



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

***Presentation to the
Waste-To-Energy Research & Technology Council
Bi-Annual Meeting***

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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

<u>Year</u>	<u>Total Disposal</u> (kg/capita)	<u>Annual</u> <u>Change</u>	<u>Total Diversion</u> (kg/capita)	<u>Annual</u> <u>Change</u>	<u>Total Generation</u> (kg/capita)	<u>Annual</u> <u>Change</u>	<u>Diversion Rate</u>
1996	697		176		873		20%
1998	688	-1.29%	222	26.14%	926	6.07%	24%
2000	753	9.45%	199	-10.36%	952	2.80%	21%
2002	769	2.12%	212	6.53%	980	2.94%	22%
2004	791	2.86%	223	5.19%	1,037	5.81%	22%
2006	835	5.56%	237	6.28%	1,072	3.38%	22%
<u>Overall Change</u> <u>(1996-2006)</u>		19.80%		34.70%		22.80%	

Trends By Sector



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



...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



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

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

MSW EFW Facilities



Name	Location	Type	Manufacturer	Heat Recovery	Capacity (# x [t/day])	APC System	Annual Throughput (Mg/
Wainwright (MSW Feed)	Wainwright, 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 traitement 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

WSH - Evaporator cooling tower or wet spray humidifier

DS - Dry reagent addition or dry scrubber

PAC - Powdered activated 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

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 (per cent of total)	Landfill (per cent of total)	Incineration (per cent of total)	Waste per capita (kg)
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

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

Beautiful Burnaby, BC





Coalition Building, Advocacy, and Education

Situational Imperative



- Municipalities face an unprecedented waste management crisis related to capacity shortfall and risk of a border closure
- Maturing international trends point toward more EFW as pre-disposal option and source of energy generation revenue
- Increasing interest in green initiatives and climate change mitigation
- Escalating costs of conventional fossil fuels sparking interest in alternative energy sources
- EFW can enhance supply mix option 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 an integrated system

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



- **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.)**
 - √ Ottawa, Ontario 1,142,700
- **Largest cities (2004 est.)**
 - ≡ Toronto , Ontario 5,203,600
 - Montreal, Quebec 3,606,700
 - √ Vancouver, British Columbia 2,160,000
 - √ Edmonton, Alberta 1,101,600
 - Calgary, Alberta 1,037,100
 - √ Quebec City, Quebec 710,700
 - ↔ Hamilton, Ontario 710,300
 - Winnipeg, Manitoba 702,400
 - √ Mississauga, Ontario 550,000
 - ↑ 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



- Dufferin EcoEnergy Park (DEEP)
 - 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 big implications
 - 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 integrated processing and transfer facility (\$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 separate R&D facility**
 - 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

Integrated In Edmonton



Case Study: Vancouver



- Comprehensive two year process of research and consultation
- 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



- **Need a political champion**
 - 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



Nine of the thirteen most livable cities in the world use EFW

Mercer's Quality of Living Survey, 2009

1	Vienna *	Austria	108.6
2	Zurich *	Switzerland	108.0
3	Geneva *	Switzerland	107.9
4	Vancouver *	Canada	107.4
4	Auckland	New Zealand	107.4
6	Dusseldorf *	Germany	107.2
7	Munich *	Germany	107.0
8	Frankfurt *	Germany	106.8
9	Bern *	Switzerland	106.5
10	Sydney	Australia	106.3

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

1	Vancouver *	Canada	98.0
2	Vienna *	Austria	97.9
3	Melbourne	Australia	97.5
4	Toronto	Canada	97.2
5	Perth	Australia	96.6
5	Calgary	Canada	96.6
7	Helsinki *	Finland	96.2
8	Geneva *	Switzerland	96.1
8	Sydney	Australia	96.1
8	Zurich *	Switzerland	96.1



Progressive Public Attitudes

Public Opinion

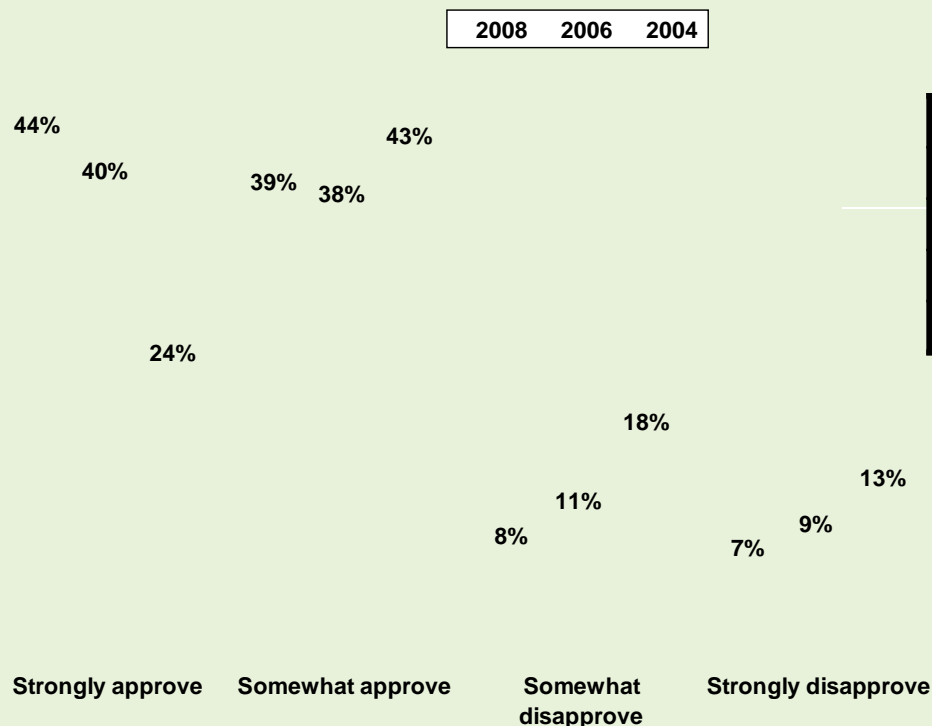


- Research shows 83% of Canadians support EFW technologies, up from 67% only four years ago
- Canadians understand that EFW can help preserve natural resources and reflects a preferred disposal option
- Among those who approve of facilities being built, more than half (58%) would also approve construction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



% Approve						
	BC	AB	SK/MB	ON	QUE	ATL
2008	83%	79%	84%	81%	91%	74%
2006	73%	75%	73%	81%	80%	69%
2004	60%	69%	67%	68%	69%	64%

2008: **83%** 2006: **78%** 2004: **67%**

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

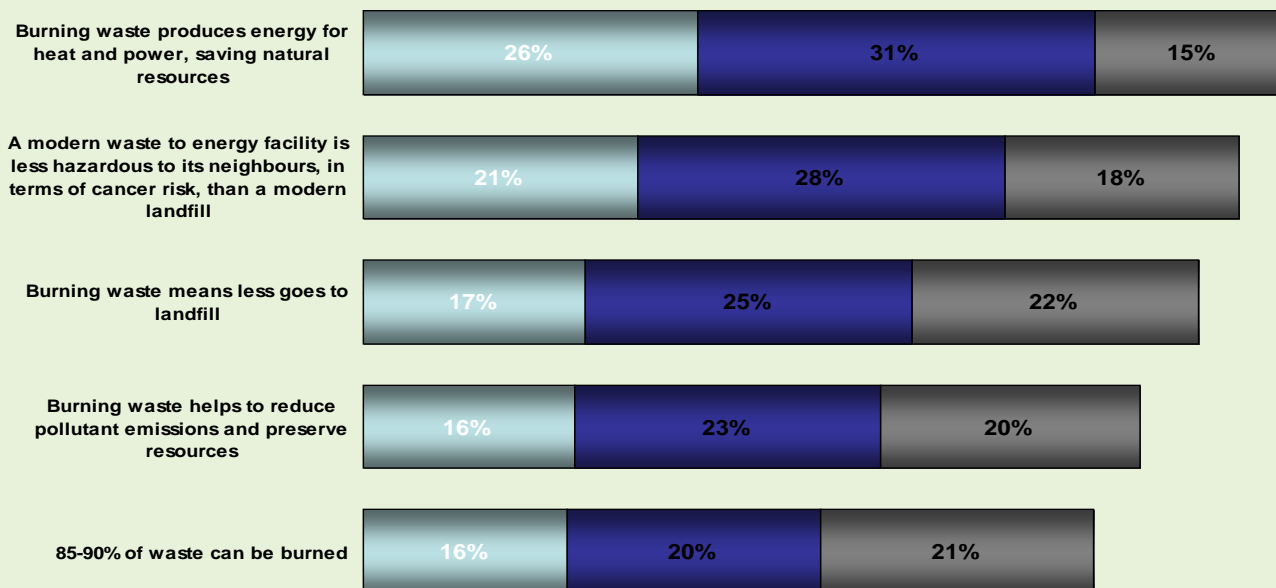
Source: Waste Management Inc. (Research by IPSOS Reid)

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...

Much more likely to approve
 Somewhat more likely to approve
 No impact



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

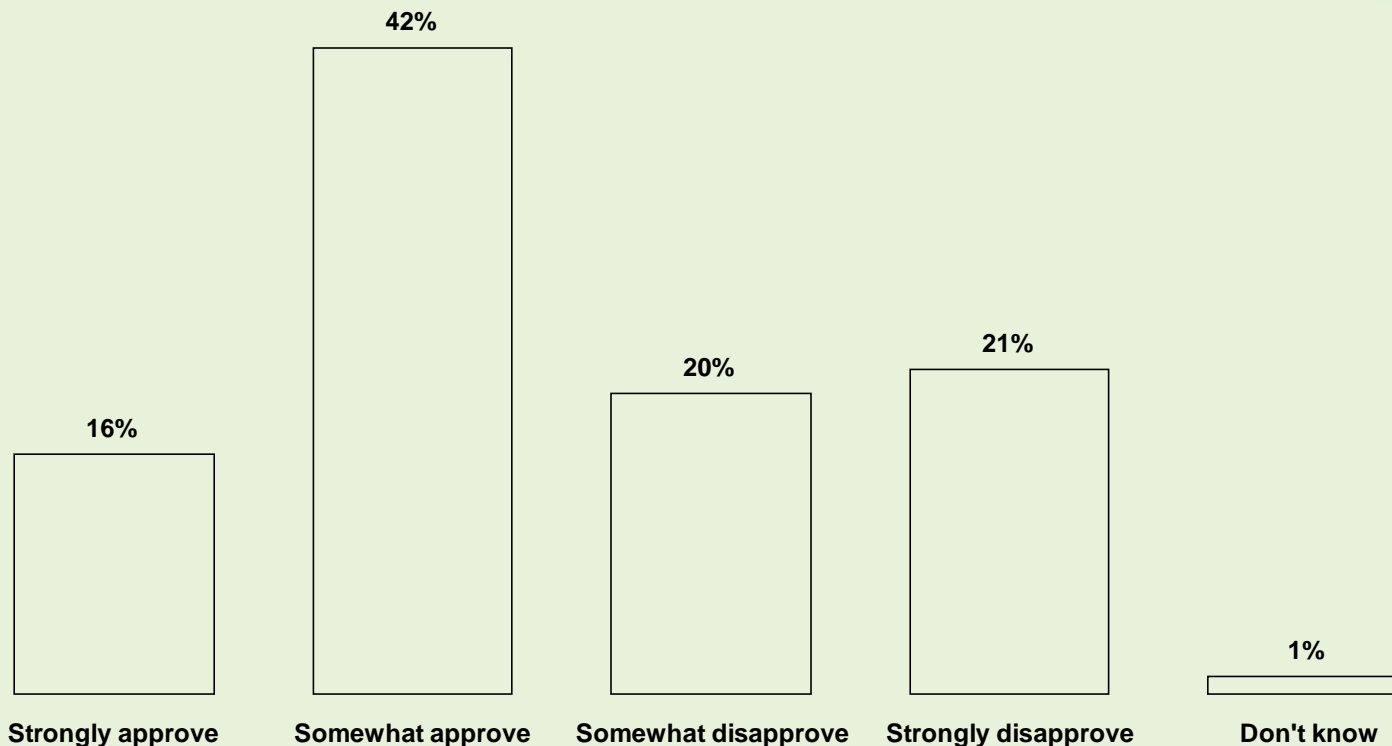
I am now going to read you some things that may be said about waste to energy facilities. Please tell me whether after hearing each statement you are more or less likely to approve of waste to energy facilities being used for garbage disposal and management, or whether the statement has no impact on 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 progressive electricity pricing 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 renewable base load power
- ✓ Advocating for the establishment of acceptable air emission standards for EFW
- Support projects coming on-line
- Educating key stakeholders, particularly on health and safety issues
- Serving as a primary and credible source 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 renewable base load power
- ✓ 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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