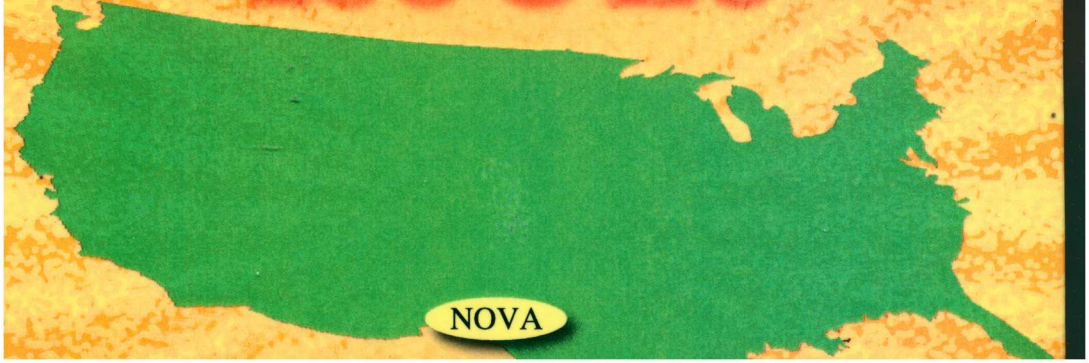
Edgar R. Thompson
Editor

Energy Policies, Politics and Prices

ENERGY POLICIES and ISSUES



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ENERGY POLICIES, POLITICS AND PRICES

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ENERGY POLICIES, POLITICS AND PRICES

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PREFACE

Energy policy is the manner in which a given entity has decided to address issues of energy development including energy production, distribution and consumption. This book examines a number of energy policies put in place by the government, as well as the issues which continue to offset substantial improvements. Topics discussed herein include anaerobic digestion; forest carbon markets; gas hydrates; concepts designed to mitigate climate change; and offshore oil and gas development.

Chapter 1- The Food, Conservation, and Energy Act of 2008 (P.L. 110-246, the 2008 farm bill) extends and expands many of the renewable energy programs originally authorized in the Farm Security and Rural Investment Act of 2002 (P.L. 107-171, 2002 farm bill). The bill also continues the emphasis on the research and development of advanced and cellulosic bioenergy authorized in the 2007 Energy Independence and Security Act (P.L. 110-140).

Chapter 2- If allowed as a compliance option in a greenhouse gas (GHG) emission reduction program (e.g., a cap-and-trade system), offsets have the potential to provide considerable cost savings and other benefits. However, offsets have generated considerable controversy, primarily over the concern that illegitimate offsets could undermine the ultimate objective of a cap-and-trade program: emission reduction.

Chapter 3- Biochar is a charcoal produced under high temperatures using crop residues, animal manure, or any type of organic waste material. Depending on the feedstock, biochar may look similar to potting soil or to a charred substance. The combined production and use of biochar is considered a carbon-negative process, meaning that it removes carbon from the atmosphere.

Biochar has multiple potential environmental benefits, foremost the potential to sequester carbon in the soil for hundreds to thousands of years at an estimate. Studies suggest that crop yields can increase as a result of applying biochar as a soil amendment. Some contend that biochar has value as an immediate climate change mitigation strategy. Scientific experiments suggest that greenhouse gas emissions are reduced significantly with biochar application to crop fields.

Chapter 4- Forests are major carbon sinks (storehouses), and activities that alter forests can release or sequester carbon dioxide (CO_2), the most common greenhouse gas (GHG). Some carbon markets have been formed under mandatory GHG reduction regimes, such as the Kyoto Protocol and various regional and state initiatives in the United States. Other markets have formed for voluntary efforts to reduce GHG emissions. Offsets, or credits for sequestering carbon or reducing emissions in unregulated sectors, are typically allowed in both mandatory and voluntary markets. Forestry activities are among the largest-volume and lowest-cost opportunities for generating offsets

Chapter 5- Anaerobic digestion technology may help to address two congressional concerns that have some measure of interdependence: development of clean energy sources and reduction of greenhouse gas emissions. Anaerobic digestion technology breaks down a feedstock—usually manure from livestock operations—to produce a variety of outputs including methane. An anaerobic digestion system may reduce greenhouse gas emissions because it captures the methane from manure that might otherwise be released into the atmosphere as a potent greenhouse gas. The technology may contribute to the development of clean energy because the captured methane can be used as an energy source to produce heat or generate electricity.

Chapter 6- Solid gas hydrates are a potentially huge resource of natural gas for the United States. The U.S. Geological Survey estimated that there are about 85 trillion cubic feet (TCF) of technically recoverable gas hydrates in northern Alaska. The Minerals Management Service estimated a mean value of 21,000 TCF of in-place gas hydrates in the Gulf of Mexico. By comparison, total U.S. natural gas consumption is about 23 TCF annually. The in-place estimate disregards technical or economical recoverability, and likely overestimates the amount of commercially viable gas hydrates. Even if a fraction of the U.S. gas hydrates can be economically produced, however, it could add substantially to the 1,300 TCF of technically recoverable U.S. conventional natural gas reserves. To date, however, gas hydrates have no confirmed commercial production.

Chapter 7- The development of offshore oil, gas, and other mineral resources in the United States is impacted by a number of interrelated legal regimes, including international, federal, and state laws. International law provides a framework for establishing national ownership or control of offshore areas, and domestic federal law mirrors and supplements these standards.

Chapter 8- Moratoria provisions for the outer continental shelf (OCS), enacted as part of the Department of the Interior appropriations over 26 years, prohibited federal spending on oil and gas development in certain locations and for certain activities. These annual congressional moratoria expired on September 30, 2008. While the expiration of the restrictions does not make leasing and drilling permissible in all offshore areas, it is a significant development in conjunction with other changes in offshore leasing activity. The ending of the moratoria signals a shift in policy that may affect other OCS policies as well.

Chapter 9- In an attempt to boost sagging U.S. auto sales and to promote higher vehicle fuel economy, the President signed legislation on June 24, 2009, P.L. 111-32, establishing a program to provide rebates to prospective purchasers toward the purchase of new, fuel-efficient vehicles, provided the trade-in vehicles are scrapped. The program was known as Consumer Assistance to Recycle and Save (CARS), or, informally, as "cash for clunkers." It provided rebates of $3,500 or $4,500, depending on fuel economy and vehicle type of both the new vehicle and the vehicle to be disposed of. Congress appropriated $3 billion for the program in two separate installments. CARS ran for a month, from July 24, 2009, until August 25, 2009.

Chapter 10- Since the 1970s, federal incentives have played a major role in encouraging agriculture-based renewable energy production. Policy goals include the stimulation of alternative uses of domestic grain and oilseeds, the promotion of national security through greater energy independence, and the encouragement of rural economic development. Federal incentives, notably tax credits, a minimum renewable fuel use requirement, and research and development funding, have helped biofuels output (ethanol and biodiesel) to surge in recent years, growing from 1.4 billion gallons in 1998 to over 11 billion in 2009. Nearly all of the growth has been in corn-starch ethanol.

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Chapter 1

RENEWABLE ENERGY PROGRAMS IN THE 2008 FARM BILL

Megan Stubbs

SUMMARY

The Food, Conservation, and Energy Act of 2008 (P.L. 110-246, the 2008 farm bill) extends and expands many of the renewable energy programs originally authorized in the Farm Security and Rural Investment Act of 2002 (P.L. 107-171, 2002 farm bill). The bill also continues the emphasis on the research and development of advanced and cellulosic bioenergy authorized in the 2007 Energy Independence and Security Act (P.L. 110-140).

Farm bill debate over U.S. biomass-based renewable energy production policy focused mainly on the continuation of subsidies for ethanol blenders, continuation of the import tariff for ethanol, and the impact of corn-based ethanol on agriculture. The enacted bill requires reports on the economic impacts of ethanol production, reflecting concerns that the increasing share of corn production being used for ethanol had contributed to high commodity prices and food price inflation.

Title VII, the research title of the 2008 farm bill, contains numerous renewable energy related provisions that promote research, development, and demonstration of biomass-based renewable energy and biofuels. The Sun Grant Initiative coordinates and funds research at land grant institutions on

biobased energy technologies. The Agricultural Bioenergy Feedstock and Energy Efficiency Research and Extension Initiative provides support for on-farm biomass energy crop production research and demonstration.

Title IX, the energy title of the farm bill, authorizes mandatory funds (not subject to appropriations) of $1.1 billion, and discretionary funds (subject to appropriations) totaling $1.0 billion, for the FY2008-FY2012 period. Energy grants and loans provided through initiatives such as the Bioenergy Program for Advanced Biofuels promote the development of cellulosic biorefinery capacity. The Repowering Assistance Program supports increasing efficiencies in existing refineries. Programs such as the Rural Energy for America Program (REAP) assist rural communities and businesses in becoming more energy-efficient and self-sufficient, with an emphasis on small operations. The Biomass Crop Assistance Program, the Biorefinery Assistance Program, and the Forest Biomass for Energy Program provide support to develop alternative feedstock resources and the infrastructure to support the production, harvest, storage, and processing of cellulosic biomass feedstocks. Cellulosic feedstocks—for example, switchgrass and woody biomass—are given high priority both in research and funding.

Title XV of the 2008 farm bill contains tax and trade provisions. It continues current biofuels tax incentives, reducing those for corn-based ethanol but expanding tax credits for cellulosic ethanol. The tariff on ethanol imports is extended.

Implementation of the farm bill's energy provisions is underway. President Obama, in May 2009, directed the U.S. Department of Agriculture (USDA) and the Department of Energy (DOE) to accelerate implementation of renewable energy programs. Notices and proposed rules have appeared in the *Federal Register* soliciting applications for the Biorefinery Program, the Rural Energy for America Program, and the Biomass Crop Assistance Program.

BACKGROUND

Renewable energy policy in the Food, Conservation, and Energy Act of 2008 (P.L. 110-246, 2008 farm bill) builds on earlier programs, many of which were established in the Farm Security and Rural Investment Act of 2002 (P.L. 107-171, 2002 farm bill). The 2002 farm bill 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. 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).[1] Many policymakers view agriculture-based biofuels as both a catalyst for rural economic development and a response to growing energy import dependence. Ethanol and biodiesel, the two most widely used biofuels, receive significant federal support in the form of tax incentives, loans and grants, and regulatory programs.[2]

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), and many of its provisions also build on the goals of EISA.[3] The emphasis on facilitating production of biofuels derived from cellulosic feedstocks reflects the goals of the renewable fuels standard (RFS) in EISA. EISA includes a significant expansion of the RFS to 36 billion gallons by 2022, with carve-outs for biodiesel (1 billion gallons by 2012) and cellulosic ethanol (16 billion gallons by 2022) and an implicit cap on corn starch ethanol (15 billion gallons by 2015). Provisions in the 2008 farm bill reflect the increased role for biofuels mandated by the expansion of the RFS and its likely impact on the U.S. agriculture sector.[4]

The emphasis on cellulosic ethanol also reflects increasing concerns about the economic and environmental issues associated with corn starch-based ethanol.[5] Record high commodity prices in 2007 and mid-2008, combined with high energy costs, resulted in sharp increases in livestock feed costs, export prices, and domestic food price inflation. For the first time, an agricultural commodity is directly competing with petroleum in the marketplace. Ethanol production, the profitability of which depends directly on both petroleum and corn prices, accounts for about a third of U.S. corn production. The increase in corn used for U.S. ethanol production exceeds the increase in corn produced during the three years. When petroleum prices rise, so does demand for ethanol as a substitute, which in turn increases both the demand for and price of corn. The "food versus fuel" debate intensified during the 2008 farm bill debate as food price inflation accelerated both in the U.S. and globally—highlighting some of the potential problems associated with replacing even a small share of the nation's gasoline consumption with corn-based ethanol.

Competition for limited corn supplies between livestock producers, ethanol refiners, exporters, and other domestic users resulted in calls for at least a partial waiver of the RFS in 2009.[6]

Several of the federal programs that currently support renewable energy production in general, and agriculture-based energy production in particular, are outside the purview of the U.S. Department of Agriculture (USDA) and have legislative origins outside of the farm bill. For example, the RFS mandates the inclusion of an increasing volume of biofuels in the national fuel supply. This originated with the Energy Policy Act of 2005 (P.L. 109-58) and was more recently expanded in EISA. Similarly, the federal tax credits available to biofuel blenders were initially contained in the American Jobs Creation Act of 2004 (P.L. 108-357), although they have been incorporated in the farm bill.

Major Energy Provisions in the 2008 Farm Bill

The 2008 farm bill (P.L. 110-246) significantly expands existing programs to promote biofuels. Like the 2002 farm bill (P.L. 107-171), it contains a distinct energy title (Title IX) that covers a wide range of energy and agricultural topics with extensive attention to biofuels, including corn starch-based ethanol, cellulosic ethanol, and biodiesel. Research provisions relating to renewable energy are found in Title VII and tax and trade provisions are found in Title XV.

The enacted 2008 farm bill keeps the structure of Title IX as it was in the Senate-passed version of the farm bill. Title IX serves as a substitute amendment to the 2002 farm bill Title IX and consists of 3 sections. The first section, 9001, contains 13 new provisions which effectively replace the provisions of the 2002 bill. Sections 9002 and 9003 direct studies and reports on biofuels infrastructure and renewable fertilizer, respectively. See **Appendix A** for a side-by-side comparison of previous law with the energy provisions of the 2008 farm bill.

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

- emphasis on cellulosic ethanol production through new blender tax credits, promotion of cellulosic feedstocks production, feedstocks infrastructure and refinery development;
- grants and loan guarantees for biofuels (especially cellulosic) research, development, deployment, and production;
- studies of the market and environmental impacts of increased biofuel use;

- expansion of biofuel feedstock availability;
- expansion of the existing biobased marketing program to encourage federal procurement of biobased products;
- support for rural energy efficiency and self-sufficiency;
- reauthorization of biofuels research programs within the USDA and Environmental Protection Agency (EPA);
- an education program to promote the use and understanding of biodiesel;
- reduction of the blender tax credit for corn-based ethanol;
- continuation and expansion of the federal bio-products certification program;
- environmental safeguards through greenhouse gas emission requirements on new biofuel production; and
- continuation of the import duty on ethanol.

ENERGY POLICY ISSUES IN THE 2008 FARM BILL

Cellulosic Biofuels

The 2008 farm bill energy title provides $1 billion in financial incentives and support to encourage the production of advanced (mainly cellulosic) biofuels.[7] Grants and loan guarantees leverage industry investments in new technologies and the production of cellulosic feedstocks. For instance, the Biomass Crop Assistance Program (BCAP, Section 9001) supports the production of dedicated crop and forest cellulosic feedstocks and provides incentives for harvest and post-production storage and transport. Advanced biofuels refinery capacity construction is assisted under the Biorefinery Assistance program (Section 9001) through grants and loans for the development, construction, and retrofitting of commercial-scale refineries to produce advanced biofuels. These programs are supported by increased funding for advanced biofuels research under the Agricultural Bioenergy Feedstock and Energy Efficiency Research and Extension Initiative (Section 7207), and the Sun Grant Program (Section 7526) which support and coordinate advanced biofuels research, extension, and development between government agencies, universities, and research institutions.

Cellulosic ethanol is produced from cellulose, hemicellulose, or lignin derived from the structural material that provides much of the mass of plants.

Besides corn, several other agricultural products are viable feedstock and appear to offer attractive long-term supply potential—particularly cellulose-based feedstock such as prairie grasses and fast-growing woody crops such as hybrid poplar and willow trees, as well as waste biomass materials (logging residues, wood processing mill residues, urban wood wastes, and selected agricultural residues such as sugar cane bagasse and rice straw). Some cellulosic feedstock, such as native prairie grasses (e.g., switchgrass), appear to offer environmental benefits over corn-based ethanol because they thrive on marginal lands (as well as on prime cropland) and need little water and no fertilizer.

Currently, cellulosic ethanol is not produced on a commercial scale. Only a few small refineries are scheduled to begin production in 2010, with an additional nine expected to commence production by 2013 for a total output of 389 million gallons per year (mgpy). In January 2009, USDA announced funding for a cellulosic biofuels plant under the Biorefinery Assistance program (Section 9001) with projected output of 20 mgpy, beginning in 2010. The RFS mandates cellulosic ethanol production of 100 mgpy in 2010, and 500 mgpy in 2012 (a year earlier than the projected output of 389 mgpy). For more information on cellulosic ethanol, see CRS Report RL34738, *Cellulosic Biofuels: Analysis of Policy Issues for Congress*.

Tax Credits and Tariffs

Title XV of the 2008 farm bill contains provisions which extend and modify tax credits and tariffs on ethanol. In keeping with the promotion of cellulosic ethanol, a blender credit of $1.01 per gallon applies to ethanol produced from qualifying cellulosic feedstocks. This tax credit is intended to spur investment in cellulosic ethanol production. The ethanol blender tax credit of $0.51 per gallon (which applies to all ethanol blended, including imports) was reduced to $0.45 per gallon in January 2009. Section 15331 of the farm bill requires the reduction starting the first year following that year in which U.S. ethanol production and imports exceed 7.5 billion gallons. Production and imports in 2008 were estimated to have exceeded 9 billion gallons.

Table 1. 2008 Farm Bill Energy Funding by Provision, FY2009 to FY2011 ($ in Millions)

Section[a]	Program	Funding Type	FY2009			FY2010			FY2011		
			Pres Req[b]	FB Auth[c]	Budget Auth	Pres Req[b]	FB Auth[c]	Budget Auth	Pres Req[b]	FB Auth[c]	Budget Auth
Sec. 7205	Nutrient Management Research and Extension Initiative	Discretionary	0	SSAN	0	0	SSAN	0	0	SSAN	NA
Sec. 7207	Bioenergy Feedstock and Energy Efficiency Research and Extension Initiative	Discretionary	0	50	0	0	50	0	0	50	NA
Sec. 7526	Sun Grant Program	Discretionary	0	75	0	0	75	0	0	75	NA
Sec. 9002	Federal Biobased Markets Program	Mandatory	—	2	2	—	2	2	—	2	NA
Sec. 9002	Federal Biobased Markets Program	Discretionary	0	2	0	0	2	0	0	2	NA
Sec. 9003	Biorefinery Assistance	Mandatory	—	75 TRAUE	75 TRAUE	—	245 TRAUE	245 TRAUE	—	TRAUE	NA