Renewable Energy Programs and the Farm Bill: Status and Issues

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Summary

Title IX, the energy title of the 2008 farm bill (P.L. 110-240), contains the bioenergy programs administered by the U.S. Department of Agriculture (USDA). All of the major Title IX bioenergy programs expired at the end of FY2012 and lacked baseline funding going forward. The American Taxpayer Relief Act of 2012 (ATRA; P.L. 112-240) extends the 2008 farm bill through FY2013. However, all major bioenergy provisions of Title IX—with the exception of the Feedstock Flexibility Program for Bioenergy Producers—have no new mandatory funding in FY2013 under the ATRA farm bill extension. Although most of the bioenergy programs are reauthorized for FY2013, their mandatory funding expired at the end of FY2012. If policymakers want to continue these programs under either the 2008 farm bill extension or in the next farm bill, they will need to pay for the program with offsets.

USDA renewable energy programs have been used to incentivize research, development, and adoption of renewable energy projects, including solar, wind, and anaerobic digesters. However, the primary focus of USDA renewable energy programs has been to promote U.S. biofuels production and use—including corn starch-based ethanol, cellulosic ethanol, and soybean-based biodiesel.

An energy title first appeared in the 2002 farm bill, and was both extended and expanded by the 2008 farm bill (Food, Conservation, and Energy Act of 2008, P.L. 110-246). The 2008 farm bill energy title (Title IX) significantly expanded the number and types of programs available to support renewable energy production and use. In addition, new renewable-energy provisions were included in the rural development (Title VI), research (Title VII), livestock (Title XI), and tax (Title XV) titles of the 2008 farm bill. The 2008 farm bill authorized slightly over $1 billion in mandatory funding for energy programs for FY2008 through FY2012, compared with $800 million in the 2002 farm bill (FY2002-FY2007). Discretionary funding in the 2008 farm bill totaled $1.7 billion, up sharply from $245 million in the 2002 farm bill. However, all discretionary program funding is subject to the annual appropriations process, which may or may not appropriate funds due to budget constraints. Actual discretionary appropriations to Title IX energy programs have been substantially below authorized levels through FY2012.

Corn starch-based ethanol dominates the U.S. biofuels industry. However, in response to growing concerns about the emerging spillover effects of increasing corn use for ethanol production, the 2008 farm bill attempted to refocus U.S. biofuels policy initiatives in favor of non-corn feedstocks; the most critical program to this end is the Biomass Crop Assistance Program (BCAP), which assists farmers in developing nontraditional crops for use as feedstocks for the eventual production of cellulosic ethanol or other second-generation biofuels.

The primary energy-related issue for the next farm bill is the expiration at the end of FY2012 and lack of baseline funding going forward for all major energy-related provisions of Title IX. In addition, the appearance of substantial redundancy across renewable energy programs at USDA and DOE, the slow development of the U.S. cellulosic biofuels sector, and continued concerns about spillover effects of corn use for ethanol production are issues that are likely to emerge during the next farm bill debate.

This report focuses both on those policies contained in the 2008 farm bill that support agriculture-based renewable energy, especially biofuels, and on the outlook for bioenergy programs in the next farm bill.

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ARRA	American Recovery and Reinvestment Act of 2009 (P.L. 111-5)
ATRA	American Taxpayer Relief Act of 2012 (P.L. 112-240)
BAP	Biorefinery Assistance Program
BCAP	Biomass Crop Assistance Program
BRDB	Biomass Research and Development Board
BRDI	Biomass Research and Development Initiative
CCC	Commodity Credit Corporation
CHST	Collection, Harvest, Storage, and Transportation
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EEI	Energy Efficiency Improvement
EERE	Office of Energy Efficiency & Renewable Energy, DOE
EISA	Energy Independence and Security Act of 2007 (P.L. 110-140)
EPA	U.S. Environmental Protection Agency
FFP	Flexible Feedstock Program
FR	Federal Register
NIFA	National Institute of Food and Agriculture
NOCP	Notice of Contract Proposal
NOFA	Notice of Funds Available
NOSA	Notice of Solicitation of Applications
OCE	Office of the Chief Economist, USDA
OEPNU	Office of Energy Policy and New Uses, OCE, USDA
RAP	Repowering Assistance Program
RBCS	Rural Business and Cooperative Service, RDA, USDA
RDA	Rural Development Agency, USDA
REAP	Rural Energy for America Program
REDA	Renewable Energy Development Assistance
RES	Renewable Energy Systems
RFS	Renewable Fuel Standard
USDA	U.S. Department of Agriculture
VEETC	Volumetric Ethanol Excise Tax Credit

Overview

Agriculture-based renewable energy can take several forms, including biofuels such as corn-based ethanol or soy-based biodiesel, wind-driven turbines located on farmland or in rural areas, anaerobic digesters that convert animal waste into methane and electric power, or biomass harvested for burning as a processing fuel or to generate heat as part of an industrial activity.

Since the late 1970s, U.S. policymakers at both the federal and state levels have adopted a variety of incentives, regulations, and programs to encourage the production and use of agriculture-based renewable energy (mostly biofuels).[1] In particular, the two most widely used biofuels—ethanol produced primarily from corn starch and biodiesel produced primarily from soybean oil—have received significant federal support in the form of tax incentives, loans and grants, and regulatory programs.[2] By early 2008, just prior to the 2008 farm bill (the Food, Conservation, and Energy Act of 2008; P.L. 110-246), total direct federal biofuels subsidies were estimated at nearly $5.5 billion per year.[3] By 2010, federal biofuels subsidies surpassed $7 billion. Motivations cited for these legislative initiatives included energy security concerns, reduction of greenhouse gas emissions, and raising domestic demand for U.S.-produced farm products.

This report focuses both on those policies contained in the 2008 farm bill—and as extended by §701 of the American Taxpayer Relief Act of 2012 (ATRA; P.L. 112-240)—that support agriculture-based renewable energy, especially biofuels, and on the outlook for bioenergy programs in the next farm bill. The introductory sections of this report briefly describe how USDA bioenergy policies evolved and how they fit into the larger context of U.S. biofuels policy. Then, each of the bioenergy provisions of the 2008 farm bill are defined in terms of their function, goals, administration, funding, and implementation status. Finally, a section reviews the outlook for bioenergy programs in the next farm bill, as well as the major emerging issues related to U.S. Department of Agriculture (USDA) energy programs.

Two tables at the end of this report present data on 2008 farm bill energy provision funding—the budgetary authority (**Table 1**), and the funding authority with the actual funding available for FY2008 through FY2012 (**Table 2**). A third table (**Table 3**) presents proposed bioenergy program funding for FY2013-FY2017 under farm bill legislation of the 112th Congress—the Senate-passed bill (S. 3240) and the House Agriculture Committee-reported measure (H.R. 6083).

For a side-by-side comparison of energy-related provisions in the 2008 farm bill with those of the 2002 farm bill (the Farm Security and Rural Investment Act of 2002; P.L. 107-171), see CRS Report RL34130, *Renewable Energy Programs in the 2008 Farm Bill*. For a side-by-side comparison of energy-related provisions in the 2008 farm bill with those of the 2007 energy bill (the Energy Independence and Security Act of 2007, P.L. 110-140), see CRS Report RL34239, *Biofuels Provisions in the 2007 Energy Bill and the 2008 Farm Bill: A Side-by-Side Comparison*. Finally, for a side-by-side comparison of energy-related provisions in farm bill legislation of the

[1] For a list of federal incentives in support of biofuels production, see CRS Report R42566, *Alternative Fuel and Advanced Vehicle Technology Incentives: A Summary of Federal Programs*.

[2] See CRS Report R41282, *Agriculture-Based Biofuels: Overview and Emerging Issues*.

[3] CRS estimates based on ethanol production data, tax incentives, and congressional appropriations. These estimates do not account for the implicit subsidy inherent in biofuels import tariffs.

112th Congress with current law, see CRS Report R42552, *The 2012 Farm Bill: A Comparison of Senate-Passed S. 3240 and the House Agriculture Committee's H.R. 6083 with Current Law.*

Origins of Federal Biofuels Policy

Renewable energy production plays a key role not just in agricultural policy, but also in energy, tax, and environmental policy. As a result, many of the federal programs that support renewable energy production in general, and agriculture-based energy production in particular, are outside the purview of USDA and have origins outside of omnibus farm bill legislation. For example, the three principal federal biofuels policies of the past decade were all established outside of farm bills as follows.

- The Renewable Fuel Standard (RFS) mandates an increasing volume of biofuels use and has its origins in the Energy Policy Act of 2005 (P.L. 109-58). The RFS was expanded in the Energy Independence and Security Act of 2007 (EISA; P.L. 110-140) and divided into four distinct, but nested categories—biodiesel, cellulosic, advanced, and total—each with its own mandated volume.[4]
- The volumetric ethanol excise tax credit (VEETC), originally established in the American Jobs Creation Act of 2004 (P.L. 108-357), provided a tax credit that varied in value over the years, but was last at $0.45 per gallon of pure ethanol blended with gasoline when it expired on December 31, 2011.[5]
- The ethanol import tariff (a most-favored-nation duty of $0.54 per gallon) was intended to offset the blending tax credit and was originally established by the Omnibus Reconciliation Act of 1980 (P.L. 96-499). The ethanol import tariff also expired on December 31, 2011.[6]

In addition to the RFS, VEETC, and import tariff, several other tax credits that originated outside of farm bills were available for biodiesel production as well as for small producers (less than 60 million gallons per year per plant) of ethanol and biodiesel.[7] A substantial number of federal programs also support renewable energy sources other than biofuels.[8] In addition to federal programs, many states offer additional support to biofuels producers, blenders, and consumers.[9]

An awareness of the non-USDA federal programs is important for appreciating the role envisioned for the energy title of the 2008 farm bill, which is designed to provide incentives for the research and development of new agriculture-based renewable fuels, especially second-

[4] See CRS Report R40155, *Renewable Fuel Standard (RFS): Overview and Issues*.

[5] For more information, see CRS Report R41282, *Agriculture-Based Biofuels: Overview and Emerging Issues*.

[6] For the origins and history of the import duty, see CRS Report R42566, *Alternative Fuel and Advanced Vehicle Technology Incentives: A Summary of Federal Programs*; for a discussion of exemptions from the import duty, see CRS Report RS21930, *Ethanol Imports and the Caribbean Basin Initiative (CBI)*.

[7] Most of these tax credits have expired, with the exception of the biodiesel and cellulosic biofuels tax credits. See CRS Report R42566, *Alternative Fuel and Advanced Vehicle Technology Incentives: A Summary of Federal Programs*.

[8] For a complete listing of federal programs that support all types of renewable energy, see CRS Report R40913, *Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs*.

[9] For information on state programs, see "Database of State Incentives for Renewables & Efficiency (DSIRE)," at http://www.dsireusa.org/index.cfm.

generation biofuels (based on non-food crop biomass such as cellulose and algae), and to expand their distribution and use.

First Farm Bill Energy Title—2002

The 2002 farm bill (Farm Security and Rural Investment Act of 2002, P.L. 107-171) was the first omnibus farm bill to explicitly include an energy title (Title IX). The energy title authorized grants, loans, and loan guarantees to foster research on agriculture-based renewable energy, to share development risk and to promote the adoption of renewable energy systems.[10] Since enactment of the 2002 farm bill, interest in renewable energy has grown rapidly, due in large part to a strong rise in domestic and international petroleum prices and a dramatic acceleration in domestic biofuels production (primarily corn-based ethanol).

2008 Farm Bill Focus on Non-Corn-Based Biofuels

Annual U.S. ethanol production has expanded rapidly since 2001, rising from under 2 billion gallons to nearly 14 billion gallons in 2011.[11] Similarly, corn use for ethanol has grown from a 7% share of the U.S. corn crop in 2001, to an estimated 41% share of the 2011 corn crop.[12] In 2007 (during the 2008 farm bill debate), about 23% of the U.S. corn crop was used for ethanol and projections had ethanol's corn-use share rising rapidly, sparking concerns about unintended consequences of the policy-driven expansion of U.S. corn ethanol production. Dedicating an increasing share of the U.S. corn harvest to ethanol production evoked fears of higher prices for all grains and oilseeds that compete for the same land, higher livestock feed costs, higher food costs, and lower U.S. agricultural exports. In addition, several environmental concerns emerged regarding the expansion of corn production onto non-traditional lands, including native grass and prairie land. As a result of these concerns, policymakers sought to refocus biofuels policy initiatives in the 2008 farm bill (the Food, Conservation, and Energy Act of 2008, P.L. 110-246) in favor of non-corn feedstock, especially cellulosic-based feedstock.

Renewable energy policy in the 2008 farm bill became law six months after the enactment of the Energy Independence and Security Act of 2007 (EISA, P.L. 110-140). A key component of EISA was a significant expansion of the renewable fuels standard (RFS), which mandates the increasing use of "advanced biofuels" (i.e., non-corn starch biofuels), whose minimum use must grow from zero in 2008 to 21 million gallons by 2022.[13] The energy provisions of the 2008 farm bill were intended to reinforce EISA's program goals via a further refocusing of federal incentives toward non-corn sources of renewable energy.

Key biofuels-related provisions in the enacted 2008 farm bill include:[14]

- expansion of the existing bio-based marketing program to encourage federal procurement of bio-based products (§9002);

[10] For an overview of the 2002 farm bill's energy title, see CRS Report RL33037, *Previewing a 2007 Farm Bill*.

[11] For a discussion of the rapid growth of the U.S. biofuels sector, see CRS Report R41282, *Agriculture-Based Biofuels: Overview and Emerging Issues*.

[12] USDA, *World Agricultural Supply and Demand Estimates (WASDE) Report*, January 11, 2013.

[13] See CRS Report R40155, *Renewable Fuel Standard (RFS): Overview and Issues*.

[14] Parenthetic section numbers 9002 through 9011 refer to the amended 2002 farm bill sections.

- expansion of the federal bio-products certification program (§9002);
- additional support for biorefinery development (§9003);
- grants and loan guarantees for advanced biofuels (especially cellulosic) production (§9005);
- an education program to promote the use and understanding of biodiesel (§9006);
- support for rural energy efficiency and self-sufficiency and biofuels marketing infrastructure (§9007);
- reauthorization of biofuels research programs (§9008) within USDA and the Department of Energy (DOE);
- a new program to incentivize the production, harvesting, storage, and transportation of cellulosic ethanol feedstock (§9011);
- reauthorization of Sun Grant Initiative programs that coordinate research on advanced biofuels at land-grant universities and federally funded laboratories (§7526);
- establishment of a new cellulosic ethanol production tax credit (§15321);
- reduction of the blender tax credit for corn-based ethanol (§15331);
- studies of the market and environmental impacts of increased biofuels use (§15322); and
- continuation of the duty on imported ethanol (§15333).

Funding for Agriculture-Based Energy Programs

In general, two types of funding are authorized by Congress in a farm bill—mandatory and discretionary. Some farm bill programs identified as receiving mandatory funds (including most of the bioenergy programs) are automatically funded at levels "authorized" in the farm bill unless Congress limits funding to a lower amount through the appropriations or legislative process. For many of these programs, mandatory funding is provided through the borrowing authority of USDA's Commodity Credit Corporation (CCC).[15] The farm bill may also specify a certain funding amount as "authorized to be appropriated" for discretionary program; however, actual discretionary funding is determined each year through the annual appropriations process.

Funding Under the 2008 Farm Bill for FY2008-FY2012

The 2008 farm bill authorized slightly over $1 billion in mandatory funding for Title IX energy programs for FY2008 through FY2012 (**Table 1**), compared with $800 million in the 2002 farm bill (FY2002-FY2007). Mandatory authorizations in the 2008 farm bill included $320 million to the Biorefinery Assistance Program, $300 million to the Bioenergy Program for Advanced Biofuels, and $255 million to the Rural Energy for America Program (REAP). The Biomass Crop

[15] The CCC is the funding mechanism for the mandatory payments that are administered by various agencies of USDA, including all of the farm commodity price and income support programs and selected conservation programs. For more information on mandatory versus discretionary authorizations, see CRS Report R41964, *Agriculture and Related Agencies: FY2012 Appropriations*.

Assistance Program (BCAP) was authorized to receive such sums as necessary (i.e., funding is open-ended and depends on program participation); however, limits were set on BCAP outlays under the annual appropriations process in FY2010, FY2011, and FY2012.[16]

Discretionary funding for Title IX programs in the 2008 farm bill totaled $1.1 billion (**Table 1**), including $600 million for the Biorefinery Assistance Program, compared to $245 million in the 2002 farm bill. However, actual discretionary appropriations to Title IX energy programs have been substantially below authorized levels at $106 million through FY2012.

Since the enactment of the 2008 farm bill, the renewable energy programs authorized under the energy title have invested more than $750 million in biorefineries and renewable energy and energy efficiency systems, via mandatory funding for grants, loan guarantees, and assistance payments.[17] In addition, nearly $900 million was spent on BCAP through FY2012. Both mandatory and discretionary funding allocations for FY2008-FY2012 are described in the section below on major energy provisions in the 2008 farm bill.

Table 1, at the end of the report, illustrates the mandatory and discretionary spending levels for renewable energy programs authorized in the 2008 farm bill. **Table 2**, also at the end of the report, provides a list of provisions in the 2008 farm bill's energy title, and selected energy programs in the research title, for FY2008 through FY2012, along with their funding as authorized in the 2008 farm bill and as provided under budget authority by Congress.

Funding Under the FY2013 Continuing Resolution

The 112th Congress was unable to pass any of the regular FY2013 appropriations bills during 2012. Instead, a continuing resolution for FY2013 was signed into law on September 28, 2012 (P.L. 112-175).[18] The CR for FY2013 covers all 12 regular appropriations bills, including Agriculture, by providing budget authority for projects and activities that had been funded in FY2012 by P.L. 112-55, P.L. 112-74, and P.L. 112-77, with specified exceptions. Funding in the CR is effective October 1, 2012, through March 27, 2013, a duration of nearly the first six months of the fiscal year.

As concerns discretionary funding for FY2013, budget authority for projects and activities funded under the CR is provided at the rate that they were funded in FY2012. The Rural Energy for America Program (REAP; Section 9007) was the sole Title IX bioenergy program that received an appropriation of discretionary funds ($3.4 million) in FY2012.

Funding Under the 2008 Farm Bill Extension

Many of the provisions of the 2008 farm bill expired on September 30, 2012, including all of the bioenergy provisions in Title IX with the exception of the Feedstock Flexibility Program for Bioenergy Producers (Section 9010).[19] However, §701 of the American Taxpayer Relief Act of 2012 (ATRA; P.L. 112-240)—signed into law by President Obama on January 2, 2013—extends

[16] See CRS Report *Biomass Crop Assistance Program (BCAP): Status and Issues*.

[17] CRS estimates based on USDA program outlay data.

[18] See CRS Report R42782, *FY2013 Continuing Resolution: Analysis of Components and Congressional Action*.

[19] For more information, see CRS Report R42442, *Expiration and Extension of the 2008 Farm Bill*.

the 2008 farm bill until September 30, 2013, or, in the case of the farm commodity programs that are on a different calendar, through crop year 2013.[20]

All of the bioenergy provisions of Title IX—with the exception of Section 9010, the Feedstock Flexibility Program for Bioenergy Producers, which is authorized indefinitely—have mandatory funding only for the life of the 2008 farm bill, FY2008 through FY2012. As a result, they do not have a budgetary baseline beyond FY2012.[21] If policymakers want to continue these programs under either the 2008 farm bill extension or in the next farm bill, they will need to pay for the programs with offsets.

Funding for the next farm bill will be based on the baseline projection of the cost of the 2008 farm bill programs by the Congressional Budget Office (CBO), and on varying budgetary assumptions about whether programs will continue. Because of the current tight budget situation, it seems highly unlikely that any new money will be available to fund new or expiring programs. Therefore, the most likely way that any expiring energy programs can survive is to offset their projected costs with reductions in other mandatory programs or from other cost savings.[22]

Major Energy Provisions in the 2008 Farm Bill

Like the 2002 farm bill, the 2008 farm bill (P.L. 110-246) contained a distinct energy title (Title IX) that significantly expanded the number and type of programs available to support biofuels production and use—including corn starch-based ethanol, cellulosic ethanol, and biodiesel.[23] The enacted 2008 farm bill's Title IX served as a substitute amendment to the 2002 farm bill Title IX and consisted of three sections. The first section, 9001, contained 13 new provisions that effectively replaced the provisions of the 2002 bill. Sections 9002 and 9003 directed studies and reports on biofuels infrastructure and renewable fertilizer, respectively. Research provisions relating to renewable energy were in Title VII and tax and trade provisions were in Title XV. In addition, Title VI (Rural Development) included several programs to facilitate rural renewable energy production and development. Relevant changes to any bioenergy provisions of the 2008 farm bill made under ATRA (P.L. 112-240) are included.

Title IX—Energy Provisions

The following is a summary of the authorities found under Section 9001 in Title IX of the 2008 farm bill, including (where applicable) a brief description of each program, funding levels, and the status of program implementation. Section numbers 9001 through 9013 refer to the amended 2002 farm bill sections.

[20] A crop year refers to the year in which a commodity is harvested.

[21] See CRS Report R41433, *Expiring Farm Bill Programs Without a Budget Baseline*.

[22] See CRS Report R41157, *The Statutory Pay-As-You-Go Act of 2010: Summary and Legislative History*.

[23] For a side-by-side comparison of previous law with the energy provisions of the 2008 farm bill, see CRS Report RL34130, *Renewable Energy Programs in the 2008 Farm Bill*.

Section 9001: Definitions

As part of its effort to refocus federal biofuels incentives away from traditional food and feed crops, the 2008 farm bill explicitly created new definitions or added more specificity to the definition of several essential terms related to renewable energy (7 U.S.C. §8101), including

- **"advanced biofuels"—**fuel derived from renewable biomass other than corn kernel starch, including ethanol derived from other plant starches (e.g., sorghum, sugar, as well as cellulosic biomass or organic waste), organically derived biogas, butanol or other alcohols, and biodiesel;
- **"biobased product"—**a commercial or industrial product (other than food or feed), or an intermediate ingredient in such a product, that is composed, in whole or in significant part, of biological products;
- **"biomass conversion facility"—**a facility that converts renewable biomass into heat, power, biobased products, or advanced biofuels; and
- **"renewable biomass"—**any organic matter available on a renewable or recurring basis from nonfederal land except under very strict conditions.[24]

Section 9002: Biobased Markets Program

Function: The 2008 farm bill renamed the federal biobased products procurement preference program as the Biobased Markets Program. It requires federal agencies to establish a program with specifications for procuring biobased products including a national registry of biobased testing centers, and authorizes a voluntary labeling program under which producers of biobased products may use the label "USDA Certified Biobased Product." (7 U.S.C. §8102)

Under the Biobased Markets Program, federal agencies and their contractors are required to purchase biobased products when the cumulative purchase price of procurement is more than $10,000 or when the quantities of functionally equivalent items purchased over the preceding fiscal year equaled $10,000 or more. Each federal agency and contractor must procure biobased products at the highest content levels within each product category unless the agency determines that the items are not reasonably available, fail to meet applicable performance standards, or are available only at an unreasonable price.

Administered by: Office of Energy Policy and New Uses (OEPNU), Office of the Chief Economist (OCE), USDA.[25]

Funding: Mandatory Commodity Credit Corporation (CCC) funding of $9 million was authorized—including $1 million for FY2008 and $2 million for each of FY2009-FY2012—for biobased products testing and labeling. Discretionary funding of $2 million was authorized to be appropriated for each of FY2009-FY2012; however, no discretionary funding has been appropriated for the Biobased Markets Program through FY2012. The FY2012 Agriculture appropriations act (P.L. 112-55) did not make any funding cuts to the Biobased Markets Program. As a result, mandatory funding of $2 million was available in FY2012. Under ATRA, no new

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[24] For a discussion of issues related to discrepancies in the federal definition of "renewable biomass," see CRS Report R40529, *Biomass: Comparison of Definitions in Legislation Through the 112th Congress*.

[25] The official USDA biobased markets program website is at http://www.biopreferred.gov/.

mandatory funding was included for the Biobased Markets Program; however, discretionary funding of $2 million was authorized to be appropriated for FY2013.

Implementation Status: The Biobased Markets Program was originally established under the 2002 farm bill as a federal procurement preference program that required federal agencies to purchase biobased products under certain conditions. USDA refers to the program as the BioPreferred® Program.[26] The final guidelines for the federal preferred procurement program were published on January 11, 2005 (70 *Fed. Reg.* 1792).[27] In addition to program guidelines, through November 19, 2012, USDA has promulgated nine rounds of regulations for the BioPreferred® Program, designating 77 categories, with over 10,000 products qualifying for preferred federal procurement.[28]

The final rule for the voluntary labeling program for biobased products was published on January 20, 2011 (76 *Fed. Reg.* 3790).

Section 9003: Biorefinery Assistance Program (BAP)

Function: The Biorefinery Assistance Program (BAP) assists in the development of new and emerging technologies for advanced biofuels.[29] BAP provides competitive grants and loan guarantees for construction and/or retrofitting of demonstration-scale biorefineries to demonstrate the commercial viability of one or more processes for converting renewable biomass to advanced biofuels. Biorefinery grants can provide for up to 30% of total project costs. Each loan guarantee is limited to $250 million or 80% of project cost. (7 U.S.C. §8103)

Administered by: Rural Business and Cooperative Service, Rural Development Agency (RDA), USDA, in consultation with DOE.

Funding: Mandatory CCC funding of $75 million in FY2009 and $245 million in FY2010 (to remain available until expended) was authorized for loan guarantees. Discretionary funding of $150 million annually was authorized for FY2009-FY2012 for grants. No discretionary funding has been appropriated for BAP through FY2012. The FY2012 Agriculture appropriations act (P.L. 112-55) did not make any funding cuts to BAP. As a result, any mandatory funding unspent from the FY2010 allocation of $245 million remains available through FY2013 under the ATRA farm bill extension. Under ATRA, no new mandatory funding was included for BAP; however, discretionary funding of $150 million was authorized to be appropriated for FY2013.

Implementation Status: BAP was newly established under the 2008 farm bill. Mandatory funds are used for the loan guarantee portion of BAP whereas discretionary appropriations are to be used to fund grants. However, since Congress has not appropriated any discretionary funds for BAP during the life of the 2008 farm bill, USDA has only moved forward with the loan guarantee

[26] OEPNU, OCE, USDA, *Metrics To Support Informed Decision Making for Consumers of Biobased Products*, by Marvin Duncan, Barbara C. Lippiatt, Zia Haq, Michael Wang, and Roger Conway, AIB No. 803, October 2008.

[27] This is an abridged citation for *Federal Register,* vol. 70, no. 7, pp. 1792-1812. This abridged format will be used throughout this report.

[28] Available at http://www.biopreferred.gov/ProductCategories.aspx.

[29] For more program information, see "Biorefinery Assistance Program," Business and Cooperative Programs (BCP), Rural Development (RD), USDA, at http://www.rurdev.usda.gov/BCP_Biorefinery.html.

portion of BAP. The final rule for the BAP's guaranteed loans was published on February 14, 2011 (76 *Fed. Reg.* 8404). A correction was published on January 24, 2012 (77 *Fed. Reg.* 3379).

For loan guarantees, project lenders (not prospective borrowers) must submit the application.[30] Each loan guarantee application undergoes at least three rounds of review within USDA (including review by the Rural Development Agency, the National Renewable Energy Laboratory (NREL), and the Office of the Chief Economist (OCE)). Average processing time per application is about nine months. Application fees include both a guarantee fee and an annual renewal fee.

On November 20, 2008, a notice of funds available (NOFA) for $75 million to support guaranteed loans under BAP in FY2009 was published (75 *Fed. Reg.* 70544). During FY2009, three projects were selected for BAP loan guarantees involving $159 million in total approved leverage.[31] However, one project was dropped due to ineligibility (a biodiesel retrofit project in Minnesota), leaving $134 million in approved coverage.

On May 6, 2010, a NOFA for $150 million to support guaranteed loans under BAP in FY2010 was published (75 *Fed. Reg.* 25076). An additional four projects were selected during FY2010 with an approved value of $255 million. Of the six current projects, four are cellulosic biofuel plants, one is an anaerobic digester, and one is an algae-to-diesel or jet fuel project.

On March 11, 2011, a NOFA for $129 million to support guaranteed loans under BAP in FY2011 was published (76 *Fed. Reg.* 13351) requesting applications for funding support be received by May 10, 2011. On June 6, 2011, an extension of the NOFA applications deadline to July 6, 2011, was published (76 *Fed. Reg.* 32355). As of the closing date for applications (July 6, 2011), USDA had received 13 applications valued at $1.3 billion in requested funding.

On January 27, 2012, a NOFA announcing that no new funding would be available to support guaranteed loans under BAP in FY2012 was published (77 *Fed. Reg.* 4276).

Section 9004: Repowering Assistance Program (RAP)

Function: The Repowering Assistance Program (RAP) makes payments to eligible biorefineries (those in existence on the date of enactment of the 2008 farm bill, June 18, 2008) to encourage the use of renewable biomass as a replacement for fossil fuels used to provide heat for processing or power in the operation of these eligible biorefineries.[32] Not more than 5% of the funds shall be made available to eligible producers with a refining capacity exceeding 150 million gallons of advanced biofuel per year. (7 U.S.C. §8104)

Administered by: Rural Business and Cooperative Service, RD, USDA.

Funding: Mandatory CCC funding of $35 million for FY2009 was authorized, to remain available until expended. Discretionary funding of $15 million annually for FY2009-FY2012 was authorized to be appropriated; however, only $15 million in FY2010 has been appropriated

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[30] More information on the BAP loan guarantee applications is available at http://www.rurdev.usda.gov/SupportDocuments/BCP_9003_ApplicationGuide0311.doc.

[31] Based on information received by CRS from Kelly Oehler, Branch Chief, Energy Division, RD, USDA.

[32] For more program information, see "Section 9004: Repowering Assistance Program," BCP, RD, USDA, at http://www.rurdev.usda.gov/BCP_RepoweringAssistance.html.

through FY2012. The FY2012 Agriculture appropriations act (P.L. 112-55) did not make any cuts to mandatory funding for RAP. As a result, any mandatory funding unspent from the FY2009 allocation of $35 million remains available through FY2013 under the ATRA farm bill extension. Under ATRA, no new mandatory funding was included for RAP; however, discretionary funding of $15 million was authorized to be appropriated for FY2013.

Implementation Status: RAP was originally established under the 2002 farm bill as a grant program to help finance the cost of developing and constructing biorefineries and biofuels production plants to carry out projects to demonstrate the commercial viability of converting biomass to fuels or chemicals. The 2008 farm bill altered RAP's orientation to focus on converting fossil fuel burning plants to biomass or some other renewable fuel source for processing energy.

The proposed rule for the Repowering Assistance Program was published on April 16, 2010 (75 *Fed. Reg.* 20073). After a comment period and subsequent modifications, an interim rule was published on February 11, 2011 (76 *Fed. Reg.* 7916). Individual project awards are limited to $5 million or 50% of total eligible project costs, whichever is less.

USDA has published four NOFAs announcing funding under RAP to support eligible plants in respective fiscal years: $20 million for FY2009 (June 12, 2009, 74 *Fed. Reg.* 28009); $8 million for FY2010 (May 6, 2010, 75 *Fed. Reg.* 24873); $25 million for FY2011 (March 11, 2011, 76 *Fed. Reg.* 13349); and $25 million for FY2012 (February 2, 2012, 77 *Fed. Reg.* 5232).

Section 9005: Bioenergy Program for Advanced Biofuels

Function: The 2008 farm bill established a new Bioenergy Program for Advanced Biofuels to support and expand production of advanced biofuels—that is, fuel derived from renewable biomass other than corn kernel starch—by entering into contracts with advanced biofuel producers to pay them for production of eligible advanced biofuels.[33] The policy goal is to create long-term, sustained increases in advanced biofuels production. (7 U.S.C. §8105)

Administered by: Rural Business and Cooperative Service, RD, USDA.

Funding: Mandatory CCC funding of $55 million for 2009, $55 million for FY2010, $85 million for FY2011, and $105 million for FY2012 was authorized to remain available until expended. Discretionary funding of $25 million annually for FY2009-FY2012 was authorized to be appropriated; however, no discretionary funding has been appropriated through FY2012. In the final FY2012 Agriculture appropriations act (P.L. 112-55), mandatory spending was limited to $65 million. Under ATRA, no new mandatory funding was included for the Bioenergy Program for Advanced Biofuels; however, discretionary funding of $25 million was authorized to be appropriated for FY2013.

Implementation Status: Originally created by a 1999 executive order during the Clinton Administration, the bioenergy program provided mandatory CCC incentive payments to biofuels producers based on year-to-year increases in the quantity of biofuel produced. Under the 2002

[33] For more program information, see "Section 9005: Bioenergy Program for Advanced Biofuels," BCP, RD, USDA, at http://www.rurdev.usda.gov/BCP_Biofuels.html.

farm bill, mandatory CCC funding of $150 million was available for each of FY2002 through FY2006; however, no funding was authorized for FY2007, effectively terminating the program.

The 2008 farm bill's Section 9005 revived the bioenergy program but refocused its funding to non-corn-starch biomass sources. Producers of advanced biofuels enter into contracts with USDA to receive payments based on the quantity and duration of production of advanced biofuels, the net renewable energy content of the biofuel, and other factors. Only one producer per refinery is eligible to apply. The interim rule for the Bioenergy Program for Advanced Biofuels was published on February 11, 2011 (76 *Fed. Reg.* 7936).

Producers must submit records to document their production of advanced biofuels. Payments will be made in two tiers. The first tier is based on actual production, while the second tier is based on incremental increases in production as an incentive to expand annual production on a sustained basis. Program funding is to be distributed according to the two tiers: in FY2010 the first tier receives 80% of available funds and the second tier receives 20%; in FY2011 the first tier receives 70%, the second tier 30%; in FY2012 the first tier receives 60%, the second tier 40%; in FY2013 and beyond, each tier receives 50%. Payments are capped per recipient to ensure equitable distribution. Not more than 5% of the funds in any year can go to facilities with total refining capacity exceeding 150 million gallons per year. Solid advanced biofuels produced from forest biomass are ineligible for the second tier incremental payment and may not receive more than 5% of annual program funds.

USDA has made several notice of contract proposals (NOCPs) to make payments to biorefineries for the production of advanced biofuels under the Bioenergy Program for Advanced Biofuels:

- initial FY2009 awards of $30 million (June 12, 2009, 74 *Fed. Reg.* 27998);
- additional FY2009 awards of the remainder of $30 million less the $14.5 million awarded through early March 2010 (March 12, 2010, 75 *Fed. Reg.* 11836);
- FY2010 awards of $40 million (May 6, 2010, 75 *Fed. Reg.* 24865);[34]
- a second FY2010 award announcement of $80 million that superseded the May 6, 2010, NOCP (Feb. 11, 2011, 76 *Fed. Reg.* 7966), and
- FY2011 awards of $85 million (March 11, 2011, 76 *Fed. Reg.* 13345).
- On February 2, 2012, USDA announced the availability of up to $25 million to make payments to advanced biofuel producers for the production of eligible advanced biofuels in FY2012 (77 *Fed. Reg.* 5229). USDA also announced that, although the 2008 farm bill provided $105 million in mandatory funding to support payments for advanced biofuels projects in FY2012, the FY2012 Appropriations Act imposed a limitation of $65 million that can be used for this program in FY2012. As a result, approximately $40 million of mandatory funding would be used to pay producers for FY2011 fourth quarter and other incremental payments.

Through July 20, 2011, almost $30 million in assistance payments have been provided to 141 advanced biofuel producers.[35] On July 27, 2012, USDA announced additional payments under the

[34] The first FY2010 NCOPO was cancelled due to rural location and citizenship requirements. These requirements were removed in the interim rule of Feb. 11, 2011.

Bioenergy Program for Advanced Biofuels of $19.4 million to 125 advanced biofuel producers from across the country.[36]

Section 9006: Biodiesel Fuel Education Program

Function: The Biodiesel Fuel Education Program awards competitive grants to nonprofit organizations that educate governmental and private entities operating vehicle fleets, and educates the public about the benefits of biodiesel fuel use. (7 U.S.C. §8106)

Administered by: National Institute of Food and Agriculture (NIFA) and OEPNU, OCE, USDA.

Funding: Mandatory CCC funds of $1 million are provided annually for FY2008-FY2012. The FY2012 Agriculture appropriations act (P.L. 112-55) did not make any cuts to mandatory funding for the Biodiesel Fuel Education Program. Under ATRA, no new mandatory funding was included for the Biodiesel Fuel Education Program; however, discretionary funding of $1 million was authorized to be appropriated for FY2013.

Implementation Status: Originally established under the 2002 farm bill, the Biodiesel Fuel Education Program was extended through FY2012 in the 2008 farm bill. The program is implemented by USDA through continuation grants. The final rule for the program was published on September 30, 2003 (68 *Fed. Reg.* 56137).

On July 15, 2003, USDA published a request for applications for the Biodiesel Fuel Education Program for FY2003 (68 *Fed. Reg.* 41770). USDA awarded the original program grants to two entities: the National Biodiesel Board and the University of Idaho. Under the 2008 farm bill, NIFA obligated its funding to the same two entities for an initial period of one year, but has agreed to support their efforts through FY2012 contingent on the satisfactory progress of this project. The program is monitored by the USDA Biodiesel Education Oversight Committee, which includes a DOE representative.

Section 9007: Rural Energy for America Program (REAP)

Function: REAP provides financial assistance for:

- grants, guaranteed loans, and combined grants and guaranteed loans for the development and construction of renewable energy systems (RES) and for energy efficiency improvement (EEI) projects (eligible entities include rural small businesses and agricultural producers);
- grants for conducting energy audits and for conducting renewable energy development assistance (eligible entities include state, tribe, or local governments, land-grant colleges and universities, rural electric cooperatives, and public power entities); and

(...continued)

[35] USDA Testimony at House Agriculture Subcommittee on Conservation, Energy, and Forestry, Audit of USDA Energy Programs, July 20, 2011; at http://agriculture.house.gov/hearings/.

[36] USDA press release No. 0254.12, July 27, 2012.

- grants for conducting RES feasibility studies (eligible entities include rural small businesses and agricultural producers).

Renewable energy systems (RES) include those that generate energy from bioenergy (including flexible fuel pumps), anaerobic digesters, geothermal, hydrogen, solar, wind, and hydropower. Energy-efficiency improvement (EEI) projects typically involve installing or upgrading equipment to significantly reduce energy use. (7 U.S.C. §8107)

Administered by: Rural Business and Cooperative Service, RD, USDA.[37]

Funding: Mandatory CCC funds of $55 million in FY2009, $60 million in FY2010, $70 million in FY2011, and $70 million in FY2012, to remain available until expended, were authorized. Discretionary funding of $25 million annually was authorized to be appropriated for FY2009-FY2012. Actual discretionary appropriations have been $5 million in FY2009, $40 million in FY2010, $5 million in FY2011, and $3.4 million in FY2012.

The FY2011 appropriations act (Department of Defense and Full-Year Continuing Appropriations Act, 2011; P.L. 112-10) reduced REAP discretionary funds from $25 million to $5 million, but left REAP's mandatory funding of $70 million intact. The FY2012 Agriculture Appropriations Act (P.L. 112-55) limited REAP mandatory spending to $22 million while discretionary funding was authorized at $3.4 million, split evenly between grants and loan guarantees.

Earlier the House had agreed, by a recorded vote of 283 to 128, to an amendment (H.Amdt. 475) to its version of the FY2012 appropriations act, H.R. 2112, that would have prohibited the use of funds for the construction of ethanol blender pumps or ethanol storage facilities. On June 16, 2011, the Senate considered a similar amendment (S.Amdt. 411) to separate, unrelated legislation (S. 782) that would have prohibited the use of REAP funds for the construction of ethanol blender pumps or ethanol storage facilities. However, the amendment was not agreed to in the full Senate by a 41-59 vote. Furthermore, the House prohibition on use of REAP funds for blender pumps or ethanol storage facilities was not included in the final FY2012 Agriculture appropriations act (P.L. 112-55).

Under ATRA, no new mandatory funding was included for REAP; however, discretionary funding of $25 million was authorized to be appropriated for FY2013.

Implementation Status: The 2008 farm bill combined elements of two existing programs from the 2002 farm bill—the Energy Audit and Renewable Energy Development Program and the RES and EEI Program—into a single program renamed the Rural Energy for America Program (REAP). Certain provisions of REAP have been operating since 2005 under 7 C.F.R. part 4280, subpart B. Regulations for operating grants and loan guarantees under the 2002 farm bill's RES and EEI Program were published on July 18, 2005 (70 *Fed. Reg.* 41264). A series of *Federal Register* notices (cited below) were used to implement the REAP provisions in the 2008 farm bill (i.e., RES feasibility studies, energy audits, and renewable energy development assistance) until new regulations were implemented. On April 14, 2011, an interim rule for REAP was published (76 *Fed. Reg.* 21110) to consolidate the various REAP programs by including each part of the program in a single subpart based on USDA experience under the 2002 farm bill energy programs. The interim REAP rule includes several changes to previous implementation methods:

[37] See http://www.rurdev.usda.gov/BCP_Reap.html.

both U.S. citizenship and the rural area location requirements were removed, and flexible fuel ("blender") pumps that dispense variable blends of petroleum and biofuels were included as viable renewable energy development projects.

REAP Loan Guarantees

The REAP Guaranteed Loan Program encourages the commercial financing of renewable energy (bioenergy, geothermal, hydrogen, solar, wind, and hydropower) and energy efficiency projects.[38] Under the program, project developers work with local lenders, who in turn can apply to USDA Rural Development for a loan guarantee of up to 75% of the project's cost (subject to a maximum of $25 million and a minimum of $5,000). The maximum percentage of guarantee (applied to the whole loan) is 85% of the loan amount for loans of $600,000 or less with a declining percentage for higher loan amounts.

REAP Grants

The type of grants available under REAP are still distinguished by their 2002 farm bill origins with separate grant programs for EEI, Renewable Energy Development Assistance (REDA), and Feasibility Studies.

Under REAP, the Renewable Energy Systems/Energy Efficiency Improvement Grants Program provides grants for energy audits and renewable energy development assistance.[39] It also provides funds to agricultural producers and rural small businesses to purchase and install renewable energy systems and make energy efficiency improvements. The grants are awarded on a competitive basis and can be up to 25% of total eligible project costs. Grants are limited to $500,000 for renewable energy systems and $250,000 for energy efficiency improvements. Grant requests as low as $2,500 for renewable energy systems and $1,500 for energy efficiency improvements can be considered. At least 20% of the grant funds awarded must be for grants of $20,000 or less.

Under REAP, the Energy Audit and Renewable Energy Development Assist Grant Program also provides grants for energy audits and renewable energy development assistance.[40] The grants are awarded on a competitive basis and can be up to $100,000. Recipients of an energy audit are required to pay at least 25% of the cost of the audit. Only 4% of available funds may be used for energy audits.

The REAP/Feasibility Grant Program also provides grants for energy audits and renewable energy development assistance.[41] It also provides funds to agricultural producers and rural small

[38] For more program information, see "Section 9007: Rural Energy for America Program Guaranteed Loan Program (REAP LOANS)," BCP, RD, USDA, at http://www.rurdev.usda.gov/BCP_ReapLoans.html.

[39] For more program information, see "Section 9007: REAP Renewable Energy Systems/Energy Efficiency Improvement Program (REAP/RES/EEI) Grants Program," BCP, RD, USDA, at http://www.rurdev.usda.gov/BCP_ReapResEei.html.

[40] For more program information, see "Section 9007: REAP SECTION 9007: Rural Energy for America Program Grants/Energy Audit and Renewable Energy Development Assist (REAP/EA/REDA)," BCP, RD, USDA, at http://www.rurdev.usda.gov/BCP_ReapEaReda.html.

[41] For more program information, see "Section 9007: REAP Feasibility Study Grants," BCP, RD, USDA, at http://www.rurdev.usda.gov/BCP_ReapGrants.html.

businesses to conduct feasibility studies for a renewable energy system. The grants are awarded on a competitive basis and can be up to 25% of total eligible project costs. Grants are limited to $50,000 for renewable energy feasibility studies.

REAP Implementation and Legislative Action

A series of *Federal Register* notices have been used to implement the REAP provisions in the 2008 farm bill. A notice of solicitation of applications (NOSA) for 4% of FY2009 funds (i.e., $2.4 million) in grants for energy audits and renewable energy development assistance was published on March 11, 2009 (74 *Fed. Reg.* 10533). A NOSA for the remaining portion of FY2009 funds of $60 million ($55 million mandatory and $5 million discretionary) for RES feasibility studies and to purchase renewable energy systems and energy efficiency improvements was published on May 26, 2009 (74 *Fed. Reg.* 24769).

For FY2010, USDA published three *Federal Register* notices to implement REAP. A NOSA published on April 26, 2010 (75 *Fed. Reg.* 21584), announced that about 88% of combined mandatory and discretionary REAP funding for FY2010 ($100 million) was available for renewable energy system and energy efficiency improvement grants and guaranteed loans. On May 27, 2010, a NOFA was published (75 *Fed. Reg.* 29706) to announce $2.4 million for grants for energy audits and renewable energy development assistance grants. Finally, a NOFA published on August 6, 2010 (75 *Fed. Reg.* 47525), announced $3 million for grants to conduct feasibility studies of renewable energy systems.

For FY2011, a NOFA published on April 14, 2011 (76 *Fed. Reg.* 20943), announced funds available for financial assistance as follows: grants, guaranteed loans, and combined grants and guaranteed loans for the development and construction of renewable energy systems and for energy efficiency improvement projects; grants for conducting energy audits; grants for conducting renewable energy development assistance; and grants for conducting renewable energy system feasibility studies. The NOFA announced the availability of $70 million of FY2011 budget authority to fund these REAP activities, which is expected to support at least $42 million in grant program level and up to $61 million in guaranteed loan program level.

On January 20, 2012, USDA issued a NOFA (77 *Fed. Reg.* 2948), announcing the availability of $25.4 million of FY2012 budget authority to fund these REAP activities, which will support at least $12.5 million in grant program level and up to approximately $48.5 million in guaranteed loan program level.

According to USDA, more than 8,000 awards have been made under REAP programs (and their predecessor) from FY2003 through FY2011, spanning all agricultural sectors in all states including more than $339 million in grants and $262 million in loan guarantees. During that period, REAP funds have helped more than 13,000 rural small businesses and agricultural producers and funded more than 1,000 solar projects and more than 560 wind projects.[42] During 2012, Secretary of Agriculture Vilsack has made several REAP funding announcements for projects to implement renewable energy and energy efficiency measures in their operations.[43]

[42] USDA News Release No. 0099.12, March 20, 2012.

[43] USDA Press Release No. 0111.12, USDA, March 30, 2012; USDA Press Release No. 0207.12, USDA, June 25, 2012; and USDA Press Release No. 0273.12, USDA, August 14, 2012. A URL link to a list of award recipients is available with each news release at http://www.usda.gov/wps/portal/usda/usdahome?navid=NEWSROOM.

Section 9008: Biomass Research and Development Initiative (BRDI)

Function: BRDI—created originally under the Biomass Research and Development Act of 2000 (BRDA, P.L. 106-224)—provides competitive funding in the form of grants, contracts, and financial assistance for research, development, and demonstration of technologies and processes leading to significant commercial production of biofuels, biobased energy innovations, development of biobased feedstocks, biobased products, and other such related processes, including development of cost-competitive cellulosic ethanol. Eligibility is limited to institutions of higher learning, national laboratories, federal or state research agencies, private-sector entities, and nonprofit organizations.

BRDI provides for coordination of biomass research and development, including life-cycle analysis of biofuels, between USDA and DOE by creating the Biomass Research and Development Board to coordinate government activities in biomass research, and the Biomass Research and Development Technical Advisory Committee to advise on proposal direction and evaluation.[44] The 2008 farm bill moved BRDA in statute to Title IX of the 2008 farm bill and expanded the BRDI technical advisory committee. (7 U.S.C. §8108)

Administered by: NIFA, USDA, and DOE, jointly.

Funding: Authorizes mandatory funding (to remain available until expended) of $20 million for FY2009, $28 million for FY2010, $30 million for FY2011, and $40 million for FY2012. Discretionary funding of $35 million is authorized to be appropriated annually for FY2009-FY2012; however, no discretionary funding has been appropriated through FY2012. The FY2012 Agriculture appropriations act (P.L. 112-55) did not make any cuts to the $40 million in mandatory funding for BRDI.

Under ATRA, no new mandatory funding was included for BRDI; however, discretionary funding of $35 million was authorized to be appropriated for FY2013.

Implementation Status: Since 2002 USDA and DOE jointly have announced annual solicitations and awards of funding allocations under BRDI.[45] Under the 2008 farm bill, applicants seeking BRDI funding must propose projects that integrate science and engineering research in the following three technical areas that are critical to the broader success of alternative biofuels production: feedstock development, biofuels and biobased products development, and biofuels development analysis. A minimum of 15% of funding must go to each area.[46] The minimum cost-share requirement for demonstration projects was increased to 50%, and for research projects to 20%.

From FY2002 through FY2010, more than $202 million has been awarded to 110 projects, including $91.5 million from USDA and $111.1 million from DOE. On May 5, 2011, Secretary Vilsack (USDA) and Secretary Chu (DOE) announced a total of $47 million in new FY2011 awards to fund an additional eight research and development projects.[47] On September 26, 2011,

[44] For more information on the Biomass Research and Development Board, the Technical Advisory Committee, and project selection, visit: http://www.usbiomassboard.gov/.

[45] For BRDI current FY2011 and historical (FY2002-FY2010) solicitations and awards visit: http://www.usbiomassboard.gov/initiative/past_solicitations.html.

[46] For details on BRDI technical areas see http://www.nifa.usda.gov/nea/plants/in_focus/biobased_if_brdi.html.

[47] For a NIFA news release, see http://www.nifa.usda.gov/newsroom/news/2011news/05052_brdi.html. For (continued...)

the Biomass Research and Development Board announced a request for FY2011 applicants for an anticipated $30 million in joint USDA-NIFA ($25 million) and DOE ($5 million) in federal BRDI funding.[48] On July 25, 2012, USDA and DOE made a joint announcement of $31 million in BRDI in five new cost-share projects.[49] On January 11, 2013, USDA announced $25 million in BRDI funding for four additional cost-share projects undertaking research and development of next-generation renewable energy and high-value biobased products from a variety of biomass sources.[50]

Section 9009: Rural Energy Self-Sufficiency Initiative

Function: The Rural Energy Self-Sufficiency Initiative assists rural communities with community-wide energy systems that reduce conventional energy use and increase the use of energy from renewable sources. Grants are available to assess energy use in a rural community, evaluate ideas for reducing energy use, and develop and install integrated renewable energy systems. Grants are not to exceed 50% of the total cost of the activity. (7 U.S.C. §8109)

Administered by: Rural Business and Cooperative Service, RD, USDA.

Funding: Discretionary funding of $5 million annually is authorized to be appropriated for FY2009-FY2012; however, no funding has been appropriated through FY2012. Under ATRA, no mandatory funding was included; however, discretionary funding of $5 million was authorized to be appropriated for FY2013.

Implementation Status: Rural Development, USDA, has not yet announced any regulations for this program.

Section 9010: Feedstock Flexibility Program (FFP) for Bioenergy Producers

Function: The Feedstock Flexibility Program requires that USDA establish (in FY2008) and administer a sugar-for-ethanol program using sugar intended for food use but deemed to be in surplus. USDA would subsidize the use of sugar for ethanol production through federal purchases of surplus sugar for resale to ethanol producers. USDA would implement the program only in those years where purchases are determined to be necessary to ensure that the sugar program operates at no cost to the federal government. (7 U.S.C. §8110)

Administered by: Farm Service Agency (FSA), USDA.

Funding: Mandatory CCC funds of such sums as necessary are to be made available. Funding authority was extended through FY2013 by ATRA.

Implementation Status: The program is on standby status until such time as the CCC acquires an inventory of sugar, which currently does not exist.

(...continued)

information on the BRDI grant application process, see http://www.nifa.usda.gov/fo/fundview.cfm?fonum=2660.

[48] See http://www.biomassboard.gov/pdfs/2011_brdi_foa.pdf.

[49] USDA News Release No. 0251.12, July 25, 2012.

[50] USDA News Release No. 0005.13, January 11, 2013.

Section 9011: Biomass Crop Assistance Program (BCAP)

Function: The Biomass Crop Assistance Program (BCAP) provides financial assistance to owners and operators of agricultural land and non-industrial private forest land who wish to establish, produce, and deliver biomass feedstocks.[51] BCAP provides two categories of assistance:[52]

1. **establishment and annual payments**, including a one-time payment of up to 75% of cost of establishment for perennial crops, and annual payments (i.e., rental rates based on a set of criteria) of up to five years for non-woody and 15 years for woody perennial biomass crops; and
2. **matching payments**, at a rate of $1 for each $1 per ton provided, up to $45 per ton, for a period of two years, which may be available to help eligible material owners with collection, harvest, storage, and transportation (CHST) of eligible material for use in a qualified biomass conversion facility.

Establishment and annual payments are available to certain producers who enter into contracts with USDA to produce eligible biomass crops on contract acres within designated BCAP project areas. Eligible land for BCAP project area contracts includes agricultural land and non-industrial private forestland, but does not include federal or state-owned land, land that is native sod, or land enrolled in the Conservation Reserve Program, Wetlands Reserve Program, or Grassland Reserve Program. Generally, crops that receive payments under Title I (the commodity title) of the farm bill (e.g., corn, wheat, rice, and soybeans) and noxious weeds or invasive species are not eligible for annual payments.

BCAP assistance for establishing and producing biomass crops is available within designated project areas. BCAP project areas are specific geographic areas where producers may enroll land to grow specified biomass crops.[53] Participants may be eligible to receive financial and technical assistance as well as annual payments to establish these crops. Project areas are established based on proposals submitted to FSA by either a group of producers or an entity that converts biomass to heat, power, a biobased product, or an advanced biofuel. Those interested in submitting a proposal are encouraged to contact their FSA state office for details. Upon designation of a project area, certain producers within the project area are then eligible to enroll land into the program.

Matching payments are available to eligible material owners who deliver eligible material to qualified biomass conversion facilities. Eligible material must be harvested directly from the land and separate from a higher-value product (e.g., Title I crops). Invasive and noxious species are considered eligible material and land ownership (private, state, federal, etc.) is not a limiting factor to receive matching payments. (7 U.S.C. §8111)

Administered by: FSA, USDA.

[51] For more information, see CRS Report R41296, *Biomass Crop Assistance Program (BCAP): Status and Issues*.

[52] Farm Service Agency, USDA, "Biomass Crop Assistance Program (BCAP), "Fact Sheet," at http://www.fsa.usda.gov/Internet/FSA_File/bcap_update_may2011.pdf.

[53] See FSA, USDA, "BCAP Project Area Information," at http://www.fsa.usda.gov/FSA/webapp?area=home&subject=ener&topic=bcap-pjt.

Funding: Mandatory CCC funds of such sums as necessary are made available for each of FY2008-F2012. Outlays depend on the number of participants. The 2010 Supplemental Appropriations Act (P.L. 111-212) limited BCAP funding to $552 million in FY2010 and $432 million in FY2011. The Department of Defense and Full-Year Continuing Appropriations Act, 2011 (P.L. 112-10), further reduced BCAP funding for FY2011 to $112 million.

With respect to FY2012 funding, the President's FY2012 budget proposed to limit funding for CHST to $70 million. The remaining annual and establishment payment portion of BCAP would remain at such sums as necessary (SSAN). On June 16, 2011, the House passed an FY2012 appropriations bill (H.R. 2112) that would have eliminated funding for BCAP for FY2012. In contrast, the Senate FY2012 spending bill left BCAP mandatory spending untouched. In the final FY2012 Agriculture appropriations act (P.L. 112-55), BCAP mandatory spending was limited to $17 million.

Under ATRA, no new mandatory funding was included for BCAP; however, discretionary funding of $20 million was authorized to be appropriated for FY2013.

Implementation Status: On May 5, 2009, President Barack Obama issued a directive addressing a variety of advanced biofuel priorities including the implementation of matching payments for CHST of eligible materials for biomass conversion. On June 11, 2009, USDA published a NOFA (74 *Fed. Reg.* 27767) to implement the CHST matching payments component of BCAP. The NOFA was terminated on February 3, 2010, and, on February 8, 2010, USDA published a proposed rule for BCAP (75 *Fed. Reg.* 6264). The final rule was published on October 27, 2010 (74 *Fed. Reg.* 27767), and implements the full BCAP program, including the annual and establishment payment. USDA is required to submit a report to the House and Senate Agriculture Committees on the dissemination of the best practice data and information gathered from participants receiving assistance under BCAP no later than four years after enactment of the 2008 farm bill (i.e., by June 18, 2012).

No payments were made in FY2008; however, through FY2012, nearly $900 million has been paid out to projects in 31 states.[54] As of June 2012, USDA had selected 11 BCAP project areas and continued to enroll producers for annual and establishment payments. However, due to the reduced funding availability imposed by limitations on the availability of mandatory funding through the annual appropriations process (see above discussion), USDA published an interim rule on September 15, 2011 (76 *Fed. Reg.* 56949), amending the BCAP regulation to provide specifically for prioritizing limited program funds in favor of the ''project area'' portion of BCAP. The limited funding available for BCAP means that not all BCAP requests can be funded. The interim rule explicitly provides a priority for funding establishment and annual payments for project area activities because "such activities will produce the greatest long term good in BCAP by providing an ongoing supply of new biomass."[55] Under the interim rule, matching payments for CHST would only be funded if resources are available after funding all eligible project area applications. The interim rule also enables prioritization among project area proposals if eligible requests exceed available funding.

[54] For funding and other program details see CRS Report R41296, *Biomass Crop Assistance Program (BCAP): Status and Issues*.

[55] *Federal Register*, Vol. 76, No. 179, Thursday, September 15, 2011, p. 56949.

Section 9012: Forest Biomass for Energy

Function: The Forest Biomass for Energy program is a research and development program to encourage use of 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 is given to projects that use low-value forest byproduct biomass for the production of energy; develop processes to integrate bioenergy from forest biomass into existing manufacturing streams; develop new transportation fuels; and improve the growth and yield of trees for renewable energy. (7 U.S.C. §8112)

Administered by: Forest Service, USDA.

Funding: Discretionary funding of $15 million annually is authorized to be appropriated for FY2009-FY2012; however, no funding has been appropriated through FY2012. Under ATRA, discretionary funding of $15 million was authorized to be appropriated for FY2013.

Implementation Status: The Forest Service has not yet announced any regulations for this program. The President's FY2011 budget proposed to fund both the Forest Biomass for Energy Program and the Community Wood Energy Program using funds from the Hazardous Fuels Program (Wildland Fire Management) within the Forest Service. The President's FY2012 budget proposal included a similar request to fund both programs using the Hazardous Fuels Program; however, only $15 million was requested for the Forest Biomass for Energy Program and $3.75 million for the Community Wood Energy Program.

Section 9013: Community Wood Energy Program

Function: The Community Wood Energy Program provides matching grants to state and local governments to acquire community wood energy systems for public buildings. Participants must also implement a community wood energy plan to meet energy needs with reduced carbon intensity through conservation, reduced costs, utilizing low-value wood sources, and increased awareness of energy consumption. (7 U.S.C. §8113)

Administered by: Forest Service, USDA.

Funding: Discretionary funding of $5 million annually is authorized to be appropriated for FY2009-FY2012. No funding has been appropriated through FY2012; however, the Forest Service has awarded $49 million in funding from the American Recovery and Reinvestment Act of 2009 (ARRA, P.L. 111-5) for wood-to-energy projects, and the appropriations committee reports in FY2010 and FY2011 have directed the use of $5 million in Hazardous Fuels funds for biomass energy projects. Under ATRA, discretionary funding of $5 million was authorized to be appropriated for FY2013.

Implementation Status: The Forest Service is pursuing the implementation of this program using funding from their overall State & Private appropriation.[56] An agency working group is developing the work plan for the Community Wood Energy Program, coordinating with Rural Development (RD) to ensure the new program is complementary with other biomass energy

[56] Farm Bill Working Group, Office of Budget and Program Analysis, USDA, "Highlights: Title IX-Energy," October 26, 2009.

programs administered by RD. (See “Implementation” note under “Section 9012: Forest Biomass for Energy” for funding proposals under the President’s FY2011 and FY2012 budget proposals.)

Biofuels Infrastructure Study

Function: Section 9002 of the 2008 farm bill requests that USDA, DOE, EPA, and the Department of Transportation (DOT) jointly report on the infrastructure needs, requirements, and development approaches for expanding the domestic production, transportation, and distribution of biofuels given current and likely future market trends. A report including the study results is to be submitted to various related committees in Congress. No deadline was specified.

Funding: No specific funding was announced for this study and no funding has been authorized through FY2012. No new funding authority was included in ATRA.

Renewable Fertilizer Study

Function: Section 9003 of the 2008 farm bill requires that a report be submitted to the House and Senate Agriculture Committees within one year of receipt of the appropriations to carry out the study on the production of fertilizer from renewable energy sources in rural areas. The report is to be based on a study of the challenges to commercialization of rural fertilizer production from renewable sources, potential processes and technologies, and the potential impacts of renewable fertilizer on fossil fuel use and the environment.

Funding: Discretionary funding of $1 million was authorized to be appropriated for FY2009; however, no discretionary funding has been authorized through FY2012. No new funding authority for the Renewable Fertilizer Study was included in ATRA.

Title VII—Energy-Related Agricultural Research and Extension Provisions

Three provisions from Title VII of the 2008 farm bill related to renewable energy initiatives and are described here.

Section 7205: Nutrient Management Research and Extension Initiative

Function: Section 1673(h) of the 1990 farm bill (Food, Agriculture, Conservation, and Trade Act of 1990; P.L. 101-624) authorized matching grants under the farm bill nutrient management research and extension initiative for finding innovative methods and technologies for economic use or disposal of animal waste. This program was extended through 2007 by Section 7120 of the 2002 farm bill. The 2008 farm bill again extended the nutrient management research and extension initiative through FY2012 and added dairy cattle waste as a type of waste to be studied. It also added an amendment to include the production of renewable energy from animal waste as an eligible activity to receive grants under this section. (7 U.S.C. §5925a)

Administered by: National Agricultural Research, Extension, Education, and Economics Advisory Board, USDA.[57]

Funding: Mandatory CCC funds of such sums as necessary are made available for each of FY2008-F2012**.** No new funding authority was included in ATRA.

Section 7207: Agricultural Bioenergy Feedstock and Energy Efficiency Research and Extension Initiative

Function: Section 7207 of the 2008 farm bill established the Agricultural Bioenergy Feedstock and Energy Efficiency Research and Extension Initiative, a program to award competitive matching grants (up to 50% of project costs) for projects with a focus on supporting on-farm biomass crop research and the dissemination of results to enhance the production of biomass energy crops and the integration of such production with the production of bioenergy. (7 U.S.C. §5925e)

Administered by: The Secretary of Agriculture in consultation with the National Agricultural Research, Extension, Education, and Economics Advisory Board, USDA.

Funding: Discretionary funding of $50 million annually is authorized to be appropriated for FY2008-FY2012; however, no funding has been appropriated through FY2012. No new funding authority was included in ATRA.

Section 7526: Sun Grant Program

Function: The Sun Grant Initiative (SGI) is a national network of land-grant universities and federally funded laboratories—coordinated through regional Sun Grant centers—working together to further establish a biobased economy.[58] Sun Grant centers are also charged with reviving America's farming communities by placing an emphasis on rural economic development through the production of biobased renewable energy feedstocks.

This provision was added subsequent to the 2002 farm bill under the Sun Grant Research Initiative Act of 2003 (Section 778, Consolidated Appropriations Act, 2004; P.L. 108-199). The initiative was originally established with five national Sun Grant research centers based at land-grant universities (a north-central center at South Dakota State University; a southeastern center at the University of Tennessee; a south-central center at Oklahoma State University; a western center at Oregon State University; and a northeastern center at Cornell University), each covering a different national region, to enhance coordination and collaboration among USDA, DOE, and land-grant universities in the development, distribution, and implementation of biobased energy technologies. Competitive grants are available to land-grant schools within each region. The 2008 farm bill reauthorized the Sun Grant Program through FY2012 and established a sixth regional center—a Western Insular Pacific Sub-Center at the University of Hawaii. (7 U.S.C. §8114)

[57] See http://nareeeab.ree.usda.gov.

[58] See "Sun Grant Initiative," at http://www.sungrant.org/.

Administered by: NIFA, USDA. Each regional Sun Grant center manages the programs and activities within its region, although a process based on peer and merit review is used to administer grants.

Funding: Discretionary funding of $75 million annually is authorized to be appropriated for FY2008-FY2012. However, only $2.25 million for FY2010 and $2.2 million for FY2012 have been appropriated. No new funding authority was included in ATRA.

Implementation Status: As of October 2011, SGI had more than 130 field studies on biomass feedstocks currently underway with locations in more than 90% of the states.

Since NIFA has been delegated the authority to administer the program, awards made under the Sun Grant Program are subject to NIFA's assistance regulations at 7 C.F.R. part 3430 as announced on November 18, 2010 (Competitive and Noncompetitive Nonformula Federal Assistance Programs—Administrative Provisions for the Sun Grant Program, 75 *Fed. Reg.* 70578).

Title XI—Energy-Related Livestock Provisions

Section 11014: Study on Bioenergy Operations

Function: Section 11014 of the 2008 farm bill requires a USDA study on the use of animal manure as a fertilizer and potential other uses; the impact of limitations placed on the use of animal manure on consumers and agricultural operations; and the effects of increased competition for manure due to biofuel uses. A report on the results of the study was due to respective agricultural committees of the House and Senate by June 18, 2009 (one year after enactment).

Funding: No specific funding was announced for this study.

Title XV—Energy-Related Tax Provisions

Section 15321: Credit for Production of Cellulosic Biofuel

Function: Section 15321 of the 2008 farm bill established a new tax credit—the Cellulosic Biofuel Producer Credit—uniquely for cellulosic ethanol producers, and at a substantially higher rate than is available for corn-starch ethanol blenders. Prior to the 2008 farm bill's enactment, all ethanol (cellulosic included) blended into gasoline was eligible for a volumetric ethanol excise tax credit (VEETC) of $0.51 per gallon. The ethanol blender, not the producer, was eligible for the VEETC. With the Cellulosic Biofuel Producer Credit, producers of cellulosic ethanol (produced exclusively in the United States) became eligible for a credit of $1.01 per gallon less the amount of small-producer ethanol credit claimed and the alcohol mixture credit claimed for ethanol. (26 U.S.C. §40)

Status: The Cellulosic Biofuel Producer Credit expired on December 31, 2012. However, it was extended retroactively from January 1, 2013, through December 31, 2013, by §404 of ATRA (P.L. 112-240). In addition, ATRA expanded the list of potential feedstock for qualifying cellulosic biofuels to include cultivated algae, cyanobacteria, or lemna; then it replaced the term "cellulosic biofuel" with the more expansive term of "second generation biofuel."

Section 15322: Comprehensive Study of Biofuels

Function: Section 15322 requires the Secretary of Treasury, with USDA, DOE, and EPA, to commission the National Academy of Sciences to produce a report on biofuels, including current and projected production, economic and environmental impacts, government program impacts, and the relative impacts of different types of biofuels on markets, trade, and infrastructure. The report should also assess the ability to convert corn ethanol plants to other uses, compare corn ethanol with other biofuels and renewable energy sources, and assess the need for additional scientific inquiry and areas of interest for future research.

Status: The final report was due to Congress by June 18, 2009 (12 months after the 2008 farm bill enactment), but to date, has not been completed. See the **Appendix** for a list of related reports by both governmental and nongovernmental sources.

Funding: No specific funding was announced for this study.

Section 15331: Modification of Alcohol Credit

Function: As stated earlier, prior to passage of the 2008 farm bill, any ethanol blended into gasoline was eligible for a tax credit of $0.51 per gallon as provided under previous law (American Jobs Creation Act of 2004, P.L. 108-357) through December 31, 2010. Section 15331 of the 2008 farm bill reduces the VEETC to $0.45 per gallon beginning in the first calendar year after the year in which 7.5 billion gallons of ethanol is produced. In 2008 an estimated 9.2 billion gallons of ethanol was produced, so the tax credit reduction was effective January 1, 2009. (26 U.S.C. §40)

Status: The VEETC was further amended by the Energy Improvement and Extension Act of 2008 (P.L. 110-343, Division B, §203) to limit qualifying biofuels to U.S. production. VEETC was extended through December 31, 2011, by the Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010 (P.L. 111-312, §708). VEETC expired on December 31, 2011.

Section 15332: Calculation of Volume of Alcohol for Fuel Credits

Function: A small amount of gasoline is added to pure ethanol at the production plant to "de-nature" it (i.e., prevent it from being sold as alcohol), thereby converting it to "fuel" ethanol. Prior to the 2008 farm bill, the volume of bio-alcohol counted as fuel eligible for the tax credit could include up to 5% of the volume as denaturant. Section 15332 of the 2008 farm bill reduced the permissible volume of denaturant to 2% for purposes of calculating the volume of alcohol eligible for the tax credit. (26 U.S.C. §40)

Status: Fully implemented.

Section 15333: Ethanol Tariff Extension

Function: Imports of ethyl alcohol (Heading 9901.00.50 of the Harmonized Tariff Schedule (HTS)) are subject to a most-favored nation duty of 14.27¢ per liter ($0.54 per gallon) and a 2.5% ad valorem tariff (Heading 2207.10.60; HTS) on imports of un-denatured ethyl alcohol. The import duty was to expire on December 31, 2008. Section 15333 of the 2008 farm bill extended the import duty of $0.54 per gallon for imported ethanol or mixtures of ethanol (heading 9901.00.50 of the HTS) through December 31, 2010.

Status: The ethanol import duty (and the VEETC) were subsequently extended through December 31, 2011, by the Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010 (P.L. 111-312). On June 16, 2011, the Senate voted 73-27 to accept an amendment (S.Amdt. 476 to S. 782) that would have eliminated both the import duty and the VEETC. However, a cloture vote on the underlying bill, S. 782, failed on June 21, 2011. Both the ethanol import duty (and the VEETC) expired on December 31, 2011.

Section 15334: Limitations on Duty Drawback on Certain Imported Ethanol

Function: Section 1313 of the Tariff Act of 1930, as amended, permits the refund of an import duty if the duty-paid good is re-exported or used to make a good that is exported. This type of duty refund is referred to as a "drawback." Prior to the 2008 farm bill, a person who manufactured gasoline using ethanol that was subject to the duty imposed under HTS 9901.00.50, could export a qualifying substitute product to obtain the refund of the duty paid. Allowable substitute products included either ethanol not subject to the duty, or another petroleum product (e.g., jet fuel which does not contain ethanol). Section 15334 of the 2008 farm bill eliminates the ability to obtain a refund of an import duty if the exported product contains no ethanol.

Status: Fully implemented.

Additional Federal Renewable Energy Programs

Rural Development Agency (RDA), USDA

In addition to administering the Biorefinery Assistance Program, the Repowering Assistance Program, the Bioenergy Program for Advanced Biofuels, the Rural Energy for America Program, and the Biomass Research and Development Program as described above, the Rural Business-Cooperative Service (RBCS) of USDA's Rural Development Agency administers several additional programs targeting both rural and agricultural activities that include funding opportunities in the form of payments, grants, loans, and loan guarantees for the development and commercialization of renewable energy, among other activities. The following programs within RBCS could possibly be used to assist renewable energy producers:[59]

- Value-Added Producer Grant Program
- Business and Industry Guaranteed Loan Program
- Rural Economic Development Loan and Grant
- Rural Business Enterprise Grants
- Rural Business Opportunity Grant Program
- Cooperative Programs' Energy Research

[59] See CRS Report RL31837, *An Overview of USDA Rural Development Programs*. For program details, awards lists, and other related information, see USDA's RDA, at http://www.rurdev.usda.gov/.

- Direct and Guaranteed Electric Loan Program
- High Energy Cost Grants Program
- Various residential energy programs that provide financial assistance for energy efficiency additions or upgrades, including the Rural Energy Plus Program, the Home Repair and Preservation Program, and Housing Preservation Grants

Natural Resources and Conservation Service (NRCS), USDA

In addition to the RD programs, USDA's NRCS operates several conservation programs that include energy efficiency components with funding available for both energy efficiency improvements and assessments of energy-efficiency savings related to new energy technologies. The following programs within NRCS could possibly be used to provide energy-efficiency assistance:[60]

- Conservation Innovation Grants (CIG)
- Conservation loans
- Environmental Quality Incentives Program (EQIP)

DOE Renewable Energy Programs

The Department of Energy administers several programs that provide financial assistance for energy efficiency, research and deployment, and renewable energy projects including various loan, loan guarantee, and grant programs.[61] In addition, DOE's Office of Energy Efficiency and Renewable Energy (EERE) provides funding for renewable energy and energy efficiency research and development.[62]

Assessment of Federal Biofuels Policy

The impact of increased ethanol production on agricultural and rural economies was a subject of debate during the farm bill process. As a result, the 2008 farm bill included provisions requiring a series of reports assessing how ethanol production may be impacting the farm economy, the environment, and consumer food prices. Among these are:

- the Comprehensive Study of Biofuels (§15332) to be conducted by USDA, EPA, DOE, and the National Academy of Sciences (due by June 18, 2009);
- the Biofuels Infrastructure Study (§9002) by USDA, DOE, EPA, and DOT (no deadline specified); and
- an assessment of the economic impacts of expanded cellulosic biomass production on local economies and infrastructures as required by BCAP (due by June 18, 2012).

[60] For more information see NRCS, USDA, at http://www.nrcs.usda.gov.

[61] For information on DOE funding opportunities, visit http://energy.gov/funding-opportunities. See also CRS Report R42566, *Alternative Fuel and Advanced Vehicle Technology Incentives: A Summary of Federal Programs*.

[62] For information on EERE financial assistance, see http://www1.eere.energy.gov/financing/types_assistance.html.

In partial response to these study mandates, EPA, USDA, and DOE have produced several studies concerning various issues related to biofuels since the 2008 farm bill was enacted on June 18, 2008. In addition, numerous studies have been produced by the federal government, academia, and private think-tanks concerning the market effects of policy-driven biofuels production. A selection of key official government studies, as well as key examples of academic and think-tank studies, are listed in an **Appendix** to this report. The results or findings of these emerging reports that are otherwise intended to measure the success of the various USDA energy programs could result in subsequent adjustments to program implementation or to future legislation.

Energy Policy in the Next Farm Bill

The 112th Congress spent substantial time and effort during 2012 reviewing existing farm programs, consulting with stakeholders, and preparing new legislation to serve as the next five-year version of omnibus farm legislation—the anticipated 2012 farm bill.[63] The Senate passed its version of the 2012 farm bill—the Agriculture Reform, Food, and Jobs Act of 2012 (ARFJA; S. 3240)—on June 21, 2012. The House Agriculture Committee approved its version—the Federal Agricultural Reform and Risk Management Act of 2012 (FARRM; H.R. 6083)—on July 11, 2012.[64] However, House leadership did not bring H.R. 6083 to the floor for further action. As a result, the 112th Congress failed to pass a new five-year farm bill. Instead, ATRA extends the current 2008 farm bill until September 30, 2013, or, in the case of the farm commodity programs that are on a different calendar, through crop year 2013.[65]

Bioenergy Programs Proposed by the 112th Congress

The 113th Congress is expected to write a new farm bill in 2013, and might be expected to use the Senate-passed bill (S. 3240) and the House Agriculture Committee-reported measure (H.R. 6083) of the 112th Congress as starting points. Both H.R. 6083 and S. 3240 proposed extending most of the renewable energy provisions of the 2008 farm bill's energy title, Title IX, with the exception of the Repowering Assistance Program, the Rural Energy Self-Sufficiency Initiative, and the Renewable Fertilizer Study, which are repealed by both bills. In addition, S. 3240 repeals the Forest Biomass for Energy Program, while the House bill repeals the Biofuels Infrastructure Study.

The primary difference between the House and Senate bills is in the source of funding (**Table 3**). The Senate bill contains $800 million in new mandatory funding and authorizes $1.140 billion in appropriations for the various Title IX programs over the FY2013-FY2017 period. In contrast, H.R. 6083 contains no mandatory funding for Title IX programs, while authorizing $1.355 billion subject to appropriations. In addition, the House bill prevents USDA from spending Rural Energy for America (REAP) program funds on retail blender pumps and eliminates all support for the

[63] See CRS Report RS22131, *What Is the Farm Bill?*

[64] For a detailed comparison of current bioenergy provisions with provisions in the two farm bill proposals—as passed by the Senate (S. 3240) and approved by the House Agriculture Committee (H.R. 6083), see CRS Report R42552, *The 2012 Farm Bill: A Comparison of Senate-Passed S. 3240 and the House Agriculture Committee's H.R. 6083 with Current Law*.

[65] A crop year refers to the year in which a commodity is harvested.

collection, harvest, storage, and transportation (CHST) component of BCAP, severely limiting its potential effectiveness as an incentive to produce cellulosic feedstocks.

Energy Policy Issues for the Next Farm Bill

Program Expiration and Baseline Funding

Available funding to write the next farm bill will be based on the baseline projections of the cost of current farm bill programs by the Congressional Budget Office, and on varying budgetary assumptions about whether programs will continue. All 13 bioenergy provisions of Title IX—with the exception of Section 9010, the Feedstock Flexibility Program for Bioenergy Producers—received mandatory funding only for the life of the 2008 farm bill, FY2008 through FY2012. Although most of the Title IX bioenergy programs have been reauthorized for FY2013 by the ATRA farm bill extension, they have received no new mandatory funding. Instead, most bioenergy programs were given extended authority to make appropriations of varying amounts which makes them dependent on the annual appropriations process. As a result, USDA bioenegy programs do not have a budgetary baseline beyond FY2012.[66]

Because of the current tight budget situation, it seems highly unlikely that any new money will be available to fund new or expiring programs. Therefore, the most likely way that any expiring energy programs can survive is to offset their projected costs with reductions in other mandatory programs or from other cost savings. See **Table 1** for a list that includes expiring energy programs and their funding levels. Many analysts believe that lack of mandatory funding under the 2008 farm bill extension represents a severe setback for long-term development of bioenergy programs.

Possible Redundancy Across USDA and DOE Energy Programs

Although each of the various Title IX programs has somewhat different policy goals, most of them end up funding very similar types of projects—anaerobic digesters, wind turbines, solar panels, and biofuels. This is particularly true for the Bioenergy Program for Advanced Biofuels and REAP funded projects, as well as DOE-funded projects under the 1703 and 1705 loan guarantee programs. Also, research projects focused on renewable energy that are funded under REAP and BRDI, as well as certain EERE-funded programs, appear to have some potential for overlap. To actually measure the extent of overlap or similarity would require a project-by-project comparison. In general, USDA programs tend to focus on the primary energy source or feedstock, whereas DOE projects tend to focus on the conversion or processing technology; however, the difference often appears subtle to a lay person. As a result, some policymakers suggest that some energy programs could be merged or eliminated to counter possible redundancy, whereas others (particularly those whose district benefits from specific programs) are quick to argue the merits of the individual programs.

Cellulosic Biofuels' Slow Development

The potential development of a cellulosic-based ethanol industry is presently impeded by the state of cellulosic conversion technology, which still is expensive relative to corn-based production and

66 See CRS Report R41433, *Expiring Farm Bill Programs Without a Budget Baseline*.

has been slow to move production from laboratory setting to commercial scale. However, the enormous potential supply of low-cost cellulosic plant material available in the United States makes it an attractive prospective feedstock and helps to explain its considerable policy interest.[67]

The 2008 farm bill energy title provides more than $1 billion in financial incentives and support to encourage the production and use of advanced (mainly cellulosic) biofuels.[68] Grants and loan guarantees leverage industry investments in new technologies and infrastructure, as well as in the production of cellulosic feedstocks. However, the principal program designed to help "kick start" the U.S. cellulosic biofuels sector was the Biomass Crop Assistance Program (BCAP, §9001). BCAP addressed the quintessential "chicken and egg" problem—how do you encourage producers to grow cellulosic biomass when there is no existing market for that biomass, and how do you encourage investors to build cellulosic biofuels plants when there is no known existing biomass feedstock supply? BCAP attempted to remove some of the risk for biomass growers by supporting the production of dedicated crop and forest cellulosic feedstocks and by providing incentives for harvest and post-production storage and transport.[69]

Despite support from BCAP and other federal programs, the cellulosic ethanol sector has been slow to develop. Currently, only small volumes of cellulosic ethanol are produced on a commercial scale. Only a few small refineries (mostly pilot or demonstration in scope) are engaged in limited production. Due to the slow progress in cellulosic ethanol production, EPA has been compelled to substantially reduce the cellulosic biofuel RFS mandates set by Congress for the years 2010 through 2012—from 100 million gallons (mgals) in 2010 to a mandate of 6.5 mgals, from 250 mgals for 2011 to 6.6 mgals, and from 500 mgals for 2012 to a preliminary 3.5 to 12.9 mgals.[70] The EPA waiver of the cellulosic biofuels RFS for three consecutive years, coupled with recent limitations imposed on BCAP funding (see "Section 9011: Biomass Crop Assistance Program (BCAP)," earlier in this report) and the increasing congressional climate of budget austerity, likely increase the uncertainty associated with the future investments needed to kick start this sector.[71]

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[67] See the section entitled "Potential Issues with the Expanded RFS" in CRS Report R40155, *Renewable Fuel Standard (RFS): Overview and Issues*; and see CRS Report R41106, *Meeting the Renewable Fuel Standard (RFS) Mandate for Cellulosic Biofuels: Questions and Answers*.

[68] Advanced biofuels include biofuels derived from cellulosic feedstocks; sugar and starch other than corn kernel-starch; waste material including crop residue, animal, plant, or food waste; diesel fuel produced from renewable biomass including vegetable oil and animal fat; butanol or other alcohols produced through the conversion of organic matter; and other fuels derived from cellulosic biomass. For more information, see CRS Report RL34738, *Cellulosic Biofuels: Analysis of Policy Issues for Congress*.

[69] See CRS Report R41296, *Biomass Crop Assistance Program (BCAP): Status and Issues*.

[70] U.S. EPA, *Renewable Fuels: Regulations & Standards, at* http://www.epa.gov/otaq/fuels/renewablefuels/regulations.htm.

[71] See CRS Report R41106, *Meeting the Renewable Fuel Standard (RFS) Mandate for Cellulosic Biofuels: Questions and Answers*.

Table 1. 2008 Farm Bill Authorized Funding for Energy Provisions, FY2008-FY2012

($ millions)

Section[a]	Provision Name	Type	FY2008	FY2009	FY2010	FY2011	FY2012	Total
§7205	Nutrient Management Res. & Ext. Init.	Discr.[b]	SSAN	SSAN	SSAN	SSAN	SSAN	SSAN
§7207	Bioen. Fdstk + Energy. Eff. Res. & Ext. Init.	Discr.[b]	50	50	50	50	50	250
§7526	Sun Grant Program	Discr.[b]	75	75	75	75	75	375
§9002[a]	Federal Biobased Markets Program	Mand.	1	2	2	2	2	9
		Discr.[b]	0	2	2	2	2	8
§9003[a]	Biorefinery Assistance Program	Mand.	0	75	245	0	0	320
		Discr.[b]	0	150	150	150	150	600
§9004[a]	Repowering Assistance Program	Mand.	0	35	0	0	0	35
		Discr.[b]	0	15	15	15	15	60
§9005[a]	Bioenergy Program for Adv. Biofuels	Mand.	0	55	55	85	105	300
		Discr.[b]	0	25	25	25	25	100
§9006[a]	Biodiesel Fuel Education Program	Mand.	1	1	1	1	1	5
§9007[a]	Rural Energy for America Prog. (REAP)	Mand.	0	55	60	70	70	255
		Discr.[b]	0	25	25	25	25	100
§9008[a]	Biomass Research and Dev. Act (BRDA)	Mand.	0	20	28	30	40	118
		Discr.[b]	0	35	35	35	35	140
§9009[a]	Rural Energy Self-Sufficiency Initiative	Discr.[b]	0	5	5	5	5	20
§9010[a]	Feedstock Flex. Prog. for Bioenergy Prod.	Mand.	SSAN	SSAN	SSAN	SSAN	SSAN	SSAN
§9011[a]	Biomass Crop Assistance Prog. (BCAP)	Mand.	SSAN	SSAN	SSAN[c]	SSAN[c]	SSAN[c]	SSAN
§9012[a]	Forest Biomass for Energy	Discr.[b]	0	15	15	15	15	60
§9013[a]	Community Wood Energy Program	Discr.[b]	0	5	5	5	5	20
§9002	Biofuels Infrastructure Study	None	0	0	0	0	0	0
§9003	Renewable Fertilizer Study	Discr.[b]	0	1	0	0	0	1
Total Discretionary Funding Authorized[b]			**125**	**403**	**402**	**402**	**402**	**1,734**
Total Mandatory Funding Authorized			**2**	**243**	**391**	**188**	**218**	**1,042**

Source: P.L. 110-246 (Food, Conservation, and Energy Act of 2008).

Notes: "SSAN" = Such sums as necessary.

a. Section 9001 of the 2008 farm bill (P.L. 110-246) amends Title IX of the 2002 farm bill (P.L. 107-171). Sections 9001 through 9013 of the table are the amended section numbers.

b. Many of the discretionary programs never received any funding or received lesser amounts through the annual appropriations process than originally authorized in the farm bill.

c. The authority for funding under BCAP was reduced to 552 million in FY2010 and 432 million in FY2011 under the Supplemental Appropriations Act of 2010 (P.L. 111-212). BCAP funding for FY2011 was reduced a second time to 112 million under the Department of Defense and Full-Year Continuing Appropriations Act, 2011 (P.L. 112-10). Finally, the FY2012 Agriculture appropriations act (P.L. 112-55) reduced BCAP funding to 17 million for FY2012.

Table 2. 2008 Farm Bill Energy Provision Funding: Authorized and Available, FY2010 to FY2012

(millions)

			FY2008		FY2009		FY2010		FY2011		FY2012	
Section[a]	**Provision Name**	**Funds Type**	**FB**	**Available**	**FB**	**Available**	**FB**	**Available**	**FB**	**Available**	**FB**	**Available**
§7205	Nutrient Man. Res. & Ext. Init.	Discr.	SSAN	0	SSAN	0	SSAN	0	SSAN	0	SSAN	0
§7207	Bio.Fdstk+En.Eff.Res.&Ext. Init.	Discr.	50	0	50	0	50	0	50	0	50	0
§7526	Sun Grant Program	Discr.	75	0	75	0	75	2	75	0	75	2
§9002	Fed. Biobased Markets Prog.	Mand.	1	1	2	2	2	2	2	2	2	2
		Discr.	0	0	2	0	2	0	2	0	2	0
§9003	Biorefinery Assist. Prog.	Mand.[b]	0	0	75	75	245	245[b]	0	0[b]	0	0[b]
		Discr.	0	0	150	0	150	0	150	0	150	0
§9004	Repowering Assistance Prog.	Mand.[b]	0	0	35	35	0	0[b]	0	0[b]	0	0[b]
		Discr.	0	0	15	0	15	15	15	0	15	0
§9005	Bioen. Prog. for Adv. Biof.	Mand.[b]	0	0	55	55	55	55[b]	85	85[b]	105	65[b,c]
		Discr.	0	0	25	0	25	0	25	0	25	0
§9006	Biodiesel Education Prog.	Mand.	1	1	1	1	1	1	1	1	1	1
§9007	REAP	Mand.[b]	0	0	55	55	60	60[b]	70	70[b]	70	22[b,c]
		Discr.	0	36	25	5	25	40	25	5	25	3
§9008	BRDI	Mand.[b]	0	0	20	20	28	28[b]	30	30[b]	40	40[b]
		Discr.	0	0	35	0	35	0	35	0	35	0
§9009	Rural Energy Self-Suff. Init.	Discr.	0	0	5	0	5	0	5	0	5	0
§9010	Fdsk Flx. Prog. for Bio. Prod.	Mand.	SSAN	0[d]	SSAN	0[d]	SSAN	0[d]	SSAN	0[d]	SSAN	0[d]
§9011	BCAP	Mand.	SSAN	0[g]	SSAN	243	SSAN	552[e]	SSAN	112[f]	SSAN	17[c]
§9012	Forest Biomass for Energy	Discr.	0	0	15	0	15	0	15	0	15	0
§9013	Comm. Wood Energy Prog.	Discr.	0	0	5	0	5	0	5	0	5	0

Source: Compiled by CRS using the Food, Conservation, and Energy Act of 2008 (P.L. 110-246), the President's annual budget, and annual appropriations acts.

Notes: FB = 2008 farm bill authorized level; Available = for discretionary funds it is the amount appropriated, for mandatory funds it is the amount authorized in the 2008 farm bill less any reductions in annual appropriations acts.

a. Section 9001 of the 2008 farm bill (P.L. 110-246) amends title IX of the 2002 farm bill (P.L. 107-171). Sections 9002 through 9013 of the table are the amended section numbers.

b. Title IX programs 9003, 9004, 9005, 9007, and 9008 include funding that is authorized "to remain available until expended," therefore carryover could exist from previous years if funds are unobligated.

c. Mandatory funding for FY2012 was reduced to the listed amount for programs 9005, 9007, and 9011 under the FY2012 Agriculture appropriations act (P.L. 112-55).

d. This program is "triggered" when a sugar surplus exists. According to USDA, the Commodity Credit Corporation (CCC) does not have a surplus inventory of sugar, therefore this program has not been implemented and no outlays have been made.

e. The Supplemental Appropriations Act of 2010 (P.L. 111-212) limits mandatory spending on BCAP by allowing no more than 552 million in FY2010 and 432 million in FY2011. For more on these types of changes in mandatory program spending, see CRS Report R41245, *Reductions in Mandatory Agriculture Program Spending*. For more information on the 2010 supplemental, see CRS Report R41255, *FY2010 Supplemental Appropriations for Agriculture*.

f. BCAP funding for FY2011 was reduced a second time to 112 million under the Dept. of Defense and Full-Year Continuing Appropriations Act, 2011 (P.L. 112-10).

g. No BCAP outlays were made during FY2008 since the program had not yet been implemented, while $243 million of outlays were made during FY2009.

Table 3. Proposed Funding Authorizations for Title IX Provisions in Next Farm Bill (FY2013-FY2017) Under 112th Congress

($ millions)

Section[a]	Provision Name	Funds Type	FY2013 S	FY2013 HAC	FY2014 S	FY2014 HAC	FY2015 S	FY2015 HAC	FY2016 S	FY2016 HAC	FY2017 S	FY2017 HAC	FY2013-FYF2017 S	FY2013-FYF2017 HAC
§9002	Fed. Biobased Markets Prog.	M	3	0	3	0	3	0	3	0	3	0	15	10
		D	2	2	2	2	2	2	2	2	2	2	10	10
§9003	Biorefinery Assistance	M	100	0	58	0	58	0	0	0	0	0	216	0
		D	150	75	150	75	150	75	150	75	150	75	750	375
§9004[b]	Repeal Repowering Assistance	—	—	—	—	—	—	—	—	—	—	—	—	—
§9005	Bioenergy Prog. for Advanced Biofuels	M	0	0	0	0	0	0	0	0	0	0	0	0
		D	20	50	20	50	20	50	20	50	20	50	100	250
§9006	Biodiesel Education Prog.	D	1	0	1	0	1	0	1	0	1	0	5	0
		D	1	2	1	2	1	2	1	2	1	2	5	10
§9007	REAP	M	48.2	0	48.2	0	48.2	0	48.2	0	48.2	0	241	0
	(transferred from §9004)[b]	M	5	5	5	5	5	5	5	5	5	5	25	25
		D	20	45	20	45	20	45	20	45	20	45	100	225
§9008	Biomass Research & Dev.	M	26	0	26	0	26	0	26	0	26	0	130	0
		D	30	20	30	20	30	20	30	20	30	20	150	100
§9009	Feedstock Flexibilty Prog.	M	SSAN	SSAN	SSAN	SSAN	SSAN	SSAN	SSAN	SSAN	SSAN	SSAN	SSAN	SSAN
§9010	BCAP	M	38.6	0	38.6	0	38.6	0	38.6	0	38.6	0	193	0
		D	0	75	0	75	0	75	0	75	0	75	0	375
§9011[c]	Repeal Forest Biomass Energy	—	—	—	—	—	—	—	—	—	—	—	—	—
§9011-12[d]	Comm. Wood Energy Prog.	D	5	2	5	2	5	2	5	2	5	2	25	10
§9012[e]	Repeal Biof. Infrastr. Study	—	—	—	—	—	—	—	—	—	—	—	—	—
§9013[f]	Repeal Ren. Fertilizer Study	—	—	—	—	—	—	—	—	—	—	—	—	—
	Total Mandatory	**M**	**222**	**5**	**180**	**5**	**180**	**5**	**122**	**5**	**122**	**5**	**825**	**25**
	Total Discretionary	**D**	**228**	**271**	**228**	**271**	**228**	**271**	**228**	**271**	**228**	**271**	**1,140**	**1,355**

Source: Compiled by CRS using the 112th Congress' House-reported (H.R. 6083) and Senate-passed (S. 3240) versions of the next farm bill.

Notes: S = Senate; HR = House Resolution; HAC = House Agriculture Committee; D = discretionary funding, i.e., the annual amount authorized to be appropriated; M = mandatory funding, i.e., the annual amount authorized from USDA's CCC; SSAN = Such sums as necessary.

a. The Rural Energy Self-Sufficiency Initiative is repealed by omission under both H.R. 6083 and S. 3240.

b. The Repowering Assistance Program is repealed by §9004 under both H.R. 6083 and S. 3240, and the remaining funds of an estimated $25 million are to be used by the REAP program and should remain available until expended.

c. The Forest Biomass for Energy program which is repealed by §9011 of S. 3240, is not mentioned in H.R. 6083.

d. The Community Wood Energy Program is §9011 under H.R. 6083 and §9012 under S. 3240.

e. The Biofuels Infrastructure Study which is repealed by §9012 of H.R. 6083, is not mentioned in S. 3240.

f. The Renewable Fertilizer Study is repealed by §9013 under both H.R. 6083 and S. 3240.

Appendix. Key Reports on Biofuels

BRDI Interagency Working Groups Reports[72]

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Biomass Research Development Board, *Biomass Conversion: Challenges for Federal Research and Commercialization*, Biomass Conversion Interagency Working Group, February 2011.

Biomass Research Development Board, *Bioenergy Feedstock Best Management Practices: Summary and Commercialization*, Feedstock Production Interagency Working Group, undated (2011).

Biomass Research Development Board, *Biofuel Feedstock Logistics: Recommendations for Research and Needs*, Feedstock Logistics Interagency Working Group, November 2010.

Biomass Research Development Board, *Increasing Feedstock Production for Biofuels: Economic Drivers, Environmental Implications, and the Role of Research,* Interagency Working Group, December 2008.

Biomass Research Development Board, *National Biofuels Action Plan*, Interagency Working Group, October 2008; available at http://www1.eere.energy.gov/biomass/pdfs/nbap.pdf.

Other Federal Government Reports

USDA, Rural Development Agency, *The Impact of Rural Energy for America Program on Promoting Energy Efficiency and Renewable Energy*, March 2012; available at http://www.rurdev.usda.gov/Reports/rdREAPReportMarch2012.pdf.

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[72] These BRDI Interagency Working Group (IWG) reports have been prepared pursuant to Section 9008(c)(3)(B) of the 2008 farm bill and are being disseminated by DOE; available at http://www.usbiomassboard.gov/board/working_groups.html.

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Selected Non-Governmental Reports

CARD, *Outlook for Ethanol and Conventional Biofuel RINs in 2013 and 2014*, Bruce A. Babcock, CARD Policy Brief 12-PB9, December 2012; available at http://www.card.iastate.edu/.

FAPRI, *A Question Worth Billions: Why Isn't the Conventional RIN Price Higher*, FAPRI-MU Report #12-12, FAPRI, December 6, 2012; available at http://www.fapri.missouri.edu/.

FAPRI, *Renewable Fuel Standard Waiver Options during the Drought of 2012,* FAPRI-MU Report #11-12, FAPRI, October 4, 2012; available at http://www.fapri.missouri.edu/.

Steve Brick, "Harnessing the Power of Biomass Residuals: Opportunities and Challenges for Midwestern Renewable Energy," *Heartland Papers*, The Chicago Council on Global Affairs©2011, November 2011.

Bruce A. Babcock, *The Impact of U.S. Biofuels Policies on Agricultural Price Levels and Volatility*, Issue Paper No. 35, International Center for Trade and Sustainable Development, Geneva, Switzerland, June 2011; available at http://www.ictsd.org.

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