



The Quest For Zero Waste to Landfill with UL 2799

UL Solutions helps validate
zero waste claims with a
rigorous assessment process



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Executive summary



The world generates more than two billion tons of municipal solid waste every year.¹ At least 33% of it is not managed in an environmentally safe manner. The U.S. Environmental Protection Agency (EPA) estimates that U.S. industrial facilities generate and dispose of about 7.6 billion tons of non-hazardous solid waste each year. This represents approximately 97% of all solid waste. For waste products that eventually find their way into landfills, even non-hazardous materials and chemicals can adversely affect the quality of soil, air and water.

Solid waste contributes directly to greenhouse gas emissions through the generation of methane from anaerobic decay. Plus, the emission of nitrous oxide from solid waste combustion facilities negatively impacts climate change.

The Connecticut Climate Change Action Plan includes source reduction and recycling as a key strategy to reduce greenhouse gas emissions.² In fact, of the 55 strategies in the plan, recycling 40% of municipal solid waste falls within the top 10 actions in terms of quantity of projected greenhouse gas reductions. The revision of the source reduction/recycling goal to 58% will result in even greater greenhouse gas reductions.

As part of their overall commitment to environmental sustainability, leading corporations are embracing the concept of “zero waste” in their operations and business practices. Their goal? Reduce waste to the lowest possible

levels. However “zero” has been defined differently by various parties. And the absence of objective criteria and transparent validation processes lead to discrepancies among seemingly comparable practices. This diminishes the potential value of corporate waste diversion claims for brands and consumers.

This UL Solutions white paper will discuss our approach to validating zero waste claims as presented in UL 2799, Environmental Claim Validation Procedure (ECVP) for Zero Waste to Landfill. It begins with an overview of the emergence of waste diversion as a corporate sustainability priority and its potential benefits. The challenges in validating zero waste claims will be presented, followed by a discussion of the requirements in UL 2799. It concludes with a brief review of UL 2799A, Environmental Claim Validation Procedure (ECVP) for Zero Waste Classifications, and considerations for companies seeking to implement an effective waste diversion strategy.



Effective waste diversion as a sustainability priority

For most of the past 30 years, industrial recycling efforts have focused almost exclusively on the disposal of solid waste materials at the end of the production process. These efforts also only focus on the recycling of a limited number of potentially valuable and easily recycled materials such as metal, plastics and paper.

Although these efforts have helped reduce the amount of solid waste that is incinerated or diverted to landfills, they are no longer keeping up with the significant increase in the amount of industrial waste being generated. Current initiatives also do little to address the actual root causes of waste created as part of industrial processes.

The quest for zero waste is part of a fundamental shift in the overall philosophy regarding waste management. Rather than focusing exclusively on solid waste material recycling, a zero waste approach brings equal attention to reducing total waste production by reevaluating product designs and material selections, and by restructuring production processes and distribution systems. Aside from reducing or eliminating certain waste streams, these efforts can also contribute to more efficient use of limited material resources and operating capacities.

Zero waste initiatives also go beyond conventional recycling efforts to identify innovative ways to reuse or repurpose waste products. For example, scrap materials from standard production runs can sometimes be used in other applications with little or no reprocessing. “Cash from trash” programs can exploit the hidden value in some waste products by selling them to others. This often generates significant additional revenue.

Today, the adoption of the zero waste Five Rs of “refuse, reduce, reuse, repurpose and recycle” is viewed as central to the value and effectiveness of any corporate sustainability effort. By taking a holistic approach to waste management and addressing the root causes of waste generation, organizations are better positioned to achieve long-term sustainability objectives in a manner consistent with their overall strategic goals.



A zero waste approach brings equal attention to reducing total waste production by reevaluating product designs and material selections, and by restructuring production processes and distribution systems.

Traditional recycling efforts can no longer keep up with the volume of industrial waste.

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In addition to helping organizations achieve sustainability priorities, a zero approach to waste management offers a number of business benefits, including:



Improved resource economy and efficiency

A key principle of zero waste is the reduction of waste at its source. This usually means redesigned products and/or reengineered processes that require less material and fewer resources to produce and manage.

Synergy with continuous improvement initiatives

By closely evaluating current processes for potential waste, taking a zero approach to waste management can complement new and existing continuous-improvement initiatives. These include lean manufacturing or the Six Sigma managing technique and quality management systems.

Accelerated financial performance

The elimination of waste products and the more efficient use of resources results in economic benefits that directly impact an organization's financial performance. These "cash from trash" programs can also be an important source of new revenue streams.

Stronger brand identity

By sending less waste to incinerators and landfills, zero waste programs can more strongly support an organization's environmental sustainability claims and efforts. They can also help build stronger environmental brand connections with key customers.

Potential to reduce legal exposure

Finally, zero waste programs may reduce potential legal liability stemming from the direct or indirect disposal of hazardous waste. They may also reduce the contamination of adjacent natural resources.

Validation issues for zero waste claims

There are many potential benefits for organizations that adopt a zero approach to solid waste management. However, there is no universally accepted definition for “zero waste.” A number of companies promote zero waste claims based on diverting 100% of their waste from incinerators and landfills. Others claim zero waste based on diverting significant but smaller percentages of waste. The Zero Waste International Alliance has reinforced the acceptance of a “less than 100%” standard by establishing 90% as the minimum threshold for its zero waste designation. The deviations in waste diversion rates create confusion for both organizations and the public regarding the real meaning of “zero.”² They also potentially undermine the importance and value of zero waste claims.

Another challenge regarding the meaning and acceptance of zero waste claims has been the absence of a common method for validating such claims based on objective and transparent criteria. Some validation programs exclude construction and demolition debris, hazardous substances or cafeteria waste. These waste streams are among the more difficult to divert from landfills. But excluding them from diversion calculations can inflate claims.

Even when organizations employ good faith efforts to qualify their zero waste claims, individual methodologies and interpretations are inherently subjective. Also, they may be unable to withstand rigorous scrutiny. Most organizations include recycled materials in calculating the total percentage of diverted waste. But some internal recycling collection processes are more stringent than others.

Even small amounts of non-recyclable trash can contaminate a recyclables batch, relegating the entire contents to incineration or landfill disposal. The absence of a generally accepted validation method makes it nearly impossible to objectively compare seemingly similar results, further compromising the significance of zero waste claims.

The lack of a clear definition of zero waste and of an accepted method for validating zero waste claims presents other potential problems for organizations seeking to promote their solid waste reduction efforts.



Unfortunately, there is no universally accepted definition for “zero waste.”

UL 2799: A new approach to validating waste diversion claims

First published in May 2012, UL 2799, Environmental Claim Validation Procedure for Zero Waste to Landfill, was developed to support waste reduction efforts. It provides clear definitions of what constitutes waste. It also includes an objective and transparent process for validating zero waste environmental claims at individual facilities.

For organizations committed to reducing waste, UL 2799 establishes an objective basis for quantifying waste diversion rates. It also helps set benchmarks for continued improvements in diversion rate performance. Waste diversion claims validated in accordance with UL 2799 also enable consumers and the public to more accurately assess such claims and make meaningful comparisons between waste diversion rates among competing organizations.

Waste diversion performance tiers

UL 2799A, the Standard for Environmental Claim Validation Procedure for Zero Waste Classifications, requires each facility of an organization to prove at least 90% diversion through methods other than waste to energy for that facility to achieve Zero Waste to Landfill (ZWTL) designations (Silver, Gold, Platinum).

PLATINUM

The highest designation; this claim is validated by UL Solutions when a facility can prove that it consistently achieves a landfill waste diversion rate of 100%.

GOLD

This designation is reserved for facilities that have achieved a landfill diversion rate of 95% to 99% or greater.

SILVER

This claim is validated if a facility achieves a landfill diversion rate of 90% to 94%.

Facilities that do not achieve greater than 90% diversion receive a Landfill Waste Diversion claim, according to UL 2799, the Standard for Environmental Claim Validation Procedure for Zero Waste to Landfill.

Each environmental claim validation is clearly defined, carefully reviewed and thoroughly evaluated so that organizations and the public can understand the environmental significance of such a major achievement.

Acceptable methods of waste diversion

To qualify for waste claim validation under UL 2799, waste diversion efforts can take any or all of the following forms:

- Recycling discarded products
- Returning discarded products to the supplier of the original material
- Reusing discarded materials in the same production process
- Reusing discarded materials in different production processes
- Processing discarded materials and reselling them to a third party
- Commercial composting of discarded materials
- Converting discarded materials to energy through biodiesel (biofuel) or anaerobic digestion
- Incinerating discarded materials and recovering energy (limited to 10% incineration only after achieving 90% diversion in other methods, depending on claim)

Additional diversion methods may be approved for use by the UL Solutions technical team.

The waste diversion equation is how UL 2799 measures waste diversion. It divides the numerator, which is materials that are diverted either on-site or off-site from the landfill, by the denominator. The denominator is materials that are discarded or mandated by local legislation to be landfilled.

In cases where thermal technologies are used as a diversion pathway, sites must first divert 90% of their discarded materials before disposing of the remainder with thermal technologies like incineration with energy capture. This limit has been set to encourage all other diversion pathways to be explored and used before burning materials and losing the embodied carbon. In some cases, exceptions may be granted to use more than 10% diversion with thermal technology if there is an increased carbon benefit. An example would be replacing a carbon-rich fuel with discarded materials.

Diversion rate equation

$$\frac{m_{\text{recycle}} + m_{\text{composting}} + m_{\text{anaerobic}} + m_{\text{reuse}} + m_{\text{reduced}} + m_{\text{Thermal}} + m_{\text{biofuel}}}{\text{Mass discarded material } (m_{dm}) - m_{\text{mandated}}}$$

Acceptable at any percentage		Acceptable when under 10% (most of the time)	
m_{recycle}	Mass sent to recycling	m_{Thermal}	Mass sent to thermal technologies
$m_{\text{composting}}$	Mass sent to composting		
$m_{\text{anaerobic}}$	Mass sent to anaerobic digestion		
m_{reuse}	Mass reused (onsite)		
m_{reduced}	Mass reduced (onsite)		
m_{mandated}	Mass mandated	Material not processed by the material handler is counted as landfilled	
m_{biofuel}	Mass used as biofuel		

The diversion equation: a detailed view

Validation procedure and documentation

The current procedure for validating waste diversion claims requires specific information that fully documents the movement of waste at the facility. At a minimum, required information includes: details of products produced at the facility; manufacturing processes used; waste diversion methods; documentation of waste handling procedures (especially for reuse and reduce activities); records of waste pickups for the preceding 12 months; and landfill and incinerator documentation.

Once UL Solutions has carefully reviewed the documentation, the facility seeking claim validation then undergoes a physical audit of its waste handling processes and procedures. Facilities whose waste diversion claims are validated according to UL 2799 must also complete an annual review to confirm ongoing compliance. They may also be subject to periodic re-audits based on the findings presented in their annual reviews.



“The extraction and processing of natural resources has accelerated over the last two decades and accounts for more than 90% of our biodiversity loss, water stress and approximately half of our climate change impacts.”

Bruno Oberle, S. B.-D. (2019). Global Resources Outlook: Summary for Policy Makers. UN Environment International Resource Panel.

Considerations for implementing an effective waste diversion strategy

The extent of effort required to achieve the goal of zero waste differs from organization to organization. However, the following considerations are essential for the development and execution of an effective 100% waste diversion strategy:

Begin with the end in mind

Set long-range goals, e.g., “Zero Waste to Landfill” claim validation, broken down into short-term objectives. For example, 80% diversion at the end of the first year, 90% by the end of year two and 100% by the end of year three. This approach provides a road map that helps sustain momentum and track progress.

Partner with vendors

Engage with suppliers to achieve waste diversion goals. The best suppliers will welcome the opportunity to contribute to the process. They may also bring a fresh perspective to waste management challenges and are likely to be a source of new ideas and innovative approaches.

Pay attention to what’s measured

Rigorous data collection and reporting practices are vital to establishing baseline performance rates and measuring improvements. Timely reporting can also help identify unanticipated problems while they can still be addressed. UL 2799 provides specific guidance on the types of discarded material to track and measure.

Get everyone involved

The most successful waste reduction efforts align with the overall goals and objectives of a business. They also leverage the power of collective engagement. The commitment to a zero-waste strategy must begin at the highest levels of an organization. But every employee can contribute to success. Regular communication about program efforts and results is essential to keeping everyone engaged and committed.

Expect success to be a journey — not an event

Achieving the goal of zero waste does not happen overnight. It typically requires an ongoing commitment of resources and energy over an extended period of time. Therefore, a focus on continuous improvement can help push the effort forward even in the face of unanticipated setbacks.



“Managing waste is an important part of our efforts to increase the sustainability and efficiency of our operations, and we are pleased that our site in Singapore has achieved UL 2799 Zero Waste to Landfill Validation.”

Daniel W. Steele, Senior Director of Asia-Pacific Environmental, Health, Safety and Security at Global Foundries.



Summary and conclusion

Reducing the amount of industrial waste destined for incinerators and landfills increasingly depends on the adoption of a zero-based approach to waste management. Achieving 100% waste diversion may be unrealistic for every organization. But applying the principles of zero waste can significantly improve waste diversion rates in almost any setting. A zero-based approach to waste management can also stimulate efforts to attack waste generation at its source, ultimately reducing the dependence on waste diversion.

UL 2799A prescribes a clear methodology for measuring and validating actual waste diversion rates. It gives organizations an effective tool for benchmarking waste diversion performance and for assessing the impact of new waste diversion initiatives. Waste diversion claims validated in accordance with UL 2799 also provide employees, suppliers, consumers and the public with objective information about an organization's waste diversion efforts. This better enables them to make informed choices that support their own environmental goals and objectives.

UL Solutions provides a range of services that help organizations around the world make and market healthier and more sustainable products and services.

For more information about UL 2799 and Environmental Claim Validation services, visit [UL.com/ECV](https://www.ul.com/ECV).

Sources

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