metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

SOLID WASTE MANAGEMENT PLAN
PUBLIC/TECHNICAL ADVISORY COMMITTEE

REGULAR MEETING

September 18, 2025
1:00 pm – 3:00 pm
In-person Meeting (1:00 pm – 3:00 pm)
Vancouver Landfill Tour prior to meeting

A G E N D A

ITEMS	TIME
1. WELCOME • **Independent Consultation and Engagement Panel Members** o Andrea Reimer o Celena Benndorf	1:00 – 1:10 pm
2. AGENDA	1:10 – 1:15 pm
3. MEETING NOTES **3.1 June 19, 2025** (Attachment 1)	1:15 – 1:20 pm
4. ACTION/STANDING ITEMS	
4.1 Action Tracker (Attachment 2)	1:20 – 1:25 pm
5. DISCUSSION ITEMS	
Solid Waste Management Plan Update:	
5.1 Draft Plan Outline *For information and comments* *Designated Speaker: Terry Fulton, Senior Project Engineer, Solid Waste Services*	1:25 – 1:50 pm

Proposed agenda times are intended to support effective meeting facilitation. Items requiring extended discussion that cannot be accommodated within the regular meeting time may be deferred to a future agenda or addressed in a specially scheduled meeting.

5.2 Draft Plan Strategies and Rubric *For plenary discussion* *Designated speaker: Karen Storry, Senior Engineer, Solid Waste Services* **5.3 Residual Waste Management Options Review** *For plenary discussion* *Designated Speakers: Paul Henderson, General Manager, Solid Waste Services; Nathalie Marble, Team Lead, Senior Solid Waste Engineer, Stantec*	1:50 – 2:20 pm 2:20 – 2:50 pm
6. INFORMATION ITEMS	
6.1 Zero Waste Committee and Other Updates *For information* *Designated Speaker: Paul Henderson, General Manager, Solid Waste Services*	2:50 – 2:55 pm
7. ADDITIONAL ITEMS	
7.1 Metro Vancouver Response to PTAC Member regarding Vancouver Landfill Greenhouse Gas Emissions (Attachment 3) **7.2 Communications between HSR Zero Waste and Metro Vancouver (July 23, August 21, and August 22, 2025)** (Attachment 4) **7.3 Public/Technical Advisory Committee Updated 2025 Work Plan** (Attachment 5) **7.4 Regional Waste Flows August 2025** (Attachment 6)	2:55 – 3:00 pm

Attachment 1: Draft Meeting Notes – June 19, 2025 – Solid Waste Management Plan Public/Technical Advisory Committee

Attachment 2: Action Tracker

Attachment 3: Metro Vancouver Response to PTAC Member regarding Vancouver Landfill Greenhouse Gas Emissions

Attachment 4: Communications between HSR Zero Waste and Metro Vancouver (July 23, August 21, and August 22, 2025)

Attachment 5: Public/Technical Advisory Committee Updated 2025 Work Plan

Attachment 6: Regional Waste Flows August 2025

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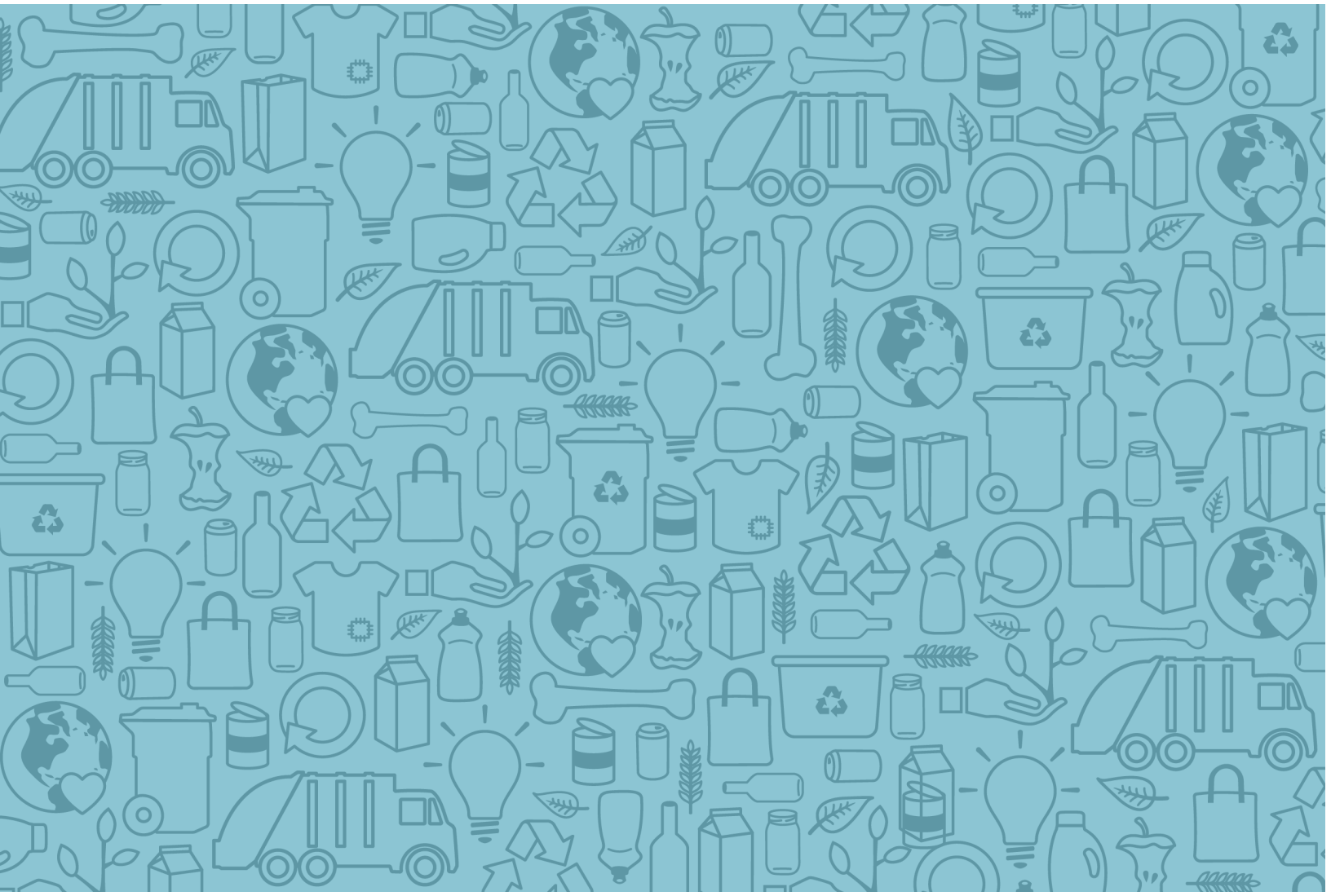


Draft Solid Waste Management Plan - OUTLINE

September 2025

ABOUT METRO VANCOUVER

Metro Vancouver is a diverse organization that plans for and delivers regional utility services, including water, sewers and wastewater treatment, and solid waste management. It also regulates air quality, plans for urban growth, manages a regional parks system, provides affordable housing, and serves as a regional federation. The organization is a federation of 21 municipalities, one electoral area, and one treaty First Nation located in the region of the same name. The organization is governed by a Board of Directors of elected officials from each member jurisdiction.

TERRITORIAL ACKNOWLEDGMENT

Metro Vancouver acknowledges that the region's residents live, work, and learn on the shared territories of many Indigenous peoples, including 10 local First Nations: q̓icə̓y̓ (Katzie), q̓ʷɑ:ṅl̓əṅ (Kwantlen), kʷikʷəƛ̓əm (Kwikwetlem), máthxwi (Matsqui), xʷməθkʷəy̓əm (Musqueam), qiqéyt (Qayqayt), Semiahmoo, Sḵwx̱wú7mesh Úxwumixw (Squamish), scəẇaθən məsteyəxʷ (Tsawwassen), and səlilwətaɬ (Tsleil-Waututh). Metro Vancouver respects the diverse and distinct histories, languages, and cultures of First Nations, Métis, and Inuit, which collectively enrich our lives and the region.

Table of Contents

METRO VANCOUVER'S SOLID WASTE MANAGEMENT PLAN

Solid waste management is the term used to describe how packaging, construction and demolition materials, food scraps, yard and garden trimmings, and other materials from residential, commercial, and institutional sources are managed when they're no longer needed. It includes the decisions we make when reducing and preventing garbage, using recycling and green bins, and the services provided by companies, governments, and non-profits to collect, transport, and process these materials.

This plan will guide solid waste management strategies and actions, targets, and priorities in the decade ahead. The plan identifies how our region can continue to prevent and reduce waste, increase reuse and recycling, reduce greenhouse gas emissions, and work towards a circular economy. Together as a region, we need to think about how we purchase, use, reuse, recycle, and throw things away in Metro Vancouver to better manage our solid waste.

Vision and Guiding Principles

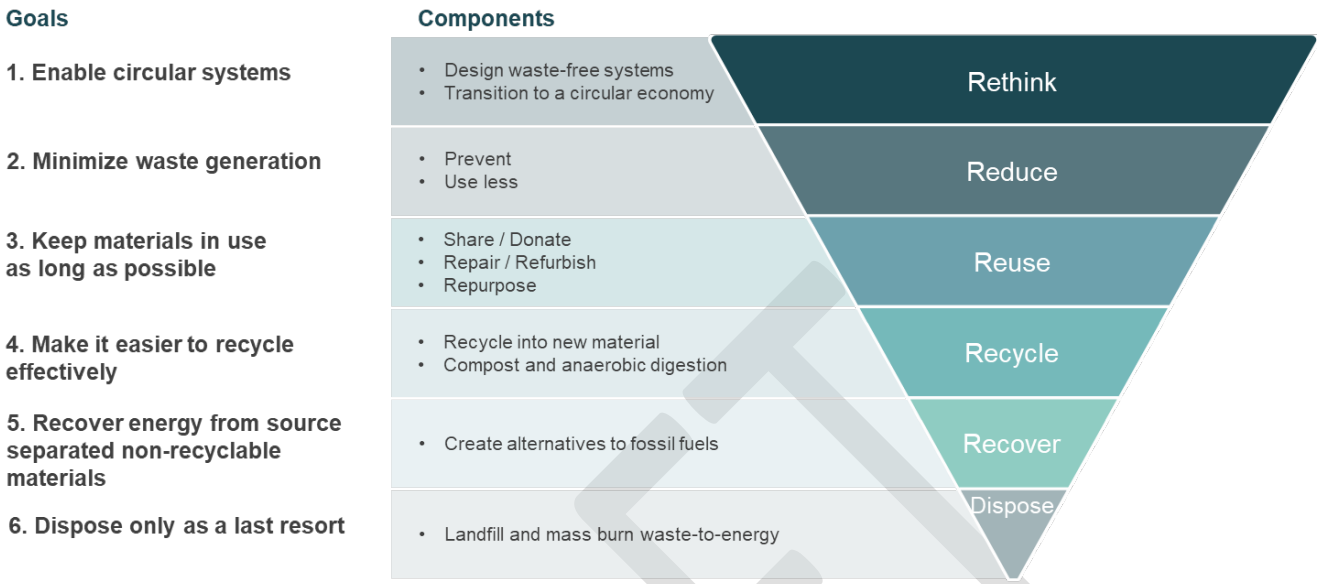
Metro Vancouver has established a vision statement and guiding principles for the solid waste management plan update. These will guide plan implementation, and were created with input from First Nations, member jurisdictions, neighbouring regional districts, advisory committees, interested parties, and the public.

Vision: A thriving region where nothing is wasted and resources are valued.

These guiding principles are specific to the Metro Vancouver region, and complement the set of guiding principles provided by the BC Ministry of Parks and Environment in their Guide to Solid Waste Management Planning.

Goals and Hierarchy

The goals of the solid waste management plan describe the long-term aims to be achieved by the plan. The goals link closely to Metro Vancouver's waste management hierarchy, which builds on the BC Pollution Prevention Hierarchy to outline priorities for solid waste management in the Metro Vancouver region. The highest priorities are at the top of the hierarchy, and are associated with actions that preserve resources, prevent waste, and help transition to a circular economy. Specific terms used within the goals and hierarchy are defined in the glossary.



Targets

To be considered in November.

OVERVIEW

Metro Vancouver is responsible for planning for waste prevention, reduction, reuse, and recycling, and disposing of the remaining waste in an environmentally responsible manner. This work is guided by our commitment to environmental stewardship, and affordable and accessible waste management services. It would not be possible without the continued efforts of committed residents, First Nations, member jurisdictions, and innovative businesses and organizations across the region. Metro Vancouver operates several recycling and waste centres in the region where residents, member jurisdictions and businesses can drop off recycling and garbage. Metro Vancouver also runs educational campaigns and initiatives to encourage waste prevention, reduction, reuse and repair, and recycling.

At its facilities, Metro Vancouver is responsible for providing convenient drop-off for garbage for residents and businesses, determining the final disposal destination of that material, and providing opportunities to drop off small quantities of materials for recycling or reuse. Recycling sorting and processing facilities, and most commercial recyclables collection and drop-off are managed by the private sector. This system allows and encourages private sector innovation in recycling.

In some cases where challenges exist in the provision of recycling services by the private sector, Metro Vancouver may opt to provide services to ensure reliable access for municipalities and the public. A recent examples of this approach is the provision of commercial organics services at the North Shore Recycling and Waste Centre, following the closure of a centrally located organics receiving facility.

Metro Vancouver's Strategic Priorities

Metro Vancouver embraces collaboration and innovation in providing sustainable regional services that contribute to a livable and resilient region, and a healthy natural environment for current and future generations.

The Board Strategic Plan provides a framework for the decisions Metro Vancouver's Board will take to address regional priorities, today and for the long-term. It informs staff's approach to the delivery of utility services, planning, and other activities required so Metro Vancouver remains one of the most desirable places in the world to live and do business.

Strategic priorities outlined in the 2022-2026 plan include:

- Financial Sustainability and Regional Affordability
- Climate Action
- Resilient Services and Infrastructure
- Reconciliation

These strategic priorities guide all of Metro Vancouver's work, including the solid waste management plan, and are as important to the execution of the plan as the plan's guiding principles.

Governance, Roles and Responsibilities

The solid waste management system in Metro Vancouver depends on the interconnected operations of many different organizations, as summarized in the subsections below. .

First Nations

First Nations have an important role in stewardship of the region's land, water, and air. This extends to working with all orders of government to advance improvements to solid waste management, protect the health of the environment, and achieve environmental, cultural, spiritual, and economic goals for their communities.

Federal Government

The federal government is responsible for protection of the environment through the *Canadian Environmental Protection Act*, and has the ability to ban materials such as problematic plastic to prevent degradation of the environment. The federal government is also responsible for legislation regarding the import and export of waste from the country and between provinces.

Provincial Government

British Columbia's waste management authority stems from the *Environmental Management Act*, which provides permitting authority for solid waste facilities and other powers to protect public health and the environment in BC. The Ministry of Parks and Environment approves solid waste management plans for regional districts in BC, which outline how a regional district manages waste within its jurisdiction.

Metro Vancouver

Regional districts including Metro Vancouver, are responsible for developing solid waste management plans in cooperation with member jurisdictions and in accordance with *A Guide to Solid Waste Management Planning,* the province's guidance for creating a solid waste management plan. Metro Vancouver operates recycling and waste centres where residents and businesses can drop off materials at convenient locations across the region, and is responsible for waste reduction and recycling planning.

Member Jurisdictions

Member jurisdictions have a significant role with collecting waste, organics, and in some instances recycling, from residents in the region, either directly or through service agreements with service providers the region. Some member jurisdictions also own or operate recycling depots or organics management facilities in the region. Member jurisdictions have regulatory authority to enact specific bylaws at the property level that directly influence requirements for recycling or garbage collection.

Waste and Recycling Industry

The waste and recycling industry in Metro Vancouver includes waste, recycling, and organics haulers as well as facility operators and material processors. The industry is involved in all parts of waste management, including education, collection, sorting, and processing of materials.

Producer Responsibility Organizations

Under the *BC Recycling Regulation*, producer responsibility organizations are responsible for implementing BC's extended producer responsibility programs under which producers are responsible for the end-of-life management of materials. One example, RecycleBC, is responsible for the collection and end-of-life management of residential packaging and printed paper in the province. As such, municipal collection in Metro Vancouver is typically provided directly by, or subsidized by, Recycle BC.

Businesses and Institutions

Businesses and institutions in Metro Vancouver not only generate waste, but many have influence over how products and packaging are designed, manufactured, distributed and used, and their ability to contribute to a circular economy. Some businesses provide waste management related goods or services, such as zero waste stores or thrift stores, repair shops and rental businesses. The region also has several established reuse businesses, and the network continues to grow and evolve along with the solid waste management system.

Non-Profits

Metro Vancouver has a vast system of non-profit organizations that work within all aspects of the waste and recycling industry, as well as in the waste reduction and reuse sectors. Some non-profit organizations work on donation and redistribution of specific material types like textiles or rescued food, while others work on amplifying the voice of underrepresented and equity-denied communities.

Residents

Every resident creates waste, and thanks to the efforts of residents across the region, Metro Vancouver's disposal rate has decreased 26% since the implementation of the current solid waste management plan in 2011. With continued efforts and participation we can continue to improve our performance as a region.

Neighbouring Regional Districts

Materials may flow between regional districts for recycling or disposal. Metro Vancouver works collaboratively with adjacent regional districts to discuss consistency in solid waste management to work towards shared priorities.

Working Collaboratively with First Nations

To be drafted

Regional Solid Waste System

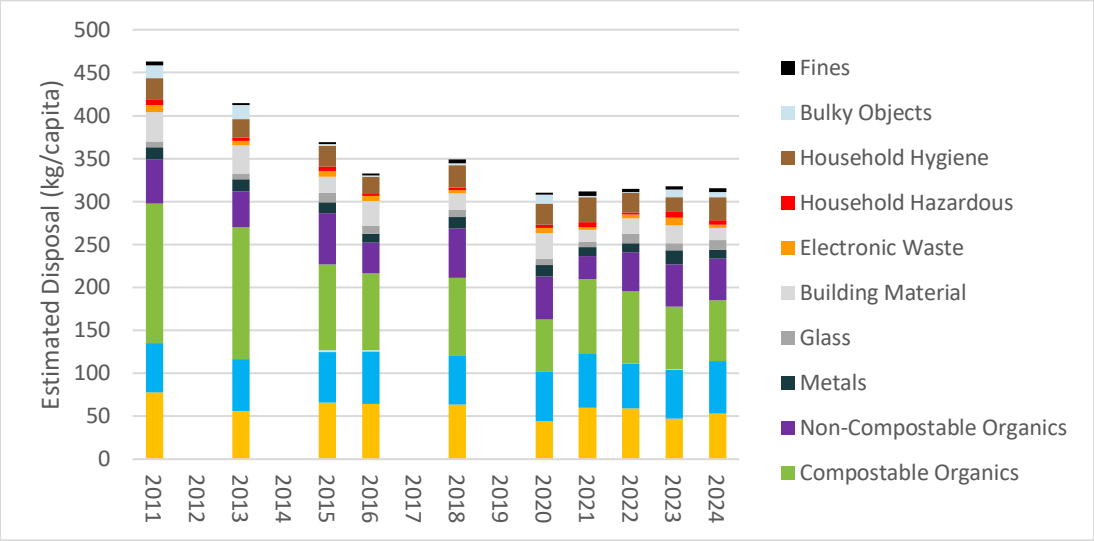
Metro Vancouver and the City of Vancouver operate a network of facilities across the region that offer recycling and reuse drop-off and waste disposal services, as shown in Figure X.

Figure X: Regional Solid Waste System

In addition to the Metro Vancouver and the City of Vancouver facilities, the regional solid waste system includes licensed (private) solid waste facilities (recycling, composting, construction & demolition and other facilities), other facilities such as concrete and asphalt recycling facilities, extended producer depots, return to retail outlets, and municipal recycling depots.

Progress to date

Figure X: Waste Composition Over Time



As part of the process to update the plan, Metro Vancouver reviewed progress since the 2011 Integrated Solid Waste and Resource Management Plan was first implemented, including trends in waste composition (Figure X), disposal, and recycling and waste generation data, to identify key issues and opportunities. These were summarized into seven discussion questions which outline areas where new actions and ideas can help us improve solid waste management across the region. These discussion questions were used to gather engagement feedback from audiences.

For each question, a one-page summary highlighting accomplishments and progress to date was developed to provide background information and context. These are attached as Appendix X and summarize key initiatives since the last plan, and the current challenges and opportunities for regional solid waste management.

Circular Economy

The concept of a circular economy is embedded in this solid waste management plan and particularly as part of Goal 1: Enable Circular Systems. Strategies and actions under this goal seek to rethink solid waste management to shift toward a system in line with our vision, where resources are valued and nothing is wasted.

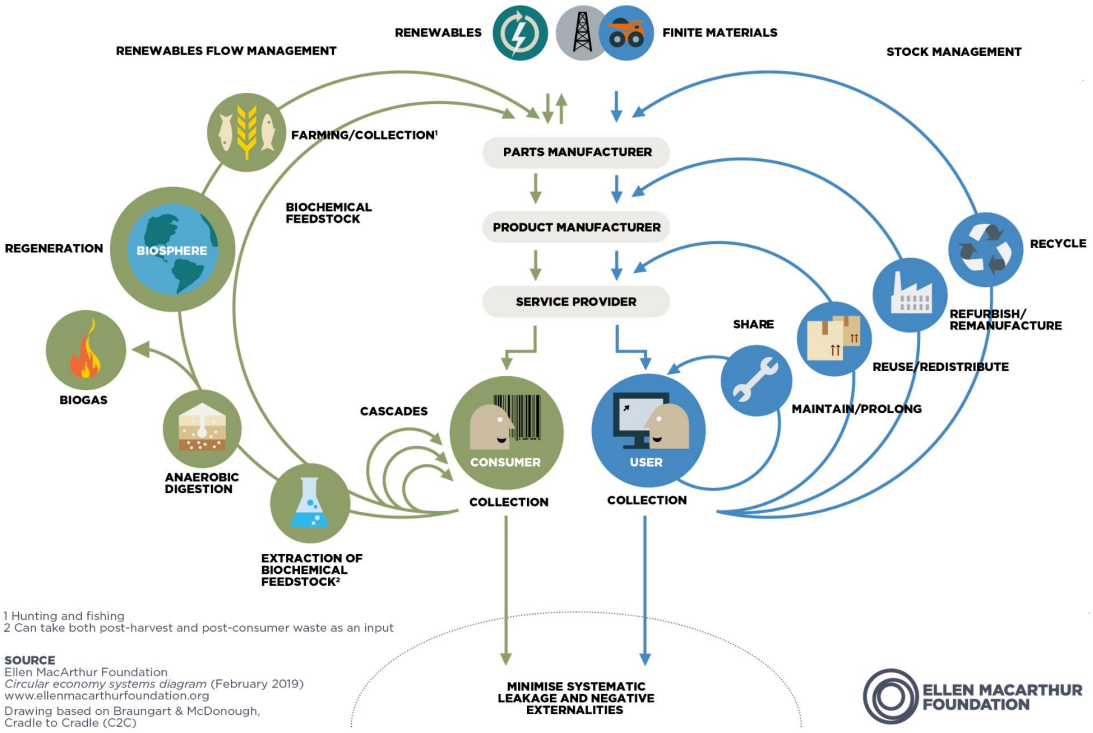
A circular economy is an alternative to a traditional linear economy (make, use, dispose) and is restorative and regenerative by intention and design. Transitioning towards a circular economy means designing out waste and pollution, keeping products and materials in use, and regenerating natural systems.

The concept of a circular economy has gained momentum since the first Ellen MacArthur Foundation publication in 2012 which presented the circular economy as an opportunity for significant sustainable economic growth, creating green jobs, increasing resilience, and fostering innovation while reducing

greenhouse gas emissions. Moving toward a circular economy is a crucial step to addressing the impacts of climate change, and has the potential to significantly reduce global emissions related to the products we create and consume.[1] It launched the Ellen MacArthur Butterfly, which presented strategies for technical and biological cycles (Figure X). It presented three guiding principles:

1. **Eliminating waste and pollution:** developing effective systems that minimize the volume of waste that ends in landfills and negative externalities
2. **Circulating products and materials at their highest value:** enhancing the usefulness of products, components and materials, and keeping them circulating in the economy.
3. **Regenerating Nature:** preserving natural capital and promoting the effective use of finite resources and balancing the use of renewable resources.

Figure X: The Ellen MacArthur Butterfly Diagram



Waste Prevention and Advocacy

Waste prevention consists of actions that prevent or reduce waste from being created in the first place. This does not refer to recycling. While recycling is important, it is an activity that occurs after a product

[1] *Completing the picture: How the circular economy tackles climate change* (2019).

or material is used or consumed. The linear economy has created a system where decisions made in the early stages of a product's lifecycle (e.g. during the design, manufacturing and packaging stages) are disconnected from the cost and challenges of managing those materials at end-of-life.

A focused effort to prevent the creation of waste will mean fewer natural resources are extracted and less energy is used in the production, distribution, and consumption of products. It also means that less spending, public or private, will be needed for recycling and disposal programs. Waste prevention provides many opportunities to create green jobs and grow a low-carbon economy while mitigating pollution including greenhouse gas emissions.

Efforts at waste prevention require change at a systems level, which Metro Vancouver cannot do alone. Collaboration, both within the region and outside of it, in addition to strong, coordinated advocacy efforts to provincial and federal governments, other local governments, and national agencies and organizations, are key tools to promote waste prevention at its source and accelerate the transition to a circular economy.

REFERENCE TO NATIONAL ZERO WASTE COUNCIL TO BE ADDED

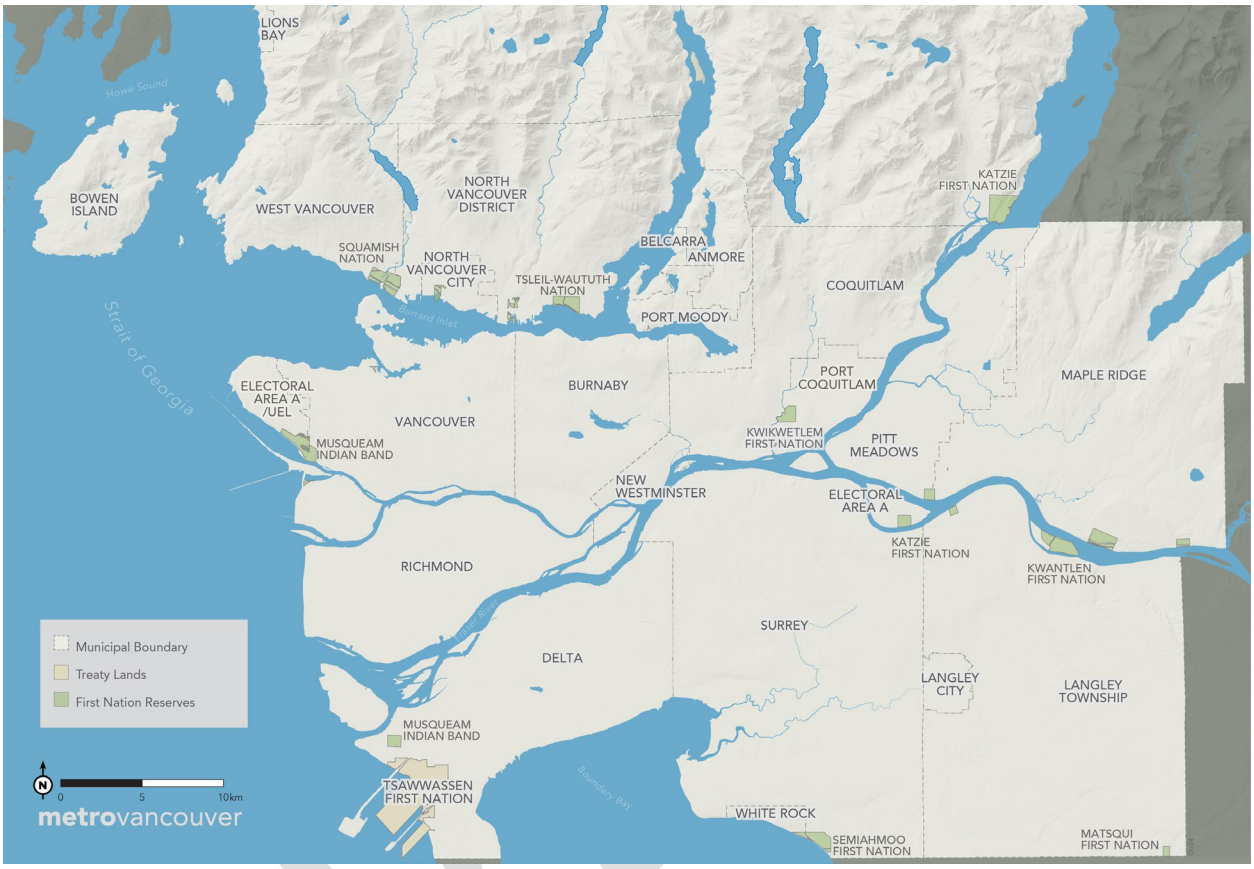
Scope of the Plan

The plan focuses on actions that Metro Vancouver, either on its own or in collaboration with other organizations or its members, can undertake to further advance waste prevention, reduce greenhouse gases and transition to a circular economy, in accordance with the waste hierarchy and the plan goals. This includes advocacy efforts to rethink the system, promotion and education, implementing, expanding or modifying programs and policies, or offering services at its facilities. The plan contemplates strategic priorities for regulation and recycling and waste centre development, as well as technical criteria for assessing residual management options as a framework for future decision making in those areas.

Actions in the plan focus on municipal solid waste, which means discarded solid material that originates from residential, commercial, institutional, demolition, land clearing or construction sources. Waste from agricultural and industrial sources are out of scope for this plan; however, waste prevention efforts may extend to these sectors.

Geographically, the plan covers the extent of the Metro Vancouver Regional District, including member jurisdictions that are not a part of the Greater Vancouver Sewerage & Drainage District. Figure X shows the boundaries of the Metro Vancouver Regional District.

Figure X: Metro Vancouver Regional District



Alignment and Linkages

Alignment with National Initiatives

Various aspects of Metro Vancouver's solid waste management plan align with national initiatives. For example. under the Federal Sustainable Development Strategy 2022-2026, Environment and Climate Change Canada has outlined indicators and associated targets to achieve goal 12: Reduce waste and transition to zero-emission vehicles. The following table outlines Environment and Climate Change Canada's targets, and how Metro Vancouver's solid waste management plan will help meet those targets.

Environment and Climate Change Canada Target	Metro Vancouver's Solid Waste Management Plan
By 2030, the amount of single-use plastics that are entering the environment as pollution will be reduced by 5% and that are sent to landfill by 3%	The updated solid waste management plan outlines efforts to continue Metro Vancouver's ongoing work to reduce single-use items, which is supported by a robust provincial regulatory framework and efforts by member jurisdictions.

Reduce the amount of waste Canadians send to disposal from a baseline of 699 kilograms per person in 2014 to 490 kilograms per person by 2030 (a 30% reduction); and to 350 kilograms per person by 2040 (a 50% reduction)	Metro Vancouver's per capita disposal target is X kg/person, below the federal target of 350 kg/person.

Alignment with Provincial Initiatives

This plan was completed in accordance with the provincial document, A Guide to Solid Waste Management Planning, and as required by the *Environmental Management Act*. One of Metro Vancouver's targets is to reduce per capita disposal to X kg/person, which exceeds the provincial target of 350 kg/person.

Metro Vancouver's hierarchy aligns with the BC Pollution Prevention Hierarchy, with some exceptions:

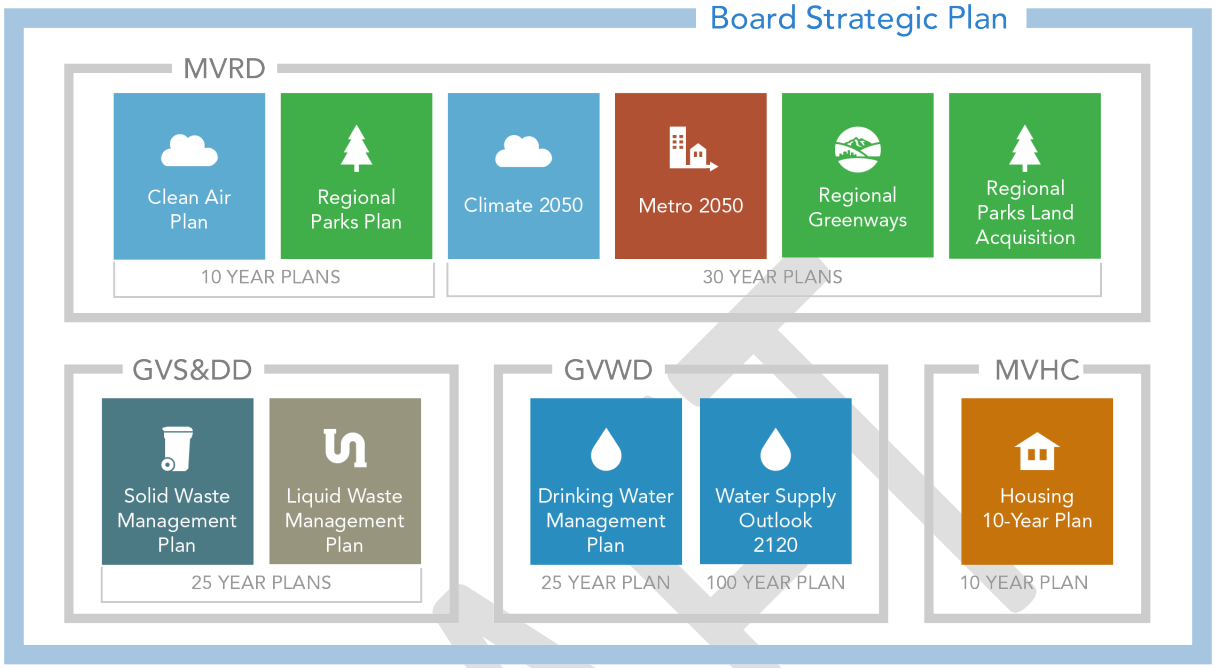
- "Rethink" has been added as an additional tier above Reduce in response to feedback received on including a strong circular economy and waste prevention focus.
- "Recover" is focused on materials not currently viable for recycling, and does not include mass burn waste-to-energy, reflecting that mass burn waste-to-energy defined as a disposal method to manage residual garbage, similar to landfilling; and
- "Dispose" replaces "Residuals Management" and includes both landfill and mass burn waste-to-energy.

Metro Vancouver's guiding principles consider the provincial principles but are built in response to region-specific feedback.

Alignment with other Metro Vancouver plans

Metro Vancouver's other departments follow strategic plans outlining their goals and priorities, all informed by and aligned with Metro Vancouver's 2022-2026 Board Strategic Plan. Other Metro Vancouver management plans are depicted in Figure X, and key linkages with select plans are explored below. The 2022-2026 Board Strategic Priorities and Climate 2050 are described in dedicated sections of this document.

Figure X: Metro Vancouver Strategic Plans



Clean Air Plan (2021) – Metro Vancouver's Clean Air Plan (2021) is the regional plan for managing air quality and greenhouse gases over the next 10 years. The Clean Air Plan includes key actions to effectively reduce greenhouse gas emissions in this region, in pursuit of 2030 emissions targets. It also includes actions to reduce health harming air contaminants, to improve day to day air quality. Linkages with the solid waste management plan include strategies to shift to zero carbon district energy systems, accelerate the transition to lower embodied emissions in buildings, accelerate emission reductions from industrial facilities, and implement leading management practices to continually improve regional air quality and reduce greenhouse gas emissions.

Metro 2050 (2022) – Metro 2050 is the region's collective vision for how growth will be managed to support the creation of complete, connected, and resilient communities, while protecting important lands and supporting the efficient provision of urban infrastructure like transit and utilities. Linkages with the solid waste management plan include a strategy to advance land use, infrastructure, and human settlement patterns that reduce energy consumption and greenhouse gas emissions, create carbon storage opportunities, and improve air quality.

Liquid Waste Management Plan (2025) – Metro Vancouver's liquid waste management plan includes community-specific solutions for Metro Vancouver and its member jurisdictions to manage wastewater and address growing pressures in the region, aiming to protect public health and the environment. Key linkages with the solid waste management plan include strategies to diversify options for biosolids and implement proven resource recovery technologies.

Regional Food Systems Strategy (2025) – Metro Vancouver's Regional Food Systems Strategy supports a collaborative approach to creating a sustainable, resilient, and healthy food system that contributes to

the well-being of all residents, the economic prosperity of the region, and the conservation of our ecological legacy. Although not depicted in Figure X, the Regional Food System Strategy has key intersections with the solid waste management plan with respect to food waste prevention and food recovery.

Climate 2050 Solid Waste Primer

TO BE DRAFTED

STRATEGIES AND ACTIONS

Goal 1

Goal 2

Goal 3

Goal 4

Goal 5

Goal 6

PLAN IMPLEMENTATION

Regulatory Approach

Purpose

The solid waste management plan regulatory strategy outlines the types of regulatory initiatives, such as bylaws, that Metro Vancouver may consider over the lifespan of the solid waste management plan, including how potential Metro Vancouver regulations are assessed, engaged on, and implemented. Recognizing that future changes to regulation require dedicated engagement beyond the scope of this solid waste management plan

update, the regulatory strategy aims to clarify Metro Vancouver's outlook with respect to any future regulatory actions to further progress toward the solid waste management plan goals and targets.

Background

Overview

The Greater Vancouver Sewerage and Drainage District (GVS&DD) Board enacts bylaws to better manage waste within our system and protect public health and the environment. This authority is delegated to the GVS&DD from the province under the *Environmental Management Act* S.B.C. 2003 c.53, and the *Greater Vancouver Sewerage and Drainage District Act* S.B.C. 1956 c.59, Section 7A and 7B.

The primary bylaws related to solid waste management in the region are the *GVS&DD Tipping Fee and Solid Waste Disposal Regulation Bylaw No.379,2024,* as amended (Tipping Fee Bylaw), which sets garbage and recycling fees at Metro Vancouver solid waste facilities, identifies recyclable and hazardous materials banned from disposal and specifies surcharges, and establishes the requirements of the generator levy; and the *GVS&DD Municipal Solid Waste and Recyclable Material Regulatory Bylaw No.181, 1996,* as amended (Bylaw 181), which specifies requirements for private solid waste facilities, including reporting, inspection, and enforcement provisions. The *GVS&DD Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No.378, 2024,* as amended, provides an additional compliance promotion tool, allowing the issuance of penalty amounts up to $500 per contravention of specified provisions of Bylaw 181 and the Tipping Fee Bylaw. It also establishes a process for dispute adjudication.

Existing Regulations

Bylaw	Key Components
GVS&DD Tipping Fee and Solid Waste Disposal Regulation Bylaw No.379, 2024	• Fees and surcharges • Recyclable and hazardous materials banned from disposal • Generator levy
GVS&DD Municipal Solid Waste and Recyclable Material Regulatory Bylaw No.181, 1996	• Facility licensing • Compliance promotion
GVS&DD Notice of Bylaw Violation Enforcement and Dispute Adjudication Bylaw No.278, 2024	• Compliance promotion • Dispute Adjudication

Since approval of Metro Vancouver's 2011 solid waste management plan, the types of facilities regulated have expanded, material disposal bans have been updated, and bylaw compliance promotions have been strengthened. The generator levy, added to the Tipping Fee Bylaw in 2018, encourages the use of Metro Vancouver and City of Vancouver solid waste facilities where recyclable materials are banned from disposal, and ensures all garbage generators contribute to funding the cost of the regional solid waste system – a system that provides reliable and resilient services that benefit and are available to all residents and businesses in the region. The generator levy is included in the garbage tipping fee charged at regional solid waste facilities; however, if garbage is delivered to other facilities, haulers must pay the per-tonne generator levy directly to Metro Vancouver. The generator levy is a key contributor to Metro Vancouver's continued success in advancing waste reduction and recycling.

Metro Vancouver's Role

Metro Vancouver's Regulatory Role

Metro Vancouver's solid waste regulatory role includes the ability license private facilities processing municipal solid waste, and the authority for a tipping fee bylaw establishing rates and requirements for use of the Metro Vancouver Solid Waste facilities as well as generator levy provisions.

Metro Vancouver's regulatory authority does not currently include the ability to enforce bylaws at the generator or property level. Generally, that authority resides with municipalities. Also out of scope are extended producer responsibility programs and regulations impacting the sale or distribution of specific products, and eco fees or refundable deposit fees charged for some products, which may be implemented at the provincial or federal level. Any changes beyond Metro Vancouver's current regulatory authority, including compliance promotion mechanisms, require changes to provincial legislation and associated approval processes. Metro Vancouver also plans to advocate for continuous improvement of extended producer responsibility programs and regulations at the federal and provincial level that will help rethink waste and transition to a circular economy, including design for recyclability, the right to repair, and waste prevention legislation.

In addition to bylaws, Metro Vancouver can implement requirements through contracts, agreements and Board policy. Ideas received that can be implemented through these mechanisms were evaluated in the solid waste management plan's options analysis and, where applicable, were incorporated into the plan as strategies and actions.

Compliance and Enforcement

TO BE DRAFTED

Reporting and Continuous Improvement

TO BE DRAFTED

Strategic Approach

Regulatory Priorities

Metro Vancouver's regulatory priorities for the solid waste management plan align with the vision and guiding principles and can help to achieve the plan's strategies and actions. These priorities are summarized below.

Solid Waste Management Plan Guiding Principle	**Regulatory Priority**	**Potential future regulatory approach**
A solid waste and recycling system that is affordable, convenient, and consistent across the region	Encourage provision of recycling services across all sectors.	• Hauler licensing
A solid waste system that is resilient to climate change and future challenges		
Accountability from residents, businesses and governments to prevent waste	Increase reuse and recycling	• Source separation requirements • Reuse and recycling minimums for licensed facilities

		• Financial incentives for collectors that meet certain requirements
Environmental stewardship and climate action	Enhance Metro Vancouver's disposal ban program	• Add new materials to disposal ban program • Adjust surcharges in Tipping Fee Bylaw • Adjust material thresholds in Tipping Fee Bylaw • Improve education and enforcement
Inclusive solid waste services and programs	Reduce barriers to participation	• Recycling requirements at multi-family properties • Regulation changes to simplify recycling for small businesses
Innovation and collaboration to support a vibrant regional economy that keeps products and materials in circulation	Support innovation, particularly for reuse and repair	• Expanded facility types and provisions such as reuse minimums in Bylaw 181 • Financial incentives for innovation within license provisions • Variable tipping fees based on contamination levels and residual waste volumes
Transparency about what happens to garbage and recycling	Improve data accuracy, transparency and availability	• Update reporting provisions in Bylaw 181, such as real-time data submission platforms and RFID systems • Expand facility types covered under Bylaw 181, including those that are recovering energy rather than recycling material

Considerations

For any proposed regulations not identified in the solid waste management plan's strategies and actions, the following will be considered:

- What is the objective of the proposed regulation, and are there other options for achieving the same objective?
- Does GVS&DD currently have authority to implement the proposed regulation, and if not, what is required for obtaining that authority?
- What are the resource requirements for developing the proposed regulation, and for administering and enforcing it once enacted?

- Which sectors, businesses or individuals would be subject to the proposed regulation, and what is the estimated impact on meeting solid waste management plan goals and targets that would be achieved by regulating the targeted sectors?
- If the proposed regulation targets a specific material type and impacts how that material is managed, what are the expected operational consequences to the solid waste system overall?
- What are the expected financial implications resulting from the proposed regulation, such as tipping fee changes or other costs borne by residents and businesses?
- Are there any unintended consequences of implementing the proposed regulation?

Engagement

Any new regulations, including changes to existing bylaws or the creation of new bylaws, will be accompanied by a transparent engagement process. Engagement will follow Metro Vancouver's Public Engagement Board Policy and Public Engagement Guide. Metro Vancouver will also comply with any provincial requirements related to engagement.

Recycling and Waste Centres

This section will reflect priorities for facilities, to be discussed further in November

Residual Management Options

To be added following discussion

Education and Outreach

Section will describe Metro Vancouver's approach to education and outreach

Financial Overview

Section will describe how the actions in the plan will be funded

Performance Indicators

To be completed following targets discussions

Collaboration

Section will describe the importance of collaboration in implementing the plan

Risk Analysis

Plan will describe any associated risks

Plan Monitoring

Section will describe how progress will be monitored and reported

Schedule

Section will describe rough timelines and priorities

GLOSSARY

TO BE DRAFTED

APPENDIX A — MAPS

Include map of existing facilities as well as closed landfills

APPENDIX B - DISPUTE RESOLUTION PROCEDURE


Metro Vancouver Waste-to-Energy Facility


Vancouver Landfill

Residual Waste Management Options Review

Paul Henderson, P.Eng.
General Manager, Solid Waste Services

Nathalie Marble, P.Eng.
Senior Solid Waste Engineer, Stantec

PTAC Meeting, September 18, 2025
Orbit Link: 78255863

metrovancouver

Stantec

STUDY PURPOSE/CONNECTION TO SOLID WASTE MANAGEMENT PLAN

- Continuing to work with Vancouver and Delta on using Vancouver Landfill to physical capacity.
- Study purpose:
    - To understand the current national and international (United States, Europe, Japan, and Australia) practices for managing residual waste.
    - To identify the economic and regulatory drivers, successes and challenges that have led to the residual waste management option for each region.
    - To develop technical criteria for potential incorporation into the solid waste management plan to assist with decision-making if new residual waste disposal capacity is required over the solid waste management plan term.

STUDY INTRODUCTION

- The management of residual waste and measures to prevent its generation has an important role in the region's solid waste management system.
- Approximately 1,000,000 tonnes of residual waste from residential and commercial / institutional sources requires disposal each year.
- Residual waste is currently disposed at the Waste-to-Energy Facility, Vancouver Landfill and three remote landfills.

"Residual waste" for the purposes of this study means:
Non-hazardous waste collected from residential, commercial, and institutional sources that requires disposal.

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Residual Waste Management Options Review

METRO VANCOUVER'S SOLID WASTE MANAGEMENT PLAN UPDATE
PRESENTATION TO REAC SWSC ON JULY 31, 2025

Metro Vancouver Central Surrey Recycling and Waste Centre

Contents

Purpose of Presentation

- Identify the key considerations for residual waste management approaches
- Share draft technical criteria for evaluating residual waste management options
- Seek committee feedback on the draft technical criteria.

Definitions

Recycling: processing of source separated materials to produce products and includes composting and anaerobic digestion

Mass burn waste-to-energy: involves full oxidization in one step without pre-processing of the residual waste feedstock, usually includes energy recovery either as electricity or heat

Waste hierarchy: Environment and Climate Change Canada's Waste Hierarchy: Waste Prevention, Reuse – Repair, Remanufacture – Refurbish, Recycle, Energy Recovery and Landfill

Waste-to-energy: Thermal processing or thermal treatment, involving the conversion of residual waste at high temperatures into gaseous, liquid, and solid products with a concurrent and subsequent release of heat energy – used in the broader context

Scope Summary

1. Literature review
   - Review options for management of residual waste
   - Prepare historic case studies (up to 10) on alternative / non-mainstream technologies
   - Prepare current case studies (up to 10) on alternative (non-mainstream) technologies

Addressed through the Literature Review

2. Summarize considerations for residual waste management approaches
3. Identify potential technical criteria for evaluating residual waste management options
4. Reporting

Findings of the Literature Review

The following countries/regions were selected for review:

- Canada
- United States
- European Union, with a focus on Scandinavian countries and Germany
- Australia
- Japan

Findings of the Literature Review - Canada

- Landfilling is predominantly used for residual waste management
- A small proportion (3%) is managed in two-stage and mass burn waste-to-energy facilities
- Existing waste-to-energy facilities are well established – newest opened in 2016
- The Alberta Utilities Commission has approved Varme Energy's application to build a waste-to-energy facility in Strathcona County (near Edmonton)
- Alternative waste-to-energy technologies have not been successfully implemented at a commercial scale

Gasification and Pyrolysis Technologies - Canada

- **Plasco** in Ottawa opened in the early 2000s and closed in 2015 using pyrolysis to produce syngas for diesel engines
- **Enerkem** in Edmonton opened in 2014 and closed in 2024 using gasification to produce methanol and ethanol
- **Sustane** Technologies in Chester, Nova Scotia, opened in 2019 to produce biomass pellets and synthetic diesel using pyrolysis

- These facilities have not processed residual waste at a commercial scale

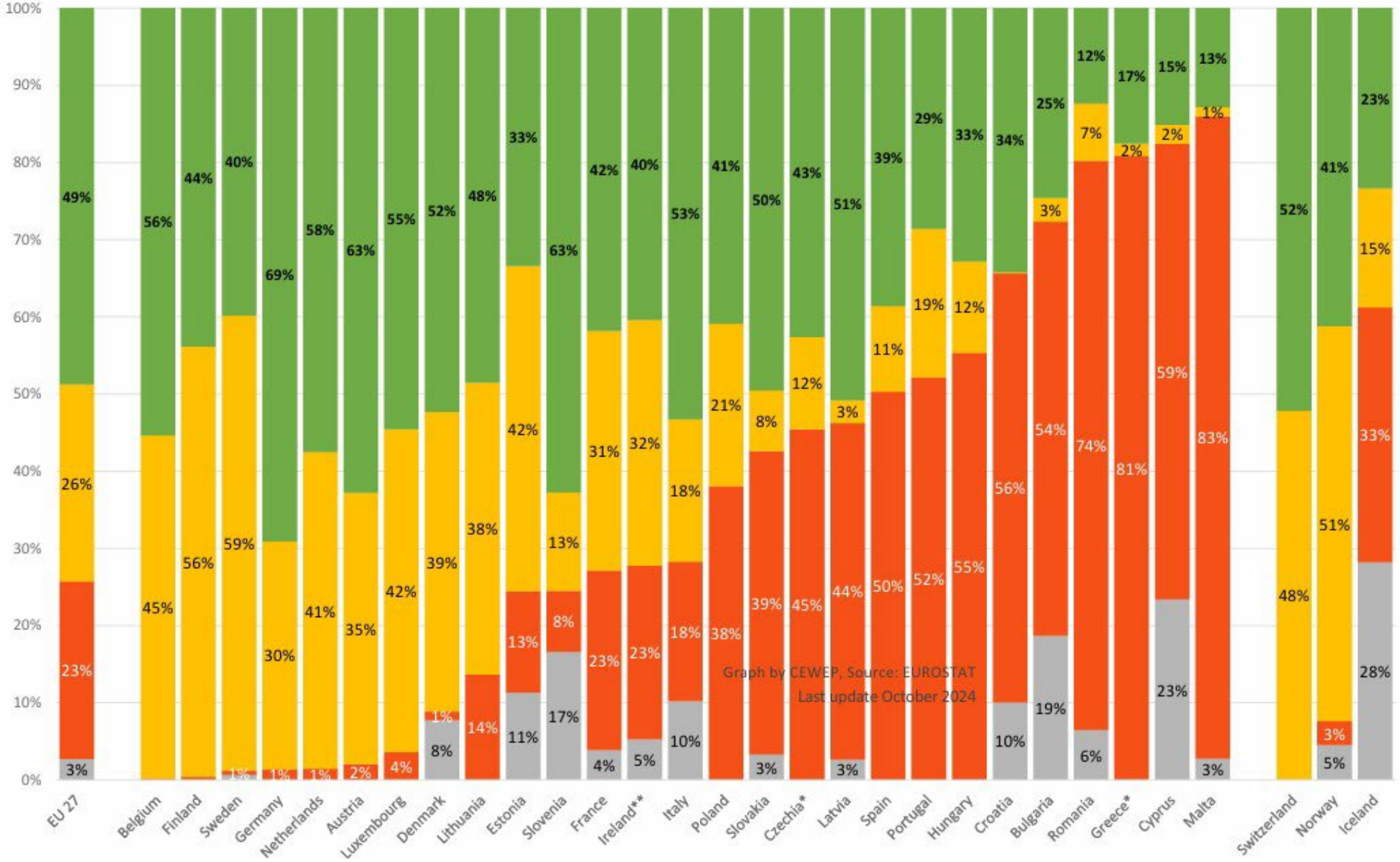
Findings of the Literature Review - United States

- Majority of the residual waste is landfilled – 19% managed through mass burn waste-to-energy
- Alternative waste-to-energy technologies have not been successfully implemented at a commercial scale
- Mass burn waste-to-energy is predominantly in place in densely populated areas (e.g. northeastern United States)
- Several mass burn waste-to-energy facilities have closed from 2001-2019 but total electricity generation has only declined slightly

Findings of the Literature Review - European Union

- Rapid growth of waste-to-energy from 1991-2010
- Disposal via mass burn waste-to-energy is slightly more than landfilling
- Countries with higher per capita GDP and higher recycling rates dispose of residual waste using mass burn waste-to-energy (e.g., Germany, Finland, Sweden, Belgium)
- Overcapacity, EU policies and directives have resulted in the transport of processed waste (refused derived fuel) between countries

Municipal waste treatment in 2022



Percentages are calculated based on the municipal waste reported as generated in the country

*: last available data 2021
**: last available data 2020

Findings of the Literature Review - Australia

- Predominantly reliant on landfills for residual waste management
- Small amount of residual waste (2%) is used for energy recovery (refuse derived fuels)
- First two mass burn waste-to-energy facilities are in the commissioning phase and pre-construction phase respectively

Findings of the Literature Review - Japan

- Mass burn waste-to-energy is the main method of managing residual waste
- Limited land availability and costly waste export are key drivers
- Limited information on alternative waste-to-energy technologies – performance is unknown due to lack of publicly available information

Findings of the Literature Review

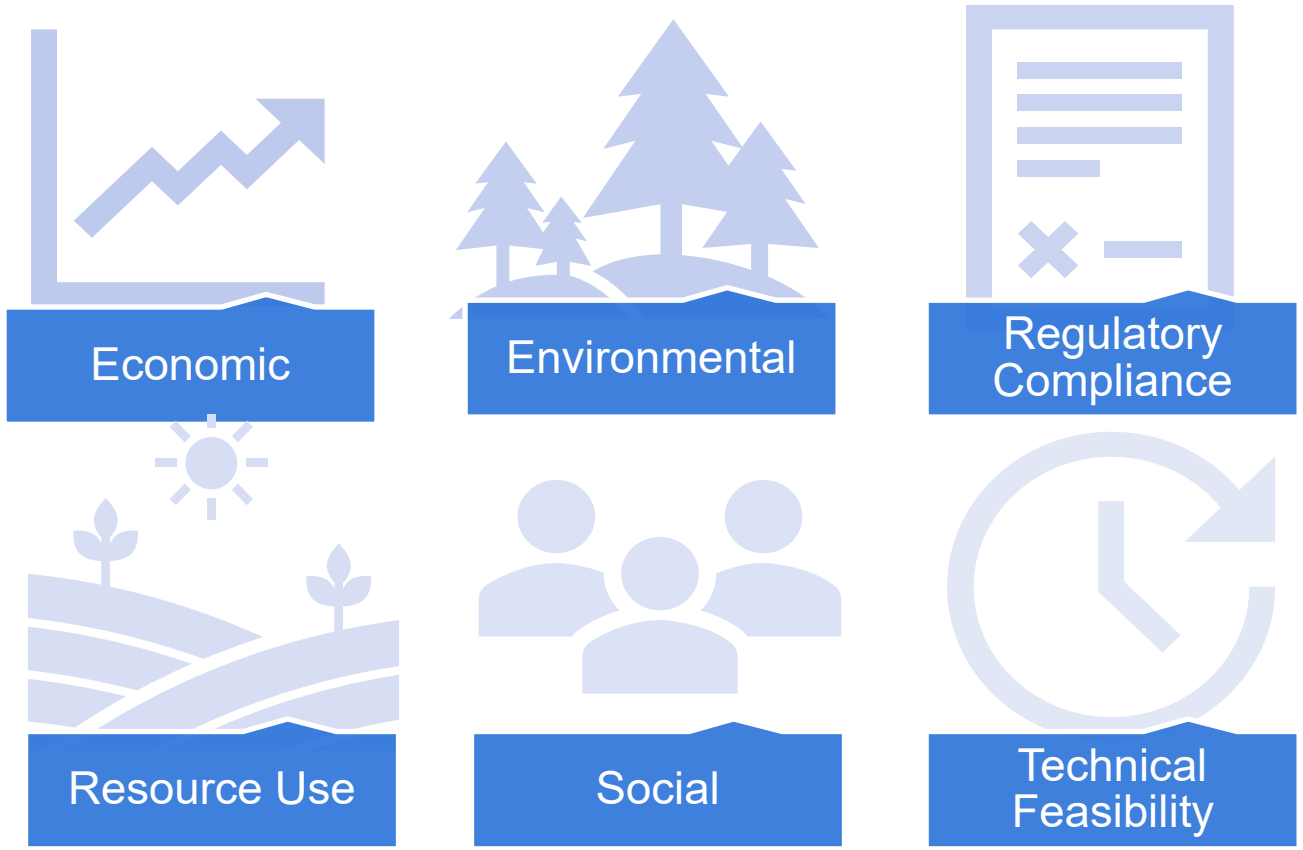
- Each region establishes waste management hierarchy with specific goals
- Landfill and mass burn waste-to-energy are primary options for residuals management world-wide
- US (19%), Canada (3%) & Australia (2%) of residual waste is managed through waste-to-energy
- Japan, Sweden & Germany 99% of residual waste managed through waste-to-energy
- Thousands of mass burn waste-to-energy facilities world-wide
- Alternative technologies have not demonstrated commercial scale viability worldwide

Considerations in Selecting Between Landfilling or Mass Burn Waste-to-Energy

Considerations for jurisdictions selecting between landfilling and mass burn Waste-to-Energy include:

- Policy and regulatory framework
- Land availability
- Landfill tipping fees/transportation logistics
- Energy prices
- Public perception
- Subsidies or carbon credits

Draft Technical Criteria for Evaluating Residual Waste Management Options



Draft Technical Criteria for Evaluating Residual Waste Management Options

Economic

- Overall cost: capital, operational, closure, post closure
- Opportunities for revenue generation: selling recovered materials or energy to markets, reducing transport costs
- Financial risk

Regulatory Compliance

- Meets all applicable environmental and waste management regulations
- Permitting and approval processes required for implementing the system

Environmental

- General environmental factors such as dust, odour, emissions, litter, noise, vectors etc.
- GHG emissions direct and indirect contributions and offsets (avoided GHGs)
- Risk from climate change/natural disasters
- Geotechnical considerations
- Groundwater and surface water protection systems

Draft Technical Criteria for Evaluating Residual Waste Management Options

Resource Use

- Land requirements for facilities and operations
- Energy generation and use potential and proximity
- Opportunities for co-locating complimentary operations (e.g., public reuse and recycling depot services)

Social

- Potential impact on public health and safety
- Public perception and community acceptance of the system
- Job creation during construction and operation

Technical Feasibility

- Maturity, reliability and degree to which the system has been proven on a commercial scale
- Compatibility with residual waste as the feedstock material and ability to adapt to changing waste streams
- Capacity and scalability to handle large volumes of waste consistently and meet future needs
- Pre-processing requirements
- Percentage of the residual waste stream effectively processed by the system

Discussion

- Is there anything missing, that should be added in the technical criteria for evaluating residual waste management options?
- What would you consider the main priorities to guide decision-making for future assessments of residual waste management options?
- Any other feedback or comments?

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Presented by:
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Thank you

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Residual Waste Management Options Review

Metro Vancouver Solid Waste Management Plan

Prepared for:
Solid Waste Services, Metro Vancouver
Metrotower III, 4515 Central Boulevard
Burnaby, BC, V5H 0C6

Prepared by:
Stantec Consulting Ltd.

August 8, 2025

Project/File:
133800068

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date
0	Final Draft for Committee Distribution	Wajeeha Qazi, Veronica Bartlett	August 8, 2025	Nathalie Marble	August 8, 2025		

The conclusions in the Report titled Residual Waste Management Options Review are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

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Executive Summary

The Environmental Management Act mandates all regional districts in British Columbia (BC) to develop long term plans for managing municipal solid waste and recyclable materials. A solid waste management plan guides solid waste management strategies and actions, targets, and priorities for the next decade. The Guide to Solid Waste Management Planning 2016, developed by the Ministry of Environment and Parks, provides advice to aid in plan development that is consistent with legislative requirements. It sets out expectations regarding plans and desirable outcomes, defined by provincial targets and principles.

As part of the overall process for updating Metro Vancouver's solid waste management plan, Metro Vancouver commissioned Stantec to review residual waste management options.

Residual waste is the leftover non-hazardous (residual) waste from the residential and commercial/institutional sectors and demolition, land clearing or construction sources that is destined for disposal. Residual waste is the fraction of the municipal solid waste stream that is left after waste prevention and recycling. This study focuses on management of residual waste from the residential, commercial and institutional sectors.

The main objectives of the review are to:

- Provide technical information in support of solid waste management plan discussions related to options for management of residual residential and commercial/institutional waste following efforts to maximize waste reduction and recycling.
- Provide an overview of the considerations of all potential options as well as identifying potential criteria for evaluating options in the future.

The review is not intended to rank residual waste management options.

A key component of the residual waste management options review was to complete a literature review with the objective to summarize international practices related to the management of residual waste and provide a high-level overview of approaches being taken around the world in countries or regions with a similar standard of living to Canada.

In addition to a general overview of the approaches taken in other regions, the literature review includes discussion of some of the economic and regulatory drivers that have helped define the residual waste management approach for each region. This review highlights and summarizes the primary goals for managing waste, waste reduction efforts, and residual waste management within the regions. Also identified are residual waste management systems and approaches that are working well or may be experiencing some challenges.

Similarities to Metro Vancouver were considered when selecting the regions for the literature review. Regions were selected because they have one or more of the following similarities: standards of living to Canada, waste streams, economic models, and apply a waste hierarchy as a guide for managing wastes.

The following regions/countries were selected for review:

- Canada
- United States
- European Union with a focus on Scandinavian countries and Germany
- Australia
- Japan

Canada

Landfilling is the most common approach for managing residual waste in Canada and a small portion is treated using mass burn and two-stage waste-to-energy technologies. Low landfill tipping fees are one of the factors favouring landfills as the most common approach for managing residual waste in Canada. Low landfill tipping fees are driven by the availability of landfill capacity across much of the country. In comparison, mass burn and two-stage waste-to-energy facilities are characterized by high initial capital costs. Other barriers to development of waste-to-energy facilities include public risk perceptions.

The mass burn and two-stage waste-to-energy facilities currently operating in Canada are well established with the newest mass burn facility beginning operations in 2016. The Alberta Utilities Commission has approved Varme Energy's application to build a waste-to-energy facility near Edmonton (Anchan, 2025). Some facility owners are looking into district heating upgrades. The facility owners of two-stage waste-to-energy facilities are exploring the potential to replace the systems with mass-burn waste-to-energy.

Waste-to-energy technologies, other than the mass burn and two-stage waste-to-energy technology, such as gasification and pyrolysis have not been successfully implemented at a commercial scale to process residual waste in Canada. Mixed waste processing has also not been implemented successfully in Canada. Studies have shown that mixed waste processing of residual waste would be unlikely to meet target outcomes of recycling and resource recovery and be less cost-effective than current waste recycling program efforts (City of Toronto, 2021).

United States

In the United States most of the residual waste is managed through landfilling and the remaining is treated or managed primarily at mass burn waste-to-energy facilities. Between 2000 and 2019, 31 mass burn waste-to-energy facilities in the United States have stopped operation due to economic constraints related to decreasing electricity prices and lower landfill tipping fees (Baptista, 2019). While no new mass burn waste-to-energy facilities opened in the United States between 1995 and 2015, some were expanded to handle additional waste and generate more energy. In 2015, the first new mass burn waste-to-energy facility in 20 years was built and commissioned in Palm Beach County, Florida (United States Department of Energy, 2019; U.S. Energy Information Administration, 2023).

There are two demonstration gasification facilities in North Carolina and California, United States (National Renewable Energy Laboratory (U.S. Department of Energy), 2023). The Fulcrum’s Sierra Biofuels gasification facility in Nevada started operations in 2022, however, the facility later closed in

2024 due to permitting and operational issues (Bettenhausen, 2024). Like Canada, gasification and pyrolysis technologies have not been successfully implemented at a commercial scale for residual waste management in the United States.

European Union

After the rapid growth of the mass burn waste-to-energy facilities between 1991 and 2010, and the implementation of the Circular Economy Act in 2012 in Germany, overcapacity in the mass burn waste-to-energy market was reported in 2013. The Circular Economy Act increased the focus on reduction and recycling efforts, which created a competitive mass burn waste-to-energy market with low tipping fees as per the reports of 2013 (Roll, 2013).

The developed recycling infrastructure and overcapacity in the German and Scandinavian mass burn waste-to-energy markets has resulted in the importation of refuse derived fuel from countries like the United Kingdom. For instance, Germany was the second largest refuse derived fuel recipient from England with 415,000 tonnes being imported in 2021 (GPT, 2020; Langley, 2022). Importing unprocessed residual waste into Germany or Sweden is prohibited. Only refuse-derived fuels may be imported, resulting in the processing of residual waste through mixed waste processing facilities prior to export in countries such as the United Kingdom (Environment Agency UK, 2025).

Countries with the highest gross domestic product per capita (i.e. Luxembourg, Ireland, Denmark, Netherlands, Austria, Sweden, Finland, Belgium, Germany, France) and recycling rates at 40% or higher rely more on waste-to-energy for disposal of residual waste compared to countries with a lower per capita gross domestic product and generally lower recycling rates rely more on landfilling for the management of residual waste.

Australia

Australia’s residual waste management approach is heavily reliant on disposal in landfills. The first two mass burn waste-to-energy facilities planned in Western Australia are currently working towards starting their commercial operations. As of 2025, the Kwinana Energy from Waste project owned and operated by ACCIONA is going through the commissioning phase, which started on July 2024 with initial waste deliveries prior to combustion start up in September 2024 and full ramp up to commercial scale operations later in 2025. As of December 2024, the East Rockingham mass burn waste-to-energy project is at the pre-construction phase, with the construction cost estimate under review and an external specialist engineering consulting firm engaged to provide support.

According to Waste Management and Resource Recovery Association of Australia, one of the main reasons for the historically low adoption of mass burn waste-to-energy facilities in the country appears to be public opposition, which stems from the perception that air pollution and control systems are inadequate (Waste Management and Resource Recovery Association of Australia, 2021).

Japan

The shortage of landfill sites has been one of the most critical challenges of waste management in Japan due to the difficulty in constructing new landfills (limited land availability). In addition, waste export would be costly since it is an isolated island as compared to other countries in the European

Union where waste export to neighboring countries is easier and less costly. Waste-to-Energy is used to manage effectively all residual waste in Japan.

In Japan, the primary waste-to-energy technology is mass burn with some two-stage waste-to-energy facilities. Japan also has few Thermoselect facilities (combines pyrolysis and gasification) constructed in the early 2000s that have been reported to yield syngas suitable for gas turbine or conversion to liquid fuels and chemicals. However, performance of Thermoselect processes in Japan is not known due to the lack of public information.

Summary of National and International Practices

The approaches for managing residual waste in Canada, United States, European Union, Japan and Australia were reviewed and presented in this report. In general, these countries/regions align their goals with the waste management hierarchy and make efforts to move waste and related initiatives up the hierarchy. All countries/regions have set goals to reduce, reuse and recycle and decrease the total amount of residual waste to be managed.

The two main residual waste management approaches that have been adopted across the five countries/regions are mass burn waste-to-energy and landfilling. Among the regions reviewed, land availability, the prevalence of landfills and the low fees of landfilling have been important factors in determining the prevalent approach to manage residual waste. Other factors impacting the selection of options include the regulatory setting, public perceptions, energy prices/availability and incentives such as subsidies or carbon credits. Japan has the highest average landfill tipping fees in the world due to the limited landfilling capacity. Similarly, limited landfill space and policy have been the main drivers of the widespread adoption of mass burn waste-to-energy in many parts of Europe. In the United States, where overall landfilling of residual waste is the dominant approach, the majority of mass burn waste-to-energy facilities are used in states with dense populations and limited available land for landfills.

Key Considerations & Technical Criteria for Evaluating Future Options

In Canada, landfilling is expected to continue to be the most common approach to managing residual waste for the foreseeable future. Mass burn waste-to-energy is the primary alternative to landfilling around the world with communities choosing mass burn waste-to-energy rather than landfilling based on both local and national circumstances.

Technical criteria have been developed that could be considered during the decision-making process when selecting the most appropriate approach to manage residual waste, through landfilling or waste-to-energy. This report presents draft technical criteria for evaluating residual waste management which covers six different main criteria categories, as identified in the figure below.

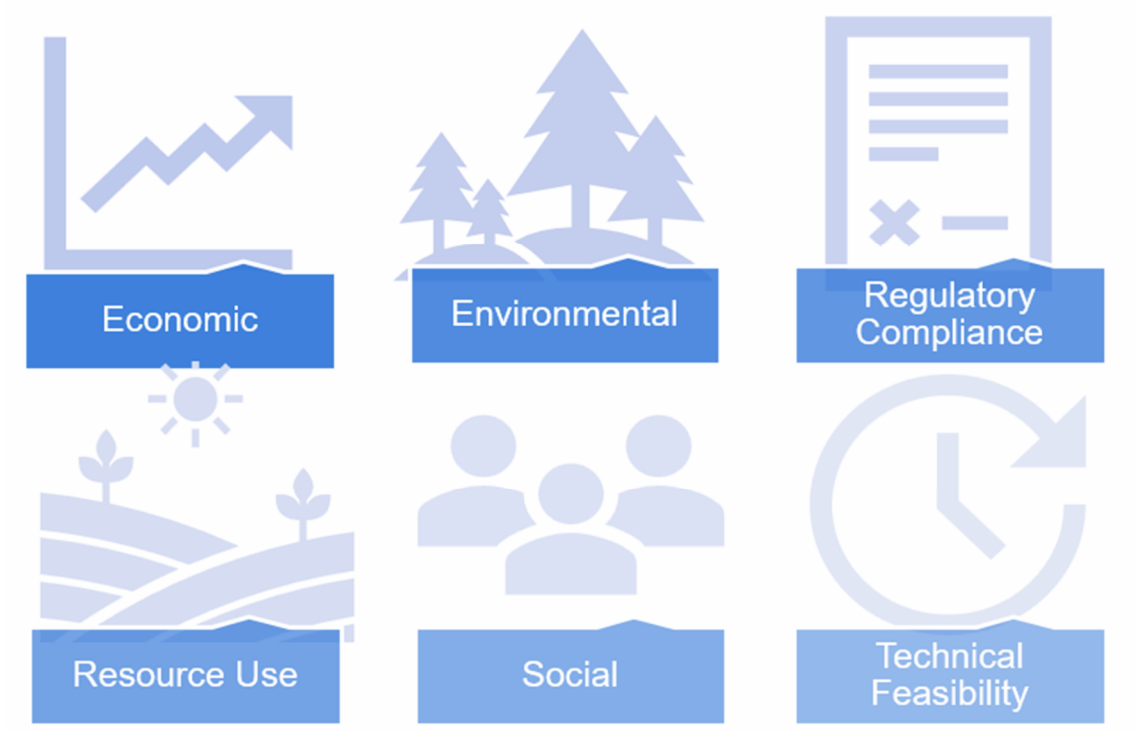

Figure: Six categories of the draft technical criterial for evaluating residual waste management options

Definitions

Commercial Scale Facility	Commercial scale operation of a facility that provides consistent treatment capacity for residual waste to meet community disposal needs and regulatory standards and refers to the state in which the complete equipment is officially declared by the owner to be available for continuous operation at different loads up to and including rated capacity. Commercial scale facilities must operate at a high utilization to increase productivity and control costs. Information with respect to the ongoing performance of the facility is publicly available and verified by independent third parties.
Gasification	Thermal treatment process in which the majority of the carbon in the waste is converted into the gaseous form (syngas), leaving an inert residue (char). The upgrading process involves the partial combustion (partial oxidation) of a portion of the fuel in the reactor with air, pure oxygen, and oxygen enriched air or by reaction with steam. The energy content of the waste is therefore transferred into the gas phase as chemical energy, which can be utilized to generate power. The term “gasification plant” is typically used to name the entire system that converts the primary feedstock into useful energy carriers. As opposed to two-stage combustion, gasification plants typically use the syngas for a separate chemical process or as a fuel after cleaning/refining. Gasification typically involves shredding and other residual waste pre-processing steps.
Landfilling	Landfilling is the process of disposing of waste in or on the land in an organized manner while establishing systems and approaches for minimizing the impacts from things like leachate, landfill gas and vectors.
Mass Burn Waste-to-Energy	Sometimes referred to as incineration, is the direct controlled burning of waste in one or more chambers with excess amounts of oxidant (typically air) at temperatures of 850ºC and above. The energy stored in the feedstock is released into the combustion chamber as well as in the flue gases generated during the combustion process. These technologies are often also called “conventional waste-to-energy” or “mass burn”. Compared to other technologies, mass burn waste-to-energy involves full oxidization in one step without pre-processing of the residual waste feedstock, and typically includes energy recovery either as electricity or heat for either space heating and hot water or for industrial purposes.
Mixed Waste Processing Facility	Facility where residual waste undergoes one or more manual, mechanical, and/or biological processing stages to separate recyclables and the organic fraction from the residual waste.
Municipal Solid Waste	Refers to recyclables and compostable materials, as well as residual waste from residential, commercial, institutional, demolition, land clearing and construction sources.
Pyrolysis	Thermal degradation of carbonaceous materials, typically at temperatures between 400ºC and 600ºC either in the complete absence of oxygen, or with such a limited supply, that gasification does not occur to any appreciable extent. The products of pyrolysis always include gas (syngas),

	liquid (pyrolytic oil) and solid char. Pyrolysis, similar to gasification, typically involves shredding and other residual waste pre-processing steps.
Recycling	Recycling is the processing of source separated materials to produce products and includes composting and anaerobic digestion.
Residual Waste	The non-hazardous waste collected from residential, commercial, institutional, demolition, land clearing or construction sources that is destined for disposal. It does not include material that is collected and diverted to recycling. Residual waste is the fraction of the municipal solid waste stream that is left after prevention, reuse, and recycling. For the purposes of this study residual waste refers to waste from residential, commercial and institutional sources.
Refuse Derived Fuel	Fuel product produced from residual waste which has undergone some level of mechanical and sometimes biological processing, that can be used in conventional mass-burn waste-to-energy, cement plants or in gasification and pyrolysis, where feedstock quality is more critical.
Renewable Energy	Energy obtained from non-fossil based resources such as sunlight, wind, geothermal, and biomass.
Two-stage Waste-to-Energy	Two-stage waste-to-energy is similar to conventional mass burn waste-to-energy except that the individual stages of combustion occur in separate chambers. The first chamber involves incomplete combustion and the creation of a syngas. The syngas is then combusted in a second chamber without additional cleaning and heat is typically recovered. This technology is also sometimes called “staged gasification” because gasification is the first step. However, true gasification plants use the syngas for a separate chemical process or as a fuel after cleaning/refining. Staged gasification directly followed by combustion of the syngas is considered two stage waste-to-energy for the purpose of this study.
Waste-to-Energy	Thermal processing or thermal treatment, involving the conversion of residual waste at high temperatures into gaseous, liquid, and solid products with a concurrent and subsequent release of heat energy. In this report, the term "waste-to-energy" is used in a broader context, encompassing not only mass burn waste-to-energy but also other thermal processes such as gasification, pyrolysis, and others.
Waste Hierarchy	The waste hierarchy is a framework that ranks waste management practices by environmental impact, from most to least favorable, such as: prevention, reuse, recycling, energy recovery and landfill. In this paper the term Waste Hierarchy refers to the Environment and Climate Change Canada’s Waste Hierarchy: Waste Prevention, Reuse – Repair, Remanufacture – Refurbish, Recycle, Energy Recovery and Landfill.

2 Introduction

2.1 Purpose and Objectives

The Environmental Management Act mandates all regional districts in British Columbia (BC) to develop long term plans for managing municipal solid waste. A solid waste management plan guides solid waste management strategies and actions, targets, and priorities for the next decade. The Guide to Solid Waste Management Planning 2016, developed by the Ministry of Environment and Parks provides guidance to aid in plan development that is consistent with legislative requirements (Government of British Columbia, 2024b). It sets out expectations regarding plans and desirable outcomes, defined by provincial targets and principles.

As part of the overall process for updating Metro Vancouver's solid waste management plan, Metro Vancouver commissioned Stantec to review residual waste management options.

The main objectives of the review are to:

- Provide technical information in support of solid waste management plan discussions related to options for management of residual waste.
- Provide an overview of the considerations of all potential options as well as identifying potential criteria for evaluating options in the future.

The review is not intended to rank residual waste management options.

2.2 Scope Summary

The scope of the residual waste management options review was developed through discussions with Metro Vancouver and feedback received from advisory committees involved in the solid waste management planning process, including the Solid Waste Management Plan Public/Technical Advisory Committee, Solid Waste and Recycling Industry Advisory Committee, and Regional Engineers Advisory Committee Solid Waste Subcommittee. The proposed tasks were:

1. Literature review
2. Review options for management of residual waste
3. Prepare historic case studies (up to 10) on alternative/non-mainstream technologies
4. Prepare current case studies (up to 10) on alternative (non-mainstream) technologies
5. Summarize considerations for residual waste management approaches
6. Identify potential criteria for evaluating residual waste management options
7. Reporting

During the development of the literature review, through discussions with Metro Vancouver, it was decided that there would be more value in a comprehensive literature review integrating case studies rather than developing stand-alone case studies. The scope was updated to focus on the following:

- A literature review of how other regions manage residual waste with examples of key considerations such as waste management goals, economic and regulatory drivers, successes and challenges.
- A summary of key considerations for future options within the context of Metro Vancouver when looking at residual waste management options.
- A set of potential evaluation criteria when assessing future options for managing residual waste from Metro Vancouver.

This report presents the findings of the residual waste management options review.

3 Literature Review of Residual Waste Management in Different Countries and Regions

3.1 Introduction

The purpose of the literature review is to summarize international practices related to the management of residual waste and provide a high-level overview of approaches being taken around the world in countries or regions with socio-economic conditions similar to Canada, which included the United States, Europe, Japan, and Australia.

In addition to a general overview of the approaches taken in other regions, included in the following sections is a discussion of some of the economic and regulatory drivers that have helped define the residual waste management approach for each region. This review highlights and summarizes the primary goals for managing waste, waste reduction efforts, and residual waste management within the regions. Also identified are residual waste management systems and approaches that are working well or may be experiencing some challenges.

3.2 Countries & Regions Selected for Review

Similarities to Metro Vancouver were considered when selecting the regions for the literature review. Regions were selected because they have one or more of the following similarities to Canada: standards of living, waste streams, economic systems, and apply a waste hierarchy as a guide for managing wastes. These regions were also selected to provide a broad cross section of practices and approaches for managing residual waste. For example, some regions focus on waste-to-energy while others rely more on landfilling.

The following regions/countries were selected for review:

- Canada
- United States

- European Union with a focus on Scandinavian countries and Germany
- Australia
- Japan

Included in the following sections is an overview of these regions and their approaches to managing residual waste.

3.3 Canada

3.3.1 Overall Waste Management Goals & Objectives

The federal government has adopted a waste hierarchy (waste prevention-reduce, reuse-repair, remanufacture-refurbish, recycle, energy recovery, landfill) (Environment and Climate Change Canada, 2021), where energy recovery from residual waste is preferred over landfill disposal and mass burn without energy recovery. All provinces and territories follow a similar hierarchy (Canadian Council of Ministers of the Environment, 2014). Generally, a similar strategy of achieving maximum waste reduction and diversion through reduce, reuse and recycle is favoured before disposal.

In 2022, Canada generated approximately 36 million tonnes of municipal solid waste, with approximately 9.9 million tonnes (27.1%) diverted from disposal and 26.6 million tonnes (72.9%) managed as residual waste (Environment and Climate Change Canada, 2022a). As per Environment and Climate Change Canada, approximately 97% (25.8 million tonnes)[1] of the waste requiring final disposal is sent to landfills and 3% (0.79 million tonnes)[2] is treated in mass burn and two-stage waste-to-energy technologies (Environment and Climate Change Canada, 2024a). Figure 1 shows the amount of residual waste landfilled and thermally treated in waste-to-energy facilities in Canada.

[1] Calculated based on 2022 tonnages.
[2] Calculated based on 2022 tonnages.

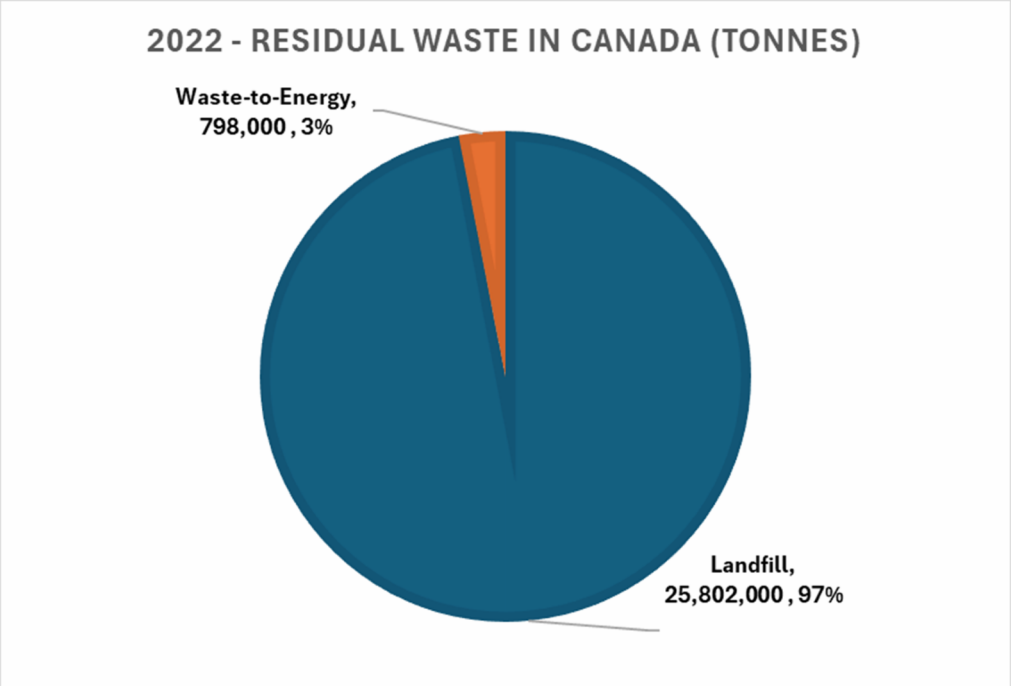

Figure 1: Residual waste management in Canada (Environment and Climate Change Canada, 2022a; Environment and Climate Change Canada, 2024a).

The Government of Canada has set goals to decrease the country's 2014 per capita disposal rate by 30% by 2030 and by 50% by 2040 (Environment and Climate Change Canada, 2025). All provinces and territories have intentions of reducing the amount of waste disposed or generated, with some having set provincial/territorial targets. Some of the targets by province and territory are given below:

Targets for Waste Reduction:

- Saskatchewan aims to reduce their per capita waste generation rate by 30% by 2030 and 50% by 2050 (Saskatchewan, N.D.).
- Metro Vancouver, in its 2011 solid waste management plan, set a waste generation reduction goal of 10% compared to 2010 (Metro Vancouver, 2010).

Targets for Recycling:

- Ontario plans to achieve 50% diversion[3] by 2030 and 80% by 2050 (Ministry of the Environment, Conservation and Parks, N.D.).
- Yukon has set a target to increase the amount of recycling to 40% by 2025 (Government of Yukon, N.D.).
- Metro Vancouver, as part of its 2011 solid waste management plan, set an aspirational 80% recycling target (Metro Vancouver, 2010).

[3] Ontario was planning to achieve diversion mainly through reduce, reuse and recycling (as defined in this report), however, treatment of non-recyclables waste in waste-to-energy technologies was also considered to achieve the diversion goal.

Targets for Disposal:

- British Columbia has set a provincial target to lower the municipal solid waste disposal rate to 350 kg per capita per year (Government of British Columbia, 2022).
- The Capital Regional District aims to decrease annual municipal solid waste disposal from 380 kg per capita to 250 kg per capita within a 10-year planning period (2020 – 2030) (Capital Regional District , 2020).
- Similarly, Regional Districts across British Columbia have set their own target of decreasing per capita municipal solid waste disposal rates. The Central Coast Regional District aims to decrease the estimated per capita municipal solid waste disposal rate by 20% from the estimated 2016 baseline of 450 kg/year (Central Coast Regional District, 2017). The Cowichan Valley Regional District plans to decrease the disposal rate to 250 kg per capita per year by 2028 (Cowichan Valley Regional District, N.D.).
- Alberta had set a target to reduce per capita disposal to 500 kg per person by the year 2010. However, the annual waste per capita disposal rate in Alberta was still 1,034 kg per person in 2021, 45.6% higher than the national average of 710 kg per person per year (Government of Alberta, 2024b).
- Newfoundland and Labrador's goal in it's 2002 Waste Management Strategy is to reduce materials going to landfill by 50% by 2010 and had reached 25% in 2019 (Newfoundland and Labrador, 2019).

3.3.2 Summary of Residual Waste Management Approaches

Landfilling is the most common approach for residual waste management in Canada. In 2022, Environment and Climate Change Canada reported that there are over 3,000 open and closed municipal solid waste landfills in the country, with slightly more than half in operation (Environment and Climate Change Canada, 2022b). According to landfill gas inventory data from Environment and Climate Change Canada, there are approximately 267 large landfills in Canada that received almost 90% of the waste landfilled in 2019 (Environment and Climate Change Canada, 2022b; Environment and Climate Change Canada, 2024b). Of these, 214 are open and have a remaining capacity of more than 100,000 tonnes of waste and 53 are closed (1 temporarily closed) which contain over 450,000 tonnes of waste in place. According to Canada's Greenhouse Gas Inventory in 2022, 36% of the generated methane from landfills in Canada was captured and flared or used for energy, and the remaining was emitted into the atmosphere (Environment and Climate Change Canada, 2024c).

Canada has five commercial-scale mass burn and two-stage waste-to-energy facilities located in Ontario, British Columbia, Quebec, and Prince Edward Island as listed in Table 1 (Environment and Climate Change Canada, 2020).

Table 1. Waste-to-Energy Technologies Operating in Canada

Facility Name	Waste-to-Energy Technology	Location	Capacity (Tonnes/Year)	Output
L'incinérateur de la Ville de Québec, QC	Mass burn Waste-to-Energy	Quebec, Quebec	245,000 [b]	Heat for industry [c]
Metro Vancouver Waste-to-Energy Facility	Mass burn Waste-to-Energy	Burnaby, BC	240,000	Electricity [c]
Emerald Energy from Waste Facility	Two-stage Waste-to-Energy [a]	Mississauga, Ontario	180,000	Heat, electricity
Durham York Energy Centre	Mass burn Waste-to-Energy	Durham Region, Ontario	140,000	Electricity
Prince Edward Island (PEI) Energy Systems Waste-to-Energy Facility	Two-stage Waste-to-Energy [a]	Charlottetown, PEI	26,000	Heat, electricity

[a] Current thermal treatment facility is in the process of being replaced with a mass burn waste-to-energy facility.
[b] Note permitted capacity is approximately 310,000 tonnes. Tonnages shown in table represent annual tonnages reported in 2021 and 2022.
[c] Facilities have plans for district heating expansions.

The Durham York Energy Centre commenced full operations in 2016. The Alberta Utilities Commission has approved Varme Energy's application to build a waste-to-energy facility in Strathcona County, northeast of Edmonton (Anchan, 2025). The Emerald Energy from Waste Facility plans to replace their two-stage waste-to-energy system with a higher capacity mass burn waste-to-energy system at the facility in phases, adding processing capacity in response to market demand (GHD, 2024). The Prince Edward Island Energy Systems Waste-to-Energy Facility also plans to replace their two-stage waste-to-energy system with higher capacity mass burn waste-to-energy systems that would include a waste reception hall, waste bunker, boiler hall, emissions treatment hall, auxiliary plant rooms, control room and residue silos (Stantec Consulting Ltd., 2022).

In addition to the waste-to-energy facilities noted above, Sustane Technologies is working to develop a facility in Chester, Nova Scotia. The Sustane facility was designed to use a mechanical process (shredding, separation and thermal hydrolysis) to produce biomass pellets and rotary kiln pyrolysis to produce synthetic diesel. Built in 2019, the Sustane facility was expected to be fully commissioned by spring 2019, with a processing capacity of 70,000 tonnes of residual waste annually (Government of Canada, 2024b; Comox Strathcona Waste Management, 2023a; Environment and Climate Change Canada, 2023). The facility aimed to convert 10–20% of the incoming residual waste into fuel, and the remaining (80 – 90% of the residual waste) into biomass pellets (Environment and Climate Change Canada, 2023). However, the Sustane facility faced several setbacks over the years and has not performed at a commercial scale. The facility has not demonstrated an ability to continuously process residual waste (Comox Strathcona Waste Management, 2023a; Comox Strathcona Waste Management, 2023b).

A facility in Edmonton owned by Enerkem Alberta Biofuels (Enerkem) began operations in 2014 under a 25-year agreement with the City of Edmonton. The facility used fluidized bed gasification to produce methanol and ethanol from refuse derived fuel supplied by the City of Edmonton. The City produced refuse derived fuel from residual waste at the Integrated Processing and Transfer Facility in Edmonton (CBC, 2024; City of Edmonton, 2025). The Enerkem Edmonton facility closed in 2024 after producing a total of 5 million litres of biofuels – the initial projection was to create 36 million litres per year. The $80

million Enerkem facility never processed residual waste at a commercial scale (CBC, 2024). Enerkem has stated that another facility is under construction in Varennes, Quebec – this gasification facility is intended to produce biofuels from various feedstock and the estimated capital cost is $875 million (Enerkem, 2025). However, construction of the gasification facility in Varennes, Quebec has paused due to lack of funds (La Presse, 2025).

A third gasification facility, constructed by Plasco Energy Group (Plasco) in Ottawa in the 2000s shutdown in 2015 after raising $300 million dollars in investment. It was never able to effectively process residual waste and failed to meet its contractual obligations with the City of Ottawa (Ottawa Citizen, 2015).

Mixed waste processing facilities have not been implemented successfully in Canada. In 2021, the City of Toronto conducted a study to evaluate whether a mixed waste processing facility, with a focus on recycling and organics recovery, could help achieve its 70% residential waste recycling target. The findings of the study indicated that such a facility would be unlikely to meet target outcomes of resource recovery and recycling and be less cost-effective than current waste recycling program efforts. The study also found that recovering recyclables from residual waste through a mixed waste processing facility would have a minimal impact on the City's recycling rates (City of Toronto, 2021). There have been facilities in Canada that incorporate a form of mixed waste processing as part of an overall process to produce refuse derived fuels for thermal treatment. However, these facilities (e.g. Enerkem facility in Edmonton and Sustane facility in Chester) have not been able to process residual waste at a commercial scale.

3.3.3 Summary of Economic & Regulatory Drivers

Some of the economic and regulatory drivers affecting residual waste management are outlined below.

3.3.3.1 Disposal Levies

At the provincial level, Quebec and Manitoba have introduced disposal levies to be paid by the owner/operator of the waste management facilities per tonne of waste disposed. In Quebec the regulations apply to both landfills and waste-to-energy (Canadian Legal Information Institute, 2024; Canadian Legal Information Institute, 2023). In Manitoba the levy applies to landfilling and waste-to-energy (Manitoba, N.D.). Similarly, Prince Edward Island and Saskatchewan are considering introducing disposal levies in the future to help fund waste reduction and recycling efforts across the province (Prince Edward Island, 2018; Saskatchewan, N.D.).

3.3.3.2 Disposal Bans

Some jurisdictions in Canada focus on increasing recycling by implementing disposal bans at the regional or provincial levels (e.g., Metro Vancouver, Capital Regional District, Nova Scotia and Newfoundland and Labrador) (Government of Nova Scotia, N.D.; Pollution Prevention Division, 2023). Disposal bans provide a signal to generators and haulers to encourage recycling of the banned material.

3.3.3.3 Energy Costs

The price of electricity in British Columbia, Quebec, Newfoundland and Labrador, and Manitoba is relatively low because of the presence of numerous large hydro electric power developments. In

contrast, provinces that rely on fossil fuels have higher electricity prices. Since waste-to-energy facilities typically produce electricity, the value of electricity impacts the financial model for waste-to-energy facilities. The Maritimes and Quebec have the highest average natural gas costs in Canada, where few homes in these provinces use natural gas for heating. This could improve the feasibility of steam supply (district heating) from mass burn waste-to-energy facilities (Environment and Climate Change Canada, 2023).

3.3.3.4 Landfill Tipping Fees

Landfill tipping fees in most of Canada are relatively low. Multiple factors, including total landfill capacity, the number of landfills, and relatively inexpensive design and operation of landfills, tends to keep tipping fees low. Tipping fees are a consideration in selecting a disposal option (Environment and Climate Change Canada, 2023).

3.3.3.5 Incentives/Funding

Provincial and federal emission offset policies provide opportunities for different emission reducing projects to generate carbon credits. The Alberta Emission Offset System allows certain waste-to-energy projects to generate carbon credits through the Quantification Protocol for Waste Heat Recovery or the Energy Generation from the Combustion of Biomass Waste (Government of Alberta, 2024a). There are federal and some provincial quantification protocols that help generate carbon credits from landfill methane recovery and destruction (Government of British Columbia, 2024a; Government of Canada, 2024a; Gouvernement du Québec, 2024).

3.3.4 Overview – Successes & Challenges

Landfilling is the most common approach for managing residual waste in Canada and a small portion is treated using mass burn and two-stage waste-to-energy technologies. Low landfill tipping fees are one of the factors favouring landfills as the most common approach for managing residual waste in Canada. Low landfill tipping fees are driven by the availability of landfill capacity across much of the country. In comparison, waste-to-energy facilities are characterized by high initial capital costs. Other barriers to development of waste-to-energy facilities include risk perceptions (Leung & Heacock, N.D.).

The mass burn and two-stage waste-to-energy facilities currently operating in Canada are well established. Some facility owners are looking into district heating upgrades, and the two two-stage waste-to-energy facilities are planning to replace the technology with higher capacity mass burn systems (GHD, 2024) (Stantec Consulting Ltd., 2022).

Waste-to-energy technologies, other than the mass burn and two-stage waste-to-energy technology, such as gasification and pyrolysis have not been successfully implemented at a commercial scale to process residual waste in Canada. Mixed waste processing has also not been implemented successfully in Canada. As indicated above, the Edmonton Enerkem, Ottawa Plasco, and Halifax Sustane technologies have been unsuccessful in meeting their intended objectives. Studies have shown that mixed waste processing of residual waste would be unlikely to meet target outcomes of recycling and resource recovery and be less cost-effective than current waste recycling program efforts (City of Toronto, 2021).

3.4 United States

3.4.1 Overall Waste Management Goals & Objectives

In general, the United States promotes reduction, reuse and recycling of waste. The 2030 Food Loss and Waste Reduction Goal was introduced by the United States Environmental Protection Agency on September 16, 2015. This goal's objective is to cut food loss and waste in half by the year 2030 (United States Environmental Protection Agency, 2024a).

In addition, a national goal of increasing the recycling rate to 50% by 2030 was announced by the United States Environmental Protection Agency on November 17, 2020. As a parallel effort, the United States Environmental Protection Agency developed a National Recycling Strategy that identifies objectives and actions needed to create a stronger, more resilient United States recycling system (United States Environmental Protection Agency, 2024b).

There are differing waste management approaches across the United States depending on the goals and initiatives within each state. Many states, such as Washington, Oregon, and California, have similar goals and initiatives to Metro Vancouver, BC., and have a strong focus on sustainable waste management practices (State of Washington, 2020; Oregon, N.D.; State of California, 2020). These regions emphasize the importance of reducing waste and increasing recycling. In 2018, the United States generated a total of 265.2 million tonnes of municipal solid waste, of which 32% was recycled and composted. An additional 16 million tonnes of food waste (6% of the total municipal solid waste) was managed by other methods such as bio-based materials/biochemical processing and co-digestion/anaerobic digestion (United States Environmental Protection Agency, 2022).

Across the United States, after considering recycling, composting, and food waste management efforts, there is still roughly 62% (164 million tonnes) of the waste stream left as residual waste that is mainly managed through mass burn waste-to-energy and landfill disposal. In 2018, 19% of the residual waste (31 million tonnes) was treated in mass burn waste-to-energy facilities and 81% (132 million tonnes) was landfilled (Figure 2).

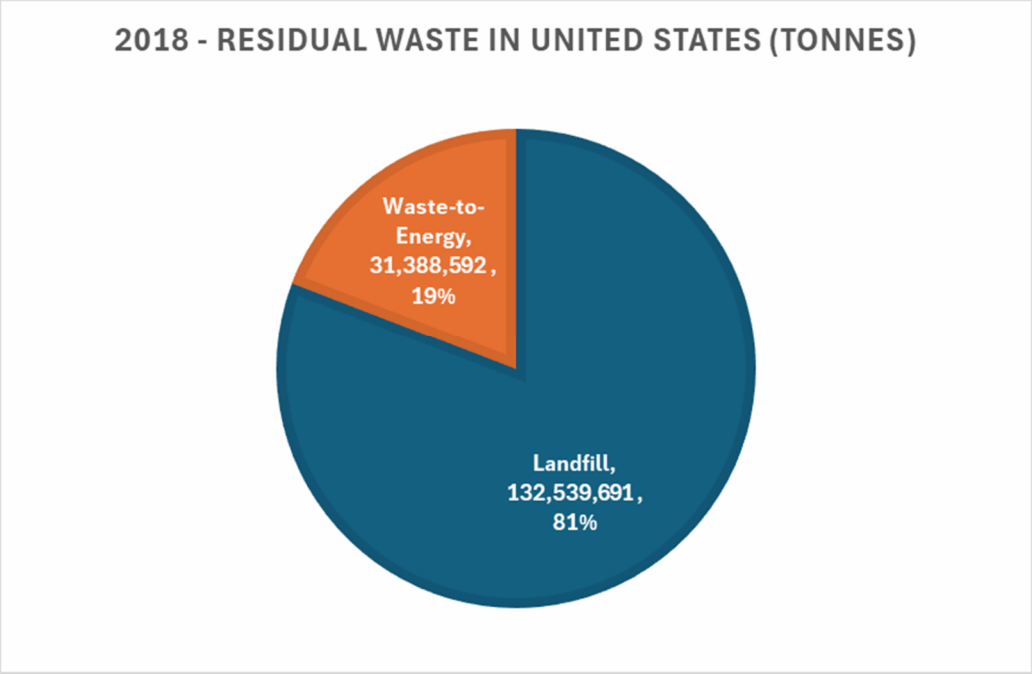

Figure 2: Residual waste management in the United States (United States Environmental Protection Agency, 2022).

3.4.2 Summary of Residual Waste Management Approaches

Residual waste in the United States is either treated at waste-to-energy facilities (19% of residual waste) or disposed of in landfills (81% of residual waste). Landfilling is the most common option to manage residual waste in the United States. The country has 2,639 landfills of which 542 recover energy from landfill gas and 444 landfills are in the process of upgrading to recover energy from landfill gas (United States Environmental Protection Agency, 2024a).

Mass burn waste-to-energy facilities are the most common thermal treatment technology (United States Environmental Protection Agency, 2022). In 2018, there were 75 mass burn waste-to-energy facilities in the United States treating residual waste as shown in Figure 3. Four of these facilities are modular systems, and 13 mass burn waste-to-energy facilities use refuse derived fuel (National Renewable Energy Laboratory (U.S. Department of Energy), 2023; IEA Bioenergy, 2018). Modular systems are much smaller than traditional mass burn waste-to-energy facilities and are a “portable” form of mass burn waste-to-energy (capacity ranging between 5 and 120 tonnes per day) used to manage unprocessed, mixed residual waste (United States Environmental Protection Agency, 2024b). As of April 2025, it appears there are 72 mass burn waste-to-energy facilities operating in the United States, three less than in 2018 (U.S. Energy Information Administration, 2025). The reason behind these closures is not known at the time of writing this report.

The United States has two demonstration gasification facilities: one in Durham, North Carolina, featuring a two-stage steam reforming process in a deep fluidized bed (3.6 tonnes per day of processing capacity), and the other at the United States Army Garrison Fort Hunter Liggett in Monterey County, California, utilizing FastOx gasification technology (18 tonnes per day of processing capacity). Both facilities employ the Fischer-Tropsch method at the final stage to produce liquid fuels. A third small

pyrolysis plant is in Knoxville, Tennessee, commissioned in 2007 with a design waste processing capacity of 907 tonnes per year and 1 MW electricity generation capacity (National Renewable Energy Laboratory (U.S. Department of Energy), 2023). There is no publicly available information on the ongoing performance of any of these facilities, and none have reached commercial scale operations.

In 2015, Florida's Palm Beach Renewable Energy Facility Number 2 became the first new mass burn waste-to-energy facility in the United States to come online since 1995 (United States Energy Information Administration, 2016). In 2023, Pasco County, Florida, approved a $260 million (approx. CAD $374 million) expansion of its existing mass burn waste-to-energy facility. Other communities are considering building new mass burn waste-to-energy facilities, but none are currently under construction (Behrendt, 2023). While no new plants opened in the United States between 1995 and 2015, some expanded to handle additional waste and generate more energy (US Department of Energy, 2019)

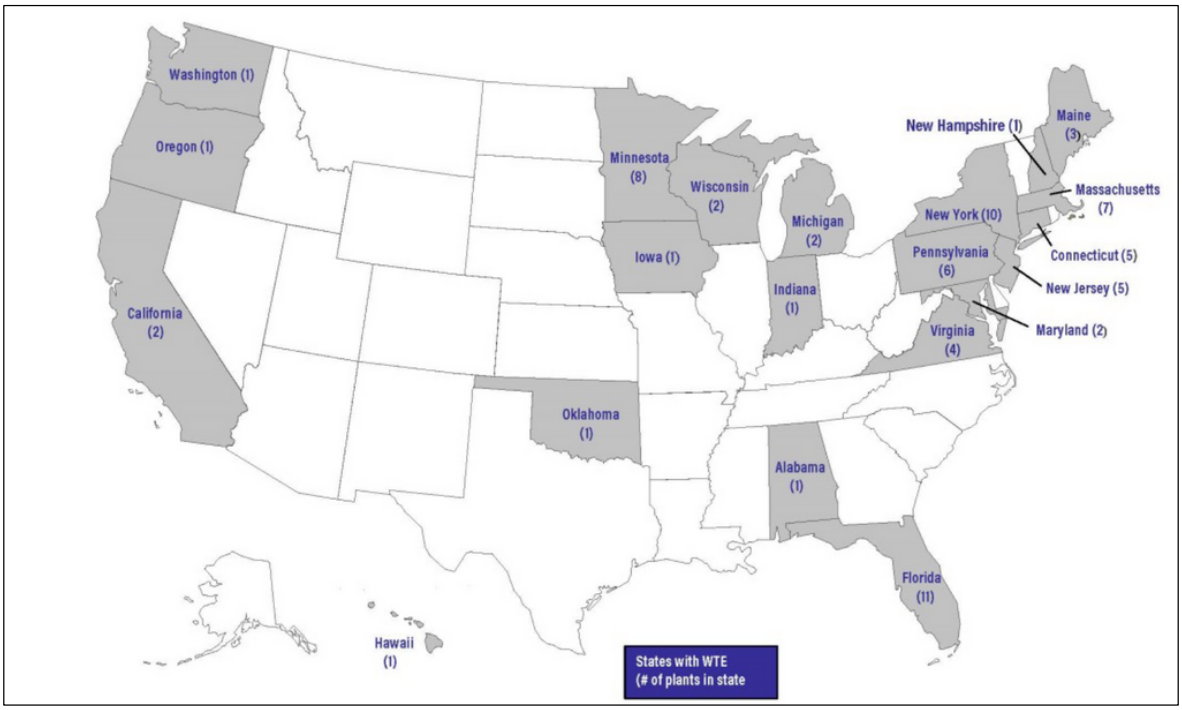

Figure 3: States within the United States with Mass Burn Waste-to-Energy Facilities (International Solid Waste Association, 2023a)

3.4.3 Summary of Economic & Regulatory Drivers

3.4.3.1 Land Availability

Within the United States there is generally an abundance of available land which supports landfilling and lower tipping fees, relative to many other countries. As a result, landfilling generally remains a cost-effective and popular option to manage residual waste (United States Environmental Protection Agency, 2024b). Some areas in the United States, such as the northeast, where there are highly populated areas and limited land, have adopted mass burn waste-to-energy as a preferred option. Typically, the first step for large communities, once local landfills reach capacity, is typically to explore sending residual waste to remote landfills in smaller communities, which may or may not be privately owned.

3.4.3.2 Capital Costs

Landfilling in the United States is often considered the most viable residual waste disposal option, especially in the short term, due to the low cost of building or expanding landfills in comparison to high initial capital costs of mass burn waste-to-energy facilities (United States Environmental Protection Agency, 2024b). The economic benefits of mass burn waste-to-energy may take several years to be fully realized due to its high capital costs.

3.4.3.3 Landfill Tipping Fees

The distribution of mass burn waste-to-energy facilities is closely linked to a state's landfill tipping fee (International Solid Waste Association, 2023a). In northeastern states, highly populated areas with less available land played a role in increasing landfill tipping fees up to $144.5 per tonne, creating favourable financial conditions for mass burn waste-to-energy facilities (Themelis, 2013). In 2015, Florida and four states in the northeast accounted for 61% of the total mass burn waste-to-energy facility power capacity in the United States, and they produced 64% of the total mass burn waste-to-energy electricity generation (United States Energy Information Administration, 2016). In 2023, the average landfill tipping fees were highest in the Northeastern states (average $134 per tonne) and the Pacific states (average $99 per tonne) (Environmental Research & Education Foundation, 2024). The average tipping fees are significantly lower in the Midwest, Mountains/Plains (e.g., Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming), and Southeastern states with the lowest average tipping fees of $72 per tonne reported in the South Central states (Environmental Research & Education Foundation, 2024).

3.4.3.4 Electricity Prices

The main sources of revenue for mass burn waste-to-energy facilities are tipping fees, sale of co-products (e.g., recovered metals) and sale of electricity, heat and steam. In the United States, long-term power purchase agreement prices have been trending much lower at the wholesale level due to the rapid deployment of natural gas, wind, and solar in recent years. For example, recent data shows contractual wind prices in the range of 2.9¢/kWh and solar at approximately 4.3¢/kWh, price points at which, depending on other factors, mass burn waste-to-energy may not be able to compete with landfilling (United States Department of Energy, 2019).

3.4.3.5 The Public Utility Regulatory Policies Act (PURPA) 1978

The Public Utility Regulatory Policies Act 1978 is a federal law that requires utility companies to buy energy from cogeneration and renewable energy facilities to promote energy security (Mukherjee, 2020). The qualifying facilities include small power production facilities, which produce electricity from renewable resources or biomass and waste (Chernyakhovskiy, Tian, McLaren, Miller, & Geller, 2016). Throughout the 1980s and 1990s, this prompted the development of multiple mass burn waste-to-energy facilities and resulted in long-term contracts between utility and mass burn waste-to-energy companies which are now coming to an end (Mukherjee, 2020).

3.4.3.6 Renewable Energy Policy

In United States, individual states determine whether the energy recovered from the residual waste is considered renewable energy. There are multiple statutes and policies at the Federal level that consider energy recovery from the biogenic portion of residual waste renewable, including the Environmental Protection Agency's Clean Power Plan.

Some or all of the energy produced by mass burn waste-to-energy facilities is viewed as renewable by 34 states, as defined in various state statutes and regulations, including renewable portfolio standards. Therefore, facilities in the remaining states do not receive any incentives related to renewable energy (e.g., grants, subsidies, etc.). Some states which define the electricity/energy produced from biogenic portion of residual waste through mass burn waste-to-energy as renewable include Oregon, Washington, Oklahoma, Michigan, New York, Pennsylvania, Ohio, Florida, and Iowa while states like Texas, California, Illinois, North Carolina, and Georgia do not (Environment and Climate Change Canada, 2023).

3.4.3.7 Clean Air Act (CAA)

The Clean Air Act came into effect in 1970, which placed new standards onto existing mass burn waste-to-energy facilities. These standards banned the uncontrolled burning of residual waste and placed restrictions on particulate emissions. The facilities that did not install the technologies needed to meet the Clean Air Act requirements were required to close (United States Environmental Protection Agency, 2024b).

3.4.3.8 State Specific Waste Management Policies

Following the waste hierarchy, many states have implemented waste reduction programs, such as recycling and composting, which have reduced the amount of residual waste requiring disposal. For example, California and Washington had a target of 75% and 70% reduction in waste disposal by 2020, respectively. Both states implemented several programs, including mandatory commercial recycling, organic waste recycling, statewide recycling, and a ban on certain materials in landfills (International Solid Waste Association, 2023a). Both states consider mass burn waste-to-energy as disposal in their waste hierarchy.

3.4.4 Overview – Successes & Challenges

As discussed in previous sections, across the United States, most of the residual waste is managed through landfilling and the remaining is treated or managed primarily at mass burn waste-to-energy facilities. Between 2000 and 2019, 31 mass burn waste-to-energy facilities in the United States have stopped operation due to economic constraints related to decreasing electricity prices and lower landfill tipping fees (Baptista, 2019). While no new mass burn waste-to-energy facilities opened in the United States between 1995 and 2015, some were expanded to handle additional waste and generate more energy. In 2015, the first new mass burn waste-to-energy in 20 years was built and commissioned in Palm Beach County, Florida. Electricity generation by mass burn waste-to-energy facilities has had a slight downward trend over the past 14 years with approximately 15 thousand gigawatt hours generated in 2001 declining to approximately 14 thousand gigawatt hours in 2014 and 13 thousand gigawatt hours in 2022 (United States Department of Energy, 2019; U.S. Energy Information Administration, 2023).

There are 2 demonstration gasification facilities in North Carolina and California, United States (National Renewable Energy Laboratory (U.S. Department of Energy), 2023). The Fulcrum's Sierra Biofuels gasification facility in Nevada started operations in 2022, however, the facility later closed in 2024 due to permitting and operational issues (Bettenhausen, 2024). Similar to Canada, no pyrolysis or gasification facilities have achieved commercial scale operations in the United States.

3.5 European Union

3.5.1 Overall Waste Management Goals & Objectives

The 2008 European Union Waste Framework Directive, which is a legal framework for treating and managing waste, sets out a clear five-step waste hierarchy which promotes waste prevention, reuse and recycling. The waste hierarchy defines mass burn waste-to-energy and landfilling as options for management of residual waste. Landfilling is the least preferred residual waste management option per the Waste Framework and Landfill Directive (European Commission, N.D.b).

The European Union generated 229 million tonnes of municipal solid waste in 2023. Almost half of the generated municipal solid waste was recycled and composted (52%) and the remainder (48%) was residual waste that was treated in the mass burn waste-to-energy facilities, mass burn facilities without energy recovery, and disposed in landfills (see Figure 4) (Eurostat, 2023). Figure 4 shows the overall residual waste disposal distribution, with 52% (56.8 million tonnes) of the residual waste treated using mass burn waste-to-energy facilities, 1% (1.2 million tonnes) treated in mass burn facilities without energy recovery, and 47% (51.4 million tonnes) ending up in landfills.

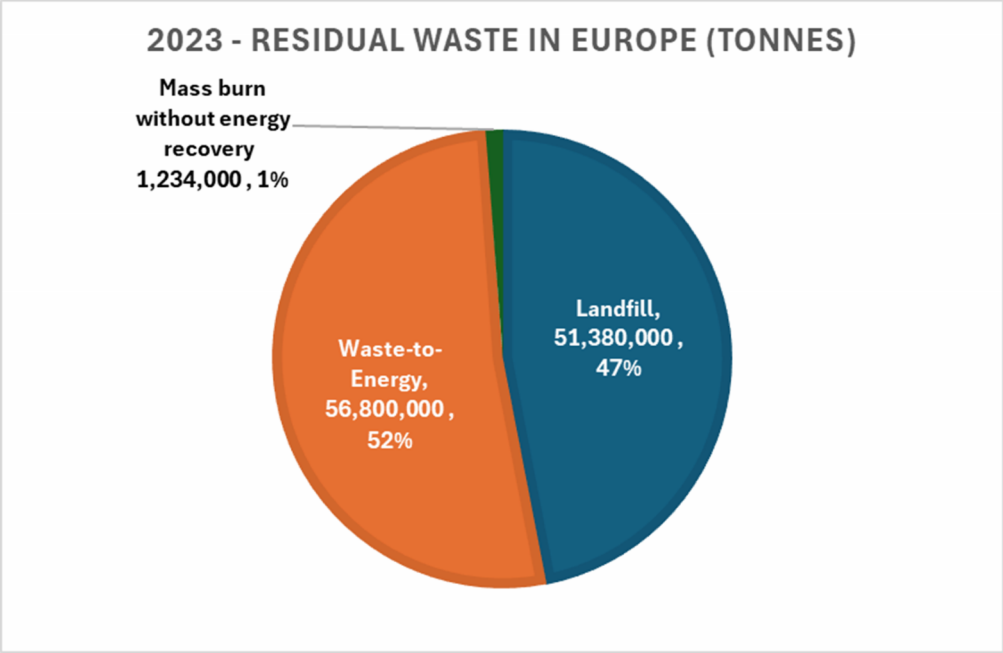

Figure 4: Residual waste management in Europe (Eurostat, 2023).

The following directives are in place (European Environment Agency, 2022a; European Union, 2023; European Commission, N.D.a):

- The Landfill Directive's landfill diversion target aims to limit the share of municipal waste landfilled to 10% by 2035.
- The Packaging and Packaging Waste Directive established a recycling target of 65% by 2025.
- The Waste Framework Directive targets a 55% increase in recycling and reuse by 2025, and 60% and 65% increase by 2030 and 2035, respectively.

To comply with the objectives outlined in the directives, European Union Member Countries are required to implement measures that address specific recycling targets within set time frames (European Union, 2023). After the implementation of these pieces of legislation, a 32% reduction in landfilling rates and a 19% increase in recycling rates was reported between 2001 and 2017. Mass burn waste-to-energy use also increased by 12% during the same time frame (Confederation of European Waste-to-Energy Plants, 2019).

In the European Union, different member countries have different waste management strategies. Germany, the Netherlands, Belgium, and Denmark all have high rates of recycling and composting (between 57% and 68% of municipal solid waste), with almost all residual waste managed using mass burn waste-to-energy. In Sweden and Finland, recycling and composting rates are lower (around 40%), with almost all residual waste management through mass burn waste-to-energy facilities. These countries have reduced landfill disposal to less than 1%-3% of the municipal solid waste generated. (Confederation of European Waste-to-Energy Plants, 2023; European Environmental Agency, 2024; Weghmann, 2023; Psomopoulos C.S. et al., 2021).

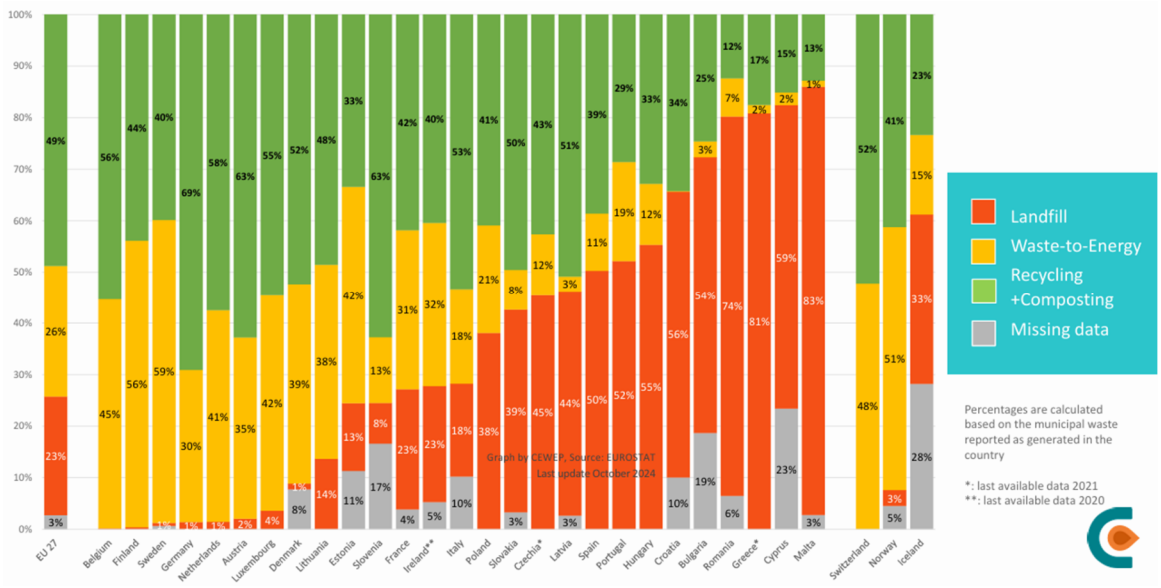

Figure 5: Municipal solid waste management practices across Europe (Confederation of European Waste-to-Energy Plants, 2025) .

In almost half of the European Union member countries, such as Spain, Portugal and the eastern countries, landfilling is the most common method for disposing of residual waste (Confederation of European Waste-to-Energy Plants, 2023). As shown in Figure 5, recycling and composting rates are the lowest (below 25%) in four countries that rely primarily on landfilling for residual waste disposal.

3.5.2 Summary of Residual Waste Management Approaches

Overall, the reliance on mass burn waste-to-energy facilities for management of residual waste is slightly higher than landfilling in European Union member countries. However, certain European Union member countries rely mostly on landfilling residual waste (Confederation of European Waste-to-Energy Plants, 2023; Weghmann, 2023)

The exact number of mass burn waste-to-energy facilities within the European Union is difficult to determine due to the constant commissioning and decommissioning of operating facilities and numerous new projects still in the planning stage. However, according to the data presented by the Confederation of European Waste-to-Energy Plants there were approximately 498 mass burn waste-to-energy facilities in 2021 which delivered 35 billion kWh of electricity and 87 billion kWh of heat through local district heating networks (Confederation of European Waste-to-Energy Plants, 2021a; Confederation of European Waste-to-Energy Plants, 2021b).

There are currently 98 mass burn waste-to-energy facilities in Germany. These facilities treat 103.35 million tonnes of residual waste yearly. Overall, the mass burn waste-to-energy facilities in Germany supply 1% of the energy consumed throughout the country (Weber, 2019).

Both Sweden and Finland rely heavily on mass burn waste-to-energy facilities to manage almost all of their residual waste, with less than 1% of residual waste disposed in landfills (Confederation of European Waste-to-Energy Plants, 2023).

As inferred from Figure 5, countries with the highest gross domestic product per capita (i.e. Luxembourg, Ireland, Denmark, Netherlands, Austria, Sweden, Finland, Belgium, Germany, France) and recycling rates at 40% or higher rely more on waste-to-energy for disposal of residual waste. Countries with a lower per capita gross domestic product and generally lower recycling rates rely more on landfilling for the management of residual waste (Statista, 2025).

3.5.3 Summary of Economic & Regulatory Drivers

3.5.3.1 European Union

3.5.3.1.1 Regulation / Policies

All European Union member countries are required to abide by European Union law such as the Waste Framework Directive, Landfill Directive and Packaging and Packaging Waste Directive, described in Section 3.5.1.

An objective of the 1991/31/EC Landfill Directive required that national strategies be developed by 2003 to include measures and pre-treatment technologies to reduce biodegradable municipal waste going to landfill to 35% of 1995 levels by 2016 with a caveat for member states landfilling more than 80% in 1995 to delay goal attainment by up to four years (European Union, 2006a).

Since 1993, European Union law on the shipment of waste that included rules for transporting waste across borders. European Union Regulation No 1013/2006 establishes procedures and control regimes for the shipment of waste, depending on the origin, destination and route of the shipment, the type of waste shipped and the type of treatment to be applied to the waste at its destination (European Union, 2006b).

Recently, a new regulation of waste shipments, entered into force on May 20, 2024, with most provisions to apply starting May 21, 2026, and most export rules to apply from May 21, 2027. The regulation focuses on three aspects (European Commission, 2024b):

- Ensuring that the European Union does not export its waste challenges to countries outside of European Union and contributes to environmentally sound management of waste.

- Strengthen enforcement to prevent illegal shipments of waste occurring within the European Union, as well as from the European Union to third countries.
- Increase traceability of waste shipments within the European Union and facilitate recycling and reuse.

The European Union Landfill Directive 2018/850 amends Directive 1999/31/EC on the landfill of waste to ensure a progressive reduction of landfilling of waste, particularly of waste that is suitable for recycling or other recovery, and to provide for measures, procedures and guidance to prevent or reduce as far as possible negative effects on the environment. The Directive also states, that as of 2030 all waste suitable for recycling or other recovery (with a focus on municipal solid waste), should not be disposed of in a landfill, except for waste where landfilling delivers the best environmental outcome (European Commission, 2024a).

3.5.3.1.2 Land Availability

Generally, European countries have dense populations with limited available land for new landfills, therefore the adoption of mass burn waste-to-energy is high across the region. Globally there is a correlation between land availability (related partly to population density) and the prevalence of landfills. The prevalence of mass burn waste-to-energy facilities in Europe is also related to other drivers, as outlined in the other sub-sections of section 3.5.3.

3.5.3.1.3 Energy Prices

The current energy market may incentivize or increase interest in mass burn waste-to-energy as part of countries' strategies to address high energy prices. In 2022, gas and electricity prices in the European Union reached all-time highs due to global instability and disruptions in gas supply (European Commission, 2022). Energy prices are expected to remain high due to market uncertainty. The European Commission reports that the European Union has been experiencing lower than usual electricity generation. This is due to increased maintenance work at power stations, reduced hydropower output caused by extreme summer weather conditions, and the closure of some older power stations. These factors have also contributed to the ongoing energy scarcity and rising energy prices (European Commission, 2022).

3.5.3.2 Germany

Regulations/policies and economic factors that may affect residual waste management in Germany are below.

3.5.3.2.1 Regulation / Policies

The "Circular Economy Act," enacted in 2012, is the implementation of the European Union Waste Framework Directive, which promotes a hierarchy of waste management approaches. This is achieved by setting a mandatory recycling rate of 65% from 2035 onwards and requiring each state in Germany to separate organics, paper, metals, plastics, and glass. Meanwhile, the "Packaging Act" is a mandatory policy that defines recycling targets and rates (Schroeder, 2019). Together, these Acts can influence the composition, and the amount of residual waste produced in the country.

Germany has no national support mechanisms for mass burn waste-to-energy facilities as they are not identified as renewable sources of electricity in the “Renewable Energy Sources Act 2009” (Schroeder, 2019).

3.5.3.2.2 Waste Availability and Energy Prices

Policies under the Directive 1999/31/EC, also known as Landfill Directive, along with high energy prices provided the initial drivers for the mass burn waste-to-energy market. The Landfill Directive has a policy that limits the percent of municipal waste landfilled to 10% by 2035. In addition, when spare capacity arises at mass burn waste-to-energy facilities the opportunity to import residual waste from other European Union member countries exists (Behrsin, 2019). However, with the new waste shipment regulation, discussed in section 3.5.3.1.1, the shipment of residual waste for disposal at landfill or mass burn waste-to-energy facilities from other member countries will require prior notification and a consent procedure to be followed before shipment can take place (European Commission, 2024b).

3.5.3.3 Scandinavian Countries

3.5.3.3.1 Regulation / Policies

Sweden introduced a tax on landfilling waste, which was put into effect in the beginning of 2000. Since then, the landfill tax has been adjusted yearly. In 2021, the landfill tax was reported to be 573 SEK/tonne (approx. CAD $74/tonne), which is an overall increase of 141% since its introduction in 2000. Under this regulation all material entering landfill facilities is taxed, while material removed from the facility qualifies for a deduction (European Environment Agency, 2016; European Environment Agency, 2022b).

Between 2006 and 2010, Sweden also implemented a tax on waste-to-energy to promote recycling. The waste-to-energy tax was repealed by the Swedish government in 2010 (Sandhi & Rosenlund, 2024; European Environment Agency, 2016).

3.5.4 Overview – Successes & Challenges

After the rapid growth of the mass burn waste-to-energy facilities between 1991 and 2010, and the implementation of the Circular Economy Act in 2012 in Germany, overcapacity in the mass burn waste-to-energy market was reported in 2013 (Roll, 2013).

The developed recycling infrastructure and overcapacity in the German and Scandinavian mass burn waste-to-energy markets has resulted in the importation of refuse derived fuel from countries like the United Kingdom. For instance, Germany was the second largest refuse derived fuel recipient from England with 415,000 tonnes being imported in 2021 (GPT, 2020; Langley, 2022). However, importing unprocessed residual waste into Germany or Sweden is prohibited. Only refuse-derived fuels may be imported resulting in the requirement to process residual waste through mixed waste processing facilities prior to export from countries such as the United Kingdom (Environment Agency UK, 2025).

3.6 Australia

3.6.1 Overall Waste Management Goals & Objectives

Australia and Canada have geographic and economic similarities. Australia and Canada share similar land areas, population, and gross domestic product (Bank, 2021).

Similar to other countries discussed, Australia follows the same waste hierarchy, with a focus on reduce, reuse and resource recovery prior to landfilling. Australia is one of the world's largest municipal solid waste generators on a per capita basis with an estimated 76 million tonnes generated in 2023. Of the total municipal solid waste generated, 63% is reused and recycled, and 37% is residual waste (The Department of Climate Change, Energy, the Environment and Water, 2024). In 2023, 2% (0.5 million tonnes) of residual waste was used for energy recovery (refuse-derived fuels) and 98% (26 million tonnes) was disposed in landfills (Figure 6).

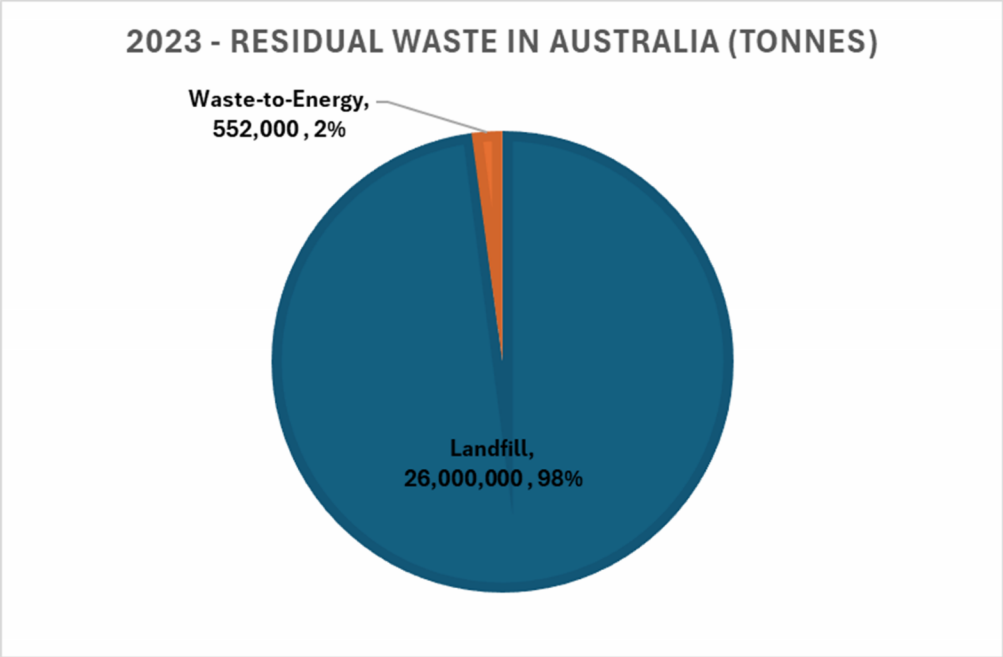

Figure 6: Residual waste management in Australia (The Department of Climate Change, Energy, the Environment and Water, 2024).

Australia has targets to reduce the amount of waste going to landfill for disposal. According to the National Waste Policy Action Plan, the targets include 80% average resource recovery rate (the percentage of waste recovered for reuse, recycling and waste-to-energy) from all waste streams following the waste hierarchy, by 2030. This was anticipated to be done through measures such as increasing reuse, recycling and energy recovery (e.g. heat, steam or electricity generation), with the target to halving the amount of organic waste sent to landfills, and reducing total waste generation by 10% per person by 2030. The country has also introduced policies to promote recycling and waste reduction (Australian Government, 2024).

3.6.2 Summary of Residual Waste Management Approaches

With the abundance of land in Australia, landfilling is the most common waste disposal method, receiving 98% of the residual waste. In 2017, it was estimated that there were 600 officially registered landfill sites in Australia, along with potentially up to 2,000 small, private, and unregistered landfills (The University of Queensland, 2017).

As of 2024, Australia had no mass burn waste-to-energy facilities operating. Australia uses only 2% of its residual waste to produce refuse derived fuels, which are then sent to the cement kilns to be used as an energy source (The Department of Climate Change, Energy, the Environment and Water, 2024).

There are two mass burn waste-to-energy facilities in Western Australia that aimed to start operation in 2024. The Kwinana Energy from Waste project, which began construction in 2018, is located at Kwinana Beach, Western Australia and is Australia's first mass burn waste-to-energy facility. The facility aims to process 400,000 tonnes of residual waste per year. The site utilizes a Keppel Seghers mass burn waste-to-energy to thermally treat residual waste and produce approximately 36 MW of baseload power for grid export (Australian Renewable Energy Agency, 2018). As of 2025, the facility owned and operated by ACCIONA is going through the commissioning phase, which started on July 2024 with initial waste deliveries prior to combustion start up in September 2024 and planned full ramp up to commercial scale operations later in 2025 (Kwinana Energy Recovery, 2024).

The East Rockingham mass burn waste-to-energy project began construction in 2019. This facility is in Perth, Western Australia, and aims to process 330,000 tonnes of residual waste per year using mass burn waste-to-energy technology to produce around 30 MW of power after it starts its operation (Enterprise, 2019; Australian Renewable Energy Agency, 2018). As of December 2024, the project is at the pre-construction phase, with the construction cost estimate under review and an external specialist engineering consulting firm engaged to provide support. A business case including the construction cost has been completed and is being assessed by the consortium partners prior to their final investment decision (Opal Australian Paper, 2025).

3.6.3 Summary of Economic & Regulatory Drivers

3.6.3.1 Land Availability

With the large abundance of land in Australia, landfilling is the predominant waste disposal method.

3.6.3.2 Landfill Levy

A landfill levy in Australia must be paid for all waste received at licensed landfills. The licensed waste facilities are required to pay the government for each tonne of waste received at the facility. One of the key purposes of the waste levy is to reduce waste that is disposed in landfills. The waste levy is intended to encourage waste generators to look for ways to reduce the amount of waste they generate and send to landfill. Usually, it is up to the landfill operator to decide on if, and how, the levy is passed through to their customers. Currently, the waste levy is executed on a state level with different states imposing different rates (Australia, 2022).

3.6.3.3 Incentives/Funding

The Australian Renewable Energy Agency was established in 2012 and is an independent agency operating under the federal Australian government (Australian Renewable Energy Agency, 2018). Australia's only two mass burn waste-to-energy facilities in Western Australia (under construction/commissioning) have both received approximately $20 million AUD (approx. CAD $18 million) in funding from Australian Renewable Energy Agency. This has incentivized private waste management organizations to invest in mass burn waste-to-energy technologies leading to growth in the Australian mass burn waste-to-energy industry (Australian Renewable Energy Agency, 2024; Australian Renewable Energy Agency, 2018).

3.6.4 Overview – Successes & Challenges

Australia's residual waste management approach is heavily reliant on disposal in landfills. The first two mass burn waste-to-energy facilities planned in Western Australia are currently in the commissioning and pre-construction phase as of 2025.

According to Waste Management and Resource Recovery Association of Australia, one of the main reasons for the historically low adoption of mass burn waste-to-energy facilities in the country appears to be public opposition, which stems from the perception that air pollution and odour pollution control systems are inadequate (Waste Management and Resource Recovery Association of Australia, 2021).

3.7 Japan

3.7.1 Overall Waste Management Goals and Objectives

Japan has a robust waste management strategy which highlights the importance of reducing waste generation where possible. This has been strongly influenced by rapid economic growth in the late 19th century and the country's mountainous terrain which limits the ability to site and operate landfills. Japan generated 40.3 million tonnes of municipal solid waste in 2022 which is a 21.4% reduction from 2000 (Organisation for Economic Co-Operation and Development (OECD), 2021; Government of Japan, 2024). This decrease in waste generation can be attributed to several factors, including enhanced public awareness, better waste segregation practices, and government policies promoting waste reduction (Moshkal, Akhapov, & Ogihara, 2024).

Japan recycles 20% of the generated municipal solid waste leaving behind 80% of the entire waste stream as residual waste. Japan is heavily reliant on mass burn waste-to-energy as a waste treatment and energy recovery method (Organisation for Economic Co-Operation and Development (OECD), 2021). In 2021, Japan treated 93% (31 million tonnes) of residual waste in waste-to-energy facilities, 6% (1.8 million tonnes) in mass burn facilities without energy recovery, and 1% (0.34 million tonnes) was disposed in the landfills (Figure 7).

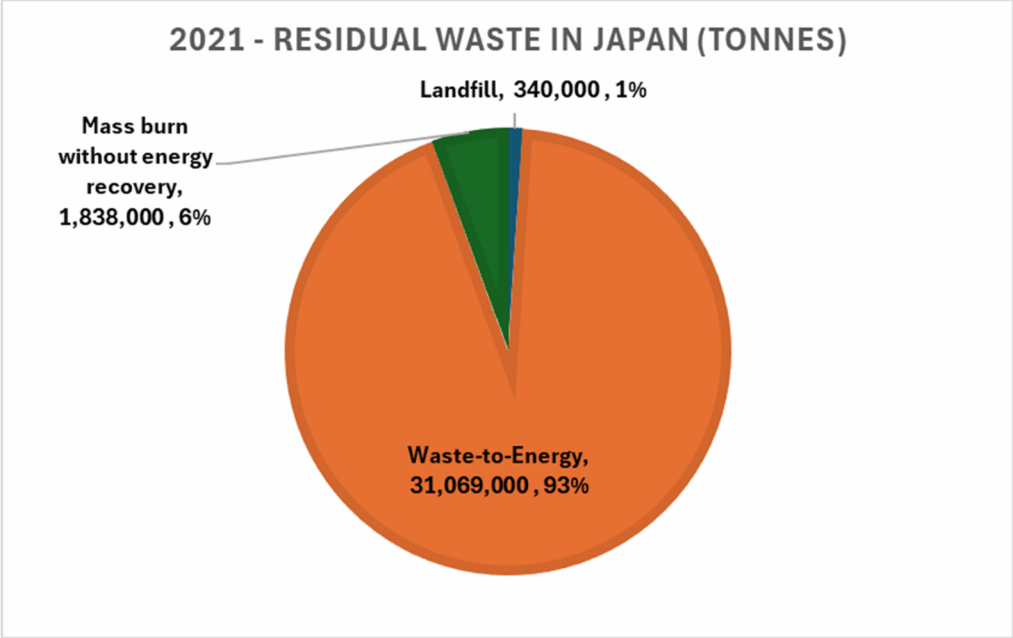

Figure 7: Residual waste management in Japan (Organisation for Economic Co-Operation and Development (OECD), 2021).

Japan developed the Packaging Recycling Act that requires producers to recycle paper and plastic packaging for products (Yamakawa, 1977; Moshkal, Akhapov, & Ogihara, 2024). In 2000, the Japanese central government introduced a new plan to establish a Sound Material-Cycle Society by working closely with regional governments to promote the reduce, reuse, recycle philosophy (Moshkal, Akhapov, & Ogihara, 2024).

3.7.2 Summary of Residual Waste Management Approaches

As of 2023 there were 1,016 operational mass burn waste-to-energy facilities in Japan. Of these facilities, 730 recover residual heat while 404 facilities generate electricity. The number of facilities without energy recovery is unknown. The largest facility is the Maishima mass burn waste-to-energy facility located in Osaka, Japan, operated by Hitachi Zosen. The project was commissioned in 2001 and has the potential to produce 32 MW of electricity (Carmen, 2022; Ministry of the Environment Government of Japan, 2022). The Yokohama City plans to reconstruct the Hodogaya Plant (mass burn waste-to-energy) to address future processing capacity shortages. The facility is expected to be completed in 2031 (Mitsubishi Heavy Industries, 2024).

There were 109 installed non-mass burn waste-to-energy facilities in Japan in 2011 (50 shaft furnaces, 39 fluid beds and 12 rotary kilns as well as 7 units for gas reforming), while another 3 units were added in 2012 (IEA Bioenergy, 2018). Most of these facilities in Japan are two-stage waste-to-energy facilities (sometime referred as “staged gasification”). These facilities use pre-processed residual waste and/or sludge and ash (Environment and Climate Change Canada, 2023; Nippon Steel Engineering, N.D.). The two-stage waste-to-energy facilities often have a dual purpose of processing residual waste and vitrifying bottom ash with the goal of creating a glass-like amorphous solid that can potentially be used for beneficial uses. According to Environment and Climate Change Canada (2023) and Ciuta et al. (2018), Japan has been operating two plasma gasification facilities since the 2000s, and five

Thermoselect process were in operation as of 2016. The Thermoselect process involves both pyrolysis and gasification stages, capable of processing sludge and as-received residual waste, while plasma gasification facilities accept a combination of residual waste, auto shredder residue, and sludge (U.S. Department of Energy, N.D.; Environment and Climate Change Canada, 2023; Vivera, 2024a; Vivera, 2024b). The Thermoselect process has been reported to yield a syngas that can be used in a gas turbine or converted to liquid fuels and chemicals (Ciuta, Tsiamis, & J. Castaldi, 2018; Environment and Climate Change Canada, 2023). However, no public information is available on the performance of Thermoselect facilities to produce syngas for turbines or to produce liquid fuels. All of the Thermoselect facilities in Japan were constructed in the early 2000s and the only facility built outside Japan, located in Germany, closed in 2006.

3.7.3 Summary of Economic & Regulatory Drivers

3.7.3.1 Land Availability

The Japanese government has indicated that the number of landfills is generally decreasing and suitable sites for new landfills are continuously difficult to secure. As of March 2023, the total landfill capacity remaining in the country was estimated at just over 23 years. In Japan, a high priority is placed on conserving remaining landfill space (Government of Japan, 2024).

3.7.3.2 Landfill Tipping Fee

Japan has the highest average landfill tipping fee in the world. In 2018, the average fee was approximately $804 per tonne of waste disposed of in landfills. The prohibitive landfill tipping fee in Japan is a primary factor for the high adoption of waste-to-energy technologies (International Solid Waste Association, 2023b; Honma & Hu, 2021).

3.7.4 Overview – Successes & Challenges

The shortage of landfill sites has been one of the most critical challenges in waste management in Japan due to the difficulty in constructing new ones (limited land availability).

In Japan, the primary waste-to-energy technology is mass burn with some two-stage waste-to-energy facilities. Japan also has a few Thermoselect facilities (combines pyrolysis and gasification) constructed in the early 2000s that have been reported to yield syngas suitable for gas turbine or conversion to liquid fuels and chemicals. However, performance of Thermoselect processes in Japan is not known due to the lack of public information.

3.8 Summary of National and International Practices

The approaches for managing residual waste in Canada, United States, European Union, Japan and Australia were reviewed and presented in this report. In general, these countries/regions align their goals with the waste management hierarchy and make efforts to move waste and related initiatives up the hierarchy. All countries/regions have set goals to reduce, reuse, recycle and decrease the total amount of residual waste to be managed.

The two main residual waste management approaches that have been adopted across the five countries/regions are various forms of mass burn waste-to-energy and landfilling. The level of reliance

on these two methods varies from region to region. For instance, in United States, Canada and Australia only a small proportion (20%, 3% and 2% of the residual waste, respectively) is managed through waste-to-energy with mass burn waste-to-energy systems accounting for almost all of installed waste-to-energy capacity. Landfilling is used to manage the rest of the residual waste in those countries. Countries like Japan, Sweden and Germany treat most of their residual waste in mass burn waste-to-energy facilities, with landfilling rates being less than 1% of the municipal solid waste generated in some areas. Of the countries/regions reviewed, there seems to be a correlation between available land area and the prevalence of landfills in comparison to mass burn waste-to-energy facilities.

Among the regions reviewed, land availability, low landfill tipping fees and transportation logistics are key drivers with respect to the selected approach to managing residual waste. Other factors impacting the selection of options include the policy and regulatory framework, public perceptions, energy prices/availability and incentives such as subsidies or carbon credits. Japan has the highest average landfill tipping fees in the world due to the limited landfilling capacity left in the country. Similarly, limited space for landfills and policy have been the main drivers of the widespread adoption of mass burn waste-to-energy in Europe. In the United States, where overall landfilling of residual waste is the dominant approach, more mass burn waste-to-energy facilities are used in states with a high population density and limited land available for landfills.

4 Key Considerations for Future Options

The literature review presented in the previous section illustrates that a region's overall approach to achieving stated waste management goals and ultimately to managing residual waste is region-specific. What works for one region may not work for another given the significant number of factors that drive regional approaches. Even within broad regions, such as Europe, there are key differences with how waste streams can and should be managed, which depend also on the wants/needs of the public and the overall political direction.

In Canada, landfilling is expected to continue to be the most common approach to managing residual waste for the foreseeable future. Mass burn waste-to-energy is the primary alternative to landfilling around the world with communities choosing mass burn waste-to-energy rather than landfilling based on both local and national circumstances. Technologies such as mixed waste processing appear to be used where the policy or regulatory framework either prohibits or discourages landfilling or treatment and disposal of unprocessed residual waste by waste-to-energy. Two-stage waste-to-energy facilities make up a small component of the international waste-to-energy market, and in some cases serve the dual process of combusting residual waste and vitrifying bottom ash. No evidence supports that there are commercial scale gasification/pyrolysis facilities for residual waste treatment producing syngas suitable for use as liquid fuel or for the generation of electricity in reciprocating or other electricity generators. This conclusion aligns with the Environmental Screening Report for a facility in Ontario, prepared by GHD for Emerald Energy from Waste Inc. It evaluated waste-to-energy technologies, including gasification and pyrolysis, and concluded that mass burn waste-to-energy offers the most economical, most energy efficient, and robust waste-to-energy technology solution (GHD, 2024).

4.1 Provincial Guidelines

Regional districts in British Columbia are mandated to prepare solid waste management plans and the provincial guide is used to navigate the planning process. With respect to residual waste management, regional districts are encouraged to develop programs, policies and facilities that support keeping waste in the upper levels of the waste hierarchy. Disposal, including both waste-to-energy and landfilling, is the least preferred management option (Government of British Columbia, 2024b).

The Ministry of Environment and Parks published an information sheet for Waste-to-Energy and Solid Waste Management Plans in 2018. All regional districts that plan to direct a portion of their municipal solid waste to a waste-to-energy facility must (Ministry of Environment and Climate Change Strategy, 2018):

- Amend their solid waste management plan before considering waste-to-energy and include sufficient details which:
    - Identify a municipal solid waste disposal rate of 350 kg/capita/year with measurable interim targets set and met throughout the planning and implementation process;
    - Highlights that waste-to-energy planning and capacity is conducted only after considering the higher levels of the hierarchy and does not impede efforts to achieve higher levels of the first three levels of hierarchy (reduce, reused and recycle); and
    - Authorizes the waste-to-energy facility to accept municipal solid waste for treatment and/or disposal.

5 Technical Criteria for Evaluating Residual Waste Management Options

Technical criteria have been developed that could be considered during the decision-making process when selecting the most appropriate approach to manage residual waste, through landfilling or waste-to-energy technologies. The table below presents draft technical criteria for evaluating residual waste management which covers six different main criteria categories. These are presented alphabetically without any indication that one category is more important than another.

Table 2: Draft Technical Criteria for Evaluating Residual Waste Management Options

Criteria Category	Criteria for Evaluating Residual Waste Management Options
Economic	• Overall cost, including initial capital construction, operational, closure and post closure costs. • Opportunities for revenue generation through selling recovered materials or energy to markets. • Opportunities for efficient or reducing transport costs (e.g. backhauling) • Financial risk from unstable geopolitical or regulatory environment.
Environmental	• General environmental factors such as dust, odour, emissions, litter, noise, vectors etc. • GHG emissions direct and indirect contributions and offsets (avoided GHGs). • Risk from climate change and natural disasters. • Geotechnical considerations (e.g. slope failure, flooding risk). • Groundwater and surface water protection systems.
Regulatory Compliance	• Meets all applicable environmental and waste management regulations. • Permitting and approval processes required for implementing the system.
Resource Use	• Land requirements for facilities and operations. • Energy generation and use potential and proximity. • Opportunities for co-locating complimentary operations, such as public reuse and recycling depot services, processing of specific materials streams.
Social	• Potential impact on public health and safety. • Public perception and community acceptance of the system. • Job creation during construction and operation.

Technical Feasibility	• Maturity, reliability and degree to which the system has been proven on a commercial scale. • Compatibility with residual waste as the feedstock material and ability to adapt to changing waste streams. • Capacity and scalability to handle large volumes of waste consistently and meet future needs. • Pre-processing requirements. • Percentage of the residual waste stream effectively processed by the system.

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Stantec

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

SOLID WASTE MANAGEMENT PLAN
PUBLIC/TECHNICAL ADVISORY COMMITTEE

June 19, 2025
Online Meeting
1:00 pm – 3:00 pm

Meeting Notes

Attendees: Director Sarah Kirby-Yung, Chair; Director Craig Hodge, Vice-Chair; Adelyn Chan, Amika Watari, Ben Liegey, Bill Chan, Brianne De Man, Cassidy vander Ros, Christoph Schultz, Cody Irwin, Daniel Rotman, Daryl Foster, Doug Schell, Gil Yaron, Jake Turek, Jamie Kaminski, Jennifer Henry, John Doherty, Komal Fatima, Louise Schwarz, Marcelle Moreira dos Santos, Michael Zarbl, Raman Johal, Sarah Scanlan, Sean Miles, Sue Maxwell, Tara Immell, William Selten.

Absent: Allen Lynch, Brenda Martens, Grant Hankins, Jaye-Jay Berggren, Kevin Huang, Matthew Morin, Sara Larter, Stephanie Voysey, Ulwiana Mehta-Malhotra.

Metro Vancouver Staff: Brooke Atkinson, Chris Underwood, Chris Allan, Karen Storry, Paul Henderson, Sahar Ahmadvand, Stephanie Liu, Terry Fulton, Samantha Joy, Zack Ha, Allen Jensen.

	INTRODUCTIONS • Meeting started at 1:00 pm	Chair
1.	**Welcome from the Chair** • Director Kirby-Yung welcomed Committee members • Territorial acknowledgement	
2.	**AGENDA** • Reviewed the June 19, 2025 agenda.	Chair
3.	**MEETING MINUTES – May 8, 2025** • Reviewed the May 8, 2025 meeting notes and revised April 10, 2025 meeting notes and members did not note any errors or omissions.	Chair
4.	**ACTION/STANDING ITEMS**	Chair

	4.1 Action tracker
	The action tracker was reviewed, and updates were provided.
	• Pending action items:
	  ○ Update on Reuse and Repair with report (provided as attachment)
	  ○ Provide information on breakdown of organic vs. recycled materials at multi-family residents (provided as attachment)	

	○ Provide PTAC full list of ideas from idea generation engagement ○ Provide source of GHG data for climate action plan • Completed action item: ○ Presentation on SWMP Governance, PTAC's role in SWMP, and Zero Waste Initiatives	
5.	**DISCUSSION ITEMS**	
	5.1 Solid Waste Management Plan Update: • **Updated Waste Hierarchy and Goals** *For feedback* Terry Fulton, Senior Project Engineer, Solid Waste Services Discussion summary: • Member suggested that under Recycle, "recycle into new material", the "new material" should be "new products" because it is recycled material, not new product. • Members noted opposition to having Recover refer solely to energy; it should be focused on recovering materials that haven't been source separated, and potentially harmful substances like mercury and asbestos. • Suggestion there should be an "Unacceptable" category including incineration and waste-to-energy • Comment that Zero Waste International Alliance Hierarchy should be used (that classifies incineration and waste-to-energy as unacceptable). • Member noted that hierarchy systems are complicated because there are a lot of different entities involved and responsibilities within each level. • Question as to why Recover (related to the creation of products to be used as a fuel substitute) is included in the hierarchy. Suggestion that Recover should go into disposal; could be under "Unacceptable", not diversion level. • Comment that Rethink is rather focused on a transition to a circular economy, but where does supporting innovation fit into the proposed hierarchy. • A member noted recovery should be a combination of items you can't recycle – should be thought of if they can be recovered or must go to landfill. • Member noted no concern with Recover being a part of the hierarchy, it's aligned with Provincial hierarchy – no issue with alternative fuels, better than it being landfilled. • Member supports hierarchy as proposed. • Member suggested replacing recovery for fuel with recovery of materials for recycle and reuse. • **Draft Regulatory Strategy** *For feedback* Terry Fulton, Senior Project Engineer, Solid Waste Services	

Discussion summary:

- Member asked for clarification as to is considered a generator with respect to the Generator Levy. Staff confirmed that the generator is the original generator of the waste, but consistent with Metro Vancouver's authority under the GVS&DD act, haulers are responsible to remit the Generator Levy to GVS&DD.
- Comment on waste hierarchy having a reduce and reuse, and how that relates to the priorities of the regulatory strategy.
- Member commented that it is difficult to comment and provide meaningful feedback on the draft regulatory strategy when the committee has not seen the draft strategies and actions yet.
- Staff and committee agreed that a more detailed draft regulatory strategy will be brought back to the committee at a later meeting.

5.2 Draft Recycling and Waste Centre Strategy Development

For input

Paul Henderson, General Manager, Solid Waste Services

Discussion summary:

- A member noted increasing challenge of siting depots in the region (i.e. Encorp, etc.)
- Comment that the strategy should prioritize the reuse/repair groups that currently operate at the existing facilities, allow them to have input on the reuse and repair process.
- Suggestion that recycling opportunities should be close to consumers and a focus on reuse options.
- Cultural communities and repair/reuse – a potential suggestions is to provide space at facilities to provide knowledge sharing and community building that addresses different cultures in the region.
- A member noted the new hierarchy and strategy doesn't include a circular economic lens, example is thinking about adjacent land use to the major facilities and the potential to co-locate circular activities.
- Suggestion to have drivetime map that considers population density in the region.
- Member asked about the reuse pilot going at United Boulevard facility?
    - Staff shared information that the scope of materials being collected is less than at the North Shore facility, and will come back with some further information.
- Suggestion to expand reuse pilot including the types of materials accepted and expanding EPR programs.
- Suggestion to look at these strategies to design a system so that inspections of 80% of loads can take place.

	• Suggestion of partnering with public groups, while prioritizing the upper parts of hierarchy and look into having alternate ways to delivery services to address accessibility (i.e. farmers market, adjacent businesses) for reuse opportunities. **5.1 Solid Waste Management Plan Update - continued** • **Idea Generation Engagement Summary** *For information* Stephanie Liu, Program Manager, Community Engagement, Solid Waste Services • No questions or feedback provided.	
6.	**INFORMATION ITEMS**	
	6.1 Zero Waste Committee and Other Updates **Items provided for members as information in the agenda package.	Paul Henderson
7.	**OTHER BUSINESS**	
	7.1 Additional Information on Multi-Family Solid Waste Generation **7.2 Metro Vancouver Reuse and Repair Initiatives** **7.3 Zero Waste Conference – November 27, 2025** **7.4 Potential Invited Presentation from Oceana – feedback from members** Discussion summary: • Members indicated support for Oceana presentation at a future committee meeting. • Member suggested opportunities for members' feedback should be prioritized to provide feedback on plan update items before having external presentations.	Brooke Atkinson
8.	**ADDITIONAL ITEMS**	
	8.1 Public/Technical Advisory Committee Updated 2025 Work Plan **8.2 Regional Waste Flows May 2025** **8.3 Concrete and Asphalt Recycling Opportunities Review**	
	ADJOURNMENT • Adjourned at 3:13 pm	Chair

metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

Attachment 2

2025 Solid Waste Management Plan Public/Technical Advisory Committee Action Tracker

To be updated after every Public/Technical Advisory Committee (PTAC) meeting to keep track of the actions or tasks that Metro Vancouver staff are responsible for.

Meeting Date	Requested Action/Item	Assigned Staff	Status
September 7, 2023	• Metro Vancouver to share lessons learned from innovative Metro Vancouver repair and reuse initiatives with PTAC	Karen Storry	Complete
February 21, 2025	• Provide information on the breakdown for organic materials versus recyclable materials in the multi-family sector	Terry Fulton	Complete
February 21, 2025	• Provide a full list of plan update ideas from Idea Generation phase of engagement	Terry Fulton	Pending
April 10, 2025	• Metro Vancouver to provide response to PTAC member inquiry regarding the Landfill Greenhouse Gas Emissions	Paul Henderson	In-progress
June 19, 2025	• Potential to have an invited presenter (OCEANA) to a future PTAC meeting	Brooke Atkinson	Pending
June 19, 2025	• Staff to bring back information on the United Boulevard Recycling and Waste Centre Reuse Days pilot	Paul Henderson	Pending
June 19, 2025	• Staff to bring back a more detailed regulatory strategy to the committee at a later meeting	Terry Fulton	Pending

Question with Respect to Landfill Greenhouse Gas Emissions

At the April PTAC meeting, a PTAC member asked about the calculations of greenhouse gas emissions for landfills shown in the Climate 2050 Solid Waste Primer presentation provided to the Committee. The presentation included a chart showing emissions from disposal of region's solid waste at landfills and Waste-to-Energy Facility (WTEF), which was equivalent to approximately 0.4 million tonnes of CO_2e in 2022 according to Climate 2050 Progress Report 2023/2024.

Anthropogenic emissions from WTEF are carbon dioxide from combustible non-organic material such as plastic. Included emissions from landfills are fugitive methane emissions that are not captured in the landfill gas management system. Similar to biogenic emissions from the Waste-to-Energy Facility, the carbon dioxide from flaring of methane captured by the landfill gas management systems is considered biogenic and is not counted towards total landfill emissions under international carbon accounting standards.

The chart presented to PTAC includes the following GHG emissions:

- *Vancouver Landfill – fugitive methane emissions as reported by City of Vancouver here: Greenhouse Gas Reporting Program data search - Canada.ca (Under Advanced Search, look for Delta, and/or enter G10443 for the facility ID to find the data)*
- *Closed landfills – fugitive methane emissions from closed landfills within the Metro Vancouver region with data from various sources*
- *Remote landfills:*
    - *Cache Creek Landfill – fugitive methane emissions data associated with Metro Vancouver garbage calculated based on: Greenhouse Gas Reporting Program data search - Canada.ca (Under Advanced Search, look for Cache Creek and/or enter G10573 for the facility ID to find data)*
    - *Other remote landfills within contingency disposal contracts – fugitive methane emissions estimated using IPCC's First Order Decay model recommended by EPA and Province, assuming the same parameters as Vancouver Landfill*
- *WTEF anthropogenic emissions – this data is also publicly available here: Greenhouse Gas Reporting Program data search - Canada.ca (Under Advanced Search, look for Burnaby and/or enter G10470 for the facility ID to find data)*

See table below for example solid waste annual emissions in tonnes of CO_2e:

	2010	**2020**	**2022**
Vancouver Landfill	319,797	208,351	227,554
Closed landfills	115,350	57,879	51,556
Remote landfills	120,537	53,559	52,314
WTEF	103,310	143,652	115,736
Total	**658,994**	**463,441**	**447,160**

Attachment 4

Jamie Kaminski
President – HSR Zero Waste
[redacted]

July 23, 2025

Metro Vancouver Zero Waste Committee
Attn: Chair and Members
Metro Vancouver Regional District
Metrotower III, 4515 Central Boulevard
Burnaby, BC V5H 0C6

CC:

British Columbia Provincial Oversight Committee
Metro Vancouver Board of Directors
Solid Waste Management Plan Independent Consultation and Engagement Panel

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RE: Concerns Regarding the Integrity and Transparency of the Solid Waste Management Plan (SWMP) Consultation Process

Dear Chair and Members of the Zero Waste Committee,

I am writing to formally express deep concern regarding significant issues with transparency, accuracy, and integrity in the consultation and decision-making process for the Solid Waste Management Plan (SWMP). As an active participant in the Industry Advisory Committee (IAC) and Public Technical Advisory Committee (PTAC), I have directly observed substantial gaps and distortions between the advisory committees' discussions and how their feedback is represented to your committee.

Attached to this letter is a detailed information package that documents and substantiates these concerns through rigorous comparison of advisory committee meeting discussions, official minutes, and subsequent staff reporting to your committee.

Key Issues Identified:

1. **Misrepresentation of Advisory Input:**
   Crucial advisory recommendations, such as strong opposition to categorizing waste-to-fuel or refuse-derived-fuel (RDF) as recycling or diversion, have been significantly diluted or generalized when reported to your committee. Expert feedback from IAC and PTAC clearly indicated this practice is misleading and inappropriate, yet it remains largely underreported or minimized in Zero Waste Committee (ZWC) documentation.

2. **Delayed or Omitted Critical Discussions:**
   Repeated requests from advisory committees for explicit and timely discussions regarding residual management, landfill capacity, and disposal strategies have been systematically deferred or ignored. This critical information, fundamental to informed policy-making, has not been transparently presented to your committee.

3. **Pattern of Selective Reporting and Dilution:**
   Advisory feedback that aligns with predetermined Metro Vancouver staff positions is clearly and fully represented, while dissenting expert views or concerns are minimized or relegated to brief mentions, thus creating an unbalanced perception of consensus.

4. **Recent July 2025 Advisory Discussions:**
   The recent July 2025 advisory meetings strongly reinforced earlier positions clearly stating that waste-to-fuel should unequivocally be classified as Disposal or preferably "Unacceptable" and excluded entirely from diversion metrics. This information has yet to be transparently conveyed to your committee, creating a substantial risk of premature and ill-informed decision-making.

Requests for Immediate Action:

- Defer any final decisions on the waste management hierarchy or residuals management until the complete July 2025 advisory meeting documentation is thoroughly reviewed by your committee and this aspect of the SWMP is fully and thoroughly discussed, along with a presentation from and discussion with an industry expert in the field of residuals management from either the Energy Justice group, GAIA, or Zero Waste International Alliance.
- Implement mandatory inclusion of draft advisory committee minutes and detailed feedback summaries in Zero Waste Committee reports moving forward.
- Schedule dedicated committee discussions specifically addressing residual management, landfill lifespan, and waste-to-fuel classifications prior to adopting any new policies.
- Establish clear protocols ensuring all dissenting advisory viewpoints are transparently reported, preserving the integrity of committee deliberations.

Your prompt attention to these issues will reinforce the integrity of our regional solid waste management decision-making process and ensure genuinely collaborative stakeholder engagement.

Thank you for your immediate consideration. I remain available to discuss this further at your earliest convenience.

Respectfully,

Jamie Kaminski

Attachments:

- Comprehensive analysis and summary comparing advisory meeting minutes to Metro Vancouver Zero Waste Committee reports (January–July 2025)
- Comprehensive analysis and summary of advisory committee discussions and corresponding gaps in staff reporting
- Supplemental Findings

Review of Recent IAC and PTAC Meetings
Findings and Discrepancies
(July 17th, 2025 – HSR Zero Waste)

Introduction

Metro Vancouver's Solid Waste **Industry Advisory Committee (IAC)** and **Public/Technical Advisory Committee (PTAC)** play key roles in the ongoing Solid Waste Management Plan update. To assess the transparency and integrity of this consultation process, we reviewed the published minutes and available video recordings of the last five meetings of each committee. Specifically, we compared official meeting minutes against the actual discussions (as evident from video or transcript) to identify any discrepancies, omissions, or misrepresentations. Our analysis focused on how key issues were documented, including:

- Concerns about classifying waste-to-fuel ("fuel substitutes") as *recycling*.
- Whether committee feedback and objections, especially expert input, were fully and accurately recorded.
- Treatment of major topics such as residuals management (long-term disposal), landfill capacity, and the draft waste management hierarchy in the minutes versus actual discussion.
- Instances where member comments were omitted or summarized in a potentially misleading way.

Below we summarize our findings, with supporting evidence from official IAC/PTAC minutes and related materials.

Meetings Reviewed

For the **Public/Technical Advisory Committee (PTAC)**, we examined meetings in late 2024 and 2025, including: September 13, 2024; November 21, 2024; February 21, 2025; April 10, 2025; and the special meeting on May 8, 2025 (convened to continue April's agenda). For the **Industry Advisory Committee (IAC)**, we included: November 7, 2023; January 9, 2024; March 5, 2024; April 8, 2024; and subsequent early 2025 meetings (February 4, 2025 and March 4, 2025). These encompass the most recent five or more gatherings where substantive plan-related discussions occurred. Meeting minutes were obtained from Metro Vancouver's website (often as part of agenda packages), and video recordings (where available) were reviewed to verify the content of discussions.

(Note: Some IAC/PTAC meetings in this period were held virtually with recordings posted, while a few were in-person with no recordings. In those cases, our analysis relies on the official minutes and any available transcripts or summaries.)

Findings and Key Issues

1. Classification of Waste-to-Fuel as "Recycling" – Concerns and Documentation

One of the most contentious issues has been whether materials diverted from waste to produce fuel (often termed "fuel substitutes" or "recycle as energy") should count as **recycling** in the waste management hierarchy. Multiple committee members – including industry representatives and zero-waste experts – raised **strong objections** to labeling waste-to-fuel as recycling.

- **PTAC Small-Group Feedback (April 10, 2025):** During the April 10 PTAC meeting, members broke into groups to discuss the **draft waste hierarchy**. The *initial draft hierarchy* presented by staff included a category for "Recycle as energy" (meaning recovering waste for fuel/energy). In small-group reports, **members voiced concern** that this would legitimize waste-to-fuel as an equally desirable outcome, thereby **discouraging higher-tier actions** like reduction and true recycling. The summary of their discussion (attached to the meeting record) shows members felt *"Recycle as energy" is not clear* and that *recycling should only refer to materials at their highest value*, not burning for energy. Specifically, the inclusion of "Recycle as energy (fuel)" in the hierarchy *"suggests a constant demand and would ultimately discourage active participation in the top of hierarchy,"* according to the PTAC feedback. While it was noted in the attached details; someone suggested that if such a category exists at all, it be reframed (e.g. renamed "Dedicated Fuel") or **moved under disposal rather than recycling**, *"'Recycle as energy' is more appropriate in disposal; it should be 'disposal as energy'"*. In the "Dispose" section of the detailed notes, it was recorded that a participant stated that energy recovery should rank above landfill if considered at all, noting *"waste-to-energy should be included above landfill, since it still has a beneficial component***," but there was no mention in the details in that same section that many argued that incineration should be either below landfilling or unacceptable.** Even though this feedback **exists in the attachment it is still incomplete**, and the **main minutes of the April 10 PTAC meeting** only briefly note that *"members had small group discussions on [the draft hierarchy]; a summary of these discussions is included as Attachment 1"*. **No detailed points from this debate appear in the body of the minutes**, potentially downplaying the level of concern to anyone reading the minutes without the attachment.

- **IAC Discussion and Q&A (May 6, 2025):** The IAC's May 6 meeting (held via Zoom) provides a stark example of members pressing Metro Vancouver staff on this issue. According to the official minutes, during a presentation on the **"Updated Waste Hierarchy and Goals,"** a member asked pointedly whether Metro Vancouver has **decided to count fuel derivatives as recycling**, noting that *"the Provincial government includes fuel substitutes in its definition of recycling, but other countries have excluded creating fossil fuels from their definitions."* The question: *"Has Metro Vancouver confirmed that fuel substitutes should be included in the recycling section?"*. Staff's response (per minutes) was that *"Metro Vancouver is not bound by the Provincial hierarchy; however, the current practice is to count material used as a fuel substitute as recycling."*. This essentially confirmed that, at least **at present, Metro Vancouver does count waste-to-fuel toward recycling**, despite international examples to the contrary.

The exchange did not end there. A follow-up **Q/C (question/comment)** from a committee member pressed further: *"So this was a decision by Metro Vancouver to include materials used as fuel substitute in the recycling definition? There have been many voices saying that this is not appropriate."*. The member went on to state that counting fuel as recycling *"does a disservice to the recycling industry who are trying very hard to find markets for materials that can be recycled."* In other words, experts in the industry feel this practice **undermines real recycling efforts** by artificially inflating recycling rates with what is essentially disposal (fuel burning). The **minutes do capture this strong language** (without naming the speaker) and show that Metro Vancouver staff responded by acknowledging the feedback but somewhat deflecting the issue. The staff's reply was that one of the *"potential metrics and targets for the updated plan could include tracking and maximizing the amount of material that is recycled into new products and materials,"* and that Metro Vancouver *"will continue to be responsive to feedback on potential metrics."* Ultimately, staff noted, *"it is our Board that will make the decisions"* on the plan, albeit *"they will hear all the feedback we've heard from all audiences throughout the plan update process."*.

Finally, a committee member (evidently unsatisfied) added *"I believe this requires more discussion before it's adopted because this is ultimately going to hold us back from achieving our goals."*. This closing remark underscores **the depth of concern**: stakeholders fear that misclassifying waste-to-fuel as recycling could impede genuine waste reduction goals. **Notably, the minutes for this meeting are quite detailed** on this sequence, capturing the Questions/Comments and Response dialogue in a way that aligns closely with what was said on record. In this instance, the **published minutes do reflect the objections and rationale voiced by experts**, including references to other jurisdictions and the impact on recycling markets. **However, it is important to note** that this level of detail appeared in the draft minutes of May 6, 2025; earlier meeting records were not always so explicit.

- **Lack of Visibility in Summaries:** While the May 2025 IAC minutes are granular, earlier meetings and the PTAC minutes often summarize such concerns more generally. For example, **prior to these exchanges**, the idea of including "Recycle as energy" in the hierarchy was first flagged as problematic during earlier workshops. The **PTAC's feedback in April** (as mentioned) was appended to the minutes but not summarized in the main text. Similarly, the **IAC's February 4, 2025 meeting** indicates that the committee had to explicitly add **"Draft Goals and [Waste] Hierarchy" as a topic to their 2025 Work Plan**, *"The Work Plan was amended to include 'Draft Goals and Hierarchy'"* after a member suggested that the hierarchy needed to be discussed alongside plan goals. This implies that **without member intervention, the waste hierarchy (and by extension, the "fuel as recycling" question) might not have been deliberated as a priority**. In short, the concern over waste-to-fuel classification was very much on the minds of committee members, and while it **was** raised and recorded in places, one must dig into attachments or Q&A sections of minutes to find it. A casual reader of meeting summaries or high-level notes might **miss the intensity of this debate**, raising questions about the transparency of how these dissenting views are being communicated upward or outward.

2. Committee Feedback & Expert Objections – Completeness of the Record

We next examined whether the **minutes fully and accurately captured committee feedback and objections**, especially the input provided by subject-matter experts or seasoned industry members. A pattern emerged where **certain objections are noted in the minutes, but often briefly**, and sometimes without context, whereas the **meetings themselves featured more extensive discussion or multiple voices on the issue**. Below are examples illustrating this:

- **Desire for Genuine Consultation:** At the IAC meeting of November 7, 2023, members expressed concern that their expertise was not being tapped early or often enough in decision-making. The minutes record a *"suggestion to solicit the expert advice of the IAC Committee members before submitting decision items to the Zero Waste Committee"* (the Board's standing committee). In the same breath, it notes that *"Industry Advisory Committee Co-Chairs will be discussing how to increase member participation related to linking its work with that of the Zero Waste Committee."*. This indicates IAC members felt **consultation was happening late** or that their input was not reaching the governing bodies in time. The minutes do reflect this suggestion, which came directly from members, highlighting their **desire for a more meaningful role**. Whether this feedback is acted upon is another matter, but at least it was documented.

- **Concerns About Transparency of Information:** A striking example of an **objection by members being captured succinctly** (if bluntly) is found in the same Nov 7, 2023 IAC minutes. During **Zero Waste Committee updates**, the topic of **Vancouver Landfill's remaining lifespan and capacity** came up. The minutes state: *"View that responses to questions about the lifespan and capacity of the Vancouver Landfill are not transparent."*. In plainer terms, one or more members felt that Metro Vancouver staff had **not provided clear or satisfactory answers** regarding how long the region's primary landfill can continue to operate. This is a serious assertion, essentially accusing the process of lacking openness about a critical piece of data. The fact that it was captured in the minutes at all is significant. However, what's missing is any detail of **what was asked and how it was answered (or not answered)**. The video of that meeting (and accounts from attendees) indicates that members were trying to pin down specifics, for instance, "How many years of capacity remain at the Vancouver Landfill under current disposal rates?" and were met with either vague estimates or deflections. The minutes, by stating the outcome ("view that responses…are not transparent"), give a *sense* of the objection but **do not record the actual response or discussion leading to that frustration**. There is no indication if staff disagreed, promised to provide data later, or otherwise addressed the complaint. **In this way, the minutes acknowledge a transparency issue was raised, but provide no transparency in the record itself about the landfill data.** A reader must infer that the committee was left dissatisfied. This is a subtle but important shortcoming in the documentation.

- **Expert Presentations – Recorded vs. Omitted:** PTAC meetings often feature outside expert or member presentations. A notable one was on **September 13, 2024**, when PTAC member **Sue Maxwell (Zero Waste BC)** presented a case study examining the Metro Vancouver solid waste system and the Waste-to-Energy (WTE) facility's role. The presentation, as described, questioned the WTE incinerator's environmental and economic performance and explored scenarios for phasing it out. The minutes do list this presentation by title and then summarize **member discussion** that followed. Crucially, however, **the minutes do not summarize the content of the presentation at all**, only the reactions to it. This means **the official record is silent on the critical data or conclusions Ms. Maxwell likely shared** (e.g., emissions statistics, comparisons to alternatives, etc.). Instead, the record focuses on questions and comments from other members: e.g., clarifying the source of greenhouse gas data, and asking what alternatives to the WTE facility exist if it were to be closed. One staff response noted in minutes is that Metro Vancouver is working on a source-reduction incentive program (tangentially related to reducing waste before it reaches disposal). Members then debated points raised by the case study: one **emphasized that a robust waste reduction plan is paramount** and pressed about *the costs of waste reduction measures*, then asked *"In the meantime, what are the alternatives to the Waste-to-Energy Facility?"*. Another member responded with a **strong caution**: *moving all waste to landfill is not the solution; we should focus on waste reduction and recycling* as the priority. And, significantly, the minutes note: *"Concern was expressed on the message of the case study supporting Waste-to-Energy Facility closing down given the importance of maintaining all options for managing residuals for the region."*. In simpler terms, at least one member voiced **opposition to the idea of shutting the incinerator**, arguing that the region needs to keep every disposal option (incineration, landfill, etc.) on the table to handle garbage that cannot be recycled.

What emerges from the **video vs. minutes** comparison here is an **imbalance in recorded perspectives**. The **minutes capture the skepticism about phasing out WTE (the counterpoint)**, i.e. the argument for maintaining incineration – but **nowhere do they explicitly state that some members (and the presenter) advocated for eventually closing the incinerator.** The "message of the case study" is mentioned, yet one has to infer that message (closure of WTE) because it's not explicitly summarized. This could be considered a **misrepresentation by omission**: readers of the minutes see the concern about the case study's stance but not a clear statement of what that stance was or which committee members supported it. In effect, the minutes *could be read as if the committee as a whole was mostly concerned about keeping the incinerator, whereas in reality there was a **divergence of opinion***. Some members (especially from environmental NGOs) likely supported the case study's recommendations, while others (perhaps industry or municipal reps) raised objections. **Only the objections made it into the written record clearly.** This kind of selective capture, whether intentional or not, undermines the completeness of the consultation record.

- **Summarization of Objections:** In several instances, **members' nuanced objections were reduced to brief bullet points**. For example, during the **March 5, 2024 IAC meeting**, staff presented the provincially-required **Biennial Report on the Solid Waste and Resource Management Plan**

(covering data from 2021-2022). Members asked questions during discussion, including technical points about how certain materials are counted. One such question was how **landfill cover materials** (e.g. ground wood used as daily cover in the landfill) are accounted in the recycling/disposal statistics. The minutes note the answer: *"Landfill cover materials including ground wood are not included as recycling or disposal. Some communities do count landfill cover as recycling. Detail on how landfill cover is treated will be included in reporting to the Zero Waste Committee and Board."*. This is a helpful clarification that made it into the minutes – and it even flags that other jurisdictions count something as recycling that Metro Vancouver does not. **Why is this relevant?** It shows the committee was drilling into definitions (like what counts as recycling), and staff committed to clarify that in higher-level reports. However, the minutes **do not indicate which member raised the issue or any further debate**; it's presented as a factual Q&A. If one watched the meeting, one might have seen a more robust conversation about consistency of metrics or concerns that Metro Vancouver might start counting such things to boost recycling rates (akin to the fuel issue). The minutes simply give the outcome. This is not misleading per se, but it is *minimalistic*. For someone evaluating the consultation, it's hard to tell if the committee was satisfied or if this was a lingering concern.

In summary, **most major objections by committee members are at least mentioned in the minutes**, which is good. We found **no evidence that outright dissent was completely omitted** from the written record. However, the **depth and context of those objections are often lost**. The PTAC and IAC minutes tend to be action- or outcome-oriented, which can gloss over how strongly something was debated or the expertise behind a comment. In some cases (e.g. the waste-to-fuel debate in IAC), the minutes were commendably detailed. But in others (the WTE case study), **one side of the discussion is underrepresented**. This patchy recording can **skew the perceived balance of opinions** in the committees. It raises a concern that decision-makers or the public reading these summaries might not grasp the full extent of feedback, especially critical or dissenting views.

3. Residuals Management, Landfill Capacity & Waste Hierarchy as Underrepresented Topics

Residuals management (how to handle the "leftover" garbage that isn't reduced or recycled) and **landfill capacity** are fundamental to long-term waste planning. We looked at how these big-picture topics have been handled in recent committee deliberations and whether the minutes accurately reflect those discussions or perhaps sideline them.

- **Residuals Management - Deferred to Working Group:** The record indicates that rather than deep diving into residuals and disposal capacity in the main PTAC or IAC meetings, Metro Vancouver chose to spin off a **"Residuals Management Working Group."** At the March 5, 2024 IAC meeting, staff noted that *"a residuals management working sub-group with voluntary participation is also being put together, which will cover a range of topics including long-term disposal planning, competition, the generator levy, procurement, and capital budget."*. An open call was to go out for IAC members to join this subgroup. This approach means that **key issues like how to secure future disposal capacity (new landfills? new waste-to-energy facilities? shipping waste out of region?)** were not hashed out by the full committee, at least not yet, they

were **punted to a subcommittee**. The minutes dutifully record the formation of this working group, but thereby also show that *the main forum (IAC) did not have a thorough public discussion of residuals management in that meeting*. Indeed, earlier in November 2023, IAC members had identified **"Future capacity and long-term planning" for both the Vancouver Landfill and the Waste-to-Energy facility** as topics they wanted on the 2024 Work Plan. They even suggested dedicating "one topic at each IAC meeting for more in-depth discussion" such as *landfill closures and plans for the current incinerator*. The fact that a separate working group was later established indicates that **the detailed discussion might be happening out of the main public eye** (working groups are often less formal and may not have published minutes). Stakeholders might view this as *underrepresentation* of a crucial topic in the primary records.

- **Landfill Capacity – Evasive Answers:** As mentioned, when IAC members did try to pin down **landfill capacity questions in open session (Nov 2023)**, they felt they got **non-answers**. The minutes capture their dissatisfaction ("responses…are not transparent"), but not the specifics. The **context from the meeting** (and subsequent meetings) suggests Metro Vancouver may have been reluctant to publicly commit to a closure date or needed expansion for Vancouver Landfill. Given that the landfill is owned by the City of Vancouver and has a finite life, this is understandably sensitive. However, it is exactly the kind of issue the committees are meant to advise on. The **public minutes from PTAC meetings in 2024** show little mention of landfill capacity at all, aside from data reports. For example, an information item at the November 21, 2024 PTAC meeting included a **"Regional Waste Flows" report**, but any discussion on what those flows imply for landfill life isn't noted. Likewise, the **Zero Waste Committee (Board committee) agendas** referenced in PTAC materials suggest that disposal topics (like an update on "contingency disposal") were being handled there, perhaps with limited input from PTAC. The **absence of explicit landfill capacity discussion in PTAC minutes**, despite it being a looming concern, could mean that **the issue was not given adequate time at PTAC**, or that any such discussion was high-level. Only by reading IAC minutes (or attending meetings) would one catch that members are uneasy about the lack of transparency on this front. In terms of official record, this is somewhat underplayed.

- **Waste Management Hierarchy Draft – Summary vs. Substance:** The **draft updated waste hierarchy** (the ladder of Reduce, Reuse, Recycle, etc., including contentious categories like "Recycle as energy") was a major topic in early 2025. **PTAC's April 10, 2025 meeting** was devoted to this, yet the **minutes provide almost no detail** besides noting that an update was given and that small-group discussions occurred (with a summary attached). As detailed above, the attachment captures very substantive feedback (including the recommendation to **rename or move "Recycle as energy"** and even to perhaps retitle the "Waste Hierarchy" to "Resource Hierarchy" to emphasize reduction, etc.). But none of those specifics make it into the meeting summary itself. **Similarly, the discussion of draft goals and metrics** for the plan at that meeting was boiled down to a few bullet points in the minutes (e.g. recommending per-capita metrics, noting difficulty of measuring upstream emissions, etc.). **What's the discrepancy?** Mainly that **any contentious or challenging feedback in those discussions lives in attachments or is**

deferred. The **options analysis criteria** (essentially how to evaluate different waste management options) was deemed so important that the PTAC scheduled an extra meeting on May 8, 2025 to continue it. We searched the records of that meeting and found that PTAC members continued to probe Metro Vancouver's assumptions, for instance, asking how certain costs and emissions trade-offs would be weighed. If those conversations were as probing as the waste-to-fuel ones, the worry is whether the **minutes of the May 8 meeting (once published) will thoroughly reflect them, or only list which criteria were reviewed**. At this time, the May 8 discussions are not yet in published minutes form, so we cannot fully assess that.

In sum, **some major topics appear to be under-discussed in the main committee records**. Residuals management (i.e. what do we do with the "garbage" portion in the long run) and hard questions about capacity and new facilities are not front-and-center in the minutes. They are either spun off to subgroups or touched on only through **brief comments** (like the transparency complaint). The **waste hierarchy debate** was certainly discussed, but the *official summary hides the controversy in an attachment*. This could be seen as a lack of upfront transparency. A casual reader might not realize there was significant pushback on the proposed hierarchy at all.

4. Potential Misrepresentation or Omission of Member Comments

Finally, we scrutinized whether any committee member comments were **left out entirely** or **summarized in a misleading way** in the minutes. It's important to state that **minutes are not transcripts**; some condensation is expected. However, when condensation crosses into the territory of altering the apparent meaning or consensus, it's problematic. We identified a few areas of concern:

- **Selective Emphasis:** The **PTAC September 13, 2024 minutes** (as discussed under point 2) emphasize the concern about not closing the WTE facility without mentioning that others supported closing it. If one were not at that meeting, the minutes could give the impression that the committee's takeaway was chiefly worry over losing the incinerator, whereas the actual discussion was more balanced (with an entire presentation arguing for an eventual phase-out, which some members presumably found persuasive). This selective emphasis can **misrepresent the diversity of opinions**. We have to infer pro-reduction/pro-closure sentiments from the context (the "message of the case study") rather than seeing them clearly stated. In a sense, **the dissent to Metro Vancouver's current waste-to-energy approach was voiced via the presentation, but the minutes don't explicitly credit any committee member with agreeing to that dissent**, only those who argued against it. That is a form of omission that tips the scales.
- **"No Comments" Statements:** In a few instances, minutes record that after a staff update, the Co-Chair *"invited members to share comments… No comments were made."* For example, in the May 6, 2025 IAC minutes, after a presentation on upcoming meeting topics, it notes: *"Co-Chair Hodge invited other committee members to share related questions/comments… no comments were made."*. While this could be entirely accurate (perhaps no one spoke up at that moment), it's worth verifying against the video to ensure that a comment wasn't made and omitted. Assuming the minutes are correct, the absence of comment might itself be due to prior discussions being cut short or members feeling issues were already raised. We note this because

it's an area where one might suspect if a comment was made and not recorded, but our review didn't catch a specific example of that. All major remarks we heard in recordings did appear somewhere in the written record. The issue was more *how* they appeared (briefly or obliquely).

- **Level of Detail and Tone:** Some members have technical expertise and provide detailed rationale in their statements. The minutes often condense these to a single line. For instance, an expert might explain that *"including fuel derived from waste in the recycling rate will artificially inflate our diversion statistics and reduce incentive to invest in true recycling infrastructure"*. The minutes distilled a lot of that sentiment into *"many voices saying this is not appropriate…a disservice to the recycling industry"*. While the gist is preserved, the **nuance (e.g. "artificially inflate diversion stats") is lost**. If Metro Vancouver staff later respond only to the recorded minutes, they might address the broad point but not the specifics. There is a risk that **subtleties are being left on the cutting room floor**, which can mislead by omission of detail. It might not be *intentional mischaracterization*, but it does flatten the discourse.
- **No Indication of Magnitude of Support:** In situations where the committee was divided or a comment was isolated, the minutes usually don't indicate whether one person said it or many agreed. For example, *"Concern was expressed…"* Was that one member or a general feeling? *"A member noted that…"* Does that mean others concurred or not? The minutes are written in a neutral third-person passive voice. This is standard practice, but it can be misleading if, say, **the majority of PTAC members objected to counting waste-to-fuel as recycling**. Is that reflected as a majority view or just one comment? From the attachments we know multiple people raised that issue in small groups. The IAC minutes for May 6 present it as a series of Q/C exchanges by presumably different members (which at least hints that several people chimed in). But it's never explicitly stated how many agreed. Similarly, on residuals management, if a concern about transparency is noted, was it one outspoken person or an opinion shared by many around the table nodding their heads? The record doesn't tell us. If Metro Vancouver later says "only a couple of committee members raised X," we'd have to trust their characterization since the minutes don't quantify. This opens the door to **potential downplaying** of concerns when reported up the chain.

In conclusion, our review indicates that **while the committees are surfacing crucial issues and varied perspectives, the official documentation (minutes) often does not fully convey the depth or breadth of those discussions**. Important concerns, like the **integrity of the waste hierarchy, how we count recycling vs. energy recovery, whether we're planning adequately for dwindling landfill space, and how transparently Metro Vancouver shares information, are indeed raised by committee members**. However, the minutes frequently **compress or adjunct these points (e.g. relegating them to attachments or one-liners)**, rather than highlighting them in the main narrative. Some viewpoints (especially those critical of existing Metro Vancouver approaches, such as reliance on WTE) come through more faintly in the written record than they did in person.

This analysis suggests a **lack of complete transparency and potentially a bias in emphasis** at the documentation stage of the consultation process. Whether intentional or systemic, the effect is that

someone relying on published minutes alone would get an incomplete picture of the feedback from these advisory committees. This gap can undermine confidence in the process, as stakeholders may question whether **decision-makers are fully apprised of the committees' concerns** or if inconvenient feedback is being downplayed.

All citations are from official Metro Vancouver sources: published committee minutes or meeting materials from the Metro Vancouver website, as indicated.

Sources

- Metro Vancouver Solid Waste **Public/Technical Advisory Committee**: Meeting minutes and agenda materials (2024–2025).
- Metro Vancouver Solid Waste **Industry Advisory Committee**: Meeting minutes (Nov 2023, Mar 2024, May 2025, etc.).
- Metro Vancouver Zero Waste Committee agenda materials (referenced in discussion).
  (Full detailed references are provided inline above in the report for specificity and verification.)

Comprehensive analysis and summary of advisory committee discussions and corresponding gaps in staff reporting

July 17, 2025 – HSR Zero Waste

Comparison was done on:

1. **The last five Zero Waste Committee (ZWC) meetings for which agenda-packages or minutes are available**
   * 3 Jul 2025 (agenda package: decision on *Goals & Hierarchy*)
   * 5 Jun 2025 (agenda package: *SWMP Progress Update*)
   * 3 Apr 2025 (minutes)
   * 6 Feb 2025 (minutes)
   * 9 Jan 2025 (minutes)

2. **Corresponding source documents from the two advisory committees** that feed into the Solid Waste Management Plan (SWMP):

* Industry Advisory Committee (IAC): 6 May 2025 minutes Metro Vancouver
* Public/Technical Advisory Committee (PTAC): 10 Apr 2025 small-group notes Metro Vancouver

3. The **staff reports delivered to the ZWC** that purport to transmit that advisory input:

* "SWMP Goals and Hierarchy" report to ZWC, 3 Jul 2025 Metro Vancouver
* "SWMP Progress Update" report to ZWC, 5 Jun 2025 Metro Vancouver

I tracked each advisory concern through to the way it was (or was not) presented to elected officials on the ZWC.

What the Working Groups Actually Said

Topic raised in IAC / PTAC	Evidence from advisory record
Stop counting material burned as fuel as "recycling."	IAC members questioned the practice explicitly and called it *"not appropriate… a disservice to the recycling industry"* Metro Vancouver
"Recycle as energy" label is misleading; should be in *Disposal*	PTAC small-group summary: *"'Recycle as energy' is not clear… inclusion of fuel discourages participation at the top of the hierarchy… should be re-named or moved to disposal."* Metro Vancouver
Need a full, open discussion on residuals management & landfill capacity before the hierarchy is finalized.	IAC 2024-25 minutes and work-plan requests (previous analysis) repeatedly flagged long-term disposal planning and Vancouver Landfill life-span as critical topics.

These positions were repeated by several members and, in the IAC case, captured verbatim in the minutes.

How That Information Reached the Zero Waste Committee

1. 3 July 2025 – *Goals & Hierarchy* decision

Staff report to ZWC lists engagement "themes" (Table, p.4): *"Prioritise recycling of materials over using material to create energy"* and *"Don't count material used as fuel as recycling."* It also concedes that several PTAC members *"suggested that any management of waste through combustion processes should not be included in the hierarchy."* Metro Vancouver

What changed?

- Metro Vancouver dropped the label "Recycle as energy."
- A new rung **"Recover (energy & alternatives to fossil fuels)"** is inserted, and **mass-burn WTE is shifted to "Dispose."**

What did *not* change? The report maintains that "Recover" includes *creating alternatives to fossil fuels*, i.e., fuel substitutes, and recommends the hierarchy for approval. No mention is made that IAC members asked for **more debate before adoption** or that some experts argued combustion belongs *below* landfill in priority.

Net effect: Advisory opposition is acknowledged in one bullet but quickly characterised as inconsistent with Metro Vancouver's current approach; the recommended hierarchy is still advanced for approval.

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2. 5 June 2025 – *SWMP Progress Update*

The information report to ZWC says only that draft goals/hierarchy **"are being refined through review and feedback by advisory committees."** Metro Vancouver It does **not** convey any of the controversy around "Recycle as energy," nor the request for a residual-management discussion. The report therefore *assures* directors that engagement is robust but provides **no substantive detail** about disagreements.

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3. 3 Apr 2025 – Manager's Report

The sole SWMP reference is that "new members" were added to PTAC Metro Vancouver. No summary of the April 10 PTAC hierarchy debate (which occurred one week later) was provided to the Committee in April.

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4. 6 Feb 2025 – PTAC Terms-of-Reference update

ZWC received the updated PTAC ToR. The change is procedural; no SWMP content or feedback was presented.

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5. 9 Jan 2025 – 2025 Work Plan

The work plan notes that SWMP goal/hierarchy items are "pending," but again no advisory substance is given.

Findings – Alignment vs Gaps

Stage	Advisory message	What ZWC heard	Observed gap / bias
Fuel counted as recycling is unacceptable	Strong, multi-member objection (IAC & PTAC) Metro Vancouver	One bullet in July 3 report notes the concern; staff nevertheless propose "Recover" category that still allows fuel-substitutes. Metro Vancouver	Objection *acknowledged but diluted*; ZWC not told that IAC requested more discussion *before* approval.
Residuals & landfill capacity need a stand-alone discussion	Repeated IAC requests, expressed frustration over lack of transparency.	June 5 report says technical study underway; no mention that committees requested the topic be tabled for full debate. Metro Vancouver	Issue reframed as a staff study, not a policy debate; urgency and dissatisfaction invisible to ZWC.
Desire for earlier, fuller engagement before items go to ZWC	IAC minutes show members want advice sought *before* decisions.	ZWC sees procedural ToR updates, but substantive issues arrive late and packaged as staff recommendations.	Chronology indicates a *time-lag* - advisory debate (Apr/May) → staff synthesis (Jun) → ZWC decision (Jul) with little space for committee-board dialogue.

Conclusion

Across the last five ZWC meetings, advisory input has travelled through **high-level staff summaries that compress nuance and debate into generic "themes."**

- Where advisory feedback aligns with existing Metro Vancouver preferences it is presented prominently.
- Where feedback conflicts (e.g., combustion counted as recycling, urgency of residuals planning) it is either relegated to a bullet, reframed as a study item, or omitted entirely.

The Committee therefore reaches decisions—such as endorsing the draft hierarchy, *without ever seeing the full weight and rationale of dissenting expert opinion.* This pattern reinforces the perception voiced by working-group members that Metro Vancouver enters Committee with a largely pre-determined plan.

Supplemental Finding

July 2025 IAC & PTAC Meetings

(July 17, 2025 – HSR Zero Waste)

Status of the records. Metro Vancouver has not yet posted agendas or draft notes for the **early-July 2025** meetings of the Industry Advisory Committee (IAC) and the Public/Technical Advisory Committee (PTAC). However, multiple committee participants confirm that **"waste-to-fuel / refuse-derived-fuel (RDF) must not be counted as diversion"** was the central topic of those July sessions. In plenary and breakout discussion, members reportedly called for:

- placing **all RDF or waste-derived fuel under *Disposal***,
- or, preferably, labelling it **"Unacceptable"** so it does **not** earn any diversion credit at all;
- rejecting any new regional targets that might rely on "fuel substitutes" to boost the recycling rate.

Because Metro Vancouver's Secretariat has not released the July minutes, the substance of those deliberations **has not yet been transmitted to the Zero Waste Committee (ZWC)**. This repeats the pattern highlighted earlier: strong advisory dissent is voiced in-committee but **lags weeks or months behind in the official paper trail** that reaches elected decision-makers.

Evidence Trail Leading up to July

Date & Committee	Verbatim advisory feedback	Citation
8 Apr 2025 IAC	" 'Recycle as energy' should be **greyed-out or moved to the bottom… Anything to do with *fuel* should go at the bottom. "	
10 Apr 2025 PTAC	Small-group notes: *"'Recycle as energy' is confusing… include it under **Disposal** or rename; counting fuel discourages higher-value recycling."*	
6 May 2025 IAC	Q/C: counting fuel substitutes as recycling is *"not appropriate… a disservice to the recycling industry."*	

The July meetings **did not introduce a new concern**; they **re-affirmed and strengthened** a position the committees have voiced since April.

Implications for the Zero Waste Committee Review

1. **Material still missing from ZWC files.** The ZWC's last five agenda packages (Jan - Jul 2025) contain only brief, thematic references such as
   "Some PTAC members suggested that any management of waste through combustion processes should not be included in the hierarchy." (Metro Vancouver)
   There is **no indication** that *both* advisory committees, in their most recent meetings, called for **moving waste-to-fuel to Disposal or removing it entirely**.

2. **Risk of premature Board endorsement.** On **3 Jul 2025** the ZWC endorsed a modified hierarchy that still places **"Recover (Energy & fossil-fuel substitutes)" above Disposal**. Without the July IAC/PTAC records, directors remain unaware that the committees' *latest* recommendation is to demote or exclude that rung altogether.

3. **Pattern of dilution persists.** The July discussions, like April's, are at risk of being boiled down to one-line "themes" in a future staff report, rather than being presented in full. Unless the raw July minutes (and any breakout-group summaries) travel to ZWC intact, the **strength of the advisory consensus will once again be masked**.

Metro Vancouver Response 'RE:Metro Vancouver Consultation Transparency Concerns SWMP'
on August 21, 2025

Hi Jamie,

I received a copy of your letter to the Zero Waste Committee dated July 23, 2025, titled "Concerns Regarding the Integrity and Transparency of the Solid Waste Management Plan (SWMP) Consultation Process". I'm copying my response to the Chair and Vice Chair of the Zero Waste Committee, and the Co-Chair of the Solid Waste and Recycling Industry Advisory Committee. I'm also copying the Independent Consultation and Engagement Panel.

As I have indicated in the past, we appreciate your participation in the Industry Advisory Committee (IAC) and Public/Technical Advisory Committee (PTAC) knowing that your participation is part of your commitment to helping advance waste reduction and recycling in the region, and that the perspectives you bring to the committees reflect your years of experience in the waste and recycling industry.

It is unfortunate that you believe that the IAC and PTAC minutes do not fully reflect the conversations of the meetings. Our goal throughout the process of both the IAC and PTAC is to ensure transparency with respect to recording the discussions that occur at those meetings. A few mechanisms that are in place to help promote transparency:

- Notes for IAC are produced by a third party note-taker
- At the beginning of each meeting for each of IAC and PTAC, the meeting chair asks participants if there are any errors or omissions in the notes (following your question at a recent IAC meeting on timing of posting of the notes, we are now posting IAC notes soon after the meeting to ensure that members can review them while their recollection of the meeting is fresh)
- Both IAC and PTAC have representatives of the Zero Waste Committee participating in the roles of Co-Chair of IAC, and Chair and Vice-Chair of PTAC, to ensure a direct link to the Zero Waste Committee for those committees
- All meeting information (agendas, notes, livestream) is available on Metro Vancouver's website
- Meetings are open to the public, and for virtual meetings, the livestream is available both in real time and as part of the meeting documentation available on the website
- Reports to the Zero Waste Committee and Board with respect to the solid waste management plan update include summaries of related feedback received from both the IAC and PTAC.
- The terms of reference for PTAC and IAC note that votes are not held to determine the committee's position on issues or recommendations; however, committee feedback, including consensus or dissenting opinions, are captured in the meeting notes.

One of the points in your letter is that feedback from small group discussions are typically reported as an attachment to meeting notes rather than being integrated into the meeting notes. Something we can ensure going forward is that highlights from report-outs from small group sessions are included in the meeting notes. Additionally, we will continue to make sure that there is an opportunity for any member to

provide their specific feedback in plenary if they do not feel their perspectives have been adequately communicated in the report-outs.

Residuals Management
As you note in your letter the region's approach on residuals management will be an important element of the solid waste management plan. As we have reported at IAC and PTAC, a technical study is nearing completion on options for residual disposal. The terms of reference for the study were provided to both IAC and PTAC for comment in advance of the study starting. We are intending to bring the draft results of the study to PTAC and IAC in September.

With respect to the Vancouver Landfill, as reported to the IAC in previous meetings, Metro Vancouver, the City of Vancouver, and City of Delta are in discussions with respect to using the Vancouver Landfill to its physical capacity. As soon as those discussions are complete, we will report on the outcome to both IAC and PTAC.

Additional Mechanisms to Support IAC and PTAC Transparency
As noted above, we are now posting IAC notes soon after the meeting to ensure that members have an opportunity to review the notes for any errors or omissions while the meeting is still fresh in members' minds. PTAC follows a similar approach. We will also ensure that highlights of any report-outs from small group discussion are captured in the meeting notes. Additionally, a member or members of the Independent Consultation and Engagement Panel will attend IAC and PTAC meetings to ensure that they are aware of conversations that occur at those meetings.

We don't see a benefit including the IAC and PTAC meeting notes as attachments to the Zero Waste Committee agendas, but as noted above, those notes are available on the Metro Vancouver website, and related feedback from IAC and PTAC is included in solid waste management plan reports to the Zero Waste Committee and Board.

With respect to your suggestion to have dedicated meetings on topics such as residuals management, we are happy to add meetings to either IAC or PTAC as required and have done that for both committees in the past.

With respect to the draft solid waste management plan hierarchy, it was approved by the Board at its July 25, 2025 meeting following endorsement by the Zero Waste Committee at its July 3, 2025 meeting. The report to the Zero Waste Committee and Board noted that a number of members of PTAC did not support including any form of combustion in the hierarchy. The hierarchy will be considered again as part of the overall draft solid waste management plan that we expect to be able to provide to the Zero Waste Committee and Board for consideration in 2026. At that time, we will ensure to continue to provide the Zero Waste Committee and Board with feedback from IAC and PTAC on all elements of the draft plan including the hierarchy.

Paul.

Paul Henderson, P.Eng.
General Manager
Solid Waste Services
t. 604.432.6400

HSR Zero Waste Response 'RE:Metro Vancouver Consultation Transparency Concerns SWMP'
on August 22, 2025

Dear Paul,

Thank you for your response to my July 23 submission, and for copying the Chair and Vice-Chair of the Zero Waste Committee, the IAC Co-Chair, and the Independent Consultation and Engagement Panel.

While I appreciate your continued engagement, and your willingness to improve some documentation practices going forward, I must express that several key concerns raised in my letter remain unresolved. These concerns go to the heart of whether this consultation process is operating with the level of transparency and accountability required for a plan of this magnitude.

1. Advisory Input Was Not Adequately Reflected in ZWC Reporting

This is not simply a disagreement over how the minutes are drafted. The July 25 approval of the updated hierarchy occurred without the benefit of seeing the full July IAC and PTAC meeting feedback. These meetings included clear and repeated direction from committee members that RDF and other waste-to-fuel approaches should be categorized under Disposal, or preferably marked Unacceptable, and excluded from diversion calculations.

This input came not as isolated comments, but as a consistent and multi-meeting consensus that followed similar recommendations in April and May. Yet in the July staff report to the ZWC, these objections were summarized vaguely and without any indication of their strength or prevalence. This level of filtering does not align with the intent or expectations of a robust public consultation process.

2. Lack of Discussion on Residuals Undermines the Hierarchy Decision

It is also deeply problematic that the hierarchy was advanced and approved without a full advisory discussion on residuals management and landfill capacity. IAC and PTAC members had explicitly asked for this discussion to occur before any major decisions were made. That did not happen.

Residuals infrastructure and landfill planning are critical dependencies of the hierarchy. Proceeding

without full review of those topics undermines the integrity of the hierarchy decision. I strongly urge the Board and Committee to revisit this approval, especially in light of the yet-to-be-seen residuals study and the unresolved questions around Vancouver Landfill.

3. Advisory Voice Must Be Heard Directly

While I note your comments about procedural mechanisms for transparency, the pattern we have observed is that advisory feedback which aligns with staff positions is clearly elevated, while dissenting or complex expert input is often minimized. Relegating key points to thematic bullet points or report appendices does not allow decision-makers to understand the depth or rationale of the committees' input.

I again request that advisory meeting notes and breakout summaries be appended to ZWC reports moving forward, or at minimum circulated to directors when SWMP decisions are being made.

Next Steps Requested

To restore confidence in the process and uphold the region's stated commitment to collaboration, I respectfully request:

- That the July 25 hierarchy endorsement be reopened for discussion, pending full review of the July IAC and PTAC minutes and residuals management study.
- That a dedicated session on long-term residuals and landfill strategy be scheduled before the end of 2025.
- That a process be established to ensure committee consensus or majority opinions are clearly indicated and directly visible to the ZWC and Board.
- That the Independent Consultation and Engagement Panel be tasked with reviewing the advisory-to-ZWC information pathway and recommending improvements.

Thank you for your consideration. I remain available to discuss this further and am prepared to elevate these concerns to the BC Ministry if meaningful corrective steps are not taken.

Sincerely,

Jamie Kaminski, ZWa & True Advisor
President
HSR Zero Waste
[redacted]
hsrzerowaste.com
1603 Langan Ave., Port Coquitlam, BC, V3C 1K6
Citizenship | Leadership | Environment | Empowerment | Responsibility

We acknowledge that Happy Stan's Recycling Services Ltd operates from the traditional, ancestral and unceded territory of the kʷikʷəƛəm (Kwikwetlem), səlilwətaɬ (Tsleil-Waututh), xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), qícəy̓ (Katzie), qʷaːn̓ ƛ̓ən̓ (Kwantlen), qiqéyt (Qayqayt), and Stó:lo (Sto:lo) Peoples, and extend appreciation for the opportunity to work on this territory.

Solid Waste Management Plan Public/Technical Advisory Committee

2025 Annual Work Plan – Updated Draft

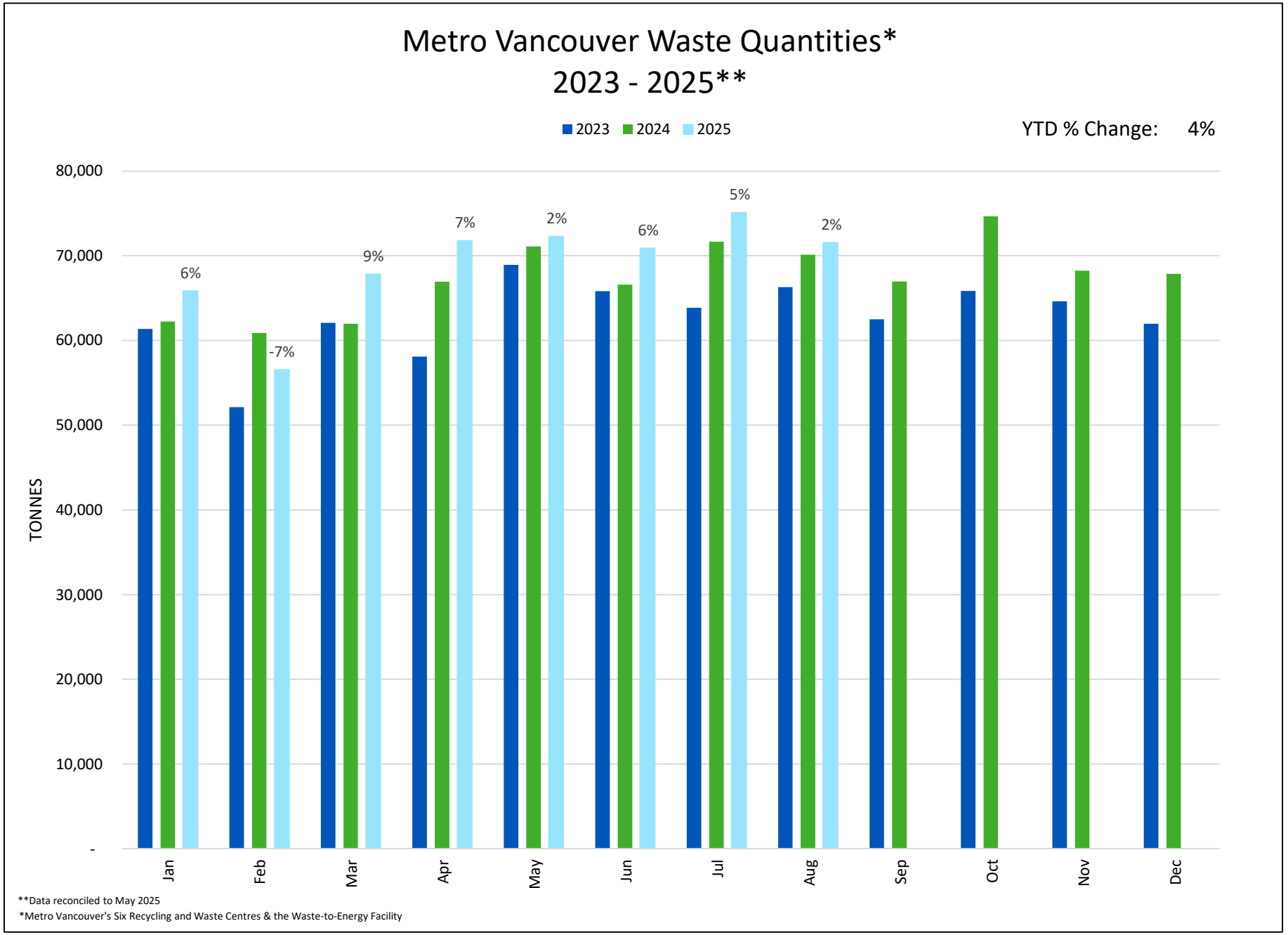
Meeting Date: September 18, 2025

An annual work plan for the committee will be developed by Metro Vancouver staff based on deliverables in the solid waste management plan development. The work plan will be reviewed annually by the committee, and will guide development of meeting agendas.

Priorities		
Item	**Status**	**Proposed Meeting Date**
Public/Technical Advisory Committee Updated Terms of Reference	Complete	February 21, 2025
2023 Solid Waste and Recycling Statistics	Complete	February 21, 2025
Solid waste management plan update:		
• Introducing Goals and Options Analysis Criteria	Complete	February 21, 2025
• Climate 2050 Solid Waste Primer	Complete	April 10, 2025
• Draft Hierarchy, Goals, and Performance Metrics Feedback Session	Complete	April 10 and May 8, 2025
• Options Analysis Criteria	Complete	May 8, 2025
• Regulatory Framework	Complete	June 19, 2025
• Idea Generation Engagement Summary Report	Complete	June 19, 2025
• Concrete and Asphalt Recycling Opportunities Review	Complete	June 19, 2025
• Recycling and Waste Centre Strategy	Complete	June 19, 2025
• Residual Waste Management Options Review	In progress	September 18, 2025
• Plan Outline, Rubric, and Strategies Review	In progress	September 18, 2025
• Vancouver Landfill Tour	In progress	September 18, 2025
• Options Analysis Feedback Session	Pending	October 3, 2025
• Targets	Pending	November 20, 2025

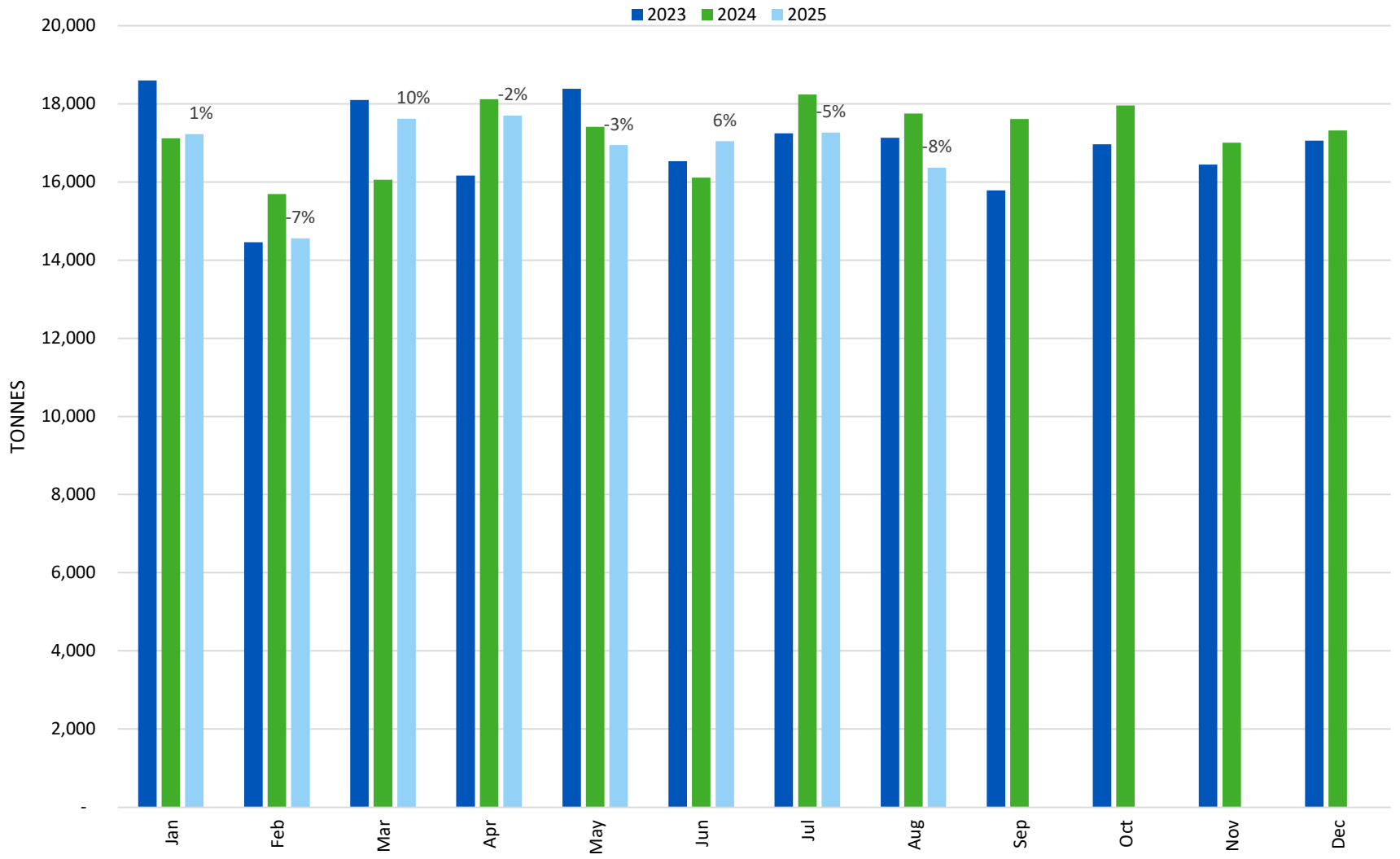
2025 Meeting Dates:

February 21, 2025
April 10, 2025 (In-person)
May 8, 2025
June 19, 2025
September 18, 2025 (Vancouver Landfill Tour and meeting)
October 3, 2025 (In-person)
November 20, 2025 (In-person)


Metro Vancouver Waste Quantities*
2023 - 2025**
2023
2024
2025
YTD % Change: 4%
TONNES
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
6%
-7%
9%
7%
2%
6%
5%
2%
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
**Data reconciled to May 2025
*Metro Vancouver's Six Recycling and Waste Centres & the Waste-to-Energy Facility

City of Vancouver Waste Quantities*
2023 - 2025
(Demo garbage not included)

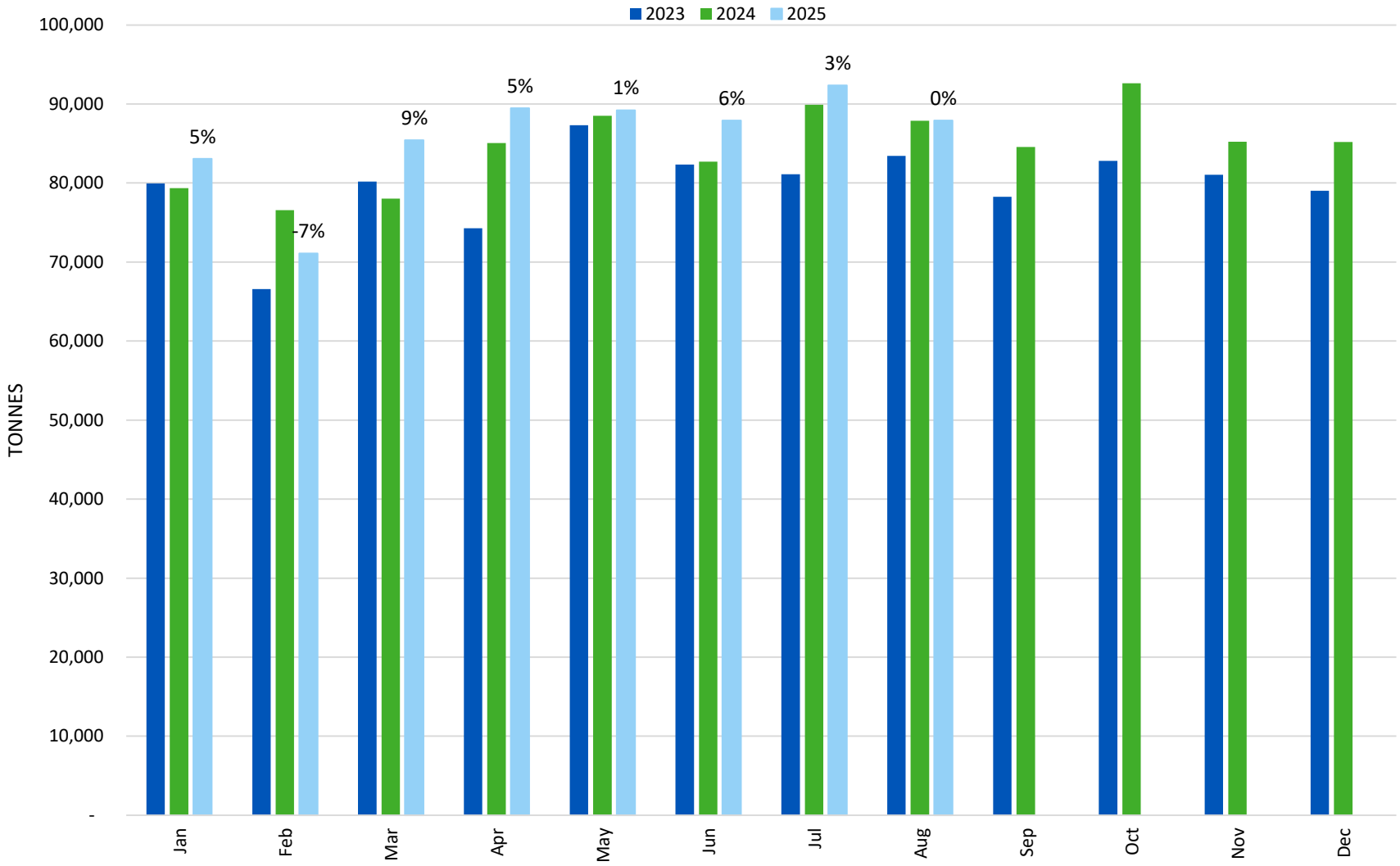
YTD % Change: -1%



*Vancouver Landfill & Vancouver South Transfer Station

Metro Vancouver and City of Vancouver Waste Quantities
2023 - 2025*
(Demo garbage not included)

YTD % Change: 3%



*Metro Vancouver data reconciled to May 2025