

The U.S. Biodiesel Market, 2000 to 2010: Riding the Rollercoaster

Introduction

The U.S. biodiesel industry is younger and much smaller than the ethanol industry. However, it too can make an important contribution to national energy security and environmental goals. Diesel accounts for about one-quarter of U.S. on and off-road transport fuel, and biodiesel can be blended up to 20 percent without engine modification. Biodiesel has high greenhouse gas savings when made with virgin vegetable oils, and even higher savings when animal fats and waste oil feedstocks are used. The emerging global biofuels and larger bioenergy economy relies on policy and program support to expand market presence in an energy market dominated by fossil fuels. The U.S. biodiesel industry is no different and relies on a suite of national and state-level policies and programs to support domestic production and consumption.

Commodity price volatility and the price spread between feedstocks (the raw materials used to produce biofuels) and fossil fuel as well as policy support that lacks long-term stability have created challenges for the biodiesel industry worldwide. Biodiesel is generally not cost-competitive with fossil diesel, and the industry is burdened with significant unused capacity. Following a slow, five-year, start-up phase, and the industry underwent a six-year expansion-contraction cycle driven mainly by changes in exports. In 2011, the U.S. biodiesel industry is poised to begin a sustained period of growth supported by rising federal use mandates.

The Early Years, 2000-04: Limited Production and Domestic Use, No Trade

Domestic biodiesel production and use rose from 2 million gallons in 2000 to 28 million gallons in 2004 (data source 2000-05: USDA's Bioenergy Program). Supply was modest compared to the 44-billion gallon on and off-road diesel transport market. There was no trade and no federal or state mandates or state tax incentives to support biodiesel use. Soybean oil was the feedstock (85 percent or more by volume) of choice.

USDA's Bioenergy Program (fiscal 2001-06), which authorized funding up to \$150 million a year to support the ethanol and biodiesel industries, spurred most of the infant biodiesel industry's early growth by providing payments directly to producers to lower the cost of feedstock. Payments to individual companies were capped, and preference was given to smaller producers and certain feedstock. The Congressional Budget Office estimated total program support from 2002 to 2006 at \$204 million. A growing number of federal, state and local government procurement programs for vehicle fleets created limited demand.

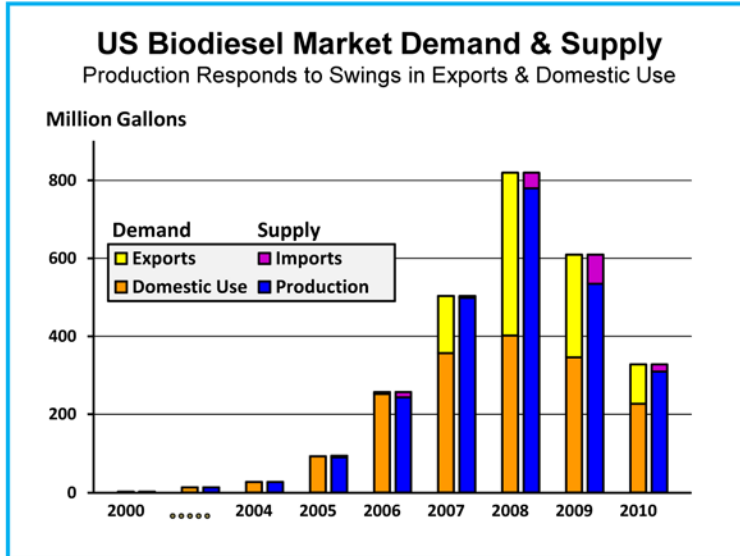
USDA's National Biodiesel Education Program, funded at \$1 million a year beginning in fiscal 2003, financed industry activities in education, research and promotion. Its accomplishments include building support among original equipment manufacturers (truck and farm equipment companies) for higher blends, supporting the BQ-9000 Quality Certification Program, research on feedstock diversification, and broadening public awareness. These activities continue today managed by the National Biodiesel Board and the University of Idaho.

The Go-Go Years, 2005-08: Production and Exports Soar, Domestic Use Rises

Production soared from 91 million gallons in 2005 to 780 million gallons in 2008 (data source 2006-10: Department of Commerce industry surveys). Over half of the expansion in these years was due to rising

International Agricultural Trade Report

exports. U.S.-origin exports began in 2006 then soared to 418 million gallons by 2008 when one of every two gallons produced was shipped overseas. Domestic use quadrupled to 402 million gallons. The industry was beginning to expand, but that was short-lived.



The federal tax credit for biodiesel blenders, established under the Jobs Creation Act of 2004, was first used in the 2005 tax year. Companies blending biodiesel with fossil fuel became eligible for a \$1 a gallon tax credit for all biodiesel made from virgin vegetable oil and animal fat and a \$.50 a gallon tax credit for all biodiesel made from recycled oils. Further guidance issued by the Internal Revenue Service (IRS) broadening the scope led to greater use of the tax credit beginning in 2006 at which point it replaced the Bioenergy Program as the key federal support for biodiesel. Blenders became eligible for a \$1 per gallon

tax credit without restrictions on company size, feedstock or amount blended. Mainly used by petroleum companies who do most of the blending, it was reauthorized in 2006 for a two-year extension through 2008.

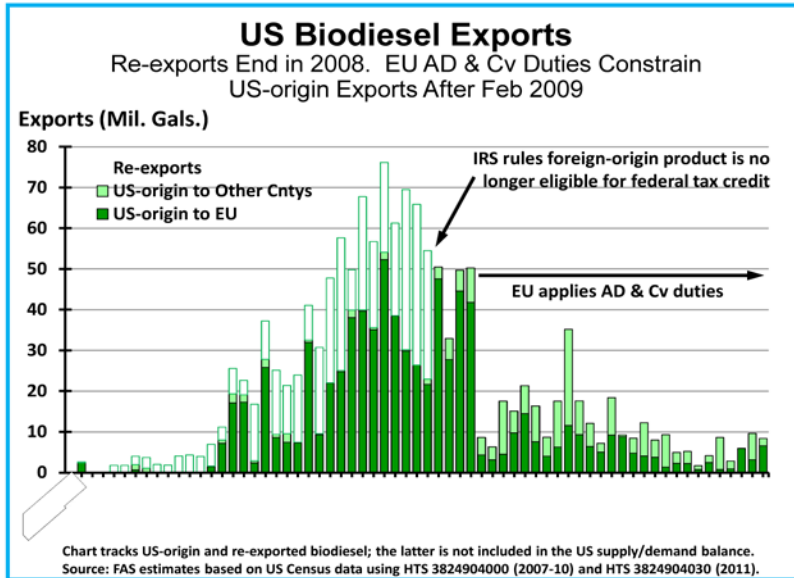
The 2005 to 2008 expansion phase was driven more by exports than domestic use, and nearly all exports were shipped to Europe. The European Union (EU), the world’s largest biodiesel consumer and producer, consumed six times more biodiesel than the U.S. market and grew nearly 600 million gallons in both 2007 and 2008 (source: FAS EU Biofuels Annual, 2011). These annual increases were 1.5 times larger than peak annual U.S. consumption in 2008. U.S. shipments to the EU began as a trickle in 2006 then became a flood by 2007. Much of the initial trade consisted of foreign-origin re-exports, but US-origin sales grew steadily after early 2007. In 2008, nearly 80 percent of EU imports and one of every six gallons consumed in the EU (2.6 billion gallons that year) was produced in the United States.

The re-export business was enabled by the federal tax credit because the tax code permitted credits on foreign-origin biodiesel that could then be exported. This practice known as “splash ‘n dash” permitted shippers to import biodiesel from Southeast Asia and Argentina, add a tiny amount of fossil fuel, claim the tax credit, and then ship B99 (99 percent biodiesel, 1 percent fossil fuel) to Europe. Re-exports peaked around 270 million gallons in 2008. The Emergency Economic Stabilization Act of May 2008 eliminated splash ‘n dash in October 2008, and extended the federal tax credit for U.S.-origin product regardless of final end market (domestic or foreign) through 2009. The re-export business involved only a small group of traders, and were never part of the U.S. supply-demand balance.

U.S.-origin exports and domestic production peaked in 2008. The average national biodiesel blend rate (by volume) for biodiesel used in transport that year was 0.8 percent which was low compared to the blend rate of 7.7percent percent for ethanol (data source: Energy Information Agency). Regarding domestic demand, biodiesel and other biofuels qualified for the mandate under the first Renewable Fuel Standard (RFS1), but biodiesel was more expensive to produce than ethanol. For this reason, only

International Agricultural Trade Report

ethanol was used to meet the RFS1 mandate. However, a handful of states passed laws creating some effective demand as early as 2005, the same year the federal tax credit for biodiesel came into effect.



Some tax incentives were established, but blend-level mandates designed to increase over time were the more effective form of state support. These initiatives initially supported only a small fraction of production, but their importance would soon grow.

Industry financial conditions are difficult to generalize due to differences in business models, location, feedstock use, and technology platforms. The federal tax credit created opportunity for positive producer margins in 2005 to 2006, but those margins came under considerable pressure in 2007 to 2008 as the price of soyoil

(the most commonly used feedstock) rose faster than diesel prices. At the same time, producers moved to convert their facilities to multi-feedstock use systems in an effort to control costs. Prior to 2007, higher-cost soy oil accounted for 85 percent or more of total feedstock use (national average). By late 2008, the figure had fallen to 50 percent with larger amounts of lower-cost animal fats and recycled oils in use. Feedstock diversification had become one strategy used to control financial risk since feedstocks account for 80 to 90 percent of biodiesel production costs. Production capacity swelled from 290 million gallons in 2005 to 2.2 billion gallons in 2008 (source: National Biodiesel Board (NBB)). These were the years of rapid economic growth just prior to the global financial crisis of 2008 with cash-flush venture capital firms and easy financing terms.

Retrenchment, 2009-10: Exports Collapse and Domestic Use Falts, Production Declines

U.S. exports to the EU were sharply reduced in early 2009, the first federal use mandate for biomass-based diesel (biodiesel) was delayed 18 months, and there was a 12-month lapse in the federal tax credit. The financial crisis tighten credit market and froze operating capital, and the ensuing recession lowered demand for transport fuels. Producer margins remained tight to non-existent. The combined effect of these events was immediate and severe: biodiesel production shrank 470 million gallons (or 60 percent) to 310 million gallons in response to a collapse in exports (down 317 million gallons or 76 percent) and sharply lower domestic use (down 175 million gallons or 44 percent). Imports supplemented production to a limited extent, but remained small with little appreciable effect on the market.

Regarding foreign demand, the European Commission (EC) initiated anti-dumping and countervailing duty investigations on U.S. biodiesel in June 2008, and eventually imposed duties on blends above B20 for five years beginning in March 2009. These duties were calculated to offset the federal tax credit and benefits of selected state schemes, effectively eliminating trade to the EU on all blends above B20. Some direct shipments continued, but only on lower blends not assessed the punitive duties. Interestingly, EU imports from all destinations saw little change as Argentina (as well as Southeast Asian suppliers of palm oil biodiesel) stepped in to fill most of the drop in U.S. shipments.

International Agricultural Trade Report

The impact of EU antidumping and countervailing duties on U.S. exports was severe. Monthly sales volumes of U.S.-origin biodiesel to the EU immediately fell to one-fifth of their former levels during the first 12 months of duty imposition and one-tenth their former levels in the second year of duty imposition. On an annual basis, sales to the EU fell from 404 million gallons valued at \$1.5 billion (\$3.67 per gallon) in 2008, to 161 million gallons valued at \$309 million (\$1.92 per gallon), to 51 million gallons (\$112 million) in 2010. This impact was partially offset by higher exports to other countries – most importantly, Taiwan, India and Australia – but the offset potential was limited by (i) the much smaller size of these markets (compared to the EU) and (ii) antidumping and countervailing duties imposed by Peru in late 2009 which became final by August 2010, and anti-dumping duties imposed by Australia after October 2010. In the end, U.S.-origin exports to all countries fell from a record 418 million gallons in 2008, to 264 million gallons in 2009, to only 101 million gallons in 2010. Industry export reliance (exports divided by production) fell from 54 percent to 33 percent.

As for domestic demand, the federal biomass-based diesel (BBD) mandate created by the Energy and Independence and Security Act of 2007 (EISA) offers long-term support through 2022. Originally slated to start January 2009, the schedule of minimal blending requirements set forth in EISA are 500 million gallons in 2009, 650 million gallons in 2010, 800 million gallons in 2011, and 1 billion gallons from 2012 onwards. Unfortunately, the original start date was delayed 18 months until July 1, 2010. This was due to the exceptionally difficult rule-making process which uses lifecycle carbon accounting (a new science) as the tool to establish greenhouse gas performance standards for different biofuel pathways. EPA's proposed rules were announced after a delay of one year, then the public comment period was extended to allow the agency time to address the large number of responses.

Looking at the supply side, USDA's Bioenergy Program was reauthorized in fiscal 2009 for five years. But its importance to the biodiesel industry – even after corn ethanol was dropped from the feedstock payments scheme – was diminished from earlier years. The funding ceiling, higher feedstock costs, and higher production levels meant that less of the feedstock cost could be covered compared to earlier years. More importantly, the federal tax credit expired in December 2009. Although it was restored in December 2010 and made retroactive for the entire year, it created pricing uncertainty for the industry and reduced incentives to blend. Federal tax credits for both biodiesel and ethanol had become a political football in a much larger debate over how to manage the growing budget deficit.

While the biodiesel industry waited for the implementation of a federal use mandate, exports collapsed and the federal tax credit lapsed, but the industry could still rely on state policies to set a minimum floor for demand. While nearly every state has enacted biofuels legislation, only half a dozen states established mandates and tax incentives that created about 125 million gallons of effective demand in 2009, a figure which rose to 160 million gallons in 2010 (source: NBB). This 'insurance policy' covered one-third of domestic use in 2009 and three-quarters of domestic use in 2010.

The Path Ahead, 2011: Rising Domestic Demand Will Drive Changes in the Market

USDA does not forecast U.S. biodiesel supply and demand, but it is clear that domestic demand and its impact on production will be the most important development to watch in 2011. In 2010, the industry became more reliant on the domestic market. This trend is expected to continue in 2011.

The EU remained the top market for U.S. biodiesel exports in 2010 accounting for nearly half of all exports valued at \$230 million. Unfortunately, the EU launched a circumvention of duties case in August 2010, covering direct U.S. shipments of B20 and lower blends and alleged transshipments via Canada and Singapore. It appears that optics rather than substance motivated this action, because combined direct sales plus alleged transshipments via Canada – no significant exports to Singapore occurred – represented

International Agricultural Trade Report

less than 5 percent of EU biodiesel consumption in 2010 (data source: FAS 2011 EU Biofuels Report). Following the publication of the investigation's findings on May 5, prohibitive anti-dumping and countervailing duties were placed on all direct shipment lower blends not covered by existing duties, and on all Canadian companies that shipped product during the investigation period.

The 2011 federal BBD mandate of 800 million gallons is three and a half times greater than domestic use in 2010. EPA also qualifies most biodiesel produced via transesterification as an advanced, non-cellulosic biofuel. This category has its own separate mandate of 300 million gallons (ethanol equivalent) in 2011. It will be interesting to monitor how biodiesel production (and imports) respond to these EPA-administered federal requirements. As a side note, state mandates and tax incentives will create about 200 million gallons of effective demand in 2011 (source: NBB). The federal tax credit remains in place until at least December 2011.

The biodiesel industry continues to face both challenges and opportunity. The industry is working to diversify its use of raw materials by boosting the use of minor oilseeds, recycled cooking oils, and inedible corn oil (an ethanol co-product). Still, soyoil continues to account for as much as 50 percent of feedstock use. Plant capacity use is dropping to about 12 percent in 2010. Capacity use will rise in 2011, but consolidation seems inevitable. Support for the federal tax credit is at risk as Congress works to address the budget deficit. As for opportunities, biodiesel is the only advanced biofuel using domestic feedstock that is available in commercial quantities today. This edge opens possibilities to produce above the 1- billion gallon BBD mandate.

**For a recent international agricultural trade report about U.S. ethanol, read [U.S. on Track to become World's Largest Ethanol Exporter in 2011*](#)*