Innovative IoT solution helps Emerson Grind2Energy™ turn food scraps into fuel

About Grind2Energy

Grind2Energy™, Emerson’s food waste recycling initiative, helps large food waste generators such as supermarkets, hotels, hospitals and arenas minimize their environmental impact and boost their operational efficiency. The system uses industrial-strength InSinkErator® food waste grinders to quickly process food scraps into a liquid slurry that is pumped into on-site holding tanks. The slurry is then transported to anaerobic digesters, which convert it to biofuels and fertilizer.

Situation

As state and local governments begin to ban the future use of landfills, large volume food waste generators needed a sustainable solution that’s better for the environment. Emerson engineers developed Grind2Energy to cut down on the amount of food waste in U.S. landfills. The system enables venues with large food service operations to process food scraps and store the resulting slurry in onsite tanks. Grind2Energy wanted to monitor the slurry tanks so it could dispatch trucks to pump out the tanks only when they were almost at capacity, saving fuel and driver hours. It also wanted to monitor conditions to better schedule preventive maintenance to prevent down time. Finally, Grind2Energy wanted to give its customers usage and
sustainability reports to help them document their efforts to comply with environmental mandates. infrastructure, Oakland County again turned to AT&T.

Solution

Emerson uses an AT&T Internet of Things (IoT) solution to advance its innovative waste recycling system. Remote sensors in slurry tanks monitor equipment and let the company know when to schedule repairs or preventive maintenance. They also measure slurry levels and alert Emerson when a pump-out is necessary, which eliminates wasted trips and decreases fuel costs. The IoT capabilities also enable Grind2Energy to provide near real-time environmental sustainability information, performance data reporting and data analytics to its customers.

In Search of a Better Way to Manage Food Scraps

Fully 97% of food waste in the U.S. ends up in landfills, according to the U.S. Environmental Protection Agency. Adding 80 billion pounds of food scraps every year takes up space in landfills and creates methane, a greenhouse gas that has been linked to global climate change. It also creates high disposal costs and tipping fees. As states and municipalities have begun mandating that food waste be diverted from landfills, groceries, hospitals, arenas and other institutions that have a lot of food waste have been searching for ways to comply with the laws and help protect the environment.

Today’s emphasis on freshly prepared food has contributed to the amount of food waste in some venues, even though many stores and restaurants donate as much of their leftover food as possible. Others compost some or all of their food scraps, but composting can be problematic. “One of our customers unloaded material for compost at their digester. Somehow a padlock had gotten into their receiving bay, which jammed up their auger system,” said Doug Brokaw, Director of Sales for Grind2Energy. “They had an expensive repair and production was down for about a day and a half.”

Composting also attracts insects, rodents and scavenging birds; the bins often emit odors and sometimes get knocked over, Brokaw said, which means employees have to clean the mess. “The compost facilities are also very strict in terms of contamination levels, and if you have an unlocked bin somebody can come along and throw whatever into it and you wouldn’t know it,” he said. “We’ve had customers tell us that they’ve done everything right but the compost facility rejects it. It ends up going to a landfill anyway, and they get fined for having to send it to the landfill.”
Emerson, the company that makes the industry-leading InSinkErator® food waste disposers, was looking for better ways to deal with food scraps, said Erica Vranak, senior marketing manager for Emerson’s Commercial Solutions Group. “We’re constantly seeking that next big idea on how we can make people’s lives more convenient and more sanitary, in terms of handling food waste,” she said. Emerson’s Helix Innovation Center, on the campus of the University of Dayton, provides a collaborative environment in which academicians and industry professionals work to develop solutions to industry challenges.

The company’s pioneering Grind2Energy initiative was developed at the request of an anaerobic digesting company. “They were looking for contaminant-free slurry that they could have delivered to their digesters,” Brokaw said. “We started researching the product idea in the market and here we are.”

“A Recipe for Renewable Energy

Grind2Energy recycles food waste into clean water and renewable energy — in the form of electricity, heat, or compressed natural gas. Through the startup company’s innovative process, customers grind food waste onsite using a customized, industrial-strength foodservice grinder. Grind2Energy provides 10-gallon totes with covers that customers can use in their kitchens, back rooms or wherever they collect food waste.

When the tote is full, employees take it to a processing table, where they screen out any contaminants and put the remaining scraps into a 10-horsepower grinder, which pumps the slurry into a holding tank. Customers can put meat, bones, cheese, bread, fruit and vegetables into the grinder, along with fat, oil and grease. “Because we’re a non-sewer based system, they can put all of that material through our grinder into the holding tank safely and the digesters love it,” Brokaw said.

Grind2Energy trucks pump out the tank and transport the slurry to an anaerobic digestion facility where methane is extracted for energy production. The remaining biosolids become nutrient-rich fertilizer. The system produces electricity, heat, or compressed natural gas, while reducing odors, pests, vehicle emissions, and labor costs.

“As the data is collected, an algorithm in the system optimizes our hauling schedule based on the history of that site. Imagine the ease of being able to monitor all of our systems across the country from one desk.”

Doug Brokaw
Director of Sales for Grind2Energy
Shifting Paradigms, Adding Value

Ms. Vranack said Grind2Energy’s biggest challenge has been getting people to think differently about managing food waste. “It’s a paradigm shift and sometimes it’s a little slow to start,” she said. “But once people try our system, they like it and they want to continue with it.”

For example, one large grocery store chain was hesitant about changing the way it disposed of food scraps, but agreed to test Grind2Energy in one of its stores. Store officials soon noticed that they had eliminated food odor in the backroom and dumpster areas and saved significantly on hauling fees by reducing the number of trash compactor pulls from the store from eight per month to just one. The initial location is now processing eight tons of food per week that used to go to a landfill. As a result, the chain decided to adopt Grind2Energy in all 12 of its stores and make it a part of every new store it constructs.

Grind2Energy wanted to add even more value to its system by giving customers detailed information about the waste they were processing, Ms. Vranak said. “We wanted to provide data on what is going through their systems to help them manage their waste,” she said. “If they see that they’re putting through a lot, maybe they’re ordering too much at a location or maybe there was spoilage because of equipment failure.”

Officials at Grind2Energy believed that delivering better data could promote better decisions, decreasing the amount of food wasted and saving organizations money. The company also wanted to streamline the slurry pickup process, eliminating scheduled runs in favor of dispatching trucks only when holding tanks were nearly full.

Diverting Tons of Waste from Landfills

AT&T suggested equipping Grind2Energy’s innovative food waste recycling system with IoT connectivity and platforms to provide near-real time visibility into food loss operations. AT&T global SIMs provide data storage for historic tank levels, water pressure data, and more, allowing Emerson to supply performance data, analytics and predictive maintenance reports to its customers. AT&T M2X, a managed data storage service for Internet-connected machine-to-machine devices, and AT&T Flow Designer, a cloud-based development tool, make it easier for Grind2Energy to collect, organize and analyze data.

The solution vastly improves tank monitoring and pump-out scheduling. Sensors monitor conditions and alert Emerson’s local tank service provider when the holding tanks are nearly full, streamlining
communication, decreasing wasted fuel from trucks, optimizing pick up scheduling and minimizing costs. It provides data that predicts maintenance needs and maximizes system uptime, offering customers visibility into food loss with real-time data that can be used to manage avoidable food waste.

Grind2Energy customers appreciate the insights, Brokaw said. “We send them a tonnage report that shows how much they’ve diverted from the landfills and a sustainability report that shows how much heat, energy, fertilizer, and equivalent car miles they removed the road,” Brokaw said. Instead of visiting each site to manually pull system data, which was expensive and inconvenient, Emerson can now access the data remotely and share it with customers electronically. Comparing system runtime across multiple locations in a chain will ultimately help customers eliminate unnecessary waste.

Ms. Vranak said data can even highlight the difference between different shifts. “A big difference in the amount of waste processed may mean that the third shift at a location needs additional training on how to use the system. Or it may mean they’re preparing foods that have more waste in them,” she said. “By gathering the information at so many different data points, we can slice and dice and look at it from a business perspective to help each individual site operate better.”

New Ways to Provide Value for Customers

The IoT solution also simplifies operations for Grind2Energy, which owns the systems it places in customer locations. “We don’t sell equipment,” Ms. Vranak said. “It’s a lease system and so all the responsibility of service and system changes falls on Emerson.”

Embedding IoT sensors into its equipment makes it much easier for Emerson to manage its equipment. “Before we had the IOT, we physically had to send somebody out to our tables in the markets, open up our control panel, pull the data down and jot down the water meter readings. Everything was manual,” Brokaw said. “Now we can see how the systems are performing and track the data so much more easily.”

Thanks to the sensors, it’s much simpler to get a read on individual systems and visualize trends. “As the data is collected, an algorithm in the system optimizes our hauling schedule based on the history of that site,” he said. “Imagine the ease of being able to monitor all of our systems across the country from one desk.”

Thanks to Emerson’s corporate culture of innovation, Ms. Vranak said, Grind2Energy is always looking for new ways to provide value to its customers. “If there’s a way that we can help our customers and become better partners, that’s where the value is for us,” she said. “The IoT aspect adds just another exciting reason to believe in this initiative. This is just the first stop. The future is so bright.”