

Proposed Senate Bill S.559:
Securing America's Future with Energy and Sustainable Technologies Act
Comment on the Bill from an Advanced Biofuels Perspective

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US Senators Amy Klobuchar (D-MN) and Tim Johnson (D-SD) recently introduced Senate Bill S.599, the "Securing America's Future with Energy and Sustainable Technologies Act" or SAFESTA. This bill contains numerous amendments to existing Energy legislation and is being advertised as a comprehensive approach to increasing biofuel, wind, and solar use in the United States.

As in any piece of Congressional legislation, the old saw, "*The Devil is in the Details,*" applies. A review of the biofuels portion of the proposed bill, Titles I, II, and III, found that the wording of many of the draft provisions seemed to work against the goal of increasing biofuel use. This is primarily because of proposed reductions in funding, the introduction of an overly complex vehicle fuel use mandate, and ill-defined definitions.

The following review analyzes the sections that raise the most questions from an advanced biofuels standpoint. The sections are listed in chronological order for ease of review.

Section 103. International Indirect Land Use Changes.

This section proposes a moratorium on the use of International Indirect Land Use Change (IILUC) equations when calculating biofuel greenhouse gas (GHG) emissions. The moratorium would end when the National Academy of Sciences issues a report on IILUC calculations that says if they should be used or not. The legislation does not appropriate any money for the study, however.

While this section probably has support from many people who have been involved in the IILUC debate, there are several points to consider when legislating NAS to conduct the study.

- **Funding:** With NAS studies "you get what you pay for." NAS is as expensive as a high-end consulting firm and a study should be funded accordingly. Therefore, an adequate appropriation for the NAS report should be included in the legislation. If this is not done, the budget for the report will instead come out of the discretionary budgets of DOE, USDA, and EPA. Given the cuts that have been made to their budgets, there would be very little left for the IILUC NAS

report. With such a restricted budget, NAS would simply go to the Searchingers and other IILUC originators to perform cursory reviews on their work. Such a report would not be sufficient for Congress or the Administration to credibly act on the determinations made by the report.

- **Public Input:** Without a sufficient budget for the IILUC report, NAS will resort to their basic requirements for perfunctory public input process, i.e. one public hearing near the beginning of the process. Given that IILUC research is in the very early stage, an expanded, in-depth, and continuous public input process must be put in place. This will enable local and national effects on crop yields, apart from multinational commodity markets, to be properly calculated. These crop yield effects can include: national land-use laws, traditional land-ownership patterns, national and local barriers to technologies, and national and local agricultural loan practices.

Section 104. Modification of Definition of Renewable Biomass.

Given the multiple changes in biomass definitions made in both Federal legislation and various agency regulations, the need for revised science-based definitions is seen by many as a useful task. However, requesting another NAS study, also without appropriated funding, within one year of enactment will most likely have the effect of making the situation worse by picking the wrong set of “winners & losers” to be eligible for Federal incentives for the following reason.

Advanced biofuel research and development is at the stage where very few feedstocks and conversion processes have been eliminated. While this is a very exciting time for researchers, this amount of uncertainty makes it virtually impossible for a limited group of NAS panel members operating on a limited budget and without access to most proprietary research to correctly predict where the advanced biofuels industry will be in five or ten years.

Section 201 Loan Guarantees for Projects to Construct Renewable Fuel Pipelines.

The purpose of this section is stated to be the establishment of a program that would be devoted to only constructing Renewable Fuel Pipelines. However, the wording in the subsection, (e) (B) (4) Rapid Deployment of Renewable Fuel, could easily open up the program to non-renewable fuel projects as well.

The proposed wording is, *“Installation of sufficient infrastructure to allow for the cost-effective deployment of clean energy technologies appropriate to each region of the United States,…”*

Inclusion of the terms “infrastructure” and “clean energy technology” would open this section to include funding for non-renewable energy projects such as electric vehicle power lines, electric vehicle recharging stations, and non-renewable natural gas pipelines that are considered “clean energy technology” by US legislative and regulatory definitions. Inclusion of these types of projects for funding does not seem to be the stated objective of this section.

Section 202. Open Fuel Standard (OFS) For Transportation.

This section appears to be the cornerstone of the SAFESTA legislation. Instead of providing biofuel tax credits at their present rates (see Section 301 below) to jump-start the biofuel industry, a Federal mandate would be created to require all vehicles sold in the United States in 2021 to use fuel types (biofuel, natural gas, and electric) defined by the government. (30% would be required by 2013, 50% by 2015, 80% by 2017, and 100% by 2021.)

These new vehicles envisioned by the legislation are called Fuel Choice Enabling Automobiles and would include; a new type of Flex-Fuel Vehicle (FFV), plug-in hybrids, electrics, and new [vehicles that produce] *“50 percent (or 75 percent) less fossil fuel per mile than the average of vehicles,”* (see Definitions below).

The idea behind this section appears be one where demand creation is substituted for direct industrial development assistance through tax credits. However, instead of relying on market driven demand creation, the selected mechanism is government regulation of the American consumer vehicle fleet.

Attempts by governments to regulate vehicle fleet mixtures are replete with failures. (Note the lack of US government’s fueling of their mandated Flex-Fuel vehicles with E85.) The attempt being made by this section would probably meet a similar result.

The US automotive market is highly competitive and highly segmented. It is also highly affected by swings in fuel prices. However, the one aspect of it that has been constant for over five years is the market penetration of hybrids which has stagnated around 3% despite new models being introduced and the US government offering substantial tax benefits. Therefore, an attempt to increase “fuel-choice-enabling automobiles” which appear to be primarily plug-in hybrids, electrics, and some new “less than 50 percent

fossil fuel” technologies would force a sizeable portion of the vehicle buying public to purchase vehicles they have already turned down.

As an alternative, to increase the demand for available renewable biofuels, it would seem advantageous to work with the car industry to introduce ethanol/butanol Flex-Fuel vehicles, based on available technology, that would produce real-world E85/B_u85 mileage very similar to optimized E10 mileage and let the market take over to get them sold.

New or Amended Definitions in Section 202

The following are fuel and vehicle definitions proposed in this section.

Alcohols

The inclusion of M85 [85% Methanol] in this section, while attempting to acknowledge the existence of fuel alcohols other than ethanol, creates a serious conflict with the goal of this legislation to increase the use of renewable fuels. Specifically, virtually all methanol both currently being delivered to the United States for chemical purposes and planned for future fuel use is produced from non-renewable natural gas. Methanex, the Canadian company that has a virtual North American monopoly on methanol production, has made it very clear that an OFS with methanol would allow them to import natural gas based methanol to the United States. Is this the goal of this legislation?

In addition, bio-isobutanol (a C-4 alcohol) is now being produced by several US firms and will become a commercial renewable bio-alcohol fuel within the time frame of this legislation. Bio-isobutanol has similar combustion properties to ethanol. Therefore, it would seem logical to include bio-isobutanol, and other higher number bio-alcohols, in this and all alcohol definitions used in this legislation.

New Vehicle Categories

Flex-Fuel Vehicles (FFVs) defined in this section as Fuel Choice Enabling Autos would be required to run on M85 and well as E85 in order to use the M85 included in the alcohol definition.

This section also creates a new vehicle definition that reads, [vehicles that produce] “50 percent (or 75 percent) less fossil fuel per mile than the average of vehicles...”

While this language represents what appears to be a clear objective, a critical part of the vehicles' definition is missing. Specifically, by not listing the fossil fuel used to generate the electricity used by electric or plug-in-hybrids as part of the total fossil fuel used, these definitions could allow for vehicles that would in fact use much more fossil fuel than intended by the definition. In addition, for the sake of consistency, all vehicles or fuels listed in this section should be subject to the well-to-wheel energy and emissions requirements placed on biofuels by the 2007 Energy Act and subsequent regulations.

Section 204. Blender Pump Installation.

The objective of this section is to create a tax incentive program for the installation of ethanol blender pumps. Blender pumps are generally considered to provide market driven intermediate ethanol/gasoline mixtures between E10 and E85 to be used by Flex-Fuel vehicles. However, the definition proposed for a blender pump in this legislation does not appear to meet this need.

Instead, the blender pump proposed in this section is one that can dispense at a minimum 3 different blends including; 1) gasoline, 2) E10, and 3) E85. Therefore a pump that meets the minimal requirements would not be able to dispense any intermediate mixtures.

Furthermore, given that E10 is now the de facto "regular" gasoline because of the octane enhancement and oxygenation properties of ethanol, E10 is already delivered to retail fueling installations as "regular" and does not require blending. In addition, E85 is also currently delivered to retail fueling installations and does not need pump blending either. So if these are the only blends included in the blend pump definition, a blend pump does not seem necessary.

If, however, the purpose of this section is to implement blending pumps, i.e. provide market driven intermediate ethanol/gasoline mixtures, minimum requirements should be increased by at least two or three blends between E10 and E85.

In addition, if blend pumps are to be used for Flex-Fuel Vehicles that can run on any mixture between E10 and E85, it does not seem necessary that the intermediate blends need to be determined by the Secretary of DOE as stated in the legislation.

Section 301. Modification of Credit for Alcohol Used as Fuel

Since this legislation proposes that an increased biofuel demand will be created by the Open Fuel Standard (OFS) included in Section 202, current tax credit incentives for biofuels are being significantly reduced.

The proposed 2012 level of \$.20/gallon for VEETC (Volumetric Ethanol Excise Tax Credit) represents an immediate 56 percent reduction (reduced from \$.45/gallon to \$.20/gallon) and the VEETC would be eliminated by 2016.

There appear to be two problems with this VEETC phase-out approach. One, it doesn't track with the proposed OFS market increase, and two, it does not seem to track with the investments required by the ethanol industry to meet Federal GHG reduction requirements.

- OFS Phase-In: Even assuming the best-case scenario for the OFS standard, less than 10 percent of the consumer fleet is replaced every year. So, while the VEETC incentive is cut by 56% in 2012 and ended by 2016, no substantial increase in the biofuel market would have occurred by that time. 3% in 2013 and 2014 (30% of 10% of total vehicles) and 5% in 2015 (50% of 10% of total vehicles) for a total of 11% increase including non-biofuel vehicles.
- Efficiency and GHG Reduction Reinvestments: This tax credit reduction has been proposed without a NAS type study on its effects on the ethanol industry. Specifically, a study should be conducted on the technology reinvestments being made by the ethanol industry to decrease green house gases (GHGs), increase ethanol yields, and produce more value-added byproducts before changes in tax credits are made.
If the results of that study show that the industry is using the current tax credit rate for that purpose, the rate should not be changed. Conversely, if such a study shows a lower rate will suffice, that should be the proposed rate.

New or Amended Definitions in Section 301

Alcohol

The proposed definition of alcohol includes only ethanol and methanol. Since bio-isobutanol is now in the late stages of development and will be available for purchase within the timeframe of this legislation, it should be included.

Bio-isobutanol motor fuel has been proven in the rigorous arena of motor sports. The Dyson Mazda/Lola prototype ran the entire 2010 American Le Mans series on bio-

isobutanol with no fuel related engine failures. In addition they won the Mid-Ohio race in August 2010.

Section 301 (c) Cellulosic Biofuel Producer Credit

This proposed section contains the following:

“This section [Cellulosic Biofuel Producer Credit] shall not apply to any sale or use for any period after December 31, 2016.”

This proposed cutoff date of 2016 seems to have been set without a complete analysis of the cellulosic fuel industry.

Three conditions of the cellulosic industry do not seem to have been taken into consideration: 1) cellulosic biofuels are not currently commercially available in any sizable quantities, 2) many promising advanced production technologies have not reached the pilot stage, and 3) cost-effective perennial energy grasses (which take up to three years to reach maximum harvest yields) have not yet been commercially planted.

Because of these realities, maintaining a 2016 cutoff of the Cellulosic Biofuel Producer Credit would have a very negative effect on the eventual sustainability of the cellulosic biofuel industry. Specifically, the early cutoff would concentrate available capital in those technologies that would return tax credits before 2016 even if they were not the most effective. Consequently, a 2016 cutoff would hamstring the industry, leaving it dependent on less than effective feedstocks and conversion technologies meaning high costs, small market share, and probably more expensive incentives to make up for the lost opportunities of the 2016 cutoff.

New or Amended Definitions in Section 301

Cellulosic Biofuels

The definition of cellulosic biofuel includes the terms, *“lignocellulosic or hemicellulosic matter.”* While these general terms of art are usually assumed to refer to all biofuel feedstocks, there is one important biomass component that is not specifically named in these definitions. This is pectin. Pectin is a complex carbohydrate that is crucial to plant cell wall growth and development. It may comprise between 10 and 30 percent of plant cell walls. (Caffall and Mohnen, Carbohydrate Research, 344, pp-1879-1900, 2009).

Pectin can be converted to a C-6 sugar called galacturonic acid which has been shown to be an effective biofuel feedstock.

The definition of cellulosic biofuels also includes the terms, “*renewable or recurring basis,*”

It is hard to see what the term “recurring” adds. Renewable is a very clear biofuel concept--biomass used for biofuel is replaced by more plant or algae biomass that is grown. And since biomass and biofuel are fungible, the addition of “*come up again or repeatedly*” to the definition would appear to imply that the biomass used for biofuel had to be replaced by the same quantity and type of biomass grown in the same place. This seems to make the definition more complex than needed.

Special Rule for Cellulosic Biofuel Producer Credit

The purpose of this definition appears to limit applicability to only biofuel produced in the United States which is in keeping with the goal of the proposed legislation. However, the wording, “*unless such cellulosic biofuel is produced in the United States,*” leaves out where the biomass comes from. Without reworking the phrase to something like, “*unless such cellulosic biofuel [and biomass used to produce the biofuel] is produced in the United States,*” cellulosic biofuel produced from biomass that was grown in another country would be eligible for the cellulosic ethanol tax credit.

For comparison, without including the origin of feedstock wording, a similar petroleum based fuel definition for a tax credit program would consider all the gasoline produced in the United States with imported oil as “*gasoline produced in the United States*” and eligible for a tax credit. Is this the intent of this legislation?