

THE ECONOMIC AND ENVIRONMENTAL VALUE OF BROWN GREASE FOR THE BIOFUELS INDUSTRY

TRANSFORMING BROWN GREASE FROM NUISANCE WASTE TO RENEWABLE RESOURCE



a Downey Ridge
Environmental
Company

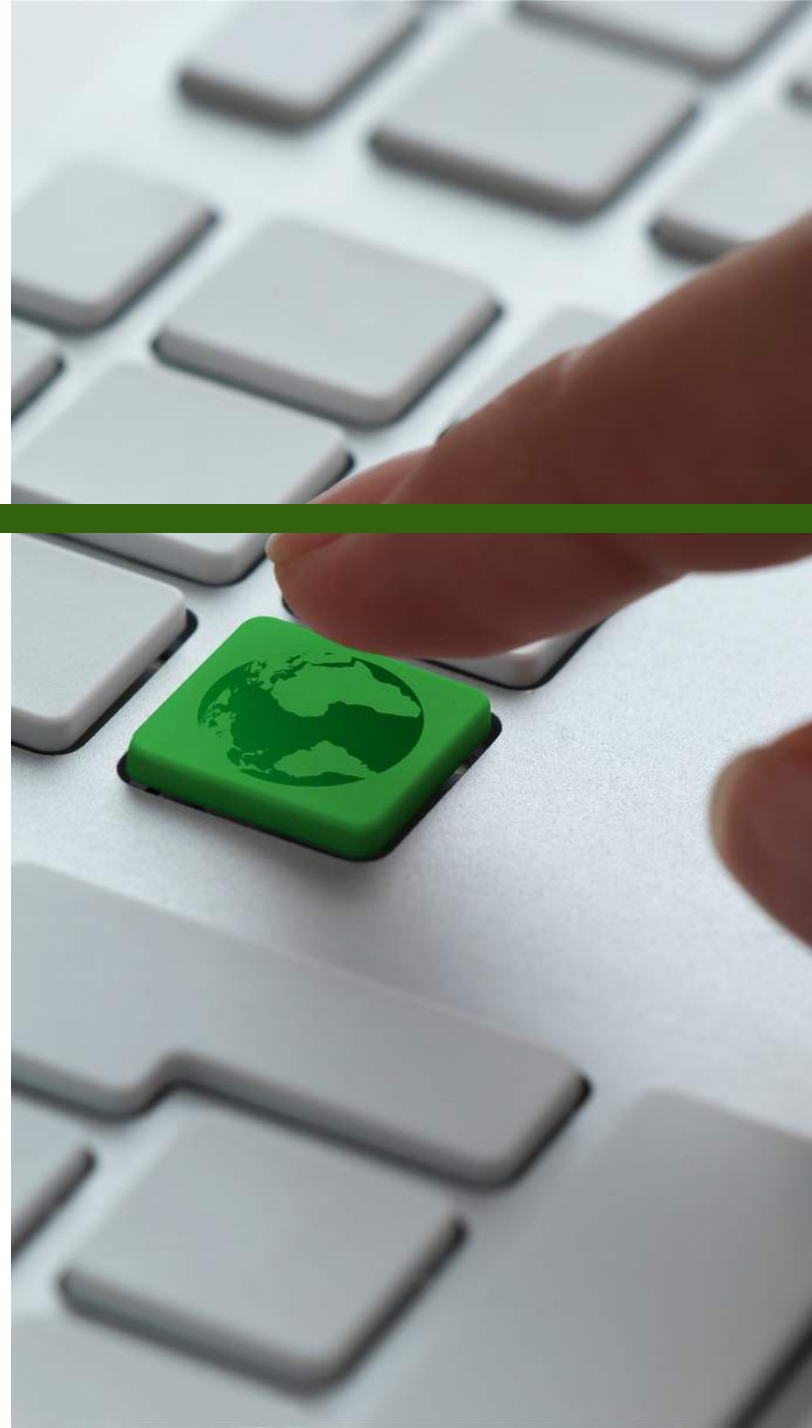
CONVERTING WASTE INTO BIOFUELS

Brown Grease, or FOG (fats, oils & grease), is created by the food industry as a byproduct of food preparation. Collected with grease traps and disposed of as grease trap waste alongside biosolids and water, the majority of Brown Grease ends up in landfills or incinerators.

The EPA estimates that between 800 and 17,000 pounds of grease trap waste is produced per restaurant, per year.

When separated into its basic components, grease trap waste can yield resources for the biofuels and biodiesel industries.

REFINE.
REDUCE.
REUSE.



Recovering Brown Grease as a fuel resource transforms a negative value waste stream into useful energy resources. The abundant waste product can be used to enhance the production and availability of biofuels and biodiesel, reduce landfilling and contribute to greater sustainability.

WHY BROWN GREASE?

Extending the lifecycle of Brown Grease provides a number of benefits to the energy sector, local communities and the environment. Proper recycling of Brown Grease decreases landfilling and landfill-related methane emissions.

As a resource for the biofuels sector, Brown Grease can help reduce greenhouse gas emissions and mitigate the effects of climate change, as well as offer a cheaper alternative for biofuel and biodiesel creation.



LOW-COST

As a waste product, Brown Grease costs less than crop-based biofuels and oilseed feedstocks grown on agricultural land.



READILY-AVAILABLE

The food service industry produces over 4 billion pounds of grease trap waste annually, most of which is landfilled or incinerated.



SUSTAINABLE

The EPA estimates that producing biofuel from waste grease results in an 86% reduction in greenhouse gases and lowers dependency on petroleum fuels.

SOURCING BROWN GREASE

The infrastructure is already in place for the collection of Brown Grease. FOG receiving stations are offered nationwide by wastewater treatment plants, recycling facilities and other disposal locations.

An increasing number of receiving stations are installing Greasezilla FOG separation systems as part of sustainability initiatives. The hydronic thermal system ecologically separates millions of gallons of grease trap waste each year, recovering high-quality energy and water resources without the need for chemical additives or flocculants.

The process results in:

For us, the integration of Greasezilla into our biodiesel manufacturing process provides a quality feedstock from an otherwise difficult process. We see FOG and Brown Grease - and many in the industry agree - as the biggest untapped opportunity in the renewable fuel market today, and we're excited about being part of it.

Jessica Sweeney
VP of CF Technologies, Inc.



Low-moisture (<1%)
Brown Grease
advanced biofuel or
biodiesel feedstock



Batter for
composting and
biogas production



Pasteurized water
ready for standard
wastewater
treatment





BIODIESEL PRODUCTION

The demand for biodiesel continues to increase, driven by greater environmental awareness and regulatory changes. The U.S. Energy Information Administration reports that since 2001, U.S. consumption of biodiesel increased from 2 million gallons to nearly 2 billion gallons annually.

Most often, biodiesel is used as an additive or substitute for petroleum-based diesel fuel in vehicles, heating oil and electricity generation. With a higher oxygen content and lower sulfur levels than petroleum diesel, biodiesel produces fewer emissions. Biodiesel also increases the efficiency of engines due to its higher lubricity.

As a steadily-growing renewable energy resource, biodiesel is becoming more readily-available for public consumption. An increasing number of government institutions are using biodiesel blends in their buses, trucks and other vehicles. The trucking industry is turning to low-level biodiesel blends to improve engine performance. Even the public is beginning to see more and more fuel stations offering biodiesel for everyday use.

FEEDSTOCK CHALLENGES

Biodiesel is usually produced by catalytic transesterification of vegetable oils and animal fats. The industry has mostly relied upon vegetable oils. However, the cost of oilseed feedstocks is steadily rising. Practices such as growing feedstock on agricultural land keep those costs elevated. Since expensive feedstocks drive up the total cost of production, biodiesel producers are beginning to consider other feedstock options.

Feedstocks are
70-95% of the
cost of biodiesel
production



One of the obstacles for incorporating Brown Grease feedstock into biodiesel production has been that Brown Grease requires additional processing to prepare it for biodiesel conversion. Brown Grease has a higher free fatty acids (FFA) content than virgin vegetable oils, thus requiring an extra step to prepare it for biodiesel conversion.

However, Brown Grease is fast becoming an attractive feedstock for biodiesel production because it is much less expensive compared with food-grade oilseed. The significant cost differential is improving the perception of Brown Grease feedstock.

HEAVY FUEL OILS

Marine fuel oils, often referred to as Bunker fuels, are filthy high-sulfur fuels made from the thick residue that remains once the lighter, higher-quality liquids have been refined. The smoke, sulfur and greenhouse gas emission levels generated by Bunker fuels negatively impact climate change and are linked to serious health problems.

Responsible for roughly 80 percent of the trade worldwide, the vast scale of the shipping industry has a formidable environmental footprint. The primary obstacle for the industry in adopting cleaner fuel alternatives was the low cost of Bunker fuels compared with higher-priced low carbon fuel alternatives. However, the International Marine Organization (IMO) set new limits on fuel emissions as part of a plan to reduce greenhouse gas emission levels by 50% over 50 years. The move is driving rapid change within international shipping.

Fuel oils lower in sulphur content are replacing or blending with Bunker fuels to reduce overall emissions. Brown Grease advanced biofuel can be blended with or substitute for Bunker C (No. 6) fuel oil, offering a lower-cost alternative biofuel to help ships meet regulatory compliance.



BENEFITS OF BROWN GREASE



Offers lower cost biofuel and biodiesel feedstock options

Provides additional fuel security and lowers dependence on fuel imports

Turns a problematic waste stream into reusable resources

More effective waste management

Lowers costs for municipalities by reducing grease-induced sewer blockages

Reduces air and water pollution

Promotes sustainability and contributes to a circular economy