AT&T Business

Repurposing used cooking oil and waste enabled by AT&T IoT connectivity

Business needs

A way to monitor the fill level of restaurant waste oil tanks and protect against oil theft

Networking solution

AT&T IoT connectivity facilitates the company's recycling process for used cooking oil

Business value

Route optimization, reduced fuel consumption, decreased risk of oil theft, reduced emissions all enabled by AT&T IoT connectivity

Industry focus

Circularity: transforming agricultural material into feed, food, and fuel

Size

$6.42 billion annual revenue

About Darling Ingredients

Darling Ingredients repurposes and recycles materials from the animal agriculture and food industries. It transforms them into essential ingredients that do everything from feeding animals to fertilizing crops, fueling planes, and nourishing people.

The situation

Darling Ingredients collects and recycles used cooking oil from more than 200,000 restaurants in the U.S. and Canada. The company wanted to create a smart-tank solution to improve the timing of oil pickups to ensure that its oil collection trucks arrived just as the tanks became full, helping lower costs and emissions associated with transportation. It also sought to prevent theft of the used cooking oil—a crime increasing in frequency.

Solution

AT&T IoT connectivity enables Darling Ingredients to optimize used cooking oil pickup routes. This optimization reduces fuel consumption for Darling Ingredients' fleet, helping lower its carbon footprint. Optimization also enhances operations for restaurants and kitchens by making sure their storage tanks are emptied at peak capacity right on time so that clients don't need to improperly dispose of oil due to lack of space. Finally, AT&T IoT connectivity helps support Darling Ingredients' efforts to prevent oil theft.

Transforming agricultural material into food, feed, and fuel ingredients

Founded in 1882, Darling Ingredients Inc. (NYSE: DAR) is a world leader in circularity. In other words, the company transforms materials from the animal agriculture and food industries into valuable ingredients that nourish people, feed animals and crops, and fuel the world with renewable energy.

Darling Ingredients and its global brands, including its restaurant services brand DAR PRO Solutions, operates over 260 facilities in more than 15 countries, transforming more than 16 million metric tons of raw material into over 350 sustainable ingredients every year. It processes about 15% of the world's animal agricultural by-products, produces about 30% of the world's collagen (both gelatin and hydrolyzed collagen), and is one of the largest producers of renewable energy.

The company has three business segments: Feed, Food, and Fuel. David Van Dorselaer, Darling Ingredients Vice President of Restaurant Services, said the company's DAR PRO Solutions brand collects used cooking oil (UCO) and provides grease trap services for restaurants and industrial kitchens. It also collects and processes meat scraps from groceries and meat markets. These materials are transformed into ingredients for animal feed, petfood, fertilizer, and feedstocks for low-carbon renewable fuels.

"Over the past five years, our diverse, global business has grown remarkably through acquisitions and strategic investments," Van Dorselaer said. "We're extending our reach into new markets, applying our expertise and technologies to develop novel, innovative products."
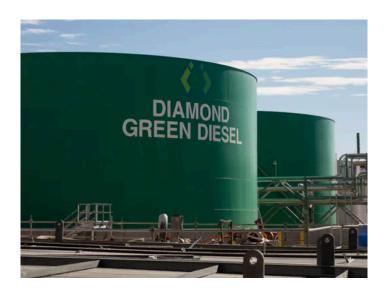
Turning used cooking oil into feedstocks for low-emission fuels

Darling Ingredients is North America's largest collector and processor of used cooking oil, which can be a messy byproduct of restaurants and industrial kitchens, especially fast-food operations. "We collect used cooking oil from more than 200,000 restaurants in the United States and Canada," Van Dorselaer said.

To provide high-quality service to restaurants around the country at that scale, Darling Ingredients operates one of the nation's top-30 largest fleets.

Darling Ingredients' reliable end-to-end service makes disposal and recycling of UCO a nonissue for customers and contributes to a more sustainable tomorrow. The company consolidates and processes UCO, extracting and treating water, and selling the finished products primarily as feedstocks for renewable diesel.

Darling Ingredients' 50/50 joint venture, Diamond Green Diesel (DGD), utilizes recycled animal fats and used cooking oil, some of which are supplied by brands like DAR PRO Solutions in its Feed segment, to produce low-carbon intensity fuel with up to 80% fewer lifecycle greenhouse gas emissions than traditional fuel. DGD is the world's only vertically integrated producer of renewable diesel.

> ## "With AT&T Business, we get the consistent results, uptime, and building penetration that we need."
>
> **David Van Dorselaer**
> **Vice President of Restaurant Services, Darling Ingredients**

"Darling Ingredients' story is a very compelling one," Van Dorselaer said. "Our work addresses society's concerns about wastefulness and offers solutions everyone can get behind. Our business breathes new life into materials that many people typically consider waste. Through our DAR PRO Solutions brand, we create value for restaurants, grocers, and food processors across North America by collecting and recycling their used cooking oil so it can be transformed into low-carbon intensity feedstocks for renewable fuel and help decarbonize the world."

Convenience for the customer, smooth operations for all

Craig Lee, Darling Ingredients' Director of Technology Innovation, was tasked with streamlining the used cooking oil collection process. "Our challenge was to transform our UCO tank solution into an IoT solution that remotely monitors oil levels and alerts our team to service tanks without customer involvement," he said.

Darling Ingredients' past tanks used a level float with a light-and-beeper alert system that activated when a tank was full. "Only customers were alerted by the system, so we relied on customers to contact us when their tanks needed to be serviced," Lee said.

The company also previously relied on predictive tools to schedule service routes, often servicing tanks before tanks were truly full to minimize operational disruptions for customer operations. That meant that company trucks visited restaurants more frequently than needed. Darling Ingredients needed a way for its new tanks to communicate accurate oil levels to its logistics operations in order to automate and optimize oil collection fleet routing, resulting in more efficient operations that consumed less fuel.

"Logistically, our new solution enhances our ability to service tanks 'just on time' to keep our customers in business and operating without interruption, delivering industry-leading service," Lee said. "Our new IoT solution alleviates that burden on our customers and allows them to focus on their core business while we manage their UCO service."

Significantly deterring and preventing oil theft

Theft of used cooking oil has become a significant problem. The National Renderers Association estimates that up to $75 million worth of used cooking oil is stolen in the United States each year. "Theft impacts our customers and our business," Lee said. "The value of UCO in a single storage tank can be hundreds of dollars. Our new solution focuses on addressing the ongoing challenge of UCO theft, helping deliver value to our customers and adding value to our business."

Darling Ingredients' design also features a patented solution that communicates exclusively with their trucks, preventing thieves from stealing the UCO from customers' tanks.

Great signal penetration

Delivering the connectivity required to support Darling Ingredients' IoT tank solution for UCO was complex. "We knew that relying on customer Wi-Fi or other communication presented challenges," Lee said. "It was clear early on that cellular was the ideal connectivity solution."

After a thorough review, Darling Ingredients chose the AT&T LTE-M network to provide connectivity to help communicate oil levels from customers' tanks to the company's logistics managers in real time. LTE-M is a low-power, wide-area network designed for IoT devices that are compact, require longer battery life and carrier-grade security, are mobile, and can work deep inside buildings and hard-to-reach places.

"Most importantly, using the LTE-M or CAT-M solution that AT&T Business has deployed nationwide gives our company the IoT experience we required to be able to create this product, especially the reliable, in-building cellular," Lee said.

"As we've been rolling out our new tank solution on LTE-M network, coupled with the AT&T network, reliable, in-building coverage has not been a concern," Lee said.

AT&T Control Center is a game-changer

Darling Ingredients considered numerous other telecommunications providers and their various technologies as it was designing its IoT tanks. They selected AT&T Business because of the strength of its connectivity solution and the benefits provided by the AT&T Control Center SIM management platform. Lee was impressed with the platform's ability to help businesses manage, launch, and monetize IoT services.

"Although we considered other providers, utilizing the AT&T Control Center platform for IoT billing and troubleshooting is a game-changer with deployments of our kind," Lee said. "I can go into the AT&T Control Center system and see what's going on with each device in real time as it attaches to the network."

If problems arise, the AT&T Control Center alerts Darling Ingredients immediately and sends the error codes. "Detailed diagnostic information is crucial when developing these systems, troubleshooting a product, and troubleshooting individual installations," Lee said. "The combination of LTE-M and AT&T Control Center platform was ideal to meet our needs."

Combining the AT&T LTE-M network with cellular connectivity gives Darling Ingredients dramatically increased building penetration and a real-time view of its data use. "Having visibility into detailed data and billing records, down to individual transactions, is huge," Lee said. "We can easily use diagnostics to see if the device is online and transmitting data, so it is invaluable as we're trying to put these IoT solutions together."

> "AT&T has a proven track record with extensive experience working alongside customers in a variety of industries and applications."
>
> **David Van Dorselaer**
> **Vice President of Restaurant Services, Darling Ingredients**

Reliability and security

Lee and his team appreciate the reliability of the AT&T Business solution. "The problem we were solving for is how to collect real-time information about oil levels," Lee said. "If the communications path was unreliable or spotty, we were unable to consistently collect data. If some percentage of devices weren't phoning home, those tanks wouldn't have information in our service routing system for the next day. So, reliable connectivity is critical to realizing our most important goal, which is efficient and effective logistics."

technology was critical, so early on we identified and submitted our most unique ideas for patents," Lee said. "The aspects of our solution that are patentable enhances the solution, sets our company apart from the competition, and provides protections against competitors capitalizing on our ideas and technologies."

Expertise and responsive support

Van Dorselaer is pleased with the benefits Darling Ingredients is realizing. "Having national, reliable coverage and an excellent account team supporting us in the field through AT&T Business gives us confidence in the reliability that we can offer our customers and the value we can deliver to the business and our stakeholders, which is what we set out to do," he said. "With AT&T Business, we can get the consistent results, uptime, and building penetration that we need."

"AT&T Business has a proven track record with extensive experience working alongside customers in a variety industries and applications," Van Dorselaer added. "That expertise helps us craft the right solution and utilize all tools and benefits available to our organization. Throughout the last couple of years, we've called on AT&T Business resources to help solve some technical issues. We have a responsive AT&T Business team that has been there to help."

That reliability also supports Darling Ingredients' security protocols. "Thieves are trying to steal oil out of our tanks at all hours," Lee said. "We now have theft-detection solutions, so when a theft is attempted, we receive real-time cellular alerts and information. In some cases, we can catch thieves in the act. If that connection was spotty, however, we may not get alerted until hours later. When we know a theft is taking place in real time, we can act in real time to protect our business and our customers."

Protecting data is also important to Darling Ingredients. "We needed to be confident that our tank data is secure," Lee said. "Cellular has inherent security for IoT because cellular uses a SIM card as the authentication element. When using a cellular communications path, inherent security is built right in, and that benefit is often underappreciated."

To support its IoT tank solution, Darling Ingredients designed, prototyped, and began producing custom-built hardware. "Developing new, creative and patentable

> "Reliable connectivity is critical to realizing our most important goal, which is efficient and effective logistics."
>
> **Craig Lee**
> **Director of Technology Innovation, Darling Ingredients**

AT&T Business