



# Recovering Energy from Waste



An underwater scene showing a large amount of plastic waste, including bottles, bags, and other debris, floating in the water. Several fish are visible swimming around the trash. The water is a deep blue color.

# **You wouldn't dump waste in the ocean, so why is it ok to send it to a landfill?**

The rate at which Ontario's landfills are approaching full capacity is cause for alarm, with projections indicating they will reach maximum capacity by 2035. This will compel Ontarians to resort to shipping their waste to the United States, a practice that not only carries a hefty financial burden and lacks sustainability but also contributes significantly to carbon emissions.

An underwater photograph showing a large amount of plastic waste, including bags and bottles, floating near the surface. Several fish are swimming in the water, some near the trash. The water is clear and blue.

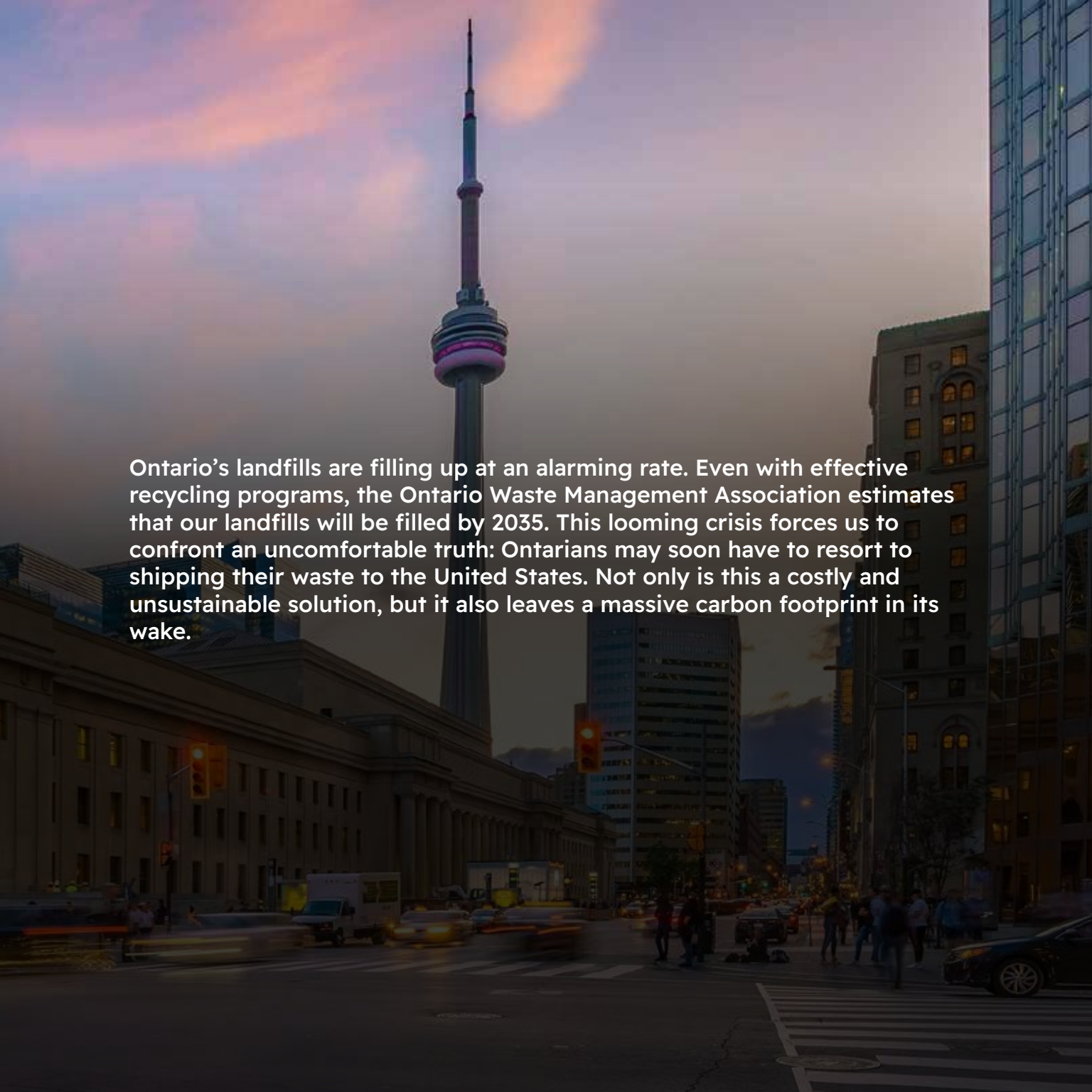
While you can certainly maximize your company's recycling and diversion efforts, there will inevitably be some remaining waste that needs to be sent to a landfill. This practice is not in line with sustainable principles.



A city skyline at dusk with several tall skyscrapers and a street scene in the foreground. The sky is a mix of blue and pinkish-purple, suggesting sunset or sunrise. The buildings are illuminated with various lights, and the street below shows blurred lights from moving vehicles.

# Ontario Needs An Alternative To Landfill Disposal

In today's world, sustainability is the buzzword, and companies are starting to make strides in reducing their emissions and overall carbon footprint. Yet, there remains a pressing issue that often goes unnoticed: the fate of our waste. While recycling efforts are commendable, there's always a residual amount that ends up in landfills, and this simply is not a sustainable solution.



Ontario's landfills are filling up at an alarming rate. Even with effective recycling programs, the Ontario Waste Management Association estimates that our landfills will be filled by 2035. This looming crisis forces us to confront an uncomfortable truth: Ontarians may soon have to resort to shipping their waste to the United States. Not only is this a costly and unsustainable solution, but it also leaves a massive carbon footprint in its wake.

A glowing lightbulb with a green leaf inside, symbolizing sustainable energy. The background is dark with some green foliage on the left.

# Energy from Waste

Energy from Waste (EfW) is a sustainable and innovative approach that involves converting non-recyclable waste materials into renewable energy. This process helps address two critical issues simultaneously: waste management and energy generation. By harnessing the value of waste materials, EfW not only reduces the burden on landfills but also provides a valuable source of renewable energy.



At U-Pak, we champion a Zero Waste philosophy, viewing it as a cornerstone principle for the 21st century. While recycling is a part of this approach, it goes beyond recycling and adopts a holistic “whole system” perspective on the flow of resources and waste through society. It’s about maximizing recycling, minimizing waste, reducing consumption, and ensuring products are designed with reusability, repairability, and recyclability in mind, whether that means returning them to nature or back into the marketplace.

# Zero Waste Solutions

## Emerald's Waste-to-Energy Endeavor

At U-Pak, we are fully dedicated to diverting waste from landfills while contributing value to our community. We envision a promising future for our Emerald Energy-from-Waste (EfW) project and are in the process of formulating our expansion plan in accordance with the Environmental Assessment Act (EAA).

Our energy production not only offsets the usage of fossil fuels but also eliminates emissions associated with the transportation and disposal of waste in landfills. We are committed to ensuring our community benefits from a diverse range of energy products, including steam, electricity and exploring new avenues such as district heating and hydrogen production.

### Key Highlights of Emerald's Waste-to-Energy Initiative:

- Our facility has been in operation since 1992.
- We specialize in extracting energy from non-hazardous waste.
- Our current energy production capacity stands at 10 MWe.
- We currently supply steam to a local recycled paper manufacturer and electricity to the Ontario grid.
- Our operations support 43 employees and contribute \$3 million to the local economy through various services.
- We have a 30-year track record of adhering to Ontario's stringent environmental standards.
- Ongoing redevelopment efforts are aimed at increasing energy recovery to 100 MWe, as steam, heat, electricity and hydrogen.
- We share ownership with U-Pak Disposals and are committed to sustainable waste management.







**Why choose Zero Waste?** The simple answer: we aim to send nothing to landfill. We reduce what we need, reuse when possible, recycle or compost what we can and recover energy from the residual.

U-Pak and Emerald's **Zero Waste Solutions** looks to redefine the system. As a society, we used to live in a linear economy where we take resources and energy from the earth and dump them into the ground when they have little or no value. Zero Waste supports the circular economy, where waste is virtually eliminated.

Reduce, reuse, recycle, and recover...preserving nature

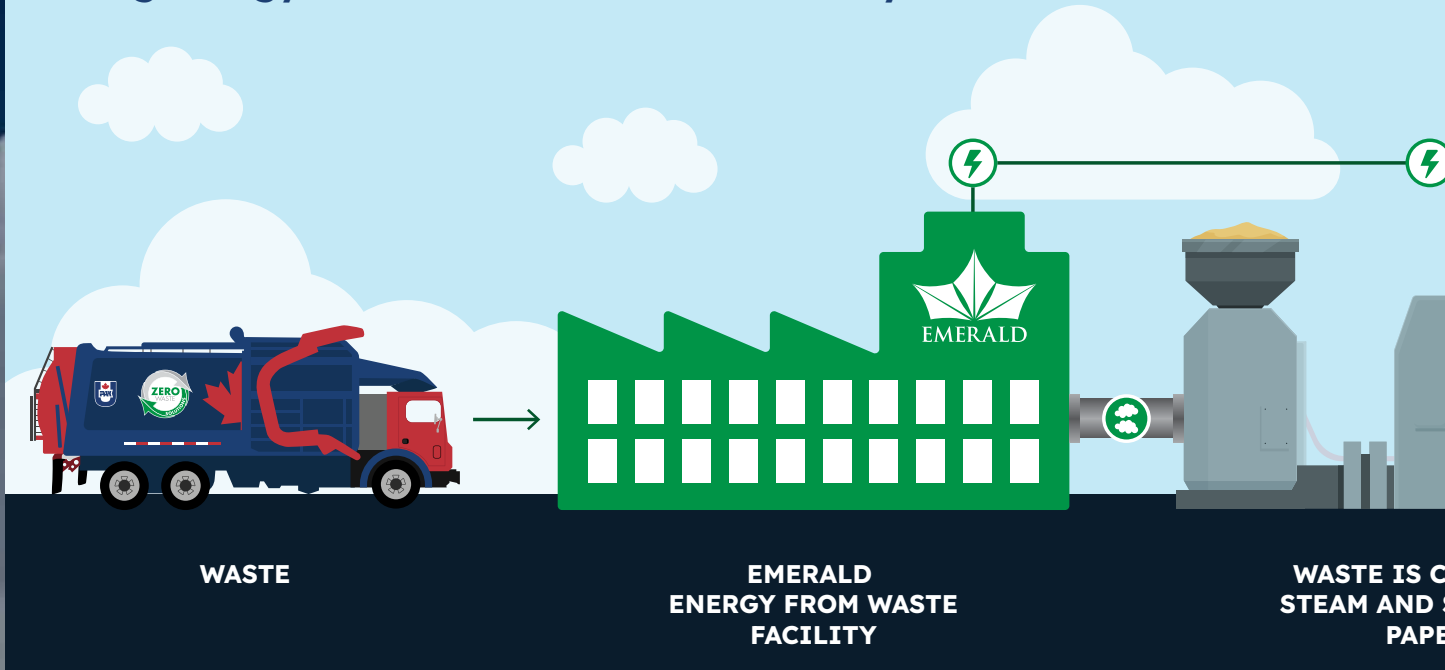
# Understanding Energy from Waste

## And its Applications

Located in Brampton ON, our Emerald Energy from Waste facility serves to meet Ontario's need for sustainable waste solutions. Established in 1992, this state-of-the-art facility is approved to process up to 500 tonnes of waste per day, and from this, it consistently produces a staggering 10 MW of energy. The energy that is recovered is used in two ways:

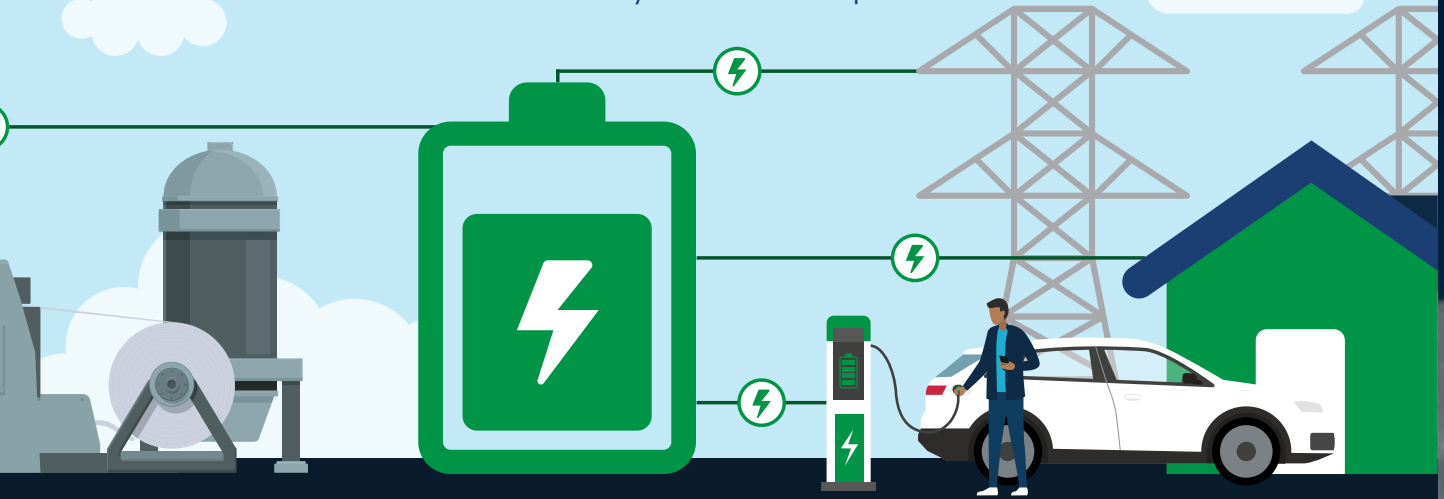
- Steam – which is sold to a local industry
- Electricity – which is sold to the Ontario electrical grid

### Using Energy from Waste to Create Electricity



By converting unwanted waste into renewable energy, we not only address the urgent issue of overflowing landfills but also provide a sustainable energy source for our communities. It's time to make a tangible difference, not just for today, but for the future we leave to generations to come. Join us in turning waste into wattage, and let's power a more sustainable tomorrow, together.

For every metric tonne of waste diverted from landfill, you save: 7 tonnes of carbon offset credits, 420kWhr of electricity and 0.8m<sup>3</sup> landfill space saved.



CONVERTED TO  
SENT TO LOCAL  
PAPER MILL

UNUSED STEAM IS SENT BACK  
TO EMERALD AND CONVERTED  
TO ELECTRICITY

ELECTRICITY IS SENT TO  
ONTARIO POWER GRID

# Why Choose Energy from Waste?

Sustainable communities adopt a localized approach to managing their waste

## Promoting Resource Recovery



Sustainable communities seek to extract the maximum value from all residual waste, materials that can't be recycled for commercial, technical or economic reasons. Energy generated from residual waste plays a pivotal role in supporting these communities by:

- Offering a sustainable means of managing materials that can't be recycled.
- Returning energy to the community as steam, heat, electricity and now hydrogen.
- Recapturing metals from non-recyclable materials.
- Creating opportunities to re-purpose ash into alternative construction materials.

## Minimizing Landfill Waste



Sustainable communities aim to minimize the volume of waste destined for landfills and its associated environmental impacts. Energy recovery plays a significant role in achieving this goal by:

- Diminishing the need for landfill disposal.
- Reducing pollutant and greenhouse gas emissions associated with waste transportation to remote landfills.
- Conserving agricultural lands and safeguarding rural communities from the impacts of landfill expansion.
- Reducing greenhouse gas emissions from landfills.



## Harnessing Energy



Energy derived from waste captures the energy contained within materials that cannot be recycled for technical or economic reasons. Energy recovery can yield multiple advantages for the local community, such as:

- Supporting local industries and homes through electricity, steam or district heating.
- Diminishing the demand for energy from non-renewable sources.
- Generating hydrogen locally for use as a transportation fuel.

## Empowering Communities



Energy recovery contributes to the empowerment and resilience of local communities by delivering both economic and social benefits, including:

- Fostering the creation and growth of local businesses.
- Generating employment opportunities for local families.
- Supporting the development of local services and infrastructure.

An aerial photograph of a vast, dense green forest stretching towards a horizon under a bright, low sun, creating a warm, golden glow. The sun is positioned in the upper center, casting long, soft shadows across the landscape.

# Sharing the Advantages

**Energy from Waste is a multifaceted boon for society. It eases pressure on traditional energy grids, curbs carbon emissions, and fosters local employment opportunities, contributing to economic growth and innovation. Simultaneously, it reduces waste sent to landfills, alleviates environmental pollution and carbon emissions, improves air quality, and ultimately enhances the overall well-being of communities. This holistic approach to waste management delivers economic, environmental, and social benefits, making Energy Recovery a pivotal solution for a sustainable and resilient future.**

## **Energy from Waste**

Assessing the viability of a renewable energy technology for hydrogen production:

- Easing the burden on the grid.
- Mitigating carbon emissions from the waste management sector.
- Pioneering a new business model for the energy recovery.

## **Hydrogen Industry (commencing in 2025)**

Launching the hydrogen economy:

- Implementing an approach that can resolve the Supply-Demand dilemma within the Hydrogen Economy.
- Providing a consistent, competitively priced supply of high-quality hydrogen for users in the GTA.



**Energy from Waste** will divert waste that would typically be sent to landfill.



**Emerald Green Hydrogen** can supply clean fuel to power our communities.



## Transportation Sector

Helping to de-carbonize the transportation sector:

- Eliminating or decreasing diesel consumption.
- Reducing contaminant emissions.
- Reducing CO<sub>2</sub> emissions.
- Extending the operational lifespan of existing assets.

## Communities

Supporting sustainable, resilient communities:

- Diverting waste from landfill disposal.
- Protecting local air quality.
- Supporting job growth in CleanTech including:
  1. 50 full-time positions at Emerald.
  2. Opening opportunities in hydrogen technology manufacturing, use, distribution and research and development (R&D).





## WASTE HAS VALUE

Scan the QR code to find out how much your waste is worth today!



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