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Renewable Diesel Versus Biodiesel

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Andrews Kurth LLP

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- Has Represented Clients In Renewable Energy (Fuels Power) Project Finance Since 1978, Domestically And Internationally.
- A Founder And Original General Counsel:
 - Renewable Fuel Association –1979-1984.
 - Clean Fuels Development Coalition – since 1985.
 - Clean Fuels Foundation – since 1990.
 - American Council On Renewable Energy – since 2001.
- A Key Lobbyist On The Creation Of The Alternate Energy Tax Incentives In The 1978 And 1980 Tax Acts, And Their Expansions and Extensions Thereafter.
- A Key Lobbyist for The Renewable Fuels And Renewable Power Industries in the 1978 Public Utility Regulatory Policies Act, 1983 Caribbean Basin Economic Recovery Act, 1990 Clean Air Amendments (and Reformulated Gasoline Regulations thereto), 1992 Energy Policy Act, 2005 Energy Policy Act, and the 2007 Energy Independence and Security Act.

Kreido Biofuels, Inc.

Larry Sullivan

Chief Technology Officer

- Kreido Biofuels, Inc. has invested US\$20 million to provide the world renewable energy through its proprietary process intensification technology - the STT® system.
- The Company is currently developing biodiesel plants in the U.S. that will have an anticipated aggregate nameplate capacity of 100 million gallons per year (333,000 mt/yr). Kreido's plants are built around its STT® 30G biodiesel production unit, a complete pipe-to-pipe biodiesel production system that significantly improves the efficiency, quality, and process control of biodiesel production.
- Committed to building a sustainable future, Kreido Biofuels' plants have a smaller footprint and offer feedstock flexibility. The Company plans to license its biodiesel technology internationally and to third-party biodiesel producers.

Kreido Biofuels, Inc.

Sullivan's previous positions include:

- Delta-T Corporation - Led the biodiesel business development efforts from 2005 to 2007.
- World Energy, part of Gulf Oil Group - Completed development of the biodiesel market in the Midwest which involved critical negotiations for supply of biodiesel to leading Midwestern petroleum refiners, distributors and suppliers from 2004 to 2005.
- Crown Iron Works Company - Led the strategic design and product marketing team developing the first generation of biodiesel production technology from 2002 to 2004.
- Consultant to Petroleum Refining and Renewable Fuels/Chemical companies 1994 to 2002.
- Conoco U. K. and Dupont International S.A. - Led refining strategy development for Europe in planning their efforts in integrating refinery and petrochemical intermediates from 1990 to 1994.

Safe Harbor Statements

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I. RENEWABLE DIESEL VERSUS BIODIESEL

- A. The Energy Policy Act of 2005 (the “2005 Energy Act”) defined “Renewable Diesel” as diesel fuel derived from biomass using a thermal depolymerization process that meets:
 - 1. The registration requirements for fuel and fuel additives established by the EPA under Section 211 of the Clean Air Act.
 - 2. The requirements of the American Society of Testing (“ASTM”) D-975 (for petroleum diesel fuel) or D-396 (for home heating oil).

- B. The Renewable Diesel Provision Was Inserted, in the later discussions of the 2005 Energy Act by Congressman Roy Blunt (R-Mo.), during the extension of the biofuels tax incentives, at the behest of Changing World Technologies, Inc., to convert turkey offal into Renewable Diesel through a thermal depolymerization process.
 - 1. Renewable Diesel was provided a \$1.00/gallon (“Renewable Diesel”) tax credit without distinguishing between virgin (e.g., unprocessed oils, plant matter and animal fats) and non-virgin (e.g., processed waste materials like recycled restaurant greases) feedstocks.
 - 2. Biodiesel was accorded a \$1.00/gallon (“Agri-biodiesel”) tax credit for virgin and a \$0.50/gallon (“Biodiesel”) tax credit for non-virgin feedstocks under the tax provisions of the 2004 American Jobs Creation Act.

3. The term “Thermal Depolymerization” was left undefined by Congressman Blunt/Congress in the 2005 Energy Act. Congress never had a chance to debate the provision inserted late in the legislative process.
4. As such, the Internal Revenue Service (“IRS”) would not permit refiners and chemical processors, who saw the provision as a significant opportunity to claim the credit on Renewable Diesel produced in their refineries and chemical processing facilities as well as petrochemical complexes, until the term “Thermal Depolymerization” was formally defined. Thus, they applied to the IRS for a formal ruling.

II. NEW IRS NOTICE 2007-37 (MARCH 2, 2007, PUBLISHED APRIL 3, 2007) FOR RENEWABLE DIESEL POTENTIALLY ADVERSELY IMPACTS THE BIODIESEL INDUSTRY

- A. IRS Notice 2007-37, under its new broad definition of “Thermal Depolymerization”, enables refiners and chemical processors (using Fischer Tropsch technologies – (e.g., coal-to-liquids (“CTLs”), gas-to-liquids (“GTLs”), biomass-to-liquids (“BTLs”)) and other chemical processes) to by-pass Biodiesel manufacturers and, thus, purchase biomass-based, virgin and non-virgin feedstock directly from their feedstock producers and then introduce such feedstock directly into (i) a refinery’s existing hydrotreating and/or isomerization units co-processing these feedstocks with petroleum feedstocks and/or (ii) newly-constructed, independent stand-alone hydrotreaters and/or isomerization units, to create essentially the same product as Biodiesel.

- B. The IRS Defined “Thermal Depolymerization,” after expressly consulting with the U.S. Department of Energy (“DOE”), as a process for the reduction of complex organic materials through the use of pressure and heat, with or without the presence of catalysts, to decompose long-chain polymers of hydrogen, oxygen and carbon into short-chain hydrocarbons with a maximum length of around 18 carbon atoms.
- C. The IRS Notice 2007-37 Creates a “Win-Win-Win” scenario for refiners and chemical processors, as well as for refiners and other owners with petrochemical complexes, as follows:
 - 1. Tax Credits
 - a. Renewable Diesel -- \$1.00/gal. (Without distinguishing between virgin/non-virgin feedstocks).
 - b. Biodiesel – Distinguishes different rates for different feedstocks -- \$1.00/gal. (Agribiodiesel Tax Credit -- virgin feedstock) and \$0.50/gal. (Biodiesel Tax Credit -- non-virgin feedstock).
 - c. Each tax credit currently expires on December 31, 2008.

- d. Refiners/Chemical Processors, as well as Petrochemical Complex Owners, thus, are incentivized to pay feedstock producers a high price in competition with Biodiesel Manufacturers for the same already-costly feedstock. Also, with the enormous existing storage infrastructure of refiners/chemical processors/Petrochemical Complex Owners, and the enormous profits made by them over the past several years, these hydrocarbon manufacturers could purchase tremendous quantities of a Biodiesel Manufacturer's feedstock on a long term basis and simply place these feedstocks in storage. This potential aggressive approach could force Biodiesel Manufacturers into a tremendous short position.
- e. House-Passed Tax Bill:
 - i. It would eliminate the \$1.00/gal. tax credit for Renewable Diesel produced from the co-processing of biomass feedstock with petroleum feedstock in existing refinery/chemical processing units, as well as in petrochemical complexes. However, Renewable Diesel produced from free-standing units would continue to qualify for the \$1.00/gal. tax credit.
 - ii. The National Biodiesel Board ("NBB") sought to reduce the latter tax credit to \$0.50/gal. and impose a "60 million gallon per-producer" limit on this tax incentive. The House, however, did not agree.

- iii. The House Tax Bill also (a) expands the Renewable Tax Credit to become a “Biomass-Based Diesel Credit” at free-standing units (i.e., not co-processing in existing refinery/chemical processing units) and (b) creates a \$1.00/gal. tax credit for biomass-based Jet Fuel.
- iv. Furthermore, the House Tax Bill removes the requirements of (a) thermal depolymerization and (b) the satisfaction of ASTM D-975 and D-396. Thus, the House Tax Bill removes any doubt that Renewable Diesel and other such renewables fuels processed through a Fisher Tropsch processing system would qualify for the \$1.00/gal. tax credit, if this conclusion already was not clearly established, as it seemingly had been, through IRS Notice 2007-37.

f. Senate-Unpassed Tax Bill:

- i. The original Senate Tax Bill had no provision.
- ii. The new Senate Tax Bill reduces the \$1.00/gal. tax credit for Renewable Diesel to \$0.50/gal. for co-processing, but does not reduce the existing \$1.00/gal. tax credit for Renewable Diesel produced in stand-alone facilities. It also does not impose an annual “per-producer” limitation. Instead the Senate proposes a “60 million gallon/year per facility” limitation on the tax credit. To date, the Senate has not passed its Tax Bill.

2. Cetane Rating

- a. Renewable Diesel – 85 to 100.
- b. Biodiesel – 60 to 65 at the high end with palm oil or tallow; otherwise it is closer to 55 with vegetable oil, fats and greases.
- c. Petroleum Diesel – 40 to 45.

3. Pipeline Fungibility

- a. Renewable Diesel – entirely pipeline fungible, as it is indistinguishable from petroleum diesel.
- b. Biodiesel – U.S. “perception” is that it is “not” pipeline fungible (i.e., could contaminate aviation gasoline/jet fuel) – while B-2 and B-5 blends are pipelined safely in Europe without fear of contamination by Europe’s airline industry.

4. RFS

- a. Renewable Diesel – 1.7 credits/gal.
- b. Biodiesel – 1.5 credits/gal.
 - ❖ Each could increase to 2.5 credits/gal., if the respective production facility is powered on 90% or more of a non-hydrocarbon-based fuel.
- c. Refiners and chemical processors potentially can meet RFS purchase obligations, because Renewable Diesel is produced within the refinery and chemical processing units, as well as within petrochemical processing complexes. Thus, they potentially would not need to purchase RFS qualified-fuel to meet their RFS obligations, depending on the amounts of RFS qualified Renewable Diesel produced versus the size of their RFS obligations. In fact, depending upon the fulfillment of their RFS purchase obligations, refineries and chemical processors could save money, as they, instead, potentially would create new revenue streams from selling excess RFS fuel/credits.

5. Environmental Benefits – The Environmental Benefits of Biodiesel should be captured in Renewable Diesel, as Biodiesel evidences immediate and dramatic effects by reducing harmful emissions (e.g., CO₂, Carbon Monoxide, SOX, Hydrocarbon Emissions, Particulate Matter) by more than 50% when compared to petroleum diesel. Thus, by using the same renewable biomass feedstocks as Biodiesel to create these tremendous Environmental Benefits, Renewable Diesel should produce similar such emissions reductions and resulting Environmental Benefits.
 - a. Refiners and chemical processors, as well as owners of petrochemical complexes, thus, could become “net-sellers” of Clean Air Act credits in the more-restrictive 2008 Phase II Clean Air Act regulatory regime. In such case, a reduction or elimination of their obligations to purchase such emissions credits would potentially permit them to become “net sellers” of credits, creating new revenue streams.
 - b. Similarly, refiners/chemical processors, as well as owners of Petrochemical Complexes, could become “net-sellers” of carbon credits in states implementing mandatory industrial carbon offsets, if they meet their obligations by controlling the manufacture of these renewable fuels.
 - c. These are only two examples of potentially new refinery/chemical processing/petrochemical complex income streams, where these hydrocarbon manufacturers otherwise would need to purchase credits to be compliant with Federal Clean Air Act and State Industrial Carbon Laws.

6. BTU Value – Biodiesel and Renewable Diesel have similar energy content and, independently, each exceed the BTU Value of other competing alternative fuels.
7. Fuel Quality Controls –
 - a. Renewable Diesel – Refinery, Chemical Processors' and Petrochemical Complex Owners' quality control systems ensure product quality.
 - b. Biodiesel – However, Biodiesel Manufacturers frequently encounter product quality issues and challenges.
8. Manufacturing Facilities And Distribution Systems
 - a. Renewable Diesel – Can be produced and distributed within existing refineries, chemical processing facilities and petrochemical complexes, along with their existing pipeline and other distribution systems. Thus, their capital expenditures (“CAPEX”) are very small, unless they must construct stand-alone units. In the latter case, the required CAPEX could be more than double those similar expenses incurred by Biodiesel Manufacturers producing the identical product volumes.
 - b. Biodiesel – CAPEX can range from \$0.50/gal. to more than \$1.50/gal. depending on the process design, equipment and construction requirements thereto. In fact, CAPEX has increased to as high as \$2/gal. in the last year for greenfield developments.

9. Temperature Range – Renewable Diesel is chemically equivalent to conventional diesel and, thus, likely has a lower “cloud point” than does Biodiesel. The result could permit the use of Renewable Diesel at a broader range of temperatures than Biodiesel. Biodiesel, unlike Renewable Diesel, has faced many issues and challenges, when used in colder climates.
10. The oil industry has tried for more than 30 years to eliminate the ethanol industry and has failed to do so. However, in one fell swoop, the IRS, after consultation with the DOE, has served up the potential “knock-out punch” to undercut severely, if not to kill, the Biodiesel industry in the United States.
11. In an April 16, 2007 NBB Press release, a NBB Board member stated that through the IRS Notice, “the oil companies could put a stranglehold on materials used to make biodiesel, stunting the growth of the industry, and leaving [biodiesel] companies....standing on a bridge to nowhere.”

12. The alternatives have been to either sue the IRS or to seek a legislative fix immediately.
 - a. With the rush of biofuels tax bills presently before Congress (now and in the past Congressional Session), a new Democratic Congress and an Administration now touting biofuels, a legislative fix immediately is the best path. However, it must be accomplished early in 2008, because no tax bill likely will be passed/enacted later in an election year. Also, the 2008 Presidential and Congressional elections, with a 2009 transition period thereafter, could mean that we may not see a tax bill enacted until 2010. Nevertheless, a mere extension of existing and expiring tax credits could be simply accomplished through an appropriations bill enacted during 2008 or 2009.
 - b. The NBB has chosen the legislature path. Notwithstanding, simultaneous pressure on the Secretary of the Treasury and his legislative counsel also should be vigorously pursued to reach a fair result. The NBB will have its “hands full” trying to defeat an historically powerful and highly-skilled oil and chemical industry lobby.

III. MARKETPLACE OVERVIEW

A. Renewable Diesel (thermo-depolymerized oils and fats)

1. Current U.S. Market – Less than 100 million gallons/yr of planned production. The process is used in the EU by Neste Finland and expected to be used by ConocoPhillips.
2. New ConocoPhillips – Tyson Foods Joint Venture - Within two weeks of the IRS issuance of this severe ruling, Conoco and Tyson Foods announced, on April 16, 2006, a major agreement to produce 175 million gallons of Renewable Diesel by 2009, with each company investing more than \$100 Million. Tyson will provide ConocoPhillips animal fats to refine into Renewable Diesel in Conoco's refineries for ultimate pipeline shipment and sale. ConocoPhillips and Tyson Foods began producing ultra-low sulfur Renewable Diesel from beef fat at Conoco's Borger, Texas refinery on December 18, 2007.
3. New Syntroleum Corporation – Tyson Foods Joint Venture - Syntroleum Corporation, in June 2007, in partnership with Tyson Foods, formed Dynamic Fuels LLC, a 50%/50% joint venture, to produce synthetic renewable fuels from animal fats targeting the Renewable Diesel, jet/aviation and military fuel markets. This jet/aviation fuel results from military requests and fits long term Department of Defense ("DOD") planning for a single fuel (JP-8).
4. Projected U.S. Production - 2 billion gallons/yr production by 2012 with production capacity increases by using existing and stand-alone facilities – Hydrotreaters and Hydrocrackers.
5. 2015 – Could be Very Significant Production, including "Second Generation Biodiesel." Although under DOE planning these would be derived from cellulosic feedstocks, not fats and oils (lipids), which are converted to syngas for use in FT processes to create alkanes (diesels, kerosenes, solvents, waxes and lube oils).

B. Biodiesel (mono alkyl esters from long chain fatty acids)

1. Current U.S. Market – Approximately 1.85 billion gallons/yr Biodiesel capacity exists in approximately 165 Plants. However, only approximately 450 million gallons of biodiesel were sold in 2007. Much of this capacity is in dedicated and non-dedicated oleochemical and chemical plants. Many plants are able to direct output to markets other than Biodiesel, such as soaps, detergents, and a myriad of other oleochemicals used in non-fuel related markets.
2. Current U.S. Construction – Approximately 1.4 billion gallons/yr production of Biodiesel is under construction in approximately 80 new plants which are to be operational by December 31, 2008. Many facilities will not be constructed, however, unless mandates and tax credits remain in place.

3. 2008 – Expect more than 3.25 billion gallons/yr production capacity, if all current construction is realized.
4. 2008-2015 – Additional capacity in potentially substantial amounts is dependent upon extended tax incentives, available and competitively-priced feedstocks and/or captive feedstock production (such as algae produced in significant tonnage per acre), and available RFS capacity/environmental emissions reduction credits. Captive crushing operations are a plus.
5. Europe – European Biodiesel Manufacturers are selling at 10% of their current capacity (which is currently multiple times larger than current U.S. capacity) due to the loss of tax incentives, environmental concerns involving available feedstocks, and importation of more than 50% of U.S. production under an existing weak U.S. currency.

IV. PROJECT FINANCING MODELS

A. Renewable Diesel

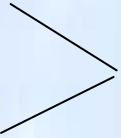
1. CAPEX - near US\$0, unless required to segregate diesel from other products with existing hydrotreaters. Whether to use existing facilities or construct new stand-alone units is the major question.
2. If the latter case, the CAPEX for new hydrotreaters is approximately up to twice the cost of the similar capacity produced in a biodiesel manufacturing facility. Over US\$0.50/liter in the EU.
3. Operating Costs – Approximately \$2.50/Gallon reduced by the \$1.00/Gallon Renewable Diesel Tax Credit regardless of whether using the same Virgin or Non-Virgin (used restaurant oils) feedstocks. These are the same feedstocks used for Biodiesel production.
4. ROI – 20% to 30%, with the higher returns if integrated into, instead of outside of, the petroleum refinery. These returns represent a very good deal for refiners and chemical processors (e.g., Eastman) to enter what the EPA and DOE call the “non-ester” diesel marketplace.

B. Biodiesel

1. Debt/Equity Ratio – has maintained at approximately 50%/50%. Today, more equity is required.
2. CAPEX – is moving from more than \$1.00/Gallon (generally inside the U.S. and EU) to \$0.25 to \$0.50/Gallon (at the lower rates outside of the U.S. and EU – such as in Asia) due to increasingly better technologies, lower production and labor costs (as industry moves away from steel to composites and uses other technology advancements) and growing numbers of Top-Tier Process Engineering Companies. (Top-Tier Engineering Performers are only now appearing for Biodiesel versus ethanol plants. In the past, such Top-Tier Engineering Companies were not as important for Biodiesel projects, whereas they were required for ethanol projects).

3. Operating Costs – Are Approximately \$2.80 – \$3.00/Gallon (at least \$2.30/Gallon constitutes feedstock costs), reduced to \$1.80 - \$2.00/Gallon by \$1.00/Gallon Agribiodiesel Tax Credit for Biodiesel produced from Virgin (plants and animal fats) Feedstocks or to \$2.30 - \$2.50/Gallon by \$0.50/Gallon Biodiesel Tax Credit produced from Non-Virgin (biomass - based greases and other recycled biomass- based) Feedstocks. Integrated oilseed agriculture and processing are key.
4. ROI – 7% to 18%, with the higher returns, if the developer owns the oilseeds and extraction process. These ROIs were higher than 50% just over one year ago. U.S. exports of Biodiesel to the EU are currently saving the U.S. industry.

V. ESTABLISHMENT OF THE RENEWABLE FUELS STANDARD (2005 ENERGY ACT SECTION 1501)

- A. Tax incentives, although critical to project finance/project closings, never built out the biofuels markets as did assured market demand from a statutorily-enacted/required RFS through the 2005 Energy Act.
- B. Legislation establishes the RFS for biofuels (including Biodiesel) at the following levels:
- | | | |
|----------------------------|--|--|
| 2006 - 4.0 Billion Gallons |  | - 700 mill gal/yr increase for years 1-5 |
| 2007 - 4.7 Billion Gallons | | |
| 2008 - 5.4 Billion Gallons | | |
| 2009 - 6.1 Billion Gallons | | |
| 2010 - 6.8 Billion Gallons | | |
| 2011 - 7.4 Billion Gallons | - 600 mill gal/yr increase in year 6 | |
| 2012 - 7.5 Billion Gallons | - 100 mill gal/yr increase in year 7 | |
- C. Originally, the required amount in 2013 was to be determined, but it would not have been less than that used in 2012. The U.S. Secretary of Energy makes this determination in consultation with the U.S. Secretary of Agriculture and the U.S. EPA Administrator. Experts predict that, at the current growth levels, potentially, Biodiesel will grow to over 4 billion gallons/year and fuel ethanol will grow to over 16 billion gallons/year by 2015.

- D. The regulations for the RFS under the 2005 Energy Act were issued on April 10, 2007 and the program is to be governed by the EPA.
- E. Subsequent years' refiner requirements are determined by the amount of gasoline ÷ amount of Biodiesel (approximately 3 percent). For example, a refiner producing 100 Million Gallons of gasoline must buy 3 Million Gallons of Biodiesel or purchase credits.
- F. Use of the above base amount results in the accumulation of credits – a gallon of (B-100) Biodiesel = 1.5 RFS credit. (One gallon of grain-derived ethanol = 1 RFS credit; One gallon of Renewable Diesel = 1.7 RFS credit; One gallon of cellulosic ethanol = 2.5 RFS credit; One gallon of either grain-derived ethanol, Biodiesel or Renewable Diesel produced in a plant powered on 90% or more non-hydrocarbon-based fuel may receive 2.5 RFS credits.)

- G. Credits are transferable/saleable. Generally, at least for ethanol, 1 credit is attached to the physical gallon sold; while the balance of any amount of the total per gallon credit, if any, can be stripped off and monetized by the blender-owner, as opposed to producer/manufacturer. So long as the RFS mandate is set higher than the available physical biofuels gallons in a particular year, then these RFS credits will command potentially a significant trading price.
- H. Initially, these credits are designed to ease refiner compliance with the RFS purchase requirements:
1. Refiners could conceivably meet the RFS purchase obligations without purchasing any “wet” gallons of Biodiesel.
 2. This “flexibility” for the refiner to effect compliance with the RFS mandate is exactly the reason for the enactment of the RFS into law.

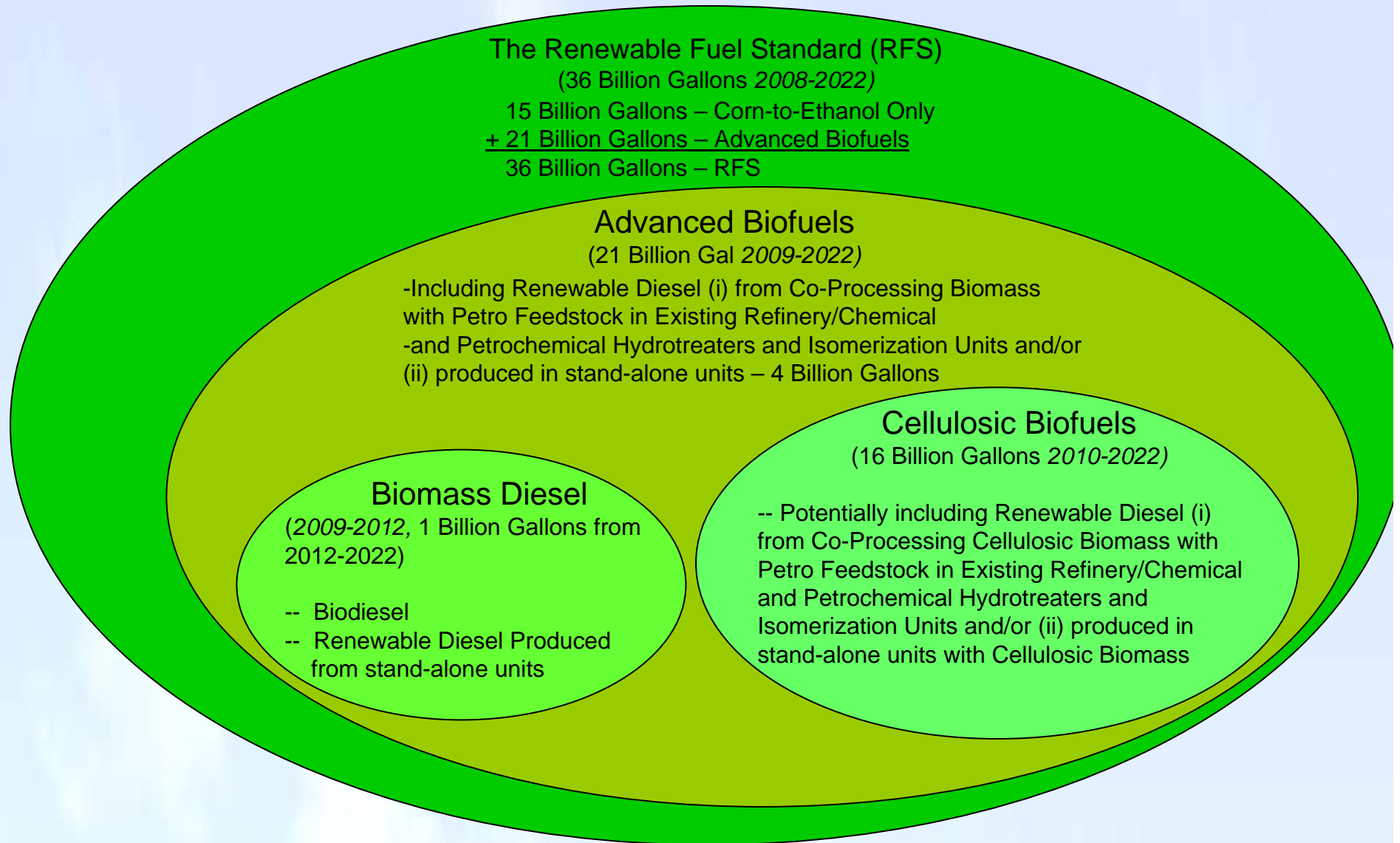
VI. The 2007 ENERGY ACT – THE NEW RFS

- A. President Bush's State of the Union address in January 2007 called for the creation of an "Alternative Fuel Standard" ("AFS") as opposed to the RFS, thus expanding the scope of such mandate which could include a host of other fuels including gas-to-liquids and coal-to-liquids. The Bush plan called for 35 billion gallons/year to be met by these alternative fuels (including biodiesel and fuel ethanol) by 2017, or extending the current 7.5 billion gallons/year by 2012 RFS, by nearly 27.5 billion gallons/year of the additional capacity in a 5-year time frame.
- B. Congress, in the Energy Independence and Security Act of 2007 (the "2007 Energy Act") revised the RFS by (i) increasing the 7.5 billion gallon/year (by 2012) limit to 36 billion gallons/year (by 2022) and (ii) creating new categories for "Ethanol-from-Corn," "Advanced Biofuels", "Cellulosic Biofuels" and "Biomass Diesel". As CTL, BTL and GTL through Fisher-Tropsch and other advanced processes, which process biomass products into CTL, GTL, BTL and other products, seemingly can participate in the New RFS, the revised standard has become more of the AFS contemplated in the Bush 2007 State of the Union Address.
- C. Senator Binghamon's S.987 RFS-Expansion, moreover, has been included in the 2007 Energy Act. Thus, a further expansion of the RFS also would qualify renewable fuels used as boiler fuels, jet fuel and home-heating fuel for these valuable RFS credits, in addition to the previous motor fuel use-only standard.

Energy Independence and Security Act of 2007 New RFS Mandate

Year	Total Volume of Renewable Fuels (Billions of Gallons)	Advanced Biofuel Requirement (Billions of Gallons)	Cellulosic Requirement (Billions of Gallons)	BioMass Diesel Requirement (Billions of Gallons)	Resulting Cap on Corn Ethanol (Billions of Gallons)
2008	9.000				
2009	11.100	.600		.50	10.5
2010	12.950	.950	.100	0.65	12.0
2011	13.950	1.350	.250	0.80	12.6
2012	15.200	2.000	.500	1.0	13.2
2013	16.550	2.750	1.000	1.0	13.8
2014	18.150	3.750	1.750	1.0	14.4
2015	20.500	5.500	3.000	1.0	15.0
2016	22.250	7.500	4.250	1.0	15.0
2017	24.000	9.000	5.500	1.0	15.0
2018	26.000	11.000	7.000	1.0	15.0
2019	28.000	13.000	8.500	1.0	15.0
2020	30.000	15.000	10.500	1.0	15.0
2021	33.000	18.000	13.500	1.0	15.0
2022	36.000	21.000	16.000	1.0	15.0

New Renewable Fuel Standard Law



VII. Conclusion

- A. Biodiesel and Renewable Diesel will play important roles in the rise from 1 billion gallon annual RFS as of 2012 and continuing for 10 years thereafter, until they collectively reach at least a 5 billion annual gallons RFS in 2022. There is room in the vast diesel market for both fuels to exist side-by-side.
- B. Other technologies, like biomass (cellulose) converted by gasification to syngas, whereupon the syngas is oligimerized to diesel fuels, will begin to enter the market during the years 2015 to 2022.
- C. The diesel fuel market for North America will be fully integrated by 2022, with annual diesel volumes potentially surpassing 100 billion gallons per year. In such a setting, Biodiesel, Renewable Diesel and any new biomass-based diesels could only achieve a penetration rate of 5% or 5 billion using all available 2008 biomass resources (e.g., soybean oil, other oils and fats, biomass and algae).

VII. Conclusion (cont.)

- D. Only algae seemingly can provide a substantial feedstock supply beyond 2022, where EPA regulations could expand the volumes. Gasoline growth could go negative and diesel could attain 3% or more growth rates, as we saw in the EU circa 1990s to present.
- E. The biggest current threat to Biodiesel and Renewable Diesel may be the conversion of coal-to-liquids (“CTL”) through Fischer Tropsch technology with or without the use of similar biomass-based feedstocks. In such case, the low cost of coal, with new and effective CO₂ sequestration technologies, could make coal the preferred source of feedstocks in North America.