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Attitudes toward waste to energy facilities and impacts on diversion in Ontario, Canada

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ABSTRACT

Despite progress in residential waste diversion, residual waste – that fraction which cannot be recycled or composted – must continue to be managed by municipalities. Zero waste and environmental groups worry that waste-to-energy (WtE) incinerators discourage diversion, while both incineration and landfill have been stigmatized in the popular consciousness such that WtE incinerators in particular are being cancelled more often than they are approved. We conducted a mail-back survey of 217 residents in Toronto, Durham and Peel, Ontario, to understand attitudes toward diversion, levels of support for WtE incineration and WtE landfill (landfill gas recovery) facilities, and predictors of facility support. Contrary to experiences elsewhere, diversion seems threatened by WtE when measured as attitudes with 18%, and 14% agreeing that they would be less inclined to divert recyclable/compostable materials if they knew materials went to a WtE landfill or incinerator. When forced to choose between four options landfill or incineration with and without energy recovery, WtE incineration is *most* preferred (65%) and landfill without WtE is the *least* preferred option (61%). However, measurement has a large influence on public opinion results in the sense that support for WtE incineration drops to 43% when asked as a "vote in favor" question and to only 36% when measured as a 4-item index of support. When the indexes of support for landfill and WtE incineration are modeled, the prominence of odor in the landfill model distinguishes it from the WtE incinerator model which is dominated more by community and concern about health effects. Implications for policy are discussed, particularly mandatory diversion targets to accompany WtE.

1. Introduction

Municipalities face very difficult decisions managing discards as "waste" is increasingly viewed as a resource and there is a wide range of technologies for treating it as an energy resource. Further, the waste hierarchy encourages working toward "zero waste" societies where minimization, reuse, recycling and composting result in diversion of waste from landfill and incineration facilities. Waste-to-energy (WtE) (or energy-from-waste – EfW) is now widely used worldwide as an alternative to traditional landfill and incineration without energy recovery; mainly by producing steam to heat buildings directly or by using biogas (largely methane) to run turbines for electricity production. Yet such energy recovery is still relatively rare in the province of Ontario, Canada. Further, these technologies are highly contested both by environmental groups and local communities facing the prospect of a new facility – contributing to high levels of both expense and frustration. This study explores some of these issues by testing four hypotheses about public views of WtE facilities – particularly incineration – relative to landfill.

Canada's WtE incineration capacity for municipal waste has grown only slightly in recent years expanding from five large (above 10,000 t/day) operating facilities in 2006 (Giroux Environmental Consulting, 2014) to six in 2015. There are 2150 WtE incineration plants worldwide, and Canada's raw number pales in comparison to the E.U. and U.S. with 300+ (1.7 million people per facility) and 80+ (4 million people per facility) WtE facilities respectively (Waste Management World, 2014). Despite increasing interest in WtE in Canada, industry organizations continue to cast the Canadian public as "stubbornly skeptical" about

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WtE incineration (Waste Management World, 2015b), something corroborated by news media coverage of the issue (Canadian Broadcasting Corporation, 2015; Sandor, 2015) and recent decisions by three of Canada's municipalities (City of Vancouver, Regional Municipality of Peel, and the City of Sault Ste Marie) to cancel or stall proposed WtE facilities based in part on predictions of lower or uncertain waste volumes (Chan, 2015; Della-Mattia, 2016; Javed, 2016). The siting of landfills is also controversial but there are a larger number of WtE landfills in Canada than WtE incinerators. As of 2011, 14 WtE landfills were recovering landfill gas (primarily methane) for energy production (Giroux Environmental Consulting, 2014).

There is considerable policy debate about WtE and, compared to traditional incineration and landfill, surprisingly little social scientific research on WtE attitudes. A key debate is whether the presence of WtE in a community, particularly incineration, reduces recycling – one of the hypotheses tested here. Key environmental groups opposed to WtE incineration in Canada on the grounds that it will discourage the maximization of diversion include the Zero Waste Coalition (Environmental Leader, 2013), the Canadian Center for Policy Alternatives (Canadian Center for Policy Alternatives, 2015), Greenpeace Canada (Martin, 2010) and the Sierra Club (Jackson, 2015). Internationally, the Global Alliance for Incineration Alternatives (Global Alliance for Incineration Alternatives, 2013) has published a fact sheet specifically dealing with the issue of incinerators undermining recycling programs and subverting the push toward zero waste.

Municipalities are also exposed to alternative messaging about WtE incineration from industry. In Canada, groups like the Canadian Resource Recovery Council – a group supporting the waste industry's efforts to implement WtE incineration – use fact sheets to persuade the public that WtE incineration and enhanced diversion are compatible (Canadian Resource Recovery Council, 2015). However, the claims refuting that WtE (EfW) incineration reduces diversion are based largely on evidence from experiences in the U. S. and E.U. (Solomon Wood, 2014; Tracey, 2013); places which tend to be exposed to different policy drivers, particularly the E.U. which has a 1999 waste directive to phase out landfill (European Commission, 2015). This has prompted some zero waste enthusiasts to take more of a middle ground position, suggesting that incineration may be a useful stop-gap, including North (2009) who cites incineration and recycling rates in places like Denmark, Japan, Switzerland and Sweden to show that high incineration is often matched by relatively high diversion rates. Yet, two countries with the highest incineration rates in Europe – Norway (57%) and Denmark (54%) – have relatively modest diversion rates of 39% and 44% respectively (Eurostat, 2015). Seltenrich (2013a,b) reports on the more extreme case of Flanders Belgium where diversion is at 75%, largely because there is a policy mandated cap of 25% of waste management by incineration. By contrast media in Ontario point out cases like Detroit, which has an incinerator and until only very recently no municipal recycling program; suggesting that diversion has been limited and piecemeal because of a historical reliance on WtE (Porter, 2010).

Historically, waste data have been notoriously difficult to standardize for comparing between municipalities and within municipalities over time. For example, only since 2006 has Ontario had an organization to oversee the standardization and verification of municipal residential waste and diversion data (Waste Diversion Ontario, 2015). Unfortunately these data show the province has been stalled at a 47% diversion rate since 2011.

Until recently, Ontario had only one large WtE incinerator, namely a privately-owned facility in the Regional Municipality of Peel, which has been operational for over two decades managing only residential waste for most of that period (1992–2012). In 2012, Peel decided not to renew its contract with the operators of the facility, intending to build its own more modern and larger WtE facility. Recently however, Peel Council rejected the proposed WtE in 2015 (one year after the completion of our field research), finding that the cost of construction had become prohibitive (Muir, 2015). It also heard from both staff and environmental groups that most of the waste stream currently being sent to landfill was recyclable or compostable (Javed, 2016). Council therefore chose to invest in new sorting and composting facilities while aiming for a target of reducing, reusing and recycling 75% of its waste by 2034 (Muir, 2015). Though the Peel municipal solid waste (MSW) feedstock dwindled for the privately-owned WtE facility it continued to operate by taking MSW from outside of Peel and concentrating on commercial, industrial and institutional waste. With the start of operations of the Durham-York Energy Center (DYEC) in 2015, Ontario now has two large WtE incinerators (Javed, 2015a). Further, the adjacent City of Toronto has recently embarked upon a long term waste strategy process that includes consideration of WtE (City of Toronto, 2015). These new developments make the time ripe for studying how the Ontario public views such facilities.

Though media messages about WtE incineration often center on concerns and opposition, this contrasts with industry polls, which tend to focus on support for WtE. For example, in a 2014 poll commissioned by the plastics industry in Canada, Nielsen (2014) found 66% of Canadians have a "favorable impression" of waste-to-energy compared to 29% who do not (50% and 42% if combustion-based only). This industry poll is consonant with one In Peel Region, taken before Peel's WtE review process, showing that 73% supported a new local WtE incinerator (Javed, 2015b). Further, the plastics industry poll shows that 89% of their sample of Canadians prefer non-recyclable plastics to be disposed in a WtE facility compared to only 5% preferring traditional landfill. There was no response available asking whether we should use non-recyclable plastics in the first place, while 6% did not know or refused to answer the question. Further, WtE ranked third after solar and wind as a preferred energy source (other choices were natural gas, oil, nuclear and coal). Like most polls the survey was not set up for in-depth analysis (e.g., modeling), so there is little emphasis on how such figures correlate with other preferences regarding waste and waste planning.

2. Background literature

This paper brings together literatures on: (i) attitudes toward non-WtE and WtE incineration and landfill with (ii) attitudes toward recycling. The former has its roots in the facility siting and risk literatures while the latter is embedded more in the environmental psychology and environmental economics literatures. We draw them together to construct four hypotheses about incineration and landfill both with and without energy recovery, as outlined in Section 3.

It is not always clear which types of waste facilities people prefer. In terms of relative support for various technologies, Achillas et al. (2011) were surprised to find higher levels of support for WtE incineration in Greece relative to landfill. They measured whether residents of Thessaloniki, a large city with an acute waste crisis, felt traditional landfill (LF) was considered a better solution than WtE incineration in terms of: cost (LF = 39% vs WtE = 30%), public health (LF = 31% vs WtE = 46%), aesthetic nuisance (LF = 23% vs WtE = 54%), land degradation (LF = 23% vs WtE = 50%) and energy recovery (LF = 6% vs WtE = 69%) – with cost being the only one favoring landfill. An older study of New Haven Connecticut voters found that opposition to a hypothetical WtE incinerator within one mile of the resident's home was 79% and within five miles it dropped to 49% (Lober and Green, 1994). They

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