

"The State of EFW in Canada: An Overview of Policy Options and Political Challenges"

Presentation to the

Air & Waste Management Association,

Ontario Section Annual Conference

Toronto, Ontario

6 October 2010



Agenda



- Canadian Waste Market
- EFW Then and Now
- Case Studies
- Coalition Building
- Government Initiatives
- Projects In Development
- Progressive Public Attitudes
- Two Years From Today



Canadian Waste Market

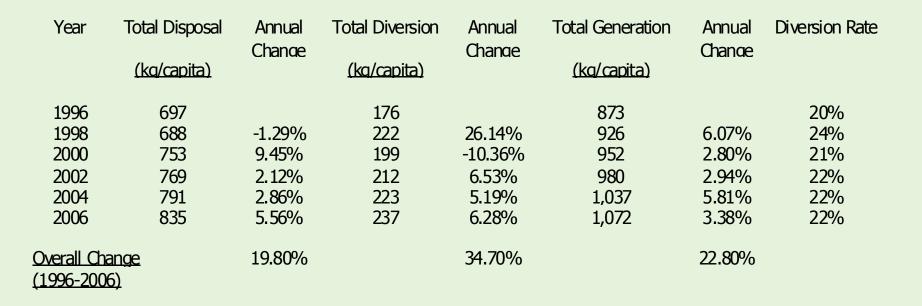


Critical Market Numbers

- 35 m tonnes handled by waste industry
 - 13 m tonnes from residential sources
 - 22m tonnes from non-residential sources
- 27 m tonnes to disposal
 - 74% to landfill
 - 3% to "incineration," including EFW
- 7.7 m tonnes diverted (22%)
- Per capita performance
 - 1,072 kg of waste per capita
 - 793.3 kg to landfill
 - 32.2 kg to "incineration"
 - 237 kg diverted



Canadian MSW Trends



Source: Statistics Canada, Waste Management Industry Survey, 2006



Trends By Sector

	Category	Measure	2000	<u>2002</u>	<u>2004</u>	<u>2006</u>	% Chg
							′00-′06
Municipal Solid Waste	Population	(m)	30.8	31.4	31.9	32.6	6%
	Generation	Tonnes (m) Kg/Capita	29.3 952	30.7 980	32.3 1,037	35 1,072	19% 13%
	Disposal	Tonnes (m) Kg/Capita	23.2 753	24.1 768	25.2 791	27.2 835	17% 11%
	Diversion	Tonnes (m) Kg/Capita	6.1 199	6.6 212	7.1 223	7.5 237	23% 13%
Residential		% Diversion	21	22	22	22	1%
	Generation	Tonnes (m)	11.2	12.2	12.3	13	16%
	Dienocal	Kg/Capita	365	390	385	398	9%
	Disposal	Tonnes (m) Kg/Capita	9.1 295	9.4 301	9 280	9.2 283	1% -4%
	Diversion	Tonnes (m)	2.2	2.8	3.4	3.7	68%
		Kg/Capita	71	89	105	115	62%
Non-Residential		% Diversion	19	23	27	29	10%
	Generation	Tonnes (m) Kg/Capita	18.1 587	18.5 589	20 626	22 674	21.50% 15%
	Disposal	Tonnes (m) Kg/Capita	14.1 458	14.6 467	16.3 508	18 552	28% 20.50%
	Diversion	Tonnes (m)	4	3.9	3.7	4	0%
	2.7.5151611	Kg/Capita % Diversion	129 22	123 21	117 19	123 18	-5% -4%

Source: Alain David, Waste Reduction and Management Division, Environment Canada

National Performance...

...In A Global Context

- According to the Conference Board of Canada...
 - Canada's overall environmental performance...
 - 15th out of 17 developed countries
 - "C" grade
 - Canada's waste generation record...
 - "D" grade (Poor performance)
 - Ranks in last place out of 17 countries
 - Behind...Japan, Belgium, Finland, Sweden, France, Italy, Austria, UK, Germany, Netherlands, Switzerland, Austria, Denmark, Ireland, US, and Norway

Source: Conference Board of Canada, "How Canada Performs – Environment Report Card", 3 November 2008; see also www.conferenceboard.ca





EFW Then and Now

Current Situation

Seven (7) main installations

- Five (5) with energy recovery
 - One (1) starved air plant in Prince Edward Island
 - One (1) mass burn plant in Quebec
 - One (1) starved air plant in Ontario
 - One (1) excess air plant in Alberta
 - One (1) mass burn plant in British Columbia
- Two (2) without energy recovery
 - Two (2) step grate plants in Quebec
- Range in capacity from 30 tpd to 920 tpd
- Throughput totals approximately 763,000 tonnes per year
- Energy generation (steam and electricity) from 96% of combusted waste



Existing EFW Plants



Canadian EFW Plants and Incinerators, 2000-2005

Type	2000	Waste Quanity	2005	Waste Quanity	
		(Ma/vr)		(Ma/vr)	
Municipal Medical Hazardous Sewage Sludge Federal Entities Remote	11 101 7 7 62	950,711 5,579 163,208 171,474 1,235	7 42 9 6 30 22	762,793 8,082 204,418 172,525 1,087 3,320	
Total	188	1,292,207	116	1,152,225	

Source: Review of Dioxins and Furans from Incineration in Support of a Canada-wide Standard Review, A.J. Chandler & Associates Ltd., 15 December 2006



MSW EFW Facilities



				Heat			Annual
Name	Location	Туре	Manufacturer	Recovery	Capacity	APC System	Thoughput
					(# x [t/day])		(Mg/
Wainwright (MSW Feed)	Wainright, Alberta	3-stage excess	Basio	Yes	1 x 29	WSH/DS/PAC/FF	2,383
Greater Vancouver RD	Burnaby, BC	Mass burn	Martin	Yes	3 x 240	SNCR/WSH/DS/PAC/FF	275,000
Algonquin Power EFW	Brampton, Ontario	2-stage starved	Consumat	Yes	5 x 100	WSH/DS/FF/PAC/SCR	140,000
Trigen	Charlottetown, PEI	2-stage starved	Consumat	Yes	3 x 33	WSH/DS/PAC/FF	32,000
Centre de traiement des residue urbains	Quebec City, PQ	Mass burn	Von Roll	Yes	4 x 230	ESP/WSH/DS/PAC/FF	280,000
La Regie internumicipale de Gestion Rive Sud	Levis, PQ	Step grate		No	1 x 80	WSH/DS/PAC/FF	24,310
MRC des Iles de las Madelaine	Dune-du-Sud, PQ	Step grate		No	1 x 31	WSH/DS/PAC/FF	9,100

APC System Key

ESP - Electrostatic precipitator for particulate matter removal

 $\ensuremath{\mathsf{WSH}}$ - Evaporator cooling tower or wet spray humidifier

DS - Dry reagent addition or dry scrubber

PAC - Powdered activited carbon addition

SNCR - Selective non-catalytic reduction for NOx control

SCR - Selective catalytic reduction for NOx and PCDD/F control

FF - Fabric filter particulate control

Source: Review of Dioxins and Furans from Incineration in Support of a Canada-wide Standard Review, A.J. Chandler & Associates Ltd., 15 December 2006

Past Notables

SWARU in Hamilton

- No RDF facilities still in operation since closure in 2002
- "While 11 MSW incinerators were included in the (2000) inventory, most of the emissions from this sector were associated with the now closed SWARU facility in Hamilton."
 - (A.J. Chandler & Associates, Report to CCME, December 2006)

Ashbridge's Bay (Commissioner's Street) facility in Toronto

- Inner city plant closed in 2000
- Rallying point for opponents, zero-wasters, and downtown residents





EFW In Global Context

Country	Diversion	Landfill	Incineration	Waste per capita
				(kg)
	(per cent of	(per cent of	(per cent of	(3)
	total)	total)	total)	
Netherlands	65	3	32	624
Austria	59	31	10	627
Germany	58	20	22	600
Belgium	52	13	35	469
Sweden*	44	5	50	464
Denmark	41	5	54	696
Luxembourg	36	23	41	668
Spain	35	59	6	662
Ireland	31	69	0	869
Italy	29	62	9	538
Finland	28	63	9	455
France	28	38	34	567
UK	18	74	8	600
Greece	8	92	0	433
Portugal	3	75	22	434
United States	33	54	13	763
Canada	24	74	2	1,037

Sources: Institute for Public Policy Research, base yr: 2003/4, Environment Canada (2004) * 2005; US EPA; Magnus Schonning, Embassy of Sweden



Case Studies

CANADIAN

ENERGY-FROM-WASTE

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National Overview





Case Study: Peel Region

- Opened under public ownership in 1992
 - Sold to private investors in 1999
- Five (5) units, 100 tonnes each
 - Rated at 182,000 tonnes/year
 - Operates at 160,000 tonnes/year
- Waste agreement up for renewal in 2012
- EFW a municipal (upper tier) priority
 - Green field opportunity under investigation
 - Consulting work complete
 - Own and operate a critical area of focus
- Willing host but "unwilling" customer
- Selling steam to paper company, Norampac

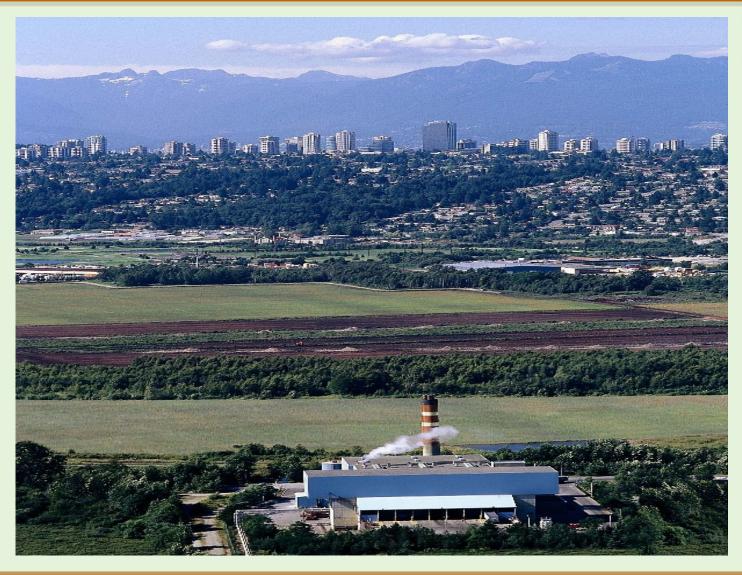


Case Study: Burnaby

- Began commercial operation in March 1988
 - Owned by Metro Vancouver (an upper tier municipality)
 - Operates with philosophy of continuous improvement
 - 47 employees
 - First plant in Canada, 2nd in North America with ISO14,000 certification
- Three (3) boiler lines processing approximately 300,000 tons/yr
 - Averaged 94% plant availability over 21 years
 - Past 2 years at 95%
- Processed over 6 million tons of MSW on a 5-acre footprint
- Sold over 8.5 million tons of steam to recycle paper mill
 - Equivalent of 6 million barrels of oil
- Contributed over 700,000 megawatt hours of electricity to provincial grid since July 2003
- Enhanced Metro Vancouver's 55% recycle rate by recovering 185,000 tons of ferrous metal
 - Metro Vancouver landfills have buried over 1 million tons of recyclable steel in the same time frame

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Beautiful Burnaby, BC







Coalition Building, Advocacy, and Education



Situational Imperative

- Municipalities face an <u>unprecedented waste</u>
 <u>management crisis</u> related to capacity shortfall and risk of a border closure
- Maturing <u>international trends</u> point toward more EFW as predisposal option and source of energy generation revenue
- Increasing interest in green initiatives and <u>climate change</u> mitigation
- <u>Escalating costs</u> of conventional fossil fuels sparking interest in alternative energy sources
- EFW can <u>enhance supply mix option</u> and address power supply shortage
- Overwhelming scientific evidence validates EFW value proposition
- Strong public opinion polling shows growing support for EFW
- Prudent planning dictates investigation of all options in <u>an</u> <u>integrated system</u>





Mission Statement

"The Canadian Energy-From-Waste Coalition, an organization of industry, associations, and stakeholders committed to sustainable environmental policies, stands for the promotion, adoption, and implementation of ER/EFW technology for the management of residual materials within the context of an integrated solid waste management system. Recognizing that ER/EFW technologies are compatible with proactive recycling and other diversion efforts, the coalition seeks to promote the merits of the thermal treatment of waste and garner support for waste derived fuels."



Coalition Principles



- Social Sustainability
 - Operate within the context of local circumstances, preserving community sustainability
- Environmental Sustainability
 - Reduce overall environmental burden by complementing, not competing with, recycling and diversion programs
- Economic Sustainability
 - Balancing costs and benefits most advantageous and acceptable to end-users, customers, and host communities



Organizational Matrix



Municipalities

Labour

Emerging Tech

Equipment

Industry

Academia

W/E Alliances

Diplomats

Engineers

Lawyers

Real Estate

Operators



Membership Matrix



Vancouver, Peel, Edmonton

Power Workers Union

AlterNRG

AE&E Von Roll

Canadian Cement Association, Canadian Plastics Industry Association

WTERT

ERC, OWMA, SWANA, ASME Sweden, Italy, Netherlands, Denmark, France, Germany, Spain

Golder Associates, GENIVAR,
AMEC, Stantec, Ramboll

Borden Ladner Gervais, Willms & Shier Aquilini Renewable Energy

Covanta, Wheelabrator



Coalition Activities



Education and Promotion

- Raising association profile
- Maintaining website
- Speakers bureau
- Engaging key stakeholders, audiences
 - Outreach to public health officials
- Membership recruitment

Government Relations

- Ontario
 - Pursuing standard offer program
 - Advocating for clear emissions standards
 - Participating in technology peer review
- British Columbia
 - Working Group on Waste
 - Municipal relationship building

Media Engagement

- On-going national campaign
 - Editorial boards
 - Op-ed
 - Rebuttal letters and articles

Project Monitoring

- Advocacy and support
 - Where warranted, needed
 - Where allowed
- Opposition and arguments
 - Getting closer to the truth
 - Correcting the nonsense



Accountability

- EFW is critical part of an integrated waste and energy system
- And integration matters because...

...engages robust selection of options

...it leverages proven technologies

...emerging solutions are allowed to fail

...progressive solutions will thrive

...zero-waste a generation or more away

...diversification mitigates risk

...it forces us closer to the truth

...it's the right thing to do

...we've seen what's possible in time







Government Initiatives

Shared Jurisdictions

Jurisdictional Roles

- Municipal
 - Responsible for the collection, diversion, and disposal of MSW from residential sources
 - Upper and lower tier division of responsibilities
- Provincial/Territorial
 - Movements of wastes within jurisdiction
 - Licensing of generators, carriers and treatment facilities
 - Extended producer responsibility
- Federal
 - International agreements
 - Trans-boundary movements of hazardous waste, hazardous recyclable material, and non-hazardous waste
 - Federal lands and operations

Areas of Cooperation

- Developing national initiatives
- Promoting of technical expertise and supporting innovation
- Gathering statistics, performing analyses, disseminating information
- Building capacity





Policy Drivers



Convergence of factors

- Waste capacity crisis
- Risk of border closing
- Need to manage material at home
- Recognition that zero waste is far off
- Acknowledgement that technology works
- Appreciate changing public attitudes



Quiet Support



Support municipal priorities

- Considerable provincial political support at high levels
- Will implement policies to support one-off projects (eg. pricing)
- Will develop comprehensive position once toehold established

• But...

- Will not interfere in municipal decision-making
- Need projects to acquire independent municipal approval
 - Must stand on own merits
 - Leave political risk at local level



Tactics vs Vision



Ontario

- Life Cycle Analysis
 - Review of landfill gas versus gasification
 - Seeking "plug-and-play" policy tool
 - Theoretical conclusions
 - Proprietary gasification should work
 - But no operational data
 - Province now looking at decision-support parameters

British Columbia

- Working Group on Waste
 - Coordinated effort to produce vision in multiple policy areas
 - Establish over-arching framework to guide choices
 - Diverse stakeholders in all areas of waste
 - Waste water, project development, landfill, plastics manufacturers, associations (recycling, construction), municipalities

Setting Priorities



Air Emissions Guidelines

- Guideline A7 review designed to exceed European standards
- Tough but manageable
- Will allow emerging projects to proceed with confidence
- Will retain/build/elevate public trust

Preferred EFW Pricing

- Ontario Power Authority (OPA) set Durham EFW power price at \$0.08
 - Good precedent, clear direction in absence of a formal EFW policy
 - Subject to project meeting environmental guidelines on emissions, diversion

Streamlined environmental assessment process

- Comprehensive analysis and review of alternatives still required
- But fewer public meetings so it's more cost effective and timely
- Encourages alternative approaches
- Involvement of local distribution companies
- Extensive work undertaken by unregulated energy affiliates



An Imperfect World



Waste Diversion Act

- The Good
 - Sympathetic to zero waste lobby
 - Promotes extended producer responsibility
- The Not-So-Good
 - Does not recognize integrated waste hierarchy
 - Limited definition of diversion to exclude EFW
 - Selective manipulation of case studies
 - Fails to recognize the climate change benefits and energy value of residual waste





Projects In Development



| Major Metropolitan Areas

•	Capital (2004 est.)	
	$\sqrt{}$ Ottawa, Ontario	1,142,700
•	Largest cities (2004 est.)	
	■ Toronto , Ontario	5,203,600
	Montreal, Quebec	3,606,700
	$\sqrt{}$ Vancouver, British Columbia	2,160,000
	$\sqrt{}$ Edmonton, Alberta	1,101,600
	 Calgary, Alberta 	1,037,100
	$\sqrt{}$ Quebec City, Quebec	710,700
		710,300
	 Winnipeg, Manitoba 	702,400
	\checkmark Mississauga, Ontario	550,000
	\$\tag{London, Ontario}\$	459,700
	 Kitchener-Waterloo, Ontario 	450,100
•	And other up-and-comers	
	→ Durham-York Regions	1,100,000
	→ Southern Alberta	120,000
	← Sault-Ste Marie	70,000
	→ Dufferin County	50,000



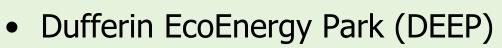
Case Study: Durham



- Ten year waste management planning exercise
 - Shared process (and costs) with York Region
 - Extensive consultation
- Regional commitment to manage waste locally
 - Stop shipments to Michigan
 - Establish control for mandated responsibilities
- Plant to be 140,000 tonnes, with expansion potential
 - Clarington site is willing host
 - No importation of waste
 - District energy potential with industrial neighbours
- Success to date resulting from strong political leadership
 - Opposition loud but limited
 - No advocacy permitted by proponents
- Final stages
 - Preferred vendor (Covanta Energy) selected in April 2009
 - Business case complete by June 2009
 - Approval to proceed in summer 2009



Case Study: Dufferin



- Gasification process
 - Will treat 27,500 tons per year (75 tonnes per day)
 - Will take MSW, ICI, and tires
 - Will generate 3 megawatts
- Approval in May 2009 to negotiate with AlterNRG
 - Westinghouse Plasma technology
 - County to undertake due diligence
- Small project with <u>big implications</u>
 - Rejected huge landfill opportunity
 - EFW possible even for small communities
 - If approved, no reason to deny large cities





Case Study: Edmonton

Currently constructing a new <u>integrated processing and transfer facility</u> (\$85M)

- Landfill to close in July 2009
- Will only run the transfer station until EFW facility operational

Gasification/biofuels facility (\$70M) received approval from Alberta Environment in April 2009

- 100,000 tonnes per year of processed RDF residues
- Capacity to co-produce methanol/ethanol and residual syngas
- Screened over 150 gasification technologies

Joint venture

- Partner to build/operate gasification and fuel production facilities for 25 years
- Operational sometime in 2011

City of Edmonton and Alberta Energy Research Institute (AERI) also building <u>separate R&D facility</u>

- 300 kg/hr pilot gasification facility this year (\$9M)
- Operational by year-end
- On-going research and development, including different feedstocks and the potential to produce higher value products, such as DME and alcohols



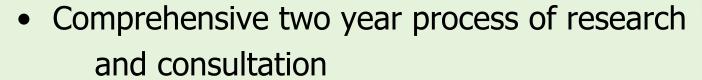
CANADIAN

Integrated In Edmonton





Case Study: Vancouver



- 40+ public meetings through Spring and Summer
- Approved Long-Term Waste Management and Resource Plan (LTWMRP)
 - Strong emphasis on waste reduction and extended producer responsibility
 - Clear statement against landfilling in interior
- Seeking 500,000 tonnes of capacity
 - In-region and/or out-of-region EFW
 - Maybe more than one plant



Vancouver Timeline

July: Metro Vancouver Board approved

Long-term Waste Management and

Resource Plan (LTWMRP)

September: Submit LTWMRP to Minister of Environment for

approval

December: Receive approval from Minister to proceed with

LTWMRP

Winter 2011: Establish expert review panel to assess EFW

solutions/options

Winter/Spring 2011: Issue Request for Expressions of Interest for

preferred sites and technology

Summer 2011: Shortlist preferred sites, technology, vendors

Fall 2011: Initiate Environmental Assessment and Health

Risk Assessment studies





Lessons Learned



Best Practices



- Because there's always opposition
- Even the converted can only move in small, incremental steps

Decision-makers playing to different audiences

- Municipal staff Council Ratepayers Media
- Provincial staff Executive Finance Cabinet Premier

Must meet zero-wasters head-on

- Many generations away
- No policy will get us there in realistic timeframe

Need to recognize different forms of communications

- New media social networking, internet
- Polling, focus groups
- Give equal weighting to public meetings

Industry leading way and public well ahead of policy

Senior levels of government "get it"

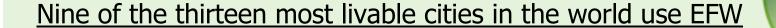
- Understand the technology and simplicity
- See EFW as part of public health infrastructure
- But live in a complex political world

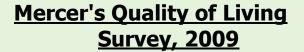
Organized association critical for credibility





Livable Cities





The Economist's World's Most Livable Cities, 2009

1	Vienna *	Austria	108.6	1	Vancouver *	Canada	98.0
2	Zurich *	Switzerland	108.0	2	Vienna *	Austria	97.9
3	Geneva *	Switzerland	107.9	3	Melbourne	Australia	97.5
4	Vancouver *	Canada	107.4	4	Toronto	Canada	97.2
4	Auckland	New Zealand	107.4	5	Perth	Australia	96.6
6	Dusseldorf *	Germany	107.2	5	Calgary	Canada	96.6
7	Munich *	Germany	107.0	7	Helsinki *	Finland	96.2
8	Frankfurt *	Germany	106.8	8	Geneva *	Switzerland	96.1
9	Bern *	Switzerland	106.5	8	Sydney	Australia	96.1
10	Sydney	Australia	106.3	8	Zurich *	Switzerland	96.1





Progressive Public Attitudes



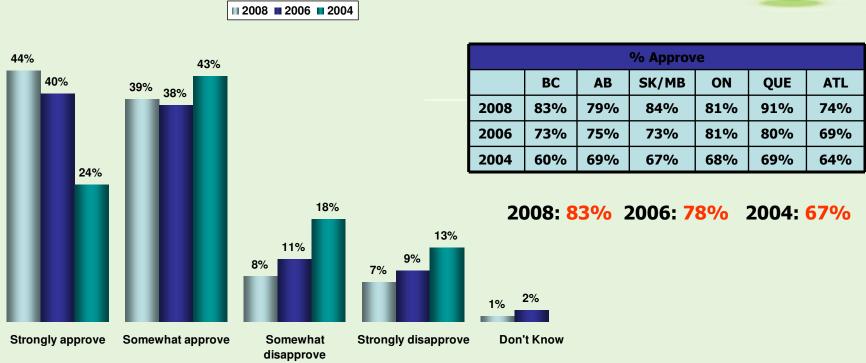
Public Opinion

- Research shows 83% of Canadians support EFW technologies, up from 67% only four years ago
- Canadians understand that EFW can help preserve natural resources and reflects a preferred disposal option
- Among those who approve of facilities being built, more than half (58%) would also approve construction of such a facility in their immediate community



Support is Growing

Using 'Waste to Energy Facility' Increases Approval 5 points Nationally...+11 Points in Quebec and +10 in BC...From 2004: Up 16 Points...



NOTE: In the 2008 wave, 'waste to energy facility' replaced 'incinerator' in questionnaire.

Thinking about this and the other options available, do you approve or disapprove of waste to energy facilities being used for garbage disposal and management in your province? Is that strongly or somewhat? Base: 2004 All respondents N=1,806, 2006 N=2,750, 2008 N=1,652

Source: Waste Management Inc. (Research by IPSOS Reid)

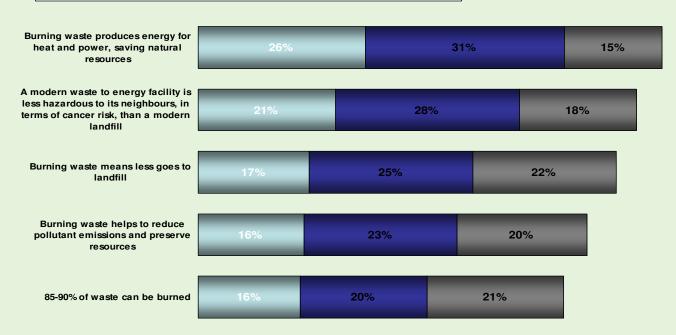


Energy Versus Waste



Most Effective Message to Move to "More Likely to Approve" is Burning Waste Saves Natural Resources and a Modern Facility is Less Hazardous to its Neighbors than a Landfill...





NOTE: In the 2008 wave, 'waste to energy facility' replaced 'incinerator' and 'burning' replaced 'incineration' in questionnaire.

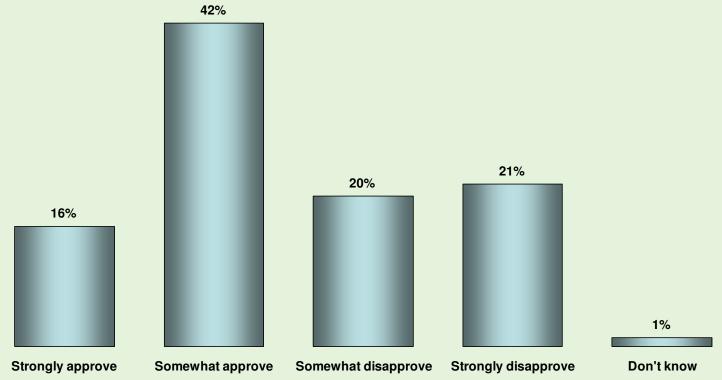
I am now going to read you some things that may be said about waste to energy facilities. Please tell me whether after hearing each statement you are more or less likely to approve of waste to energy facilities being used for garbage disposal and management, or whether the statement has no impact on your opinion? Base: Do not approve/don't know of incinerators being used for garbage disposal N=278

Source: Waste Management Inc. (Research by IPSOS Reid)



A Good Neighbour

Among those who Approve of EFW Facilities being Built, More than Half (58%) Would also Approve the Construction of such a Facility in their Immediate Community...



How would you feel about a waste to energy facility being built in your immediate community? Would you strongly approve, somewhat approve, somewhat disapprove, or strongly disapprove? Base: All respondents that said 'Strongly Approve' or 'Somewhat Approve' at Q15 2008 N=1,375

Source: Waste Management Inc. (Research by IPSOS Reid)





Two Years From Today



Operational Priorities

- ✓ Advocating for <u>progressive electricity pricing</u> reflecting EFW's net positive impact re: climate change
 - Power purchase agreements will assure project financing and long-term, stable tip fees for EFW users
 - Tipping fees can be used as an incentive for 3Rs
 - Proper pricing model will allow operators to shift load during peak demand periods
- Advocating for designation of EFW as <u>renewable base load</u> <u>power</u>
- ✓ Advocating for the establishment of acceptable <u>air emission</u> <u>standards</u> for EFW
- Support <u>projects coming on-line</u>
- <u>Educating key stakeholders</u>, particularly on health and safety issues
- Serving as a <u>primary and credible source</u> for EFW information



So, By 2012...

- Four or five new projects approved
 - Moving towards construction and/or operation
 - In Ontario, Alberta, and British Columbia
- ✓ Preferred price for EFW
 - Accelerated price for EFW operations that meet recycling and environmental goals
- Recognition of EFW as <u>renewable base load power</u>
- ✓ Clearly articulated air emissions standards
- Recognition by policy-makers, politicians, and the public, that EFW is...
 - Safe
 - Proven
 - Cost-effective
 - Compatible with recycling
 - Environmentally sustainable
 - Trusted by residents and ratepayers
 - Increasingly utilized worldwide





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