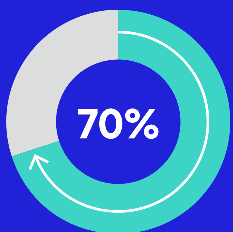
Turning Waste into Scope Emission Wins

An Actionable Entry Point to Reducing Supply Chain-Related GHG Emissions and Moving Beyond Net Zero

Reworld™

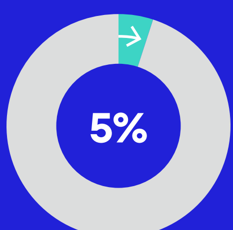
For Sustainability Leaders, the Hardest Part Begins Now

After making measurable gains toward net zero over the past decade, sustainability executives now face a significant hurdle: tracking, disclosing, and reducing Scope 3 emissions.



The challenge is formidable, with Scope 3 representing up to 70% of a company's total greenhouse gas (GHG) emissions, and time is of the essence. Although federal environmental, social, and governance (ESG) enforcement has relaxed in the short term, overall sustainability expectations have not meaningfully receded. States such as California and New York continue to mandate disclosure requirements, with Scope 3 reporting set to begin in 2027 and 2028, respectively. Expectations from customers, investors, and commercial partners haven't eased, either. Companies must keep up with their ESG initiatives or risk falling further behind when federal standards inevitably swing back the other way.

Some enterprises have already made progress reducing their Scope 3 footprints upstream, encouraging their suppliers to use electric tractors for farming or leverage green energy sources for power consumption. Fewer, however, are looking downstream, neglecting key areas like waste management and end-of-life emission reduction.



Yet while waste often accounts for 5% or less of a company's total supply chain emissions, how that waste is managed can have a real impact on Scope 3 performance. Redirecting waste away from landfills—which have been recognized as GHG super-emitters—reduces companies' environmental footprints and uncovers value-creation opportunities through resource recycling and renewable energy recovery. Companies like Nestlé, Boeing, Kraft, Subaru, Bridgestone, and Unilever are leading the way by committing to or even achieving zero waste-to-landfill initiatives.

How can a focus on downstream GHG emissions help similar companies reduce their Scope 3 footprints and even move beyond net zero? **Let's find out.**

Scope 3 Emissions Refresh: What They Are (and Why They're So Complex)

While Scope 1 and 2 emissions are relatively easy to monitor and address, Scope 3 offers few clear paths to net zero.

Scope 1 Emissions

These are greenhouse gas emissions that businesses directly generate through sources they own or control, such as company boilers, furnaces, and vehicles.

> ***Common Solutions:*** *Because they're fully in a company's control, Scope 1 emissions are relatively straightforward and can be lowered by utilizing greener industrial assets and processes, such as switching out gas-powered trucks for electric vehicles or installing carbon capture and storage systems.*

Scope 2 Emissions

These are greenhouse gas emissions that businesses indirectly generate through the electricity, steam, heating, and cooling that they purchase.

> ***Common Solutions:*** *Companies can lower Scope 2 emissions by switching to renewable energy sources (such as wind, solar, waste-to-energy, etc.) or utilizing customized, low-carbon fuels.*

Scope 3 Emissions

These are greenhouse gas emissions that businesses indirectly generate through their value chain, such as those generated by suppliers (upstream) and customers (downstream).

> ***Common Solutions:*** *Enterprises can begin assessing their Scope 3 footprint by conducting a waste audit and lifecycle assessment to identify which waste and resource streams offer the greatest potential for reduction, reuse, recycling, or recovery. Just as important is understanding which mitigation actions can be handled internally and which require external expertise.*

The problem with tracking and reducing Scope 3 emissions is that they represent the "invisible" part of a company's footprint. To see why, consider a major consumer goods retailer. It must account for:

→ Upstream emissions from raw material extraction and supplier manufacturing

→ Emissions associated with business travel and the upstream transportation of goods between suppliers and facilities

→ Downstream emissions from the transportation, use and end-of-life disposal of products by customers

Waste is a key downstream impact captured under Scope 3, Category 5. This includes materials such as end-of-life consumer products, food and beverage waste, and the byproducts of their manufacturing.

It also includes wastewater treated at third-party facilities that the company doesn't own. Because the company's operations generate these types of waste, the emissions tied to managing and disposing of them count toward the business' Scope 3 footprint.

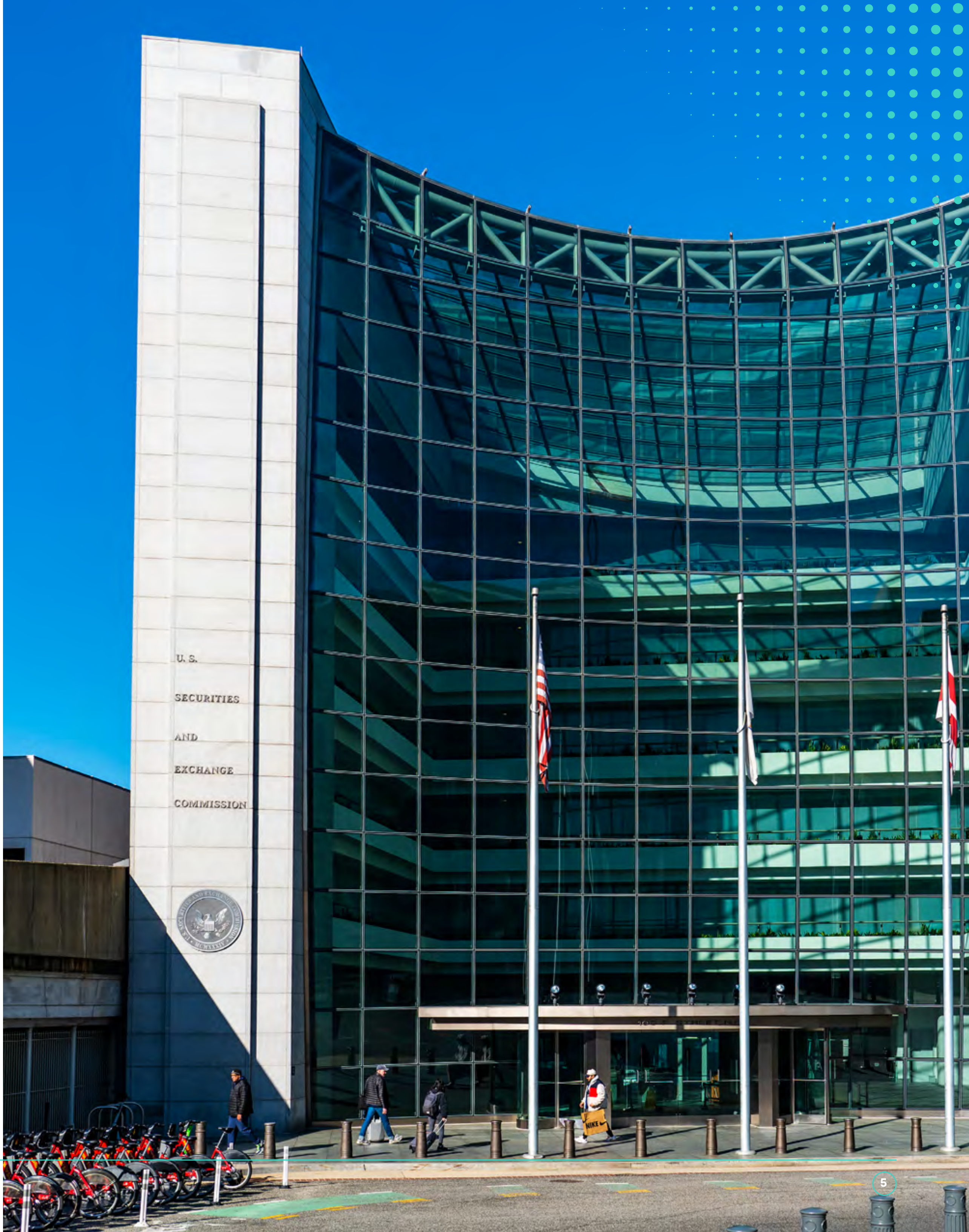
The Regulatory and Business Imperatives of Scope 3 Reporting

Fluctuating U.S. regulations muddy the waters of Scope 3 reporting for sustainability executives.

While the Securities and Exchange Commission (SEC) paused the defense of its rules requiring disclosure of climate-related risks and GHG emissions in early 2025, investors still seek ESG transparency and reporting when evaluating companies.

Multiple states—including California, New York, Colorado, New Jersey, and Illinois—have either enacted regulations requiring Scope 3 reporting or are advancing legislation to mandate disclosures for companies doing business within those states. California's Climate Corporate Data Accountability Act (SB-253) requires reporting for companies with more than $1 billion in revenue in 2027, while New York's Climate Corporate Data Accountability Act sets similar thresholds for Scope 3 reporting beginning in 2028.

The bottom line for enterprises regardless of where they do business is that reducing GHG inventories is a forward-thinking action plan capable of lowering costs and reducing environmental impact. That's why the Global Reporting Initiative (GRI) recommends that organizations fully embed their climate transition plans into their business strategies.



The Hidden Downstream Scope 3 Lever

Over the past half-decade, many sustainability leaders have looked upstream to reduce Scope 3 emissions, building a diverse network of supply chain partners that meet specific GHG-reduction targets. An equally important and often overlooked opportunity exists downstream in waste management, an area with meaningful and measurable impact.

Waste management creates a clear path to action.
Internal operations, facilities, or procurement teams may be able to identify key waste streams, but specialized partners can provide the infrastructure required to prioritize and leverage them into resources that drive business value while lowering GHG emissions.

Waste management initiatives involve fewer external dependencies.
Unlike upstream emissions that depend heavily on a variety of external suppliers, decisions about waste management involve a smaller group of internal operations team members, facilities managers, and vendors. That group can become an even leaner one when utilizing a comprehensive, end-to-end waste partner.

Waste management offers measurable benefits.
By diverting waste from landfill disposal and prioritizing recycling, composting, and renewable fuel creation or energy recovery processes for their products at every stage of their lifecycles, enterprises can powerfully offset their Scope 3 emissions.

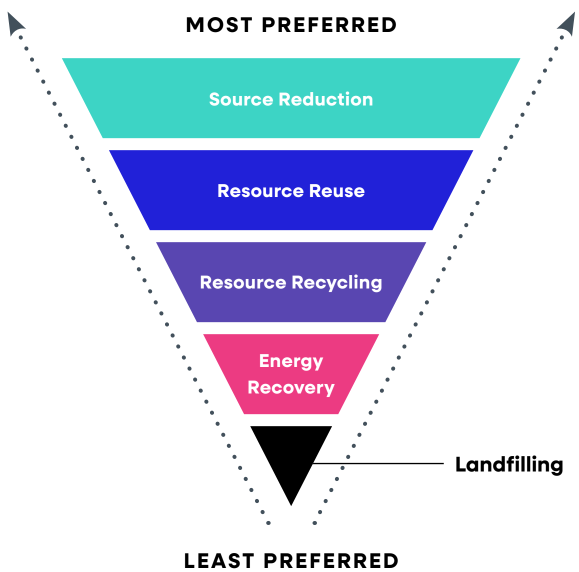
And while waste typically represents less than 5% of most companies' total GHG emissions from operations, leaders can combine waste management with other organizational levers—including zero to-waste-landfill and recycling targets—to move beyond net zero into "carbon-negative" territory.

Benefits of Strong Waste Management

Scope 3 emissions	Reduce GHG emissions tied to downstream operations.
Methane avoidance	Prevent highly potent emissions from being created.
Circularity	Keep materials at their highest value and in use longer.
Risk transfer	Shift long-term ESG risks away from the company.
Resource recovery	Turn post-recycled scrap into renewable fuel or energy that powers facilities.
Operational control	Enable action in areas the company can influence directly.
Future-focused strategies	Create a foundation for other Scope 3 approaches.
Cost savings	Reduce waste in production lines to save on raw materials.

Why Waste Management Makes a Huge Impact

To understand why waste management is so effective in reducing Scope 3 emissions, consider the problems posed with the most common method: landfilling, which sits below "Energy Recovery", at the very bottom of the waste hierarchy.



When biodegradable waste goes to a landfill, it breaks down anaerobically. That gas contains more than 170 air pollutants, including 40-plus that are hazardous. Two of the most potent GHGs are carbon dioxide (CO2) and anthropogenic methane.

Landfills release ~101M metric tons of CO2e annually, a large portion of which is methane—a GHG that is 80x more potent than CO2 over a 20-year period (a timeline relevant to many net-zero climate goals). What's more, many landfills severely under-report their emissions, so their real environmental impact is likely 25% to 100% worse than what's officially documented.

While some landfills have systems in place to capture GHGs, those methods capture only a fraction of the gas due to capacity limits and frequent leaks. Landfills are also relatively unregulated and can be active for many years after they close. During this time, the trash within them releases GHGs that add to a company's Scope 3 emissions burden over the long haul.

Due to Superfund Liability, a company's responsibility for waste doesn't end at the landfill.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) can impose liability on parties responsible for, in whole or in part, the presence of hazardous substances at a landfill—even retroactively.

Adopting a Zero Waste-to-Landfill Strategy

Scope 3 GHG emissions fall into two categories: waste generated in operations (Category 5) and end-of-life treatment of sold products (Category 12). Diverting waste from landfills saves costs and reduces environmental impacts while satisfying a company's supply chain requirements.

Nearly any business can get on the path toward zero waste-to-landfill by implementing the waste hierarchy into their material strategies.

- **Reduce:** Assess opportunities to reduce waste generation and resource use across operations.
- **Reuse:** Identify waste streams that can be reused or repurposed, such as byproducts reused as lubricants or water reused as coolant.
- **Recycle:** Determine which materials require treatment or processing before reuse and route them to the appropriate recycling channels.
- **Recover:** Use fuel and energy recovery solutions for residual waste that can't be reduced, reused, or recycled and are landfill-bound.

Two powerful tools to help you avoid landfills, securely dispose of materials, and sustainably generate fuel and energy are:

- **Waste-to-energy (WTE)** processing, which takes place at thermomechanical treatment facilities (TTFs). WTE transforms landfill-destined waste into renewable steam and electricity.
- **Alternative engineered fuel (AEF)** processing, which takes place at material processing facilities (MPFs). AEF transforms diverted waste into low-carbon fuels that are tailored to meet a boiler system's specifications and burn cleaner and more efficiently than the fossil fuels they replace.

Third-Party Verified LCA*

TTFs avoid 2.4 metric tons of CO_2e per ton of MSW when landfill methane is considered.

*Verified LCA by an independent third party per international life cycle standards (https://info.reworldwaste.com/lifecycle-assessment)

5 Ways Fuel and Energy Recovery Solutions Support Sustainable Business

1 **Divert Waste from Landfills**
They convert non-recyclable materials into usable fuel or energy, supporting zero waste-to-landfill goals and reducing exposure to long-term safety, compliance, and brand liabilities.

2 **Reduce Environmental Impact**
They avoid soil and water contamination, reduce GHGs, and replace fossil fuel use with renewable, carbon-negative power sources.

3 **Improve Resource Efficiency**
They recover valuable resources that would otherwise be lost; extend the useful life of products and components; generate domestic energy; and support circular economy strategies.

4 **Enhance Cost and Operational Resilience**
They provide more stable, often lower-cost (and lower-risk) disposal outlets than landfills do, especially as tipping fees rise, landfill capacities tighten, and standards intensify.

5 **Strengthen ESG Performance and Reporting**
They generate measurable sustainability outcomes (diversion rates, emissions reductions, renewable energy generation, etc.) through highly monitored and tracked processes that stand up to stakeholder and regulatory scrutiny.

Moving Beyond Inventory Reductions

An effective waste management strategy doesn't stop with inventory accounting. It also addresses the lifecycle value of GHG emissions reductions across the supply chain.

As an example, consider a company with waste in a landfill that's generating 40 tons of methane. Diverting that waste to a TTF or MPF drastically mitigates long-term methane generation, materially improving the enterprise's Scope 3 profile.

Because these sites can also recover metals and produce usable products and energy that displace fossil-based fuels, end-to-end waste management creates benefits that support broader decarbonization goals.

Companies can extend the value of waste management even further by exploring additional strategies:

Tackling Wastewater Treatment

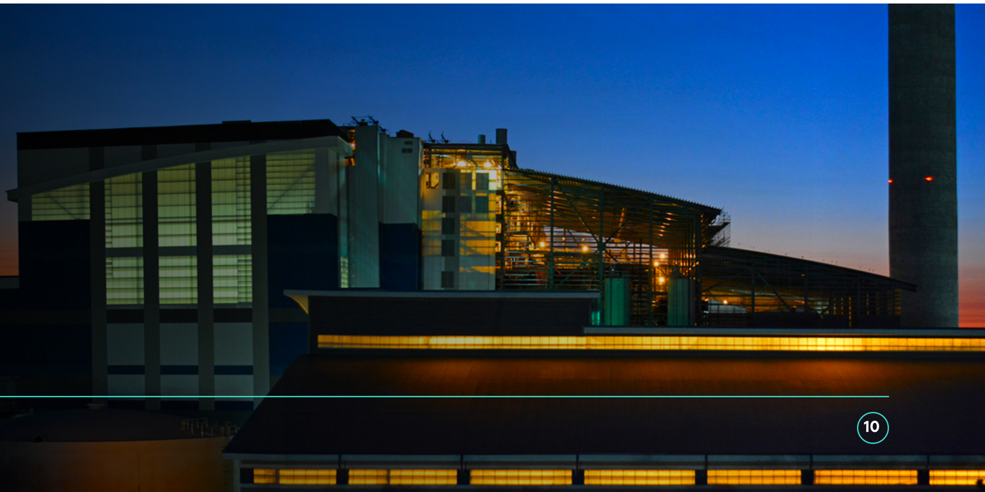
A company's liquid footprint is a critical yet frequently overlooked Scope 3 reduction strategy as well. Effective wastewater treatment options proven to reduce risks and improve corporate responsibility include:

- → **Centralized water treatment (CWT)** for liquid waste with high biochemical or chemical organic loads (BOD or COD) or high levels of suspended solids. CWT uses physical and chemical processes like coagulation, flocculation, and sedimentation to remove harmful contaminants, then safely discharge the water into publicly owned treatment works (POTWs).
- → **Total destruction via liquid direct injection (LDI)** for more challenging liquid streams, such as those containing pharmaceutical residues, leachates, or persistent organic pollutants. LDI introduces waste into a TTF, where extreme heat vaporizes the water and chemically destroys the contaminant.

Exploring Carbon Insets

Different from carbon offsets, which compensate for emissions through projects outside a company's operation, insets focus on reductions achieved within the company's own value chain.

Global standards for insets are still evolving. In the context of waste management, insets point to a future where lifecycle reductions from recycling and waste-to-energy could help improve performance across landfill-related emissions within Scope 3, Category 5.



"Waste-to-energy generates a renewable energy source and reduces carbon emissions by offsetting the need for energy from fossil sources and reduces methane generation from landfills."

U.S. EPA | Sustainable Materials Management: Energy Recovery

Sector-Specific Risks and Opportunities

It's no secret that waste streams differ by industry. In general, the more organic or biogenic material that exists within a company's waste stream, the greater the impact waste management decisions will have on Scope 3 emissions. Sector-specific risks and opportunities include:

SECTOR	CHALLENGES	OPPORTUNITIES
Chemicals Manufacturing	Complex industrial waste streams, contaminated wastewater, and the potential for spills or emergency events	Lower disposal costs and risk through improved waste routing, faster spill response, and safer treatment of complex waste streams
Consumer Goods Manufacturing	Overstock and expired goods, product destruction requirements, mixed and composite packaging waste, and production downtime due to byproducts	Improved landfill diversion and emissions performance that protects brand reputation, recovers value from excess products, and maximizes operational uptime
Environmental Services	Surge capacity demands from large events or disasters, mixed- and hard-to-handle waste streams, and pressure to demonstrate real ESG outcomes	Scalable approaches that support emergency response, site remediation, and industrial cleanup while improving diversion rates and delivering ESG proof points
Food and Beverage Manufacturing	Large volumes of food and processing waste, strict food safety and recall requirements, high water use, and contaminated wastewater	Lower landfill resilience and emissions through organic waste diversion and reduce water costs through effective wastewater treatment
Healthcare, Pharma, and Biotech	Controlled drug disposal and chain-of-custody requirements, regulated biohazardous waste, and hazardous laboratory and chemical waste streams	Reduced regulatory exposure and liability through secure handling, compliant treatment, and auditable disposal of hazardous waste
Metals and Industrial Manufacturing	Large volumes of mixed medal scrap, process sludges, and wastewater, along with remediation and cleaning-related downtime	Increased material recovery, lower water and disposal costs, reduced environmental risk, and improved plant uptime

Achieving Impactful Wins with Waste Management

Moving toward zero waste-to-landfill can deliver rapid operational gains. Some enterprises can significantly reduce their Scope 3 emissions inventory from waste generated in operations within just a few weeks.

An ideal starting point is to conduct a waste characterization (sometimes called a "dumpster dive") to identify the waste streams that will deliver the greatest return on environmental spend. For example, if a company generates 50 tons of glass and 50 tons of cardboard waste but can only prioritize one stream, cardboard often delivers the higher climate impact. Unlike glass, cardboard decomposes in landfills and generates ample methane, making its diversion particularly impactful from a Scope 3 waste perspective. That said, local landfill gas capture rates, recycling markets, and end-use outcomes should always be considered when setting priorities.

As programs mature, enterprises can build on these early wins by diverting additional waste streams from landfills. This strengthens environmental performance, but also improves resource efficiency, reduces costs, and establishes the company's brand as a leader in sustainability.

These impacts are achievable in-house. But truly game-changing outcomes come from partnering with waste management experts. Here's what getting started with a trusted partner looks like.

5-Step Waste Management Startup Checklist

1 **Assess and baseline your waste streams.**
Conduct a comprehensive waste audit to understand material types, volumes, contamination risks, and true disposal costs.

2 **Align on business and sustainability goals.**
Define clear objectives (cost control, diversion targets, compliance, ESG reporting, risk reduction) so the enterprise's waste strategy supports broader business outcomes.

3 **Design a customized solution.**
Co-develop a program that integrates reduction strategies, reuse and recycling, secure disposal, alternative fuel processing, waste-to-energy, and other solutions as needed.

4 **Implement with operational rigor.**
Establish clear roles for internal and external resources, along with KPIs, training and processes to ensure a smooth rollout, safety, and consistency across facilities.

5 **Measure, optimize and scale.**
Track performance, validate data, report results, and continuously improve your efforts. You will unlock additional sustainability opportunities and build more resilience over time.

Embrace a Clear Path Forward for Scope 3 Progress

Moving Scope 3 emissions reductions from theory to practice requires a strategy that considers both upstream and downstream risks. Decisions about how to manage waste generated in operations (Category 5) and end-of-life treatment of sold products (Category 12) can jumpstart a company's path toward net-zero.

While waste accounts for a smaller share of Scope 3 emissions on paper, a waste management strategy can deliver multiple carbon accounting and lifecycle benefits.

As ESG leaders begin exploring their options, they will need to find sustainability solutions partners who can help them evaluate their waste streams and choose the best path forward. For best results, prioritize vendors with extensive experience in Scope 3 reductions and verified third-party lifecycle impacts.

KEY REWORLD BENCHMARKS

100+
facilities (and growing) across North America

20M+
tons of waste diverted annually from landfills

40M+
metric tons of GHG emissions avoided yearly

470K+
tons of metals recycled annually

10MWh+
equivalent of energy generated from waste

Learn more

about sustainable waste management solutions.