CONCRETE ZERO
Canada's cement and concrete industry action plan to net-zero

Metro Vancouver – Zero Waste Committee
April 4, 2024
Introduction

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Sr. Director, Construction Innovation

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Who is the Cement Association of Canada?

• **Nationally:**
  - We are the voice of Canada’s cement industry.
  - Together with our members and partners in the concrete sector, we’re committed to making concrete a net-zero material of choice helping building a better, greener future.

• **Locally:**
  - Cement manufacturing plants Lafarge (Richmond), Heidelberg Materials (Delta)
Cement and concrete industry in BC

- **Cement Manufacturing Plants**
  - Heidelberg / Lehigh, Delta and Lafarge, Richmond

- **Concrete Operations**
  - 135 “ready-mixed” concrete facilities throughout BC
  - 17 precast concrete producers

- **Cement is a Strategic Local Asset**
  - Cement will continue to be required in all Metro Vancouver / BC infrastructure
  - Want to see continued support for **locally produced cement and concrete** in housing, water & sewer utilities, public transportation, renewable energy, industry
  - COVID-19 has highlighted the need for domestic manufacturing

- **Jobs and Investment**
  - Supports more than 23,000 direct and indirect jobs in BC
  - $11 billion in direct, indirect and induced economic impact
Concrete as an important building material

- All construction requires concrete
- Twice as much concrete is used than all other materials combined
  - over 20 billion tonnes / 8 billion m³ of concrete produced globally each year
- using 4 billion tonnes of cement
- Second most consumed material in the world, second only to water
- Concrete is inherently a local material
GHGs from cement production

- Cement production is energy intensive
- GHGs produced both from combustion and process

Key areas to reduce GHG emissions:
- Transition from fossil fuels (coal, natural gas) to lower carbon and biogenic fuels (e.g. urban woodwaste, wastewater biosolids)
- Produce lower carbon intensity cement (e.g. PLC, blended cement)
- Capture CO₂ emissions, including irreducible process emissions
- Use higher levels of supplementary cementitious materials (SCMs)
- Use concrete effectively in construction
- Maximize re-carbonation of concrete at end-of-life
Concrete

- 7-15% cement is added to water, sand and gravel
- but cement comprises 60% to 80% of the carbon footprint of concrete
Action Plan to Net-Zero

- Released on May 2, 2023
- Outlines the steps that the Canadian cement and concrete sector will take to help Canada achieve its net-zero carbon goals
- Supported and featured contributions from our members and provincial and national concrete producers’ associations
- Peer reviewed by industry allies, academics, and environmental non-governmental organizations
How we plan to get there

- There is no single magic solution that will get us to zero. Rather it will take many actions.
- We focus on **existing, proven technologies** and we will update the plan as more technologies and solutions become commercially available.
- Organized based on the 5 C’s through the value chain (clinker, cement, concrete, construction, and carbon uptake)
The 5 C’s

- **Clinker**: The primary ingredient used in making cement
- **Cement**: A mineral binder, key to making concrete
- **Concrete**: made from sand, gravel, water AND cement
- **Construction**: Designing and building
- **Carbon Uptake**: Concrete as a CO₂ sink

- The 6th C: **Carbon Capture, Utilization and Storage**
Collaboration is Key

- Through collaboration across the value chain, industry is making significant progress.
- All member companies are making innovative advancements.

2 Examples:
- Alternative Fuels – Heidelberg
- Fly Ash Repurposing - Lafarge
Technical Introduction to PLC, updated August 2023

• Updated in August 2023
• Provides technical information and illustrates jurisdictions across Canada that are now allowing PLC
• Available for free from the CAC
Concrete BC EPD
Concrete Carbon

- A Guideline for Specifying Low Carbon Ready Mixed Concrete in Canada
- Based on Concrete Ontario’s Guideline
- Includes similar information to the Ontario Guide with expanded Carbon Budget Case Studies
- Available for free
Concrete Zero

- Concretezero.ca
- Available for free
Canada’s cement and concrete industry is committed to doing our part to help Canada build a better, cleaner future. **Working together, we can deliver concrete zero.**
2022 BIENNIAL REPORT OVERVIEW

• Summarizes 2021 and 2022 highlights
• Reports on status of each action within the solid waste management plan
• Provides updated solid waste and recycling statistics
2022 HIGHLIGHTS

• Solid waste management plan update
• Waste prevention, reduction and reuse initiatives
• New recycling and waste centres
• District energy project
GUIDING POLICY & TARGETS

2011 Solid Waste Management Plan

Goal: 10% Reduction Waste Generation (Achieved 11%)
Generation = Recycled + Disposed

Goal: 80% Recycling Rate (Achieved 65%)
Recycling Rate = Recycled / Generated
RECYCLING RATE

2022 Disposal Quantities

<table>
<thead>
<tr>
<th>Facility</th>
<th>Tonnage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancouver Landfill*</td>
<td>691,000</td>
</tr>
<tr>
<td>Waste-to-Energy Facility*</td>
<td>219,000</td>
</tr>
<tr>
<td>Contingency Disposal</td>
<td>145,000</td>
</tr>
<tr>
<td>Private Landfill Construction &amp; Demolition Disposal</td>
<td>190,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sector</th>
<th>Tonnage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>506,000</td>
</tr>
<tr>
<td>Commercial/Institutional</td>
<td>401,000</td>
</tr>
<tr>
<td>Construction and Demolition</td>
<td>339,000</td>
</tr>
</tbody>
</table>

*In addition to municipal solid waste, disposal facilities also received approximately 56,000 tonnes of treatment plant residuals, Japanese beetle soil, and out-of-region material.*
# Recycling

## 2022 Recycling Highlights

- Recovery in glass recycling following facility closures in 2021 due to flooding
- Increase paper and plastics recycling
- Used asphalt and concrete numbers from 2021 due to large unverified increases from unlicensed facilities

<table>
<thead>
<tr>
<th>Materials Type Recycled (tonnes)</th>
<th>2021</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphalt*</td>
<td>295,300</td>
<td>295,300</td>
</tr>
<tr>
<td>Batteries</td>
<td>13,858</td>
<td>13,838</td>
</tr>
<tr>
<td>Concrete*</td>
<td>866,363</td>
<td>866,363</td>
</tr>
<tr>
<td>Electronic &amp; Electrical Equipment</td>
<td>11,213</td>
<td>10,812</td>
</tr>
<tr>
<td>Paper/Paper Products</td>
<td>328,065</td>
<td>340,386</td>
</tr>
<tr>
<td>Glass</td>
<td>49,786</td>
<td>55,582</td>
</tr>
<tr>
<td>Gypsum</td>
<td>63,533</td>
<td>58,512</td>
</tr>
<tr>
<td>Household Hazardous Waste</td>
<td>21,292</td>
<td>24,339</td>
</tr>
<tr>
<td>Metal</td>
<td>73,369</td>
<td>58,515</td>
</tr>
<tr>
<td>Plastic</td>
<td>43,849</td>
<td>54,037</td>
</tr>
<tr>
<td>Textiles</td>
<td>691</td>
<td>372</td>
</tr>
<tr>
<td>Tires</td>
<td>21,328</td>
<td>19,237</td>
</tr>
<tr>
<td>Wood</td>
<td>161,309</td>
<td>161,242</td>
</tr>
<tr>
<td>Yard &amp; Food</td>
<td>401,890</td>
<td>392,044</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,351,848</strong></td>
<td><strong>2,350,580</strong></td>
</tr>
</tbody>
</table>

*Used previous year’s data
RECYCLING RATE OVER TIME
From all sectors
GENERATION & RECYCLING OVER TIME
From all sectors
## 2022 SUMMARY

<table>
<thead>
<tr>
<th>WASTE SECTOR</th>
<th>DISPOSED (tonnes)</th>
<th>RECYCLED (tonnes)</th>
<th>RECYCLING RATE (%) (3)</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2021</td>
<td>2022</td>
<td>2021</td>
<td>2022</td>
</tr>
<tr>
<td>Residential</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tonnes</td>
<td>510,337</td>
<td>505,592</td>
<td>601,509</td>
<td>579,754</td>
</tr>
<tr>
<td>tonnes/capita</td>
<td>0.182</td>
<td>0.177</td>
<td>0.21</td>
<td>0.20</td>
</tr>
<tr>
<td>Single Family</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tonnes</td>
<td>266,999</td>
<td>248,750</td>
<td>455,723</td>
<td>434,495</td>
</tr>
<tr>
<td>Multi-Family</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tonnes</td>
<td>243,337</td>
<td>256,842</td>
<td>145,786</td>
<td>145,259</td>
</tr>
<tr>
<td>Commercial/Institutional</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tonnes</td>
<td>372,861</td>
<td>400,976</td>
<td>316,406</td>
<td>375,466</td>
</tr>
<tr>
<td>tonnes/capita</td>
<td>0.13</td>
<td>0.14</td>
<td>0.11</td>
<td>0.13</td>
</tr>
<tr>
<td>Construction &amp; Demolition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tonnes</td>
<td>371,972</td>
<td>338,955</td>
<td>1,433,933</td>
<td>1,395,360</td>
</tr>
<tr>
<td>Total</td>
<td>1,255,169</td>
<td>1,245,523</td>
<td>2,351,848</td>
<td>2,350,580</td>
</tr>
<tr>
<td>tonnes/capita</td>
<td>0.45</td>
<td>0.44</td>
<td>0.84</td>
<td>0.82</td>
</tr>
<tr>
<td>tonnes/ household</td>
<td>1.15</td>
<td>1.11</td>
<td>2.15</td>
<td>2.09</td>
</tr>
</tbody>
</table>

**Notes:**
1. Residential unplugged waste is less than commercial waste due to an increase in our recycling rate.

**Recycling Rate (3):**
- Residential: 54% in 2021, 53% in 2022, -0.7% change.
- Single Family: 63% in 2021, 64% in 2022, 0.5% change.
- Multi-Family: 37% in 2021, 36% in 2022, -1.3% change.
- Commercial/Institutional: 46% in 2021, 48% in 2022, 2% change.
- Construction & Demolition: 79% in 2021, 80% in 2022, 1% change.
- Total: 65% in 2021, 65% in 2022, 0% change.
2022 Reuse Highlights

- Slight increase in online reuse, however limited ability to track
- Overall similar to 2021
- Looking at ways to improve measurement with performance metrics review

<table>
<thead>
<tr>
<th>Material Category</th>
<th>2021 Annual Reuse (tonnes)</th>
<th>2022 Annual Reuse (tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Textiles and Accessories</td>
<td>17,400</td>
<td>17,400</td>
</tr>
<tr>
<td>EPR Programs</td>
<td>17,300</td>
<td>18,000</td>
</tr>
<tr>
<td>Food</td>
<td>7,300</td>
<td>7,000</td>
</tr>
<tr>
<td>Hotels and Hospitality Sector</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>Office Furniture</td>
<td>1,400</td>
<td>1,400</td>
</tr>
<tr>
<td>IT Equipment</td>
<td>1,600</td>
<td>1,600</td>
</tr>
<tr>
<td>Construction/ Demolition Materials</td>
<td>4,800</td>
<td>4,900</td>
</tr>
<tr>
<td>On-Line for Selected Materials</td>
<td>27,400</td>
<td>27,800</td>
</tr>
<tr>
<td>Total</td>
<td>77,600</td>
<td>78,500</td>
</tr>
</tbody>
</table>
Waste-to-Energy Facility District Energy System

PROJECT UPDATE

Sarah Wellman
Senior Engineer
Zero Waste Committee, April 4, 2024
Orbit: 66650343

Nathan Jamieson
Senior Project Engineer

Metro Vancouver Waste-to-Energy Facility
WASTE-TO-ENERGY FACILITY
District Energy System

Opportunity to triple the energy recovery efficiency of the Waste-to-Energy Facility

• Heat and hot water for up to 50,000 homes
• Reduction of greenhouse gas emissions by up to 70,000 tonnes per year
• Capital costs recovered through energy sales over the life of the infrastructure
PHASE 1
Construction from 2025 to 2027

• Construction of 6km hot water piping between the Waste-to-Energy Facility and River District
• Design and construction of the energy centre adjacent to the Waste-to-Energy Facility
ENERGY CENTRE DESIGN

Primary function of the energy centre is to convert steam to hot water.
It is also being designed to include:
• an educational space
• amenities such as public washrooms, electric vehicle charging
• features that describe the solid waste system including the Waste-to-Energy Facility, and waste reduction and recycling
DISTRICT ENERGY SYSTEM PHASES

• Phase 1 Piping route has been selected
• Piping and energy centre will be sized to support future expansion
• Phase 2 expansion to Metrotown and Edmonds – route to be determined
WASTE-TO-ENERGY FACILITY DISTRICT ENERGY SYSTEM

British Columbia Utilities Commission Exemption

• GVS&DD will be applying to the BC Utilities Commission for an exemption from Part 3 of the *Utilities Commission Act*

• GVS&DD has previously applied for and been granted exemptions for other heat recovery projects
NEXT STEPS

• File British Columbia Utilities Commission exemption application
• Engage with the City of Burnaby, the City of Vancouver, First Nations, and the public while proceeding with design
Thank you

Metro Vancouver cityscape in fog
BACKGROUND

What? Encourage residents to celebrate the holiday season with less waste

Why? Supports waste reduction and diversion targets established in the Integrated Solid Waste and Resource Management Plan

How? Long-term waste reduction messaging
- 16th year of a holiday waste reduction campaign
- 13th year of “Create memories, not garbage”
APPOROACH
Strategy

Primary message:
Make just one change to celebrate with less waste

Call to action:
Find low-waste ideas at creatememoriesnotgarbage.ca
## APPROACH
### Media

<table>
<thead>
<tr>
<th></th>
<th>EARLY SHOPPERS</th>
<th>MAIN CAMPAIGN</th>
<th>POST CHRISTMAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct 16 – Oct 29</td>
<td>YouTube, Online ads, Social Media, Google Search, TV</td>
<td>Oct 30 – Dec 25 YouTube, Online Ads, Social Media, Google Search, Sponsored Content, Shopping Mall Displays, Audio Streaming, Radio, Transit, TV</td>
<td>Dec 26 – Jan 7 YouTube, Online Ads, Social Media, Google Search</td>
</tr>
</tbody>
</table>
MEDIA METRICS

Social media
MEDIA METRICS
Digital tactics

Banner ads
Sponsored content
MEDIA METRICS

TV & out-of-home

PSA

Transit bus backs

Shopping mall digital screens
POST-CAMPAIGN RESEARCH

• 17% of respondents are familiar with the holiday waste campaign
• 1 in 4 residents said that the ads caused them to make changes
  • using no or recyclable gift wrap was the preferred choice (70%)
• Holiday tips are well received — popular suggestions already align with existing opinions
• Environmental impact of gifts is not a meaningful consideration for most residents
• A majority of respondents opted for shopping online — particularly young families
• Experiences are still seen to cost more or harder to find
2024 CAMPAIGN STRATEGY

• Revisit creative platform to ensure consistency across tactics

• Focus campaign period on highest performing weeks

• Consider new content – DIY ideas, influencers, helping the last-minute shopper, adding more Merry Memory Maker app ideas

• Continue collaboration with member jurisdictions