BIOFUELS FINANCE – Renewable Diesel Versus Biodiesel

WIREC 2008 – Washington International Renewable Energy Conference

Washington Convention Center
Washington, DC
March 4-6, 2008

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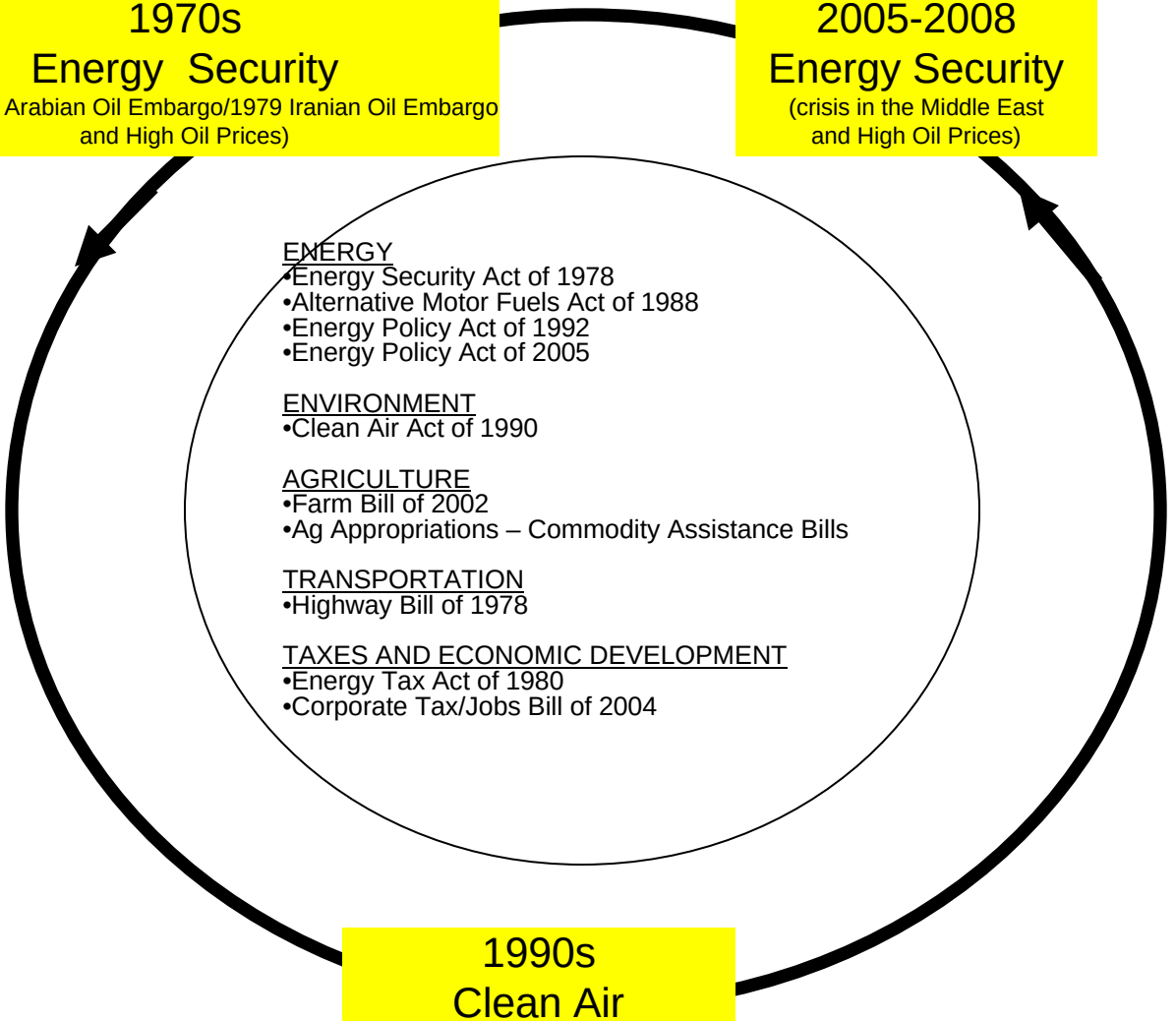
- Has Represented Clients In Renewable Energy (Fuels Power) Project Finance Since 1978, Domestically And Internationally.
- A Founder And Original General Counsel:
  - Renewable Fuel Association –1979-1984.
  - Clean Fuels Development Coalition – since 1985.
  - Clean Fuels Foundation – since 1990.
  - 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.
- Renewable fuels/power finance attorney, 1978-present.

I. Biofuels Have Come Full Circle

1970s
Energy Security
(1973 Saudi Arabian Oil Embargo/1979 Iranian Oil Embargo and High Oil Prices)

2005-2008
Energy Security
(crisis in the Middle East and High Oil Prices)



ENERGY
- Energy Security Act of 1978
- Alternative Motor Fuels Act of 1988
- Energy Policy Act of 1992
- Energy Policy Act of 2005

ENVIRONMENT
- Clean Air Act of 1990

AGRICULTURE
- Farm Bill of 2002
- Ag Appropriations – Commodity Assistance Bills

TRANSPORTATION
- Highway Bill of 1978

TAXES AND ECONOMIC DEVELOPMENT
- Energy Tax Act of 1980
- Corporate Tax/Jobs Bill of 2004

1990s
Clean Air
(reduction of air pollution)

II. Factors For Biofuels Growth

A. Need For Energy Independence
   1. Political instability in the Middle East.
   2. High Petroleum prices.
   3. Impacts National Security.

B. Benefits To The Environment And Economy
   1. Increased economic activity and creation of jobs.
   2. Emission reductions cause reductions in cancer and lung disease.

C. Incentives – Both Federal And State
   1. Tax Incentives.
   2. RFS.
   3. Emissions Reduction Credits/Renewable Energy Certificates under State Renewable Portfolio Standards.

D. Cost Competitiveness
   1. As per the Energy Management Institute Survey, alternative fuels are more cost competitive than their hydro-carbon based counterparts – Biodiesel is 29.2% more cost competitive while ethanol is 17.4% more cost competitive.

III. 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.

III. Renewable Diesel Versus Biodiesel

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.

IV. 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.

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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.

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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. <u>Senate-Unpassed Tax Bill</u>:

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 "<u>per-producer</u>" limitation. Instead the Senate proposes a "60 million gallon/year <u>per facility</u> limitation on the tax credit. To date, the Senate has not passed its Tax Bill.

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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.

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4. RFS

   a. Renewable Diesel – 1.7 credits/gal.
   b. Biodiesel – 1.5 credits/gal.
      i. 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.

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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., CO_2, 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.

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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.

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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."

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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.

V. 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.

V. Marketplace Overview

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).

V. Marketplace Overview

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.

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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.

VI. Project Financing Models

A. Financing Biodiesel Projects

1. Investors ideally seek a 25%-30% ROI. However, increased CAPEX, feedstock costs and construction time frames, along with decreased product prices and oil prices have challenged this expected ROI significantly.
2. Substantial Funding Needed – Equity and Debt. The Biodiesel standard CAPEX has been approximately $1/gallon constructed (some recent technology advancements are reducing Biodiesel CAPEX to below 50 cents/gallon constructed). Renewable Diesel manufactured in existing refineries/chemical processing units (i.e., “co-processing) requires little CAPEX. However, if it is produced in stand-alone units, it will require a CAPEX of at least twice that necessary to construct same annual gallonage of Biodiesel.
3. Approximately 18-24 months ago, fuel ethanol (from grain) was $1/gallon constructed and now it exceeds $2/gallon constructed (cellulosic ethanol CAPEX is much higher) due to the lack of recognized highly-qualified process engineers, substantial increases in the price of steel generally and stainless steel specifically, increased costs for concrete and asphalt, increased labor costs, shortages of critical components such as heat exchangers, pumps and distillation columns. These same increased cost factors also are driving Biodiesel CAPEX costs upward.

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4. Debt- Equity ratios for Biodiesel plant construction at best are 50%:50% (ethanol was 70%:30%, then moved to 60%:40% and today is closer to 50%:50% for a conventional dry-mill facility) (cellulosic ethanol plants will require even considerably higher percentages of equity). Stand-alone units for Renewable Diesel will exhibit similar debt-equity ratios to those of Biodiesel. Wall Street banks are capping equity at a maximum of $125 Million. Increases in project capital costs, thus, will require increasingly more equity.
5. Andrews Kurth recently closed a 50 Million Gallon Biodiesel project in India at a total cost of $21 Million initially on an all-equity basis (subsequently seek to project finance the project with debt including an additional 50 Million Gallon/year expansion thereto). The project has nearly 400,000 monetizable carbon credits at up to $14 per credit per year or nearly $5.6 Million in additional annual revenues currently unavailable in the U.S. for projects, as the U.S. has not signed or ratified the Kyoto Protocol.

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6. Managing Risk – e.g. shift technology risk to construction contractor through performance warranties.
7. Investing in company versus project level. (This approach is seen through the recent use of venture capital and private equity funding and/or capital markets funding through reverse mergers into public vehicles accompanied by private investments into public enterprises (PIPES) at the company level.)
8. Engage a very capable design-build team at very reasonable price and assemble a highly-capable management team.
9. Estimate the project's initial seed capital needs for six (6) months to a year – Seed capital can be used towards:
    a. development of a feasibility study and business plan. These documents, among other requirements, will determine if any deal-breakers exist and how to surmount them.
    b. site development, pre-engineering and permitting.
    c. legal and accounting expenses.

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10. Equity funding is relatively straightforward, and the parties will negotiate the terms of the investment, including liquidation preferences, board seats and other preferential rights.
11. Typical debt funding requirements are:
    a. lender having a first mortgage on all real estate.
    b. no other party having a prior security interest in any of the assets.
    c. legal opinions regarding enforceability of the loan agreements and required permits and governmental authorizations have been obtained.
    d. Delivery of collateral assignments of significant contracts to the lender.
    e. Periodic delivery of financial information.
    f. Satisfaction of certain financial requirements, such as an appropriate debt service coverage ratio, debt-to-equity ratio, tangible net worth ratio and others.

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B. Renewable Diesel

1. Co-Processing 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. Stand-Alone Unit CAPEX - 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.

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C. 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).

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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 firm 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.

VI. Project Financing Models

D. Critical Contract Issues

1. Strong Feedstock Supply Contract with terms of 3-5 years – Attracts financing.
2. Delays - Force Majeure clause; liquidated damages; limitations on liabilities.
3. Well-negotiated Offtake Agreement with terms up to 5 years – including a determination of whether the buyer or seller arranges the rail transportation.
4. Commodity Risk Management –
   a. Ability to intelligently manage commodity risk is invaluable for preserving margins and surviving market swings.
   b. Hedging risks through tolling arrangements, over-the-counter options, futures etc.
5. Purchasing Insurance
   a. Insurance to cover property, testing, builders risk, a delay in start-up, general liability, automobiles, business interruption, crime, or workers compensation, pollution coverage among others.
   b. IMA Financial Group Inc., an insurance brokerage company recently has begun to offer a Biodiesel insurance program providing a complete package of necessary insurance to projects.
   c. In foreign projects, one must obtain political risk insurance and insurance to pay winners of arbitration awards where enforcement of such award is difficult or impossible – the U.S. Overseas Private Insurance Corporation provides such insurance policies and products.

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6. Construction Related Agreements
   a. Design & Engineering – Once "full-wrap" agreements (ensuring a fully integrated plant would be constructed on time, according to specifications, and would produce the desired functionality) including "balance of plant" provisions (providing for all facilities from feedstock receiving to fuel storage, etc.) were regularly provided. However, industry expansion has strained the capacity of processing engineers to provide full wraps. As such, owners have had to be creative to bridge the gaps between design and construction. Thus, the scope of work must be fully specified in the design and construction agreements, with identical consolidated mediation/arbitration provisions designed to draw the engineers, constructors and owners into a single action to resolve disputes quickly.
   b. Equipment Procurement.
   c. Performance guarantees – in the form of bonds or payment guarantees.
   d. Warranty –
      i. Usually heavily negotiated - term of warranty and limitations on warranty.
      ii. Producers should insist on three (3) fundamental warranties - yield, throughput and specifications (quality).
   e. Insurance arrangements and Indemnities – personal injury, general commercial liability, automobile; use risk management specialist to determine amounts.

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7. Feedstock Agreements
   a. Need to align with a recognized, credit-rated, oils and energy commodities entity that will sell domestic and internationally sourced feedstock.
   b. Pricing based on a published commodity price index to enable hedging of forward price risk exposure against established exchange-traded and OTC financial products.
8. Off-take Agreements
   a. Need to align with a recognized, credit-rated, oils and energy commodities entity that will purchase refined Biodiesel.
   b. Sell at prices based on a published commodity price index to enable hedging of forward price risk exposure against established exchange-traded and OTC financial products.
9. Transportation Agreements
   a. Renewable Diesel – is entirely pipeline fungible, as it is indistinguishable from petroleum diesel. The major petroleum companies control/own the transportation source.
   b. Biodiesel – B2 and B5 blends are pipeline fungible in Europe. The "perception" in the U.S. is that Biodiesel cannot be pipelined. As such, trucks, barges and trains are the principal modes of transportation.

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E. Construction Of A Biodiesel Versus Renewable Diesel Plants

1. Generally a greenfield plant takes approximately 12 months for Biodiesel and much longer for stand-alone Renewable Diesel plants from project capitalization to commercial operation, although this timeframe is increasing.
2. Conducting a Feasibility Analysis
   a. In depth feedstock market analysis including availability and suitability of feedstock – feedstock is the single largest cost. component of Biodiesel production at 80% of total production costs.
   b. analyze the local/state policy supporting incentives for Biodiesel and Renewable Diesel.
   c. analyze the diesel fuel market segment and potential customers for Biodiesel and Renewable Diesel.
   d. select the most appropriate process technology for Biodiesel and Renewable Diesel.
3. Plant Considerations
   a. Size - Biodiesel -- recommended minimum size is 80,000 MT - 100,000 MT of Biodiesel/year (approximately 30 Million Gallons/year) when using virgin oils and not less than 40,000 MT of Biodiesel/year (approximately 13 Million Gallons/year) when using recycled oils. We are seeing Biodiesel plant sizes increasing to 50 Million Gallons/year to 100 Million Gallons/year in the U.S. and abroad. Renewable Diesel – Sizes vary substantially on a barrel per-day basis.
   b. It is preferable to have multi-feedstock producing capability and deep-water access (to move feedstock/products into and out of the manufacturing facility easily and to reduce rail congestion risks.)

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F. Additional Deal Structure Issues

1. Location of Feedstock –
   a. proximity of feedstock to plant.
   b. transportation costs.
2. Location of customers – such as proximity to diesel producers and blenders.
3. Transportation
   a. railroad, highway and deep navigable water access for Biodiesel and pipeline access for Renewable Diesel.
   b. analysis of these transportation alternatives.
   c. loading and unloading infrastructure providing access to facility by rail, road, vessel and barge to facilitate efficient feedstock sourcing and Biodiesel distribution.

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4. Permits and Local Land Use
   a. Permitting can commence up to one (1) year before construction and continue throughout the construction cycle.
   b. Ease in obtaining permits impacts time schedules. There is no generic list of permits for a typical biofuels project. Such list is specific to the project design, site and host state/municipality. Often, these projects will require more than 40 permits and/or governmental approvals. Also the ease in obtaining permits/governmental approvals varies widely. It may prove more difficult in one state to obtain one approval/permit than obtaining multiple ones in another state. For example, Minnesota requires one area permit for several kinds of air discharges that another state might require individual permits to cover each type of discharge.
   c. Local rules may prohibit certain uses.
   d. Environmental, air, water and other issues -- some permits include approvals for air emissions, water discharge, stormwater, erosion control, wetlands, endangered species, cultural resources, local site development, zoning, rail etc. Ethanol production also requires approval from the U.S. Alcohol and Tobacco Tax and Trade Bureau prior to selling denatured ethanol.

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e. Occupational Health and Safety Administration (OSHA) requires Process Safety Management (PSM) – employees of the facility know about the use of hazardous chemicals in the workplace.

f. EPA uses PSM in a different context to inform public about the presence and use of highly hazardous chemicals in their vicinity.

5. Water supply
   a. environmental issues as to any effluent discharge.
6. Form of ownership of land
   a. flexibility in lease with landlord, i.e. minimum prior approval requirements (for example, terms of 20 years with multiple 10 year extensions); and
   b. obtain necessary easements.

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7. Proven Management
   a. Strong track record and experience of management team (Board of Directors, Board of Advisors, Officers/Managers) is a must.
   b. The management team must be able to create new revenue streams (e.g. monetize emissions, RFS, RECs, carbon credits, tax and other revenue generating/debt securitizing credits) and reduce front-end project costs – in other words, seek the greatest possible reward for the least amount of risk.
8. Proven Operational Experience
   a. Expertise in all areas of plant management including logistics, client relationships, quality control, marketing and administration.

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G. Biofuels Finance Challenges

1. High energy costs to power facilities, increased feedstock costs, lower product prices.
2. Decreasing co-product prices.
3. Oversupply always an issue.
4. Environmental issues.
5. Financing – need larger pool of lenders.
6. Equity – VC/Private Equity, Capital Markets – U.S. versus AIM (London Stock Exchange), Dubai Stock Exchange, Deutsche Borsche.
7. Maintaining small versus large plants.
8. Maintaining/Extending current tax incentives.
9. Destabilizing tax rulings (e.g., IRS Notice 2007-37 (March 2, 2007)).
10. Imports (lack of duties).
11. Low demand for By-products such as Glycerine.
12. Funding for new technologies.
13. Limitations of construction, fabrication, services.

VI. Project Financing Models

H. International Biofuels Considerations For Developing Countries

1. Large Biodiesel and Renewable Diesel projects are difficult to finance in developing countries principally due to the need for international finance and equity.
2. However, Larger Biofuels (Biodiesel/Fuel Ethanol) Projects Are Beginning To Be Financed At Sizes of 30 Million Annual Gallons to 100 Million Annual Gallons. In this regard, we have closed or are working on the following renewable energy projects in India:
   a. Closed 2 Biodiesel projects in Kakinada, Andhra Pradesh, India for
      i. a large U.S. venture capital company at 50 million gallons per year and which will be increased to 100 million gallons per year (with 2 x 100 million gallons per year in additional projects to be constructed) and
      ii. a medium Indian Biodiesel developer at 30 million gallons per year – through the UTI Ascent Fund.
      iii. The U.S. VC Company project approximately has 400,000 carbon credits per year under the Kyoto Protocol monetizable at approximately $5.6 million per year. These credits can be used as security for project loans and/or as project revenues.

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3. These projects have been financed on various models –
   a. All equity finance (through private equity, venture capital, strategic partners, etc.) with debt finance brought in after the Commercial Operations Date, which permits better loan terms – lower interest rates, longer tenures, etc. – due to risk mitigation.
   b. Project Finance Models ranging from 80%/20% to 60%/40%.
   c. Private – Public Partnerships ("PPPs") with combinations of Indian Government, private sector, multi-lateral and bi-lateral, etc., debt and equity providers.
   d. Funds also will be raised through the Indian and foreign capital markets.

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4. Problem Areas
   a. Lack of contract sanctity is potentially a significant problem.
      i. For example, in the Indian Power Sector, tariffs for the Dabhol Power Project and power projects in the State of Tamil Nadu caused the particular State government to cancel and/or disregard otherwise legally- binding agreements.
   b. Failure of States or Provinces to uniformly apply Federal or Central government statutes. For example, in the Indian power sector, certain States have not uniformally applied the 2003 Indian Electricity Act with respect to third-party sales.
   c. Long term tax incentives / low customs duties on capital equipment are required, although not consistently adopted. For example, in India, substantially high duties exist on raw materials and imported goods. India continues to have the highest customs duty rates in Asia, if not the world. The 2007 Budget did lower the peak rate of basic duties for non-agricultural products from 12.5% to 10%, and the effective overall duty rates from 36.74% to 34.13%. However, these rates remain substantially too-high.
   d. Need to stabilize developing countries' tax environment – Tax statutes and regulations often change frequently, with tax incentives regularly added and dropped.

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e. Excessive numbers of permits, clearances and other Governmental Authorizations at the Central/Federal, State/Provencial and Local Government levels – single window clearance/pre-vetted projects are a must.

f. Heavy regulation of labor – difficult to scale down jobs during economically – depressed times.

g. Poor infrastructure acts as deterrent to foreign investment in the manufacturing sector.

h. Disputes resulting in arbitration or litigation substantially may slow down and adversely affect project economics. For example, in India, the Indian court system (a Unitary Court System) is plagued by intractable delays. If no new cases were filed, it would take approximately 350 years to clear the current court case backlog (not including administrative judicial and quasi-judicial case backlogs).

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i. Corruption is rampant in developing countries – not so much top-level corruption (e.g. receipt of project permits as permit requirements are reduced), but "frictional corruption" across the lower levels – inspectors, meter readers, etc. Encourage a corporate culture of saying "no" to corruption. Strict U.S. Foreign Corrupt Practice Act ("FCPA") compliance adherence is an absolute necessity. Do not avail yourself of the FCPA "facilitating payments" exemption/exception, as it is a gray area that can lead to FCPA violations and host country anti-bribery law violations. Once a company is recognized as clean, then attempts to collect payoffs/bribes will drop.

j. Choose your states and provinces wisely. Each has different levels of development and different levels of market – friendliness.

k. State and Provincial, or even Federal and Central, government elections can be problematic for incumbent politicians. Expect political instability particularly in parliamentary government systems.

l. Lack of credit worthiness of product purchasers.

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m. Substantial cross-subsidies and politicized tariff-setting -- for example, in the Indian power sector, farmers receive free power / industry pays more than its share.

n. Inadequate offtake and payment guarantee mechanisms adversely may affect project economics.

o. Inadequate fuel supply and transportation agreements with developing country governments and/or government-owned companies may require the renewable fuels' manufacture to accept significant risks which must be abated by insurance and other protective mechanisms.

p. Foreign investors and financiers require:
   i. sanctity of contracts (including the purchase of, and full payment for, contracted products),
   ii. strictly honored-payouts for purchased products under binding guarantees (i.e., payment (i.e., counter guarantees) and debt (i.e., sovereign guarantees) security mechanisms), and
   iii. the knowledge and practice that invoices will be paid in full and regularly without requiring litigation to ensure each payment.

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q. Protecting Your Investment
   i. Engage qualified counsel, accountants and consultants at the outset.
   ii. Need for Upfront & Well-Considered Tax and Corporate Structuring, using limited liability vehicles and Double Taxation Avoidance Treaties.
   iii. Use Special Economic Zones where possible, as they often have up to a 100% tax holiday.
   iv. Project and Partner Due Diligence Are Key Exercises.
      1) Ensure that your partner is trustworthy and has the financial ability to implement the investment.
      2) Enshrine IP protection in all contracts.
   v. Contracts Require Certain Protective Clauses:
      1) Neutral-country arbitration is a must
         (a) e.g., London venue with ICC, UNCITRAL, London Court of International Arbitration Procedural Rules.
         (b) if pressed into arbitration in India, bifurcate the arbitration clause so that smaller disputes are arbitrated in India and larger ones are arbitrated in a neutral country.

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2) Need for strong indemnification clauses
3) Force Majeure – this provision permits suspension of contractual obligations under certain circumstances.
4) Compliance with U.S. Foreign Corrupt Practices Act (FCPA) and foreign country anti-bribery laws – accusations particularly can adversely affect public company stock.
5) Need for insurance requirements to protect transactions, such as political risk insurance against expropriation, arbitration award enforcement insurance, etc.

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r. Key policy areas to address:

i. Provide long-term, stable government policy support through updated new energy legislation and regulations.

ii. Reduce technology, commodity and financing risks, respectively, through intellectual property filings (e.g., marks, copyrights, patents, etc.), hedging (e.g., futures contracts, swaps, pollution credits trading, etc.), and security (e.g., guarantees, LCs, escrows, insurance, long-term feedstock/fuel and off-take agreements, pollutional credit pledges, etc.) protection mechanisms.

iii. Consider the use of domestic and international venture capital and private equity, capital markets (AIM / London Stock Exchange, Bombay Stock Exchange/Indian National Stock Exchange (if project is in India), Deutsche Borsche Exchange, Dubai Stock Exchange), and other funding mechanisms.

iv. Establish a federal carbon credit market with national trading exchanges for the monetization of carbon credit offsets to create new project revenue/income streams.

VII. 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
2007 - 4.7 Billion Gallons
2008 - 5.4 Billion Gallons
- 700 mill gal/yr increase for years 1-5

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.

VII. Establishment Of The Renewable Fuels Standard (2005 Energy Act Section 1501)

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.)

VII. Establishment Of The Renewable Fuels Standard (2005 Energy Act Section 1501)

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
<u>without</u> purchasing any "wet" gallons of Biodiesel.

2. This "<u>flexibility</u>" for the refiner to effect compliance with the RFS mandate is exactly the reason for the enactment of the RFS into law.

VIII. 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.

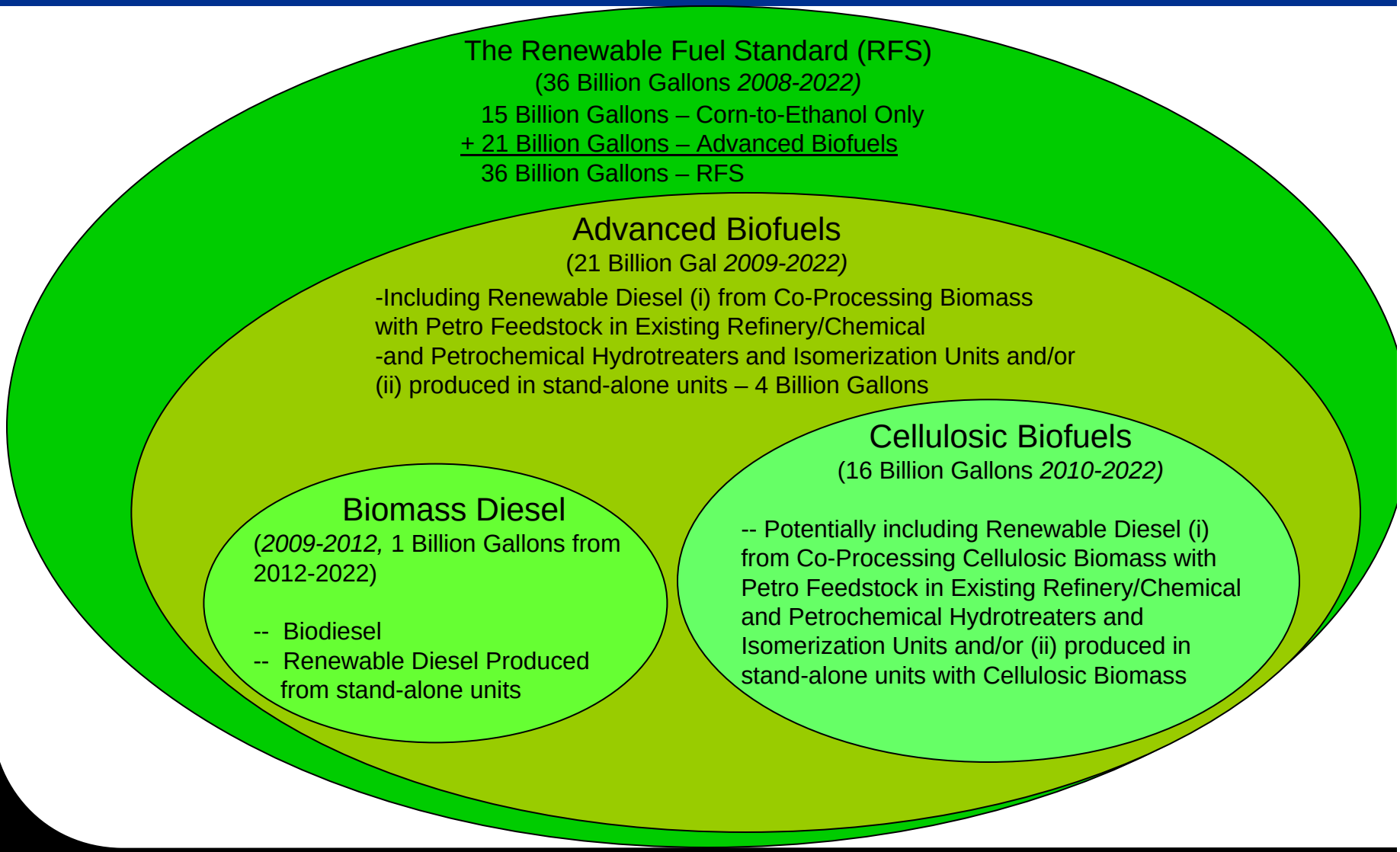
B. Congress, in the Energy Independence and Security Act of 2007 (the "2007 Energy Act") revised the RFS by (i) increasing the 7.5 billion gallon/year (by 2012) limit to 36 billion gallons/year (by 2022) and (ii) creating new categories for "Ethanol-from-Corn," "Advanced Biofuels", "Cellulosic Biofuels" and "Biomass Diesel". As CTL, BTL and GTL through Fischer-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



Source: Michael McAdams, Advanced Biofuels Coalition and Mark Riedy, Andrews Kurth

IX. 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).

IX. Conclusion

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 CO_2 sequestration technologies, could make coal the preferred source of feedstocks in North America.