Report to/Rapport au :

Planning and Environment Committee /
Comité de l'urbanisme et de l'environnement

and Council/ et le Conseil

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City Wide/À l'échelle de la ville Ref N°: ACS2009-CCS-PEC-0020

SUBJECT: **SWEDEN WASTE-TO-ENERGY TOUR SUMMARY AND RECOMMENDATIONS**

OBJET : **RÉSUMÉ DE LA VISITE DE TRANSFORMATION DES DÉCHETS EN ÉNERGIE DE LA SUÈDE ET RECOMMANDATIONS**

REPORT RECOMMENDATIONS

That Planning and Environment Committee recommend Council approve that:

1. **The City of Ottawa, in conjunction with the City of Gatineau and with the cooperation of the Swedish Trade Council, establish a Task Force to investigate the waste handling practice of incineration and its suitability in the National Capital Region and the surrounding Eastern Ontario municipalities;**

2. **The Task Force work cooperatively with the Ministry of the Environment to ensure the investigation of incineration is included as an alternative to the undertaking where a review of the undertaking is contemplated or required under the *Environmental Assessment Act* or outlined in the Environmental Assessment Requirements for Waste Management Projects**

3. **The Planning and Growth Management staff work jointly with the developers of the Fernbank lands to explore state of the art technologies and principles relating to waste.**

4. **The Environmental Services include in 2010 budget an allotment for staff training and research to support recommendations made by Councillor Qadri.**

BACKGROUND

The Planning and Environment Committee approved the participation of Councillor Qadri at the Energy Educational Tour from May 23-30, 2009. The Canadian Urban Institute spearheaded this initiative. As part of the approval, Councillor Qadri agreed to provide a report, which he has prepared for the consideration of Committee and Council.

DISCUSSION

Introduction

A modern and revolutionary approach to the waste and waste-to-energy sector is of critical importance as we lay the framework for an environmentally sustainable City of Ottawa.

The state-of-the art technologies and principles within the waste and waste-to-energy sector that have been adopted by Swedish municipalities and companies serves as an example for Ottawa to follow.

The Waste-to-Energy tour, conducted by the Swedish Trade Council and the Embassy of Sweden, in co-operation with the Canadian Urban Institute, highlighted the myriad of responses to operational and educational methods used within Sweden and Europe.

The holistic theme echoed throughout the duration of the tour crystallized the importance of viewing waste at a micro and macro level in order to effectively combat the environmental degradation experienced by the continued use of unsustainable waste practices.

The crux of Sweden's approach to modern waste and waste-to-energy practices rests on the pillar of synergy and the invisible links between municipal services (energy, waste management, water supply, sanitation, transportation, planning, etc).

For far too long, the City of Ottawa has approached these services as independent entities; in Sweden, under the framework of the 'SymbioCity,' the approach is to find links between municipal services and invest in them to maximize results. The by-product is an integrated approach that can be adapted to different developable areas, be it urban or suburban, yielding substantial environmental and financial rewards.

Analysis

The Brundtland Commission contends that sustainability is "development that meets the needs of the present without compromising the ability of future generations to meet their needs."

At the root of SymbioCity's symbiosis is the fusion of services with long-term benefits in mind: combine waste management and heat production to create a new power industry; combine waste-water treatment and traffic systems to develop a biofuel for public transport; combine industrial waste heat with the municipal energy plant in order to cut energy production costs in half and thus the dependency on imported resources.

The most important word in the SymbioCity concept is value.

Two messages derived from the Waste-to-Energy tour are how best to dispose of waste and how to collect waste more efficiently. In Sweden, landfilling has decreased and material recovery, biological treatment and incineration for energy recovery have increased as a result of more sorting of waste at source and changes in waste treatment. The quantity of energy and materials recovered has risen dramatically. These measures have also reduced the environmental impact of waste management. To contextualize, landfilling of household waste fell from 1,380,000 tonnes in 1994 to 380,000 tonnes in 2004, with just nine per cent of household waste being disposed of in a landfill.

With the Terms of Reference for the expansion of the Carp Road Landfill forthcoming, landfilling should be viewed as the smallest component of the TORs, with considerable emphasis placed on the development and implementation of other technologies, like Plasco and incineration.

From a waste collection standpoint, there are a number of key initiatives aimed at increasing the efficiency of traditional curbside pick-up by replacing it with more advanced collection systems, specifically Envac and Optibag.

Envac's underground waste system blurs the line between commercial and domestic garbage. The collection system is facilitated by the efficient separation of waste into dedicated streams through a vacuum technology that utilizes pipes to move waste from deposit portals to sorting stations.

The system is offered in either a stationary format or a mobile system. The stationary system consists of a number of collection points, linked together by piping that transports the waste to a central collection station. When a refuse bag is deposited into an inlet, it is temporarily stored in a chute on top of a discharge valve. When the containers are full, they are vacuumed to a central collection point where trucks collect the refuse to transport to incineration facilities, composting plants or the smallest component, landfills.

In the mobile system, the waste is deposited in storage tanks, which are regularly emptied via special docking stations into vacuum-equipped vehicles. The refuse bag is put into an inlet, which may be located indoors or outdoors. The bags are temporarily stored in a closed tank, the size of which is adapted to the amount of waste generated by the building

occupants. The storage tanks are linked to docking points via a network of pipes. The docking points are placed so that the vehicle collecting the waste does not need to drive into small residential streets etc. The system is most often dimensioned for emptying once or twice a week.

Optibag, on the other hand, continues the delivery of curbside waste collection, but places considerable emphasis on source-separation. Aiming to maximize efficiency for customers, Optibag has modernized and revolutionized curbside pick-up.

Household waste is sorted at source into colour-coded bags and stored in one standard bin and collected by one service truck. The waste is then transported to a plant and all bags are tipped into one receiving pit. The advantage to this is that waste can be sorted into any number of streams – limited only by the number of coloured bags used.

Using a videosystem that recognizes the colour of the bag passing a sensor, the bags are sorted and treated accordingly**.**

Case Study – Hammarby Sjostad, Sweden:

Mere decades ago, what is now one of the hottest real estate markets in Stockholm was a grim industrial wasteland – a brownfield lined with wharfs and docks, buried deep in 130 tonnes of oil and grease, and 180 tonnes of heavy metals.

Plans were set in motion in the 90's to radically transform these lands, resting on the edge of downtown Stockholm, into an integrated redevelopment program driven by sustainability. The vision was a network of 11,000 apartments, 25,000 inhabitants and 10,000 workplaces by 2018.

The district has become famous for its modern architectural theme, buoyed by a commitment to investing in sustainable materials and progressive programs.

At the heart of the development are key principles that have defined the way in which people live, work and play:

- Automatic underground waste collection systems
- District heating and cooling fuelled partly by local waste collection and by heat exchangers in water treatment
- Solar-powered hot water and electricity
- Biogas from household sewage water and waste
- Collection and filtration of runoff water
- Super-efficient buildings, triple-glass windows, green roofs, ect.

A significant portion of electricity in Hammarby is generated via the incineration of combustible waste, while air quality is monitored religiously. Heat is extracted from the purification process of treating wastewater, while solar power supplies half of the annual requirement for domestic hot water. Energy efficiency is rooted in the transportation plan,

as inner-city buses run on biogas generated from sewage sludge and organic waste. Energy systems are designed to take advantage of environmental conditions to maximize efficiency and usability. This is the same principle of a LEED development that we employ, but on a neighbourhood scale.

Current Waste Collection Financial Information

A Feasibility study for the implementation of a system of pneumatic waste collection in Fernbank, prepared by Envac, details at a very high level the cost to implement an underground waste collection system in the future Fernbank lands, based on full build out. The cost can be scaled to number of units served, rather than the entire Fernbank community. Said cost can be incorporated into the cost of a unit (based on final residential and commercial unit mix and size of the system). The report follows this document.

For reference, the following collection costs are based on the 2010 and 2011 pricing of current collection contracts and expected tonnages per material type for 2010 and 2011. Please note that apartment contracts are charged by the lift (each time a front–end loaded bin is emptied) not by weight. The costs have been converted to a per tonne cost. Processing costs have been left out, as they are irrelevant to collection systems so long as the collection streams remain the same. Processing costs do increase significantly once materials are combined together for collection purposes.

The diversion performance for the multi-residential sector is lower than that of the residential sector due to anonymity and inconvenience (one garbage shute, carry recycling to recycling room).

	Curbside						
	year	**Cost/tonne**	**Tonnes**	**Total**	**number of households**	**Cost per household**	**Tonnes of material per household**
Garbage	**2010**	$83	154900	$12,927,954	258900	$50	0.60
Garbage	**2011**	$85	155650	$13,272,276	263400	$50	0.59
organics	**2010**	$125	51800	$6,468,784	258900	$25	0.20
organics	**2011**	$128	52050	$6,662,921	263400	$25	0.20
yard waste	**2010**	$154	10000	$1,541,000	258900	$6	0.04
yard waste	**2011**	$157	10000	$1,574,100	263400	$6	0.04
bluebox	**2010**	$155	14200	$2,195,178	258900	$8	0.05
bluebox	**2011**	$158	14200	$2,240,760	263400	$9	0.05
blackbox	**2010**	$155	47000	$7,265,730	258900	$28	0.18
blackbox	**2011**	$158	47500	$7,495,500	263400	$28	0.18

	Multi-residential						
	year	Cost/tonne	Tonnes	Total	# of households	Cost per household	Tonnes of material per household
Garbage	**2010**	$34.02	38800	$1,320,000	116600	$11	0.33
Garbage	**2011**	$33.76	39300	$1,326,600	117500	$11	0.33
bluebox	**2010**	$490.45	2010	$985,800	116600	$8	0.02
bluebox	**2011**	$492.67	2100	$1,034,600	117500	$9	0.02
blackbox	**2010**	$116.70	7950	$927,800	116600	$8	0.07
blackbox	**2011**	$118.71	8350	$991,200	117500	$8	0.07

Below are the recycling revenues for 2006-2008. They should not be used to offset any other costs however. Processing costs have not been included. When comparing collection systems, only collection costs should be used. The recycling market is expected to generate only 50% of the 2008 revenues in 2009, due to the economic downturn. These revenues have not been split out between curbside and multi-residential, as they are not marketed in that manner.

Black box Revenues	2006	2007	2008
Boxboard	$186,733	$184,588	$220,553
Hard Pack	$47,315	$51,277	$0
Mixed Fibre	$50,826	$275,268	$174,683
News #8	$3,721,904	$4,521,278	$5,128,103
Newspaper	$0	$0	$0
OCC	$534,323	$920,997	$829,917
Telephone Books	$24,084	$23,877	$14,346
Total	**$4,565,185**	**$5,977,285**	**$6,367,602**

Bluebox revenues	2006	2007	2008
Aluminum	$1,250,268	$1,425,941	$1,381,854
Clear Glass	$17,124	$16,438	$6,790
Gable	$18,767	$24,599	$16,597
Mixed Glass	$0	$1,662	$0
Mixed HDPE	$472,747	$481,013	$610,985
Mixed PETE	$448,831	$597,388	$585,295
Steel/Tin	$218,397	$312,250	$464,636
Tubs & Lids	$21,950	$20,183	$31,631
Total	**$2,448,084**	**$2,879,474**	**$3,097,788**

CONSULTATION

This item will be advertised in the local dailies as part of the Public Meeting Advertisement on Friday preceding the Planning and Environment Committee meeting.

In addition to attending the Waste-to-Energy tour and liaising with key stakeholders, delegations from across Canada and business representatives, several meetings have been held with senior City Staff in the Waste and Wastewater Services department, the Planning department as well as future developers in the Fernbank community.

Environmental Services

The Environmental Services Department will support the Task Force that will look at the alternative waste technologies

FINANCIAL IMPLICATIONS

There are no current financial implications as outlined in the recommendations in this report. Any cost in establishing the task force will be absorbed by existing budgets.

LEGAL/RISK IMPLICATIONS

There are no legal/risk management impediments to the implementation of this report's recommendations.

SUPPORTING DOCUMENTATION

Document 1 - Feasibility study for the implementation of a system of pneumatic waste collection in Fernbank – report prepared by Envac (Issued Seperately)

DISPOSITION

That staff support and participate in the proposed Ottawa-Gatineau-Swedish Trade Council task force.