USDA Rural Development

United States Department of Agriculture
Rural Development

JAN - 6 2011

TO: Project File

SUBJECT: Finding of No Significant Environmental Impact for Proposed Rules Related to Biofuels Development

The attached programmatic environmental assessment (PEA) for the rules relating to biofuels development has been prepared and reviewed by the appropriate Rural Development official(s). After reviewing the PEA and all supporting materials attached, I find that the subject proposal will not significantly affect the quality of the human environment. Therefore, the preparation of an Environmental Impact Statement is not necessary.

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Programmatic Environmental Assessment
For Rural Development's
Proposed Rules Related to Biofuels Development

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1. Purpose and Need for Proposed Action

Rural Development (the Agency) proposes to adopt final rules to administer the biofuels programs enacted by Title IX of the Food, Conservation, and Energy Act of 2008. The purposes of the rules are to provide for financial support related to the development of renewable energy and advanced biofuels in the U.S.

2. Proposed Action

2.1 Background

Rural Development (the Agency) administers a multitude of Federal programs for the benefit of rural America, ranging from housing and community facilities to infrastructure and business development. Its mission is to increase economic opportunity and improve the quality of life in rural communities by providing the leadership, infrastructure, venture capital, and technical support that enables rural communities to prosper.

To achieve its mission, the Agency provides financial support (including direct loans, grants, and loan guarantees) and technical assistance to help enhance the quality of life and provide the foundation for economic development in rural areas. The Agency has an existing portfolio of more than $132 billion in loans, grants, and loan guarantees. Under the Food, Conservation, and Energy Act of 2008 (2008 Farm Bill) the Agency was tasked with new programs related to the development of renewable energy and advanced biofuels. Title IX of the 2008 Farm Bill, when viewed in total, provides a wide band of support for renewable energy in general and biofuels in particular, across differing value chain stages and across different levels of commercialization. Collectively, these 12 Title IX sections are intended to advance the production of renewable energy in keeping with USDA and the Administration’s objectives of energy independence, rural economic development, and the reduction of greenhouse gas emissions (**Appendix A** summarizes the 2008 Farm Bill Renewable Energy Provisions). Among those 12 sections are:

- Section 9003 - Biorefinery Assistance Program, which provides grant and loan guarantees for the construction of advanced biofuel biorefineries;
- Section 9004 - Repowering Assistance, which provides payments to biorefineries in existence on or before June 18, 2008 to replace fossil fuel energy sources with biomass energy sources at biorefineries; and
- Section 9005 – Advanced Biofuels Producer Payment Program, which provides payments to advanced biofuel producers for the production of eligible advanced biofuels.

The Agency is proposing rules to implement provision for these three programs. Though different in specific implementing provisions and funded amounts, all three programs share common purposes of achieving Congressional mandates to assist in the commercial development and support of renewable energy in the U.S., and thereby achieving Congressional and Administration objectives of energy independence, rural economic development, and the reduction of greenhouse gas emissions. Additionally, funding of advanced biofuels under two of the proposed programs (9003 and 9005) will enable a number of producers to comply with the Renewable Fuels Standards established by U.S. EPA in its recently promulgated rule (40 CFR Part 80) for the National Renewable Fuel Standard program (commonly known as the RFS2 program, and discussed below).

2.2 Proposed Rules

The Agency is proposing to adopt three rules to implement Sections 9003, 9004, and 9005 of Title IX of the Farm Bill.

- *Section 9003 Biorefinery Assistance Program*

Section 9003 of the Farm Security and Rural Investment Act of 2002, as added by the Food Conservation and Energy Act of 2008, authorizes the Secretary of Agriculture to establish the Biorefineries Assistance Loan Guarantee Program to provide loan guarantees for the construction of biorefineries to "assist in the development of new and emerging technologies for the development of advanced biofuels".

Section 9003 of the Food, Conservation, and Energy Act of 2008 (2008 Farm Bill) provides financial assistance in the form of grants and guaranteed loans to assist in the development of new and emerging technologies for the development of advanced biofuels.

The following types of financial assistance under section 9003 are authorized:

- Grants for the development and construction of demonstration-scale biorefineries to demonstrate the commercial availability of one or more processes for converting renewable biomass to advanced biofuels.
- Guaranteed loans for the development, construction or the retrofitting of commercial biorefineries using eligible technology, where eligible

technology is defined as:

(a) any technology that is being adopted in a viable commercial-scale operation of a biorefinery that produces an advanced biofuel, and

(b) any technology not described in paragraph (a) above that has been demonstrated to have technical and economic potential for commercial application in a biorefinery that produces an advanced biofuel.

Under the proposed rule, the Agency will establish a rolling process for the consideration of loan guarantee requests for the development and construction of commercial-scale biorefineries or for the retrofitting of existing facilities using eligible technology for the development of advanced biofuels. Consistent with the authorizing legislation, the proposed rule defines the term “advanced biofuel” as a “fuel derived from renewable biomass, other than corn kernel starch.” RD is proposing that the maximum percentage of the loan guarantee be 80 percent of loan and the maximum amount of the loan guarantee be $250 million. Consistent with the authorizing legislation, the goal of this program is to encourage the development of commercial scale biorefineries that produce advanced biofuels. The overall program funding is $245 million mandatory in FY2010, and $150 million of discretionary funding in FY2011, and FY 2012, which is the final year for the authorization of the program.

Table 1 Section 9003 Program funding allocation

Program Funding Type	Year	Program Funding ($Million)
Loan Guarantee	2009	$75
	2010	$245
	2011	$150
	2012	$150
Total Program Funding (Million)		$620

Funding of advanced biofuels under this proposed program will enable a number of producers to comply with the Renewable Fuels Standards established by U.S. EPA in the National Renewable Fuel Standard program (commonly known as the RFS program). This rule makes changes to the Renewable Fuel Standard program as required by the Energy Independence and Security Act of 2007 (EISA). The revised statutory requirements establish new specific annual volume standards for cellulosic biofuel, biomass-based diesel, advanced biofuel, and total renewable fuel that must be used in transportation fuel. The revised statutory requirements also include new definitions and criteria for both renewable fuels and the feedstocks used to produce them, including new greenhouse gas (GHG) emission thresholds as determined by lifecycle analysis. The regulatory requirements for RFS will apply to domestic and foreign producers and importers of renewable fuel used in the U.S. The RFS program lays the foundation for achieving significant reductions of greenhouse gas emissions from the use of renewable fuels, reductions of imported petroleum and further development and expansion of our nation's renewable fuels sector. The final rule revises the annual renewable fuel standards (RFS2) and makes the necessary program modifications as set forth in EISA. Of these modifications, several are notable. First, the required renewable fuel volume continues to increase under RFS2, reaching 36 billion gallons per year (Bgy) by 2022. The following table shows the volume requirements from EISA:

Table 2: EISA Renewable Fuel Volume Requirements (billion gallons)

Year	Cellulosic biofuel requirement	Biomass-based diesel requirement	Total Advanced biofuel requirement	Total renewable fuel requirement
2008	n/a	n/a	n/a	9
2009	n/a	0.5	0.6	11.1
2010	0.1*	0.65	0.95	12.95
2011	0.25	0.8	1.35	13.95
2012	0.5	1	2	15.2
2013	1	a	2.75	16.55
2014	1.75	a	3.75	18.15
2015	3	a	5.5	20.5
2016	4.25	a	7.25	22.25
2017	5.5	a	9	24
2018	7	a	11	26
2019	8.5	a	13	28
2020	10.5	a	15	30
2021	13.5	a	18	33
2022	16	a	21	36
2023+	b	b	b	b

* Reduced to 0.00625 billion gallons

[a] *To be determined by EPA through a future rulemaking, but no less than 1.0 billion gallons.*
[b] *To be determined by EPA through a future rulemaking.*

In order to qualify for these new volume categories, blenders of these fuels must demonstrate that they meet certain minimum greenhouse gas reduction standards, based on a lifecycle assessment, in comparison to the petroleum fuels they displace. The EPA RFS2 rule established lifecycle Greenhouse Gas

(GHG) thresholds for all renewable and advanced biofuels that seek to meet the RFS2 standard. These are:

Lifecycle GHG Thresholds Specified in EISA
(Percent reduction from 2005 baseline)

Renewable fuel	**20%**
Advanced biofuel	**50%**
Biomass-based diesel	**50%**
Cellulosic biofuel	**60%**

Table 3: GHG Reductions under RFS2 Rulemaking

Lifecycle Greenhouse Gas Emissions from Biofuels, Compared to their Petroleum Substitutes		
Fuel	Percent of Petroleum GHG Emissions	GHG Reduction
Petroleum Gasoline	100%	0%
Corn Ethanol	79%	21%
Sugarcane Ethanol	39%	61%
Switchgrass Ethanol	-10%	110%
Corn Butanol	69%	31%
Petroleum Diesel	100%	0%
Soybean Biodiesel	43%	57%
Waste Grease Biodiesel	14%	86%

Source: Chapter 2.6 of the EPA's Renewable Fuel Standard Program (RFS2) Regulatory Impact Analysis. February 2010. EPA-420-R-10-006.

Under the RD programs, all advanced biofuels to be funded must meet those GHG thresholds. The proposed rule of the 9003 program is intended to assist in the increased production of advanced biofuels set by the RFS2 mandate. It is possible that some advanced biofuel facilities may produce power or fuels, either as stand-alone facilities or as part of an integrated system for power and fuel production, and which may not be part of the RFS2 mandate. At this time, it is not considered likely that such facilities would form the majority of funding guarantees or grants under the 9003 program.

Advanced Biofuels can be produced from a number of different feedstocks, using a variety of treatment processes, and resulting in different forms of biofuels, as well as commercial by-products.

Advanced biofuels can include ethanol, biodiesel, butanol/biobutanol, and green crude/jet fuel. (In general, most fuel-based ethanol in the U.S. is currently produced from feed corn: current production is approximately 12 billion gallons in 2010 (12 Bgy). Ethanol from corn starch is not considered advanced biofuel but is considered as part of the overall target for renewable fuel volumes under the EISA.) Ethanol produced from cellulosic sources encompass a variety of feedstocks, such as corn stover or wheat straw, sugar cane bagasse, perennial grasses such as switchgrass, woody materials such as hybrid popular, wood wastes, forest thinning, municipal wastes, and other plant materials. The processes for producing cellulosic ethanol are, in general: 1. enzymatic hydrolysis; 2. acid hydrolysis; 3. gasification; and 4. hybrids of the three processes. There are a number of initiatives underway to research and develop various processes, and to build pilot and demonstration scale for commercialization of cellulosic ethanol. At this time, there is no one processes which can be considered to be a cost-effective replacement for ethanol from feed based corn. To that end, both USDA, and DOE are funding different entities across the U.S. to provide useful data on different feedstock performances, process line applications, and facility operations for cellulosic ethanol. Appendix B lists those facilities and processes being funded by DOE and USDA programs, and Appendix C lists the overall level of investments in advanced biofuel facilities.

Biodiesel as advanced biofuels can be produced from a number of feedstock sources such as vegetable oils (virgin or used); animal fats from rendering plants; grease from commercial facilities; municipal wastes; additional plant materials such as jatropha or castor bean; and algae (Appendix D). The processes for producing biodiesel are varied, including transesterfication (FAME); gasification, direct algal extraction, as well as cellulosic processes similar to those for cellulosic ethanol production.

Currently, there are few commercial plants producing cellulosic ethanol: production is less than 6 million gallons in 2010 (Mgy); some additional capacity for cellulosic ethanol is planned for the near-term 2010-2012, approximately 100-400 Mgy but such capacity is limited by lack of financing, uncertainty about commercial development business models, tax policies, the world price of petroleum, and the limits to blending ethanol amounts in US fuels (known as the "blendwall": the point where all of the nation's gasoline supply is blended as E10 and extra volumes of ethanol cannot be readily consumed without major infrastructure developments). Appendix E summarizes the major impediments to cellulosic ethanol implementation.

Current production of biodiesel is approximately 550 million gallons (Mgy) with production split almost equally between waste fats/oil reprocessing, and first use of vegetable, primarily soy, oils. The biodiesel industry capacity is approximately 2.2 billion gallons of biodiesel (Bgy) with production amounts varying by year, according to feedstock prices and other factors, such as tax credits, export demand, and the price of petroleum (Appendix F).

- *Section 9004 Repowering Assistance Program*

Section 9004 of the 2008 Farm Bill creates a new program to replace the use of fossil fuels used to produce heat or power at existing biorefineries by installing new systems that use renewable biomass or to produce new energy from renewable biomass. Congress gave the Secretary of Agriculture the authorization to "carry out a program to encourage biorefineries in existence on the date of enactment of the Food, Conservation, and Energy Act of 2008 to replace fossil fuels used to produce heat or power to operate the biorefineries by making payments for - (1) the installation of new systems that use renewable biomass, or (2) the new production of energy from renewable biomass." The overall funding is $35 million, over the life of the program, until FY2012.

Table 4 Section 9004 Funding Allocation

Program Funding Type	Year FY 2010-2012	Costs	Maximum Funding
Total Program Funding (Million)		$35 Million	$35 Million
Estimated average project costs for repowering with biomass		$3-10 Million	$1-5 Million
Number of Repowering Projects Funded under Program		5	na
Estimated Number of Ethanol Facilities Eligible		180	na

Under the proposed rule, RD will establish an annual sign-up period for biorefineries. Under this program a biorefinery will be eligible to receive a payment equal to 50 percent of the costs of installing eligible systems up to $5 million. The first payment to a biorefinery awardee will be equal to 20 percent of the total amount of the award. The remainder of the award will be paid to the awardee at a rate of $0.50 per million British thermal units of energy produced from renewable biomass.

The primary goal of this program is to replace fossil fuels with energy derived from renewable biomass for the operation of biorefineries. To help meet this goal, the program proposes to provide awardees with an incentive to use their own renewable biomass energy systems by tying the payment of 80 percent of the award to the actual production of energy from renewable biomass. The more energy from renewable biomass the awardee produces for use in the biorefinery, the faster the awardee will receive the remaining 80 percent of the award.

This program will encourage biorefineries to reduce their reliance on fossil fuels in their operations. This will help these biorefineries by reducing the carbon attributed to the bioenergy and biobased products they produce. Such reductions could improve the marketability of their bioenergy and biobased products. This program will help the overall development of bioenergy industries in the United States by encouraging the use of biomass energy systems. The Agency projects that systems designed for biorefineries could be easily adapted for use by a wide variety of other industries and thus could further encourage the replacement of fossil fuels for renewable energy across the U.S. economy.

The proposed rule sets out specific provisions to address oversight and monitoring; forms and instructions; applicant eligibility; eligible project costs; payment information; application review and scoring; ranking of applications and program payment provisions which do not affect the overall level of environmental analysis here.

- *Section 9005 Bioenergy Program*

Section 9005 of 2008 Farm Bill, authorizes the Secretary of Agriculture to “make payments to eligible producers to support and ensure an expanding production of advanced biofuels” by entering into contracts for the production of advanced biofuels to both support existing advanced biofuel production and to encourage new production. To be eligible for payments, advanced biofuels produced must be derived from renewable biomass, **excluding corn kernel starch**, in a biorefinery located in the United States. The goal of this program is to encourage the expansion of the country’s production capacity of advanced biofuels. The overall program funding is $80 million in FY2010, $85 million in FY2011, and $105 million in FY2012 (all mandatory).

Table 5 Section 9005 Program funding allocation

Program Funding Type	Year	Program Funding ($Million)
Payments	2009	$30
	2010	$80
	2011	$85
	2012	$105
Total Program Funding (Million)		$296
Estimated Advanced Biofuels produced (Mgal)		200-700

This renewable energy program under Title IX of the 2008 Farm Bill has been operated on an interim basis through the issuance of a Notice of Contract Proposal (NOCP). For the first year of the Section 9005 Program (FY 2009), RD received approximately 180 applications, of which 141 applications are being funded. Of these 141 applications, 80 are for biodiesel, 41 are for biogas, 16 are for ethanol, and 4 are for other fuels. The payments are for the following categories of feedstocks:

Table 6 Applicants for Producer Payments under Section 9005 (FY2009)

Feedstock Type	Number of Applicants
TREES GROWN ENERGY/WOOD WASTE	1
FIBERS/Wood Waste	2
GRASS/Switchgrass	1
GLYCERIN	1
OILS-OTHER; OILS-CANOLA; OILS-SOYBEAN	4
OILS-WASTE VEGETABLE OIL, ANIMAL FAT	2
SWINE WASTE/MANURE	2
ANIMAL FAT; OILS-SOYBEAN	3
DAIRY WASTE/MANURE; FOOD PROCESSING WASTE	3
DAIRY WASTE/MANURE; ANIMAL FAT; OILS-GREASES	2
OILS-OTHER	4
OILS-SOYBEAN; ANIMAL FAT	5
OILS-CANOLA	6
OILS-GREASES	6
AGRICULTURAL CROP-SORGHUM	12
OILS-SOYBEAN	10
ANIMAL FAT	19
OILS-WASTE VEGETABLE OIL	21
DAIRY WASTE/MANURE	37

<u>Process for Applicants</u>

Under the proposed rules for Section 9005, advanced biofuels producers seeking to participate in the Program enroll by submitting RD application documents. This application requires the advanced biofuel producer to provide information on the applicant entity; the applicant's biorefineries at which the advanced biofuels are produced, including location and quantities produced and a description of the business; the types and quantities of renewable biomass feedstock being used to produce the advanced biofuels; and the amount of eligible advanced biofuels produced at each biorefinery in the 12 months prior to the first day of the sign-up period and the projected amount from applicants with less than 12 months of production. Applicants are also required to submit documentation to support the amount of eligible advanced biofuels reported.

The information contained in the application will be used by the Agency to determine whether the advanced biofuel producer is eligible to participate in the Program and whether the advanced biofuel being produced is eligible for payments under the Program. The same application form will also be used by the Agency to sign-up advance biofuel producers in subsequent fiscal years (FY) and to obtain information to help determine payment rates.

Once an advanced biofuel producer has been approved to participate in the Program, the producer and the Agency enter into a payment contract. All contracts will be reviewed at least annually to ensure compliance with the contract and ensure the integrity of the program.

Once the contract is signed, the advanced biofuel producer will submit a form to request payment. This form requires the advanced biofuel producer to provide information on the types and quantities of advanced biofuels produced in each quarter and on the types and quantities of renewable feedstock used to produce those advanced biofuels. In addition, the advanced biofuel producer will report cumulative production of advanced biofuels and the use of renewable biomass feedstock for all advanced biofuel biorefineries.

Payment rates under the proposed rule are determined based on the size of the facility and whether production is “base” or “incremental.” Base production is defined as a facility’s existing level of production; any subsequent production that is in excess of the base amount is considered to be incremental. Under the proposed rule, to encourage more production of advanced biofuels, the payment rate for the incremental production will be five times greater than the payment rate for base production. The proposed rule provides that the base and incremental rates will be calculated on a British Thermal Unit basis. Because there is no limit on the number of advanced biofuels producers that enter this program, the actual payment rates will be determined based on the number of eligible applications received each year. (**Figure 1** outlines the payment steps). Consistent with the authorizing legislation, the goal of this program is to encourage the expansion of the country’s production capacity of advanced biofuels. To help meet this goal, the program would be open to all producers of advanced biofuels due to the difficulty of determining the types or technologies that will ultimately create the foundation of this industry at this early stage of development of the industry. In addition, given that the biofuels industry is very capital intensive, the Agency is proposing multi-year contracts to enable advanced biofuels producers the assurance of a multi-year revenue stream. This approach is consistent with the goal of creating a stable industry.

Figure 1: Payment provisions

Step 1. Determine the quantity of eligible advanced biofuel subject to payment each fiscal year, including both base production quantity and incremental production quantity. This determination will be made for both smaller producers and larger producers.

Step 2. Determine the British Thermal Unit (BTU) content of each of the four advanced biofuel quantities determined under Step 1.

Step 3. Determine the amount of funds available for payment for smaller producers and for larger producers (limited to >5% for large ,>150 Mgy producers)

Step 4. Determine the payment rates for base production and for incremental production for both smaller producers and larger producers based on the results of Steps 2 and 3.

Step 5. Assign payment values to each advanced biofuel producer based on the results of Step 4 and the base and incremental production in the enrollment application.

Step 6. Make payments to each participating advanced biofuel producer on actual advanced biofuel produced.

3. 1 Alternative 1 : Give Exclusive Priority to Producers of RFS2 Fuels

Under this alternative, the Agency would change the Section 9005 proposed rule regarding biofuels eligibility to fund only those producers of advanced biofuels that would meet the definition of fuels under RFS2, that is, liquid fuels used for transportation, as well as those producers using woody materials from National Forest lands.

3.2 No Action Alternative

Another alternative to the proposed rule making action would be for the Agency to take No Action to promulgate rules to implement Section 9003, 9004, and 9005, and not act upon any NOFAs for such programs. This is not a reasonable alternative in light of the Congressional mandate for USDA to help advance biofuels and renewable resource.

4. Environmental Impacts of Proposed Action and Alternatives

4.1 Impacts of Proposed Rule for Section 9003 Program

Over the life of the 9003 program, up to $620 million for guaranteed loans and/or grants to build or refit advanced biofuels facilities would be available. If estimated capital costs range from approximately $3-8/gal of advanced biofuel produced, some 7-200 Mg of advanced biofuel capacity could be funded under the program. This represents approximately 3-10% of the RFS2 mandate for producing 2.1 Bgy of advanced biofuels in the U.S. in 2013. The number of potential advanced biofuels facilities constructed or retrofitted would vary: with an assumed average level of commercial production at 10 Mgy, there would be approximately 2-10 facilities funded under the 9003 program. More facilities could be built if partially funded by RD. However, given the current financial environment, it is likely over the next three years (until the end of the program in 2012-13) that limited private financing for advanced biofuel facilities would be the norm.

Currently, the Agency is partnering with DOE financial assistance and has provided loan guarantees for two new advanced biofuel facilities, Range Fuels, in Georgia, and Sapphire Energy, in New Mexico.

<u>Range Fuels</u>

The $80 million loan guarantee to Range Fuels Inc., Soperton, Ga., was the first such USDA assistance to a commercial-scale cellulosic biofuel plant. DOE is also providing $50 million to support the initial construction of the Range Fuels plant and has agreed to provide another $26 million to support an eventual expansion of the plant.

The plant will employ heat, pressure, and steam to convert wood chips into synthetic gas, or syngas. The syngas will then be cleaned and passed over a catalyst to yield cellulosic biofuels, such as ethanol and methanol. When fully operational, the plant is expected to produce an estimated 20 million gallons of cellulosic ethanol per year, mostly from Georgia pine harvested from the surrounding area.

Sapphire

Sapphire Energy Company (Sapphire), proposes to construct and operate an Integrated Algal Bio-Refinery facility (IABR) to produce oil from algae, ultimately refining the oil into various types of transportation fuel. Sapphire is proposing to construct the IABR southwest of the community of Columbus in Luna County, New Mexico on approximately 400 acres of land. The IABR is a demonstration project that aims to produce approximately 2 MGal/yr of algal oil for 3-5 years. RD is guaranteeing some $50 million to support the IABR along with added participation from DOE.

Environmental Assessments have been prepared with public notices published for both projects which are summarized in **Table 7**.

Table 7: Environmental Impacts of RD Projects Funded Under 9003 Advanced Biorefinery Program (2009-2010)

Facility	Range Fuels, Georgia	Sapphire Energy, New Mexico
End Product/Production Amounts	Methanol- 2-4 Mgy (future production of Ethanol-Methanol Mix- 20 Mgy)	Green Crude- 2 Mgy (3-5 years)
Feedstock	Wood and Forestry Thinnings	Algae
Land Use	67 acres, direct forest conversion	400 acres, rangeland, former farmland conversion
Water Use	0.316 mgd groundwater use; 0.86 mgd wastewater discharge	1900 ac-ft/yr brine groundwater use; possible degradation of groundwater from pond infiltration
Biological Resources	Protection plans for gopher tortoise, Eastern Indigo snake	No impacts to T&E; mitigation measures for migratory bird protection
Transportation	267 truck trips/day: road capacity below 10%	10-12 truck trips/day
Historic/Cultural Resources	No effects	No effects
Soils	9-19 acres converted	200 acres converted to ponds
Air Impacts	Phase I PTE: NOx-21 tpy; PM-44.5 typ; SOx-3.9 tpy;VOC-88 tpy; HAPs-16.3 tpy	6,729 tpy CO2 direct emissions
Protected Resources	Two wetlands impacted required 10 acres of mitigation banking offsets	No floodplains or wetlands affected
Energy Use	Natural gas: 3900 ft3/day; Electric: 290 Mkwh/yr	Natural gas: 7500 ft3/day; Electric: 3.4 Mw/day
Funding: RD/DOE	$80 Million/$76 Million	$54.5 Million/$50 Million

Although the impacts varied according to the site-specific resources, the overall environmental impacts of constructing and operating these biorefineries was not considered environmentally significant by DOE or USDA assessments

Over the life of the program (terminating at the end of FY 2012), RD funding guarantees for additional advanced biorefineries will not have any cumulative environmental impacts as these facilities are likely to be located in different locations across the U.S. and likely to be for different processes, feedstocks, final products with varying coproducts. Analysis of those site-specific impacts will be on a project basis.

4.2 Impacts of Proposed Rule for Section 9004 Program

In 2009-2010, the Agency published a Notice of Funding Availability (NOFA) for the Repowering Program, and received five applications from existing biorefineries. RD prepared Environmental Assessments on those applications. The analyses of those EAs are summarized in Table 8

Table 8: Summary of Impacts for 9004 Program (FY2010)

Ethanol Plant	Feedstock Source	GHG Reduction (CO_2)	Air Impacts	Water Impacts	Transportation Impacts
Chippewa Valley, MN	50% Corn Cob; 50% Woody mass	74,000 tons/yr	Slight increases in NOx, SO_2 and PM	No change	Increase of truck trips to 4,000/yr; no change to LOS
Absolute Energy, IA	Process corn syrup	87,000 tons/yr	Slight reduction in NOx	No change	No change
Bushmills, MN	Thin Stillage	11,200 tons/yr	No change	No change	No change
ESE, KS	Thin Stillage	3220 tons/yr	No change	No change	No change
Lincolnway, IA	Woody Biomass	100,000 to 203,000 tons/yr depending upon wood vs coal mixes	Substantial reductions in CO, SO, PM, HF, HCL; slight increase in NOx	No change	Slight increase in truck trips; no change to LOS on roads

No significant environmental impacts were found for these facilities; the reduction in GHG emissions was considered to be environmentally positive since the fossil fuel power was the major GHG contributor of these biorefineries.

It is anticipated that funding under the proposed rules would be for similar types of fossil fuel power replacement in various locations of the U.S. The estimated number until the end of the program in FY2012, would range from 5-25 facilities, depending upon the amount power replaced and number of applicants. The impacts from those additional facilities receiving a payment would be similar to those listed above. The cumulative impact of additional GHG gas reductions from the payments would be positive though unquantifiable at this time.

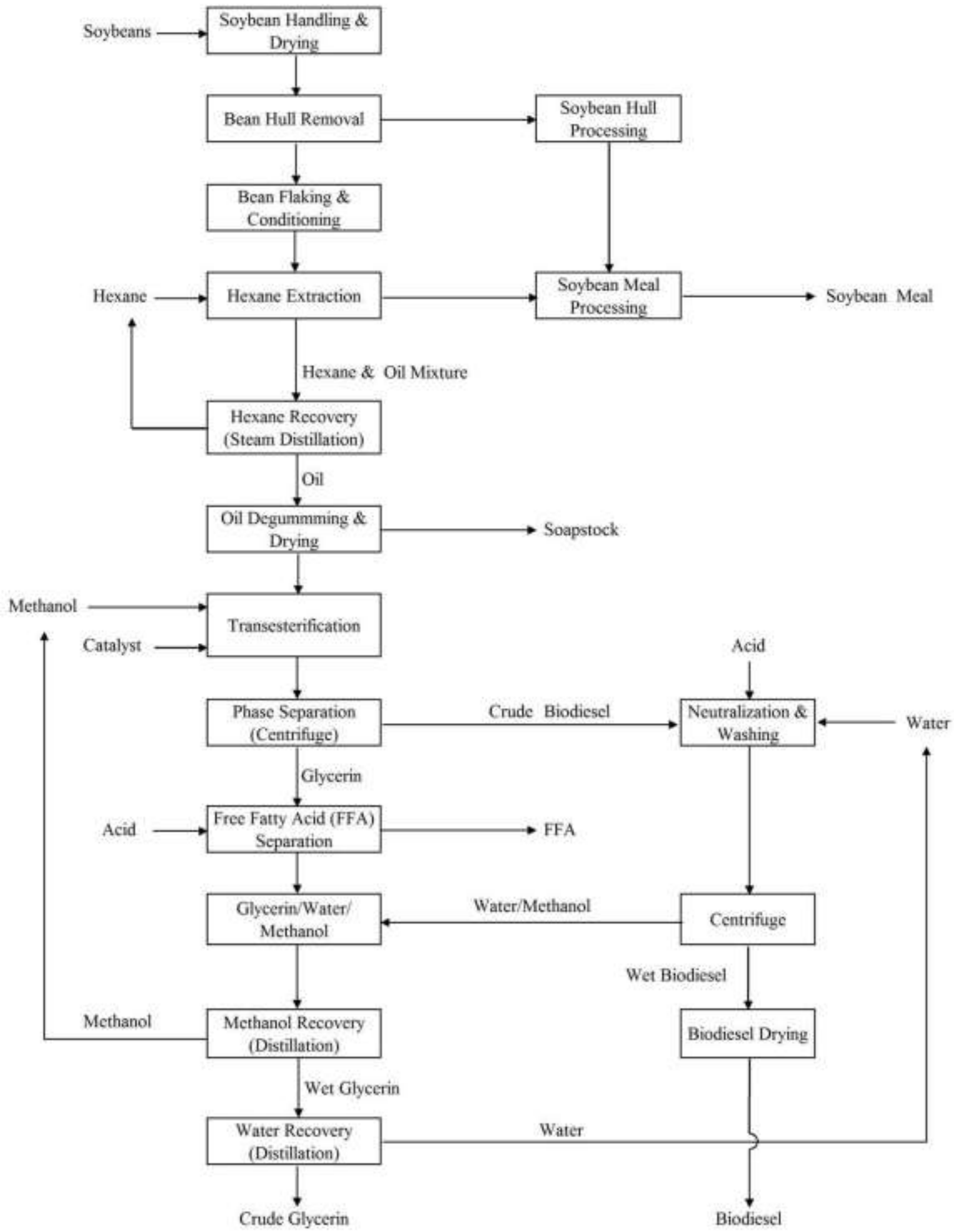
4.3 Environmental Impacts of Proposed Rules under Section 9005 Program

The proposed rules of Section 9005 consist of payments to producers for advanced biofuels with a monetary incentive for additional production in each year. Since the program has enrolled less than half of the existing advanced biorefineries, it is likely that the majority of additional applicants will be from existing facilities and it is reasonable to assume that the Section 9005 program will not result in additional facility construction. Given the intensive capital requirements for new advanced biofuels facilities, as well as the large number of existing advanced biofuels facilities, the amounts that could be given to each producer under Section 9005 will likely be incremental to their overall business models and unlikely to affect prospects for future facility construction. These conclusions are based on a survey of biorefineries conducted by RD in the spring of 2009 in which 863 biofuel facilities were identified. Of these, 630 were identified as advanced biofuel facilities. Over the life of the Program, the Agency estimates that approximately 420 entities will participate in the Program, and of those some 235 will be biodiesel producers, 116 will be ethanol producers, 54 will be biogas producers, and 15 will be other fuels. If the entire program is funded through 2012, some $630 Million would be divided amongst those 420 entities. Although the level of payments per facility cannot be accurately estimated, it seems clear at the programmatic level that the amount of money spread over the number and variety of producers would not be sufficient to substantially affect plans for new facility construction.

Using applications for producer payment data for FY 2009 (Appendix G), an analysis was performed on the types, feedstock sources, and costs of the larger facilities which represent the majority of payments for production. The majority of the projects are for biodiesel production with great variation across different types of materials and feedstocks: ranging from animal fats to waste vegetable oils, to first use (virgin) soy and canola oils. Using conservative estimates for facilities which had multiple feedstock sources, it was assumed that, unless specified otherwise, the oil for biodiesel transesterfication would be first use (virgin) soybean oil. This represents less than 10 percent of U.S. soybean oil production in 2009, and less than 2 percent of total U.S. soybean production.

A generic illustration of processing soybeans into biodiesel is presented in Figure 3. (Not all advanced biorefineries crush soybeans, since there is an active commercial market for soybean oil, both in the U.S. and in the world markets.) The major process streams in this case would be hexane, methanol, and water, with end products of biodiesel and a co-product of glycerin which is valued on the industrial supplies markets.

Figure 3: Soybean Crushing and Biodiesel Conversion



Processing of other feedstocks for biodiesel, such as animal fats, waste oils, and grease, involve different activities such as heat or catalytic treatment and can vary greatly. Processing of cellulosic feedstocks for ethanol is also highly variable, and under multiple lines of research and development across the U.S. In general, all such processes will involve materials for sugar extraction, concentration, and production, be it from enzymatic, catalytic, or microbial action, and all such processes will have air and water emissions, as well as requiring substantial amounts of fresh water for processing (excepting algal systems which may prove adept at utilizing waste or brine waters for production).

The production of advanced biofuels has many potential environmental impacts, including those to water quality, soil tilth, and non-greenhouse gas air quality. The type and size of environmental impact of advanced biofuels is largely contingent on the type of feedstock and production process used. The Agency notes that the advanced biofuel industry is still developing and, therefore, quantitative analysis detailing the environmental impacts of the production of the feedstocks, the biorefining of the feedstock, and the combined harvesting, transporting and distribution is best addressed on a project by project basis.

The Section 9005 Program is expected to provide payments to biorefineries that use food crops as feedstocks, such as ethanol from sugar cane and sorghum, and biodiesel from soy. This may result in some negative impacts to water quality and quantity, resulting from the agricultural production of these feedstocks. The impacts to water quality would vary with the crop, its management, and location. For example, soybeans require little nitrogen fertilizer but some phosphorus and potash which may runoff into local water bodies; sorghum requires little fertilizer and water but may require applications of various herbicides.

The predominant feedstocks in the cellulosic processes generally have lower demand for fertilizer, herbicide, pesticide application, or irrigation, compared to food crops but this may change over time in response to producer needs. These predominant feedstocks include renewable biomass sources such as agricultural and forestry residues, waste oils and fats, waste wood, and dedicated energy crops (e.g., switchgrass and hybrid popular).

Harvesting of agricultural and forestry residues is thought to have limited water quality impacts, because it does not require any additional inputs or management activities during the growth of the crop or forest. However, the removal of the residue can make the land more susceptible to erosion. As energy crops become more prevalent, there may be increased water quality impacts in comparison to the use of agricultural and forestry residues and waste wood feedstocks.

4.3.2 Water Resources

Biorefineries can discharge large amounts of wastewater. Many biofuel refineries use onsite wells to provide water, which often then needs to be purified in order to remove mineral content, commonly using reverse osmosis. This process results in 1 gallon of brine water discharged for every 2 gallons of pure water produced.

The concentration of minerals and ions, such as sulfate and copper, in this brine can reach levels high enough to have water quality impacts if discharged improperly. Other wastewater sources from biofuel refineries include cooling water blowdown, which is similar in composition to the brine water described above, and off-batch ethanol and process water.

While effluent from ethanol and biodiesel refineries may contain pollutants that could negatively affect water quality, discharges of these effluents are regulated under the requirements of the Clean Water Act's National Pollutant Discharge Elimination System (NPDES) program.

Effluents from refineries can be applied to land, treated on site, discharged to local wastewater treatment facilities, or discharged to water bodies.

Under the act, refineries that discharge pollutants into federally regulated waters are required to obtain a federal NPDES permit from EPA or a state RA authorized by EPA to implement the NPDES program. These permits generally allow a point source, such as a refinery, to discharge specified pollutants into federally regulated waters under specific limits and conditions. Potential pollutants could consist of discharges of contaminated water from the reverse osmosis treatment used in ethanol refineries and the glycerin that is used in biodiesel refineries; currently, the NPDES permitting process is generally being effectively applied to discharges from refineries. For ethanol refineries, these permits cover blowdown (water containing salts built up in cooling towers and boilers), as well as discharges from the reverse osmosis process.

At small biodiesel refineries, biological oxygen demand from glycerin can be a problem in effluent released into local municipal wastewater facilities because it may disrupt the microbial processes used in wastewater treatment. However, in larger biorefineries, glycerin is less of a concern because it is extracted from the effluent and refined for use in other products, including cosmetics and animal feed. In the future, it is likely that new technology will make recovery of glycerin economically feasible in smaller facilities.

4.3.3 Air Quality

Biofuels production impacts to air quality will depend upon the location of the biorefinery and the feedstocks used. When advanced biofuel refineries are located in proximity to the feedstocks used, the ambient air quality of such rural areas is generally considered to be good. For all advanced biofuel refineries, compliance with Clean Air Act provisions is routine, and there are few instances of major violations.

4.3.4 Hazardous Spills and Storage

Ethanol is highly corrosive and poses a risk of damage to pipelines, rail or tanker trucks, underground storage tanks (UST), and above-ground storage tanks (AST), which could in turn lead to releases to the environment that may also contaminate groundwater, among other issues.

Except for those UST systems specifically designed to store fuel containing 85 percent ethanol, a large number of 617,000 federally regulated UST systems currently in use at approximately 233,000 sites across the country are not certified to handle fuel blends to more than 10% ethanol.

The expected life span of USTs is typically 30 years. This, combined with the lack of information on how many of these tank systems are ethanol compatible and where they are installed, makes it difficult for EPA to gather data on the level of leakage risk posed by a switch to different blends of ethanol. Substantial turnover in ownership further complicates the challenge of determining what type of UST system is in the ground without removing it; additional regulatory actions may be necessary in the future to address this uncertainty.

4.4 Cumulative Impacts

Over the life of the programs authorized under Sections 9003, 9004, and 9005 (until September 30, 2012), there would be little change in the level of facility operations and environmental impacts at a cumulative level. Predicting the types of advanced biofuels programs that might be authorized by Congress after 2012 is currently beyond the foreseeable future because there is a great deal of uncertainty regarding future programs. Factors such as climate change legislation, budget restrictions, world oil prices, tax incentives, food stock production and prices, commercial capital availability, employment prospects, balance of trade issues, and technological innovations can each or cumulatively affect the overall shape, size, and level of advanced biofuel programs. Therefore, the environmental impacts of any such programs beyond 2012 would be remote and speculative at this time.

In its final rulemaking for the RFS2 rule, the EPA did assess overall environmental impacts for achieving the renewable and advanced biofuel targets in the year 2022, including production of 15 Bgy from corn ethanol, as well as 21 Bgy from advanced biofuels. These are presented in Table 9 below.

Table 9: **Impact Summary of the Renewable Fuel Volumes Required by RFS2 in 2022**

Category	Impact in 2022
GHG Emissions	-138 million metric tons
Non-GHG Emissions (criteria and toxic pollutants)	-1 to +10% depending on the pollutant
Nationwide Ozone	+0.12 ppb population-weighted seasonal max
Nationwide $PM_{2.5}$	+0.002 $\mu g/m^3$ population-weighted annual average
Nationwide Ethanol	+0.409 $\mu g/m^3$ population-weighted annual average
Other Nationwide Air Toxics	-0.0001 to -0.023 $\mu g/m^3$ population-weighted annual average depending on the pollutant
$PM_{2.5}$-related Premature Mortality	33 to 85 additional cases of adult mortality (estimates vary by study)
Ozone-related Premature Mortality	36 to 160 additional cases of adult mortality (estimates vary by study)
Loadings to the Mississippi River from the Upper Mississippi River Basin	Nitrogen: +1.43 billion lbs. (1.2%) Phosphorus: +132 million lbs. (0.7%)
Gasoline Costs	-2.4¢/gal
Diesel Costs	-12.1 ¢/gal
Overall Fuel Costs	-$11.8 Billion
Gasoline and Diesel Consumption	- 13.6 Bgal

Category	Impacts
Total Capital Costs Thru 2022	$90.5 Billion
Corn	+8.2%
Soybeans	+10.3%
Food	+$10 per capita
Energy Security	+$2.6 Billion
Monetized Health Impacts	-$0.63 to -$2.2 Billion
Monetized GHG Impacts	+$0.6 to $12.2 Billion
Oil Imports	-$41.5 Billion
Farm Gate Food	+$3.6 Billion
Farm Income	+$13 Billion (+36%)
Corn Exports	-$57 Million (-8%)
Soybean Exports	-$453 Million (-14%)

These projected impacts would include all renewable fuels under the RFS2 mandate; the proportion and amount of such fuels attributable to the Section 9003-9005 program rules in 2022 is not quantifiable but is considered to be a small percentage of the RFS2 totals, less than 5-8% overall.

The USDA Farm Service Agency recently completed a Programmatic Environmental Impact Statement (PEIS) on the Biomass Crop Assistance Program (BCAP). The BCAP program is authorized by Section 9011 of the Farm Bill and is intended to provide support for producing biomass that could be used for converting into advanced biofuels. The analysis of environmental impacts on land use, biological and soil resources of the preferred alternative (both Agency and environmentally preferred) are incorporated by reference here.

4.4.1 Soils

Any agricultural system needs to maintain soil health and productivity to be sustainable in the long term. Traditional annual feedstock production including intensive corn and soybean cultivation, has often been associated with soil degradation and erosion. Negative impacts tend to be more severe in large scale operations where machinery is heavier (leading to soil compaction) and tillage is more expansive and intensive thereby creating more opportunity for erosion from wind and rain. Improved crop varieties combined with the use of fertilizers, pesticides, herbicides and irrigation, has compensated for negative soil impacts as reflected in consistent yield increases over time (on average and thus far).

Expansion of annual crops for biofuel will likely have negative consequences on long-term soil health and productivity unless more sustainable practices are employed. Other cultural practices including site preparation, irrigation, and the use of fire, fertilizers, pesticides and herbicides, can impact soil health. Furthermore, if cultivation takes place in environmentally sensitive ecosystems (wetlands or tropical forests) or on marginal lands (steep slopes or shallow soils), negative soil impacts may be unavoidable and special precautions may be required to mitigate them both for site productivity and to reduce damage to surrounding ecosystems.

The use of crop residues as a cellulosic feedstock poses serious consequences if removal exceeds sustainable levels – e.g. if it contributes to erosion or loss of productivity due to reduced nutrients and soil quality (texture, beneficial microbial life and water retention capacity). It is assumed that zero sustainable cellulosic recovery from soybean harvesting would be performed because residues are necessary to mitigate erosion and soil degradation. Approximately 50% corn residues are assumed to be needed for similar reasons, leaving 50 as stover available for sustainable recovery. Approximately 15% of wheat residue is assumed to be recoverable as straw. However, the costs associated with collection and transport of harvest residues may create incentives for "all or none" approaches where residues are collected at higher (unsustainable) rates from the most economical locations and the majority of residues (that are more distant from processing plants or more costly to collect) are not recovered at all.

The economics of collection make it difficult to ensure that appropriate proportions of annual crop harvest residues are left in fields to maintain soil quality and productivity. Any parcel of land requires management appropriate to the site conditions to control erosion and maintain or improve soil health and quality. Well-managed perennial crops such as sugarcane, perennial grasses and trees are more likely to curb erosion than crops that require more intensive annual tillage. The long-term sustainability of biofuel feedstock production will depend on the development of crops and practices that preserve or improve soil productivity. Based on historic trends and available options to manage this issue, loss of soil quality was not identified as a major constraint to feedstock supply over the next three years.

4.4.2 Water

In some geographic areas, water availability and costs are expected to increasingly become limiting factors for expanding agricultural production, including most feedstocks studied. The local climate combined with a crop's water requirements and other economic factors help to dictate the need for and use of irrigation. Crops with high value and high input costs are often irrigated even though they are produced in areas where average rainfall could support a fair level of production. Irrigation in these cases reduces uncertainty and the risk of loss due to drought and allows more intensive cultivation and precise planning of inputs. Growing climate variability and climate change increase the amount of land area where irrigation (and drainage) infrastructure are required to reduce risk to acceptable levels. Climate change may eventually cause shifts in where crops can be grown successfully without irrigation and

generally, will require additional irrigation in traditional production areas. Once irrigation is established, cultivation intensity (crop density) increases to reap the most from the infrastructure investment. This in turn creates increased demand for water, fertilizer and other inputs.

Future feedstock crops such as perennial grasses and trees that are more drought-resistant and adapted to local soils and climate variation will be advantageous under these conditions.

Although it does not directly limit potential feedstock production, water pollution is another factor where intensively cultivated annual crops such as corn and soybeans have documented negative impacts (as will any crop that involves high levels of fertilizer and chemical applications that can eventually reach local water tables). Monitoring and minimizing runoff or leaching of agricultural chemicals is an important component of best practices for sustainable production. Erosion and run off can have detrimental impact on urban water supplies, freshwater ecosystems. The use of improved (more sustainable) agricultural practices are vital to avoid or mitigate these impacts.

4.4.3 Biological Resources

The potential cumulative effects on vegetation could impact native fish and wildlife as habitats are fragmented, degraded, or destroyed from new crop establishment such as switchgrass or hybrid poplars. Not all species are harmed by conversion of land to more intensive uses, and so the cumulative effects will be localized and site-specific. While the footprints of the areas considered under conversion are relatively small it is possible that in the right set of circumstances the spatial configuration and relative location of converted areas combined with existing habitat fragmentation

patterns could have a multiplicative effect on the overall regional habitat fragmentation values. The establishment of new crops in areas previously fallow or cropped for a different style of agriculture may itself cause some direct mortality and range shifting at the local scale of wildlife. The use of best management plans (BMPs) would help to prevent and minimize any significant impacts; however, fragmentation is unavoidable.

Cumulative impacts to vegetation would occur from the conversion of large amounts of agricultural land from traditional crops to dedicated energy crops. The amount of agricultural land that potentially would be converted for new energy crops is predicted to be negligible.

There are no quantitative studies of the impacts to wildlife directly related to biofuel crops. Direct effects on wildlife occur from conflicts with haying machinery or trampling by grazing livestock that may result in mortality. Direct impacts are expected to occur during the establishment and harvest stages of BCAP crops; these impacts are expected to be short-term and localized. Indirect impacts would be the result of habitat change as cropland use is shifted from traditional crops to dedicated energy crops, and are expected to be positive and negative but not significant. These habitat changes would impact such aspects as food availability, type and quantity of cover for escape and breeding, and the availability of adequate nesting sites. Wildlife in lands adjacent to the dedicated energy cropland may either be positively or negatively

impacted depending on the habitat quality provided by the biofuel crops. There would no direct and indirect impacts to vegetation and wildlife at a regional scale, or at a population level

4.4.4 Land Use

Within the U.S., there would be little change in land use from production of advanced biofuels to meet the RFS2 goals by 2022. Cropland acres will vary according to overall market prices for commodities set by world demand as food, animal feed, as well as demand for biofuel consumption; currently, the amounts by crop used vary: for advanced biofuels, it is predicted that soybean oil in the U.S. could use approximately 10-20% of crop production in 2022, depending upon a variety of factors such as land costs, other crop prices, petroleum prices, alternative feedstock prices, and tax provisions. Other crops such as sorghum, sugar cane, and canola would likely contribute much lower percentages of crop production for advanced biofuel consumption.

For cellulosic fuel production, the majority of likely sources would be crop residues, such as corn stover, woody biomass and municipal biomass. Some new crops for dedicated biomass would be planted, such as switchgrass, hybrid poplar, or other species. The amount and extent of such plantings would be dependent upon the incentives available to farmers, the demand for such biomass, as well as market prices of alternative crops. Under the BCAP program, it is estimated that up to 40,000 acres of cropland, primarily soybeans, could be converted to dedicated biomass crop production, and that no lands under the Conservation Reserve Program would be converted. This is a negligible percentage of cropland in the U.S.

4.4.5 International Aspects of Biofuels Production

A number of countries have established targets or mandates for between 2% and 10% bio-ethanol and/or bio-diesel blends with fossil fuels in coming years, partly in response to high crude oil prices but also to further national development objectives, and to meet GHG emission reduction goals. These targets appear to be aimed at providing investors with increased security based on assurances of local market demand.

Many nations (such as the countries of European Union, Brazil, Argentina, Colombia and countries in the Caribbean region) also encourage investment through reduced tariffs and tax-credit incentives.

China and India appear to be taking a more cautious approach and have discouraged the use of food crops and prime farm land for biofuel production. Wheat and corn feedstock may be seen as an interim strategy that allows producing countries to build domestic biofuel industries and gear-up for transition to other technologies and feedstocks when they become available.

The emergence of biofuels has led to stronger integration of food, fuel and fiber markets. While this integration affects consumer prices, it also creates opportunities for increased rural incomes, greater economic efficiencies, and more sustainable systems of production. The increased integration of energy and food markets is reflected in several manners. For example, while Brazil is rapidly expanding sugarcane cultivation for biofuel, the area planted in soybeans is growing even faster. The expansion of soybeans is not for biofuel production per se, but illustrates Brazil's capacity to respond to global market signals. Thus, predicting the overall levels of biofuel production from different feedstocks, and consequent environmental impacts is highly speculative.

There is substantial concern about the rate and the extent of highly-valued environmental resources, such as tropical rain forests in the Amazon and Southeast Asia, being clear-cut for timber, agricultural production such as soybeans or palm oil, or other uses, such as cattle grazing or mining. The establishment of biofuels markets and potential fuel demand may be increasing the negative impacts on those tropical resources; predicting the level, extent and severity of such impacts due to biofuels production in other countries is uncertain and highly controversial. Overall, sustainable development in terms of land use in tropical forests, and in the developing world in general, present many complicated issues of national sovereignty, national development goals such as energy or food self-sufficiency, population pressures, income distribution and land ownership, levels of imports and exports, and cultural imperatives. How the U.S. determines the quantity of imports, and tariffs for fuels imported under the RFS2 mandate with subsequent impacts on other countries' production and land use patterns is speculative, at this time. It is likely that many of those land use issues will be addressed by a comprehensive global climate change regime but predicting the time and shape of such is, again, speculative.

4.5 Impacts of Alternative 1: Give Exclusive Priority to Producers of RFS2 Fuels

Under this alternative, the Agency would change the Section 9005 proposed rule regarding biofuels eligibility to fund only those producers of advanced biofuels that would meet the definition of fuels under RFS2, that is, liquid fuels used for transportation, as well as those producers using woody materials from National Forest lands. The impact of the alternative would be to exclude those producers of syngas and wood pellets which are used for power generation. Based upon the applicants for FY 2009, and explicated in Appendix G, some 37-40 producers of advanced biofuels would be excluded from receiving producer payments under this alternative. Likely impacts would be a reduction in local water quality since the producers excluded are dairy farms that are processing cow manure into syngas; manure from dairy wastes are significant adverse impacts in a number of localities affecting drinking water quality as well as surface water BOD. Additionally, manure generate GHG reductions both of methane and CO2; exclusion of those producers would increase GHG emissions at some unquantifiable but substantive level.

4.6 Impacts of No Action Alternative

Another alternative to the proposed rule making action would be for the Agency to take no action to promulgate rules to implement Section 9003, 9004, and 9005, and not act upon any NOFAs for such programs. This is not a reasonable alternative in light of the Congressional mandate for USDA to help advance biofuels and renewable resource implementation. For the purpose of this analysis, No Action would result in a decreased probability that advanced biofuels would be produced in a quantity sufficient to reach the targets set by RFS2 and EISA. The direct impacts of not reaching those targets could be either : 1. increase importation of advanced biofuels from other countries, such as Brazil, Argentina, the Caribbean Basin Initiative (CBI) nations, and others. In some cases, the indirect impacts of such importation could be significant should the amounts imported be determinative of another country's production levels, and if that production could result in indirect land use changes that negatively impacted existing resources, such as tropical rain forests; or 2. increase imports of petroleum from other nations, with potentially significant environmental impacts from that increased production. Oil exploration, extraction, transport and burning has had profound environmental direct and indirect effects in various parts of the world. In some cases, petroleum development has resulted in clearing of rain forests in Ecuador; destruction of large tracts of wetlands in Nigeria (or Louisiana); destruction of large expanses of boreal forests in Canada and Russia, all of which have potentially globally significant impacts to carbon balances. Additional environmental effects of petroleum in the marine environment from large spills or routine discharges are well established and adverse at local and regional levels, with significance of such impacts dependent upon a variety of factors such as types of petroleum discharged, and resources affected.

In summary, No Action would likely result in an increased level of adverse impacts which cannot be quantified at this time.

5. **List of Agencies and Persons Consulted**
   The Draft EA was made available on the Agency website on May 5 and comments were taken until June 8, 2010. **No comments were received on the EA.**
   Willam Smith, Fred Petok, Rural Development, Diane Berger, Rural Development.

6. **Prepared by:**

   Frank Mancino, Senior Environmental Protection Specialist
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Appendix A: 2008 Farm Bill Renewable Energy Provisions

The following is a brief summary of the authorities found under Title IX of the 2008 Farm Bill. The sections referenced are ones contained in the 2002 Farm Bill that are amended by the Section 9001 of the 2008 Farm Bill.

Section 9002: Biobased Market Program

Provides provisions for a federal procurement program and a voluntary labeling program for biobased products. The bill provides $1 million in mandatory Fiscal Year (FY) 2008 funding and $2 million per year from FY 2009 through 2012. Additionally, the bill authorizes additional funds in the amount of $2 million per year, from FY 2009 to 2012.

Section 9003: Biorefinery Assistance Program

Provides loan guarantees for the development, construction and retrofitting of commercial-scale biorefineries, and grants to help pay for the development and construction costs of demonstration-scale biorefineries. Provides $75 million in FY 2009 and $245 million in FY 2010 for commercial-scale biorefinery loan guarantees. It also authorizes discretionary funding of $150 million per year starting in FY 2009 and continuing through FY 2012 for both demonstration and commercial scale biorefineries.

Section 9004: Repowering Assistance

Provides for payments to biorefineries (that were in existence at the time the 2008 Farm Bill was passed) to replace fossil fuels used to produce heat or power to operate the biorefineries with renewable biomass. The bill provides mandatory funds of $35 million for FY 2009 that will remain available until the funds are exhausted. The bill also authorizes additional discretionary funds of $15 million per year, from FY 2009 through 2012.

Section 9005: Bioenergy Program for Advanced Biofuels

Provides for payments to be made to eligible agricultural producers to support and ensure an expanding production of advanced biofuels. The bill provides mandatory funds of $55 million in FYs 2009 and 2010, $85 million in FY 2011, and $105 million in FY 2012. Additionally, the bill authorizes additional discretionary funds in the amount of $25 million per year, from FY 2009 to 2012.

Section 9006: Biodiesel Fuel Education Program

Provides competitive grants to eligible entities to educate government and private entities that operate vehicle fleets and the public about the benefits of biodiesel fuel use. The bill provides $1 million in funds per year, from FY 2008 to 2012.

Section 9007: Rural Energy for America Program

Expands and renames the program formerly called the Renewable Energy Systems and Energy Efficiency Improvements Program. Under the expansion, hydroelectric source technologies will be added as eligible; energy audits will be included as eligible costs, and; loan limits will be increased. The bill provides $55 million of mandatory funding for FY 2009, $60 million for FY 2010, and $70 million for FYs 2011 and 2012. It also authorizes additional discretionary funds of $25 million per year, from FY 2009 through 2012.

Section 9008: Biomass Research and Development Initiative

Provides competitive grants, contracts and financial assistance to eligible entities to carry out research on and development and demonstration of biofuels and biobased products, and the methods, practices and technologies for their production. The bill provides $20 million in funds in FY 2009; $28 million in FY 2010; $30 million in FY 2011 and $40 million in FY 2012. In addition, there is a funding authorization of $35 million per year, from FY 2009 through 2012.

Section 9009: Rural Energy Self-Sufficiency Initiative

Provides grants for the purpose of enabling eligible rural communities to substantially increase their energy self-sufficiency. The bill authorizes discretionary funds of $5 million per year, beginning in FY 2009 and continuing through FY 2012.

Section 9010: Feedstock Flexibility Program for Bioenergy Producers

Subsidizes the use of sugar for ethanol production through federal purchases of surplus sugar for sale to ethanol producers.

Funds will be provided in sufficient amounts to carry out this program.

Section 9011: Biomass Crop Assistance Program

Provides support to establish and produce crops for conversion to bioenergy in project areas, and to help with collection, harvest, storage and transportation of eligible material for use in a biomass conversion facility. The program will be implemented by the Farm Service Agency with support from other federal and local agencies.

Section 9012: Forest Biomass for Energy

The bill authorizes the Forest Service to conduct a comprehensive research and development program to use forest biomass for energy. The Forest Service, other federal agencies, state and local governments, Indian tribes, land-grant colleges and universities, and private entities are eligible to compete for program funds. Priority research projects include:

- The use of low-value forest biomass for energy from forest health and hazardous fuels reduction treatment.
- The integrated production of energy from forest biomass into biorefineries or other existing manufacturing.
- The development of new transportation fuels from forest biomass.
- The improved growth and yield of trees for renewable energy production.

Section 9013: Community Wood Energy Program

Provides grants to state and local governments to develop community wood energy plans and to acquire or upgrade wood energy systems. The bill authorizes funds in the amount of $5 million per year from FY 2009 through FY 2012.

Project	Investment ($ millions)	Location	Fuel	Feedstock
ADM	24.83	Illinois	Ethanol, Ren C	Cellulosic
ADM	10.95	Illinois	Ethanol, Ren C	Cellulosic
Algenol	25.00	Texas	Ethanol, Ren C	Algae
Algenol	33.92	Texas	Ethanol, Ren C	Algae
American Process	17.94	Michigan	Biofuels, Ren C	Wood
American Process	10.15	Michigan	Biofuels, Ren C	Wood
Amyris	25.00	California	Diesel	Sorghum
Amyris	10.49	California	Diesel	Sorghum
Amyris	41.75	California	Ren F&C	Sugarcane
Bioenergy International	50.00	Louisiana	Ren C	Sorghum
Bioenergy International	89.59	Louisiana	Ren C	Sorghum
BlueFire Ethanol	41.00	Mississippi	Ethanol	Cellulosic
BlueFire Ethanol	223.23	Mississippi	Ethanol	Cellulosic
Clearfuels	23.00	Colorado	Diesel, jet	Wood
Clearfuels	13.43	Colorado	Diesel, jet	Wood
Codexis	10.00	California	Enzymes	Advanced
Codexis	100.0	California	Enzymes	Advanced
Elevance	2.50	Iowa	Diesel, jet	Animal, ag residues
Elevance	0.64	Iowa	Diesel, jet	Animal, ag residues
Enerkem	50.00	Mississippi	Ethanol, Ren C	MSW, wood
Enerkem	90.47	Mississippi	Ethanol, Ren C	MSW, wood
ExxonMobil	300.00	New Jersey	Biofuels	Algae
Glycos Bio	5.00	Texas	Ren C	Glycerine
GTI	2.50	Illinois	Diesel gasoline	Wood, ag residue Algae
GTI	0.63	Illinois	Diesel gasoline	Wood, ag residue Algae
Haldor Topsoe	25.00	Illinois	Gasoline	Wood
Haldor Topsoe	9.70	Illinois	Gasoline	Wood
ICM	2.20	Kansas	Biofuels	Advanced
ICM	25.00	Missouri	Ethanol	Switchgrass, sorghum
ICM	6.27	Missouri	Ethanol	Switchgrass, sorghum
INEOS	50.00	Florida	Ethanol	Wood, waste
INEOS	50.00	Florida	Ethanol	Wood, waste
KL Energy	4.00	South Dakota	Ethanol	Cellulosic
Logos Technologies	20.45	California	Ethanol	Switchgrass, wood
Logos Technologies	5.11	California	Ethanol	Switchgrass, wood
New Generation	1.50	Florida	Biofuel	Advanced
Novomer	14.00	Massachusetts	Ren Chem	Co2, CO
Novozymes	200.00	Nebraska	Enzymes	Advanced
REII	19.98	Ohio	Diesel	Ag, forest residues
REII	5.12	Ohio	Diesel	Ag, forest residues
Renewable Fuel	22.00	Nevada	Biodiesel	Palm
Sapphire	50.00	New Mexico	DIF	Algae

Sapphire	85.06	New Mexico	DIF	Algae
Solazyme	21.77	Pennsylvania	Biofuels	Algae
Solazyme	3.86	Pennsylvania	Biofuels	Algae
Solazyme	57.00	California	Ren O	Algae
Solix Biofuels	16.80	Colorado	Biofuels	Algae
StatoilHydro	3.00	Virginia	Biodiesel	Algae
Synthetic Genomics	300.00	California	Biofuels	Algae
UOP Honeywell	25.00	Hawaii	Gasoline, diesel, jet	Ag residues, wood
UOP Honeywell	6.69	Hawaii	Gasoline, diesel, jet	Ag residues, wood
Verenium	22.50	Massachusetts	Ethanol	Cellulosic
Virent	25.00	Wisconsin	Diesel	Sugarcane
ZeaChem	25.00	Oregon	Ethanol	Wood, ag residues
ZeaChem	6.25	Oregon	Ethanol	Wood, ag residues
Total Investment	**$ 2,320**			

Appendix D Types of Feedstocks tested for Biodiesel

Algae Oil

Babassu oil is extracted from the seeds of the babassu palm tree, *Attalea speciosa.* The tree is common in Brazil, Mexico, and Honduras; it grows well in areas typically cultivated for coconut or palm.

Beef Tallow

Animal tissue is converted to tallow using rendering; a process by which lipid material is separated from meat tissue and water under heat and pressure.

Borage Oil

Borage oil comes from the plant, *Borago officinalis*, also known as starflower.

Camelina Oil

Camelina oil comes from the plant, *Camelina sativa*. It is an annual flowering plant that grows well in temperate climates. Camelina can be grown in arid conditions and does not require significant amounts of fertilizer.

Canola Oil

Canola is the seed of the species *Brassica napus* or *Brassica campestris*; Canola is a type of rapeseed that has been bred to produce edible oil with low levels of erucic acid and meal with low levels of toxins, allowing it to be used for livestock feed. It was developed in Canada, but is now grown in many places around the world including the United States. Currently about 1.2 million acres of canola is grown in the United States. Canola can be grown as either a spring or winter crop, with yields for winter canola being significantly higher than those for spring canola (3,500 pounds per acre vs. 1,500 pounds per acre).

Castor Oil

Castor oil comes from the castor bean *Ricinus communis*. Castor is grown in tropical and subtropical regions and prefers a dry climate.

Choice White Grease

Choice white grease is a specific grade of mostly pork fat defined by hardness, color, fatty acid content, moisture, insolubles, unsaponifiables and free fatty acids.

Coconut Oil

Coffee Oil

Coffee oil comes from spent coffee grounds; the grounds can contain as much as 11 to 20 percent oil. Currently coffee grounds are disposed of or used as compost. After oil extraction, the grounds could still be used as compost and the oil could be used to make biodiesel.

Corn Oil

Distiller's Crude, dry distiller's grain (DDG) extracted corn oil was obtained from a commercially available source. The extracted corn oil comes from the DDG stream of the ethanol production process.

Cuphea viscosissima is also known as blue waxweed, an annual crop.

Evening Primrose Oil

Evening primrose is a wildflower native to North America.

Fish Oil

Hemp Oil

The oil is derived from the plant *Cannabis sativa* and contains significant amounts of α-linolenic acid and γ-linolenic acid.[8] Hemp is legally grown in Canada as a niche crop and is used mainly in the health food market.

Jatropha Oil

Jatropha oil comes from the shrub *Jatropha curcas,* also known as physic nut. The plant is native to Mexico, Central America, Brazil, Bolivia, Peru, Argentina, and Paraguay.

Jojoba

(*Simmondsia chinensis)* is an evergreen perennial shrub grown in Arizona, Mexico, and neighboring areas.

Karanja Oil

Karanja (*Pongamia pinnata)* is a medium sized evergreen tree that grows in India.
The oil is reddish brown and rich in unsaponifiable matter and oleic acid.

Lesquerella fendleri is also known as Fendler's bladderpod

Lesquerella oil is a source of hydroxy unsaturated fatty acids, and can be used similarly to castor oil.

Linseed has been traditionally used as a drying oil. It grows in Argentina, India, and Canada. It is an annual herb and contains 37-42% oil.

Moringa oleifera is a tree that ranges in height from 5 to 10 meters, and is native to India, Africa, Arabia, Southeast Asia, the Pacific and Caribbean islands, South America, and the Philippines.

Mustard Oil

Neem Oil

Neem (*Azadirachta indica*) is a large evergreen tree, 12 to 18 m tall, found in India, Pakistan, Sri Lanka, Burma, Malaya, Indonesia, Japan, and the tropical regions of Australia.

Palm Oil

Perilla oil

Comes from the plant *Perilla Ocymoides*, the seeds of which contain 35-45 percent oil. Perilla oil has been cultivated in China, Korea, Japan, and India.

Poultry Fat

Crude poultry fat was obtained from a commercially available source.

Rice Bran Oil

Rice bran oil is a non-edible vegetable oil which is available in rice cultivating countries. Rice bran is a co-product of rice milling, containing about 15-23% oil.

Soybean Oil

Stillingia oil

comes from the Chinese tallow tree (*Triadica sebifera*). The tree has been used to prevent soil erosion. The tree can be grown on marginal land, and is native to eastern Asia.

Sunflower Oil

Tung Oil

Used Cooking Oil

Yellow Grease

Yellow grease is made up of restaurant greases, which are fats and oils left over from cooking. It can also be from rendering plants producing different quality greases.

Appendix E Issues in Cellulosic Biomass Commercialization

Biorefineries using cellulosic biomass as a feedstock face market barriers at the local, state, and federal levels. Production costs, investment risks, cultural perspectives, and infrastructure limitations continue to pose significant challenges for the emerging bioindustry. Widespread deployment of integrated biorefineries will require both demonstration of cost-effective biorefinery systems and establishment of sustainable, cost-effective feedstock supply infrastructures.

Cost of Production: An overarching market barrier for biomass technologies is the inability to compete, in most applications, with fossil energy supplies and their established supporting facilities and infrastructure. Uncertainties in fossil energy price and supply continue to exert upward pressure on the price of petroleum-derived fuels and products. Nevertheless, reductions in production costs along the biomass supply chain are needed to make bio-based fuels and products competitive in these markets.

High Risk of Large Capital Investments: Once emerging biomass technologies have been developed and tested, they must be commercially deployed. Financial barriers are the most challenging aspect of technology deployment. Capital costs for commercially viable facilities are relatively high, and securing capital for unproven technology can be extremely difficult. For private investors to confidently finance biomass technology, the technology must be fully demonstrated as technically and commercially viable. Government assistance at the demonstration stage to accelerate proof of performance is critical to successful deployment.

Agricultural Sector-Wide Paradigm Shift: Energy production from biomass on a large scale will require careful evaluation of U.S. agricultural resources and logistics, as these will likely require a series of major system changes that will take time to implement. Current harvesting, storage, and transportation systems are inadequate for processing and distributing biomass on the scale needed to support dramatically larger volumes of biofuels production.

Inadequate Supply Chain Infrastructure: The uncertainty of a sustainable supply chain and the associated risk are major barriers to procuring capital for start-up biorefineries. The lack of operating biorefineries to create the demand for biomass exacerbates the problem. Once demand is established, the infrastructure will grow. Producing and delivering bioenergy products in large volumes will require dramatic capital investments throughout the supply chain—from feedstock production and transport through conversion processing and product delivery.

Lack of Industry Standards and Regulations: The lack of local, state, and federal regulations and inconsistency among existing regulations constrain development of biomass. The long lead times associated with developing and understanding new and revised regulations for technology can delay or stifle commercialization and deployment. Consistent standards are lacking for feedstock supply and infrastructure, as well as for biofuels and the associated distribution infrastructure. Current inconsistencies among federal, state, and local agencies in permitting and regulations for construction of new biofuels production facilities also create a restrictive environment for industry growth.

Industry and Consumer Acceptance and Awareness: To be successful in the marketplace, biomass-derived products must perform as well or better than the fossil-energy-based products. Industry partners and consumers must believe in the quality, value, and safety of biomass-derived products and their benefits.

Lack of Biofuels Distribution Infrastructure: The current lack of infrastructure to transport, store and dispense biofuels puts biofuels at a significant disadvantage compared to conventional liquid transportation fuels that already have mature infrastructure. Today's biofuels distribution infrastructure, which includes over 1,200 E85 fueling stations, is concentrated in the Midwest, close to the production facilities and feedstocks (corn and soybeans). To contribute significantly to the 20-in-10 volumetric goal, expansion beyond this region of the country will be required.

Availability of Biofuels-Compatible Vehicles: About six million ethanol FFVs have been manufactured for the U.S. market, at a price competitive with conventional vehicles. At this time, however, few vehicle model/fuel type combinations are available. In addition, most FFVs on the road today use less than 4 gallons of E85 per year because of the limited number of E85 pumps across the United States.

Lack of understanding of environmental/ energy tradeoffs: A systematic evaluation of the impact of expanded biofuels production and use on the environment and food supply for humans and animals is lacking. Analytical tools to facilitate consistent evaluation of energy benefit and greenhouse gas emissions impacts of all potential biofuels feedstock and production processes is needed.

Appendix F Operating Biodiesel Plants (2009)

* Capacity noted in MMgy

City	State	Feedstock	Capacity *	Start Date
Cleburne	TX	animal fats	12	Jun 2006
St. Joseph	MO	animal fats	15	Apr 2007
Fremont	NE	animal fats	6.2	Aug 2006
Guymon	OK	animal fats	30	Mar 2008
Manitowoc	WI	animal fats	2.6	May 2009
Helena	AR	animal fats	40	N/A
Pasadena	TX	animal fats/palm oil	4	Dec 2003
Galena Park	TX	animal fats/palm oil	30	Jan 2006
Natchez	MS	animal fats/soy oil	80	May 2007
Batesville	AR	animal fats/soy oil	59	N/A
Ridgeway	VA	animal fats/soy oil	5	Nov 2005
Memphis	TN	animal fats/soy oil	5	Sep 2006
Bunceton	MO	animal fats/soy oil	4	N/A
East Dublin	GA	animal fats/soy oil	2.5	Sep 2005
Pittsburgh	PA	animal fats/soy oil	5	Dec 2005
St. Joseph	MO	animal fats/soy oil	30	Mar 2009
Dexter	MO	animal fats/soy oil	3	Apr 2007
Washington	IA	animal fats/vegetable oils	30	Jul 2007
Middletown	IN	animal fats/waste vegetable oils	15	Jun 2007
Sedgwick	KS	animal fats/yellow grease	1.2	Jun 2007
Ellenwood	GA	animal fats/yellow grease	18	Jan 2008
Seattle	WA	animal fats/yellow grease	15	Dec 2008
Elizabeth	NJ	animal fats/yellow grease	50	Feb 2007
Florence	AL	animal fats/yellow grease	2	Apr 2008
Euless	TX	beef tallow	10	Feb 2008
El Paso	TX	beef tallow/soy oil	5	Sep 2008
Odessa	WA	canola	8	Nov 2008
Velva	ND	canola oil	85	Apr 2007
Dimmit	TX	canola oil/soy oil	20	Jul 2007
Chicago	IL	canola oil/soy oil	4.5	N/A
Dayton	OH	choise white grease/yellow grease	5	Sep 2007

Mauston	WI	corn oil	5	Feb 2007
Sioux Center	IA	corn oil	1.5	Mar 2007
Cashton	WI	corn oil/soy oil	8	Dec 2007
Galva	IA	corn oil/soy oil	5	N/A
Seminole	TX	cottonseed oil	1.5	Dec 2008
Carl's Corner	TX	cottonseed oil/yellow grease	2.6	Aug 2006
Savannah	GA	multi-feedstock	1.5	N/A
Isanti	MN	multi-feedstock	3	N/A
Athens	AL	multi-feedstock	40	Jul 2008
Bakersfield	CA	multi-feedstock	30	N/A
Farmouth	KY	multi-feedstock	14	N/A
Houston	MS	multi-feedstock	8	Sep 2009
Portland	ME	multi-feedstock	1.5	Sep 2009
Stockton	CA	multi-feedstock	10	Dec 2008
American Falls	ID	multi-feedstock	1	Aug 2009
Bassett	VA	multi-feedstock	3	Jul 2008
Houston	TX	multi-feedstock	105	Jan 2008
Danville	IL	multi-feedstock	45	Nov 2008
Swanton	VT	multi-feedstock	4	Dec 2006
Kane	PA	multi-feedstock	5	Sep 2009
Corona	CA	multi-feedstock	2	Jan 2009
Cincinnati	OH	multi-feedstock	60	N/A
Greenville	MS	multi-feedstock	20	Jun 2008
Mansfield	OH	multi-feedstock	5	Jul 2008
Richmond	VA	multi-feedstock	8	May 2006
Crossett	AR	multi-feedstock	10	Mar 2008
Ontario	NY	multi-feedstock	22	May 2008
Westerly	RI	multi-feedstock	1.2	N/A
Surgoinsville	TN	multi-feedstock	5	Feb 2008
Erie	PA	multi-feedstock	45	Nov 2007
Bridgeport	AL	multi-feedstock	36.5	Jan 2007
Adamstown	MD	multi-feedstock	1	N/A
Parker	CO	multi-feedstock	1	Jun 2009
Moberly	MO	multi-feedstock	10	N/A
Santa Fe Springs	CA	multi-feedstock	10	Jul 2008
Newark	NJ	multi-feedstock	40	Jan 2004
La Porte	IN	multi-feedstock	5	May 2008
Houston	TX	multi-feedstock	90	Jul 2007
Princess Anne	MD	multi-feedstock	5	Nov 2007
Lenoir	NC	multi-feedstock	3	Jul 2007

Pittsboro	NC	multi-feedstock	1.4	Sep 2006
Redwood Falls	MN	multi-feedstock	3	Sep 2004
Asheville	NC	multi-feedstock	1.2	Sep 2007
Bangor	MI	multi-feedstock	17.5	Jan 2007
Berlin	MD	multi-feedstock	1	Jun 2006
Wall Lake	IA	multi-feedstock	30	Jun 2006
Hammond	IN	multi-feedstock	5	May 2006
Butler	KY	multi-feedstock	2	Dec 1998
Coachella	CA	multi-feedstock	12	Oct 2001
Ventura	CA	multi-feedstock	0.1	Oct 2003
Shiremanstown	PA	multi-feedstock	20	Jan 2006
Alexandria	SD	multi-feedstock	7	Feb 2006
Rome	GA	multi-feedstock	12	N/A
Crawfordsville	IA	multi-feedstock	9	Feb 2007
Seattle	WA	multi-feedstock	5	N/A
Ellensburg	WA	multi-feedstock	5	Feb 2007
New Plymouth	ID	multi-feedstock	12	Oct 2006
Pasadena	TX	multi-feedstock	20	Dec 2006
Gordon	GA	multi-feedstock	15	Sep 2007
Salem	OR	multi-feedstock	5	N/A
De Forest	WI	multi-feedstock	20	Apr 2007
White Deer	PA	multi-feedstock	1.5	Jan 2007
Minden	NV	multi-feedstock	1	Nov 2005
Oakland	CA	multi-feedstock	20	Feb 2007
Joliet	IL	multi-feedstock	21	N/A
Arlington	AZ	multi-feedstock	15	Dec 2007
DeWitt	AR	multi-feedstock	10	N/A
Columbus	MS	multi-feedstock	1	N/A
Dade City	FL	multi-feedstock	3	May 2007
Hayti	MO	poultry fat	5	Apr 2007
Kansas City	MO	soy oil	37.5	Apr 2008
Houston	TX	soy oil	20	N/A
Brewster	MN	soy oil	30	Jul 2005
Cincinnati	OH	soy oil	30	N/A
Bainbridge	GA	soy oil	10	Feb 2008
Sergeant Bluff	IA	soy oil	30	Sep 1996
Durant	OK	soy oil	10	Apr 2006
Scribner	NE	soy oil	5	Dec 2007
Morristown	IN	soy oil	5	Aug 2006
Gonzales	TX	soy oil	3	Oct 2006
Gilman	IL	soy oil	30	Jan 2007
Rome	GA	soy oil	10	May 2004

Estill	SC	soy oil	25	Dec 2007
Algona	IA	soy oil	60	Nov 2007
Claypool	IN	soy oil	80	Jan 2008
St. Joseph	MO	soy oil	28	Sep 2007
Birmingham	AL	soy oil	15	N/A
Middletown	PA	soy oil	4	Oct 2006
South Roxana	IL	soy oil	30	N/A
Gladstone	MI	soy oil	5	Dec 2007
Mexico	MO	soy oil	30	Dec 2005
Deerfield	MO	soy oil	30	Nov 2007
Iowa Falls	IA	soy oil	37.5	May 2006
Owensboro	KY	soy oil	50	Mar 2008
Taylors	SC	soy oil	40	Jun 2007
Nitro	WV	soy oil	3	Dec 2007
New Albany	MS	soy oil	7.5	Jul 2006
Logan	OH	soy oil/yellow grease	2	Jul 2009
Madison	TN	soy oil/yellow grease	12	Mar 2007
York	PA	soy oil/yellow grease	3	N/A
Denver	CO	soy oil/yellow grease	10	Dec 2005
New Kent	VA	soy oil/yellow grease	2	N/A
Wilson	NC	soy oil/yellow grease	5	May 2008
Douglass	TX	sunflower oil/yellow grease	2	Sep 2007
Temecula	CA	used cooking oil	1.5	Jan 2010
Seabrook	TX	vegetable oils	35	Sep 2008
Farley	IA	vegetable oils	30	Jun 2007
San Jose	CA	virgin oils/yellow grease	5	Oct 2006
Vassalboro	ME	waste vegetable oil	1	N/A
Port Leyden	NY	WVO	0.25	Jul 2008
Chester	PA	WVO	3	Aug 2009
Gilbert	AZ	yellow grease	2	Oct 2008
San Diego	CA	yellow grease	2	Feb 2009
Tonawanda	NY	yellow grease	5	Jun 2005
Baltimore	MD	yellow grease	1	Sep 2008
Gonzales	CA	yellow grease	1	Feb 2007
Anaheim	CA	yellow grease	1	Dec 2006
Giddings	TX	yellow grease	1	N/A
Honolulu	HI	yellow grease	1	Oct 2002
Total Plants: 150		**Total Capacity:**	**2339.0**	

Appendix G- Advance Biofuels Payments (FY 2009)

State	Payment Amt ($)	Sub Category	Feedstock	Actual Base Amt	Unit	Actual Increase Amt	Unit
MT	$587	BIODIESEL	SAFFLOWER&CANOLA&CAMELINA OIL	23,415	GAL	779	GAL
OK	$329,458	Biodiesel for Agri-business	ANIMAL FAT;OILS-GREASES; OILS-WASTEVEGATABLE OIL	14,461,629	GAL	0	GAL
OK	$85,058	biodiesel for Agri-Business	OILS-SOYBEAN	3,733,621	GAL	0	GAL
GA	$159	biodiesel from poultry fat	ANIMAL FAT	83,300	GAL	0	GAL
GA	$106,208	biodiesel from poultry fat	ANIMAL FAT; OILS-WASTE VEGETABLE OIL;	4,665,634	GAL	0	GAL
GA	$1,063	biodiesel from poultry fat	OILS-WASTE VEGETABLE OIL; ANIMAL FAT	46,644	GAL	0	GAL
GA	$196,950	biodiesel from waste oil	ANIMAL FAT; OILS-WASTE VEGETABLE OIL	885,473	GAL	2586563	GAL
GA	$8,167	biodiesel from waste oil	OILS-WASTE VEGETABLE OIL; ALGAE; ANIMAL FAT	195,750	GAL	60750	GAL
NV	$2,145	biodiesel from waste P	OILS-WASTE VEGETABLE OIL	94,145	GAL	0	GAL
IN	$165,981	Biodiesel from waste	ANIMAL FAT	7,285,763	GAL	0	GAL
IN	$5,164	Biodiesel from waste products	ANIMAL FAT	226,675	GAL	111020	GAL
IN	$17,861	Biodiesel from waste	ANIMAL FAT	784,013	GAL	0	GAL
TX	$69,453	Biodiesel From Waste	ANIMAL FAT	3,048,672	GAL	0	GAL
TX	$558	Biodiesel From Waste Products	ANIMAL FAT	24,500	GAL	0	GAL
VA	$23,342	Biodiesel from waste products	ANIMAL FAT; OILS-SOYBEAN	1,024,582	GAL	25094	GAL
TX	$8,712	Biodiesel From Waste Products	OILS-COTTONSEED; OILS-CANOLA	382,414	GAL	0	GAL
KY	$17,278	Biodiesel from Waste Products	OILS-GREASES	758,438	GAL	0	GAL
TX	$5,425	Biodiesel From Waste	OILS-GREASES	238,110	GAL	0	GAL
FL	$7,104	Biodiesel from waste products	OILS-OTHER	311,810	GAL	0	GAL
VA	$12,439	Biodiesel from waste products	OILS-SOYBEAN; ANIMAL FAT	545,998	GAL	11274	GAL
MS	$18,732	Biodiesel from waste products	OILS-SOYBEAN; ANIMAL FAT; OILS-OTHER	1,644,500	GAL	0	GAL
FL	$2,005	Biodiesel from waste products	OILS-WASTE VEGETABLE OIL	88,000	GAL	0	GAL
HI	$8,656	Biodiesel from Waste	OILS-WASTE VEGETABLE OIL	188,784	GAL	0	GAL
WA	$3,220	biodiesel from waste products	OILS-WASTE VEGETABLE OIL	141,341	GAL	0	GAL
VA	$6,584	Biodiesel from waste products	OILS-WASTE VEGETABLE OIL; OILS-COCONUT OIL	28,000	GAL	87000	GAL
MS	$106,191	Biodiesel from waste products	OILS-WASTE VEGETABLE OIL; OILS-OTHER; OILS-GREASES	4,523,485	GAL	123869	GAL

State	Payment Amt ($)	Sub Category	Feedstock	Actual Base Amt	Unit	Actual Increase Amt	Unit

State	Payment	Sub Category	Feedstock	Actual Base	Unit	Actual	Unit
MN	$25,794	Biodiesel from waste products	OILS-WASTE VEGETABLE OIL; POULTRY WASTE/MANURE; OILS-CANOLA; OILS-SOYBEAN/OTHRS	1,132,215	GAL	0	GAL
NY	$1,728	Biodiesel from waste	OILS-WASTE VEGETABLE OIL	44,573	GAL	23147	GAL
MO	$26,910	BIODIESEL MECHANICAL	ANIMAL FAT; OILS-SOYBEAN	1,181,201	GAL	0	GAL
NC	$7,710	BIODIESEL MECHANICAL	ANIMAL FAT; YELLOW GREASE; OILS-SOYBEAN	338,445	GAL	0	GAL
NC	$4,150	BIODIESEL MECHANICAL	OILS-CANOLA; OILS-SOYBEAN; ANIMAL FAT	182,148	GAL	0	GAL
AL	$2,262	BIODIESEL MECHANICAL	OILS-GREASES, animal fat	99,296	GAL	0	GAL
MN	$565,695	BIODIESEL MECHANICAL	OILS-SOYBEAN	24,831,330	GAL	0	GAL
PA	$17,511	BIODIESEL MECHANICAL	OILS-SOYBEAN	519,097	GAL	83183	GAL
PA	$3,382	BIODIESEL MECHANICAL	OILS-SOYBEAN	148,471	GAL	0	GAL
NC	$9,149	BIODIESEL MECHANICAL	OILS-WASTE VEGETABLE OIL; OILS-SOYBEAN; TOBACCO Sd.OIL	390,630	GAL	3651	GAL
AR	$20,085	BIODIESEL TRANSESTERIFICATION	ANIMAL FAT	881,644	GAL	0	GAL
KS	$11	BIODIESEL TRANSESTERIFICATION	ANIMAL FAT	500	GAL	0	GAL
TN	$2,812	BIODIESEL TRANSESTERIFICATION	ANIMAL FAT	32,425	GAL	35559	GAL
WI	$193,237	BIODIESEL TRANSESTERIFICATION	ANIMAL FAT	4,398,903	GAL	1963657	GAL
WI	$1,976	BIODIESEL TRANSESTERIFICATION	ANIMAL FAT	86,742	GAL	10153	GAL
CA	$2,000	BIODIESEL TRANSESTERIFICATION	ANIMAL FAT, OILS-WASTE VEGETABLE OIL; ANIMAL FAT	87,772	GAL	0	GAL
IL	$258,310	BIODIESEL TRANSESTERIFICATION	ANIMAL FAT; OILS-SOYBEAN	11,338,573	GAL	0	GAL
IA	$216,593	BIODIESEL TRANSESTERIFICATION	ANIMAL FAT; OILS-SOYBEAN; OILS-OTHER	9,507,597	GAL	0	GAL
CA	$55,106	BIODIESEL TRANSESTERIFICATION	Animal fat; oils-waste vegetable oil	2,418,887	GAL	0	GAL
ND	$385,062	BIODIESEL TRANSESTERIF	OILS-CANOLA	16,902,393	GAL	0	GAL

	Amt ($)			*Amt*		*Increase Amt*	
WA	$195,671	BIODIESEL TRANSESTERIFICAT	OILS-CANOLA	8,589,036	GAL	0	GAL
WI	$9,050	BIODIESEL TRANSESTERIFICAT	OILS-CANOLA	397,269	GAL	0	GAL
IA	$114,240	BIODIESEL TRANSESTERIFICAT	OILS-CANOLA; ANIMAL FAT; OILS-SOYBEAN; OILS-OTHER	5,014,686	GAL	0	GAL
OR	$643	BIODIESEL TRANSESTERIFICAT	OILS-CANOLA; OILS-WASTE VEGETABLE OIL	28,758	GAL	11584	GAL
IL	$273	BIODIESEL TRANSESTERIFICAT	OILS-GREASES	12,000	GAL	0	GAL
OR	$352	BIODIESEL TRANSESTERIFICAT	OILS-GREASES	15,454	GAL	0	GAL
IL	$239,740	BIODIESEL TRANSESTERIFICAT	OILS-GREASES; ANIMAL FAT; OILS-OTHER	10,523,447	GAL	30	GAL
AR	$544,786	BIODIESEL TRANSESTERIFICAT	OILS-OTHER	15,835,137	GAL	3526902	GAL
IA	$253,696	BIODIESEL TRANSESTERIFICAT	OILS-OTHER	11,136,279	GAL	0	GAL
WA	$10,662	BIODIESEL TRANSESTERIFICAT	OILS-OTHER	141,000	GAL	109293	GAL
OH	$924	BIODIESEL TRANSESTERIFICAT ION	OILS-OTHER; ANIMAL FAT; OILS-SOYBEAN; OILS-WASTE VEGETABLE OIL; OILS-PALM	40,559	GAL	0	GAL
WA	$8,013	BIODIESEL TRANSESTERIFICAT	OILS-OTHER; OILS-CANOLA	351,725	GAL	0	GAL
IA	$727,133	BIODIESEL TRANSESTERIFICAT	OILS-OTHER; OILS-CANOLA; OILS-SOYBEAN	9,228,222	GAL	0	GAL
WI	$6,150	BIODIESEL TRANSESTERIFICAT	OILS-OTHER; OILS-CANOLA; OILS-SOYBEAN	269,939	GAL	100000	GAL
IA	$13,962	BIODIESEL TRANSESTERIFICAT	OILS-OTHER; OILS-SOYBEAN	612,873	GAL	0	GAL
MO	$538,102	BIODIESEL TRANSESTERIFICAT	OILS-SOYBEAN	23,620,103	GAL	0	GAL
MO	$133,713	BIODIESEL TRANSESTERIFICAT	OILS-SOYBEAN	5,869,350	GAL	0	GAL
NE	$120,116	BIODIESEL TRANSESTERIFICAT	OILS-SOYBEAN	5,272,503	GAL	0	GAL

State	*Payment Amt ($)*	*Sub Category*	*Feedstock*	*Actual Base Amt*	*Unit*	*Actual Increase*	*Unit*

						Amt	
NE	$9,265	BIODIESEL TRANSESTERIFICAT	OILS-SOYBEAN	113,778	GAL	97632	GAL
AR	$316	BIODIESEL TRANSESTERIFICAT	OILS-SOYBEAN, OILSCOTTONSEED	13,865	GAL	0	GAL
GA	$531	BIODIESEL TRANSESTERIFICAT	OILS-SOYBEAN; ANIMAL FAT	23,100	GAL	0	GAL
MO	$13,748	BIODIESEL TRANSESTERIFICAT	OILS-SOYBEAN; animal fat	603,483	GAL	0	GAL
IL	$4,717	BIODIESEL TRANSESTERIFICAT	OILS-SOYBEAN; CORN ETHANOL	207,054	GAL	0	GAL
IA	$10,401	BIODIESEL TRANSESTERIFICAT	OILS-SOYBEAN; OILS-GREASES; ANIMAL FAT	456,574	GAL	0	GAL
IA	$9,742	BIODIESEL TRANSESTERIFICAT	OILS-SOYBEAN; OILS-OTHER	427,651	GAL	0	GAL
WI	$6,657	BIODIESEL TRANSESTERIFICAT	OILS-SOYBEAN; OILS-OTHER	292,208	GAL	42295	GAL
CA	$4,269	BIODIESEL TRANSESTERIF	OILS-WASTE VEGETABLE OIL	187,398	GAL	0	GAL
CA	$8,309	BIODIESEL TRANSESTERIFICAT	OILS-WASTE VEGETABLE OIL	290,322	GAL	24795	GAL
KS	$1,701	BIODIESEL TRANSESTERIFICAT	OILS-WASTE VEGETABLE OIL	74,657	GAL	0	GAL
KS	$5,281	BIODIESEL TRANSESTERIFICAT	OILS-WASTE VEGETABLE OIL	53,221	GAL	59532	GAL
OH	$1,700	BIODIESEL TRANSESTERIFICAT	OILS-WASTE VEGETABLE OIL; ANIMAL FAT; OILS-GREASES	74,612	GAL	0	GAL
IA	$298,476	BIODIESEL TRANSESTERIFICAT	OILS-WASTE VEGETABLE OIL; OILS-GREASES; ANIMAL FAT	13,101,670	GAL	0	GAL
WA	$197,244	BIODIESEL TRANSESTERIFICATION and GLYCERIN	OILS-WASTE VEGETABLE OIL, Glycerin, Oils-other, canola; animal fat, oils-soybean	4,756,252	GAL	2869848	GAL
MI	$1,372	GLYCERIN	GLYCERIN	166,251	GAL	658707	GAL
GA	$32,936	BIOGAS ANAEROBIC DIGESTER	ANIMAL FAT	187,942,900	CBC	0	CBC
WI	$10,519	BIOGAS ANAEROBIC DIGESTER	ANIMAL FAT; OILS-GREASES; WASTE/MANURE	57,532,631	CBC	1883158	CBC
FL	$0	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	600	KWH	898984	KWH
IL	$372	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	0		0	

State	Payment Amt ($)	Sub Category	Feedstock	Actual Base Amt	Unit	Actual Increase Amt	Unit
IN	$30,702	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	76,523,884	CBC	2676302	CBC
MI	$10,219	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	61,385,268	CBC	0	CBC
MN	$3,994	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	23,988,109	CBC	0	CBC
MN	$4,875	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	29,281,188	CBC	0	CBC
MT	$1,042	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	6,257,104	CBC	2534731	CBC
NY	$82,411	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	333,342,000	CBC	2.19E+08	CBC
OH	$2,028	BIOGAS ANAEROBIC	DAIRY WASTE/MANURE	3,383,787	KWH	2862	KWH
VT	$758	BIOGAS ANAEROBIC	DAIRY WASTE/MANURE	1,161,625	KWH	0	KWH
VT	$2,108	BIOGAS ANAEROBIC	DAIRY WASTE/MANURE	2,437,613	KWH	0	KWH
VT	$586	BIOGAS ANAEROBIC	DAIRY WASTE/MANURE	980,505	KWH	0	KWH
VT	$167	BIOGAS ANAEROBIC	DAIRY WASTE/MANURE	278,881	KWH	0	KWH
VT	$918	BIOGAS ANAEROBIC	DAIRY WASTE/MANURE	1,535,530	KWH	0	KWH
VT	$244	BIOGAS ANAEROBIC	DAIRY WASTE/MANURE	408,480	KWH	0	KWH
VT	$261	BIOGAS ANAEROBIC	DAIRY WASTE/MANURE	437,190	KWH	0	KWH
WA	$16,163	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	97,086,461	CBC	0	CBC
WI	$1,372	BIOGAS ANAEROBIC	DAIRY WASTE/MANURE	1,574,474	KWH	265572	KWH
WI	$341	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	570,000	KWH	0	KWH
WI	$5,734	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	3,381,913	KWH	2069026	KWH
WI	$6,892	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	1,294,281	KWH	0	KWH
WI	$383	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	640,593	KWH	42671	KWH
WI	$2,265	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	3,787,800	KWH	237400	KWH
WI	$2,046	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	3,421,358	KWH	0	KWH
WI	$1,719	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	1,717,180	KWH	385804	KWH
WI	$1,465	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	2,449,812	KWH	66588	KWH
WI	$11,535	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE; ANIMAL FAT; OILS-GREASES	69,288,421	CBC	0	CBC
WI	$11,636	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE; ANIMAL FAT; OILS-GREASES	69,895,789	CBC	0	CBC

State	Payment Amt ($)	Sub Category	Feedstock	Actual Base Amt	Unit	Actual Increase Amt	Unit
WA	$1,115	BIOGAS ANAEROBIC	DAIRY WASTE/FOOD PROCESSING	6,700,000	CBC	0	CBC
WA	$6,987	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE; FOOD PROCESSING WASTE	39,885,183	CBC	2015619	CBC
WA	$1,559	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE; FOOD PROCESSING WASTE	2,607,000	KWH	0	KWH
WI	$1,067	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE; WASTE FEED OILS-GREASES	1,784,378	KWH	0	KWH
OR	$736	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE;FOOD PROCESSING WASTE	4,417,970	MMC	0	MMC
MI	$794	BIOGAS ANAEROBIC	SWINE WASTE/MANURE	3,998,893	CBC	267153	CBC
NE	$173	BIOGAS ANAEROBIC	SWINE WASTE/MANURE	289,423	KWH	0	KWH
FL	$3	BIOGAS LANDFILL	MUNICIPAL WASTE	4,800	KWH	26527200	KWH
NY	$492	BIOGAS ANAEROBIC	DAIRY WASTE/MANURE	822,525	KWH	81675	KWH
NY	$126	BIOGAS ANAEROBIC	DAIRY WASTE/MANURE	211,220	KWH	7521	KWH
WI	$445	BIOGAS ANAEROBIC DIGESTER	DAIRY WASTE/MANURE	744,440	KWH	0	KWH
KS	$824,692	CELLULOSIC ETHANOL PROD	AGRICULTURAL CROP-SORGHUM	15,230,854	GAL	16623549	GAL
KS	$17,689	Ethanol from Waste Product	AGRICULTURAL WASTE	1,277,692	GAL	0	GAL
MN	$182,422	ETHANOL-NOT CORN KERNEL STARCH	AGRICULTURAL CROP-CORN; GLYCERIN	1	GAL	0	GAL
AZ	1,337,530	ETHANOL-NOT CORN KERNEL STARCH	AGRICULTURAL CROP-SORGHUM	2,728,731	GAL	31294874	GAL
KS	$663,271	ETHANOL-NOT CORN KERNEL STARCH	AGRICULTURAL CROP-SORGHUM	47,909,793	GAL	0	GAL
KS	$266,261	ETHANOL-NOT CORN KERNEL STARCH	AGRICULTURAL CROP-SORGHUM	19,232,749	GAL	0	GAL
KS	$34,501	ETHANOL-NOT CORN KERNEL STARCH	AGRICULTURAL CROP-SORGHUM	2,492,074	GAL	0	GAL
KS	$690,081	ETHANOL-NOT CORN KERNEL STARCH	AGRICULTURAL CROP-SORGHUM	39,209,026	GAL	3545779	GAL
KS	$104,104	ETHANOL-NOT CORN KERNEL STARCH	AGRICULTURAL CROP-SORGHUM	5,328,667	GAL	869363	GAL
KS	$150,398	ETHANOL-NOT CORN KERNEL STARCH	AGRICULTURAL CROP-SORGHUM	10,863,667	GAL	0	GAL
KS	$130,868	ETHANOL-NOT CORN KERNEL STARCH	AGRICULTURAL CROP-SORGHUM	279,838	GAL	3057690	GAL
KS	$848,999	ETHANOL-NOT CORN K STARCH	AGRICULTURAL CROP-SORGHUM	23,392,871	GAL	12644204	GAL

State	Payment Amt ($)	Sub Category	Feedstock	Actual Base Amt	Unit	Actual Increase Amt	Unit
NE	1,345,588	ETHANOL-NOT CORN KERNEL STARCH	AGRICULTURAL CROP-SORGHUM	203,265	GAL	33096707	GAL
TX	$432,306	ETHANOL-NOT CORN KERNEL STARCH	AGRICULTURAL CROP-SORGHUM	31,226,592	GAL	0	GAL
MN	$269,308	ETHANOL-NOT CORN KERNEL STARCH	ETHANOL-NOT CORN KERNEL STARCH; OILS-SOYBEAN; GLYCERIN	17,802,798	GAL	7611615	GAL
MN	$8,560	ETHANOL-NOT CORN KERNEL STARCH	GLYCERIN; TREES GROWN ENERGY/WOORD WASTE; ETHANOL-NOT CORN KERNAL STARCH	1	GAL	0	GAL
ME	$176,855	pellets	FIBERS	8,671	MTN	17625	MTN
ME	$231,292	pellets	FIBERS	49,761	MTN	11035	MTN
MO	$35,813	PELLETS FROM AG	GRASSES-SWITCHGRASS	14,192	MTN	720	MTN

ID	$203,769	WASTE PRODUCTS Wood Pellets	TREES GROWN ENERGY/WOOD WASTE	340,792,988	KWH	41767094	KWH

Total Production Amount (Gal) **340,865,612**
Total Payments ($) **14,711,362**

* - **CBC** (cubic feet) - ^ - **KWH** (kilowatt hours) ** **MTN** (metric tons)