

Attachment 1

COMMENTS OF THE NATIONAL BIODIESEL BOARD
ON
RENEWABLE FUEL STANDARD PROGRAM:
STANDARDS FOR 2018 AND BIOMASS-BASED DIESEL VOLUME FOR 2019

Proposed Rule, 82 Fed. Reg. 34,206 (July 21, 2017)
Dkt No. EPA-HQ-OAR-2017-0091



International

Global Waste Grease Supply

Study for:

National Biodiesel Board
Washington, D.C.

August 2017

Research and analysis to inform your business decisions

LMC International

Oxford

4th Floor, Clarendon House, 52 Cornmarket Street,
Oxford OX1 3HJ
t: +44 1865 791737, f: +44 1865 791739
info@lmc.co.uk

New York

1841 Broadway, New York, NY 10023, USA
t: +1 (212) 586-2427, f: +1 (212) 397-4756
info@lmc-ny.com

Kuala Lumpur

SO-30-8, Menara 1, No.3 Jalan Bangsar, KL Eco City,
59200 Kuala Lumpur, Malaysia
t: + 60 3 2202 1414
info@lmc-kl.com

www.lmc.co.uk

bsb702n

LMC International

Develops Unique, Independent Research

For over 35 years, LMC has delivered in-depth, specialist analysis to leading international companies working in agricultural commodities, biofuels, foods and industrial materials, as well as their end-use markets.

Our research covers thirteen major industry sectors:

Bio-based Chemicals	Feed Ingredients
Biofuels & Biomass	Coffee
Oils & Oilseeds	Cocoa
Oleochemicals	Food Ingredients
Grains	Rubber
Sugar & Sweeteners	Tires
Starch & Fermentation	

Recognized by many of the world's major companies as experts in research, LMC provides the business world with strategic insights unavailable elsewhere.

www.lmc.co.uk

While LMC International endeavors to ensure the accuracy of the data, estimates and forecasts contained in this study, any decisions based on them (including those involving investment and planning) are at the client's own risk. LMC International can accept no liability regarding information, analysis and forecasts contained in the study.

Global Waste Grease Supply

Executive Summary

Suppliers of waste grease have historically been limited primarily to those countries where various policies have encouraged the use of waste greases, often leading the markets to incentivize their collection and use. More recently, the number of countries collecting significant volumes has grown rapidly, as the demand for imports has expanded, supported by increased incentives.

With incentives now at a level that allows for collection and export of used cooking oil (UCO) from a wide range of countries, the potential global supply is higher than previously thought.

Globally, potential waste grease supply is projected to rise from 29.0 million metric tons in 2017 to 34.2 million metric tons in 2022 - equivalent to 10.2 billion gallons of biodiesel.

This is significantly higher than the volume projected in the study, "Current and Future Supply of Biodiesel Feedstocks" (June 2016), submitted to the U.S. Environmental Protection Agency last year, which gave forecasts to 2020. *Our forecast for 2020 has increased by 56%, equivalent to an additional 3.4 billion gallons of biodiesel.*

Introduction

This study follows on from our previous study, "Current and Future Supply of Biodiesel Feedstocks" (June 2016), by looking at the potential market for waste greases in more detail in order to capture the latest developments in the market.

Waste greases, made up of yellow and brown grease, are collected from retailers, rendering plants, and grease interceptors. The volume of oil collected is driven by the policy/market incentives, which means that supply is inextricably linked to demand. Increasing incentives in recent years have seen collection rates rise and also allowed for greater trade in waste grease globally.

This study summarizes the latest developments in the market for waste grease, highlighting the incentives that have driven the changes. We then project the potential supply to 2022 globally, given the higher level of incentives for the use of these greases.

Market developments

Historically, supplies of waste grease have come from a relatively small number of countries, primarily those with policies (such as environmental and biofuel-related) that have resulted in market incentives for collecting and using waste greases. More recently, the number of countries collecting significant volumes has increased quickly, as the demand for imports has expanded. Trade flows of used cooking oil (UCO) have seen rapid growth in recent years, as incentives encouraging the use of waste feedstocks, particularly for biodiesel, have reached a level that covers the costs of transportation and makes imports attractive. *This has led to strong growth in total global supplies.*

U.S.A.

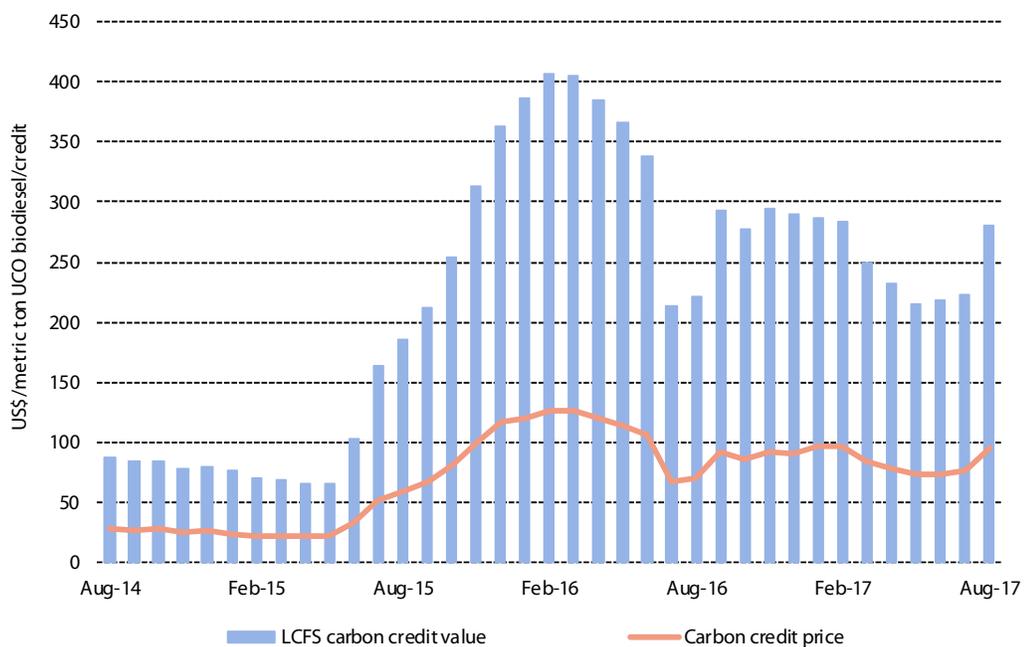
While U.S. collection of yellow grease (most of which is UCO) has been broadly stable in recent years, increasing slightly to reach around 920,000 metric tons in 2016, demand has grown strongly. Domestic use of UCO has climbed at an annualized rate of 9% since 2012, driven by increasing use for biodiesel, particularly in California where UCO has a high Carbon Intensity (CI) value. As the target in California has increased, along with the value of low CI fuels, the incentive to use waste-based biodiesel has also increased, pushing up demand for UCO as a feedstock for biodiesel.

In 2016, biodiesel comprised 85% of the market for yellow grease (YG) - up from just 19% in 2010. The remainder was destined for the feed market.

Diagram 1 presents the price of the Californian carbon credit and the value of the credit per metric ton of UCO biodiesel, based on the quarterly average CI value of UCO biodiesel used historically. Over the last year, the incentive to use waste-based biodiesel rather than conventional diesel has been \$260/metric ton (\$0.88/gallon).

The U.S.A. has been a net exporter of YG/UCO in the past, but this surplus has fallen in recent years, as domestic demand has increased. Looking ahead, as targets continue to rise, the incentive to increase collection rates will grow.

Diagram 1: LCFS credit prices (U.S.\$/mt CO₂ and U.S.\$/mt UCO biodiesel)



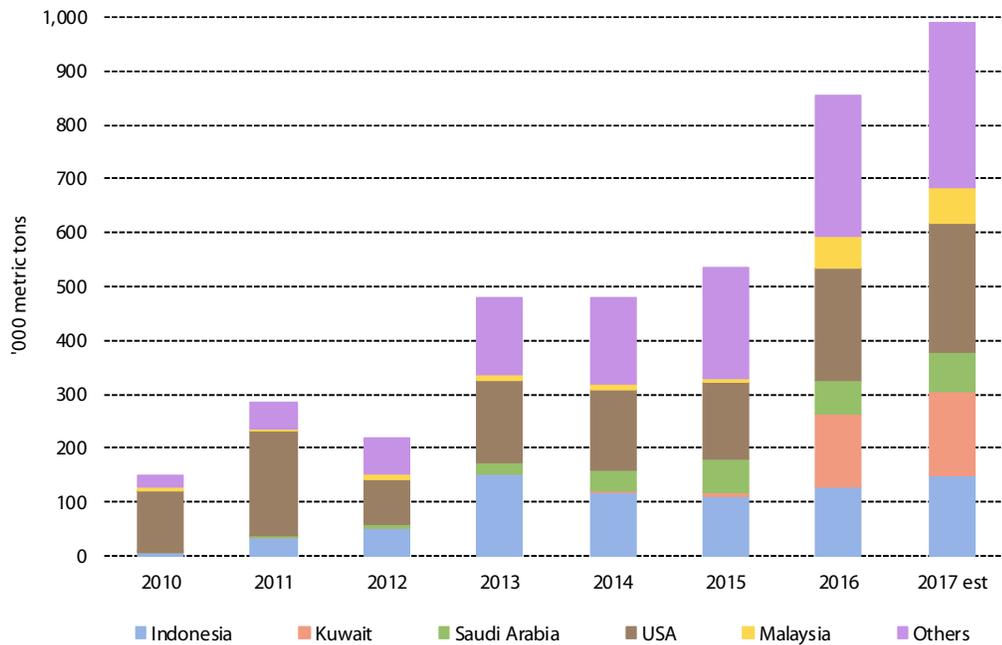
EU-28

The EU is the world’s main driver of demand for waste grease through the double counting of waste-based biofuels under the Renewable Energy Directive (RED), which allows biodiesel produced from UCO to count double towards requirements. This has seen collection of UCO in the EU grow rapidly in recent years. Indeed, some fryers with whom we spoke said that they now had an economic incentive to change their oil more frequently as a result of the double counting provisions.

The EU currently collects around 1.2 million metric tons of UCO, with collection rates having doubled from 2010 to 2015. This rise in domestic supply has not been enough to meet demand in the EU. While there is potential for domestic collection rates to grow further, it has been cheaper for the EU to import UCO. The use of UCO for biodiesel has risen strongly and was estimated at 1.58 million tons in 2015. This was at the expense of chemical uses, which have declined.

Diagram 2 reveals that imports of UCO in the EU have risen dramatically in recent years, with imports of over 800,000 metric tons in 2016 and imports expected to reach one million metric tons in 2017. This demand for imports has driven collection rates to rise in countries that do not have domestic incentives to collect UCO.

Diagram 2: EU UCO imports by origin



China

China has been the major collector of waste grease in Asia, with large quantities of UCO and grease trap oil (GTO) available. Although reliable data on UCO collection is not available, we spoke to local industry participants to understand the current status of the market. Based on this information, we estimate that Chinese biodiesel production based on UCO/GTO is around 0.5 million metric tons. Total collection is much higher than this, with the majority of waste cooking oils directed towards the animal feed, industrial chemical, and restaurant sectors. Small volumes of UCO are also exported: 13,000 metric tons in 2015, mainly to the EU.

There are significant potential volumes of GTO in China, especially following the recent crackdown on use of such oil in the food sector. In China, GTO or “gutter oil” is collected from restaurant fryers, drains, grease traps, and slaughterhouse waste. It had been cleaned up and passed off as new cooking oil until a nationwide crackdown in August 2011. The government was responding to evidence that showed such oil to be highly toxic, and in some instances, carcinogenic.

There are significant constraints to GTO usage in biodiesel production. The bulk of GTO is water, although the precise water content is disputed. One study stated that 70-80% of GTO content is water, while the free fatty acid content of GTO is up to 40%, against a 7% average for UCO. A U.S. report recently stated that the water content of GTO is 90-95%.

Quality issues mean that, in practice, very little GTO is being exported for use as a biodiesel feedstock. The collection of GTO looks set to be confined largely to domestic biodiesel use for the foreseeable future.

In China, there have been two types of collector: official collectors, which are registered with the government and collect UCO from restaurants, and unofficial private collectors, which are small and often operate illegally collecting GTO to refine and sell on for human consumption. As legislation and restrictions on this practice have tightened, GTO has been diverted to other uses. *While it is impossible to differentiate between potential UCO and GTO volumes, the majority of potential volumes in China are for GTO.*

Other Asia

Although China is the largest collector of waste greases in Asia, the greatest growth in supply in Asia in recent years has come from other countries that have not had widespread collection of UCO historically. It is these countries that have supplied the bulk of exports to the EU and that have the greatest potential for expanding supply further. In 2016, Asian countries were the source of over half of exports of UCO to the EU, supplying 441,000 metric tons from 15 different countries. *Exports from these countries have grown rapidly, doubling in just a year from 2015.*

We spoke to collectors and traders in the region, who confirmed that collection rates in some countries have already reached similar levels to those currently achieved in the EU and U.S.

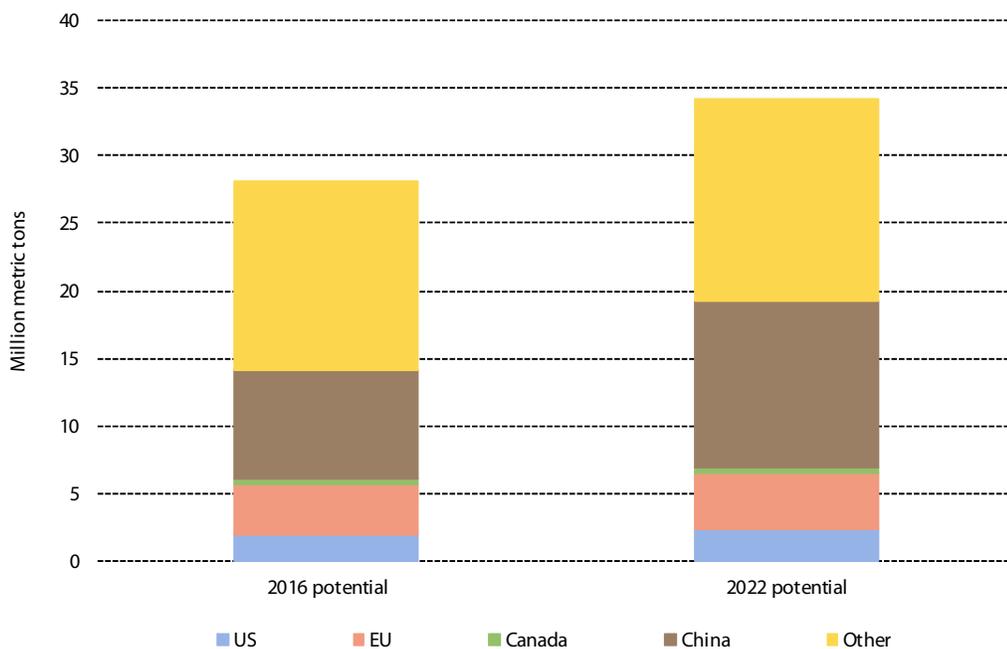
Potential supply

There is potential for growth in supply from the established supply countries if the policy parameters or market incentives are sufficient, but the greatest potential lies in countries that currently have low collection rates. Diagram 3 reveals our forecast for potential supply volumes of waste grease in 2022.

Globally, the waste grease potential is projected to rise from 28.1 million metric tons in 2016 to 34.2 million metric tons in 2022 - *equivalent to 10.2 billion gallons of biodiesel.*

Of this total, 2.4 million metric tons is from the U.S. and 12.3 million metric tons from China. Output in both these countries includes lower quality brown grease or GTO. We estimate that around 30% of U.S. supplies are brown grease, while in China the majority of supply is GTO.

Diagram 3: Potential supply - LMC forecasts (2016 & 2022)



Our forecasts for the main four countries remain unchanged from our previous study. However, the increased incentives to collect UCO for export have led us to increase our estimate for potential collection rates in countries that have not been significant suppliers historically.

Using trade data for the U.S. and EU, we have identified the countries that have exported UCO to either market in recent years. Assuming that these countries have the same potential collection rates as that of the U.S., we estimate that by 2022, these countries would be able to supply 15.0 million metric tons of UCO.

The major suppliers are India, Indonesia, Brazil, Russia, and Mexico. In 2022, these five countries will account for 70% of the supplies that are expected to be available in the rest of the world. The number of countries assumed to be potential suppliers has increased since our previous study, based on the higher number of significant suppliers to the EU.