium is a natural byproduct of natural gas. How in the world … we have a surplus of natural gas, how are we having shortage of helium?” he added. “It makes no sense to me.”¶ Like most everything, it comes down to economics.¶ “There is definitely a helium shortage. It’s been going on for probably 18 months and will probably continue for another six months,” said Joe Peterson, assistant field manager of helium resources for the Bureau of Land Management in Amarillo, Texas.¶ When the global economic downturn hit in 2008, production of natural gas, and therefore helium, slowed, creating a “supply-demand imbalance,” Peterson said. Global demand has also increased, further straining the supply.¶ “There have been cutbacks at plants throughout the world,” he added. “As far as long term availability of helium, there is not a foreseeable shortage of helium as a resource in the world. There are sources of helium that have been identified but have not been tapped.”

#### No impact---major helium users aren’t affected by the shortage or spikes

Nicodemus 12—Reporter at Worcester Telegram & Gazette (3/25/12, Aaron, With luck, we’ll all survive the helium shortage, [www.telegram.com/article/20120325/COLUMN73/103259959/1002](http://www.telegram.com/article/20120325/COLUMN73/103259959/1002))

But apparently, the worldwide helium shortage is expected to last through the rest of the year. ¶ Helium, an inert gas, is used for a variety of commercial and industrial purposes. Hospitals and other medical institutions use liquid helium to cool components of magnetic resonance imaging machines. The government uses helium in liquid-fueled rockets, and in supersonic wind tunnels. ¶ In the last helium shortage, in 2006, the Macy’s Thanksgiving Day parade was forced to use fewer giant inflatable cartoon characters because there was not enough helium to fill them all. ¶ This time around, larger users of helium don’t seem to be affected. ¶ UMass Memorial Medical Center and the University of Massachusetts Medical School, both in Worcester, report through their spokesmen that the institutions use little helium and their supply has not been affected. ¶ It’s the mom and pop florists and balloon shops that are finding helium a little hard to find. ¶ “The balloon guys, they’re not strategic,” said John R. Campbell, owner and publisher of CryoGas International, a trade publication for the gas industry based in Lexington. “The first thing that comes off are the balloon guys.” ¶ Industrial-grade helium, the purer stuff used for liquefied helium, has a higher profit margin. This protects larger users from feeling the effects of a shortage, according to Jay Kapur, general manager at Aimtek Inc. in Auburn. ¶

### No Gas Cartel

#### No cartel and it’d quickly collapse if it was formed

Warren Wilczewski 8, Researcher with the Carnegie Council for Ethics in International Affairs, December 14, 2008, “The Big Gas Troika: A Lot of Hot Air,” online: <http://www.ensec.org/index.php?option=com_content&view=article&id=170:the-big-gas-troika-a-lot-of-hot-air&catid=90:energysecuritydecember08&Itemid=334>

A close examination of the politics, both domestic and foreign, and the economic structure of the three core nations of a potential OGEC suggests that such a cartel would quickly disintegrate of its own inertia. The cultural, philosophical, or even economic underpinnings required for long-term cooperation simply do not exist among the three countries. What is more, Russia, the self-appointed swing producer and architect of the organization, has neither the kind of reserve capacity that Saudi Arabia wields in OPEC, nor the economic profile of a country oriented primarily towards energy exports. Indeed, its production-export profile is the inverse image of Saudi Arabia’s: while Saudi Arabia exports over 77% of its production, Russia consumes 72% of its production.

Only with extra supplies freed up through switching from gas-to-coal in electricity generation, planned higher domestic prices to discourage consumption (seen as political suicide should the Kremlin go through with the plan), and the possible ring-fencing of Central Asian gas exports, would Gazprom’s role in international gas trade be able to match Saudi Arabia’s 20% share of cross-border oil shipments. Such a "perfect storm," however, would require an about-turn in Russian consumption, which has been growing in synch with the economy, and the compliance of Turkmenistan in channeling its gas exports through the Gazprom network – both less-than-likely scenarios.

Russia, a self-described energy superpower, sees gas exports as primarily a political asset rather than an economic one – despite exporting more natural gas than oil, most of Russia’s rents are extracted from the oil sector. Gazprom therefore plays a lead role as the Kremlin’s main foreign policy lever. The pressure Gazprom wields over its neighbors would be severely compromised should its decision-making powers be surrendered to a secretariat – even one dominated by the Russians. The threat to cut supplies or curtail investment works as a political lever so long as such decisions are the prerogative of the Kremlin. By joining a gas cartel, Moscow would effectively relinquish the wildcard it has been holding for so long. Should Moscow choose to act unilaterally, it would very quickly alienate its partners and bring the cartel to an end.

#### No Russian leverage and no cartel

Craig Pirrong 11, Seeking Alpha contributor, December 8, 2011, “Gazprom: Too Many Holes To Plug,” online: http://seekingalpha.com/article/312577-gazprom-too-many-holes-to-plug

So, predatory pricing is just another Gazprom bogeyman. A risible scare tactic employed to defend an increasingly indefensible position.

Gazprom reminds me of the little Dutch boy, holding back the waters by putting his finger in the hole in the dike. But Gazprom’s problem is that there are more holes than it has fingers. Just follow the news and you’ll see story after story about gas exploration and development and export just about everywhere in the world.

One interesting development occurred the other day in Qatar. Russia has downgraded its diplomatic relationship with the Gulf country because of an incident in which a Russian diplomat was roughed up, allegedly when Qatari officials tried to seize the diplomatic pouch he was carrying.

Recently, Qatar and Russia had been singing of the same hymnal with respect to gas contracting practices. Moreover, Qatar has been Russia’s main interlocutor in discussions to create a gas cartel analogous to OPEC. Given the proliferation of supply sources, actual and potential, the prospects for such a cartel are dim on economic grounds. But political friction between Qatar and Russia makes the prospects even more remote.

#### Qatar will veto any cartel

Songying Fang et al 12, Assistant Professor of Political Science at Rice University, et al, January 2012, “NEW ALIGNMENTS? THE GEOPOLITICS OF GAS AND OIL CARTELS AND THE CHANGING MIDDLE EAST,” online: http://www.owlnet.rice.edu/~tl5/GasCartel.pdf

In contrast to Saudi Arabia, the regional dynamics are not likely to change Qatar’s relationship with the United States significantly. Qatar is a small and wealthy country with limited foreign policy goals, the most important of which is to protect its security and interests against bigger regional powers, namely Iran and Saudi Arabia. Qatar now enjoys the highest per capita income in the world and with financial success has come international prestige, as indicated by hosting important events such as the World Cup. Therefore, its population is likely to be less concerned about higher gas revenues, especially given the difficulty of achieving that in a well-supplied global market. Thus, security issues loom large and, in this sense, a strong military alliance with the United States is not easily substitutable, except by a similar alliance with Russia. Given that there is a direct conflict of economic interests between Qatar and Russia over natural gas, it is difficult to envision that Qatar will switch its allegiance to Russia. We conclude that we are far more likely to observe a Russo-Saudi coalition in the oil market rather than a gas cartel.

### LNG

#### Experts agree

CRS 7

Congressional Research Service, May 14, 2007, “Maritime Security: Potential Terrorist Attacks and Protection Priorities,” http://www.au.af.mil/au/awc/awcgate/crs/rl33787.pdf

Although they acknowledge the security information put forth by federal agencies, many experts believe that concern about threats to LNG tankers is overstated.102 In 2003, the head of one university research consortium remarked, for example, “from all the information we have ... we don’t see LNG as likely or credible terrorist targets.”103 Industry representatives argue that deliberately causing an LNG catastrophe to injure people might be possible in theory, but would be extremely difficult to accomplish. Likewise, the Federal Energy Regulatory Commission (FERC) and other experts believe that LNG facilities are relatively secure compared to other hazardous chemical infrastructures which receives less public attention. In a December 2004 report, the FERC stated that

for a new LNG terminal proposal ... the perceived threat of a terrorist attack may be considered as highly probable to the local population. However, at the national level, potential terrorist targets are plentiful.... Many of these pose a similar or greater hazard to that of LNG.104

The FERC also remarked, however, that “unlike accidental causes, historical experience provides little guidance in estimating the probability of a terrorist attack on an LNG vessel or onshore storage facility.”105 Former Director of Central Intelligence, James Woolsey, has stated his belief that a terrorist attack on an LNG tanker in U.S. waters would be unlikely because its potential impacts would not be great enough compared to other potential targets.106 LNG terminal operators which have conducted proprietary assessments of potential terrorist attacks against LNG tankers, have expressed similar views.107 In a September, 2006, evaluation of a proposed LNG terminal in Long Island Sound, the USCG states that “there are currently no specific, credible threats against” the proposed LNG facility or tankers serving the facility.108 The evaluation also notes, however, that the threat environment is dynamic and that some threats may be unknown.109

#### LNG does not explode

The Boston Globe, June 26, 2004, “Assessing risks of LNG tankers”

The explosion from an LNG ship would devastate the surrounding area for miles. LNG cannot explode. In fact, in its liquid state at minus 260 degrees, it cannot even burn. It becomes flammable only as it warms and vaporizes. Scientists asked to assess the fire potential from an uncontrolled release of LNG typically measure total volume in a tank and extrapolate the energy potential if it all vaporized and ignited at once. That would be a big fire. But the studies rarely look at how this could happen in the real world. The truth is, it couldn't. Even the most recent report by a government-hired consultant that made front-page news admittedly failed to evaluate the effects of improved LNG tanker design, its reduced susceptibility to attacks and accidental damages, and the benefits of security inspection, maritime escort, and constant security vigilance. One of the reasons scientists can't agree about the effects of an uncontrolled LNG tanker fire is because there has never been one. That fact alone illustrates the industry's priority in safeguarding the public, the strength of the vessels themselves, and the vigilance of all involved to maintain the highest safety and security standards.

#### No explosions have ever happened

Tempest 5

Mark Tempest, retired Navy Reserve Captain, 3/06/05, “How Big Is the Threat of LNG Tankers and Terrorists?,” http://www.eaglespeak.us/2005/03/how-big-is-threat-of-lng-tankers-and.html

Again, LNG has an impressive safety record:

LNG has been delivered across the oceans for about 45 years without major accidents or safety problems, either in port or on the high seas. In that time, there have been more than 33,000 LNG carrier trips, covering more than 60 million miles. Today, more than 150 LNG ocean tankers safely transport more than 110 million metric tons of LNG annually to ports around the world. This is more than all American homes consume each year. In 2000, one LNG cargo entered Tokyo Bay every 20 hours, and one entered Boston harbor every week. Japan relies exclusively on imported LNG for its natural gas. According to the U.S. Department of Energy, over the life of the industry, eight marine incidents worldwide have resulted involving accidental spillage of LNG. In these cases only minor hull damage occurred, and there were no cargo fires. Seven additional marine-related incidents have occurred with no significant cargo loss. No explosions or fatalities have ever occurred.

#### Worst-case scenario is extremely unlikely

Tempest 5

Mark Tempest, retired Navy Reserve Captain, 3/06/05, “How Big Is the Threat of LNG Tankers and Terrorists?,” http://www.eaglespeak.us/2005/03/how-big-is-threat-of-lng-tankers-and.html

In short, a short duration, high intensity incident under the worst of all conditions - in short if the terrorists accomplished all of their goals under ideal (for them) conditions. But how realistic is it to assume a perfectly windless day coupled with all the other events that would have to happen in exactly the right sequence? In my view, not very. In my view, you have a greater probability of having the gasoline in the tank of your car cause you a problem. It is not enough for these scientists to merely demonstrate possible worst case situations without providing information on the likelihood of such a event coming to pass. Let me put it this way. It might be possible that a large commercial airliner could crash into my house. If one did, it would cause a great deal of damage in a fairly large area. However, the odds against such a crash occurring, while not completely zero, are so small that it is not worth me worrying about it or taking any steps to ban commercial aircraft from flying within 50 miles of my home. More likely events I take reasonable precautions against. Just as the Coast Guard and others take reasonable precautions against even the remote chance of someone attacking an LNG tanker.