

BURNING QUESTION

Should Canada incinerate its waste?

By *Jordy Gold*



The Afval Energie Bedrijf (AEB) plant in Amsterdam treats about 1,540,000 tonnes of waste per year, producing over 770,000,000 kilowatt hours of electricity—enough to power around 235,000 homes.

Arguments both for and against incineration are easy to come by. Much harder to find are opinions that can be trusted in this complicated debate.

Globe and Mail reporter John Barber has said, “Stripped of its rationale, its hazards exposed, the current push to incinerate is revealed as a kind of infrastructure adventurism, led by a tunnel-visioned cadre of engineers and consultants, that can be brought to a halt with no negative consequences.”

But the other side has been just as vocal, arguing energy-from-waste (EFW) technologies are the solution to our waste problems and a new source of power. Toronto Star reporter Tyler Hamilton has said that while environmentalists label terms like EFW as spin, the newer gasification and pyrolysis technologies are actually different from past incinerators.

Ultimately it’s hard to know who to believe and what concrete steps should be taken. “Landfills bury the problem. Incinerators burn the problem. You still have the same problem,” says Barry Friesen, head of waste management for Niagara Region.

One thing is certain: older incinerators were bad news. Technologies have improved dramatically in the last thirty years—but how much? That partly depends on which technology is being debated. The proposed plant in Clarington in the region of Durham (in partnership with York Region) would use mass-burn technology and potentially gasification technology. Virtually all incinerators proposed in Ontario have been limited to the older mass-burn technology with improved scrubbers geared at reducing emissions. York Region has a second waste management project in development: forming waste into pallets to be burned for energy by industrial users. That explains their reduced role in the Durham project, which some saw as a rejection of incineration. In Ottawa, Rod Bryden’s company, Plasco, is pilot testing plasma arc technology—though they refuse, perhaps deservedly, to be associated with incineration. Environmentalists, and one waste consultant, say Plasco’s low pollution claims are, if nothing else, interesting, but they’ve yet to be fully put to the test.

Plasco believes they can avoid releasing dioxins—a major form of pollution traditionally associated with incineration. Waste researcher Bronwen

Smith found that European governments and industry were successful in selling the public on incineration by creating cleaner technologies—to meet and exceed stricter air emission standards. But European governments have also assembled comprehensive policy frameworks to reduce the amount of waste produced and reduce the amount of materials that create harmful emissions when burned. Any products that still contain toxic materials are removed from the waste stream before it’s burned. Canada has some of these policies, but there’s no comprehensive framework in place. According to waste consultant Clarissa Morawski, provinces like Ontario and Quebec are far from producing waste streams that are toxin-free. As a result, no matter how good the technology gets, that nasty stuff will get into thermal treatment plants, almost certainly releasing some of these pollutants into the air.

Dr. David Pengelly, who reviewed the proposed Halton incinerator, confirms that newer technologies still have the potential to release harmful toxins. He says Halton, with an already overtaxed airshed, should undergo site-specific testing. Regardless of how good an incinerator’s emissions may be in isolation, it’s important to see how they fit into a larger context and might compound an already existing problem. “Regulators only tally up all of the stacks from a single plant,” says Mark Winfield, a Professor of Environmental Studies at York University. “They’re not looking at regional loading; not dealing with the cumulative effects of all the region’s facilities.” As a result, new sources of pollution may be added to a region with severe air quality problems.

Proposed plants, like the one at Clarington, have promised to keep emissions below government standards. But some critics say government regulations for air quality standards are already too high, so simply meeting them is not enough. “Generally, standards have not caught up with the science,” says Winfield.

Those who are pro-incineration have argued that EFW is a major benefit of the new thermal treatment plants. Yet both challengers and proponents of these plants say they are waste disposal facilities first and energy generators second. The Sierra Club of Canada’s Rod Muir says both Sweden and the Region of Peel incinerate 50 per cent of their waste but only generate one to two per cent of their electricity use. Whether or

LANDFILLING ALTERNATIVES

Barry Friesen, who had great success in making Nova Scotia one of the national leaders in diversion, visited a stabilized landfill in Germany that he believes could serve as a model for Canadian municipalities. While he recognizes this isn't the cheapest alternative, he believes the Germans are doing it right. They begin with effective source separation, pulling out all cleaner, enriched material (40 per cent of the waste) and use this to generate energy—removing all toxins before combustion. Another 40 per cent is stable waste, with reduced or possibly no leachate. With all the organics removed, there's nothing to decompose and release methane, a potent greenhouse gas. The final 20 per cent is moisture—that's also removed. For Friesen, this combination of stabilized landfill and creating a clean fuel product is ideal. He says if you lived next to one of these landfills you wouldn't even know it. This, according to Friesen, is how to do waste-to-energy—first maximize diversion, and only then begin to look at some form of thermal treatment. ♣

not the metrics are this dramatic, these plants are clearly not being built as electricity generators.

Even if the electricity generated wasn't minimal, according to Pembina Institute fact sheets compiled in collaboration with five other organizations, mass-burn technology and gasification cause about 33 per cent and 90 per cent more greenhouse gases (GHGs) respectively (per kilowatt hour of electricity produced) when compared with coal-fired generation. It's conceivable that these emissions will soon come with a price tag, driving up costs. These plants also produce heat which, according to Andy Campbell, head of waste management for York Region, when combined with the electricity generated from thermal treatment process, captures 70 per cent of the waste's embodied energy. The Durham plant aims to capture about 20 to 25 per cent of the waste's energy—they'll need to use about 30 per cent of that to run the plant. Unfortunately, there's no guaranteed user for the majority of this heat from the proposed York-Durham incinerator right now.

Numerous experts agree there will always be some waste that can't be diverted, making zero waste an unreachable goal.

To maintain the energy balance needed to produce enough power to generate revenue, incinerators tend to need a steady stream of energy-rich waste. One of the best materials for generating power is plastics, which is essentially fossil fuel. While not all plastics can be recycled, many can be reused or recycled. The Pembina Institute's fact sheets show that recycling creates a significant net energy gain compared to the energy captured through waste-fuelled co-generation. But the major upfront investment and need for a steady, more energy-rich garbage supply that an incinerator represents creates a disincentive.

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According to Campbell, the disincentive to recycle can be neutralized through building a smaller plant. He says regions in Europe with incinerators also have some of the highest recycling rates—not all materials can be diverted.

York/Durham is diverting 50 per cent of household waste (aiming for 58 per cent this year), which compares with rates of about 45 per cent diversion in Europe. Despite this success, both Campbell and Hamilton have their doubts that true zero waste is possible. Numerous experts agree there will always be some waste that can't be diverted, making zero waste an unreachable goal. Jim McKay with Jacques Whitford, the firm helping Campbell and York Region with their proposed incinerator, says that given current material uses and forms of production, there's probably a cap of about 80 to 85 per cent on diversion.

But Franz Hartman, executive director of the Toronto Environmental Alliance, says after diverting all we can, composting, recycling and using extended producer responsibility programs, "what do you have left to burn?" Maybe the more fitting question is what's left to burn that has energy value? According to Muir, recyclables and organics alone make up over 80 per cent of our waste stream.

For the moment, municipalities have between 25 to 45 per cent of our waste stream to treat or dispose. Much of York Region's waste currently ends up in Michigan. But with that deal ending in 2010, a new solution is needed. York Region's landfill was exhausted 20 years ago and, since then, \$120 million has been spent to try to find a new alternative. Political and social complications scuttled the search and York is now seeking the province's permission to pursue incineration. But Winfield says incineration only reduces the volume of waste by about two-thirds and can leave a far more toxic by-product that requires special landfilling. Others, like Campbell, say it's likely more than two-thirds. And many say landfilling generates significant emissions through the long-range transport of waste and landfill methane emissions. Methane is more damaging than carbon in terms of its climate change potential.

Various regions have decided against incineration for the moment. But, unlike York, these areas still have landfill space. Depending on who you ask, Ontario is either in a landfill crisis, or has millions of tonnes of capacity still left. While there is no clear right or wrong answer to questions about landfill capacity, one point of agreement is that, despite fuzzy jurisdictional boundaries, provincial and even federal governments have failed to take on a leadership role. Maureen Carter-Whitney of the Canadian Institute for Environmental Law and Policy has said that "At the end of the day, the municipalities don't have all the power that they need to push policy for waste reductions and packaging, but are then stuck dealing with the waste anyways." She says, "Municipalities deserve provincial direction and should demand, along with other key stakeholders, a strong and comprehensive waste management strategy and regulatory framework, with funding to support the strategy." The federal government also has a role to play, for example, in packaging and EPR policies and in potentially setting a national waste strategy.

Europe's high-level vision, leadership and assistance for municipalities is extremely important. Using their waste hierarchy as a guide, the David Suzuki Foundation's Jose Etcheverry affirms that European cities really do follow the three R's—reduce, reuse, recycle—and only then burn what's left over. These priorities lead to strong laws around bans on toxins like mercury, packaging and extended producer responsibility.

McKay says that while some provinces, like British Columbia, are trying to take action around waste, it's a slow-moving, piecemeal approach across much of the country. Only a comprehensive framework can force industry to take more responsibility and change

its ways, leading to a more manageable and responsible waste stream.

No matter how the waste is treated, it's an issue that Canadian governments need to deal with. Canada currently sends garbage to Michigan, while 30 per cent of York's blue box program goes to Asia. Campbell, who continues to work towards gaining clearance for York's two incinerator-related projects, says, "Is exporting waste to a foreign country really a solution? If you deal with it in your own backyard, this will force you to make important decisions. We need to move the discussion from an end of pipe focus to a higher level to find solutions."

"Incineration may or may not turn out to be an appropriate technology for Ontario," says Cartner-Whitney, "but this determination should only be made once an overarching waste management policy for the province is put in place." Whether or not landfilling or incineration are good treatment options, "waste management must be led by policy, not technology." ♣



Jordy Gold is a sustainability consultant and journalist, and contributes to Corporate Knights, Green Living and World Changing Canada.

PYROPEEDIA: A GLOSSARY OF TECHNOLOGY

Mass burn is the most popular type of incineration. Waste (or another fuel) is placed in an incinerator to undergo traditional combustion. The flue gas produced in a water-wall furnace (the most popular type of mass-burn incinerator) can be used to generate electricity.

Gasification occurs in a closed tank at extremely high temperatures in a limited oxygen environment. Without enough oxygen to create what is normally considered combustion, a more complicated series of reactions occurs. The majority of the products come in the form of carbon monoxide and hydrogen gas, which can then be turned into fuels like methane, or processed into liquid fuels. Ash, solid residue and toxic liquid effluent can be dealt with in the same way as incineration by-products. Gasification is performed in a closed system, as opposed to incineration, so the capturing of exhaust gases is easier and more complete.

Pyrolysis is similar to gasification—it's performed in a closed tank with

carbonaceous material used as fuel. But where gasification operates in a limited oxygen environment, pyrolysis happens in a virtually oxygen-free environment. The liquid and gaseous products of pyrolysis can be burned more cleanly than solid waste, so the creation of secondary pollutants is limited.

Source: Ontario Environment Industry Association. Visit oneia.ca for case studies.

Plasma arc is Plasco's new multi-step process, using plasma torches to gasify the waste and later melt down any resulting solids. The process is meant to break down substances into individual molecules and reformulate them into clean, useful products, along with synthetically produced gas that can be used for electrical generation. The initial steps of the process are closed—according to Plasco, there are no emissions and the only real form of pollution comes from burning the gas, which has nothing to do with the actual processing of the waste. That's why the company believes their technology can't be classed with other these other methods. ♣

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