**Comments to EPA draft RFS2**

Mark Jenner, PhD
Biomass Rules, LLC
714 Poplar Street
Greenville, IL 62246

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**Re: Comments to EPA on the revised Renewable Fuel Standards, RFS2 Docket ID No. EPA-HQ-OAR-2005-0161**

EPA was required to write implementation regulations for the Renewable Fuels Standard as mandated in the 2007 Energy Independence and Securities Act. In the process a conflict arose between the development energy independence through economic growth and Greenhouse Gas (GHG) emission reduction. The two conflicting objectives can not be held to equal value. It is clear now that the US House, the US Senate, and the President requested standards with such narrow criteria that they are not possible to establish as prescribed in the EISA statute.

The current proposed EPA rule focuses first on emission reduction, second on fuel category definition, finally on energy independence and economic growth. This strategy restricts the development of biofuels to the point that it discourages the energy independent, economic development of biofuels for the sake of GHG emissions reduction. The restriction of energy independence is a direct violation of the Energy Independence and Security Statute. Economically, when the economic opportunity is restricted to participate in the RFS program, the biomass will move into solid and gaseous fuel markets.

The standards as proposed by EPA in the Proposed Renewable Fuel Standards in May 2009 will violate the EISA statute by:

1. Interfering with the objective of energy independence through the technical and economic barriers created by the rule. The proposed rule fundamentally thwarts hundreds of millions of dollars of funds that have been spent by the Department of Energy (DOE), the Department of Agriculture (USDA), and private investment that no longer fit the RFS definition by eliminating MSW and biomass from federal lands from participation in the revised Renewable Fuel Standards (RFS2).
2. Ignoring the fundamental principles of mathematics, rendering EPA estimates meaningless. In a sincere effort to fulfill the statutory obligations EPA used the best available data to attempt to establish RFS standards. The best data and methodologies do not meet quality necessary to serve the 'force of law.' Professionals in the life cycle assessment (LCA) field can not agree on the proper methodology. Therefore, no legally defensible LCA methodology exists. In addition EPA took coefficients developed from radically different models and created new models that create hypothetical results that are far beyond the boundaries of the underlying original data.
3. Arbitrary restrictions imposed by imposing indirect land use analyses interfere with the challenge of participation in the RFS2 program. After months of debate, no defensible causality has been established between US biofuel policy influence and global land use decisions. EPA made a gallant effort, but gaping holes remain in the level of data required to develop a representative relationship. The result is that a forced effort to guess about indirect land use creates significant barriers to energy security without providing effective greenhouse gas safeguards.

This inability to establish defensible, transparent Renewable Fuel Standards is due to the conflicting criteria established in the EISA, not from EPA effort. EPA used a general methodology that has been used in other industries where decades of historical data have been available. The only workable solution to the RFS2 standards is to simplify the RFS so that the private sector can rise to the challenge of establishing this new industry sector.

Most of the challenges that have been debated for nearly all of 2009 are about the methodology choices made by EPA to establish the four fuel categories. The spirit of the EISA 2007 law can be met by establishing two categories for renewable fuels instead of four. The two categories would partition feedstocks that 1) competed for feed and food (corn and soybeans) from those feedstocks that 2) did not compete with food and fuel (cellulose, fiber, organic residuals, and biomass).

The percent reduction in GHG emissions is also arbitrary. If severe reductions do not allow the industry to rise to meet those standards, the law will fail far more completely than if the RFS standards are broadly inclusive to industry participation but the reductions are incremental. The conventional biofuel standards (starch-based ethanol) should include a 10 percent reduction in GHG emissions, while the advance renewable (biomass/cellulosic) fuels should include a 20 percent reduction.

These reduction targets should be treated as a safety valve rather than a prescriptive absolute. The very nature of biofuels and other renewable fuels is that they are innately more carbon efficient than conventional fossil fuels. As they become more common in the coming years their carbon efficiency will also increase. The current fixed percent reductions should serve only as a policy mechanism to keep technologies from commercialization that utilize more fossil fuels in the generation of biofuels than they create.

Lowering the percent reduction goals will also relieve the responsibility on EPA for guessing about long term effects. EPA has made a valiant effort to comply with the EISA statute. If EPA does not have the authority to make adjustments in the RFS standards, then they need to send it back to the President and tell him that the EISA is not possible as written.

To create energy independence as intended by EISA 2007, the following must happen:

1. Monitor, but remove the indirect land use provisions from current RFS standards.
2. Create a conventional RFS for starch-based biofuels and a second one for fiber and residual based biofuels.
3. Build the standards around the market standard model (labeling standards like the USDA BioPreferred Program[1], not technology-based standards).
4. Recognize that technology is environment-enhancing. As technical efficiencies increase, fewer under-utilized components go into the environment. This is true from carbon emissions to nitrogen emissions to phosphorus emissions.

EPA rose to the challenge set forth in the EISA statute, but in the end can not legally or morally coordinate the broad, divergent statutory requests into a uniform law. These comments are provided in the spirit of constructive guidance based on 30 years of working at the interface between production agriculture, environmental quality, and renewable energy.

[1] USDA BioPreferred Program. The BioPreferred[SM] program aims to increase the purchase and use of renewable, environmentally friendly biobased products while providing "green" jobs and new markets for farmers, manufacturers, and vendors. The BioPreferred program offers three major benefits: Climate Change Impact Reduction, Energy/Environmental Security, and Economic Development. http://www.biopreferred.gov/Default.aspx?SMSESSION=NO

## I. Conflicted Statutory Objectives

Is the purpose of the Energy Independence and Security Act of 2007 1) promotion of energy independence through development of biofuels, or 2) emission reduction?

The over-arching intent of 2007 EISA is to promote energy independence and economic development. Here the opening lines of the Energy Independence and Security Act of 2007 have had economic emphasis added in brackets.

> To move the United States toward greater energy independence and security ***[increase domestic supply and demand]***, to increase the production of clean renewable fuels ***[increase supply and demand]***, to protect consumers, to increase the efficiency of products, buildings, and vehicles ***[increase technical efficiency]***, to promote research on and deploy greenhouse gas capture and storage options ***[increase technical efficiency]***, and to improve the energy performance of the Federal Government, and for "other purposes."

**A. Economic growth is not driven by emission reduction.** Economic growth and emission reduction can happen at the same time. However, the primary driver of economic growth is getting more economy-wide benefits per unit of input resource. Without economic growth there will be no implementation of a RFS. First the demand must exist. Then the supply will follow – unless the costs of RFS supply are too high. Then it will not happen.

**B. As the RFS2 is proposed, there is little incentive to produce biofuels from cellulosic feedstocks.** If generating liquid fuel from biomass is important, the rule must provide the incentive to have industry participate. Today that does not exist. The layers of new restrictions proposed for the agricultural production of biomass for fuel, will drive biomass producers to other solid fuel markets besides the RFS fuel market.

**C. The weak summary of the agricultural, forestry, MSW (none), and energy security costs and benefits are disappointing.** Much of the text in the RFS2 preamble on benefits is dedicated to explaining why these economic and energy security issues could not adequately be developed with EPA allotted time frame.

**D. The economy wide impact analysis had not been completed when the rule was written.** Without that analysis, EPA anticipated the need for taxes to increase to pay for this rule. The benefits from the rule should be sufficient to pay for the implementation of the RFS. The economy must grow. Clearly EPA emission-centric bias has corrupted the economic results.

The EPA does not understand that building a biofuel infrastructure will also enhance the environment. Although EPA's entire analytical effort is biased against biofuel adoption, it doesn't change the fact that increasing energy independence and economic growth (the supply, demand, and technical efficiency of biofuel production) will reduce ancient carbon emissions and promote sequestration. However, the opposite is not true. Reducing carbon emissions will not promote energy independence and economic growth.

## II. Limits to the Statutory Language

**A. The four fuel designations can not be maintained and verified by EPA.** EPA has illustrated repeatedly that insufficient data and analytical confidence exist to develop rules four renewable fuels standards. This is not a criticism of EPA. The analytical infrastructure does not exist to do what the EISA requested regarding the complex criteria for the emission impact of the three non-corn biofuel categories.

**B. The statutory language for indirect land use is fatally flawed.** EPA does a disservice to the Congress by forcing through a law that can not be measured (See discussion on limitation of the Lifecycle Assessments below).[2] There is insufficient data to conduct the level of analysis that EPA has attempted to deliver.

Indirect land use effects must be balanced with 1) the GHG emission impact of developing the Canadian tar sands as well as 2) coping with US cropland losses due to urban development. The land use issues (direct and indirect) do not deal with urban expansion. For the last 60 years, the US has lost 5 million acres of US farmland per year according to USDA (Figure 1). Are parking lots more preferred than green plants?

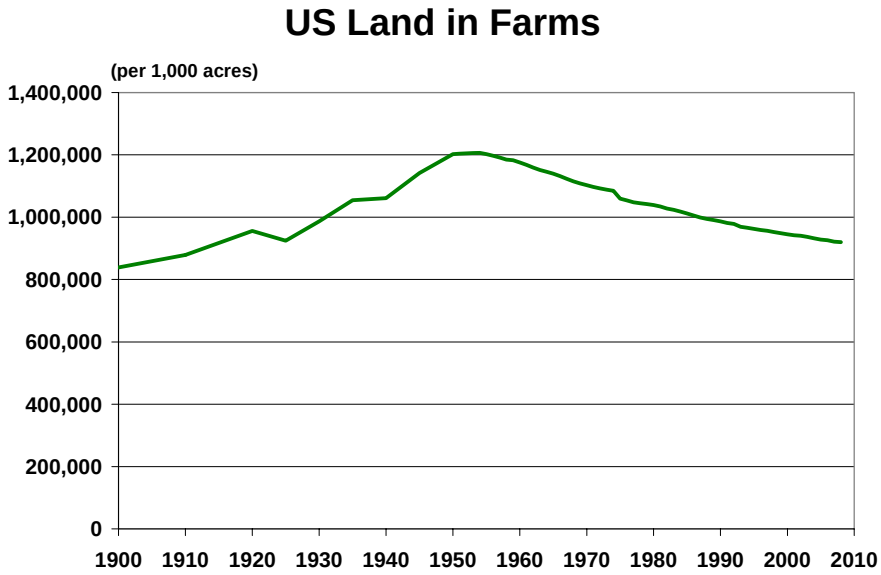


**Figure 1 US Land in Farms 1900-2008**

New energy crops will likely expand in aquatic environments (algae or cattails) which are not currently farmland. This likely will include urban areas of production since algae is a biomass crop that is not land based. Other energy crops like camelina, pennycress, and jatropha may expand into arid rangeland areas that may not currently be considered farmland. Hybrid poplars and willows are grown for remediation as well as energy. Will these beneficial sources of biomass be denied from participating in the RFS? Other future energy crop land may include mine reclamation, superfund sites, and interstate right-of-ways. None of which are currently included in the proposed EPA RFS2 rule.

[2] The message consistently delivered by EPA indirect land use contractors at the National Corn Growers August 2009 Indirect Land Use Conference was that the data is insufficient and the modeling tools are still in the formative stage to draw significant conclusions to the indirect land use discussion. "Association" does not equal "causation."

**C. Neglect of MSW in the proposed RFS2 rule adds significant restrictions to the success of energy independence.** Not including MSW in the RFS2 standards eliminates some 140 million tons of biogenic and non-biogenic MSW materials annually.[3] As noted in the Preamble of the proposed rule the EISA 2007 language is vague and conflicted as landfill gas is acknowledged while MSW is not. This is further compounded by the complexity of waste stream segregation issues. If urban wood waste is segregated out from the MSW waste stream, is it still MSW? The same 2007 EIA report referenced above identifies 300 trillion btus of energy contained in the 2005 US MSW waste stream in both biogenic (biomass) and non-biogenic (plastic/fossil carbon). As we pursue energy independence the US can not afford to turn our backs on this significant source of renewable energy.

Of the roughly 56 cellulosic biofuel technologies currently being developed, 20 percent (nearly 160 million gallons total capacity) of these planned projects utilize MSW as a feedstock.[4] Hundreds of millions of dollars have been invested in private and federal dollars to develop these technologies. And with the stroke of the EPA pen, are no longer eligible to participate in the proposed RFS2 standards.

Landfill gas and biogas from anaerobic digesters can be converted into compressed natural gas (CNG). It seems a bit arbitrary to acknowledge the fuel value of one MSW energy product (landfill gas) and not acknowledge the fuel value of another MSW energy product (pre-landfill biomass).

**D. Neglect of biomass from federal lands in the proposed RFS2 rule adds significant restrictions to the success of energy independence.** A US Forest Service paper identifies 190 million acres of federal lands that are at an increased risk of fire hazard due to the build up vegetation on these lands.[5] The federal land management agencies have developed National Fire Plan to reduce this build up of fuels. It is costly to remove this biomass fuel from the forests. Without the inclusion of biomass from federal lands in the RFS2 standards, the incentive to remove this undervalued resource from federal lands goes away. The loss of forest carbon to forest fires is a very inefficient release of carbon dioxide.

EPA discusses both the need to remove the wildfire hazard from forest undergrowth and the activities already underway on federal lands. It always maintains that it will not include biomass from federal lands.

Like the developing MSW cellulosic biofuels projects that may fall between the cracks, other biofuels technologies and projects are being developed to utilize forest residue – some from federal lands. Again for no apparent reason, EPA eliminates federally funded projects that may have targeted biomass from federal lands.

**E. On using the volume of ethanol (gallon) as a standard for biofuels.** The use of a gallon of ethanol as a renewable fuels standard was a good first step. It is currently obsolete. A better standard is a unit of 100,000 btus or 1 therm. This unit

[3] Methodology for Allocating Municipal Solid Waste to Biogenic/Non-Biogenic Energy. EIA 2007. Table A1. Municipal Solid Waste (MSW) Weights by Category, 1989-2005. http://www.eia.doe.gov/cneaf/solar.renewables/page/mswaste/msw_report.html
[4] Announced projects tabulated independently at Biomass Rules, LLC from popular press.
[5] Fire and Fuels Buildup. US Forest Service. http://www.fs.fed.us/publications/policy-analysis/fire-and-fuels-position-paper.pdf

already exists and transcends energy density of individual fuels and liquid/gaseous phases.

To convert from liquid volumes (gallons) of ethanol to therms, the legislated annual goals would need to be converted from gallons to therms.

It would make sense to convert the RIN numbers to therms. One RIN = One Therm. Additionally, 10 therms = 1 million btus (MMBTU). With this scale, every 10 RIN = 1 MMBTU.

Each individual fuel would be measured in decimal equivalents of the RIN/therm. These fuels would include ethanol, biodiesel, butanol, biooil, CNG, electricity, and any other acceptable vehicle fuel suitable for the RFS2 standard

As long as the legal volumetric standards were converted to therms, there would be no loss in the function of the law.

**F. Limitations to Life Cycle Assessment and Indirect Land Use from Biofuels.** EPA was mandated to create estimates of carbon emissions using lifecycle assessment (LCA) modeling. While EPA has successfully conducted this LCA mandate, then numbers are without sufficient meaning to serve as a binding federal US law. The legal standing on this noble exercise will fail for at least the following:

- The methodology is ambiguous. Professional US LCA modelers to not agree on the appropriate methodology.
- The data is woefully lacking to achieve what EPA hoped to achieve.
- The shifting of results from one model to another creates biases and inaccuracies that render results that impede energy security.

Planning for the LCA impacts of biofuel development required analyses to move beyond the numeric security of historical data. When FAPRI forecast crop yields out into the future, they are using historical data to do so. Even within the LCA models, historical data is used whenever it is possible. This proposed RFS2 rule is modeling technologies that do not exist yet. And for those that do exist there is almost no historical data.

Normative modeling moves the results into the realm of a hypothetical reality. The underlying data is stretched beyond reasonable boundaries. Combining the output of independent process and forecasting models violates the underlying assumptions imbedded in these independently constructed mathematical tools. **Bruce Dale, Michigan State University, has noted that this can create a propagation of errors.**

The result is a federal regulatory law based on best-available fiction. This is completely unacceptable. The constructed reality on this proposed rule has no basis in reality.

This violation of mathematical principles is further distorted by giving it the force of law. EPA has sacrificed mathematical standards of integrity for the sake of its legal authority to establish a number for Congress.

***F.1.Peer Review Reports*** The EPA peer reviewed assessments were a good idea on the four aspects of this proposed rule:

- Satellite Imagery and Emissions Factor Analysis

- Methods and Approaches to Account for Lifecycle Greenhouse Gas Emissions from Biofuels Production Over Time
- International Agricultural Greenhouse Gas Emissions and Factors
- Lifecycle Greenhouse Gas Emissions due to Increased Biofuel Production Model Linkage

Each peer review had limitations and each report was written with language that indicated there were biases. The 508 pages of the peer-reviewed reports began with the same format: "All reviewers essentially agreed that EPA followed the best available procedures, but…" and then the components that were not agreed upon were discussed. So the reviewers did not agree on many things – even though the reports stated as much. Some peer reviews were more aligned than others.

Secondly, the statute under discussion is the Energy Independence and Security Act of 2007. Nearly all the peer reviewers were biased toward greenhouse gas reduction. In fact, potential peer-reviewers were screened subjectively. This subjective screening created biases to the pool of peer reviewers. This limits the objectivity of the results. So the narrow pool of individuals who were screened 'into' the process generally agreed.

***F.2. Industry and Academic Modeler Responses to the RFS2 Modeling Protocols.***[6] The National Corn Growers assembled a very balanced conference agenda composed of leading academic and industry modeling experts. The result was many of the EPA modeling contractors expressed there discomfort with the boundaries beyond which EPA took their analyses.

Indirect land use from US biofuels production is not measurable.[7] Bruce Babcock, Director, Center for Agricultural and Rural Development (CARD), conducted some of the RFS2 modeling for EPA. While he agrees that indirect land use may have a role in policies that reduce global carbon emissions, they do not model the impact of US carbon emissions.

The economic modeling can not meet the ISO standards.

- Country specific data is required, but rarely exists.
- Models are based on insights, assumptions, simplifications, and many subjective judgment calls.
- EPA and the California Air Resources Board (CARB) are using economic policy decision models (FAPRI and GTAP) to make billion dollar regulatory laws.
- Model accuracy is not high enough to achieve EISA mandate objectives.

Bruce Dale, Professor, Chemical Engineering, Michigan State University, and pioneer in LCA analyses was concerned with many of the choices made in the RFS2 analyses.[8] Several of his points are listed:

[6] Summary of NCGA Land Use and Carbon Impacts of Corn-Based Ethanol Conference. St. Louis, MO. August 25-26, 2009. http://www.ncga.com/files/pdf/LUC.pdf

[7] Bruce A. Babcock, Center for Agricultural and Rural Development (CARD), Iowa State University. *"Measuring Unmeasurable Indirect Land Use from Biofuels."* At the Land Use and Carbon Impacts of Corn-Based Ethanol Conference. National Corn Growers Association. St. Louis, MO. August 25-26, 2009. http://www.ncga.com/files/pdf/Babcock.pdf

[8] Bruce E. Dale. Biomass Conversion Research Laboratory, Michigan State University. *"Beyond Global Guessing Games: Nitrous Oxide Generation In Real Agricultural Systems."* At the Land Use and Carbon Impacts of Corn-Based Ethanol Conference. National Corn Growers Association. St. Louis, MO. August 25-26, 2009. http://www.ncga.com/files/pdf/BruceDale.pdf

- High profile guessing is still guessing (referring to the Searchinger, et. al and Crutzen, et. al. papers).
  - o Searchinger (et. al).
    - – Premise: US biofuel producers are responsible for the actions of someone in the Amazon with a chain saw.
    - – No net yield growth (Assumption)
    - – Worst case for fate of standing biomass (burned) & land management post land use change (plow tillage) (Guess)
    - – Four (should be 6) linked predictive models, each very uncertain, can actually tell you something useful (WAG-a really lousy guess)
  - o Crutzen (et. al).
    - – Integration of biofuel systems and animal feed operations neglected (Assumption).
    - – 40% of fixed N ends up in biofuel crop (Guess)
    - – No effect of fertilizer N on net carbon dioxide uptake (WAG-a really lousy guess).
    - – "A full life cycle analysis is needed"
- Lifecycle Analyses (LCA) must follow certain rules to be effective. The following rules were not followed (with Bruce Dale suggestions in red):
  - - Use the most recent/most accurate data possible.
    - * Predicting agriculture in 2022 using economic models.
    - * We must insist on tests of the models against past history.
    - * So far, they seem to fail such tests.
  - - Select the reference system: what exactly are we comparing?
    - * Compare future biofuels with petroleum fuels in 1999-2005
  - - Make it easy for others to check your data and methods= transparency
    - * It is not easy to check their methods, largely due to complex, linked models
  - - Set clear system boundaries (physical & temporal) — must be equal or comparable for reference system and/or reference product of interest
    - * Indirect effects are assessed only against biofuels, not petrofuels
  - - Multi-product systems must allocate environmental costs among all products
    - * Entire environmental "cost" of indirect land use change is assessed against biofuels, in spite of the fact that we use land to provide food, feed, fiber, timber, etc…
  - - Perform sensitivity analysis: how much do results vary if assumptions or data change?
    - * Productive use of existing forest: did you make anything from the wood or did you just burn the trees down?
    - * Decreased land clearing rates and/or different ecosystems converted, forest vs. grassland
    - * Yield increases both in the U.S. and abroad (Negative LUC)
    - * "Carbon debt" based on GHG of diesel from oil sands in 2022 vs. DOE models in ~1999
    - * Increasing energy efficiency of biofuel plants
    - * Uncertainties in global equilibrium models…test through Monte Carlo simulation
    - * How is land managed after conversion?
    - * Has there been any indirect land use change to date? (No!)
    - * Pay attention to local, rather than global, factors

Stephen Kaffka, Director of the California Biomass Collaborative, reported the following.[9]

- About modeling indirect land use change…
  1. There is an uneasy relationship between methods and outputs. *(T. Haniotis, 2009. Broadening the knowledge base for policies: experience with the Integrated Assessment of recent CAP reforms)*.
  2. Models should be seen as learning tools, not truth machines. *(J. Rotmans, 2009. Three decades of integrative assessment: the way forward)*.
  3. There is no single policy that can control the response of complex systems. Attempting to do so will reduce sustainability. *(several sources)*
  4. **It is not food (or feed) vs. fuels, but a question of how to create more sustainable agro-ecosystems (more diverse, more profitable)**. In many cases, crops grown for biomass may facilitate that process, not only in CA but also in many locations in the developing world were human need is great.
  5. The distinction between first generation biofuels and second generation biofuels is partially arbitrary and misleading … If the entire crop plant were used (corn, sugarbeets), then energy yields could be similar to or even greater compared to so- called 2nd gen crops like switch grass. An integrated bio-refinery may change the production of energy to a by-product or waste management process rather than the primary activity.
  6. The decision to impose an iLUC handicap on agricultural biofuels was premature and occurred without sufficient understanding of the nature of agricultural systems. This violates the principle of a performance standard by excluding potentially viable biofuel sources and methods, and shuts off the human talent for agriculture as part of the solution.
  7. CA should encourage indigenous biofuel production to do its share to reduce GHG without exporting all the consequences of doing so to other locations. This is partly a matter of ethics, but it will also have the best estimates of GHG effects for local systems.
  8. **The key to a successful transition to a low carbon future will be entrepreneurial innovation.** The state should err on the side of encouraging such innovation.
  9. The economic, social and ecological effects of regulation of the energy sector are so fundamental, far- reaching and complex, that prudence and time are needed to achieve the greatest net environmental and social benefits.
- Effective rules on carbon call for the following regulatory considerations:
  - iLUC should be estimated using several methods, with a preference for direct estimation. **Reliance on a single method is unwise because no one model is currently able to deal with this complex issue adequately. Additional time is needed to create comparative iLUC approaches.** Currently, we should rely only on the best direct GHG estimates.
  - CA, the US, and EU should agree on the use of several policy approaches to avoid undesirable LUC, including direct intervention to protect high value ecological areas in developing parts of the world, while allowing for the fulfillment of needed human development.
  - Be humble, expect mistakes…
  - Go slowly…Gradually increase sustainability standards as knowledge and public consensus improves. Make sure the public agrees (legitimacy).

[9] Stephen Kaffka, Director, California Biomass Collaborative, University of California – Davis. "California's Low Carbon Fuel Standard and Land Use Change." At the Land Use and Carbon Impacts of Corn-Based Ethanol Conference. National Corn Growers Association. St. Louis, MO. August 25-26, 2009. http://www.ncga.com/files/pdf/Kaffka.pdf

- Use a light touch…**Try not to constrain innovation, be willing to make prudent tradeoffs** …The net long term public benefits from such innovation will outweigh short term losses of GHG benefits, if any, from overly restrictive policies.
- Sustainability means flexibility, the ability to adjust to the unexpected.

Quite clearly there is no consensus among EPA contractors or academic LCA practitioners. We do not have sufficient knowledge, data, or confidence to implement a climate regulation of this magnitude with such thin data and even less appropriate output.

**G. EPA does not correctly account for the influence of time / discounting**

- ***Absence of technical change in agriculture (yields, efficiency, etc.).*** EPA has no appreciation for the influence of technical change in agriculture. This phenomenon of constantly increasing output using fewer inputs is the essential underpinning of economic growth. Figure 2 below shows that since 1948 the level of inputs in US agriculture has remained constant while output has increased 2.5 times.[10]

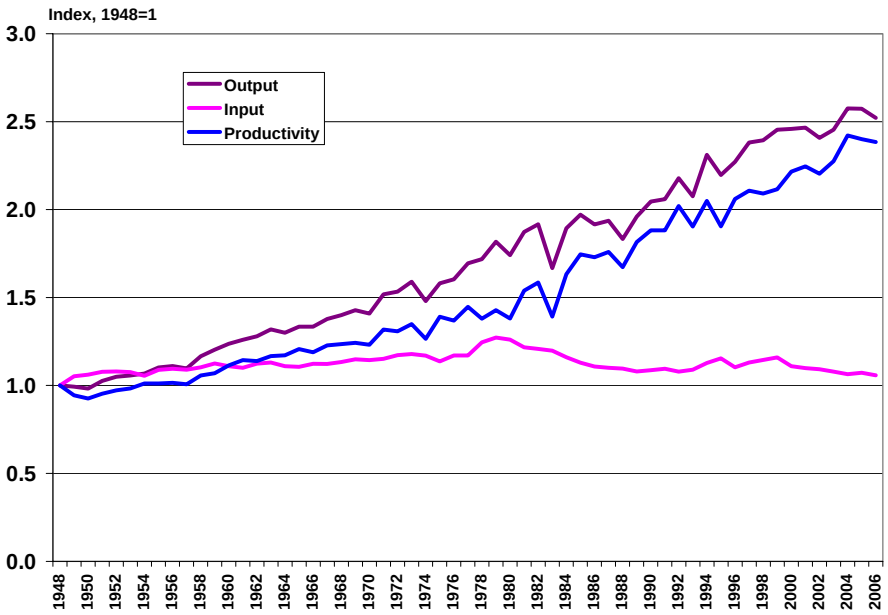


**Figure 2 USDA ERS Increase in Agricultural Productivity Since 1948**

The beauty and simplicity of this trend is that as more of the production inputs are pulled into the economy, less material is going into environmental externalities (too many nutrients and carbon emissions in the wrong place).

Other examples include:

**Combining Recent Innovations into Corn Production Systems For Higher Yields, Net Returns, Starch Energy and Lower Environmental Impact, by Jim Porterfield** [11]

[10] USDA, ERS. Agricultural Productivity in the United States. http://www.ers.usda.gov/Data/AgProductivity/

[11] **http://www.biomassrules.com/jim_porterfield.html** Jim Porterfield, Watershed/Water Quality Specialist, can be reached at: 708 S. Fairview Avenue, Park Ridge, IL 60068, Phone: 847.823.8742, Email: jporterfield51@msn.com.

Jim Porterfield and his team conducted some demonstration trials on various tillage, fertility and seed genetics of corn production. In short, the data collected last year (2008) indicates that we can grow more corn using less nitrogen with technology that is already available. His study shows that, *Compared to normal farming practices, this study's intensive management treatments boosted corn yields up to 21 percent, total starch and subsequent ethanol output per acre by up to 42 percent, net dollars per acre by up to 28 percent and reduced nitrous oxide (N2O) emissions by 16.7 percent.*

### Environmental Resource Indicators for Measuring Outcomes of On-Farm Production in the United States. [12]

This innovative presentation of US crop production creates five indices: land use, soil loss, water, energy use, and climate impact. Once the indices were established they were applied to four crops: corn, cotton, soybeans and wheat; from 1987 to 2008. The message that is overwhelmingly clear is that crop production agriculture continues to increase efficiency and reduce wastes (inefficiencies).

This chart below is a spider web of the five indices representing three specific years: 1987, 1997, and 2007 (Figure 3). The smaller the index number, the more efficient the production practices. With the index set = 1 in 2000, the year 1997 provides a visual benchmark for the index of 1. For soybeans in 1987, energy use and soil loss were nearly double 1997 levels. In 2007, the green inner pentagon, crop production is the most efficient.

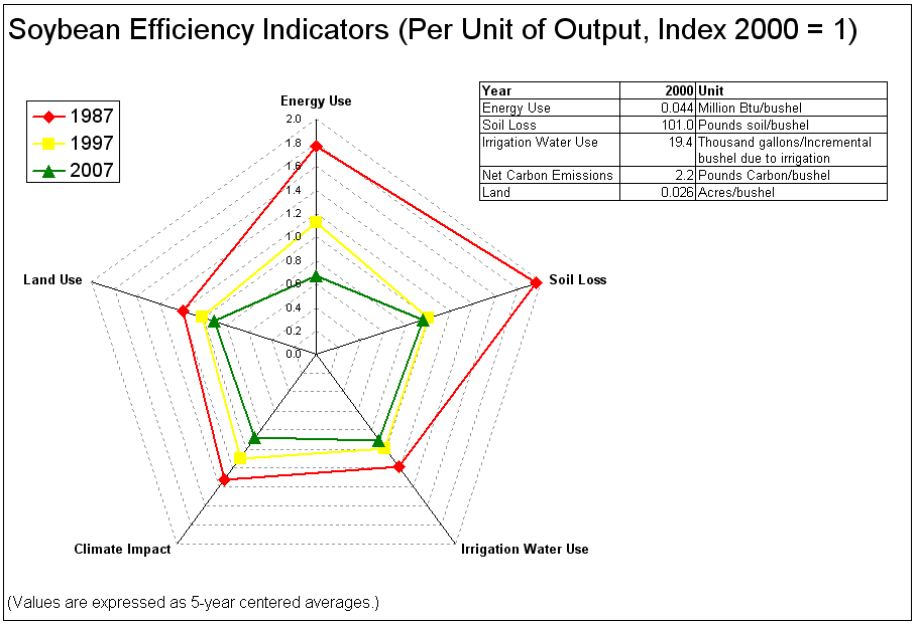


**Figure 3 Twenty years of US soybean efficiency gains**

[12] **Environmental Resource Indicators for Measuring Outcomes of On-Farm Production in the United States.** Field to Market: The Keystone Alliance for Sustainable Agriculture. First Report, January 2009. **http://keystone.org/spp/env-sustain_ag.html**

Examples go on and on: the increase in output of milk per cow, bushels of corn per acre, adoption of conservation and no-till practices, adoption of intensive rotational grazing, and the use of computer technology to monitor yields and nutrients, and increasing rate of gain per pound of feed in livestock, etc. Indicators like the last one show that fewer manure nutrients are leaving US livestock than they have only a decade before.[13]

- **Discounted carbon emissions/sequestration and time accountability in the RFS2 analysis.** The EPA carbon emission discounts over time are fatally tied to the assumption that their numbers reflect what is actually happening in real life. US agriculture is not plowing up virgin prairie or rain forests. The coefficients used by EPA to forecast carbon emissions and sequestration out 30 and 100 years may reflect a few situations, but they do not come close to approximating field conditions in the US. If real life emission values differ by only a small amount from the EPA estimates the forecasted results change significantly.

- **The IPCC methodology development imposes a bias against recovery of earlier emissions by changing the emissions accounting methodology.** The intergovernmental Panel on Climate Change (IPCC) has changed the global warming potential of methane from 21 to 23 to 25 times the radiative forcing as carbon dioxide in 1996, 2001, and 2007, respectively. While emission adjustments are updated religiously, advances in technical efficiency are rarely included. Using more efficient appliances and fuel-efficient vehicles rarely show up in the emission math. Consequently, when energy use is reduced to 1990 levels using advanced efficient technologies, our emissions will not return to 1990 levels. In addition, the IPCC methodologies attempt to account for international trade effects on fossil products, but do very poorly on agricultural/biomass products that are traded.

- **There are significant limitations to EPA Benefit/Cost Assessment, namely, it is missing.** EPA chose to remove military effects from their work on the basis that it is too difficult, but constructed a global indirect land use model with limited data. It is not clear why one analysis was deemed unworkable, while the other apparently unworkable analysis was deemed ok?

  EPA examined components, but was unable to integrate the various economic effects into a conclusive benefit/cost assessment. One of the challenges is that EPA imposes a negative bias on emissions before running the models. Methane gas is an excellent fuel. After it is combusted (oxidized), it becomes carbon dioxide. The anti-methane/anti-GHG assumptions interfere with conducting an objective benefit/cost analysis.

  Carbon dioxide is critical to photosynthesis. EPA policies need to incent CO2 emissions from power plants, ethanol plants, boilers, landfill generators, etc, out into biomass crop canopies to enhance biomass production and sequester CO2. This can never happen with existing anti-GHG policies.

  In the Paperwork Reduction Act, EPA (under) estimates total respondent burden to be 323,922 hours. This is 8,098, forty-hour weeks, or 162 full time

[13] John Lory, PhD. Environmental Nutrient Management Specialist, University of Missouri-Columbia at the Illinois State University Field Day, Lexington, IL, September 22, 2009.

equivalents. This does not include the cost of recordkeeping for producers needing to document all their crop production for an additional compliance procedure.

The National Corn Growers released a study on the cost of compliance for ethanol plants that indicated upfront cost for corn ethanol facilities will be $30 million while the annually reoccurring costs of RFS2 compliance will be $420 million.[14] This does not include the cost of the unestablished, economically vulnerable cellulosic/biomass biofuel producers.

It is unclear why EPA describes seven industries affected by this regulation in the preamble, but then only considers the petroleum refiners in the test for the Regulatory Flexibility Act? This appears to be a gross oversight on the industries affected by this regulation.

The immediate loss of hundreds of millions of dollars of public and private investment in biofuels projects using MSW needs to be considered as part of the benefit and costs of this rule. In addition, the funds that must now be appropriated to control understory fuel wood for wildfire control on federal lands must also be considered. Prior to the decision to exclude biomass from federal lands, the RFS incentives would have pulled this potential wildfire fuel off of the federal lands.

In short, the impacts of time used in the RFS2 proposed rule fall woefully short of what is necessary to have an accurate picture of the impact of RFS over time.

## III. Other Issues With the Proposed Rule

**A. Producer record keeping requirements are not cost effective and are difficult to enforce.** Producers will find alternative uses for their products – which will interfere with achieving energy independence due to policy barriers.

**B. EPA can not replicate the archaic technology matrix used in this proposed rule for the dozens of technologies using dozens of feedstocks that are being developed.** There are approximately 100 cellulosic, algal, waste oil, and methane gas technologies and projects already on the drawing board. EPA has assigned values to 15 pathways which do not include algae and other developing feedstocks. Algae developers are already beginning to partner with thermal conversion technology developers.

**C. Most of EPA assumptions on advanced biofuel production are based on the brief history of using corn for ethanol – which the regulation is moving away from.** This rule is written for land-centric biomass (ag and forestry). It nearly ignores all the human-centric biomass (wastes). It is ambiguous about MSW for biofuels but appears to accept methane fuels from (MSW-derived) landfill gas. Used vegetable oil and trap grease are being developed into biofuels. It is unclear how these fuels will comply with the RIN verification procedures.

[14] Compliance Costs Associated with the Proposed Rulemaking for the Renewable Fuel Standard. Prepared for National Corn Growers Association by Informa Economics. September 2009. http://ncga.com/files/pdf/RFS2RegulatoryComplianceCostReport9-21-09.pdf

**D. In tracking the existing RIN methodology, EPA discourages co-generation.** It appears that EPA discourages co-generation because it is difficult to track.

**E. Non-renewable fuels are not held to the same standards as the biofuels.** LCA analysis does not include the environmental impact of using Canadian tar sands for fuel (or other fossil fuels). LCA misallocates energy made from wastes. Food wastes and sewage should be included in food LCA models. In energy LCA they are a free good.

**F. Subsidies for fossil fuels were patently excluded on the basis that accounting for these indirect subsidies would be far too difficult.** However, there would be no loss of accuracy compared to the final outcome of the attempt to analyze the impact of US biofuel policy on indirect land use. In fact the Environmental Law Institute actually just released a study on the subsidies on fossil fuels.[15]

**G. This proposed rule fails to acknowledge the energy value of methane and the fertility value of carbon dioxide.** Production of these greenhouse gases is not bad. What is undesirable is the release of these valuable fuel, fertilizer, and food ingredients. This proposed rule does not incentivize the channeling of these emissions into further production of valuable products.

[15] U.S. Tax Breaks Subsidize Foreign Oil Production. Environmental Law Institute 2009. http://www.eli.org/pressdetail.cfm?ID=205