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ENVIRONMENTAL & INDUSTRIAL SERVICES

EXECUTIVE INSIGHTS: EMERGING TRENDS IN FOOD WASTE

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SOLOMON BUSINESS SERVICES TEAM



INTRODUCTION

“I’d hate for this to go to waste” is a common phrase shared over major holidays as many Americans lament the prospect of discarding their holiday leftovers. Though food waste is especially pervasive around the holidays, it is, unfortunately, a year-round problem.

The United States generates 60 million tons of food waste every year, or 325 pounds of food waste per person and 40% of the entire food supply.¹

Worse yet, 38% of food waste volume in the US ends up in landfills,² and organic waste is the largest contributor to methane emissions at landfills (~60% of methane emissions)³, a particularly harmful greenhouse gas (GHG) that is 28x as potent as carbon dioxide at trapping heat in the atmosphere. Consequently, landfills are the third-largest source of methane in the US.

Despite significant investment and advancement in capturing landfill gas for energy production, upwards of 50% of methane is still escaping into the atmosphere, which is due, in part, to the fast degradation of food waste that occurs before installation of a landfill gas collection system.⁴ That fact, combined with the high water content of food waste that converts into landfill leachate, makes it important to consider more targeted and environmentally beneficial food recovery alternatives.

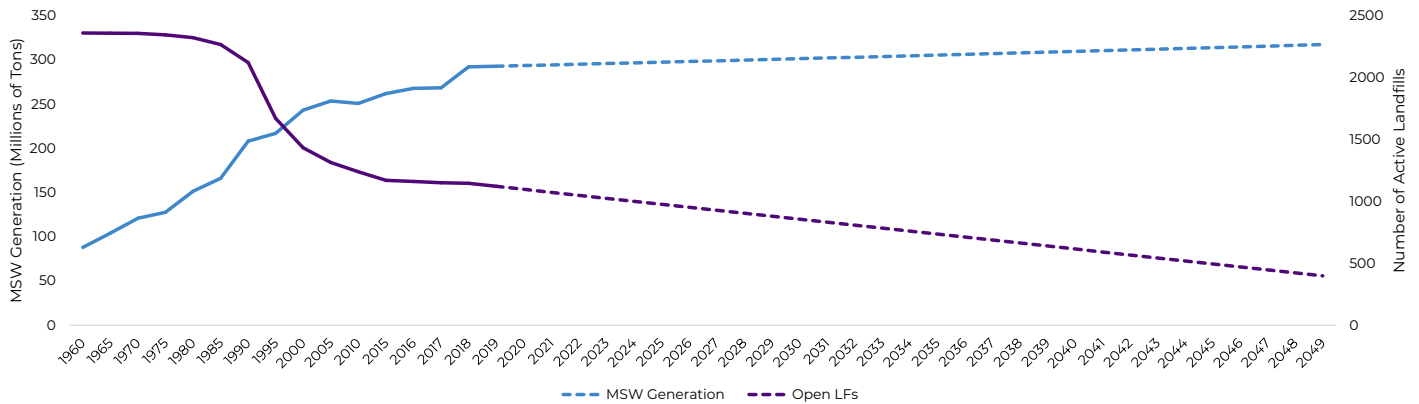
In the US, food insecurity is a major issue, and we should all do our part to supply food banks. However, despite making considerable progress, it’s unrealistic to think that we can donate our way out of this problem. In fact, most waste is incompatible for donation, which underscores the need for investment in sustainable solutions to address production byproducts and overruns, spoilage, contamination, and costly logistics across the food-supply chain.

Of course, food is only one small component in the larger waste ecosystem—but it is an important category. Food uniquely requires a significant amount of land, energy, and water to produce, so the impact of wasting this resource extends beyond landfill space and emissions associated with disposal. The good news is that it is possible for countries to prevent, recycle, and upcycle food waste to limit the amount of volume destined for landfills and incineration facilities. Standout examples include Japan and the UK, which have had per-capita reductions in food waste of 18% (2007-2021) and 31% (2008-2020), respectively, as well as South Korea, which has been able to divert 95% of generated food waste.⁵

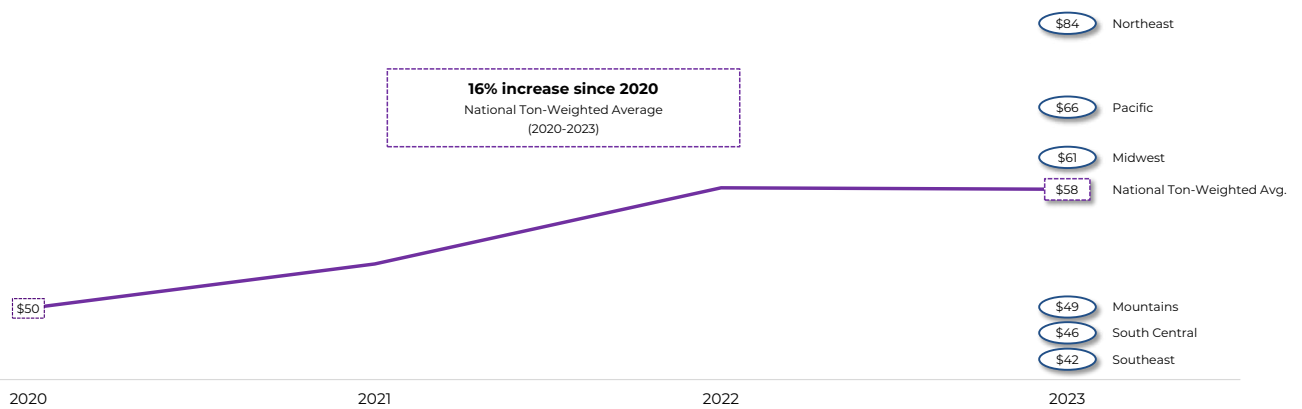
Here in the US, businesses are increasingly focused on food waste reduction, reuse, and recycling in conjunction with corporate sustainability initiatives and to meet the growing number of state-level regulations. For businesses across the food supply chain, reducing food waste represents an opportunity for significant cost savings. Food purchases are one of the largest expense items for retailers (~70% of revenue)⁶ and food service establishments (~33% of revenue),⁷ so these companies are equally focused on optimizing waste reduction for purchasing reasons and cost of disposal.

Crucially, economics are beginning to tilt toward sustainable solutions. Across the country, landfill capacity, particularly around major metropolitan areas, has substantially contracted over the past quarter century, with numerous sites set to close by 2050. Tip fees continue to rise meaningfully in certain regions given reduced capacity, and some companies are equally trying to avoid incineration facilities given emissions concerns, including from the needed long haul in parts of the country, in addition to the high cost.⁸

INCREASING MSW VOLUMES AS THE NUMBER OF ACTIVE LANDFILLS DECREASE^{9,10,11}



TON-WEIGHTED TIPPING FEES ON THE RISE¹²



At the same time, companies are making meaningful investments in alternative methods such as anaerobic digestion (AD), composting, and upcycling waste into animal feed, to extract additional value out of food waste. Advancements in de-packaging equipment are helping to expand these alternatives to packaged food, which has historically proven difficult to recycle and often ended up in landfills.¹³

Like many sectors, developments in technology and data capture and reporting are further transforming the landscape, helping service providers create additional value for their customers. Using these tools, service providers can shed light into what's inside waste bins at the store level while helping customers adjust their purchasing behavior to address operational issues at underperforming locations. Service providers can further trace waste volume diverted or minimized, along with associated emissions savings, which allows customers to demonstrate true progress toward achieving their sustainability goals.

While food producers have a history of diverting byproducts and scraps to alternative outlets, there is considerable room for improvement, especially in packaged goods. Over the past decade, national food retailers have also made progress in meeting their sustainability initiatives, but clearly they can do more to further reduce waste volumes and optimize purchasing to enhance margins.



While food waste service providers will continue to benefit from demand tailwinds within the food production and retail sectors, two areas pose significant complexity and will require longer-term thinking: households and food service facilities such as restaurants, which account for a combined 91% of the food waste going into landfills.¹⁴

For food service businesses, decentralized decision-making is complicating sustainability programs, forcing service providers to sell their economic value proposition to individual franchisees across the country. At the household level, the onus is on creating cultural change and pairing it with local regulation to force individuals to separate food waste for distinct organic waste collection—a process that is many years (if not decades) from having meaningful scale nationally.

Service providers who support sustainable practices offer a critical link to food producers, retailers, distributors, and service establishments, helping to minimize food waste costs by recovering as much economic value as possible. Consequently, service providers are gaining scale within their niches across the food supply chain and have abundant opportunities for additional growth as corporate sustainability practices and economics shift with rising landfill tip fees in certain regions of the country.

Likewise, private equity (PE) recognizes the value of investing in businesses that offer predictable cash flows, the downside protection of essential services, and opportunity for consolidation and scale against a strong tailwind of sustainability and regulatory-driven demand. Continued regulatory changes and enforcement towards food waste, reuse, and recycling, coupled with the quickly closing cost gap between landfill disposal and sustainable solutions, will help support outsized growth within the space, particularly among food service establishments and post-consumer food waste, now in its infancy in the United States. While other areas of waste services are further along the investment-and-consolidation curve, the food-waste space is still in its early innings, and we expect to see more scaled platforms and investment in the coming years.

NOTABLE PRIVATE EQUITY TRANSACTIONS

TARGET	SPONSOR	DATE	TARGET	SPONSOR	DATE
		Aug-23			Nov-22
		Aug-23			Sep-22
		Mar-23			Sep-22
		Aug-23			Sep-22
		Jul-22			
		Apr-22			Jul-21
		Dec-21			Apr-21
		Oct-21			Jan-20
		Oct-21			Sep-19
		Apr-21			
		Apr-21			

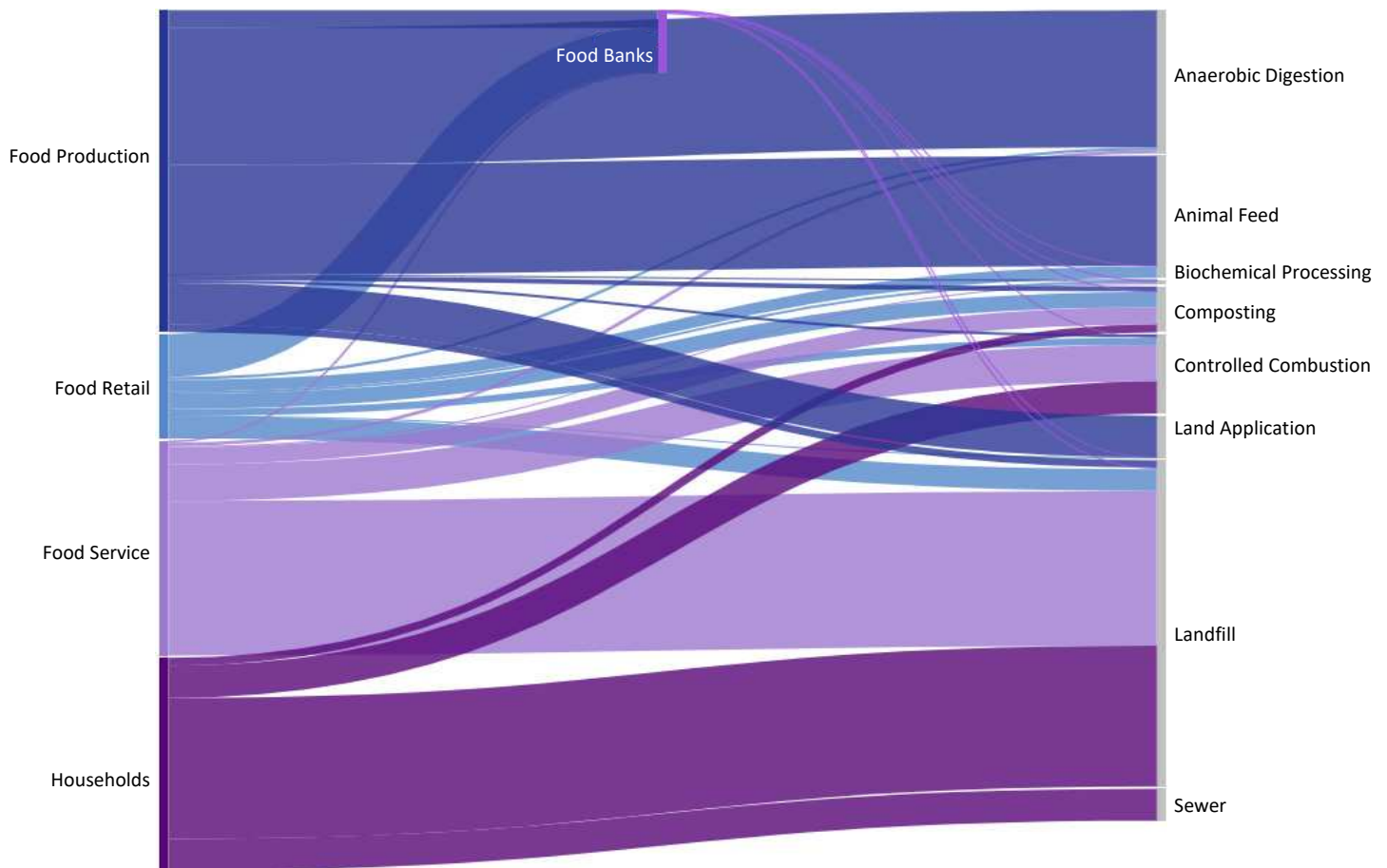
ECONOMIC EQUATION

For companies operating across the supply chain, food is one of the largest cost line items and a top contributor of waste volume. These food-based businesses are increasingly looking for ways to extract additional value from food waste and leverage insights gleaned from what's inside the waste bin to further optimize purchasing and profitability. With landfill tip fees rising across the country, companies no longer view waste as a mere afterthought and, over the past decade, have been eager to adopt alternative outlets.

Food manufacturers have been early adopters of sustainable waste practices, particularly for clean, bulk waste streams with obvious economic value. In recent years, businesses have sought ways to extend these practices to harder-to-recycle food waste streams, particularly for packaged goods. These efforts have yielded high success rates: Food manufacturers/processors produce approximately 38% of food waste but process approximately 43% via anaerobic digestion, 34% to animal feed, and approximately 1.5% via composting¹⁵, with only roughly 2% reaching landfills.

Unlike manufacturers, food retail, service, and residential sectors are still in the early-adoption phase, producing the remaining 62% of food waste—approximately 60% of which ends up in landfills.¹⁶

WASTED FOOD GENERATION AND MANAGEMENT FLOWS BY SECTOR¹⁷



But there is reason for optimism. Within the food retail sector, grocers are beginning to adopt more sustainable initiatives. From 2019 to 2022, grocery retailer signatories of the Pacific Coast Food Waste Commitment decreased the number of tons of unsold food by 25%—marking the largest decrease of food waste, according to Dana Gunders, Executive Director at ReFED.¹⁸

Waste service providers have become integral to the development and management of sustainability programs, helping companies across the food supply chain to better understand the composition of their waste streams and integrate potential alternatives to create more value.

“

If you examine the profit and loss statement for an individual grocery store, the cost of waste typically shows up far down the list, likely right after waxing the floors,” said **Mr. Begin, Co-Founder and CEO of Divert, Inc.** “However, if you look at the food brought into the store, that expense ranks second only to labor in terms of cost—and in potential for improving gross margins. An average grocery store generates about \$40,000 in net profit per store, per month, yet that same store will purchase and discard about \$40,000 of food each month. In effect, we’re talking about the potential to double their net profit, which is unparalleled aside from labor.

”

Despite the hurdles that come with making an operational switch, customers who make the investments see results, quickly—and that often leads to long-term, mutually beneficial relationships.

“When participating in an RFP, it can be challenging to demonstrate the long-term value we know we’re going to produce,” said Cory Peter, CEO of Nutrition 101, LLC. “But in the subsequent renewals, after we’ve done everything that we’ve promised, the long-term value comes to bear. We end up with long-term partnerships with our customers because of custom solutions, excellent customer service, and high switching costs.”

For service providers, successfully supporting a diverse customer base means not only having the infrastructure to navigate significant uncertainty

but also remaining nimble enough to pivot when necessary.

“We’re focused on building out this ecosystem in order to have the best solution in place to address our customers’ needs,” said Todd Mathes, CEO of Denali. “We have organic material that goes to different solutions in the same locale depending on the situation. You need to have all those solutions in place to best serve our customers.”

Companies considering potential food-waste diversion and recycling programs must typically weigh competing priorities within their procurement and sustainability departments. Though sustainability is becoming a voice of increasing importance within organizations, overall cost / economic value tends to trump sustainability.

“At the end of the day, many of our clients want their food waste going to an outlet that has the best financial return for them—either where they can achieve the highest revenue, or they can pay the least,” said Seth Goodman, Co-Founder and CEO of Northstar Recycling. “Sustainability is very important to our clients, but what we find is that with certain clients, economics often win out. There are plenty of examples where companies choose the more sustainable option. But there’s definitely a conflict of interest internally at many organizations; in those situations, between procurement and sustainability, procurement frequently wins out more than sustainability does.”

However, with growing sustainable waste infrastructure, increased regulation, and rising tip fees at landfills, service providers say they believe the scales are beginning to shift to sustainability as the more economical option. This will likely provide additional tailwinds and areas of opportunity for waste providers specializing in sustainability.

SUSTAINABILITY

More than 45 large corporations, including Amazon, Walmart, Starbucks, and other public and private companies, have signed onto the US Food Loss and Waste 2030 Champions Initiative to reduce food loss by 50% across their US operations.

Globally, the 10x20x30 initiative brings together 10+ of the world’s largest food retailers and providers,



U.S. FOOD LOSS AND WASTE 2030 CHAMPIONS



ADDITIONAL COMPANIES WITH COMMITMENTS TO REDUCE FOOD WASTE BY 50%



each engaging at least 20+ suppliers to halve food waste by 2030.

A signatory to the US Food Loss and Waste 2030 Champions, Kroger has been at the forefront of food rescue and landfill diversion since 2017, when it established its Zero Hunger | Zero Waste Food Rescue program. In 2023, Kroger provided 455 million meals, gave \$256 million in food and funding to hunger-relief organizations, donated 114 million pounds of surplus fresh food from 100% of its stores, and achieved 82% operational waste diversion from landfills company-wide.

Why are corporations increasingly committing to sustainability? Beyond altruism, large companies are beginning to recognize that sustainability is beneficial to their businesses long term, and they're starting to make changes.

"When you look at the wasted food that goes to landfills, it's approximately \$5 to \$7 billion per year," said Mr. Begin, of Divert. "Meanwhile the value of that food is about \$410 billion per year. So, the value proposition for us is not only that we participate in the landfill avoidance and provide the diversion opportunity; it's also about capturing some of that \$410 billion. And that's why as a business, we have never lost a customer in 17 years."

Even as more companies aim to reduce their carbon footprint, big-picture corporate goals aren't always translating into changed behavior at the site level. Food producers and retailers need ongoing support to ensure that they're maximizing economic potential of food waste streams and minimizing volume to landfills and/or costly waste-to-energy facilities. That's where training becomes important. Service providers can help solve the problem by training site-level staff to ensure best practices.

“

The more we can divert out of the stream before the material leaves your facility overall, the more money you save," said **Mr. Goodman, of Northstar Recycling**. "But it comes down to people doing it at the site level. And that is a very important piece of what we do, and how we help our clients—by making it the simplest possible solution system to divert as much material out of the landfill stream as possible.

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Training and education are especially important for franchisees in the restaurant sector, which lags manufacturers and grocers in sustainable waste adoption.

"Our services need to appeal to more than just the corporate brand—they also need to appeal to the franchisees," said Mr. Mathes, of Denali. "So, it's very important for people like us to educate the franchisees on the value that we can bring back to, not just their locations, but the brand itself. Brands believe there's value in pulling waste out of landfills. But you haven't seen a lot of action there just yet, simply because it's new and different, and the decisions aren't just made in one spot."

Beyond on-site support and training, manufacturers must carefully consider product packaging, as even a small amount of contamination can make recycling a practical impossibility.

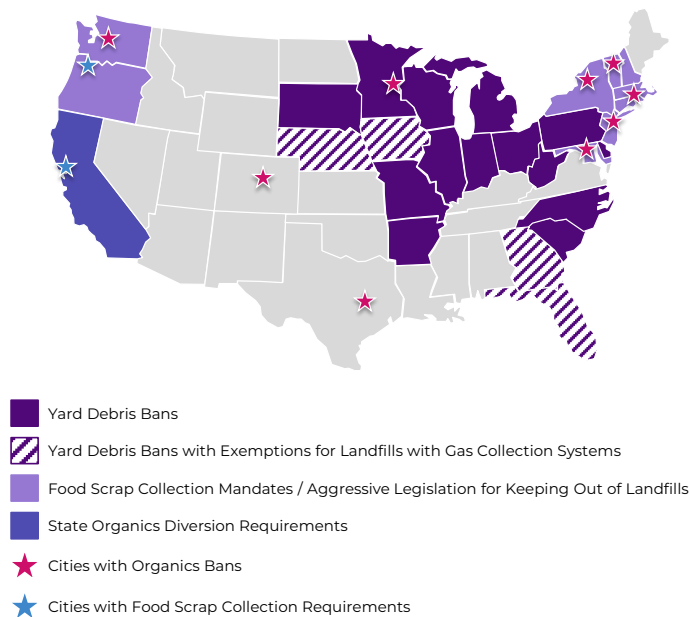


“There's readily available capital to invest in equipment to do stuff,” said Mr. Peter, of Nutrition 101. “But at the end of the day, if you've got some amount of packaging that is non-recyclable—maybe it's 90% recyclable plastic, but it's got 10% contamination—technology doesn't exist to make it cost effective to separate.”

CHANGING REGULATION & EFFECTIVENESS

For the past 10 years, federal, state, and local governments have made concerted efforts to reduce food waste.

In 2015, the EPA and USDA enacted the US Food Loss and Waste Reduction Goal—the first-ever domestic food loss/waste goal—to curb food waste by 50% by 2030. State and local initiatives followed suit, with food-waste bans now in place across 10 states and seven cities (as of spring 2024).¹⁹



While regulations banning organics in landfills started to be enacted a decade ago, progress towards widespread diversion has been slow until recently due to several factors. These include staggered implementation of regulation starting with larger generators and only recently becoming a factor for smaller generators, as well as the historical lack of available alternative outlets, which is quickly changing with added investment.

“We don't think there's a lot of enforcement going on,” said Mr. Goodman, of Northstar Recycling. “For example, California has been very strict about saying that it will issue fines. But we don't necessarily know if that is happening in practice. So, there's still a ways to go, but I think we're on the right track.”

How can regulation speed adoption of sustainable initiatives? Some waste service providers believe it requires a creative approach.

“There are smart ways to do this,” said Mr. Begin, of Divert. “Connecticut led the country in the concept that, if there is a facility that can process wasted food within 20 miles of where you are generating that wasted food, you must have a program. You don't have to use that facility. But you do have to have a program.”

With companies navigating a patchwork of different state regulations, waste service providers say customers are eager to adopt holistic solutions.

“Our customers are national, and they want to solve this problem everywhere, not just in the states where they operate and where there's a landfill ban,” said Mr. Eichinger, Chief Financial Officer at Divert. “They want to be more responsible with what they do with their wasted food.”

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As the industry looks for greater regulatory enforcement, Cory Peter, of Nutrition 101, said the Food Safety Modernization Act has been a positive for 101, because it streamlined the process of diverting human-grade products for animal feed.

“The implementation of the Food Safety Modernization Act helped the food manufacturing community develop a high standard of accountability in terms of labeling and communication regarding the food waste that they produce,” Mr. Peter said.

The passage of the Inflation Reduction Act also created incentives for companies that use anaerobic digestion to convert food waste into renewable energy. Under the legislation, companies that use the technology can receive an investment tax credit of up to 30% of the eligible costs, with additional bonus incentives.²⁰

In addition to the 10 states with food waste bans, New Hampshire’s new law is set to take effect in 2025. Should more states follow suit, service providers with the relationships, know how, and infrastructure to provide alternatives to landfill disposal will be well-positioned to capture these outsized opportunities.

INFRASTRUCTURE & MARKET LANDSCAPE EVOLUTION

The confluence of rising landfill and waste-to-energy tip fees, increased focus on sustainability, and favorable regulation and tax incentives has spurred significant investment in infrastructure to maximize the economic value of food waste. These investments have gone toward advanced de-packaging technology, anaerobic digestion, compost, and animal feed processing. De-packaging allows companies to separate food waste from its packaging so that it can be removed from waste streams once destined for landfills.

“We’re seeing all different sorts of outlets building out their ability to handle packaged food waste,” said Mr. Goodman, of Northstar Recycling. “The benefit to our clients has been to be able to recycle more material and achieve better economics.”

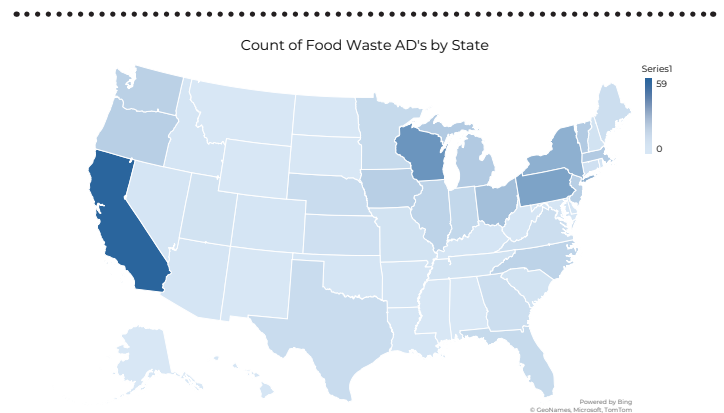
While de-packaging is helping to reduce food waste, there are varying degrees of effectiveness across available equipment. Studies have found microplastics in compost, animal feed, and anaerobic digestion slurry, which largely come from use of inferior de-packaging equipment. While there is a need for added investment in robust equipment, waste businesses that take the extra

steps to ensure high standards and compliance will be at an advantageous position in the long run as the industry continues to become aware of microplastic contamination among less-scrupulous players.

“We go through a painstaking process to make sure that we have very clean slurry,” said Mr. Begin, of Divert. “We’ve qualified our slurry with organic farmers. We’ve gone through certification processes and we self-test. We’ve kind of written the book on how this is done because, as a business, we see it as a long-term liability if not done properly.”

With uneven adoption across regions, and customers reliant on systems that can fluctuate from external factors such as weather, waste service providers say it’s important to invest in a wide array of options and to have a vertically integrated partner that can manage an otherwise complex process.

COUNT OF FOOD WASTE AD'S BY STATE²¹



“

We’re building out that infrastructure every day,” said **Mr. Mathes, of Denali**. “You see anaerobic digestion facilities being constructed or proposed. You see more de-packaging options out in the marketplace. What you don’t see as much of is someone like us who is aggregating all this waste, being vertically integrated and putting assets to work to help solve the problem. That’s where we see our opportunity.

”

For service providers, moving beyond their status as a vendor for a relatively low-cost item is one major impediment to becoming true partners that can support their customers' sustainability goals for the long term.

"A procurement lead at a Fortune 500 food company will always be challenged to control costs," said Mr. Peter, of Nutrition 101. "But if you're talking about a company that has a challenging de-packaging project—and we want to try to figure out how to get the organics out of it, so that we can recover everything and avoid the landfill—no one is ever going to sign up for a one-year stint at that. You need to have a commitment over time to develop winning solutions."

DATA TECHNOLOGY

Advanced data capturing and reporting is helping companies throughout the food supply chain understand the origins of their waste streams and work towards reducing waste volumes and increasing reuse and recycling. Today's data solutions provide comprehensive visibility into waste streams, allowing retailers to view every item of waste and determine which of their stores are most successful in meeting their goals.

"Our customers love the data and being able to see on our portal who are the best-performing sites, who are the worst-performing sites, which sites are making progress, and which sites are falling backwards," said Mr. Goodman, of Northstar Recycling. "It's definitely a lever that they use to help their various sites be as productive and sustainable as possible."

Being able to capture and report verifiable and traceable data has also become an important differentiator for waste service providers serving customers who are trying to make progress towards sustainability goals. Even if customers don't place much value at the RFP stage, service providers say that their customers become reliant on the data over time, and it becomes a material point of stickiness in the relationship.

Following the adage "you can't manage what you don't measure," customers are embracing data technology to help them operate more effectively, reduce waste, and improve their bottom lines. Data also helps large companies validate their sustainability efforts to their shareholders while helping them push back against accusations of "greenwashing."

“

We've completed our own studies to calculate greenhouse gas avoidance benefits. For example, if you take a semi load of X to the landfill, or if you send it to us, here are your greenhouse gas (GHG) savings," **said Mr. Peter, of Nutrition 101.** "And we present that up front so that our customers can see the projected impact on an annual basis. Then, we immediately shift into monitoring and reporting of that metric. Everyone needs to have accurate, timely data.

”

Certain industry participants believe having an integrated solution allows for a more accurate and real-time picture of their waste streams by being able to collect and manage data from the source of waste generation to final disposal/reuse/recycling outlet.

"There are a lot of business models that are emerging and will emerge as data-only solutions," said Mr. Eichinger, of Divert. "For us, it's the combination of the infrastructure we're building along with the data that puts us in a unique and defensible position, because they need both. And the fact is, we're physically touching and seeing those unsold food products come down the conveyor belt."

CHALLENGES

For manufacturers and retailers, increased awareness of contaminants in organic waste streams is serving as a barrier and expense to alternative, sustainable waste practices, preventing some technologies from gaining momentum.

Rather than risk the liability of sending contaminated slurry to a composter or animal feed supplier, companies often take the path of least resistance, sending organic waste to a landfill or for incineration despite its recycling potential. Considerable cost and investment is required to ensure contaminants are removed from waste streams destined for sustainable outlets. For example, composters spend an average of 21% of their operating expenses on removing contaminants.²²

“The landscape surrounding food production today has evolved a lot from where it was 30 years ago,” said Mr. Peter, of Nutrition 101. “We excel at identifying the best use of various food wastes, and how to incorporate those materials into complete diets for animals. Part of that process involves our team adding value as a partner and educating our food-production customers. By evaluating every feedstock on its nutritional components, we are able to recover a much higher volume and increase landfill-diversion rates. But that’s our job. Food manufacturers don’t want to be animal-feeding experts.”

In addition to removing harmful materials, high water concentration also poses a hurdle to achieving further progress on landfill avoidance.

“There are certain products—like the things that have high water content—that are really difficult,” said Mr. Goodman, of Northstar Recycling. “Sometimes, the juice isn’t worth the squeeze. It takes so much money to de-pack something that it may not give the producer any tangible value because of the high concentration of water. If it’s in bulk, it’s easier, because that could go right to a compost pile. But when we’re talking about packaged vegetables, packaged fruits—that’s hard.”

While investment in food waste infrastructure is growing, cost is still a sticking point, especially when customers see that they can make other changes to improve their sustainability and lower costs. “Quite honestly, the value coming off the back end isn’t as great as the savings on the front end,” said Mr. Mathes, of Denali.

Beyond waste diversion, consumers also play an important role in reducing food waste going to landfills. Studies show that “food waste is a problem of inertia and disregard among consumers, with education and efforts to change attitudes considered as key.”

In the US, consumers are responsible for nearly half of the surplus food volume,²³ so creating tangible change must include local regulation coupled with specific infrastructure and logistics support to handle this type of volume. However, the scope of such an effort means that we are likely years away from solving this particular component in a material way. Should these components materialize, the increased demand for sustainable solutions will require additional investment and produce substantial growth for service providers operating in this space.



A LOOK AHEAD

As service providers survey the evolving landscape, they express significant optimism. Investment continues to fuel new technologies and infrastructure improvements. In the years ahead, one or more sustainable outlets —compost, animal feed, or anaerobic digestion—will likely emerge as a winner, offering preferred economic and logistical value.

But their optimism is not without challenges. Despite increasing interest in alternative waste streams, service providers say that building meaningful solutions will require collaboration across multiple entities. States and localities must provide mechanisms to enforce food waste bans. Companies need to prioritize long-term investments over short-term costs, and consumers must be open to changing purchasing decisions and how they manage waste at the household level.

What will the next five to 10 years look like?

Ryan Begin, Divert:

“The US is rapidly approaching a critical threshold in terms of landfill capacity, with about 17 years of capacity remaining. While landfilling might be the most straightforward and convenient solution, it’s a short-term fix that exacerbates long-term environmental, social, and economic challenges. Given the scale of the US waste problem, a fundamental rethinking of our waste systems is imperative. We need to make investments in addressing what society is producing as waste before it’s too late. In the next five to 10 years, I anticipate a significant uptick in investments and commitments aimed at developing infrastructure that supports long-term solutions to the wasted food crisis. We will not only see innovation in infrastructure and technologies, but also an acceleration in regulatory action and more widespread public-private collaboration to solve for our outdated waste systems.”

Todd Mathes, Denali:

“Some of these processes will emerge as the real disposition winners and others of those processes might become second, third, or fourth choices for disposition. We’ll start to see some leadership on the disposition of the material on the back end.”

Cory Peter, Nutrition 101:

“There’s going to be a continued proliferation of specialized services. For our customers, we’re finding that, when we demonstrate our services and ability to innovate, we’re going to be around for a long time. For the food manufacturers in this space, they’re taking the right steps. They’re willing to partner with organizations that are engaged in helping them to improve their process, increase recovery rates, monitor, and track their progress, and celebrate the solutions.”

Seth Goodman, Northstar Recycling:

“With companies having zero waste-to-landfill goals, and with there being such a shortage of waste-to-energy facilities for products that can’t be composted or digested or recycled, there are companies trying to create modular waste energy systems. They’re still probably a year or two away, but that’s really interesting.”



CONCLUSION

The collection and disposal of food waste is changing rapidly, driven by the shrinking chasm between landfill disposal and alternative solutions, shifts in corporate practices around sustainability, and expanded regulations at the state and local levels. Such changes are also having a material impact on the waste service provider landscape as they build out alternative approaches that offer economic and sustainability advantages to customers throughout the food supply chain.

Over the next decade, we will gain deeper insights into whether companies across the food supply chain will reach their sustainability goals and discover which sustainable solutions have the distinct advantages needed to gain widespread adoption. Equally important, we'll gain clarity from a regulatory perspective—whether state and local governments continue to enact food waste bans along with the enforcement mechanisms needed to create change.

Though we have yet to learn whether sustainable solutions will demand a premium in the future, service providers who are focused on food waste have found ways to add significant economic value. With the ongoing enactment and expansion of organics programs, particularly in the food production and retail sectors, service providers focused on food waste are benefitting from strong demand tailwinds that will likely persist for the foreseeable future. Further, as usable landfill capacity shrinks and tipping fees increase, food manufacturers and retailers will continue seeking out alternative solutions. Partners who can offer data insights to help customers run their businesses more effectively will be in an advantageous position given the economic value embedded in food waste, in particular.

Industry participants believe these ecosystem changes will help drive further adoption at food service establishments over time, once the economic value for alternative solutions becomes obvious even among small business and franchise owners. The big question is whether enough local regulatory and consumer behavior changes will begin to drive organic-diversion programs at the household level at national scale. Whether or not household-level changes take hold, the high volume of food waste throughout the supply chain means that service providers still stand to benefit from ample growth opportunities.

As a result, we believe that interest and appetite for investment in this sector will continue to grow. Against this backdrop of increased demand, coupled with rising platform opportunities as emerging players gain scale and require capital, the table is now set for abundant M&A opportunities in the food waste space for years to come.



DENALI

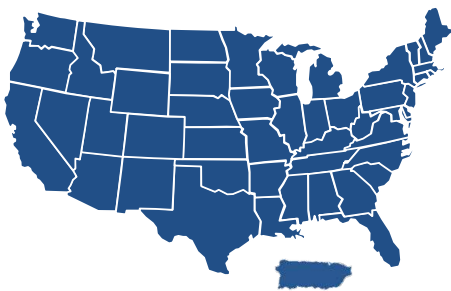


ABOUT DENALI'S FOOD WASTE CAPABILITIES

Denali is an innovative organic waste disposal and recycling company committed to repurposing waste to create value and grow the circular economy.

We have been at the forefront of diverting and converting organic waste streams for more than 25 years, having grown from a single rural Arkansas location to become a near-total solution provider for recurring organic waste streams across the nation. Our leadership team is composed of some of the most experienced professionals in the industry, and we have an impeccable safety and environmental track record.

GEOGRAPHIC COVERAGE



EXECUTIVE TEAM



TODD MATHES

Chief Executive Officer

THE INDUSTRY CHALLENGE

Although some grocery stores have adopted food recycling, starting a program and scaling it can be overwhelming. Packaged food has been a challenge in food waste recycling, as having employees separate food from packaging can be time consuming. As a result, much of the packaged food waste has been sent to landfills, where it releases greenhouse gases.

The U.S. EPA estimates that 30%-40% of the food supply is wasted each year, costing businesses and consumers billions of dollars annually. Many businesses are looking for help developing a recycling program. Companies also want solutions that drive operational efficiencies and diminish waste, allowing them to focus on other operational or revenue-generating responsibilities.

Denali helps solve these challenges, working with a wide variety of customers, including supermarkets, agriculture, food manufacturers, municipalities, the hospitality sector, including hotels and restaurants, schools and universities, entertainment venues, and healthcare.

OUR SOLUTION

Denali is the nation's leading and largest recycler of organic materials. Annually, we recycle over one billion pounds of food waste into useful products and provide a wide range of services that address organic waste streams, including collection, processing, and giving them new life as reusable resources. This is a crucial part of the circular economy that benefits the environment.

By collecting millions of tons of food waste from thousands of locations across the U.S., Denali can divert nutrients from landfills to beneficial uses like animal feed, compost, and energy. This helps reduce the amount of food waste going into landfills, leading to a more sustainable future. We also provide data that is valuable in helping customers to identify additional cost savings such as opportunities to reduce food waste or product ordering/inventory control. In certain instances, recycled organics can turn into increased revenue—particularly if that organic waste becomes a product such as our ReCirculate™ potting soil and compost. Grocers can sell these products, which were, in part, created by unsaleable food waste.

We understand the importance of making food waste recycling a top priority. We work with companies of all sizes to develop comprehensive and trackable programs that meet their unique needs. Our team is experienced in creating meaningful results that benefit both organizations and the communities in which we both operate.

OUR DIFFERENTIATION IN THE MARKET

We recognize that each organization has unique challenges and requirements. Denali offers tailored solutions to meet the specific needs of our partners, ensuring optimal waste management and compliance with all relevant regulations. Further, we utilize state-of-the-art technology and innovative processes to maximize the efficiency and effectiveness of food waste recycling. Our advanced tracking systems ensure transparency and accountability, providing clients with detailed reports on their organic waste diversion progress.

The breadth of our services includes food waste collection, including mechanical de-packaging, composting, biosolids management, lagoon and digester cleaning, de-watering, grease trap services, hydro-jetting, used cooking oil collection, land reclamation, and liquid destruction. We also produce recycled products including biofuels, compost, potting soils and mulch, animal feed and natural fertilizer.

THE RESULTS

In 2023, Denali managed 7M tons of organic waste and byproducts for recycling – specifically, 1.70 tons of food and plant waste and 5.29M tons of food manufacturing byproducts. We processed these materials into 7M tons of recycled products, including 224,000 tons of processed animal feed; 1.70M tons of compost, soils and mulch; 5.08M tons of recycled byproducts applied as natural fertilizer; and 700,000 tons of other organic products.

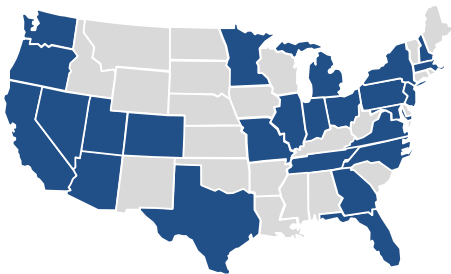
DIVERT

divert | Ara

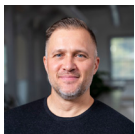
ABOUT DIVERT'S FOOD WASTE CAPABILITIES

Divert is a sustainable solutions company committed to solving the wasted food crisis and advancing a circular economy through nationwide infrastructure and innovative technologies. Founded in 2007, the company provides an end-to-end solution that leverages data to prevent waste, facilitate edible food recovery to provide to people in need, and transform unsold food into renewable energy to power communities. Through this integrated approach to reducing wasted food – Prevent, Provide, Power™ – the company works with approximately 8,000 US customer locations. Its customer base spans industries and includes five Fortune 100 companies.

GEOGRAPHIC COVERAGE



EXECUTIVE TEAM



RYAN BEGIN

CEO and Co-founder



DAVID EICHINGER

CFO

THE INDUSTRY CHALLENGE

Today, the US alone generates more than 63M tons of wasted food annually. What's more, wasted food contributes 8%–10% of global greenhouse gas emissions. Additionally, across the US, there is insufficient diversion infrastructure and logistics to solve the wasted food crisis. Divert's retail, food service, and industrials customers are looking for simple, clean, and customizable diversion programs that seamlessly integrate into their operations and comply with all organic disposal regulations. Additionally, they need a partner that can accept and process all types of materials, including organics, fully packaged and palletized material, and bulk liquids.

OUR SOLUTION

Divert is committed to solving the nation's wasted food crisis and advancing a circular economy via innovative data, tech, and infrastructure solutions. Divert works with customers and partners to increase awareness and productivity across the entire food ecosystem. When it comes to reducing wasted food, the solutions landscape is fragmented and siloed. There are companies that focus on preventing waste, facilitating donations, or diverting from the landfill, but none that focus on all three holistically. At Divert, we understand that these solutions are interconnected, and we are the only company in the wasted food space with an end-to-end solution.

Through our network of integrated de-packaging and anaerobic digestion facilities, Divert is making carbon-negative renewable energy out of unsold, non-donatable food that would otherwise be sent to landfill, achieving a net reduction in equivalent GHGs. Divert also developed the first FDA Food Safety Modernization Act (FSMA)-compliant reverse logistics process to aggregate unsold food using customers' existing transportation routes, which significantly minimizes transportation-related emissions. By 2031, Divert will scale to 30 nationwide Integrated Diversion & Energy facilities, putting the company's sustainable infrastructure within 100 miles of 80% of the US population.

OUR DIFFERENTIATION IN THE MARKET

Divert is committed to solving the nation's wasted food crisis and advancing a circular economy through innovative data, technology, and infrastructure solutions. Our advanced data capturing and technology provides clearer visibility and allows our customers to make better decisions to keep food fresh and saleable, minimizing the amount of unsold food being wasted. For food that ultimately becomes waste, our reverse logistics program makes for simple and seamless collection, minimizing disruption to existing customer operations. Our integration with a growing network of Integrated Diversion & Energy facilities helps ensure that unsold food products are processed in a highly compliant manner that maximizes the utility and minimizes the environmental impact. Divert takes a responsible approach to infrastructure development that prioritizes sustainable business practices, including the recovery and reuse of water from the unsold food material it processes, which minimizes fresh-water intake compared to some traditional industrial operators.

THE RESULTS

Divert processes over 600M pounds of wasted food a year and has 14 facilities across the country. Through collaboration with some of the nation's largest food retailers, manufacturers, and distributors, and relationships with local food banks and nonprofits, Divert has facilitated the donation of more than 14M pounds of food distributed to people in need, equivalent to approximately 11.7M meals. Divert's \$1B infrastructure agreement with Enbridge will support the development of facilities across North America. With this agreement, Divert has the potential to offset up to 400,000 metric tons of carbon dioxide annually.

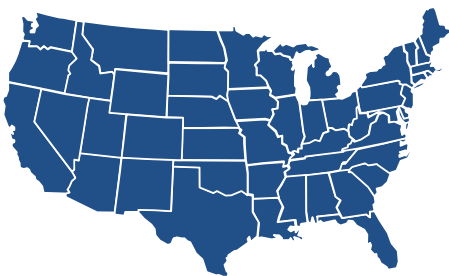
NORTHSTAR RECYCLING



ABOUT NORTHSTAR'S FOOD WASTE CAPABILITIES

Northstar Recycling offers comprehensive solutions to help businesses manage food, organic, and other waste and recycling materials sustainably. We create tailored recycling and waste reduction programs, including food waste diversion, composting, and other landfill alternatives, designed to maximize resource recovery while reducing landfill impact. By focusing on innovative food waste diversion, we unlock new avenues to meet the evolving needs of our clients while strengthening Northstar's position as a leader in waste reduction and sustainable business practices.

GEOGRAPHIC COVERAGE



EXECUTIVE TEAM



SETH GOODMAN
CEO

THE INDUSTRY CHALLENGE

The primary challenges our clients must overcome include identifying all the waste and recoverable material they are producing, determining how to reuse or dispose of it in the most sustainable and economical way, managing the logistics of getting the right material to the right end-user efficiently, and reliably tracking each step in the process.

According to 2022 data from ReFED, about 33% of all food in the US (78 million tons) ends up in landfills or wasted. Northstar's mission is to recycle more and landfill less, which includes working to responsibly redirect this food waste to beneficial re-use or recycling opportunities.

OUR SOLUTION

Northstar is dedicated to achieving our clients' goals by finding the most effective alternatives to landfill for their waste materials. Our unique structure combines an in-house team focused on solution development with a network of trusted vendor partners across North America. Often, client materials lack readily available sustainable options, and that's where we excel—creating tailored solutions to maximize diversion and reuse. We have cultivated a network of thousands of qualified service partners, and we provide our clients a seamless, single point of contact for all their waste needs. This unique business model also allows us to provide innovative solutions that help our clients increase recycling, reuse, and profits, and lower landfilled volumes.

OUR DIFFERENTIATION IN THE MARKET

As an asset-light managed service provider, we maintain the agility to adapt swiftly to new opportunities, technologies, and solutions in the marketplace. Northstar helps companies recycle more and landfill less by diverting organic and other waste streams from landfills into a variety of beneficial reuse applications with the support of our robust network of recycling outlet partners. Our proprietary technology platform provides enhanced reporting and analytics capabilities that enable clients to track sustainability-oriented initiatives and value recovery outcomes in real time.

THE RESULTS

In 2024, Northstar diverted approximately 2 million tons of organic waste to beneficial reuse pathways. As an example, last year, we redirected approximately 100,000 tons of waste from landfill to Waste-to-Energy (WTE) solutions. This WTE effort translated to preventing 238,133 tons of CO₂-equivalent greenhouse gases and generating 54,572,100 kWh of renewable energy.

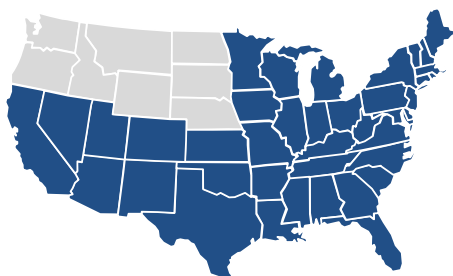
NUTRITION 101



ABOUT NUTRITION 101'S FOOD WASTE CAPABILITIES

Nutrition 101 is a national provider of eco-friendly waste management services. The company specializes in designing and implementing comprehensive plant solutions that transform wasted food into livestock feed—the EPA's top-preferred method when food waste is unsuitable for human consumption

GEOGRAPHIC COVERAGE



EXECUTIVE TEAM



CORY PETER
Chief Executive Officer

THE INDUSTRY CHALLENGE

The primary challenge of food waste management is to efficiently and reliably recover and reuse as much material as possible. A 101 customer transitioned from sending waste to a landfill to loading it onto 101 trailers, which transport the material to a 101 facility for de-packaging, drying, and conversion into a high-quality alternative for animal starter diets, distributed nationwide. Customers seek circular solutions that maximize the value of their waste and capture as much GHG savings as possible, all within a secure and controlled process—not just further downstream processing.

OUR SOLUTION

The best thing you can do with food waste that isn't suitable for humans is to feed it to animals. We make it work on an industrial scale, using our re-pasteurizing and drying equipment and refrigerated transport and storage to bridge the distance between food sources and the livestock that consume them. 101 evaluates each product stream to maximize its inherent value. We determine whether the material can be fed directly, using our custom-developed feeding equipment, or if it should be transported to one of our five facilities for further processing into various feed products. We use food-grade equipment to collect waste directly from production lines, operate our own fleet to optimize transportation, and provide witness-certified product destruction to meet customer security requirements.

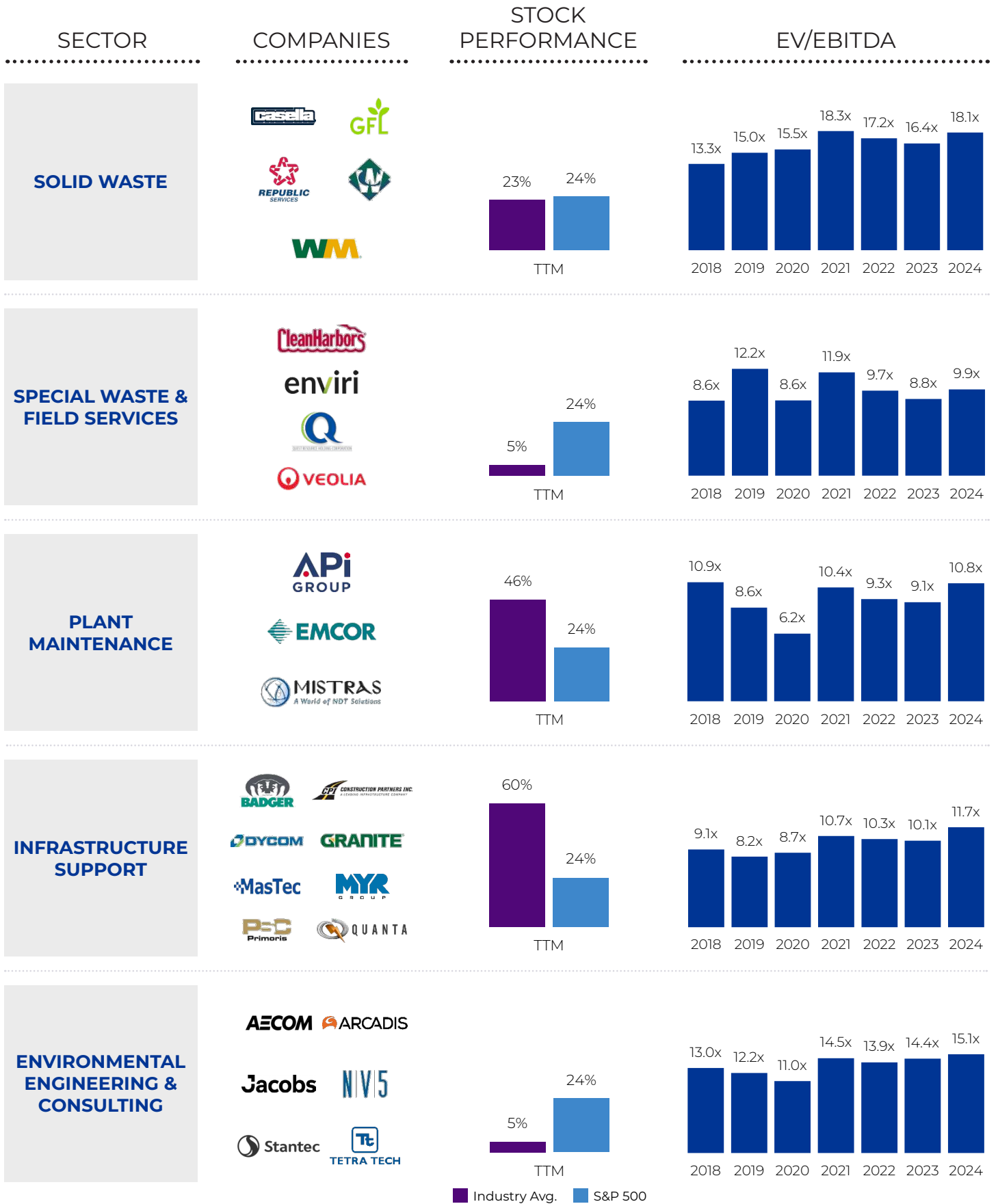
OUR DIFFERENTIATION IN THE MARKET

101 was built on excellent customer service. We have a long track record of providing customized solutions for the entire life cycle—and provide deep expertise in sustainability, food, life-cycling, livestock nutrition and the economics of food waste management. The nature of food recycling requires a custom solution almost every time, and 101 excels in designing efficient solutions to assist food manufactures at their plant while also accounting for the entire life cycle. With five nationwide facilities and our own captive fleet, 101 can respond quickly to customers' needs. Our partnership-style agreements provide security and long-term value to customers, allowing them to focus on their business.

THE RESULTS

In 2024, Nutrition 101 will recover more than 750,000 tons of food waste or around 82 semi loads a day, every day. This material is fed to more than 500,000 animals. In 2025, the company will finish carbon credit validation, completing the full life cycle of the waste and pushing food waste value to its highest level.

PUBLIC COMPANY PERFORMANCE BY SECTOR















■ Industry Avg. ■ S&P 500

Source: Capital IQ as of January 28, 2025.















PUBLIC COMPANY PERFORMANCE BY SECTOR (CONT'D)

		EV/EBITDA	REVENUE GROWTH ⁽¹⁾	EBITDA MARGIN	EBIT MARGIN
SOLID WASTE		21.2x	26.5%	23.4%	8.4%
	 ⁽²⁾	15.4x	4.1%	27.9%	6.0%
		16.5x	7.9%	30.8%	18.9%
		19.7x	10.7%	32.5%	20.3%
		15.9x	8.0%	29.8%	18.8%
SPECIAL WASTE & FIELD SERVICES		13.6x	8.4%	19.2%	12.2%
		6.9x	(6.7%)	15.4%	4.3%
	 <small>QUIST RESOURCE HOLDING CORPORATION</small>	12.0x	2.4%	4.4%	0.9%
		5.9x	(1.6%)	13.4%	7.6%
PLANT MAINTENANCE		16.4x	0.6%	11.4%	6.9%
		14.0x	17.7%	9.8%	8.9%
	 <small>A World of WDT Solutions</small>	6.3x	6.9%	10.4%	6.6%

Sources: Capital IQ, Pitchbook for most recently reported TTM period.
 Year-over-year TTM pro forma financials.
 Includes Environmental Services division which announced divestiture in Jan-25.



PUBLIC COMPANY PERFORMANCE BY SECTOR (CONT'D)

	EV/EBITDA	REVENUE GROWTH ⁽¹⁾	EBITDA MARGIN	EBIT MARGIN	
INFRASTRUCTURE SUPPORT	 BADGER	7.2x	10.8%	22.7%	12.1%
	 CONSTRUCTION PARTNERS I A LEADING INFRASTRUCTURE COMPANY	23.1x	15.6%	11.6%	6.6%
	 DYCOM	11.6x	10.4%	12.1%	7.9%
	 GRANITE	10.9x	17.8%	9.3%	4.7%
	 MasTec	13.8x	3.9%	7.9%	3.2%
	 MYR GROUP	18.6x	0.9%	3.6%	1.7%
	 P=C Primoris	11.5x	11.1%	6.9%	4.4%
	 QUANTA	22.2x	17.4%	9.4%	6.2%
ENVIRONMENTAL ENGINEERING & CONSULTING	AECOM	14.3x	12.0%	6.8%	6.3%
	 ARCADIS	10.9x	8.1%	10.4%	7.3%
	Jacobs	17.7x	6.0%	9.2%	7.0%
	 NVI5	9.7x	9.9%	15.8%	8.4%
	 Stantec	16.8x	12.0%	6.1%	8.6%
	 TETRA TECH	18.2x	11.0%	10.9%	8.2%

Sources: Capital IQ, Pitchbook for most recently reported TTM period.
Year-over-year TTM pro forma financials.

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