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## Burning questions [Part 1 of a series]



An operator hoists a load of garbage to use as fuel at Metro Vancouver's Waste to Energy Facility in south Burnaby.

*Mario Bartel / Burnaby News Leader*

By [Jeff Nagel - BC Local News](#)

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Metro Vancouver claims a new garbage incinerator can be built here that would create no net increase in air pollution in the sensitive and constrained airshed downwind in the Fraser Valley.

It's the region's preferred solution to dispose of waste that can't otherwise be recycled or diverted, in part because the electricity and heat generated could be worth hundreds of millions of dollars over the long run.

Burning garbage without creating more pollution at first glance seems implausible, and will be hotly disputed when the proposed solid waste management plan goes to public hearings next month.

But Metro says the new waste-to-energy plant would pipe steam or hot water to a nearby cluster of other buildings or industries, eliminating the need for them to have their own boilers burning fuel.

The idea is not outlandish to experts – even those critical of Metro's incineration plans – who agree it's likely emissions avoided through district heating could offset much of the smog-producing contaminants from burning garbage. Numerous waste-to-energy plants operate that way in Europe, in the heart of cities like Paris and Copenhagen.

The local model is Metro's existing Waste-To-Energy Facility in south Burnaby. Besides generating electricity for BC Hydro, it captures residual heat that is turned into steam and piped next door to power the adjacent Norampac paper mill, which no longer burns natural gas.

"Those are avoided emissions," said Metro planner Ken Carrusca. "There's no fiction here."



It's not an ideal scenario, however. The mill has struggled in recent years, shutting down two of three lines, so Metro's burner sells only one-third as much steam as before.

A new waste incinerator optimally placed in the centre of a new development could make better and more efficient use of the heat generated.

But Metro's numbers on offsetting emissions are fraught with uncertainty.

Metro assumes 50 to 90 per cent of the potential heat can be sold.

KPMG consultant Paul Levelton questions whether district heating partners could be found to take that much heat, in which case, the offsetting equations must be downgraded.

Nobody yet knows where the plant would be built, or indeed if there would be one large or multiple smaller burners – a scenario that enhances advantages from district heating but at higher capital costs.

And heating buildings instead of powering an industry could mean less demand in summer.

"You would be able to offset the emissions, but the question is how much," said Jeffrey Morris, an environmental economist with Sound Resource Management Group in Olympia, Wash.

"Is there a market? And is there a district heating system set up? That's a big question that they haven't focused on in their analysis."

### **Subtracting, not adding?**

Metro's plan envisions a 500,000-tonne-per-year incinerator, nearly twice the size of the existing one, using newer European-style wet scrubbing technology that reduces measurable emissions.

For fine particulate, Metro consultants – using emission rates from a more modern burner in Sweden that Metro's new incinerator will be modelled after – forecast such a plant would emit 4.6 tonnes per year.

Metro estimates the avoided emissions through district heating would reduce the net fine particulate emissions to – 2.4 tonnes per year – the air would be cleaner by that measure than if the incinerator is not built.

The current Burnaby incinerator releases about seven tonnes of fine particulate a year, which Metro counts as a net release of four tonnes after the paper mill's avoided emissions are considered. The region's airshed receives 7,000 tonnes of fine particulate a year, much of it from cars, although there are 37 other industries in the region that release more than the Burnaby incinerator.

Metro calculates the avoided emissions from district heating would also make the new incinerator's net release of nitrogen oxides (NOX) and volatile organic compounds (VOCs) a net subtraction rather than an addition – although 7.5 tonnes of ammonia would be added to the air because it's injected into the wet scrubbing system.



*The debate on what to do with Metro Vancouver's garbage is one of competing visions for the region's future and what is the most environmentally responsible solution.*

Will garbage be entombed in the ground – and if so, is that a waste of resources and potential energy?

Or dumped into the sky as emissions that could potentially poison the air we breathe?

Or are there still better ways to reuse what we now call garbage?

After decades of dumping trash in the B.C. Interior, should Metro Vancouver now deal with its waste at home? Or is it acceptable to truck it inland, to Vancouver Island or even to the U.S.?

Could current recycling rates be dramatically increased, or are the costs too much for taxpayers to bear?

This Black Press special series on the region's waste management plans will explore these and other issues in the weeks ahead.

Such comparisons do not take into account the other emissions an incinerator would create, which aren't generated by natural gas heating.

Dr. Ian McKendry, a UBC atmospheric scientist who penned a report for the Fraser Valley Regional District, conceded Metro may be partly right about the avoided emissions.

But he recommended against building an incinerator – or any other new sources – that might add contaminants to the unique airshed, which funnels and concentrates pollutants not just from Metro Vancouver but also northwestern Washington State.

"We have to be very careful because of the sensitivity of this airshed," he said, adding a precautionary approach should prevail if there's any uncertainty.

He sees a need to reduce local emission sources because more pollutants are expected to drift here from as far away as Asia.

McKendry said Metro also treats the emissions as if they can be spread uniformly across the Lower Mainland, when the reality is they will be concentrated wherever the smoke plume blows.

"You can have very, very high impacts locally," he said, particularly within 10 kilometres.

### **Cancer from above**

Separate from whether residents choke on smog is the question of whether they'll be stricken by cancer and other illness triggered by the assortment of toxins emitted from burning garbage.

"The fundamental issue here is the discomfort people have with the toxic substances that are emitted from these things," McKendry said.

Dioxins and furans are highly toxic and persistent, so they can bio-accumulate in the food chain and, ultimately, human bodies.

They're created mainly from burning PVC vinyl, found in a multitude of products that end up in the garbage, from food bottles to building materials. They, along with metals like mercury and cadmium, can cause various cancers and birth defects.

Soil and plant tests carried out for two years before and after the Burnaby incinerator was built detected higher readings of some metals like cadmium at test sites in Richmond, North Delta and Burnaby, and fluoride in some blueberry and cranberry crops.

Researchers concluded there was no evidence directly linking the incinerator to the soil contaminants, which were within regulatory levels.

Despite recommendations by the consultants for ongoing testing, a panel that included federal and provincial government officials concluded that was unnecessary.

There have been no further soil tests for nearly two decades.

The stack tests, performed three times a year by consultants to provincial specifications, show the existing Metro incinerator emits about 1.5 milligrams of dioxins and furans per year and 2.6 kilograms of mercury.

Cement plants in Delta and Richmond both released significantly more mercury in 2008, according to federal pollution database reports, and 10 to 30 times as much dioxin.



**Metro Vancouver's Ken Carrusca (left) and UBC atmospheric scientist Dr. Ian McKendry**

File

But the incinerator's emissions of such substances are still higher than a power station burning cleaner natural gas.

"Different pollutants are generated in different amounts by those two different fuels," notes Morris.

A review of the emission records for the Burnaby incinerator shows it has become cleaner over the past 22 years, as a result of nearly \$100 million Metro has spent on upgrades to boost energy generation and reduce pollution.

Stack tests show particulates in every cubic metre of emissions released are 85 per cent below the levels of the initial years. Nitrogen oxides are down 25 per cent, sulphur dioxides have been cut in half and mercury levels are down 90 per cent.

Some critics question whether the Metro readings are credible.

They point out the waste-to-energy plant's stack emissions are only continuously tested for certain emissions, and not dioxin or mercury.

And burners in some areas belch out worse toxins in "upset conditions," when poorer burning materials are in the chamber. The Burnaby plant's policy is to burn natural gas at such times to ensure temperatures remain high enough to destroy most toxins.

Metro says a more detailed assessment of possible contamination and human health risks would come, if the plan is approved, when a specific project is identified and undergoes an environmental assessment.

### **Nanoparticles a concern**

Ontario's environment minister heard many of the same objections before recently overruling them and approving a controversial waste incinerator for the province's Durham region.

The region's health officer concluded health risks were minimal and acceptable.

Health Canada and British health authorities have likewise concluded health risks are low.

B.C. provincial health officer Dr. Perry Kendall said he has no concerns about Metro's waste-to-energy strategy, either.

"There are technologies that can remove any of the health risks," Kendall said. "If you're doing it right, you shouldn't be getting anything harmful. You're getting water vapour and carbon dioxide. Anything else can be scrubbed out, gasified and buried."

In fact, the best-in-class incinerators in Europe still produce some emissions, although far less than the burners of the past.

But British toxicologist Dr. Vyvyan Howard is concerned about contaminants from incinerators that can't presently be measured.

"There's a plume of very fine



ultrafine particles that come out of these," he said in an interview from Coleraine, England.

Howard is a leading researcher in the emerging field of nanoparticles – extremely fine particulate less than a thousandth the width of a human hair.

While scrubbers are "quite good" at removing larger particulate, he says they can't stop ultrafine particles, so small they pass directly into the bloodstream.

Because of their minute size, nanoparticles collectively have more surface area, increasing their toxicity.

Too little is known yet about their health impacts, said Howard, who urges authorities to err on the side of caution and reject incineration.

**Dr. Perry Kendall**



**Vyvyan Howard**

Also of growing concern are brominated compounds, such as PBDE, that are used in flame retardants and have been linked to hormone and reproductive disruptions in various species.

Part of the problem is garbage isn't like other fuel – it's literally a mixed bag.

"You don't know what you're going to be tipping in from one minute to the next," Howard said.

The waste stream has become more complex over the years as manufacturers invent and use more synthetic materials.

Further effort to divert organics, paper, cardboard, and other recyclables could leave behind a greater proportion of plastics and synthetics than in past decades – a fuel supply that may be harder to burn cleanly.

Nor should residents conclude metals and other toxins would drop out of the air close to the incinerator and not contaminate more distant neighbourhoods.

"We've got data showing uranium dust from the Middle East during the Gulf War travelled as far as the United Kingdom," Howard said. "Many of the organic compounds also travel long distances."

Food crops are at particular risk, he said.

The Fraser Valley, one of Canada's most productive tracts of arable farmland, would be directly downwind.

"These compounds, once they get into any ecosystem, are going to come back to us via our food."

**Next in the series – Dumping at Cache Creek: Back to the future?**

## Metro's solid waste plan:

- Divert 70 per cent of waste by first reducing, recycling, composting more materials, particularly organics and food waste. Push province to mandate more take-back programs requiring business to recover packaging and discarded products.
- Build an in-region incinerator to replace the 500,000 tonnes per year now being sent to the Cache Creek landfill.
- If an in-region incinerator can't be built, pursue an out-of-region one, such as the one planned at Gold River on Vancouver Island by Covanta Energy.
- If neither waste-to-energy option is possible, pursue out-of-region landfilling, likely a major expansion of the Cache Creek landfill.

**SLIDESHOW: Existing waste-to-energy plant in Burnaby. Photos by Mario Bartel and Evan Seal / Black Press**

### Population growth one driver of air pollution

A new incinerator isn't the only way the Lower Mainland's air is changing.

More people are moving to the Lower Mainland all the time and each new home that's built adds more emissions to the airshed.

Metro Vancouver's population is projected to swell by 1.2 million or 50 per cent over the next three decades. It's estimated 574,000 new homes will be needed to house them.

Metro estimates the stack emissions from the new waste incinerator would be equivalent to the heating emissions from 15,000 to 20,000 homes, not counting the new residents' transportation emissions.

But officials say that after avoided emissions are counted, the new waste-to-energy facility would remove emissions equivalent of 7,000 to 70,000 homes, depending on the pollutant.

No matter which option for waste disposal is chosen, Metro estimates waste handling will contribute between 0.1 to 1.2 per cent of the region's total emissions in 2020 – similar to the current contribution.

Despite the growing population, air quality in the region has generally improved in recent decades.

A 2005 regional emissions inventory projects smog-forming pollutants will continue to decline to 2020.

Car emissions, currently the leading source of pollutants, are expected to diminish as vehicle standards continue to improve.

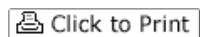
A major push is also underway to force off-road diesel machinery to upgrade to cleaner systems and that's an area Metro calculates could yield major improvements in particulate emissions.

One contaminant expected to keep increasing is ammonia, which comes mainly from farm animals and fertilizer.

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