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Energy From Waste

Everything you need to know about the Durham incinerator

by Karl Marais

As landfill space slowly but surely diminishes, a primary goal of politicians today is to find and instigate different methods of waste management. Reduce, reuse, and recycle - these waste diversion strategies are preferred by almost everyone. But after we've relied on landfill for so long, will those methods be enough to carry the world into the future?

In Durham Region -and in many other places -there is doubt. On March 31, 2006, the Minister for the 'Environment approved the Durham/York. Residual Waste Environmental Assessment Planning Study, which suggested incineration as a waste management method, and the search for a site where an incinerator could be erected began.

The Site

In March 2007, a list **of** possible sites for the Durham Region incinerator was released, with a number of the proposed sites being in Clarington, and one being in East Gwillimbury.

Before deciding where the EnergyFrom-Waste (EFW) incinerator should be located, the Region considered the impacts an incinerator would have at each of the sites, with regards to five categories:

- public health and safety and natural environment impacts,
- social and cultural costs,
- financial costs,
- technical suitability, and
- legal issues.

The first category had a high priority, the next three medium, and the last low. Things such as haul routes, air, emissions, surrounding development, and additional infrastructure were all considered. After examination, Clarington 01 ranked "Advantage" in the first four categories, and "Neutral" in the last, making it the most suitable site for the facility.

In September of this year, the site called Clarington 01 was chosen as the most suitable for a thermal treatment facility for managing residual waste. The site is owned by Durham Region and is located south of Highway 441, west of Osbourne Road, and north of a CN Rail corridor, in the Municipality of Clarington. The site is a total of 12.1 hectares, and is bounded by mostly land intended for commercial and agricultural use.

The Plan

Basically, what the incinerator would do is take in non-recyclable waste from around the Region, remove non-combustible materials and burn the remaining waste, collecting the energy that this generates. Through a process of heat exchange systems, which involve turbines that harvest energy produced by the heat, electricity is generated. (It is because there is an energy return-from the incineration that the facility is technically called an EFW program.) After incineration, materials that may be sold are removed from the ash/char that remains. The remaining material, mostly bottom ash, is then landfilled. The goal of the incinerator is to divert 60-75% of the Region's non-recyclable waste.

Since Michigan will no longer be accepting Durham Region's garbage for landfill as of 2010, an alternative for waste management must be found quickly.

Currently, Durham has a 50%-60% waste diversion rate, meaning about half of the waste produced in the region is disposed of through sustainable methods, such as recycling or composting. With an incinerator, the rest of the waste would be burned and processed. The Durham Public Works Committee believes that the diversion rate could reach 70% in the near future.

Like most incinerators worldwide this one would have to be running 24 hours a day, seven days a week -minus about two weeks each year when it would be shut down for maintenance-meaning .it would need a constant flow of trash to fuel it. It must run constantly because its core temperature usually exceeds 1000 degrees Celsius, and to shut it down, let it cool, and start it up again would be vastly inefficient.

York Region, which had previously planned to have a 50% share in the project, has reduced its commitment to 12% of the total cost. One of York Region's conditions for staying involved with the project was that there be no limits placed on the future growth of the incinerator, meaning that while it was initially intended to burn just under 200,000 tonnes of waste per year there would be no limits on its future growth.

The possibility of Peterborough and Northumberland becoming involved in the project has also been introduced, although it was not been confirmed. Since Durham Region is already quite short on landfill space, the Works Committee is saying that these other municipalities may be able to take the ash and landfill it for us, while we in turn incinerate their garbage.

What really concerns many people is that the cost of the 'project was initially estimated to be around $250 million. However, Durham Commissioner of Works Clifford Curtis says that initial estimate was much too high, and that the actual cost would be considerably lower, almost definitely in the $100-200 million range. The cost per tonne of waste burned would be around $150, taking into consideration the energy required, the transportation of waste, the wages of employees at the facility, and the disposal of the remaining ash.

Alternatives

The argument of many people opposed to the incinerator is that the huge amounts of money required for the project would be better spent on further reducing waste in Durham Region, through improvement of recycling programs and other methods. Great numbers of lists and reports outlining the-negative effects of EFW and the alternatives to burning garbage have recently been released.

One of the most popular alternatives is the development of a Zero Waste Production and Implementation Plan. This plan does not mean to divert all waste (although that would be the ultimate goal); instead, it aims to increase diversion to 70% by 2010 through recovery, recycling, and reuse. Many critics of the incinerator say that simply setting clear waste management goals would reduce waste enough that there would no longer be a need to burn garbage.

There are also a number of other waste elimination • methods and reduction incentives that could be used:

- Having regular industrial waste audits.
- Using Extended Producer Responsibility, or making manufacturers responsible for their products for the entire life cycle of the product (from creation to disposal/destruction).
- Taxing water and energy use rather than/in addition to income.
- Instigating more product return programs (like the one for alcohol bottles).
- Starting more composting and recycling programs.
- Turning to alternative waste management programs. There are many other programs that aim to replace traditional land filling, and incineration, one of which involves a process of feeding waste to a special species of worm that turns it into nutrient-rich castings which can be used for fertilizer. And since it is estimated that 70% of the worlds waste consists of organic material (i.e. paper, food waste, and leaves), there is already a great amount of nutrient-rich material to be gotten from waste,
- Using a Solid Waste Resource Management Strategy. This strategy was developed by the province of Nova Scotia - with input from its citizens - and put into play in 1996. By 2004 that province had received world renown for its management methods. Nova Scotians followed five simple provisions: source reduction, material reuse, recycling, composting, and business development (namely fostering companies that helped dispose of solid waste and otherwise assist in recycling initiatives).

Why We Shouldn't Build It

The cost and the health concerns ate the two most prominent issues raised against the incinerator, but there are complex factors that surround each issue.

Health Concerns

Scientists are still unsure of the health issues that the incinerator may raise, but data from a number of studies shows that there are legitimate concerns. Forty-three doctors in Durham Region have signed a petition stating health concerns and opposition to the incinerator.

Much of the information available comes from studies by a French team of scientists. Their findings indicate that the emissions of an incinerator could potentially cause cancers and congenital malformations. They also found that the environment could be exposed to: carcinogens, reproductive toxic chemicals, and greenhouse gases (possibly more than coal plants, one of the, dirtiest forms of energy production). Incineration is currently illegal in France.

The biggest concern of all may relate to stack emissions. When garbage is burned, many chemicals are released, and although stack screening methods have come a long way in the last thirty years, there is still no sure method to prevent some of these chemicals from escaping. Some of the following chemicals are released in the fly ash and the stack emissions:

- persistent organic pollutants such as dioxins and furans, which are chemical compounds that can be toxic in just one part per trillion (meaning that adding just one part of dioxin to a trillion parts of air contaminates all trillion parts). These chemicals can change the very way human cells operate if a person is exposed to them.
- Nanoparticles, which are particles left over from the incineration process that are so small that many incinerator filters are able to remove a small percentage of them from emissions. They can travel huge distances, be inhaled into human lungs, and possibly cause cancer, respiratory/heart disease, and birth defects.
- Toxic air emissions such as carbon monoxide, sulfur dioxide, and volatile organic compounds.
- Heavy metals such as mercury, lead, cadmium, and arsenic.

The bottom ash, which is the residue remaining after the waste has been burned, also contains many chemicals. After the incineration process, about 20% of the weight and 10% of the mass of the original amount of waste remains in the form of bottom ash. (The mass is the amount of space that the waste will occupy, so this means that, while the ash will weigh one fifth of its original waste, it will be compressed to one tenth of its original size.) This

ash must be landfilled, and the chemicals it contains can then leach into the soil (although this happens with traditional landfill strategies as well).

Unlike traditional landfill, the burning of waste gives chemicals much more opportunity to leach into crops, livestock, and food and water supplies, so it is much easier for people to contract the detrimental effects of the chemicals.

Yet another concern is the amount of waste that will be processed by the EFW. The original capacity of the proposed plant was a minimum of 200,000 tonnes per year. Although this projection has recently been reduced to about 150,000 tonnes, the amount of waste Durham Region exports to Michigan landfills was traditionally about 120,000 tonnes per year. Also, there is currently no limit as to the expansion of the plant, meaning that, if the current proposal is accepted, the EFW facility can be limitlessly expanded in the future. This causes many people to worry that Durham Region may become the new Michigan, taking the waste of many other cities and towns. As it is, Peterborough, Northumberland, and Kawartha Lakes are already in discussions to send their garbage to Durham for incineration, and in return landfill the remaining bottom ash.

Financial Concerns

Even Clifford Curtis, the Commissioner of Works for Durham, says that the biggest concern with EFW is economic. He says at the estimated cost of $250 million was an unreasonable estimate, and that it is more likely that the facility will cost many millions of dollars less than that to build. But the primary concern is the cost of operation.

Currently, when Durham ships its waste to Michigan, it pays about $70 per tonne. That transportation and disposal cost will undoubtedly jump in 2010, but it is estimated now that it will cost about $150 per tonne to dispose of waste via the incinerator.

From most accounts, incineration is known as one of the most expensive methods of disposing of garbage, and is often argued that the return that the Region receives for the electricity it produces is not enough to justify the costs. In terms of employment, for every 11 jobs created by the recycling industry (on a ton-for-ton basis) there is only one job created by incineration.

Why We Should Build It

Mr. Curtis is quick to point out that the method of waste disposal that is being proposed is not simply "incineration." Energy is gotten from the burning of waste, and because of the technology involved, he stresses that it should be called "Energy-From Waste," or EFW. He explains EFW as being, quite simply, "a viable way of getting rid of waste that would otherwise be sent to landfills." And that is perhaps the biggest advantage of EFW plants - they get rid of a lot of waste that would otherwise be landfilled. People argue that the money would better be spent on waste diversion rather than waste disposal, and Mr. Curtis admits that Zero Waste Strategies are "admirable," but he says that such things "aren't going to happen tomorrow. If people stop putting garbage out on the curb, we'll tear down the incinerator. If they stop now, we won't even build it. But that's not realistic."

The fact is that incineration does reduce waste to about 10% of its original *mass,* and with landfill space rapidly depleting, this is an important advantage of the process. Basically, what this means is that for every 10 square kilometres of land that is used as landfill space now, only 1 square kilometre would be filled with ash after incineration. Of course, some of the ash would be used as filler, so even less than that would actually be landfilled.

Environmental Impact

Mr. Curtis also says that many modern plants - specifically the one in Brampton - have been examined, and that they have so far been found to be fairly safe and clean, the effects they have on the environment being well within the laws the government has imposed to monitor such things. "We believe that it can be done healthily."

A study conducted by the Confederation of European Waste-to-Energy Plants (CEWEP) showed that toxic emissions from incinerators have dropped tremendously since 1990, because of better technology and more accountability.

"It is less environmentally intrusive," says Mr. Curtis. The fly ash, for example, "traps toxins already in the waste," and is collected and disposed of as toxic waste. In traditional landfill, these toxins are buried along with everything else, without being removed. So while there is no way that all the toxic chemicals can be trapped, with new technology, Mr. Curtis is confident that a reasonable amount can be contained.

Also in terms of pollution, there are many advantages of disposing of waste locally. Currently, waste is constantly being shipped to Michigan in trucks, a process which burns huge amounts of gas, and releases many greenhouse gases into the atmosphere. There is also a risk of traffic accidents, and highways are constantly congested with garbage transport trucks, most of which return from the US with nothing at all in their cargo. If an EFW plant was erected in Durham, the transportation of trash would be local, and many of these problems would be eliminated. Also, the Region would have much more control over its waste, getting to closely monitor what comes and goes in terms of waste.

This particular EFW facility would be different from incinerators in the past as well, because of the strict guidelines that are now in place in Canada. The Ministry of Environment currently has rigid provisions in place concerning

dioxins, furans, sulfur dioxide, and carbon dioxide emissions. Also numerous risk assessments have been done, and will continue to be done, so that parameters can constantly change to keep people safe.

Mirka Januszkiewicz, the Director of Waste Management for Durham Region, admits that "any facility has emissions," but that said emissions are "highly regulated by the province. There has already been a health risk assessment, and I believe that [the facility] will meet any guidelines set out by the Ministry of Environment." Mr. Curtis says that the general rule of thumb when it comes to risk assessment is having only one cancer case per million, and he feels that if that can be achieved, the risks are acceptable.

Financial Advantages

With the EFW system, there are also a few things done to get a return on the costs:

- The electricity generated is enough to provide energy for all the municipal facilities in Durham Region, says Ms. Januszkiewicz.
- Scrap metal and other recyclable materials are collected from the bottom ash and sold back onto the market',
- Although it not yet legal in Ontario, the Works Committee seeks to get approval to use the residual ash as a "filler." It can be used to fill the ground under roadways, instead of gravel or dirt, and it also has other uses, such as an ingredient in cement.
- If there came a time when the facility was no longer needed, Mr. Curtis estimates that the return received from all the scrap metal remaining once it is torn down would pay for the cost of its erection.

The Future

Although the plans for the incinerator are constantly shifting, and none of the dates remain absolute, Durham Region Council is supposed to make a final decision regarding the preferred site on January 8, 2008. After that, the Region will begin accepting proposals from vendors, or companies willing to design, build, and maintain an incinerator. Mr. Curtis says that the Environmental Assessment will hopefully be finalized before the end of 2008, and then the project can start to progress. But obviously, before any of this can happen, council must make a decision as to whether or not they will allow the incinerator at all.

Those with questions about this project are urged to contact Uxbridge's Regional Councillor Howie Herrema, who sits on the Region's Public Works Committee, and recently toured several EFW installations in Europe.