



Innovation pushes Edmonton to the leading edge of waste management

Community Energy Planning Mission Case Study

OVERVIEW

Increased growth can mean drastic increases in waste, but despite a booming economy and accelerated development, Edmonton's innovative strategies, technologies and research have kept it at the forefront of effective waste management. Recycling, composting and other initiatives extend the life of Edmonton's landfills and earn revenues for both the public and private sectors. Top-of-the-line facilities employ sophisticated waste handling systems and provide space to conduct expert research into new waste processing technologies. Direct marketing, information sessions and volunteer programs keep Edmontonians involved in and informed of the city's efforts. Electronic waste and street sand recycling initiatives showcase ingenuity and offer valuable new knowledge for Canadian municipalities. Taken together, the city's waste management technologies, programs and research demonstrate the province's leadership and expertise in sustainable waste management.

EDMONTON'S INTEGRATED WASTE MANAGEMENT SYSTEM

The City of Edmonton's citizen-driven initiatives and advanced collections, processing and disposal processes have made the city a national leader in solid waste management. "We listen to the citizens of Edmonton and respond to what they want," says Roy Neehall, manager of the city's waste management branch.

The city's waste management programs are financed through a combination of property taxes (31 per cent), user fees (56 per cent) and revenues (13 per cent). The

- Edmonton's integrated waste management system diverts 60 per cent of the city's waste from landfill per year.
- Recycling street sand used for traction in winter has saved the City of Edmonton \$4.5 million and diverts all but two per cent of used sand from landfill.
- eCycle Solutions Inc., an Alberta-based, approved recycler of electronic waste, recycles nearly 1,000 metric tonnes of municipal and industrial, commercial and institutional (ICI) electronic waste every month.

waste management branch surveys Edmonton residents every three years to assess their needs and gauge the city's progress in its initiatives.

At-your-door service

Edmonton's waste is collected from individual homes, apartments, condos, and depots, and from small businesses on a direct cost-recovery basis. A front-door collection service is available for seniors and others in need. Residents can also dispose of hazardous waste at the city's popular "Eco Stations." Regular litter collection keeps city streets clean. The city shares responsibility for waste collection with a private company, a collaboration that has proven successful. "It keeps us both honest," notes Neehall.

Collected waste is transferred to the Edmonton Waste Management Centre (EWMC), the heart of Edmonton's solid waste management system. Featuring state-of-the-art solid waste processing and research facilities, the



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550-acre site can process up to 200,000 tonnes of municipal solid waste each year.



City of Edmonton's Eco Station (Photo: City of Edmonton)

A hub of advanced technologies

The EWMC includes a composting facility, a residential recycling facility and a landfill gas recovery plant.

The EWMC's composting facility is one of the largest composting operations in the world. Residents are not required to separate organic material for collection; instead, organic materials are sorted out at the centre. The resulting compost is cured, screened and prepared for different uses, including mulch for lawns and gardens, agricultural fertilizer, erosion control products, and others. "It takes about two to three months to produce finished compost," explains Allan Yee, senior operations engineer at the waste management branch. In 2007, the facility generated about 50,000 tonnes of compost products.

All residential recyclables are picked up and delivered to the residential recycling facility at the EWMC, which is owned by the City of Edmonton and operated by Waste Management Inc. (WMI). An automated blower sorts plastic and paper waste, and loose cardboard is bundled into cubic-

metre bales. Garbage, which constitutes about 10 per cent of the received material, is separated from recyclables by hand. The city pays WMI \$100 per tonne to process the material, along with 25 per cent of the \$12,000 to \$15,000 per month it earns on recyclables.

The results reflect the effort: EWMC's renowned composting and recycling facilities divert 60 per cent of Edmonton's waste from landfill. With such a high diversion rate, Yee predicts that "the landfill should be fine for another 15 years."

The EWMC also incorporates a landfill gas recovery plant. The plant extracts 60,000 cubic metres per day of landfill gas and generates 4.8 megawatts of electricity per year — enough to power 4,600 homes. A leachate treatment plant and biosolids treatment lagoons, along with wetlands and a natural revegetation program, are found at the site. A research and development facility provides space for researching solid waste handling, classification, sorting and pre-processing, as well as compost and landfill processes. An adjacent administration and training centre includes a classroom and lecture hall.

A suite of complementary programs supplement the EWMC's leading technologies. "Our 'reuse roundups' provide an opportunity for residents to bring things in that are not normally accepted for recycling, like CDs, shells, bingo dabbers and buttons," explains Neehall. The EWMC now includes a reuse centre that collects these items. The annual Capital City Cleanup program invites residents to collect litter and offers up city blocks for residents to adopt and keep clean.

Engaging Edmontonians

Neehall credits the success of Edmonton's integrated waste management system to the engagement and participation of Edmonton's residents. Direct information programming and social marketing is an integral part of the city's community relations program. "We have a strong commitment to education," he notes. Ten city staff members intervene directly at the classroom level. A grade 4 unit entitled "Waste in Our World" sensitizes students to the importance of waste management. The branch also provides tours of the EWMC facilities to 10,000 students every year. An e-learning program called "Sort It Out" is available to Edmonton's school boards. "The kids teach their parents what to do," says Neehall.

The branch also attends community shows and events, provides information for homeowners, and uses Edmonton's radio and television media to spread its message. It offers a hotline, a service



centre, tours, open houses and workshops for residents. “One-on-one discussions also go a long way,” he adds.

The branch extends its \$1.5 million community relations budget through significant in-kind and volunteer support. “We have almost 1,000 volunteers working on our programs,” notes Neehall.

Future forays

Pending trials, the city intends to build gasification and ethanol plants that it anticipates will significantly increase the city’s diversion rate from 60 to 90 per cent. A major electronics waste recycling facility is currently under construction at the EWMCE that will complement Alberta’s two-year-old electronics recycling legislation. The new facility is expected to process between 12,000 and 15,000 tonnes per year of e-waste. The branch has also set its sights set on graffiti management and increasing recycling among city businesses.

A SECOND LIFE FOR STREET SAND

When temperatures plummet in Edmonton, sand trucks can deposit up to 190,000 tonnes of street sand to improve vehicle traction. About 70 per cent of this material is swept up in the spring, half of which is contaminated with salt, hydrocarbons and other material such as litter and organic matter. Until 2004, this leftover street sand went to landfill. “When new regulations levied a substantial disposal fee, the city faced a big problem,” says Bob Dunford, general supervisor with the City of Edmonton. Under the new regulations, the City of Edmonton would have to pay \$3 million for disposal in addition to the annual spring cleanup cost of \$4.5 million.

Supported by a \$618,923 grant from the Federation of Canadian Municipalities’ Green Municipal Fund™ (GMF), the city partnered with the Edmonton Waste Management Centre of Excellence (EWMCE) to test an innovative process to recycle street sand. The resulting process — washing and stockpiling street sand for reuse— proved to be an economically and environmentally sustainable solution.

How to wash dirt

First, street sweepings are separated into litter (plastics, leaves, paper, wood, etc.), large aggregate material such as stones and gravel, and fine sands. Litter is transferred to the city’s on-site composting and recycling facilities or sent to landfill, as required. Large aggregates are blended with crushed concrete and asphalt to produce base coarse aggregates used in roadway construction

and maintenance programs. The coarse and fine sands continue on to the washing system. Hydrocyclones wash, recover and de-water the sand. The coarse and fine sands are separated, the latter of which is kept for secondary use. The clean, re-usable coarse sand is then stockpiled at the city yards until needed.



Washing Edmonton’s street sand (Photo: City of Edmonton/EWMCE)

Because washing street sand requires high volumes of water, a closed system is needed, explains Phil Haug, business manager of Sand Recycling Ltd., a private company working with the EWMCE. A water reservoir collects overland drainage; water is pumped in, the sand is washed, and water is returned to the pond. He notes that while both dry and wet processes were attempted to clean the street sand, the wet process proved to be much better. “The dry method was prohibitively expensive,” he explains.

A superior product for less money

“Diversion is the first benefit,” says Dunford. All but two per cent of recovered street sand can be reused. Recycling also preserves a limited, non-renewable resource and saves in truck travel, since new sand does not need to be mined and brought in from farther and farther away, he adds.

Site selection was an important factor in the initiative’s success. Sand washing on this scale requires space. “Integrating sand recycling with the snow storage facility worked well here,” Dunford explains. The sand recycling facility at the City of Edmonton’s Poundmaker Snow Storage site can process up to 150,000 tonnes of used street sand. Also, excessive moisture in street sand could cause it to freeze, so adding salt to the stockpile is a good idea, he adds.

The project team was pleasantly surprised at the cost savings they were able to achieve. “Our best



hope was to break even, but we're ahead of that," says Dunford. Recycling street sand saves the city about \$1.75 per tonne, making recycling a cheaper option than buying new sand. The initiative has saved the City of Edmonton an impressive \$4.5 million to date. "The recycled product is cleaner than new sand," notes Dunford. "It's actually a superior product for less money."

This initiative has been recognized as a National Research Council best management practice and earned the project team the Transportation Association of Canada's Environmental Achievement Award in 2004.

ELIMINATING E-WASTE

Electronics are one of the fastest-growing waste streams in North America, threatening to overburden landfills with non-decomposing, hazardous materials. In response to this growing problem, Alberta has implemented the first-ever provincial electronic waste recycling program. Managed by the Alberta Recycling Management Authority (ARMA), the program focuses on diverting electronics from landfills and ensuring that component parts are safely recycled.

Registered recycler: eCycle Solutions

Headquartered in Airdrie with offices in Edmonton, Calgary, Chilliwack and Ottawa, eCycle Solutions Inc. is registered with ARMA, the Electronics Stewardship Association of British Columbia (ESABC) and the Saskatchewan Waste Electronic Equipment Program (SWEEP) as a qualified recycler of electronic waste. Its primary recycling facility in Airdrie is home to some of the most advanced electronics recycling machinery in North America. A range of electronic waste, including computers, monitors, printers, fax machines, televisions, and keyboards, is collected at about 220 ARMA-managed collector sites and brought to the facility. "Because we process items based on weight, even large TVs can be broken down, since they're mostly empty," explains Gary Powers, eCycle's president.

Most of the electronic waste received at the facility is processed through eCycle's MeWa QZ processing system, a powerful processor that can reduce up to five metric tonnes of electronic waste to its primary components every hour. Precious metals are set aside for smelting in Europe, earning the company some of its revenue. eCycle's staff, which number just under 50, also take apart some materials by hand, clipping wires and connections and separating commodities. The company disassembles and shreds just short of 1,000 metric tonnes of municipal and industrial,

commercial and institutional (ICI) electronic waste every month. Between the MeWa QZ processor and the eCycle team, only one per cent of waste received at the facility is sent to landfill.



Electronic waste ready for recycling (Photo: eCycle Solutions)

Alberta and beyond

eCycle opened its Edmonton office in 2006 to extend its services across Alberta and Western Canada. The MeWa's processing power, however, exceeds the supply of electronic waste in the province and the company now recycles electronic waste from across the prairies. "We get waste from Alberta, Saskatchewan, B.C. and beyond," says Powers.

BEST PRACTICES FOR CANADIAN MUNICIPALITIES

Spurred by new provincial regulations, the initiative of the city's citizens, and promising business opportunities, the innovative waste management strategies, programs and technologies implemented by the City of Edmonton and the city's private industries offer excellent examples from which other Canadian municipalities can learn. Many municipalities share Edmonton's challenges — increased growth, high disposal costs, filling landfills — now they can share in its solutions.

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ADDITIONAL RESOURCES

This case study highlights sites visited by delegates on the 2007 FCM Community Energy Planning Mission. For additional information on the Mission, including more Mission case studies, presentations and the 2007 Mission Report, visit the FCM Centre for Sustainable Community Development Website at <www.sustainablecommunities.fcm.ca/Community_Energy_Mission>.