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# Monthly Biodiesel Production Report

**March 2009**

**U.S. Energy Information Administration**  
Office of Coal, Nuclear, Electric and Alternate Fuels  
U.S. Department of Energy  
Washington, DC 20585

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<http://www.eia.doe.gov/fuelrenewable.html>

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## Preface

The Monthly Biodiesel Production Report is intended to provide insight into the operations of the U.S. biodiesel industry. The audience for this report is the U.S. Department of Energy, other governmental entities, industry trade groups, the private sector, and the general public. The U.S. Energy Information Administration (EIA) intends to provide a statistically reliable, comprehensive, and publicly accessible source of annual and monthly data. Prior to the establishment of the Monthly Biodiesel Production Report, there was no comprehensive source of statistical data to monitor the size or direction of growth in the biodiesel industry. This report is part of EIA's response to Section 1508 of the Energy Policy Act of 2005, which directs EIA to publish information on renewable fuels including biodiesel.

EIA obtains the data presented in this report from two surveys, the Monthly Biodiesel Production Survey (Form EIA-22M) and the Supplement to the Monthly Biodiesel Production Survey (Form EIA-22S). Form EIA-22M collects the following data from registered U.S. producers of biodiesel by plant:

- Plant location, operating status, and annual production capacity
- B100 and coproduct production and monthly stock changes
- Feedstock, alcohol input, and other catalysts into biodiesel production
- Sales of B100 and blended biodiesel
- End-use sales of biodiesel

Form EIA-22M is designed to provide the data necessary for EIA to carry out its responsibilities regarding renewable fuels demand in the motor fuels market, to monitor the rate of growth of the biodiesel industry, and to inform Congress whether the objectives of Section 503 of the Energy Policy Act of 1992 and Section 1508 of Energy Policy Act of 2005 are being achieved.

EIA-22M is unique in its frequency and depth. The National Biodiesel Board, for example, presents an annual production estimate. EIA has also used data from Census Report M311K Fats and Oils: Production, Consumption, and Stocks, which tracks monthly disposition of vegetable oils and animal fats. One of the uses monitored by the Census report is the input of oil and fats to methyl ester production, which is assumed to be marketed as biodiesel. EIA-22M explicitly tracks the production of biodiesel and adds data on alcohol and catalyst inputs, glycerol output, and estimated producer prices for a variety of sales types. EIA-22M enables regional and State-level reporting of biodiesel activities.

Form EIA-22S is a one-time supplement to the Monthly Biodiesel Production Survey. It collected annual observations of production capacity, biodiesel production, and coproduct production for comparison with other sources to ensure data quality. In this report, preliminary annual data are presented for 2008, and preliminary monthly data are presented for 2009.

## **Future Publications of the *Monthly Biodiesel Production Report***

The data presented in this report are approximately 13 months old. The EIA-22M survey was first opened in June 2009 for January 2009 data. There are several reasons for the lag between the opening of the survey and the first publication. One is that EIA-22M is a new survey. It is aimed at respondents who, for the most part, have never submitted an EIA survey prior to EIA-22M. Many respondents, therefore, needed online assistance or answers to technical questions as they worked through their survey for submission. Another reason for the delay is the timing of the survey launch. Market conditions were poor for biodiesel producers in early 2009. Many firms were not actively producing or marketing biodiesel and logically assumed that a response to EIA-22M was not required. Some firms may also have laid off staff during the inactivity, and the remaining employees may have experienced difficulty collecting the information needed for the survey. Our survey staff spent considerable time following up with nonrespondents in the months after the survey was launched. The complexity of EIA-22M was also an issue for survey respondents. Though EIA worked with the National Biodiesel Board to inform respondents about the content of the survey, there are many raw materials that can be used to produce biodiesel, and there are several ways that the product can be marketed. A detailed form is needed to develop a high-resolution snapshot of market conditions in each month, and it is understandable that respondents would have questions the first few times through the survey.

EIA intends to accelerate publishing the remaining data for 2009 and 2010. Data for the second quarter 2009 are expected to be released in May 2010, and the remaining quarters are expected in July and September respectively. EIA anticipates routine publication of the monthly report approximately 75 days after the end of a calendar month.

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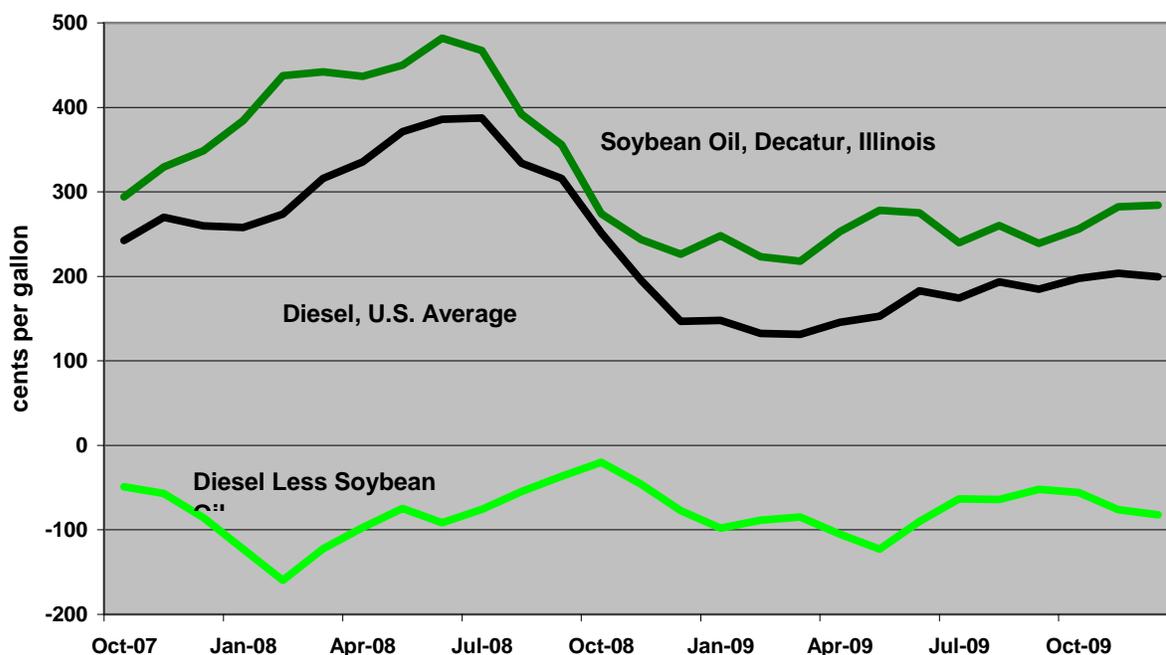
## Market Summary

This is the first report from the Monthly Biodiesel Production Survey. As of March 2009, the United States had 110 active biodiesel producers with total production capacity of 1.9 billion gallons per year. Actual production for all of 2008 was 678 million gallons. Production for the first 3 months of 2009, however, was 93 million gallons, equivalent to 372 million gallons per year. Capacity utilization was 23 percent in January 2009, but fell to 15 percent in March 2009 (Table 1). Biodiesel typically sold at a premium to petroleum diesel during this period. The average price of blends containing 98 percent or more biodiesel and sold net of the Federal tax credit was \$1.79 per gallon for the first 3 months of 2009. The average diesel wholesale price during this period was \$1.37 per gallon.

In early 2009, the biodiesel industry was concentrated in the central United States, from the Canadian border to the Gulf of Mexico. Eighty-one percent of biodiesel production capacity was located in Petroleum Administration for Defense Districts (PADDs) II and III (Figure 2, page 7). Production during March 2009, however, occurred primarily in PADD II. PADD II was home to 55 percent of U.S. biodiesel production capacity but produced 71 percent of total output in March 2009 (Table 5).

Several factors affected the biodiesel industry in 2008 and early 2009. Crude oil prices increased dramatically in the first 6 months of 2008, which in turn caused diesel prices to rise. Prices of agricultural commodities, including soybean oil, increased as the Midwest faced record floods, and market participants feared a reduced harvest. In the first 3 months of the EIA Biodiesel Survey, most production used soybean oil or another vegetable oil for raw material. Figure ES1 shows soybean oil prices, wholesale diesel prices, and the spread between the two from October 2007 through December 2009.

**Figure ES1. Soybean Oil and Diesel Prices**



Sources: U.S. Energy Information Administration, *Petroleum Marketing Monthly*, March 2010, Table 4 and U.S. Department of Agriculture, *Oil Crops Outlook*, Feb 11, 2009, and Feb 12, 2010, Table 9.

Note: Soybean oil less diesel is calculated as  $0.991 \times \text{soybean oil price} - \text{diesel price}$ , since 0.991 gallon of soybean oil is assumed to yield 1 gallon of biodiesel.

In the latter half of 2008, falling crude oil prices and a global economic downturn that reduced demand for diesel fuel triggered a sharp decline in diesel and soybean oil prices. Also, the Midwestern floods caused less damage to crops than feared, and improved expectations for the 2008 harvest placed additional downward pressure on soybean oil prices. The result was a very favorable climate for biodiesel producers in late 2008. But diesel prices had further to fall, and by January 2009, the economics of biodiesel production were less favorable. The result was that already-low levels of production in January 2009 were even lower by March 2009. Production in January 2009 was 39 million gallons; production in March 2009 was 24 million gallons.

The spread between diesel and soybean oil prices, shown as the lowest line in Figure ES-1, is a key indicator of biodiesel producers' ability to compete with petroleum diesel fuel while still covering their costs. There are some fuel consumers who are willing to pay a price premium for biodiesel, but biodiesel can probably only achieve widespread use above mandated levels if it can be sold at the same price or a lower price per gallon than petroleum diesel fuel. If the spread between diesel and soybean oil prices is negative, a subsidy or additional revenue stream is likely to be needed to make biodiesel production profitable. For the time period covered in this report, the combined value of the Federal Biodiesel Income Tax Credit and the Federal Biodiesel Mixture Excise Tax Credit was 100 cents per gallon, allowing for price parity between soybean oil and diesel fuel at the retail level as long as the spread between diesel and soybean oil prices was less than 100 cents per gallon. Biodiesel producers' ability to cover their other variable costs or realize a positive margin on their operations was increasingly compromised as the spread between soybean oil and diesel approached the value of the biodiesel tax credits. Glycerol, the major coproduct of biodiesel production, was once assumed to be an additional revenue stream. However, the growth in biodiesel production has glutted the market for glycerol in many places. It is not a given that a biodiesel producer can sell its glycerol; some may need to pay to dispose of it. Other potential subsidies during this time period were the Small Agri-Biodiesel Producer Tax Credit and various State tax credits for biodiesel producers. Unlike the Federal income and excise tax credits, these other subsidies were not universally applicable.

**Table 1. Biodiesel Production Capacity and Production, 2008 through March 2009**  
(Million Gallons)

<b>Period</b>	<b>Annual Production Capacity</b>	<b>B100 Production</b>
2008	1,759	678
<b>2009</b>		
January	1,999	39
February	1,965	31
March	1,904	24
<b>Year-to-Date</b>	--	<b>93</b>

-- = Not applicable.

Notes: B100 is the industry designation for pure biodiesel; a biodiesel blend contains both pure biodiesel and petroleum diesel fuel. Annual production capacity is measured at the end of the specified time period.

Source: U.S. Energy Information Administration, Form EIA-22M, "Monthly Biodiesel Production Survey," and EIA-22S, "Supplement to the Monthly Biodiesel Production Survey."

**Table 2. Activity at Biodiesel Plants, January through March 2009**  
(Million Gallons)

Period	B100 Production	Sales of B100	Sales of B100 Included in Biodiesel Blends	Beginning-of-Month Stocks of B100	End-of-Month Stocks of B100	B100 Stock Change
<b>2009</b>						
January	39	14	18	21	28	6
February	31	18	20	27	23	-5
March	24	11	13	21	21	-1
<b>Year-to-Date</b>	<b>93</b>	<b>43</b>	<b>50</b>	<b>--</b>	<b>--</b>	<b>--</b>

-- = Not applicable.

Notes: B100 is the industry designation for pure biodiesel; a biodiesel blend contains both pure biodiesel and petroleum diesel fuel. Totals may not equal sum of components due to independent rounding. Stock discrepancies may arise from unaccounted-for volumes, losses, and other adjustments.

Source: U.S. Energy Information Administration, Form EIA-22M, "Monthly Biodiesel Production Survey."

**Table 3. Biodiesel and Glycerol Production, by State, March 2009**  
(Million Gallons)

State	Number of Producers	Annual Production Capacity	Monthly Production	
			B100	Glycerol
Alabama	3	35	W	W
Arizona	2	18	W	W
Arkansas	2	18	W	W
California	5	51	W	W
Connecticut	2	2	W	W
Florida	1	-	-	-
Georgia	7	27	s	s
Illinois	6	218	2	W
Indiana	3	115	W	W
Iowa	7	211	W	W
Kansas	3	2	-	-
Kentucky	3	53	W	W
Louisiana	1	12	-	-
Maryland	1	3	-	-
Michigan	3	32	W	W
Minnesota	6	107	W	W
Mississippi	2	88	-	-
Missouri	6	104	4	W
Montana	1	s	W	W
Nebraska	1	5	W	W
Nevada	1	1	W	W
New York	1	20	-	-
North Carolina	5	8	s	W
Ohio	4	66	W	-
Oklahoma	4	60	W	W
Pennsylvania	5	52	W	W
South Carolina	2	57	-	-
South Dakota	1	2	-	-
Tennessee	4	52	-	-
Texas	10	359	W	W
Virginia	2	10	W	W
Washington	2	105	-	-
West Virginia	1	3	W	W
Wisconsin	3	12	W	W
<b>U.S. Total</b>	<b>110</b>	<b>1,904</b>	<b>24</b>	<b>2</b>

s = Value is less than 0.5 of the table metric, but value is included in any associated total.

W = Withheld to avoid disclosure of individual company data.

- = No data reported.

Notes: Totals may not equal sum of components due to independent rounding. Number of Producers is a count of entities with operable capacity in the reporting month.

Source: U.S. Energy Information Administration, Form EIA-22M, "Monthly Biodiesel Production Survey."

**Table 4. Biodiesel and Glycerol Production, by Census Division, March 2009**  
(Million Gallons)

Census Division	Number of Producers	Annual Production Capacity	Monthly Production	
			B100	Glycerol
New England	2	2	W	W
Middle Atlantic	6	72	W	W
East North Central	19	443	W	1
West North Central	24	431	8	1
South Atlantic	19	107	s	s
East South Central	12	227	W	W
West South Central	17	449	W	W
Mountain	4	19	W	W
Pacific	7	156	W	W
<b>U.S. Total</b>	<b>110</b>	<b>1,904</b>	<b>24</b>	<b>2</b>

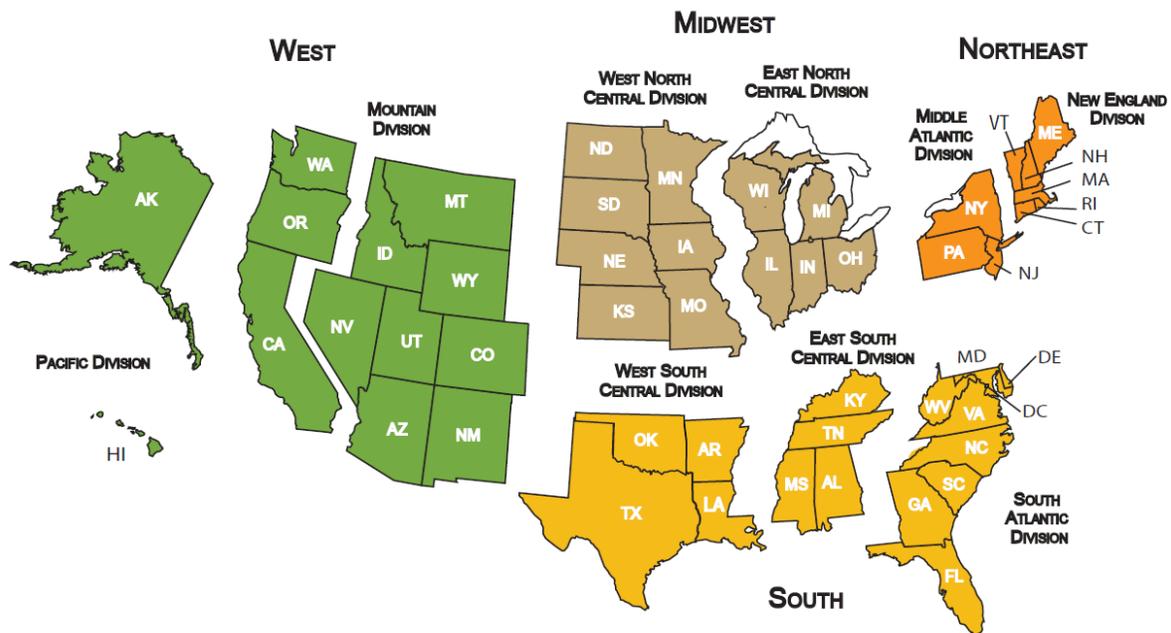
s = Value is less than 0.5 of the table metric, but value is included in any associated total.

W = Withheld to avoid disclosure of individual company data.

Notes: Totals may not equal sum of components due to independent rounding. "Number of Producers" is a count of entities with the capability to produce biodiesel in the reporting month. The entity need not have actually produced biodiesel in order to be counted.

Source: U.S. Energy Information Administration, Form EIA-22M, "Monthly Biodiesel Production Survey."

**FIGURE 1. U.S. CENSUS REGIONS AND DIVISIONS**



**Table 5. Biodiesel and Glycerol Production, by Petroleum Administration for Defense District, March 2009**  
(Million Gallons)

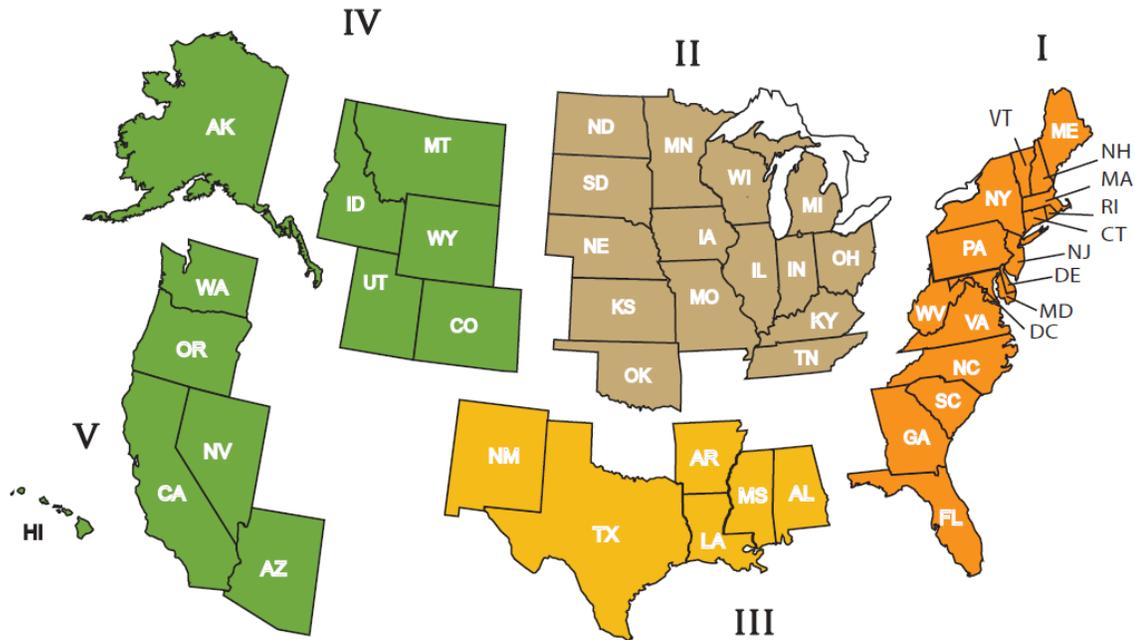
Petroleum Administration for Defense District	Number of Producers	Annual Production Capacity	Monthly Production	
			B100	Glycerol
I	27	181	2	s
II	54	1,038	17	2
III	18	511	3	s
IV	1	s	s	s
V	10	174	1	s
<b>U.S. Total</b>	<b>110</b>	<b>1,904</b>	<b>24</b>	<b>2</b>

s = Value is less than 0.5 of the table metric, but value is included in any associated total.

Notes: Totals may not equal sum of components due to independent rounding. Number of Producers is a count of entities with operable capacity in the reporting month.

Source: U.S. Energy Information Administration, Form EIA-22M, "Monthly Biodiesel Production Survey."

**FIGURE 2. PETROLEUM ADMINISTRATION FOR DEFENSE (PAD) DISTRICTS**



NOTE: MAP NOT TO SCALE.

**Table 6. Biodiesel Producers Sales for Resale, by Blend, January through March 2009**  
(Million Gallons)

Period	B100 Production	Total Sales of All Blends	Sales for Resale						
			Subtotal	Sales of B98 - B100	B100 Included in B98- B100 Sales	Diesel Included in B98- B100 Sales	Sales of Other Biodiesel Blends	B100 Included in Sales of Other Blends	Diesel Included in Sales of Other Blends
<b>2009</b>									
January	39	36	33	33	33	s	s	s	s
February	31	37	35	34	34	s	s	W	W
March	24	23	21	W	W	W	W	W	W
<b>Year-to-Date</b>	<b>93</b>	<b>96</b>	<b>88</b>	<b>W</b>	<b>W</b>	<b>W</b>	<b>W</b>	<b>W</b>	<b>W</b>

s = Value is less than 0.5 of the table metric, but value is included in any associated total.

W = Withheld to avoid disclosure of individual company data.

Note: Totals may not equal sum of components due to independent rounding.

Source: U.S. Energy Information Administration, Form EIA-22M, "Monthly Biodiesel Production Survey."

**Table 7. Biodiesel Producer Sales, by Blend and Assignment of Tax Credit, January through March 2009**  
(Million Gallons)

Period	Total Sales of All Blends	Sales of B98 - B100		Sales of Other Biodiesel Blends	
		Sales for Which Producer Claimed Tax Credit	Sales for Which Producer Did Not Claim Tax Credit	Sales for Which Producer Claimed Tax Credit	Sales for Which Producer Did Not Claim Tax Credit
<b>2009</b>					
January	36	19	17	s	-
February	37	18	19	s	-
March	23	13	10	s	-
<b>Year-to-Date</b>	<b>96</b>	<b>50</b>	<b>46</b>	<b>s</b>	<b>-</b>

s = Value is less than 0.5 of the table metric, but value is included in any associated total.

- = No data reported.

Notes: Totals may not equal sum of components due to independent rounding. The term "tax credit" includes 2 Federal tax credits: the Biodiesel Income Tax Credit and the Biodiesel Mixture Excise Tax Credit. It excludes the Small Agri-Biodiesel Producer Tax Credit and all State tax incentives.

Source: U.S. Energy Information Administration, Form EIA-22M, "Monthly Biodiesel Production Survey."

**Table 8. Biodiesel Producer Revenue, by Blend and Assignment of Tax Credit,  
January through March 2009**  
(Million Dollars)

Period	Total Revenue from Sales of All Blends	Revenue from Sales of B98-B100		Revenue from Sales of Other Biodiesel Blends	
		Sales for Which Producer Claimed Tax Credit	Sales for Which Producer Did Not Claim Tax Credit	Sales for Which Producer Claimed Tax Credit	Sales for Which Producer Did Not Claim Tax Credit
<b>2009</b>					
January	81	36	45	s	-
February	69	32	37	s	-
March	46	21	25	s	-
<b>Year-to-Date</b>	<b>197</b>	<b>89</b>	<b>107</b>	<b>1</b>	<b>-</b>

s = Value is less than 0.5 of the table metric, but value is included in any associated total.

- = No data reported.

Notes: Totals may not equal sum of components due to independent rounding. The term "tax credit" includes 2 Federal tax credits: the Biodiesel Income Tax Credit and the Biodiesel Mixture Excise Tax Credit. It excludes the Small Agri-Biodiesel Producer Tax Credit and all State tax incentives.

Source: U.S. Energy Information Administration, Form EIA-22M, "Monthly Biodiesel Production Survey."

**Table 9. Average Price Received by Biodiesel Producers, by Blend and Assignment of Tax Credit, January through March 2009**  
(Dollars per Gallon)

Period	Average Price of All Blends	Average Price of B98-B100		Average Price of Other Biodiesel Blends		
		Sales for Which Producer Claimed Tax Credit	Sales for Which Producer Did Not Claim Tax Credit	Sales for Which Producer Claimed Tax Credit	Sales for Which Producer Did Not Claim Tax Credit	
<b>2009</b>						
January	2.25	1.92	2.61	1.16	-	
February	1.86	1.75	1.96	2.12	-	
March	2.02	1.65	2.53	1.07	-	
<b>Year-to-Date</b>	<b>2.04</b>	<b>1.79</b>	<b>2.32</b>	<b>1.49</b>	-	

- = No data reported.

Notes: Totals may not equal sum of components due to independent rounding. The term "tax credit" includes 2 Federal tax credits: the Biodiesel Income Tax Credit and the Biodiesel Mixture Excise Tax Credit. It excludes the Small Agri-Biodiesel Producer Tax Credit and all State tax incentives.

Source: U.S. Energy Information Administration, Form EIA-22M, "Monthly Biodiesel Production Survey."

**Table 10. Energy Balance of Biodiesel Production, 2008 through March 2009**  
(Trillion Btu unless otherwise noted)

Period	Feedstock	Alcohol	Losses	Glycerol	B100 Production	B100 Production (Million Gallons)	B100 Production (Thousand Barrels)
2008					87	678	16,145
2009							
January	5	s	-	-	5	39	920
February	4	s	-	-	4	31	735
March	3	s	s	s	3	24	563
<b>Year-to-Date</b>	<b>12</b>	<b>1</b>	<b>s</b>	<b>s</b>	<b>12</b>	<b>93</b>	<b>2,218</b>

s = Value is less than 0.5 of the table metric, but value is included in any associated total.

- = No data reported.

Notes: Biodiesel production is accomplished by the reaction of vegetable oil or animal fat ("feedstock") with alcohol to yield biodiesel and glycerol. The following equation represents the energy balance. Feedstock + Alcohol - Losses = Glycerol + B100 Production, all terms in trillion Btu. Totals may not equal sum of components due to independent rounding.

Source: U.S. Energy Information Administration, Form EIA-22M, "Monthly Biodiesel Production Survey," and EIA-22S, "Supplement to the Monthly Biodiesel Production Survey."