



Dec 13, 2024

To Director, Environmental Management Act, Authorizations and Metro Vancouver  
[solidwasteoperations@metrovancover.org](mailto:solidwasteoperations@metrovancover.org),

Re: Response to Metro Vancouver's Operating Certificate amendment feedback request

Dear Sir or Madam,

Thank you for the opportunity to provide feedback on this request for a continued amendment.

Zero Waste BC is a non-profit association dedicated to driving systemic change towards Zero Waste in BC. Zero Waste is defined as the "conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health". Our current resource consumption system is a linear take-make-waste system. Linear resource consumption systems create waste and other forms of pollution, deplete resources, change land uses, and diminish biodiversity by design. They also generate a huge amount of greenhouse gases which constitutes just some of the discharges that threaten the economy, human health, and the environment. Here is the link to the updated [Zero Waste Hierarchy](#) which should be followed when developing waste solutions.

We are very concerned about the ongoing operation of the incinerator and this request to allow higher levels of pollution than should be permitted. Our intention for this feedback is that it will assist in the redesign of our systems for a future where waste does not threaten the economy, human health and the environment.

Sincerely  
Sue Maxwell  
Chair, Zero Waste BC

# Feedback on Metro Vancouver's proposed Operating Certificate amendment

The feedback below will look at the sulfur dioxide (SO<sub>2</sub>) and hydrochloric acid (HCl) emission levels and then look at the air quality monitoring, test results and air pollution more broadly. Feedback will also be given on greenhouse gases (GHGs), toxic substances, bottom ash, cumulative impacts, district energy and the alternatives to the incinerator before closing with final recommendations.

## 1. SO<sub>2</sub> and HCl Amendment Request

Metro Vancouver has already had over an additional 3 years of pollution allowed under the amended permit which was sufficient time to plan and build pollution capture systems to meet the provincial standard of 50 mg/m<sup>3</sup> (which should be noted allows more pollution than the more stringent levels set by the EU of 5-40 mg/m<sup>3</sup> for existing incinerators<sup>1</sup>). While Metro Vancouver notes that the ambient air quality around the incinerator still meets its standards, that does not negate the fact that in 2023 it released over 100 tonnes of sulphur dioxide and 90 tonnes of hydrochloric acid into the air.<sup>2</sup> Dilution is not the solution to pollution and allowing ambient air quality to be the metric rather than emissions is not equitable to other polluters, nor fair to the residents and workers nearby. Dilution reduces the concentration, but for non-threshold carcinogens, in an already polluted airshed this may not be adequately protective of public health.

There are other pollution sources in the region, and cumulative exposures from these multiple sources are reason for stronger action to reduce pollutants from all sources, not relaxing protections from this incinerator, as Metro Vancouver is proposing. In addition, polluter pays is a key concept reflected in many provincial policies and the desire of a polluter to avoid costs should not factor into decisions to protect air quality. These costs include the additional cancer cases, morbidity and mortality from added pollution.

When Metro Vancouver wished to build more incinerators, it assured the public that the facilities would be built and maintained to meet the best available standards and yet this proposed amendment seems to belie this intent by trying to avoid meeting more stringent pollution limits.

### Recommendations:

1. That the province maintain its requirements of polluters to meet or outperform provincial standards and require Metro Vancouver to adhere to it; and that the province update its standards to match the most stringent ones globally.
2. That the province require testing of HCl directly and not use other metrics as a substitute.

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<sup>1</sup> European Commission (2019). Best Available Techniques... for Waste Incineration. Accessed at <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32019D2010>.

<sup>2</sup> NPRI. Metro Vancouver Waste- to Energy Facility report. Accessed at <https://pollution-waste.canada.ca/national-release-inventory/2023/362>.

## 2. Air Quality Monitoring

Waste combustion facilities are a large source of industrial air pollution impacting climate and public health. Burning solid fuels emits significantly more pollution than liquid and gaseous fuels. Advances in technology have enabled more effective methods to monitor pollutants emitted by waste combustion facilities but in many cases, the actual technology in use to monitor pollutants at facilities has not been updated. As a result, the data regarding the types and amounts of pollutants emitted is not adequate to determine their true effect on human health.

Presently Metro Vancouver tests for dioxins and furans (and for other semi-volatile organic compounds, including chlorobenzenes, chlorophenols, polychlorinated biphenyls, and polycyclic aromatic hydrocarbons only once a year, only for one boiler of the three, only for the chlorinated dioxins/furans (and not other forms) and only during ideal conditions. Testing during start up, shut down or malfunction is currently prohibited but are the times when there is likely to be the highest level of these pollutants. This means that the actual total amount of dioxins and furans released is unknown and the impact it has as a cumulative pollutant is unmanaged. Of note is that dioxins/furans bioaccumulate and are particularly hazardous. The International Pollutants Elimination Network (IPEN) reports that “one-time measurements may not be informative at all for combustion plants”.<sup>3</sup> It goes on to note that these one-time measurements have underestimated emissions in several examples in European countries, highlight the recommendations of the European Environment Bureau to increase testing frequency and reports that waste incinerators were responsible for 19% of dioxin emissions to air in the EU in 2015. It similarly recommends long-term monitoring of mercury.

Samples taken near incinerators in the EU, many of which are newer and supposedly less polluting than the older ones like the one in Metro Vancouver, have revealed significant levels of pollutants in moss, soils, and the eggs of backyard chickens in the vicinity of these incinerators. This includes higher levels than officials expected near incinerators of: dioxins in backyard chicken eggs in the Netherlands; dioxin and PCBs in eggs in Belgium; PFAS, PAH and dioxins in eggs and vegetation (moss/pine needles) in Spain and Lithuania.<sup>4</sup> Health authority tests verified similar findings in France resulting in warnings regarding consumption of backyard chicken eggs.<sup>5</sup> Recent results show similar findings (dioxins in chicken eggs and meat of domestic cows; PFAS in chicken eggs, fish livers, water and sediment; heavy metals found in pine needles, moss and soil) near a cement kiln burning waste in Slovakia.<sup>6</sup> Health authority tests verified similar findings in France resulting in warnings regarding consumption of backyard

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<sup>3</sup> Jelinek, N. et al. for IPEN and Arnika(2024). Waste incineration and the environment. Accessed at <https://arnika.org/en/publications/waste-incineration-and-the-environment>.

<sup>4</sup> Toxicowatch (2023). List of studies in the EU. <https://www.toxicowatch.org/blank-1>

<sup>5</sup> Jelinek, N. et al. for IPEN and Arnika(2024). Waste incineration and the environment. Accessed at <https://arnika.org/en/publications/waste-incineration-and-the-environment>.

<sup>6</sup> Toxicowatch (2024). Executive summary -2nd TW-Biomonitoring in the region of the cement kiln Cementáreň Turňa nad Bodvou, Slovakia. Accessed at [https://www.toxicowatch.org/\\_files/ugd/8b2c54\\_a768c5dd68dd4591b33e968c8825de37.pdf](https://www.toxicowatch.org/_files/ugd/8b2c54_a768c5dd68dd4591b33e968c8825de37.pdf)

chicken eggs. Section 2.17 of the certificate required “recommendations for sampling or evaluation of receptors such as soil, vegetation, or other media.”<sup>7</sup> Additional examples of dioxin contamination near incinerators are also noted in the IPEN report.<sup>8</sup> Dioxins are non-threshold carcinogens, i.e. there is no safe level.

The fact that monitoring of pollution is not to be conducted during start up, shut down and times of malfunction means that critical data is missing. The main function of the testing is to show that the system *can* work optimally, but not that *it is* working optimally at all times. It also does not provide the data that is critical for understanding the impacts to human and environmental health, which for many pollutants is the total long-term exposure, particularly for the pollutants which accumulate and for which there is no **safe** level. Aging incinerators have more downtime incidents, resulting in higher emissions from startup and shutdown occurrences. The EU is taking steps to address this and will now require testing during start up.<sup>9</sup>

Metro Vancouver currently conducts manual stack tests four times a year on particulate matter, trace metals, and hydrogen fluoride and annual testing (on one of the three units) of chlorinated dioxins/furans, polycyclic aromatic hydrocarbons (PAH), hexachlorobenzenes, total chlorobenzenes, total chlorophenols and PCBs. Annual greenhouse gas reporting is also done as well as annual reporting to the National Pollutant Release Inventory on bottom ash, fly ash and substances emitted into the air. Continuous testing is done for sulphur dioxide, nitrogen oxides, carbon monoxide, carbon dioxide, hydrogen chloride, total hydrocarbons, and opacity. This is shown in the table below (the second column has details from the Operating Certificate).

Continuous monitoring or continuous sampling of emissions provides more accurate data than annual stack testing. A bill has been introduced into the Hawaiian Legislature that will require more stringent testing. It highlights key concerns over testing results as compared to actual emissions:

- “When data from annual stack testing was compared to data from continuous monitoring of hydrochloric acid emissions at the nation's largest waste incinerator, it was found that the actual emissions determined by continuous monitoring were sixty two per cent higher than indicated by annual stack testing.”
- “that dioxins and furans are the most toxic man-made chemicals known to science. According to studies of incinerators in Europe, it was observed that continuous sampling for dioxins at incinerators found the actual emissions to be thirty-two to fifty-two times greater than indicated by annual stack tests used in the United States, testing just once per year under ideal operating conditions. Moreover, a more recent European study

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<sup>7</sup> Ministry of Environment and Climate Change Strategy (2020). Amended Operational Certificate 107051. Accessed at <https://metrovancover.org/services/solid-waste/Documents/wtef-operationalcertificate-107051.pdf>.

<sup>8</sup> Jelinek, N. et al. for IPEN and Arnika (2024). Waste incineration and the environment. Accessed at <https://arnika.org/en/publications/waste-incineration-and-the-environment>.

<sup>9</sup> Zero Waste Europe (2023). Long-awaited revamp of Industrial Emissions Directive improves dioxin monitoring in incinerators. Accessed at <https://zerowasteurope.eu/press-release/long-awaited-revamp-of-industrial-emissions-directive-improves-dioxin-monitoring-in-incinerators/>.

using continuous sampling technology found that annual stack tests underestimate dioxin emissions by four hundred sixty to 1,290 times.”<sup>10</sup>

Similarly, Oregon set a new bar by requiring continuous testing for carbon monoxide, SO<sub>2</sub>, NO<sub>x</sub>, opacity, PCB, dioxin/furan, cadmium, lead, mercury, arsenic, total chromium, manganese, nickel, selenium and zinc.<sup>11</sup>

The European Commission adopted its Best Available Techniques in 2019.<sup>12</sup> It requires continuous testing for particulate matter, mercury, total volatile organic compounds, ammonia, hydrogen fluoride and testing every six months for polybrominated dioxins and furans but monthly for chlorinated dioxins and furans, and for dioxin-like PCBs. There should be annual testing for benzopyrene. The table below shows the current requirements for Metro Vancouver to test compared to the current best available requirements.

Parameter for Stack E300670	Current Requirements in existing Operating Certificate Sampling and Analysis Frequency	Best Available Requirements
Rate of Discharge <sup>2</sup> , m <sup>3</sup> /s	Continuous & Four times per year	Continuous
Total Particulate Matter, mg/m <sup>3</sup>	Four times per year	Continuous
Particulate Matter (PM <sub>2.5</sub> ), mg/m <sup>3</sup>	No requirement	Continuous
Particulate Matter (PM <sub>10</sub> ), mg/m <sup>3</sup>	No requirement	Continuous
Opacity, %	Continuous & record one minute average values for inspections	Continuous
Oxygen, % of dry air	Continuous & record 1/2 hr average values for concentration adjustments	Continuous
Carbon Monoxide (CO), mg/m <sup>3</sup>	Continuous & record 1/2 hr and 24 hour average values	Continuous
Hydrogen Chloride (HCl)*, mg/m <sup>3</sup>	Continuous & record 1/2 hr and 24 hour average values	Continuous

<sup>10</sup> Hawaii Legislature (2024). House Bill 2796. Accessed at <https://legiscan.com/HI/text/HB2796/id/2901851>

<sup>11</sup> Oregon Legislative Assembly (2023). Senate Bill 488. Accessed at [https://olis.oregonlegislature.gov/liz/2023R1/Downloads/MeasureDocument/SB488#:~:text=\(2\)%20A%20municipal%20solid%20waste,during%20a%20single%20calendar%20year](https://olis.oregonlegislature.gov/liz/2023R1/Downloads/MeasureDocument/SB488#:~:text=(2)%20A%20municipal%20solid%20waste,during%20a%20single%20calendar%20year)

<sup>12</sup> European Commission (2019). Best Available Techniques... for Waste Incineration. Accessed at <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32019D2010>.

<b>Hydrogen Fluoride (HF)*, mg/m3</b>	Four times per year	Continuous
<b>Sulphur Dioxide (SO<sub>2</sub>), mg/m3</b>	Continuous & record 1/2 hr and 24 hour average values	Continuous
<b>Nitrogen Oxides (NO<sub>x</sub>), mg/m3</b>	Continuous & record 1/2 hr and 24 hour average values	Continuous
<b>Total Hydrocarbons (THC), mg/m3</b>	Continuous & record 1/2 hr and 24 hour average values	Continuous
<b>PCDD &amp; PCDF TEQ, pg/m3</b>	Annually on one boiler**	Continuous
<b>Total Mercury, mg/m3</b>	Four times per year	Continuous
<b>Polychlorinated Biphenyls (PCBs), mg/m3</b>	Annually on one boiler**	Continuous
<b>Chlorophenols, mg/m3</b>	Annually on one boiler**	Annually on all boilers
<b>Chlorobenzene, mg/m3</b>	Annually on one boiler**	Annually on all boilers
<b>Lead, mg/m3</b>	Four times per year	Continuous
<b>Arsenic, mg/m3</b>	Four times per year	Continuous
<b>Cadmium, mg/m3</b>	Four times per year	Continuous
<b>Chromium (hexavalent), mg/m3</b>	Four times per year	Continuous
<b>Polycyclic Aromatic Hydrocarbons (PAH), mg/m3</b>	Annually on one boiler**	Continuous
<b>Manganese</b>	No requirement	Continuous
<b>Nickel</b>	No requirement	Continuous
<b>Selenium</b>	No requirement	Continuous
<b>Zinc</b>	No requirement	Continuous
<b>Total Volatile Organic Compounds</b>	No requirement	Continuous
<b>Ammonia</b>	No requirement	Continuous
<b>Polybrominated dioxins and furans</b>	No requirement	Every six months on all boilers
<b>Benzopyrene</b>	No requirement	Annually on all boilers
<b>Carbon Dioxide</b>	No requirement	Continuous
<b>Per and polyfluoroalkyl substances (PFAS)</b>	No requirement	Continuous
<b>Beryllium</b>	No requirement	Continuous

\*Note the operating certificate allows for SO<sub>2</sub> testing to act as a surrogate for acid gases such as HCl and HF which could mean these are not actually being tested for. No reports on regular testing for HCl have been seen in the annual, quarterly or monthly reports.

**\*\*Note the above tests should be required for all boilers instead of rotating among boilers to provide better assurance that the facility is meeting its requirements.**

The best available requirements (Hawaii) note that: “Where technologically feasible, the plan shall provide for the use of a continuous emissions monitoring system to monitor air contaminants. If it is not technologically feasible to use a continuous emissions monitoring system to monitor an air contaminant, the plan shall provide for the use of a continuous automated sampling system to continuously sample an air contaminant.”

The focus is largely on primary emissions (those coming out the main stack treated by air pollution control systems) however secondary or fugitive emissions (those from the venting of silos containing ashes and discharge of air from waste storage compartments and other indoor environments) can be responsible for “up to 29% of the total dust and 10% of organic carbon releases.”<sup>13</sup> The IPEN report notes that these fugitive emissions may have been responsible for the “presence of PCBs and dioxins in chicken eggs near incinerators in the UK and China”.<sup>14</sup>

From a health perspective, the testing should set out to identify spikes, hazardous days and the need for health warnings as well as protecting the long term health of people and the environment. Testing should also reflect best case, middle case and worst case scenarios. Section 2.13 Action Plan Review and Update of the Operating Certificate notes that the “The Operational Certificate Holder must conduct a review acceptable to the Director of an Action Plan for Review of Environmental Performance of the Metro Vancouver Waste to Energy Facility (Action Plan) to assess current environmental technology using principles outlined in the ministry Determining Best Achievable Technology Standards policy. The Action Plan must be reviewed and updated at least each 5 years from issuance of this Operational Certificate, with the next review and update required by December 15, 2021. Actions recommended as part of each review must be incorporated into the Action Plan.”<sup>15</sup> Given the changes in policy globally, it is time to conduct a review and implement changes. The certificate also required evaluation of emissions during startup and shutdown (section 2.16) and improved continuous testing would allow for an update with better data.

Testing during start-up, shutdown and times of malfunction also would eliminate the possibility that tests are not conducted when loads of problematic materials are burned or determining high results were a result of malfunction.

## **Recommendations:**

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<sup>13</sup> Jelinek, N. et al. for IPEN and Arnika (2024). Waste incineration and the environment. Accessed at <https://arnika.org/en/publications/waste-incineration-and-the-environment>.

<sup>14</sup> Jelinek, N. et al. for IPEN and Arnika (2024). Waste incineration and the environment. Accessed at <https://arnika.org/en/publications/waste-incineration-and-the-environment>.

<sup>15</sup> Ministry of Environment and Climate Change Strategy (2020). Amended Operational Certificate 107051. Accessed at <https://metrovancouver.org/services/solid-waste/Documents/wtef-operationalcertificate-107051.pdf>.

1. That the province require the best available technology and practices around air quality testing, at least equivalent to Hawaii and Oregon’s requirements.
2. That testing is done also during times of start-up, shutdown and malfunction to understand the potential air quality impacts and total amounts of pollution.
3. That testing is done with a frequency to match the best available requirements shown in the table above and done as blind testing (as in the operator will not know when the testing will be done).
4. That Metro Vancouver fund, but the Health Authority conduct, the testing of moss, soils, and backyard chicken eggs in the area surrounding the incinerator to compare this to the pre-incinerator soil tests and ensure safety of nearby residents and workers as well as those consuming any agricultural products grown or raised nearby.

### 3. Air Quality Test Results

We reviewed the test results posted by Metro Vancouver<sup>16</sup> and compared them to the best in class standard of other jurisdictions:

- SO<sub>2</sub> -Metro Vancouver’s continuous emissions monitoring data showed that in August 2024 (the most recent month of data available) the SO<sub>2</sub> emissions levels averaged 65.8 mg/m<sup>3</sup> for boiler 1, 80.7 mg/m<sup>3</sup> for boiler 2 and 69.3 mg/m<sup>3</sup> for boiler 3 which all exceeded the provincial standard of 50 mg/m<sup>3</sup> and two reached maximums (for a total of ten days for all boilers combined) that exceeded even the amended permit levels (90 mg/m<sup>3</sup>). The three boilers would not meet the more stringent requirement for SO<sub>2</sub> required by the EU or those of Durham (of 35 mg/m<sup>3</sup>) or the proposed US EPA standard (36.7 mg/m<sup>3</sup>) for even a single day of testing. Data for other months in 2024 are similar.
- NO<sub>x</sub> -August tests showed not a single day for any of the boilers would have met the standard proposed by the US EPA for a new incinerator (66.5 mg/m<sup>3</sup>). The average for each of the boilers was 129.5 mg/m<sup>3</sup>, 125.6 mg/m<sup>3</sup> and 135.6 mg/m<sup>3</sup>. Data for other months in 2024 are similar.
- Chlorinated dioxins and furans (PCDD/PCDF) -a test repeated three times in boiler 3 for the annual test showed 7.78E-06 TEQ g/day. If this was similar in the other boilers and they ran continuously, that would be over 290 mg that would have been released since the incinerator started. While this sounds small, the health impacts of even a very minute amount can be significant. Note that the dioxin/furan limits are set to match the BC June 6, 2000 Order In Council where it also notes that for pollution prevention, a strategy should be developed to minimize dioxins and furans which can include “waste diversion initiatives to minimize the generation of wastes destined for disposal (waste reduction, material reuse options)” and “waste segregation initiatives aimed at materials with greater potential to generate emissions of dioxins and furans or other air pollutants of concern (e.g., mercury, other heavy metals) and aimed at diverting those wastes to recycling or other non-incineration disposal options”.<sup>17</sup>

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<sup>16</sup> Metro Vancouver -Reports and Operational Certificate. Accessed at <https://metrovancover.org/services/solid-waste/reports-and-operational-certificate>.

<sup>17</sup> Province of British Columbia (2001). Order of the Lieutenant Governor in Council No. 525.



- Other items of note:
  - arsenic emissions doubled since 2012
  - cadmium had been much higher in past but swings around
  - CO is in general higher in past decade than previous
  - HCl is higher since 2017
  - Lead was higher in the past but still varies by up to five times
  - Mercury is notably lower since 2021 by factor of 16x and much higher in the early 2000s so need to consider accumulation
  - PM<sub>10</sub> and PM<sub>2.5</sub> vary.<sup>18</sup>

These variations show that while some items may be curbed through better pollution control measures, each load of waste will vary in contents and so the results too will vary. Continuous testing and sampling will provide more robust data. Also it is important to note that the data reported on Metro Vancouver's website only shows total particulate matter but the NPRI report shows the separate PM<sub>10</sub> and PM<sub>2.5</sub>. Each of these has different potential health impacts and so should be required for separate reporting going forward.

#### 4. Air Pollution

In general, there is no safe level of PM<sub>2.5</sub>, NO<sub>x</sub> and many other emitted air pollutants, only acceptable levels. As new studies are done, greater levels of risk are often confirmed. Therefore it is important to ensure that the population and environment in proximity of the incinerator and downwind are not suffering the additional risk from allowed pollution levels. Measuring ambient air quality is not sufficient to protect people and the environment. Using this alone without measurements at the stack, and source reduction requirements allows costs to be borne by the environment and people. Emissions regulation is used to protect the environment and human health and this is independent of which industry is producing the emissions.

Dr. Douw Steyn, a well-cited air quality specialist, conducted a review of standards from around the globe for ambient air quality, and emissions from burning waste in incinerators and cement kilns. This review informed these recommendations and is attached. Please note that the EU standards noted in that document are the standard for air emissions for ease of comparison, however the EU Best Available Techniques standards for emissions reductions offer a range based on the type of technology used, making it harder to compare across jurisdictions, but more appropriate to tailor emissions requirements for a particular kind of technology or facility. These more EU recent standards that rely on the application of BAT, are similar to, or more stringent than the emissions limits in table 6 of Dr Steyn's report.

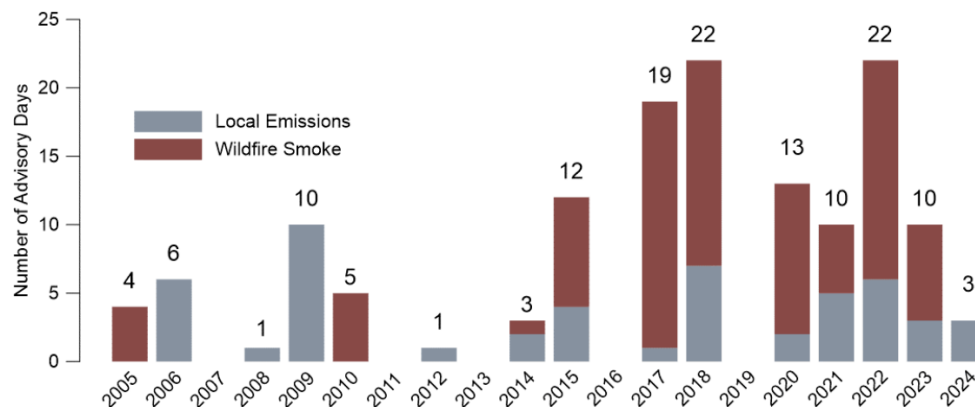
Metro Vancouver's Climate Action Committee was recently asked to update the ambient air quality objectives at its November 7th, 2024 meeting and the staff report noted:

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<sup>18</sup> National Pollutant Release Inventory. Accessed at <https://pollution-waste.canada.ca/national-release-inventory/2023/362>.

- Metro Vancouver’s Clean Air Plan’s “2030 regional target – “ambient air quality meets or is better than the ambient air quality objectives that are regularly updated by Metro Vancouver” –aims to minimize harm to human health and the environment.”
- “Exposure to certain air contaminants is linked to increased heart and breathing problems, more frequent hospitalization and premature death, even at the relatively low levels experienced by residents in the region. Health Canada estimates that air pollution from human sources and wildfires contributes to 1,900 premature deaths per year in British Columbia (Reference 1). Fine particulate matter, ozone, and NO<sub>2</sub> have the most impact on public health, followed by SO<sub>2</sub>, volatile organic compounds, and carbon monoxide. Children, the elderly, and people with underlying health conditions are most at risk from these air contaminants. These air contaminants also harm the environment (e.g., ozone can damage food crops and other plants).”
- “due to a warming climate, the region is expected to experience hotter summers, which will likely lead to higher ozone levels. Governments and others need to maintain existing policies and explore additional policies to further reduce levels of ozone, NO<sub>2</sub>, and SO<sub>2</sub> in the region.”<sup>19</sup> The number of air quality advisory days is shown later in the report and in the figure below. This shows the impact low rainfall and increased wildfire activity can have on the region (2024 being a higher rainfall and lower smoke year for the region). “Climate projections indicate the region will experience hotter, drier summers and warmer, wetted winters. “

**Figure 1: Number of days of air quality advisories in the Lower Fraser Valley**



Note: Trigger levels for advisories have changed over the years; care must be taken when interpreting advisory trends.

- The appendix of that report also acknowledges there is no safe level for ground level ozone and that it “causes respiratory problems and contributes to early death, even at ambient levels”; that there is no known safe ambient level for NO<sub>2</sub> and that it “causes respiratory problems and contributes to early death at ambient levels commonly found in Canada”; and that SO<sub>2</sub> “causes respiratory problems and contributes to early death, even at ambient levels”.

<sup>19</sup> Metro Vancouver (2024). Agenda for the Climate Action Committee meeting November, 7, 2024. Accessed at <https://metrovancouver.org/boards/ClimateAction/CAC-2024-11-07-AGE.pdf>.

- Curiously, although the report recommended updating Metro Vancouver's AAQ objectives to match the upcoming Canadian standards for 20205, it recommended keeping the older standard for SO<sub>2</sub> (1 hour) at 70 ppb instead of matching the new Canadian standard of 56 ppb or advancing to the European or American standards.
- The report also referenced Health Canada's Health Impacts of Air Pollution in Canada which notes *"Health Canada estimates that in 2016, 15,300 premature deaths in Canada could be attributed to air pollution from PM<sub>2.5</sub>, NO<sub>2</sub>, and ozone. Nonfatal health outcomes attributable to air pollution include 35 million acute respiratory symptoms days, 2.7 million asthma symptom days and 8,100 emergency room visits. The total economic value of adverse air pollution health impacts is estimated to be \$120 billion per year (2016 CAD), equivalent to 6% of total real gross domestic product in 2016. Although air pollution affects the health of Canadians in all regions of the country, the largest impacts are seen in the most populous provinces and those with the largest sources of emissions: Ontario, Quebec, British Columbia and Alberta."*<sup>20</sup>

It is ironic that while Metro Vancouver is proposing to add more stringent NO<sub>x</sub> emission limits for boilers and process heaters and notes burning materials at high temperatures and industrial facilities as key sources of the main pollutants, it is ignoring a key point source of these pollutants at the Burnaby incinerator.

## Cumulative Impacts

The province is starting to use a cumulative impact lens to evaluate consequences of permitted actions so with that in mind, we would like to point out that the incinerator is situated on industrial lands and near a busy highway where other sources of pollution exist as well. With significant land use changes since 1988 when the incinerator was built, there are more residents moving into nearby new neighbourhoods and more people working in the vicinity. This increases the risks associated with burning materials in close proximity. The only two cement kilns in BC are situated within a 10 km radius of the incinerator (see map below). Of note is that these cement kilns are also increasingly burning forms of waste and that their permits (issued by Metro Vancouver) allow even higher levels of pollution than the province allows the incinerator to produce.

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<sup>20</sup> Health Canada (2021). Health Impacts of Air Pollution in Canada: Estimates of morbidity and premature mortality outcomes -2021 Report. Accessed at <https://www.canada.ca/en/health-canada/services/publications/healthy-living/health-impacts-air-pollution-2021.html#a6>



Cement kilns are not designed to burn waste, have fewer pollution abatement measures in place than the incinerator and have far lower testing requirements with more limited transparency of results.

Additionally, we must consider the cumulative and episodic impacts to an airshed subject to air pollution from wildfires. This risk is clearly increasing with climate change. Dr Tim Takaro also raises the concern of the cumulative impacts in an industrial area with the addition of hotter days, especially in an urban heat island. The conversion of chemicals, including the ozone reaction, increases with heat and the current regulatory regime is not protective. Infants, pregnant women and seniors are the most vulnerable. The safety of the most vulnerable should be the threshold of what pollution levels are allowed. COPD, asthma, and cardiovascular disease, as well as other health issues can lead to premature death.

Standards are based on ambient air quality but impacts to people come from exposure and dose which can be hard to estimate. For some pollutants, very small amounts can be harmful - for example dioxin, furans, and mercury. In addition, averaging over time is not the answer as for some pollutants the short term concentration is the better predictor of health impacts (e.g. SO<sub>2</sub>).

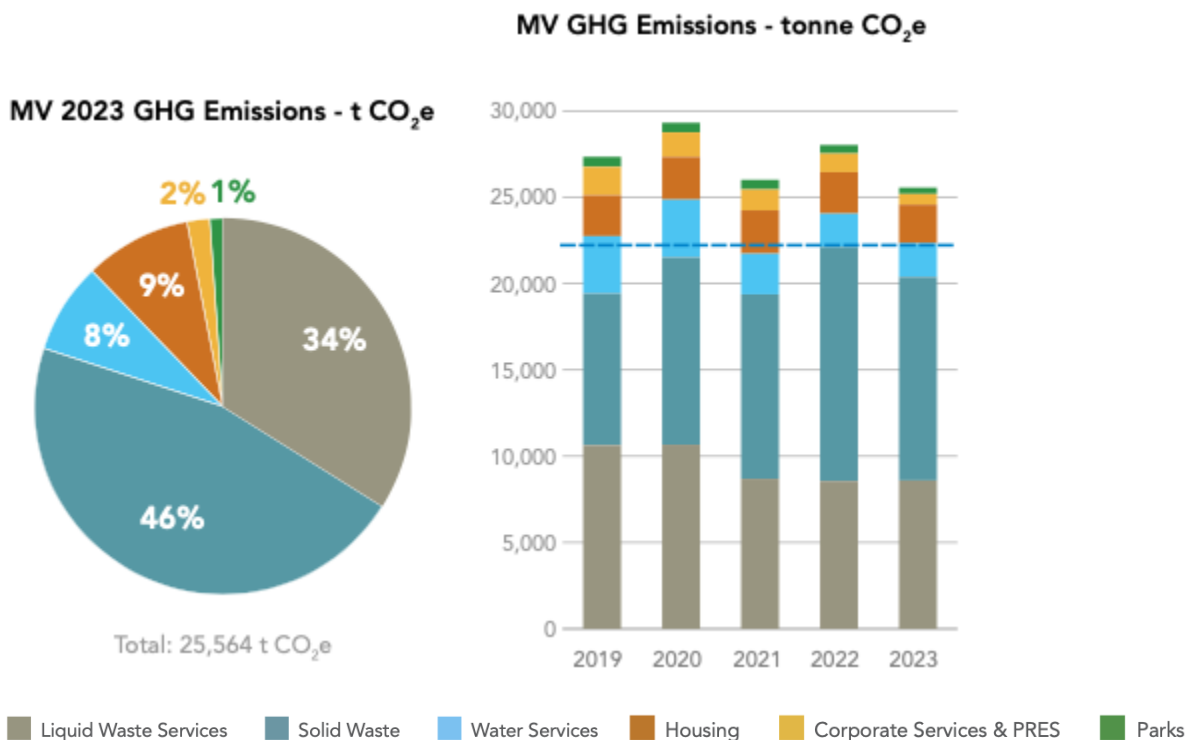
**Recommendations:**

1. The province should revise its AAQ to align with the new WHO standard.
2. The province should update its emissions limits for the incinerator to match the best in class globally, including for NO<sub>x</sub>.
3. The province should mandate source reduction in air pollutants.
4. The province take back the responsibility of issuing air quality permits In Metro Vancouver (at the very least for cement kilns where there is a discrepancy in standards and the potential for conflicts of interest).
5. The province should mandate that if waste is to be burned in cement kilns, that emissions standards should match or exceed the stringency of requirements for the incinerator. Ideally the province would ensure that the cement kilns no longer burn forms of waste and meet new upgraded standards.

6. The province do an analysis of the cumulative impacts of pollution in the area.

## 5. GHGs

The province tracks both the annual biogenic and non-biogenic emissions from the incinerator which has consistently been in the top 25 point sources of GHG in the province (non-biogenic alone). The incinerator produces a significant quantity to GHG -up 1.27 tonnes per tonne of waste burned (both biogenic and fossil-based emissions) and by 2023, the fossil based emissions of the incinerator had increased 12% since 2014.<sup>21,22</sup> The energy-related emissions for solid waste services were up by 56% since 2014, driven mainly by the incinerator. This is counter to Metro Vancouver’s stated goals to reduce emissions by 45% by 2030 (from 2010 levels) and be carbon neutral by 2050. Solid waste (in the darker blue-gray) makes up the largest segment (46%) of GHG emissions and this was similar for other years. See figures below from the same report.



The report shows the high level of GHG emissions from burning waste (Table 10 below) and that the facility produces energy (roughly twice the energy use of the solid waste services) but

<sup>21</sup> Metro Vancouver (2024). Metro Vancouver Annual Corporate Energy and Greenhouse Gas Emissions Management Report. Accessed at <https://metrovancover.org/services/air-quality-climate-action/Documents/annual-corporate-energy-and-greenhouse-gas-emissions-management-report-2019-2023.pdf>.

<sup>22</sup> The report notes this increase is due to burning more plastic, which is fossil-fuel based. It should be highlighted that this subverts efforts to encourage the redesign of products to use less plastic and plastic types that can be recycled as well as efforts to ensure producers collect their plastics back for recycling.

fails to show that more energy can be saved by taking steps to recycle or reuse the materials. The report also notes “Tonnage managed by the Waste-to-Energy Facility has decreased compared to 2014 due to the disposal ban on organics. In addition, total electricity generation and electricity generation per tonne of municipal solid waste processed at the Waste-to-Energy Facility have decreased since 2014. The turbine was offline from September 23, 2023 through July 8 2024 due to a generator malfunction.” These tables from the Metro Vancouver Annual Corporate Energy and Greenhouse Gas Emissions Management Report 2019-2023 shows that all of these metrics are moving in the wrong direction

TABLE 3: FIVE-YEAR ENERGY AND GHG EMISSIONS TRENDS- SOLID WASTE SERVICES

SOLID WASTE SERVICES							
	BASELINE (2014)	2019	2020	2021	2022	2023	% CHANGE 2014 TO 2023
Total Energy Use (GJ)	192,026	213,575	250,167	257,387	290,879	284,018	48%
Total Cost (\$)	\$5.2M	\$5.1M	\$5.0M	\$5.5M	\$8.8M	\$8.3M	58%
Total GHG Emissions (t CO <sub>2</sub> e)	7,570	8,789	10,854	10,686	13,559	11,788	56%
Mass Disposed (tonnes)	542,477	577,950	572,222	589,929	607,728	655,532	21%
GJ/tonne disposed	0.35	0.37	0.44	0.44	0.48	0.43	22%
\$/tonne disposed	\$9.67	\$8.85	\$8.73	\$9.34	\$14.54	\$12.61	30%
kg CO <sub>2</sub> e/tonne disposed	14.0	15.2	19.0	18.1	22.3	18.0	29%

Improvement / Favourable (change less than zero)

Degradation / Unfavourable (change greater than zero)

TABLE 4: FIVE-YEAR ELECTRICITY GENERATION TREND- WASTE-TO-ENERGY FACILITY

WTEF ELECTRICITY GENERATION							
	BASELINE (2014)	2019	2020	2021	2022	2023	% CHANGE 2014 TO 2023
Inbound Tonnage (tonnes)	275,266	253,184	244,362	241,531	233,052	236,278	-14%
Electricity Generation (GJ)	537,110	621,374	544,558	599,656	578,521	384,930	-28%
Electricity Generation per Tonne Municipal Solid Waste Burned (GJ/tonne)	1.95	2.45	2.23	2.48	2.48	1.63*	-17%

Improvement / Favourable (change less than zero)

Degradation / Unfavourable (change greater than zero)

\*Electricity generation and electricity generation/tonne affected by generator outage.

TABLE 10: FIVE-YEAR ENERGY AND GHG TRENDS- WASTE-TO-ENERGY FACILITY

GHG EMISSIONS (T CO <sub>2</sub> E) - SOLID WASTE SERVICES WASTE-TO-ENERGY FACILITY							
	BASELINE (2014)	2019	2020	2021	2022	2023	% CHANGE 2014 TO 2022
Inbound Tonnage (tonne)	275,266	253,184	244,362	241,531	233,052	236,278	-14%
Biogenic Emissions from MSW	158,383	152,646	151,015	171,214	170,011	150,815	-5%
Fossil Emissions from MSW	108,171	115,154	135,269	131,820	109,365	121,070	12%
Fossil Emissions from Natural Gas	563	2,191	3,416	3,570	3,976	4,193	645%
Total GHG Emissions	267,117	269,991	289,700	306,605	283,352	276,078	3%
Total GHG Emissions from MSW	266,554	267,800	286,284	303,034	279,376	271,885	2%
Total GHG Emissions per Tonne MSW	0.97	1.07	1.19	1.27	1.22	1.17	20%

Improvement / Favourable (change less than zero)  
 Degradation / Unfavourable (change greater than zero)

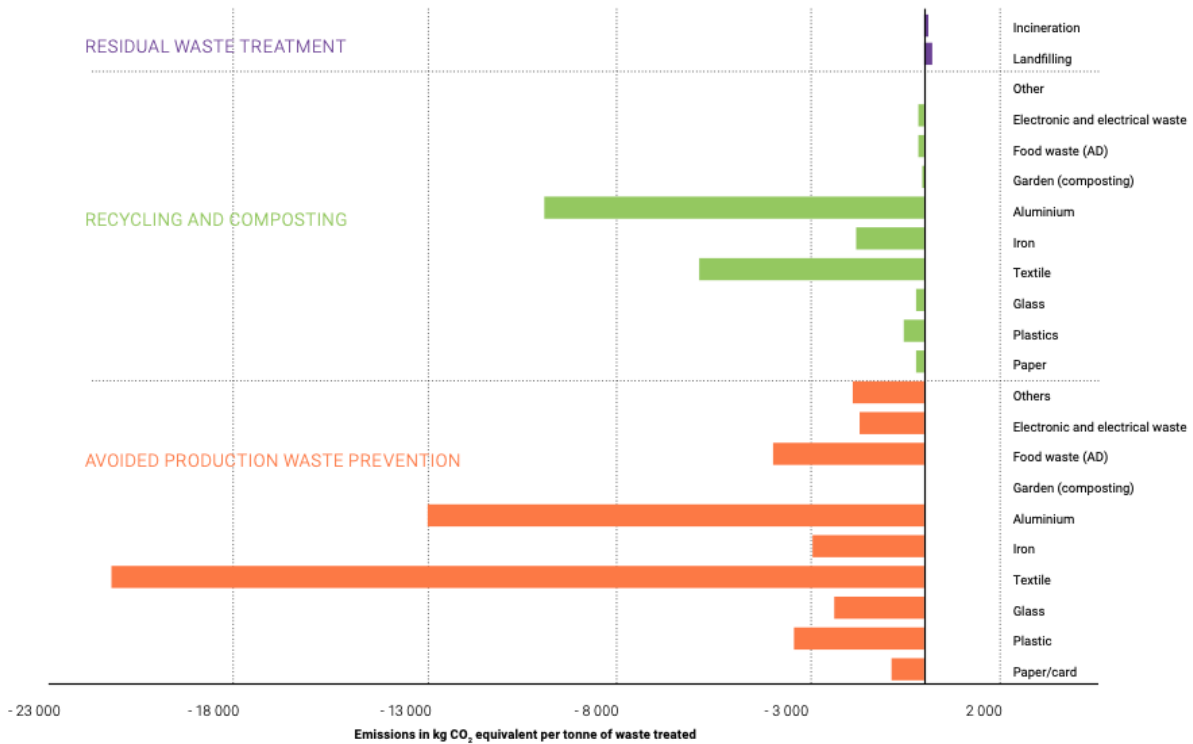
Additional concerns arise as the report shows a plan to burn biosolids which can increase the spread of PFAS and microplastics, loses nutrients and circumvents better solutions.

Zero waste practices such as recycling and composting offer more GHG benefits than WTE or landfilling and are less polluting,<sup>23</sup> however, “studies have shown that landfill with full pre-treatment (i.e. organic waste removal, further waste segregation of recyclables and bio-stabilisation) outcompetes waste incineration in terms of climate pollution, toxic air pollution and associated health costs.”<sup>24</sup> The IPEN report highlights the climate change potential of pursuing Zero Waste actions in the figure below.

<sup>23</sup> Morris, J. (2009). Environmental Life Cycle Assessment of Waste Management Strategies with a Zero Waste Objective Study of the Solid Waste Management System in Metro Vancouver, British Columbia. Accessed at <https://srmginc.com/images/LCA-and-Zero-Waste-Strategy-for-Metro-Vancouver-Region.pdf>.

<sup>24</sup> Jelinek, N. et al. for IPEN and Arnika (2024). Waste incineration and the environment. Accessed at <https://arnika.org/en/publications/waste-incineration-and-the-environment>.

**Figure 4.3:** Comparison of the impact on climate change (CO<sub>2</sub> emissions comparison) of various waste management methods excluding biogenic carbon (Source: Hogg & Ballinger, 2015).



ZWBC’s recent study also showed that more GHGs were produced per tonne of waste disposed using the Burnaby incinerator than the landfills, while Zero Waste efforts were the most beneficial and cost effective.<sup>25</sup>

**Recommendations:**

1. The province require Metro Vancouver to report total emissions from the facility and compare it to the total emissions of landfilling and Zero Waste actions and show emissions per tonne for each as well.
2. The province should ensure that burning waste is not exempt from carbon taxes nor cap and trade systems.
3. The province should ensure that burning waste does not count as a renewable energy source and should not qualify for any subsidies.
4. The province should insist that Metro Vancouver pursue and invest in Zero Waste actions.

**6. Toxic Substances**

The IPEN report also highlights the risks of chemical pollution from incineration including microplastics remaining in the ash and the spread of brominated fire retardants. The incineration of brominated fire retardants can form brominated dioxins, which are currently not tested for nor have a permitted level. Persistent Organic Pollutants (POPs) can be burned for

<sup>25</sup> Zero Waste BC (2023). Metro Vancouver - A Case Study on Waste Management Methods. Accessed at <https://drive.google.com/file/d/19oum89-TgC7Ab9-1C1IW2qFyVA7uOjyU/view>.



disposal but also are created in the incineration process, such as new forms of per- and polyfluoroalkyl substances (PFAS). The report also highlights the issue of dioxins in the ash (up to 95% of the dioxins) receiving little focus compared to air emissions and the risks posed by PCBs. The report shows concerns with hexachlorobenzene, pentachlorobenzene, hexachlorobutadiene, polycyclic aromatic hydrocarbons, polybrominated diphenyl ethers, PFAS, polychlorinated naphthalenes, polychlorinated dibenzothiophenes and other organic substances. Metals of concern with incinerators include lead, cadmium, arsenic, nickel, chromium, mercury, copper, zinc, beryllium. Many of these substances are not currently tested for nor have an allowed limit set. Some additional notes from the report:

- PFAS was not destroyed in the high temperatures and were found in bottom and fly ash. This is a particular issue when the ash will be distributed.
- Concerns on heavy metals - “Metals enter the incinerator in a less hazardous form than they exit. They leave it released from the materials they were bound to, reduced to elemental form or simpler compounds, making them more mobile and biologically available.”

**Recommendation:**

1. The province should require testing for these toxic substances and set limits. The precautionary principle should be used.

## **7. Bottom Ash**

The province requires appropriate management of bottom ash. Metro Vancouver has used bottom ash in the building of the United Boulevard Recycling and Waste Center and is proposing to send it to cement kilns to be mixed in with other materials. This would violate the precautionary principle.

In Britain, the wide distribution of ash from the Byker facility (previously asserted as safe) resulted in the requirement to recover the material and treat the areas that had been polluted.<sup>26,27</sup> The IPEN report also notes the risk of dioxins when using bottom ash for road construction and notes that both France and the Czech Republic have established dioxin content limits. It also highlights an issue that the Ministry of Environment of the Czech Republic has no overview of where the bottom and fly ash ends up.

Distributing a potential pollutant has high risk and limited benefit. At the very least, all projects that receive this material should be tracked so it could be recovered in the event of stricter regulations, better data and understanding of pollutant dispersal or higher than permitted levels of pollutants.

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<sup>26</sup> The Guardian (2000). Incinerator firm faces charges over toxic waste. Accessed at <https://www.theguardian.com/society/2000/dec/15/localgovernment.uknews>

<sup>27</sup> British Geological Survey (nd). Gateshead BGR\_Calc ground risk factsheets -Dioxins and furans. Accessed at [https://www2.bgs.ac.uk/brownfield/factsheets/BGR\\_calcGroundRiskFactsheet\\_Dioxins.html](https://www2.bgs.ac.uk/brownfield/factsheets/BGR_calcGroundRiskFactsheet_Dioxins.html).

**Recommendations:**

1. Require management of bottom ash in special landfill cells.
2. Do not allow it to be distributed through cement kilns or other methods.
3. Require testing around the United Boulevard facility, to monitor for offsite transport through the environment for toxicants of concern from bottom ash.
4. If it is distributed, require warnings to be given to recipients and a tracking system to keep records of where the materials go.

**8. District Energy**

Metro Vancouver is pursuing a district energy system; however the district energy system is being connected to the incinerator. Burning waste is the most GHG intense source of energy, even more so than coal.<sup>28</sup> The incinerator produces multiple air pollutants including dioxins and furans that are potent carcinogens with no safe level. Allowing the incinerator to be connected to the district energy system will lock the incinerator in for decades more, missing out on GHG reductions, requiring vast capital expenses and ensuring ongoing pollution in the new neighbourhoods that it will be serving.

Cleaner sources of energy exist (BC Hydro's grid has a very low GHG emissions intensity level) and more efficient ways of building and heating homes are now in common use (for example, the BC Energy Step code, passive houses, heat pumps).

**Recommendation:**

1. The province and Metro Vancouver should not permit district energy systems to connect to non-renewable energy sources (including the burning or thermal treatment of municipal waste).
2. Any district energy systems should be required to prove that the energy source is the least polluting and most efficient solution including comparisons to reducing energy requirements (through options like better sealing and insulation, etc.).

**9. Zero Waste Alternatives**

It is important to note how expensive the use of the incinerator is and thus consider what the opportunity costs are when allowing the incinerator to continue to operate. Our research shows that Zero Waste is a viable alternative to actually reduce waste in a meaningful way, while polluting less, costing less, creating more jobs and building resilient, thriving communities.<sup>29</sup>

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<sup>28</sup> Zero Waste BC (2023). The Whole Picture -Climate Impacts from Waste to Energy. Accessed at <https://drive.google.com/file/d/1V5uhUcEnmnow0rKQgXDbhpwBmHLFTRNZ/view>.

<sup>29</sup> Zero Waste BC (2023). Metro Vancouver - A Case Study on Waste Management Methods. Accessed at <https://drive.google.com/file/d/19oum89-TgC7Ab9-1C1IW2qFyVA7uOjyU/view>.

Metro Vancouver also has plans to start quantifying GHGs from Scope 3 emissions and when this happens, the benefit of reducing, reusing and recycling instead of burning materials will become even more apparent.

Viable landfill alternatives exist but Metro Vancouver should be encouraged to reduce its waste as quickly as possible to then require less landfill capacity than it uses today and thus preserve that landfill capacity as long as possible.

Metro Vancouver is engaging in the idea generation phase of its solid waste planning process and if it implemented those ideas in a meaningful way and adopted best practices used elsewhere, this waste reduction is entirely feasible.

The Operating Certificate notes in section 2.1 that the Director may require an evaluation of the potential to: re-use, recycle, or recover certain resources.

**Recommendation:**

1. The province should ensure that Metro Vancouver meets or exceeds its guidelines for solid waste planning and that Metro Vancouver robustly pursues zero waste and invests in waste reduction more than waste disposal.

**10. Metro Vancouver Operating Certificate Review**

The Metro Vancouver incinerator is past the end of its useful life<sup>30</sup> and is requiring significant capital expenses to extend the working life. Budget estimates for maintenance and repairs for the incinerator have tallied over \$117 million from budgets 2020-2027 not including the \$100 million estimated to address SO<sub>2</sub> and the additional \$75 million to connect to district heating.<sup>31</sup> The incinerator was included as part of the previous 2011 solid waste management plan (SWMP) which was meant to have been renewed in 2021, but is still under development at least until 2027. Metro Vancouver is presently actively working on connecting the incinerator to a district energy system and rebuilding the old incinerator without having renewed its plan and consulted publicly. There is no Plan Monitoring Advisory Committee as provincial guidelines recommend.<sup>32</sup> To include waste to energy in a new SWMP, Metro Vancouver would be required to meet the provincial guidelines which include -a target of 350 kg/capita/year of waste, through consideration of the higher levels of the hierarchy (as in setting and **achieving** targets

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<sup>30</sup> The average lifespan of facilities in the US is 30 and the Burnaby one was built in 1988 making it 36 years old. Baptista, A. & Perovich, A. (2019). *US Municipal Solid Waste Incinerators: An Industry in Decline*. Accessed at <https://www.no-burn.org/u-s-municipal-solid-waste-incinerators-an-industry-in-decline/>.

<sup>31</sup> Sums from review of Metro Vancouver budgets and correspondence with staff. Spreadsheet can be found in the link to data under “Metro Vancouver Waste Planning -an analysis of 2010-2020 data” at <https://www.zerowastebc.ca/about-us/our-work/> .

<sup>32</sup> BC Ministry of Environment (2016). A Guide to Solid Waste Management Planning, p.40. <https://www2.gov.bc.ca/assets/gov/environment/waste-management/garbage/swmp.pdf>

for reduction, reuse and recycling)<sup>33</sup> and not impeding actions higher up, adopting the best available technology and meeting provincial emissions requirements. Furthermore the Ministry states “The Ministry defines the pollution prevention hierarchy as reduce, reuse, recycle, recovery and residual management. The hierarchy is in descending order of preference, such that management is not undertaken at one level unless or until all feasible opportunities for management at a higher level have been taken.” Metro Vancouver does not meet these criteria. The incinerator emits toxic chemicals, some of which have no safe levels, into an airshed where hundreds of thousands of people live. The contract to operate the incinerator expires in March 2025 and the current operator (Covanta/Reworld) does not wish to continue as the operator. The BC Hydro contract to buy electricity will expire in 2026 and in 2024 Metro Vancouver produced less electricity due to its failing and aging equipment. With the closure of the two remaining incinerators in California and the one in Oregon, this facility remains one of the last two in western North America. Finally, the Stantec report<sup>34</sup> on municipal solid waste thermal treatment practices was finalized for the Province in 2011. Since then, there has been more research about the harms caused by poor air quality and pollution, other jurisdictions have tightened up their standards and yet the technology remains essentially the same.

For all of the above reasons, a mere amendment of the operating certificate is inadequate and a full review of the permitting of the incinerator should be pursued, including whether or not it should be allowed to continue at all, or whether its continuation should be part of a robust consultation process. It is time for BC to tighten up its own standards (including for how bottom ash is tested) or better yet, not allow thermal destruction of municipal waste. Ideally, the incinerator should be closed.

**Recommendations:**

1. Metro Vancouver should not be allowed to proceed with the operation of the incinerator in its new plan and instead should be required to plan for the closure of the facility and rehabilitation of the land by 2027.
2. The province should prohibit waste to energy facilities from operating in the province.

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<sup>33</sup> BC MOEP. <https://www2.gov.bc.ca/gov/content/environment/waste-management/garbage/waste-to-energy>

<sup>34</sup> Stantec (2011). Waste to Energy - A Technical Review of Municipal Solid Waste Thermal Treatment Practices. Accessed at <https://www2.gov.bc.ca/assets/gov/environment/waste-management/garbage/bcmoewteemissionsrevmar2011.pdf>.

## List of recommendations

1. That the province maintain its requirements of polluters to meet or outperform provincial standards and require Metro Vancouver to adhere to it; and that the province update its standards to match the most stringent ones globally.
2. That the province require testing of HCl directly and not use other metrics as a substitute.
3. The province require the best available technology and practices around air quality testing, at least equivalent to Hawaii and Oregon's requirements.
4. That testing is done also during times of start-up, shutdown and malfunction to understand the potential air quality impacts and total amounts of pollution.
5. That testing is done with a frequency to match the best available requirements shown in the table above and done as blind testing (as in the operator will not know when the testing will be done).
6. That Metro Vancouver fund but the Health Authority conduct the testing of moss, soils, and backyard chicken eggs in the area surrounding the incinerator to compare this to the pre-incinerator soil tests and ensure safety of nearby residents and workers as well as those consuming any agricultural products grown or raised nearby.
7. The province should revise its AAQ to align with the new WHO standard.
8. The province should update its emissions limits for the incinerator to match the best in class globally, including for NOx.
9. The province should mandate source reduction in air pollutants.
10. The province take back the responsibility of issuing air quality permits In Metro Vancouver (at the very least for cement kilns where there is a discrepancy in standards and the potential for conflicts of interest).
11. The province should mandate that if waste is to be burned in cement kilns, that emissions standards should match or exceed the stringency of requirements for the incinerator. Ideally the province would ensure that the cement kilns no longer burn forms of waste and meet new upgraded standards.
12. The province do an analysis of the cumulative impacts of pollution in the area.
13. The province require Metro Vancouver to report total emissions from the facility and compare it to the total emissions of landfilling and Zero Waste actions.
14. The province should ensure that burning waste is not exempt from carbon taxes nor cap and trade systems
15. The province should ensure that burning waste does not count as a renewable energy source and should not qualify for any subsidies.
16. The province should insist that Metro Vancouver pursue and invest in Zero Waste actions.
17. The province should require testing for these toxic substances and set limits. The precautionary principle should be used.
18. Require management of bottom ash in special landfill cells.
19. Do not allow it to be distributed through cement kilns or other methods.
20. Require testing around the United Boulevard facility.

21. If it is distributed, require warnings to be given to recipients and a tracking system to keep records of where the materials go.
22. The province and Metro Vancouver should not permit district energy systems to connect to non-renewable energy sources (including the burning or thermal treatment of municipal waste).
23. Any district energy systems should be required to prove that the energy source is the least polluting and most efficient solution including comparisons to reducing energy requirements (through options like better sealing and insulation, etc.).
24. The province should ensure that Metro Vancouver meets or exceeds its guidelines for solid waste planning and that Metro Vancouver robustly pursues zero waste and invests in waste reduction more than waste disposal.
25. Metro Vancouver should not be allowed to proceed with the operation of the incinerator in its new plan and instead should be required to plan for the closure of the facility and rehabilitation of the land by 2027.
26. The province should prohibit waste to energy facilities from operating in the province or being used by regional districts.