Maximizing the value of used cooking oil
Our role in the industry

The scope of our company’s operations gives us a unique vantage point of the role animal fats and used cooking oils have on the food industry.

Global platform:
- 5 continents
- 200+ locations
- 17 brands

Founded: 1882

Publicly traded: NSYE: DAR

Industries served: Pharma, food, feed, pet food, fuel, bio-energy, health and beauty, restaurant/hospitality, fertilizer, technical/commercial
The ingredients we produce are used in three primary segments:

- **FOOD** (pharmaceutical, gelatin, collagen, natural casings, edible fats)
- **FEED** (fats & proteins, pet food, nutritional feed supplements, fertilizers)
- **FUEL** (renewable and bio-diesel, green gas, green energy)

Highlighted brands collect animal fats or used cooking oil, or are biofuels that use it as feedstock.
Our 17 brands produce ingredients or provide services for a variety of industries. (Highlighted products could contain UCO or animal fats)
Collects and processes **meat by-products** from into a variety of beef, poultry, swine production facilities.

Fat and protein ingredients used primarily for **animal feed and pet food**

Rendered **yellow grease** (from the fat) can be used as feedstock for biofuel; also used in a variety of technical and commercial products.

Collects **used cooking oil** from restaurants, supermarkets, hospitality sector.

Collects **butcher by-products and expired meats** from supermarkets/retailers.

Both meats and UCO are processed for use in **animal feed and pet food**, or as feedstock for **biofuel** (also used in technical and commercial products).

Also provides **grease trap services**
Feed ingredients are the largest sector of our business, primarily attributable to our North American operations. The National Renderers Association reports annual North American production of:

- 4.4 billion lbs of used cooking oil
- 1.92 billion lbs of meat scrap, fat & bone, expired meats from retailers
- 56 billion lbs of meat by-products

These products are processed into an array of greases, fats and proteins.

A Closer Look at Used Cooking Oil
Some quick facts

• The National Renderers Association reports \textit{\sim 4.4 billion pounds of used cooking oil} is collected in the U.S. and Canada each year.

• Statista.com reports that in 2016, in the U.S. alone, there were approximately \textbf{160,000 fast food restaurants} and \textbf{624,000 total restaurants}. The average fast food restaurant produces an estimated \textbf{35-40 pounds of grease per day}.

• Gallup reports \textbf{that 8 out of 10 Americans eat at a fast food restaurant at least monthly}, and almost half dine weekly. Fried foods make up a significant part of a typical fast food menu…. foods are also fried up in grocery retail kitchens; casual dining establishments; institutional kitchens; hotels and colleges; military posts; etc.

• Fried foods generate \textbf{USED COOKING OIL} (or “UCO”). UCO, after proper processing, has \textbf{value}...
DAR PRO Solutions processes 100% of the UCO collected

The big picture

1. Nat'l Renderers Assoc. estimates 4.4 billion gallons of UCO generated/year

2. UCO is collected and stored by restaurant, supermarket or other customer in outdoor bins or indoor tanks

3. UCO is picked up by service provider, transferred to processing facility

4. UCO can be used for biofuel, animal feed, and an array of commercial or industrial products

5. Rebates generated from value of UCO goes back to customer

THE CYCLE REPEATS
Processing UCO

- UCO is collected from restaurants, hotels, casino’s, grocers – virtually any food service facility that uses fryers to prepare food for their customers.

- Trucked to facilities that heat the oil and remove impurities and water. Fats and UCO are processed at temperatures sufficient to kill bacteria, such as salmonella*, safely providing nutrients to animal feed.

- The grease that is produced from animal fats or used cooking oil is a commodity that is traded on industry agricultural market, The Jacobsen. Prices rise and fall daily, based on what other commodities are doing (soybean, corn).

- The processed fats and oils are delivered to manufacturers of a variety of products, from animal feed, to biofuel, to much more...

* According to validation studies reported by USDA Food Safety & Inspection, American Meat Institute, American Feed Industry Assoc., and others.
What are uses of used cooking oil?

**Used Cooking Oil**

- **Energy**
  - Animal Feed & Pet Food
  - Renewable Fuels
    - Biodiesel
    - Green diesel
    - Boiler fuel
    - Renewable propane & butane

- **Chemical uses**
  - Lubricants
  - Textiles
  - Plastics
  - Cleaners

- **Industrial uses**
  - Rubber
  - Plastics
  - Tires
  - Lubricants

...and more
The two main sectors that use recycled animal fats and used cooking oils are for **feed** (livestock and pets) and **fuel**

**FEED:** The *proper* processing of animal fats and UCO produces fats and proteins that can **safely be used as nutrients to animal feed**; the recycled oils also help reduce ‘dust’ when handling dried feed or pet food.

*NOTE:* Feed manufacturers must ensure the proteins and fats they purchase are sourced from reputable producers who follow safe food/safe feed regulations.

**FUEL:** There has been a shift in the market where more of the animal fats and UCO is used as a **feedstock for biofuel**

Largely because of the growth of demand for biofuels, these materials have **grown in value**... particularly UCO

Not so many years ago, we would **charge our customers** to pick up their grease, same as most providers of a service would do...

...today, in favorable markets, we **pay the customer** for their UCO.
Storage of used cooking oil

• Used oil **can’t be dumped down the drain** (will clog grease traps and plumbing) or thrown out with the trash (odor attracts rodents @ landfills)

• This has created a need for **UCO collection/storage** units

• Outdoor **barrels** (smaller grease producers) and large outdoor **bins**

• **Indoor equipment**
  Many UCO service providers offer their own collection equipment (from under-fryer containers the grease drains into, to fully-automated, direct pump systems that move grease from fryer to tank hands-free)
Threats to UCO

Grease Theft

As **biodiesel demand grew**, so did the value of a restaurant’s UCO

Increased demand = incentive for **thieves** to steal it

Theft of UCO is considered a **crime**, with arrests and prosecutions

Ways to **combat grease theft**:

* **Better**: Grease deterrent lids for outdoor bins
* **Best**: Move the grease indoors

**NOTE**: **Beware purchasing stolen UCO for animal feed**; it may not be processed according to feed safety regulations.

Contamination

The yield from processing animal fats and used cooking oil is **affected by oil contamination**

UCO that is **stored outdoors** is **susceptible to contamination**... from garbage being thrown into the bin, food scraps, rainwater, etc.

**Indoor containers that aren’t sealed** also can be contaminated, lowering the yield of recycled oil that can be produced from it.

This **may affect the price** that is paid to a customer for their grease

In both instances, **moving grease indoors** to a self-contained unit will **deter theft and contamination** – as well as the risks associated with spilt grease (**falls and injuries, W/C claims**)
Grease traps

• In most cities, there are increasing regulations against dumping used grease down the drain, requiring commercial kitchens to have a grease trap.

• Disposing of grease down the drain
  ▪ Can cause backups inside the kitchen from clogged pipes
  ▪ Can cause environmental runoff, exposing store to fines and downtime for cleanup
  ▪ Regular trap maintenance by a professional helps avoid these risks

• Many UCO service providers also offer grease trap maintenance
In the past, grease removed from a trap could be processed (i.e., cleaned) and used in animal feed.

New FDA/AAFCO regulations have changed that practice:

**NO TRAP GREASE CAN BE USED IN ANIMAL FEED, NOR PROCESSED IN SAME FACILITY THAT IS PROCESSING MATERIAL FOR FEED**

These limitations on the use of trap grease encourage the use of UCO tanks to collect the grease and retain its value.
The UCO & Biofuel Connection

“When you displace fossil fuel, you change the fossil fuel supply and demand mix, so fossil fuel, and all petroleum, becomes less expensive. When petroleum is less expensive, it works as a stimulant to the entire economy. So, biofuel is an amazing little technology that can be, and can accomplish, many positive things.”

– Gene Geobolys, founder and CEO of World Energy and on board of National Biodiesel Board
Why Biofuel?

- Domestic sourcing and production of high-quality fuels from sustainable sources
- Reduces dependence on foreign oil
- Supports ~62,000 U.S. jobs
- Generates ~$2.6 billion in wages
- Generates ~$17 billion total economic activity
- Reduces release of particulate matter, carbon monoxide, and unburned hydrocarbons from older engines
- Reduces greenhouse gas emissions
- Best carbon footprint of any U.S.-produced fuel

More than 10 billion gallons of biodiesel produced since 2005 have displaced more than 10 billion gallons of imported, petroleum-based diesel fuel

Diesel

Traditional diesel fuel produced from petroleum/fossil fuels

Diesel fuel is more efficient than gasoline, and most commercial trucks operate on diesel fuel

Diesel produces several pollutants, including nitrogen dioxide which is problematic for those with respiratory issues

To combat the increasing pollutants from an ever-growing trucking infrastructure, the Clean Air Act was enacted in 1970 to require automakers meet federal emission standards

Compared to 1970 vehicles, new cars, SUVs pickups, commercial trucks and buses are ~99% cleaner for common pollutants such as sulphur and greenhouse gas emissions

NEW CLEAN DIESEL TECHNOLOGY

FUEL Ultra-low sulfur diesel
ENGINE Highly efficient diesel engines
EMISSION CONTROLS Advanced emission controls

...cleaner fuel options also contribute to cleaner emissions...

Source: Diesel Technology Forum, www.dieselforum.org
Biodiesel

Produced by chemical process that uses oxygen and alcohol molecules to remove glycerin from fats and oils, leaving behind methyl esters (fuel)

Biodiesel is an add-in to diesel fuel, at 5-20% ratio

In U.S., biodiesel is separated from diesel until blended; must be delivered by truck or rail. Reduces emissions by at least 57% and up to 86%

Can be produced from most vegetable oils, distiller oils, used cooking oils, or animal fats

Fun Facts:
• The first biofuel plants in the US were in the 1990’s, using corn as feedstock for ethanol
• The first U.S. commercial facility to produce biodiesel from animal fats or used cooking oil was our plant in Butler, KY in 1997
• The first such facility in Canada was built in 2005 by our Rothsay brand near Montreal, Quebec.
• Both Butler and Montreal are still in operation

Renewable Diesel

**Chemical refining** process that turns fats & oils into a fuel with identical chemical properties as petroleum diesel.

Can be **dropped directly into and distributed via pipeline** at any ratio (can be used at 100%)

**Reduces emissions to 86%**

Biodiesel and renewable diesel can be used together in same diesel stream

1 lb. of every 10 lbs. of animal fats & UCO generated in the U.S. is processed at Diamond Green Diesel.

**Fun Facts:**
- Darling Ingredients partnered with Valero Energy Corp to construct North America’s largest facility to produce RENEWABLE Diesel from animal fats and used cooking oils
- Diamond Green Diesel went live in 2013
- Currently produces 160 million gallons /yr
- Planned expansion to 275 mill/gall by mid-2018
Commercial biofuel production in the US has increased from ~ 25 million gallons in the early 2000s, to ~2.1 billion gallons in 2015.

• Demand for biofuels is steadily growing

• The biofuel industry has a goal of producing 10% of fuel for the diesel market by 2022

Renewable fuels are a key differentiator for diesel to continue to compete in a low-carbon, alternative fuel future.

As benefits of these sustainable fuels were recognized, government entities (both in US and other countries) looked for ways to encourage their use, as well as meet environmental clean air goals, **THUS INCREASING DEMAND**

---

**Renewable Fuel Standard**

- **2005:** EPA issued the **Renewable Fuel Standard**, part of the Energy Policy Act, - setting production incentives and - setting minimum volumes of biofuel to be used in nation’s transportation fuel supply

- **2007:** **RFS2 greatly increased minimums and goals through 2022**, & set categories defining renewable fuel

- **Total renewable fuel volumes** grew 1.2 bill. gall. 2016-2017 (6% increase)**

- **By 2022****:  
  - renewable fuels= 7% of petro gas/diesel  
  - reduce GHG by 138 mill metric tons, equiv of 27 mill cars off the road  
  - reduce oil imports by $41.5 bill

---

**Steady Growth of Renewable Fuel Volume Standards, 2014 – 2017**

**4 categories qualify under RFS2 (#% = amount biofuel reduces GHG):**

- **Conventional biofuel, includes ethanol (20%)**
- **Advanced biofuel (min. 50%)**
  - **Biomass-based (animal fats/UCO) (50%)**
  - **Cellulosic (plant fibers, algae) (60%)**

**Sources:** *EPA, Renewable Fuel Standard Program; only bio-mass based volume has been determined for 2018**

**Center for Climate & Energy Solutions, Renewable Fuel Standard**
Currently, only California & Oregon have a mandate in place; some other states are reviewing.

**Low Carbon Fuel Standard**

- **STATE**, not Federal mandate
- **2007:** California first in US to adopt. Standards set by their Air Resources Board
- Requires producers of petroleum based fuels to **reduce the carbon intensity** of their transportation products
- **Goal to reduce fuel’s GHG emissions by 10% by 2020;** reductions are set at increasing levels from 2010 to 2022
- Both biodiesel and renewable diesel comply with LCFS

California represents approximately 12% of demand for all U.S. transportation fuel

[https://www.arb.ca.gov/homepage.htm](https://www.arb.ca.gov/homepage.htm)

LCFS Illustrative Fuel Pathway Carbon Intensity – as of 09/17/2015
• **Car manufacturers** are increasingly building engines that will accommodate biofuel at up to 20% levels

• Many **municipal fleets and school buses are converting to biofuel** trucks and service vehicles, particularly on the west coast, but also in middle America in cities such as Chicago, Fayetteville Arkansas, Saint Louis, Oklahoma City, Raleigh, and many more

• **San Francisco** has fully switched from petroleum diesel to renewable diesel for all of its municipal fleet; **expects a 60% reduction in GHG emissions**

• **Uncertain:** How will Trump presidency affect biofuel mandates, incentives and demand?

---

**Fun facts:**

- Reduces dependence on foreign oil by replacing more than 500 million gallons of petroleum
- Reduces emission compounds linked to cancer and respiratory disease by as much as 90%
- Safest fuel to handle, use and store; safe enough to ingest.
- Safe for most engines built after 1993, tho may be restrictions on blend ratio

---

Biodiesel production does not interfere with ‘food vs fuel’ debate

When we grow protein to feed the world, we get more fat than we can eat; fats and oils are a by-product of feeding people and animals. Cows are not bred for fuel, and used cooking oil is processed for reuse as fuel.

The EPA will only approve a renewable feedstock as satisfying Renewable Fuel Standard requirements if:

• **Greenhouse gas emissions are significantly reduced** as compared to petroleum diesel

• **No crop land was converted strictly for use in biofuel production**

*Both animal fats and used cooking oils meet this requirement*

Thank you.