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Short-Term Energy Outlook Supplement:

Biodiesel Supply and Consumption in the *Short-Term Energy Outlook* [1]

Introduction

The historical biodiesel consumption data published in the EIA *Monthly Energy Review* (http://www.eia.doe.gov/emeu/mer/contents.html) March 2009 edition were revised to account for imports and exports. Table 10.4 of the *Monthly Energy Review* was expanded to display biodiesel imports, exports, stocks, stock change, and consumption. Similar revisions were made in the April 2009 edition of the *Short-Term Energy Outlook* (*STEO*). Biodiesel production, net imports, and consumption history and forecasts have been added to the *STEO* Custom Table Builder, and biodiesel production and consumption are now reported in *STEO* Table 8. A review of the data sources for biodiesel production, trade (imports and exports), and consumption is presented in this report.

Biodiesel and the Renewable Fuels Standard

The Energy Policy Act of 2005 amended the Clean Air Act to establish a Renewable Fuel Standard (RFS) program, (Environmental Protection Agency Renewable Fuel Standard Program, http://www.epa.gov/otaq/renewablefuels/420f07019.pdf). On December 19, 2007, President Bush signed into law the Energy Independence and Security Act of 2007 (EISA), which amended the Clean Air Act section governing the RFS program. Some of the major changes enacted in EISA include:

- expansion of the applicable volumes of renewable fuel;
- separation of the renewable fuel volume requirements into four categories: cellulosic biofuel, biomass-based diesel, advanced biofuel, and total renewable fuel; and

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- increasing the volume of renewable fuel required from 9 billion gallons in 2008 to 36 billion gallons by 2022 (Table 1).

Table.1. Renewable Fuel Standard
(Billion gallons per year)

Year	Renewable Biofuel	Advanced Biofuel	Cellulosic Biofuel	Biomass-based Diesel	Undifferentiated Advanced Biofuel	Total RFS
2008	9.0					9.0
2009	10.5	0.6		0.5	0.1	11.1
2010	12.0	0.95	0.1	0.65	0.2	12.95
2011	12.6	1.35	0.25	0.8	0.3	13.95
2012	13.2	2.0	0.5	1.0	0.5	15.2
2013	13.8	2.75	1.0		1.75	16.55
2014	14.4	3.75	1.75		2.0	18.15
2015	15.0	5.5	3.0		2.5	20.5
2016	15.0	7.25	4.25		3.0	22.25
2017	15.0	9.0	5.5		3.5	24.0
2018	15.0	11.0	7.0		4.0	26.0
2019	15.0	13.0	8.5		4.5	28.0
2020	15.0	15.0	10.5		4.5	30.0
2021	15.0	18.0	13.5		4.5	33.0
2022	15.0	21.0	16.0		5.0	36.0

Source: Renewable Fuels Association, http://www.ethanolrfa.org/resource/standard/.

Any party that produces gasoline for use in the United States, including refiners, importers, and blenders (other than oxygenate blenders), is considered an obligated party under the RFS program. All obligated parties are expected to meet the RFS beginning in 2007, with two important exceptions. First, small refiners and small refineries are exempt from meeting the renewable fuel requirements through 2010. Second, all gasoline producers located in Alaska, Hawaii, and noncontiguous U.S. territories are exempt from the RFS program indefinitely. These States and territories may opt into the program, however, and all of the refiners (except for small refiners and refineries), importers, and blenders located therein would then be subject to the RFS.

Capacity and Production

The RFS program and rising fuel prices over the last few years led to a surge in biodiesel production capacity (Table 2) and production (Table 3).

Table 2. U.S. Biodiesel Production Capacity
(Million gallons per year)

As of	Production Capacity
January 1, 2001	62.3
January 1, 2002	92.3
January 1, 2003	153.3
January 1, 2004	162.3
January 1, 2005	240.3
January 1, 2006	332.9
January 1, 2007	672.3
January 1, 2008	1,925.8
September 29, 2008	2,610.0

Source: National Biodiesel Board – Commercial Biodiesel Plants, http://www.biodiesel.org/buyingbiodiesel/producers_marketers/Producers%20Map-Existing.pdf.

Table 3. Annual U.S. Biodiesel Production

Year	Million Pounds	Million Gallons	Million Barrels
2001	65.610	8.577	0.204
2002	80.203	10.484	0.250
2003	108.703	14.210	0.338
2004	214.062	27.982	0.666
2005	694.517	90.787	2.162
2006	1915.760	250.426	5.963
2007	3747.253	489.837	11.663
2008	5221.339	682.528	16.251

Notes:

- Production in pounds is converted to gallons by dividing by 7.65. Production in gallons is converted to barrels by dividing by 42.
- Through 2000, data are not available. Beginning in 2001, data are estimates.

Sources:

- **2001-2005**—U.S. Department of Agriculture, Commodity Credit Corporation, Bioenergy Program records.
- **2006**—U.S. Department of Commerce, Bureau of the Census, "M311K - Fats and Oils: Production, Consumption, and Stocks," Table 3A, data for soybean oil consumed in methyl esters (biodiesel). In addition, the Energy Information Administration (EIA), Office of Integrated Analysis and Forecasting, estimates that 14.4 million gallons of yellow grease were consumed in methyl esters (biodiesel).
- **2007 and 2008**—U.S. Department of Commerce, Bureau of the Census, "M311K - Fats and Oils: Production, Consumption, and Stocks," Table 3A, data for all fats and oils consumed in methyl esters (biodiesel).

Tax Credit and Biodiesel Trade

Much of the increase in production in 2007 and 2008 was not consumed within the United States but was exported because of incentives provided by the biodiesel tax credit (see data in Table 4).

The Volumetric Ethanol Excise Tax Credit or "Blender Tax Credit" (BTC) was created in 2004 as part of the American Jobs Creation Act of 2004. The BTC provided a $1.00-per-gallon tax credit for "virgin feedstock-biodiesel" (first-use vegetable oils and animal fats, including palm and fish oil) and a $0.50-per-gallon tax credit for biodiesel produced from recycled oils and animal fats that is blended with conventional diesel. The BTC was originally scheduled to expire at the end of 2006 but was extended to end in 2008 by the Energy Policy Act of 2005. The intent of the BTC was to make biodiesel blends competitive with petroleum diesel, which in turn would increase demand and spur investment in biodiesel supply infrastructure. The BTC applied to all biodiesel blended with conventional diesel regardless of where the biodiesel was produced or where the blend is consumed.

The seemingly innocuous "loophole" that imported biodiesel also benefited from the tax credit led to significant increases in biodiesel trade. The loophole, called "splash and dash," is exploited in the following manner:

- A tanker load of 100-percent biodiesel (B100) is "splashed" (blended) with a small amount of conventional diesel. Adding 0.1 percent of conventional diesel to a load of biodiesel is enough to qualify for the BTC.

- The shipment, now B99, a 99-percent biodiesel blend, is then exported ("dashed") to markets, primarily in the European Union (EU).

Since the passing of the BTC, increasingly large volumes of imported biodiesel from Asia and Latin America have taken advantage of the loophole. Because of this practice, officials of EU's leading biodiesel industry group, the European Biodiesel Board (EBB), claimed that "splash and dash" damages domestic producers, constitutes export dumping, and violates World Trade Organization agreements. The EBB, in April 2008, presented a formal complaint before the European Commission (EC), which later found sufficient evidence to launch an investigation. The EC's investigation determined that placing tariffs on U.S. biodiesel was warranted.

The Emergency Economic Stabilization Act of 2008 (EESA) included several pieces of biodiesel-related language. The EESA extended the BTC for one year through December 31, 2009, and provided credit parity for feedstocks. The EESA provides that all biodiesel fuel qualifies for the $1.00-per-gallon BTC beginning on January 1, 2009. Previously, biodiesel produced from second-use, or non-virgin, feedstocks was only eligible for a $0.50-per-gallon tax credit. The EESA also contained language that closed the "splash and dash" loophole. Foreign-produced biodiesel sent to the United States can no longer receive the BTC, but domestic biodiesel that is blended and then exported is still eligible.

In March 2009, the EU imposed anti-dumping and anti-subsidy duties on imports of biodiesel from the United States. Starting on March 13, for the next 6 months, U.S. firms exporting biodiesel into the EU will have to pay anti-dumping tariffs of up to 29 percent and anti-subsidy duties ranging between 29 percent and 41 percent. The EU Executive, which oversees trade policy for the 27-nation EU, must decide within the next 6 months whether to impose "definitive duties" on U.S. biodiesel imports. These duties, which are in effect for at least 5 years, must be approved by EU-member country trade ministers.

Table 4. U.S. Biodiesel Exports and Imports
(Million gallons, except shares)

Exports to:					
	World	**North America**		**European Union**	
Year	**Volume**	**Volume**	**Share of world total**	**Volume**	**Share of world total**
2003	4.61	1.28	28%	0.82	18%
2004	5.19	0.98	19%	0.74	14%
2005	8.64	1.58	18%	3.78	44%
2006	34.76	11.91	34%	16.48	47%
2007	272.04	18.20	7%	237.01	87%
2008	677.38	6.82	1%	645.96	95%
Imports from:					
	World	**North America**		**Asia**	
Year	**Volume**	**Volume**	**Share of world total**	**Volume**	**Share of world total**
2003	3.93	0.16	4%	2.53	64%
2004	4.08	0.49	12%	1.61	39%
2005	8.68	1.10	13%	4.94	57%
2006	44.91	7.74	17%	24.19	54%
2007	140.37	20.81	15%	100.67	72%
2008	315.07	25.45	8%	129.43	41%

Notes: Exports include re-exports.

Sources: U.S. Department of Agriculture, Foreign Agriculture Service, import data for Harmonized Tariff Schedule code 3824.90.40.20 (Fatty Esters Animal/Vegetable/'Mixture), and export data for Schedule B code 3824.90.40.00 (Fatty 'Substances Animal/Vegetable/Mixture). Although these categories include products other than biodiesel (such as those destined for soaps, cosmetics, and other items), biodiesel is the largest component. In the absence of other reliable trade data for biodiesel, EIA sees these data as good estimates.

STEO Biodiesel Supply and Consumption Balance

The *STEO* biodiesel balance currently involves the following three variables:

- BDPRPUS = Biodiesel plant production
- BDNIPUS = Biodiesel net imports
- BDTCPUS = Biodiesel product supplied (consumption).

EIA will soon begin collecting monthly biodiesel plant statistics including: biodiesel and co-product production, end-of-month inventories, feedstock inputs, and sales of biodiesel (B100) and biodiesel blends. A one-time survey that will collect historical annual biodiesel production data for 2006, 2007, and 2008 is also scheduled. Until these data become available, the *STEO* biodiesel balance will assume no monthly stock change. Biodiesel consumption, BDTCPUS, is calculated from a balance around plant production and trade (Table 5):

BDTCPUS = BDPRPUS + BDNIPUS

Table 5. Biodiesel Annual Statistics
(Million gallons)

Year	Production (BDPRPUS)	Exports	Imports	Net Imports (BDNIPUS)	Imputed Consumption (BDTCPUS)
2001	8.57	1.65	3.29	1.64	10.20
2002	10.50	2.33	8.02	5.68	16.18
2003	14.20	4.61	3.93	-0.68	13.52
2004	27.97	5.19	4.08	-1.10	26.87
2005	90.80	8.64	8.68	0.04	90.84
2006	250.43	34.76	44.91	10.14	260.58
2007	489.83	272.04	140.37	-131.67	358.17
2008	682.53	677.38	315.07	-362.31	320.22

Notes:
- Exports include re-exports
- Imputed consumption = production + imports – exports
- Through 2000, data are not available. Beginning in 2001, data are estimates.

Sources:
Production: See Table 1.
Trade: See Table 3

Biodiesel production, net imports, and consumption history and forecasts have been added to the *STEO* Custom Table Builder, and biodiesel production and consumption are now reported in *STEO* Table 8.