Recovering Maximum Value from Waste Conversion to Achieve Clean Energy

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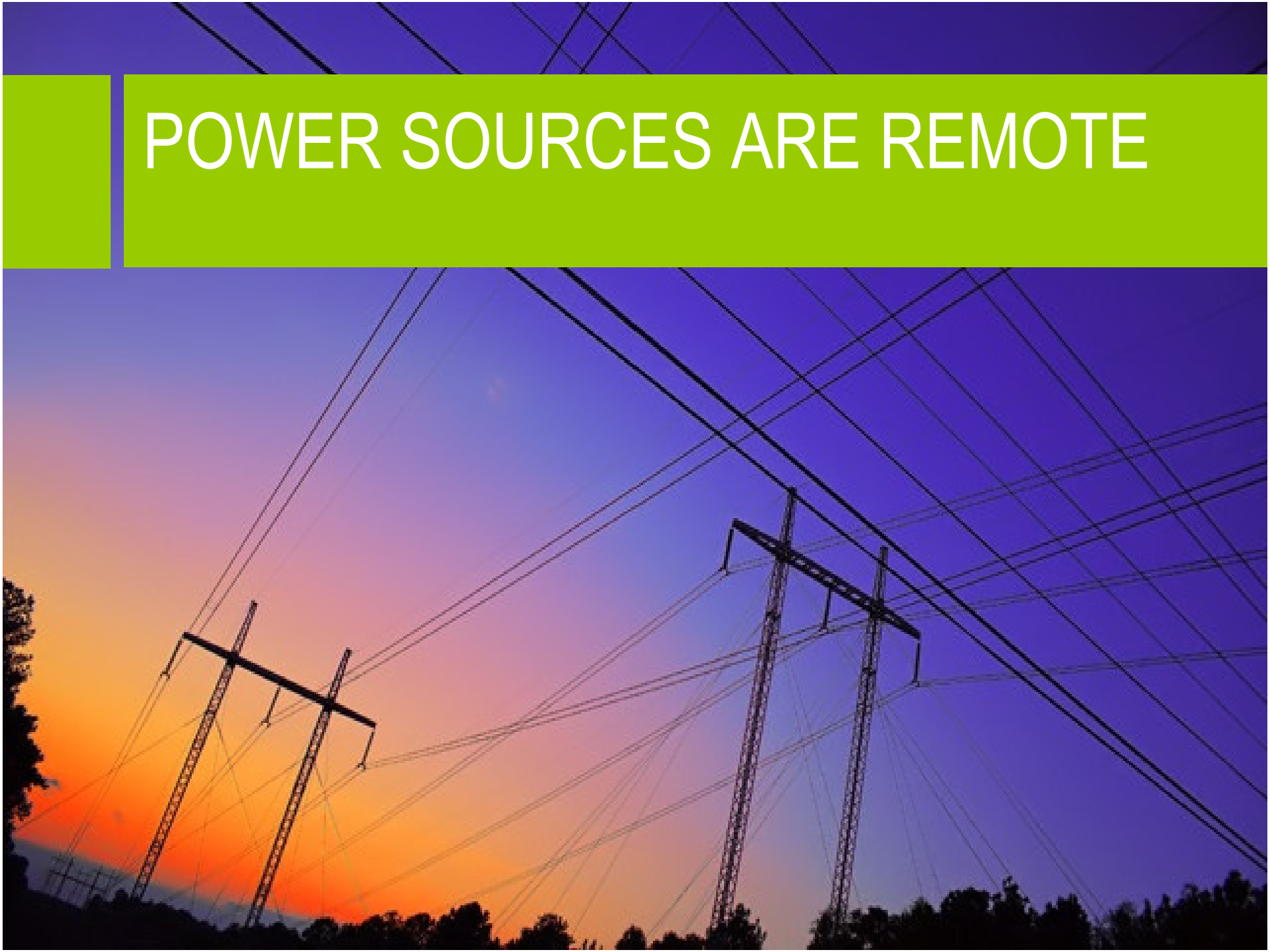
URBAN CENTERS ARE CONCENTRATED CONSUMERS OF ENERGY

Slide 2

r1 rbryden, 10/1/2010

POWER SOURCES ARE REMOTE



THE “GREEN” CHOICE – REMOTE AND VARIABLE

MSW Always in Urban Centers - More Energy per tonne than Oil Sand …

Table 1: A Comparison of the Energy Value of Various Fuels

Energy Source	BTU (mil)/ Tonne
Conventional Oil	39.6
Coal	21 - 30
Seasoned Firewood	15.3
Switchgrass	14.4
Wood Pellets	14
Municipal Solid Waste	13.9
Wood Waste	10
Yard Trimmings	6
Food Waste	5.2
Tar Sand	2.7 – 3.3

"Typically, oil sands contain about 75% inorganic matter, 10% bitumen, 10% silt and clay, and 5% water.

Congressional Research Service, 2008

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BUT OF COURSE IT IS BURIED

While we dig up the oil sands…

Canadian Tar Sands Development, National Geographic, 2009

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WHY NOT BURN IT FOR HEAT?

UGLY + TRUCK TRAFFIC = NIMBY

Garbage to Useful with NO Emissions

Landfilled
MSW

Plasco Conversion System

Potable
Quality
Water

Synthetic
Fuel Gas

Clean
Aggregate

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Plasco's Emission Profile

Parameter	Units	A7 Guidelines (Ontario)	PTR Regulation (Ontario)	Plasco Flare[1]	Plasco Engine[1]
Particulate Matter	mg/Rm^3	17	12	3.45	2.74
Organic Matter	NMHC- mg/Rm^3	-	-	-	5.90 [2]
	CH4 - mg/Rm^3	-	-	-	146.04
	TOC - mg/Rm^3	66	49	0.14	153.58
Hydrogen Chloride	mg/Rm^3	27	19	0.75	1.25
Sulfur Dioxide	mg/Rm^3	55	37	30	22
NOx	mg/Rm^3	207	207	134	≤100
Carbon Monoxide	mg/Rm^3	-	-	0.60	26
Mercury	$\mu g/Rm^3$	20	20	0.2	3.3
Cadmium	$\mu g/Rm^3$	14	14	0.1	0.1
Lead	$\mu g/Rm^3$	142	142	3.1	0.7
Dioxans and Furans	$ngTEQ/Rm^3$	0.08	0.04	0.016	0.010

All values are expressed at 11% O_2 and reference conditions (101.3 kPa, 25°C)

1. CEMS and Source Testing done by Plasco – Not approved by MOE
2. Proposed Ontario Engine Regulation for NMOC 1.3 kg/MWh, Plasco source test 0.04 kg/MWh
3. With SCR, NOx levels less than 100 mg/Rm3

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Efficient at a Small Scale

- 100 tonne per day modules
- Optimal plant size 3 module or more
- Reduce trucking
- Process waste where it is generated
- Locally distributed power supply

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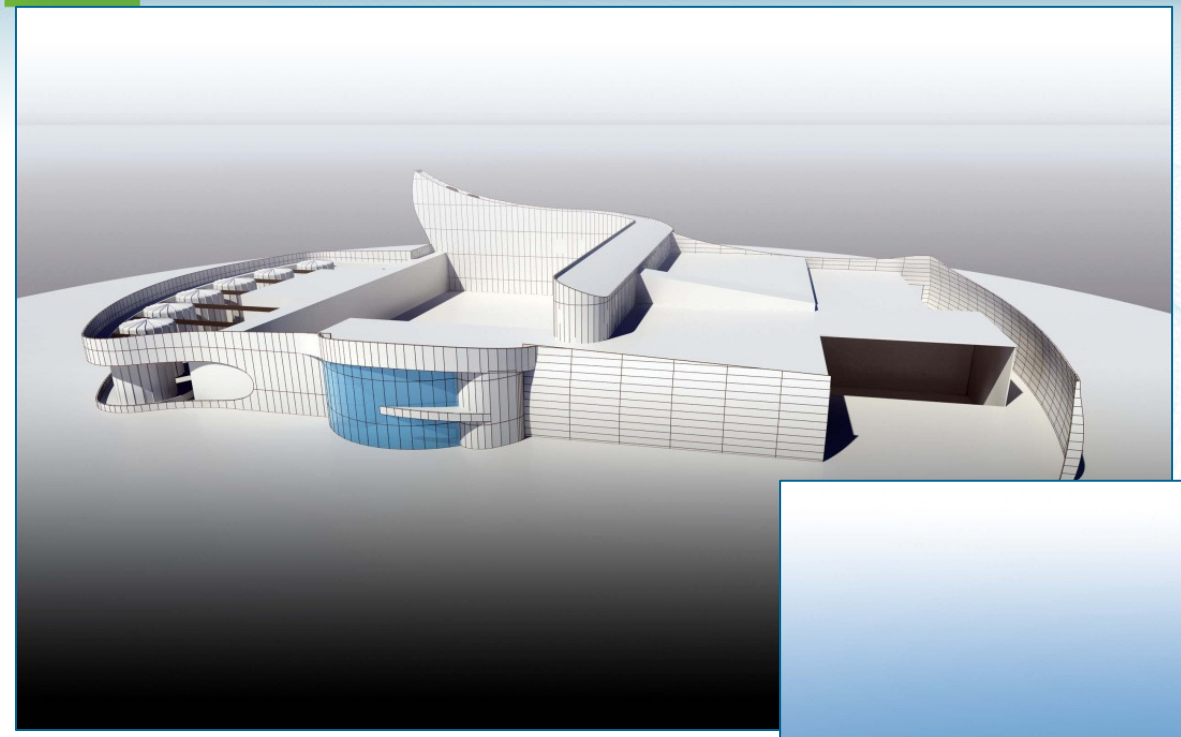
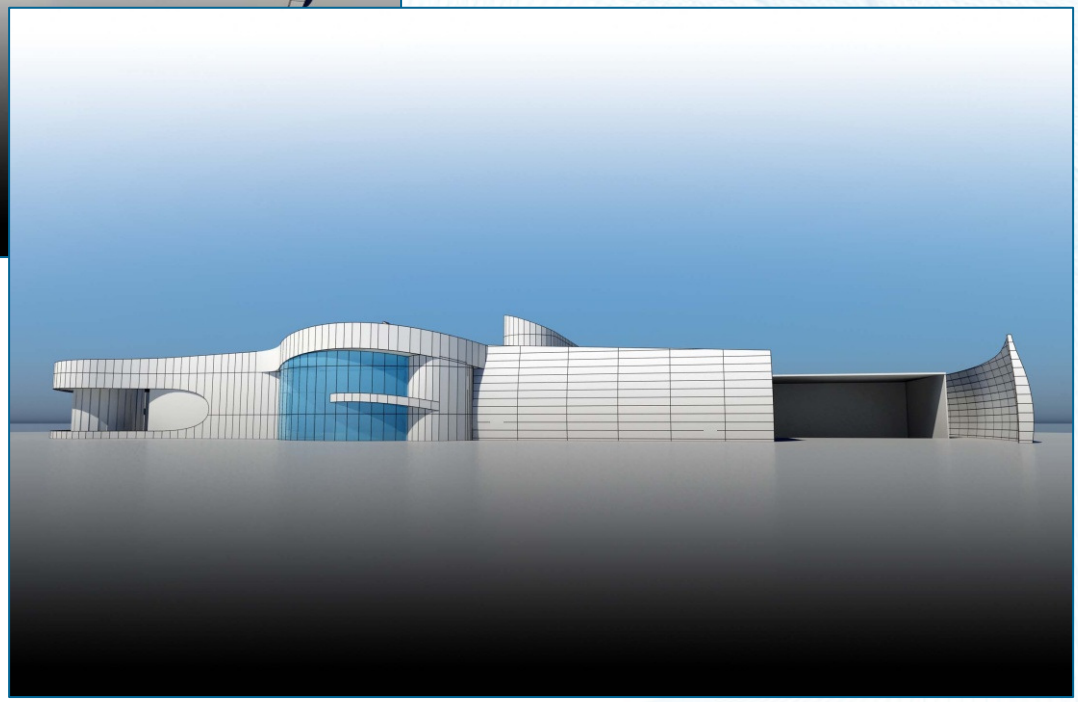
Aesthetically Pleasing





But Can We Afford It?

	Proposed Covanta Incinerator (Durham Region)	Proposed Plasco Facility
Capacity	140,000 TPY	140,000 TPY
Tip Fee	$110 per tonne	$70 – 80 per tonne
Power per Tonne	767 kWh per tonne	960 kWh per tonne
Capital Cost to Community	$272,000,000	$0 (Paid by tipping fee and power sales)

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And the Alternative?

	Wind Power	Plasco Power
Power Price	$ 0.135 per kWh + transmission costs	??
Transmission Load	High Variable	Reduction – Inside local distribution grid
GHG per Mwh	0 CO_2e	-1.5 Tonnes CO_2e (assumes 0% LFG Capture)

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