



Public Meeting June 2008



















Humans: The Problem and Solution

- **Intelligence and need to improve**
 - ❖ Too many people using too much
 - ❖ ~ 40% of people, < \$2 per day
 - ❖ ~ 60% won't cut back to make room
- **We must do more with less impact**
- **Intelligence will produce the solutions**
 - ❖ Decision processes delay adoption





Burn it

Bury it



Waste as a Resource

- Affluent urban societies create $\frac{3}{4}$ of a tonne of solid waste per person per year
- Jurisdictions have established policies to maximize recycling, maximize value recovery and minimize disposal
- To implement this policy, three imperatives will be key:
 - ❖ Maximize recycling to the limits of feasibility
 - ❖ Eliminate environmental impact on land, water and air
 - ❖ Maximize net economic value from residual waste

Recovery vs. Disposal

- Conversion of waste to useful products **without air emissions** and **without contamination of water or land** is a concept that implements the “waste as a resource” policy and is recognized by legislation in California
- **Energy efficiency** is a key criteria for differentiating between **recovery** operations and **disposal** operations and is defined by Directives in the EU



Recovery vs. Disposal cont'd

- The European Union issued a directive in January 2008 that defines technologies with recovery efficiencies higher than 65%* as recovery and those lower than 65% as disposal. According to their formula, our conversion system achieves 78% efficiency
- * Calculated using procedure identified in the EU Directive

PlascoEnergy 200 tpd Plant



Maximum Value

What Becomes of the Waste?

Per Tonne (Based on 16,500 MJ @ 30% moisture)	Type
2600 Nm ³ *	Syngas @ LHV = 4.85 MJ/Nm ³ (dry basis)
150 kg	Vitrified Slag
5 kg	Sulphur
5 - 10 kg	Salt
300 L	Water (potable water standards)
1.3 kg	Heavy metals and particulate**

* Normal conditions are °C and 101.3 kPa.

** These heavy metals are due to improper disposal of hazardous waste, such as batteries, by the public and not due to Plasco Conversion.

99.8% of waste is converted to clean fuel and valuable products

Maximum Value cont'd

What Becomes of the Syngas?

Net Power per 2600 Nm³ of Dry Syngas @ 4.85 MJ/Nm³*

	Internal Combustion Engine	Steam Turbine	Steam / Hot Water
Combined Cycle**	970 kWh _{el}	260 kWh _{el}	210 kWh _{th}
Cogeneration***	970 kWh _{el}	0 kWh _{el}	1350 kWh _{th}

* Normal conditions are 0°C and 101.3 kPa

** 1230 kWh_{el} will sustain a household for 50 days (750 kWh/month)

*** 970 kWh_{el} will sustain a household for 40 days (750 kWh/month)

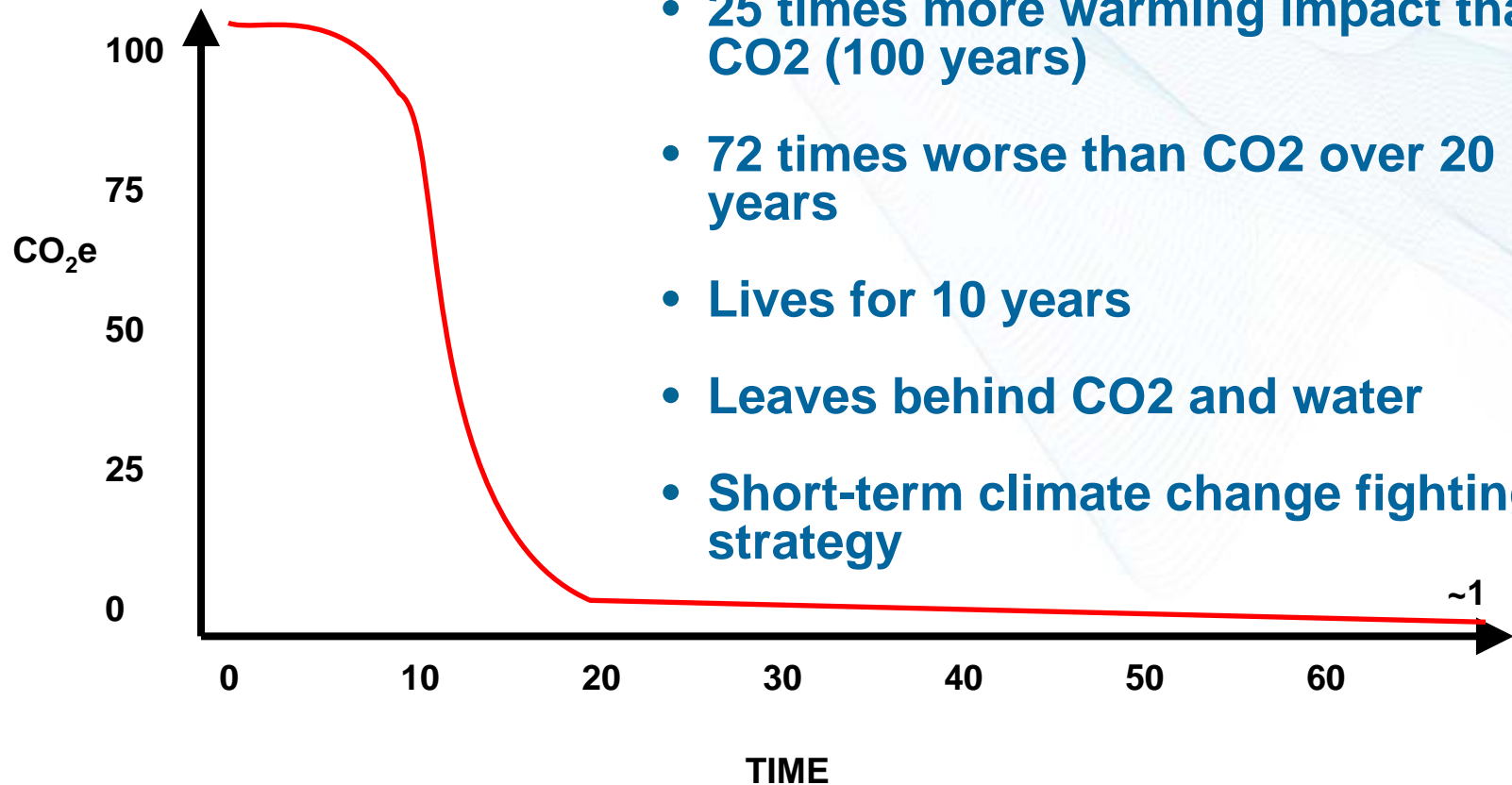
**Syngas is used to run internal combustion engines
Waste heat is recovered for additional power**

Excellent Performance Against the Toughest Regulations

Parameter	Units	Ontario	British Columbia	Alberta	California	EU	Plasco Energy
Particulate Matter	mg/m ³	12	19	50	16	9	3
Organic Matter	mg/m ³	49	39	-	-	9	9
Hydrogen Chloride (HCl)	mg/m ³	19	69	75	27	9	2
Hydrogen Fluoride (HF)	mg/m ³	-	3	-	-	0.9	0.02
Sulphur dioxide (SO ₂)	mg/m ³	37	246	450	56	46	10
NOx expressed as NO ₂	mg/m ³	207	344	400	202	183	9
Carbon monoxide (CO)	mg/m ³	-	54	57	41	46	34
Mercury (Hg)	mg/m ³	0.020	0.19	0.02	0.06	0.046	0.0005
Cadmium (Cd)	mg/m ³	0.014	0.10	-	0.01	0.046	0.001
Lead	mg/m ³	0.142	0.049	-	0.14	-	0.012
Class III Metals	mg/m ³	-	-	-	-	0	0.046
Dioxins and furans	ng/m ³	0.040	0.5	0.080	9	0.9	0.000

- Notes:
1. All values are expressed at 11%O₂ and regular conditions (101.3 kPa, 25°C)
 2. EU regulations combine Thallium with Cadmium and Lead with Class III Metals
 3. Alberta standards taken from *Code of Practice for Energy Recovery*

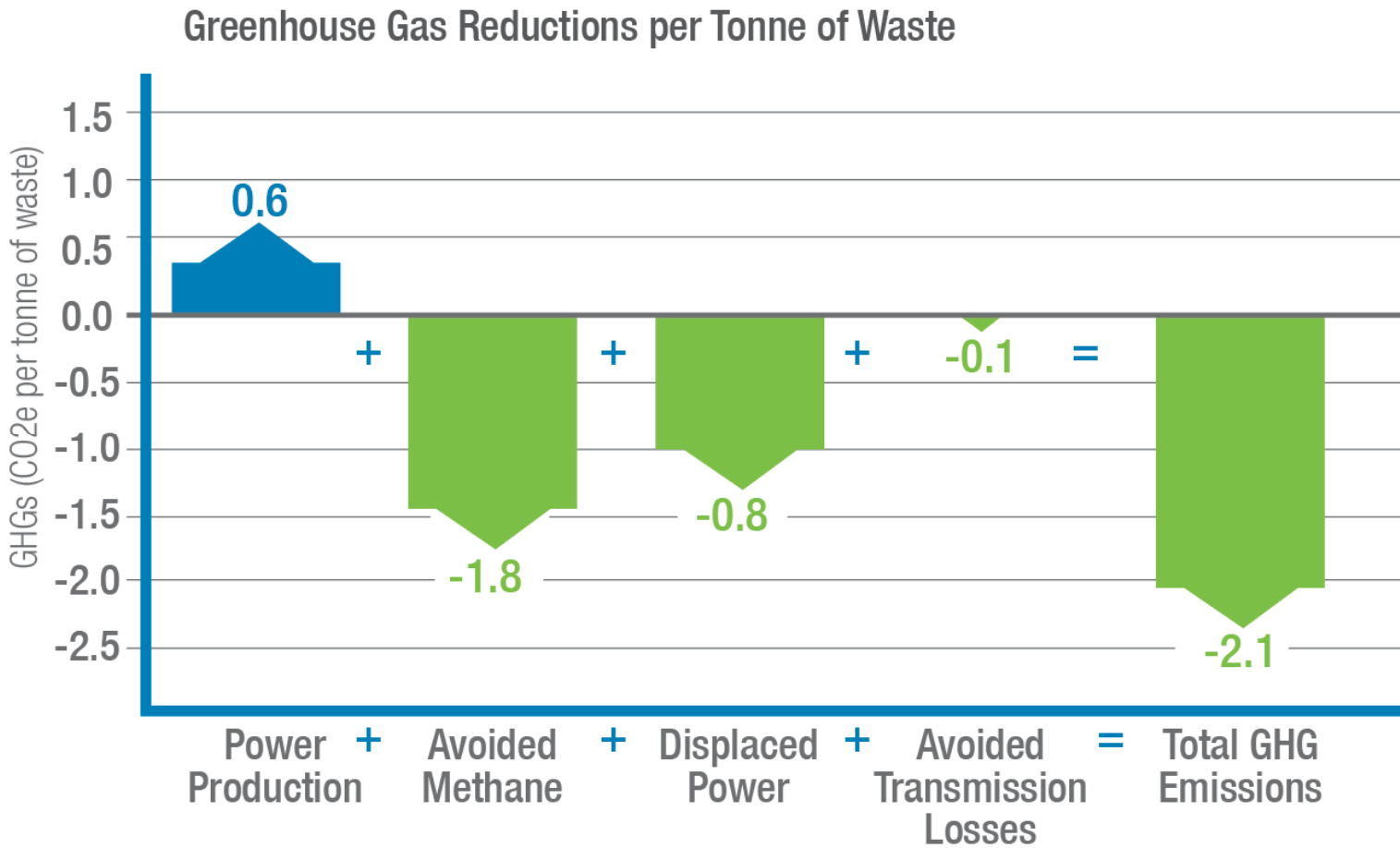
The Life Cycle of Methane



- 25 times more warming impact than CO₂ (100 years)
- 72 times worse than CO₂ over 20 years
- Lives for 10 years
- Leaves behind CO₂ and water
- Short-term climate change fighting strategy

Maximum Environmental Protection

GHG Reductions



PlascoEnergy – A Partner in the Solution

	PLASCO CONVERSION	WIND	SOLAR
Methane Avoidance from Landfills			
Elimination of Long-distance Trucking of Waste			
Displacement of GHG-intensive Power (e.g. Coal)			
Reduction in Transmission Losses			

Processing waste through Plasco Conversion reduces greenhouse gas (GHG) emissions.

Comparing the Alternatives

WHAT HAPPENS TO 1 TONNE OF WASTE?

Maximum Value

Comparator	Plasco Conversion	Incineration	Landfill Gas Capture
Power Generation	Primary Internal Combustion Engine Secondary Heat Recovery - Steam Turbine	Heat Recovery-Steam Turbine	Internal Combustion Engine
Power per Ton	1.2-1.4 MWh	0.6 MWh	0.15 MWh
Diversion	99.8%	75-80%	0%

Comparing the Alternatives

Maximum Environmental Protection

Comparator	Plasco Conversion	Incineration	Landfill Gas Capture
GHG's avoided (per tonne) (tonnes of CO ₂ e)	2.3	1.5	1.2
CACs (per MWh)			
NOx (g)	80	1660 ^b	570 ^d
Sulfur (g)	40	95 ^b	50 ^a
Particulate Matter (g)	11	37 ^b	8 ^d
CO (g)	144	190 ^b	2950 ^d
Mercury (mg)	2	60 ^c	2 ^a
Dioxins and Furans (ng)	0	60 ^c	0

a Parameters based on US EPA AP-42 Emission Factors for IC engines and methane produced per tonne of waste.

b Based on Montenay's response to Request for Expressions of Interest, GVRD, 2006.

c Based on "Life Cycle Assessment of Two Waste Management Scenarios for Metro Vancouver".

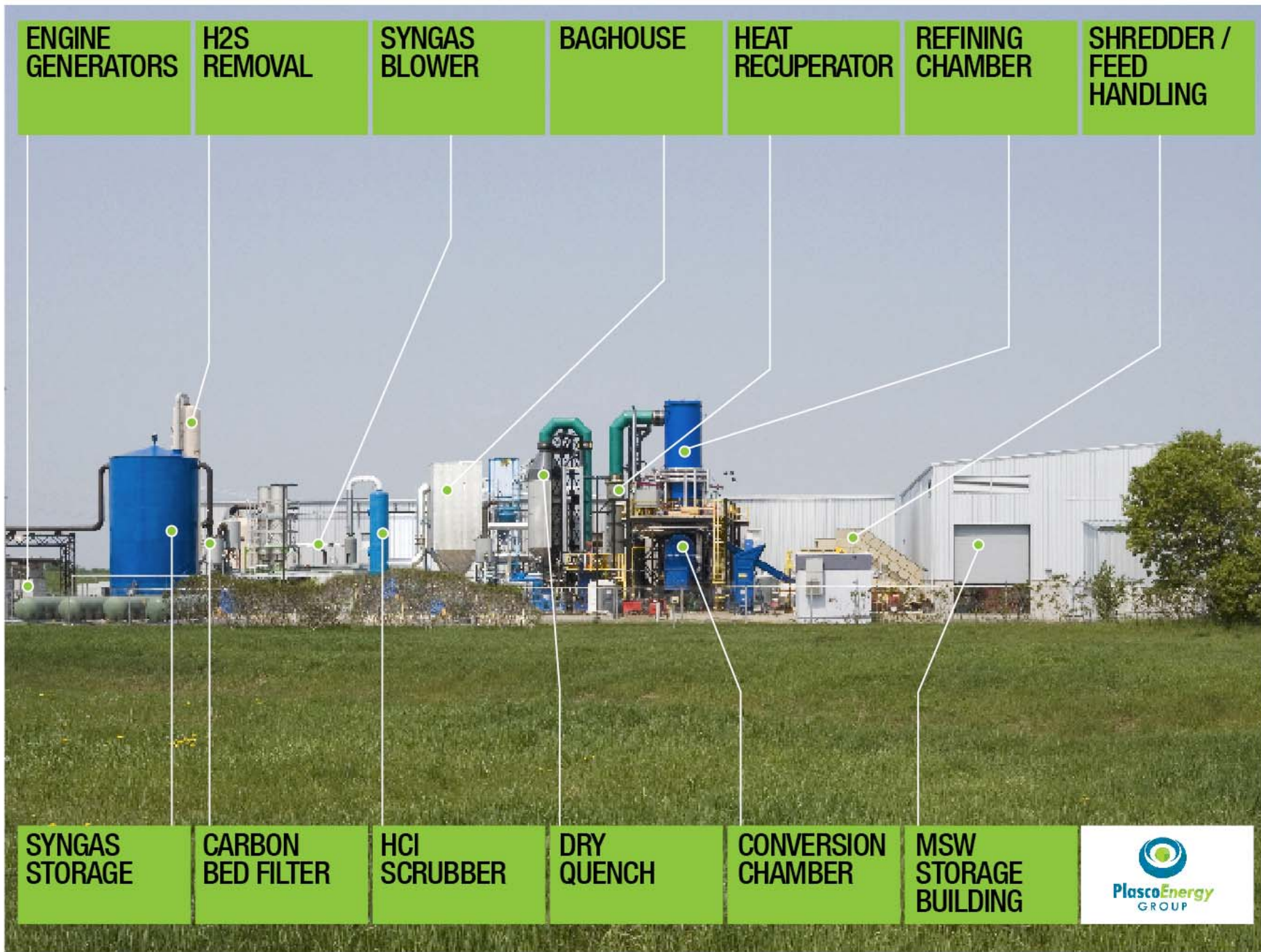
d Based on 2006 National Pollutant Release Inventory (NPRI) data for Vancouver Landfill and electrical capacity of 7.4 MW.

Excellent Performance Against the Toughest Regulations

	Alberta Standards for Coal Fired Plants	PlascoEnergy	Units
Sulphur Dioxide (SO ₂)*	0.80	0.08	kg/MWh
Nitrogen Oxides (NO _x)*	0.69	0.08	kg/MWh
Primary Particulate Matter (PM)*	0.095	0.02	kg/MWh
Mercury (Hg)**	> 70%	> 99.9%	Capture Efficiency

* New Generating Units of a Coal Fired Power Plant Annual Emission Intensity Limits. From *Alberta Air Emission Guidelines for Electricity Generation*. December 2005.

** Mercury Emissions from Coal-fired Power Plants Regulation, Alta. Reg 34/2006.



ENGINE GENERATORS

H2S REMOVAL

SYNGAS BLOWER

BAGHOUSE

HEAT RECUPERATOR

REFINING CHAMBER

SHREDDER / FEED HANDLING

SYNGAS STORAGE

CARBON BED FILTER

HCl SCRUBBER

DRY QUENCH

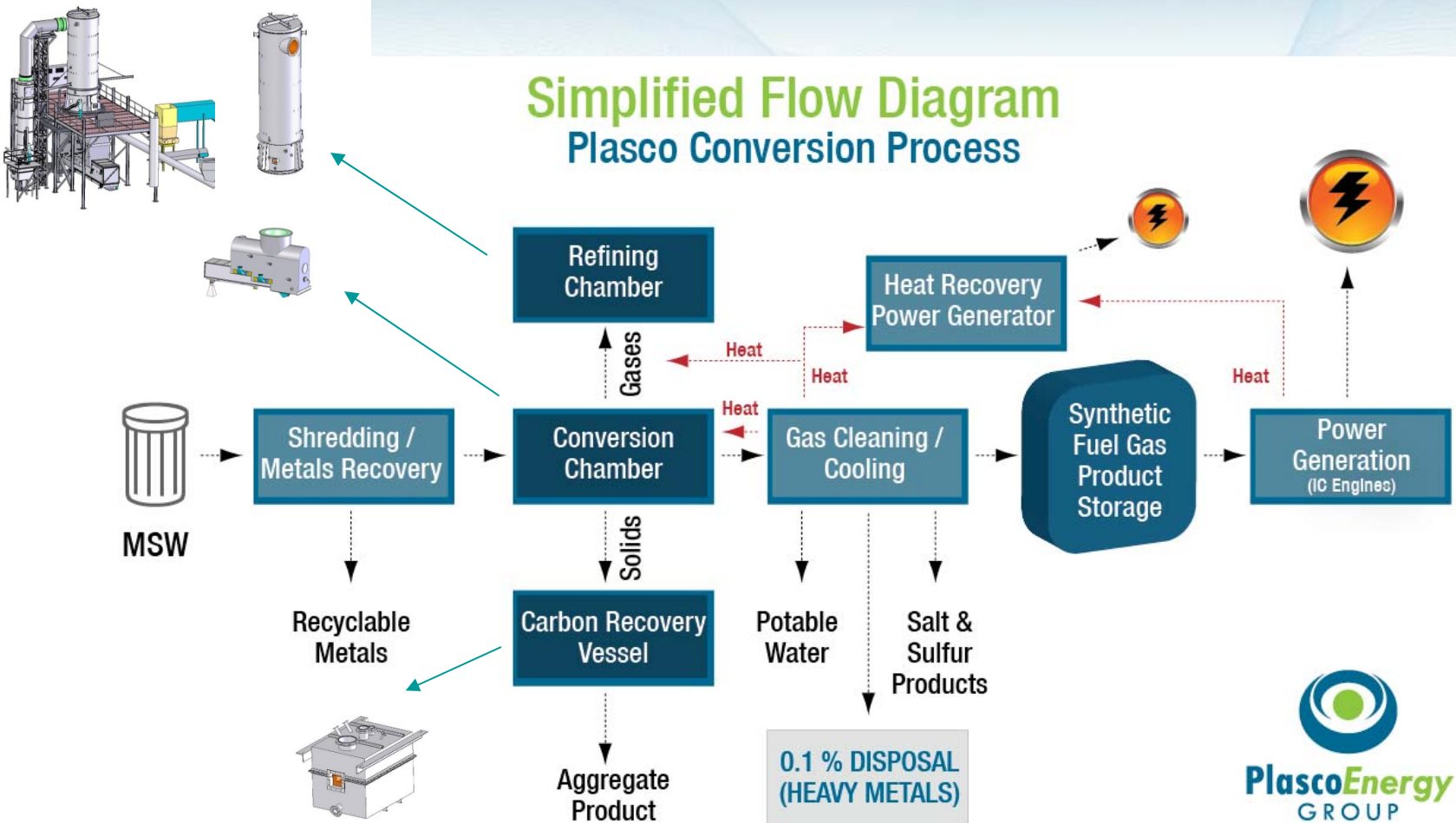
CONVERSION CHAMBER

MSW STORAGE BUILDING



Simplified Flow Diagram

Simplified Flow Diagram Plasco Conversion Process



Maximum Technical Advantage

Nanoparticles

- **Dr. Javad Mostaghimi, PhD, PEng, FASME, FIUPAC**
Canada Research Chair Professor
Director, Centre for Advanced Coating Technologies
Faculty of Applied Science and Engineering
University of Toronto
- **Chair, Gordon Plasma Conference on Plasma Processing Science**
- **Chair, International Symposium on Plasma Chemistry**



Nanoparticles cont'd

- **Plasma can create or destroy them**
 - ❖ Plasco Conversion destroys them
- **Engines can create them**
 - ❖ Natural gas or Plasco Syngas less tendency to create than gasoline or diesel
- **Dr. Javad Mostaghimi to analyze and advise**
 - ❖ Best measurement method
 - ❖ Actions to remove if they are found

Public Disclosure



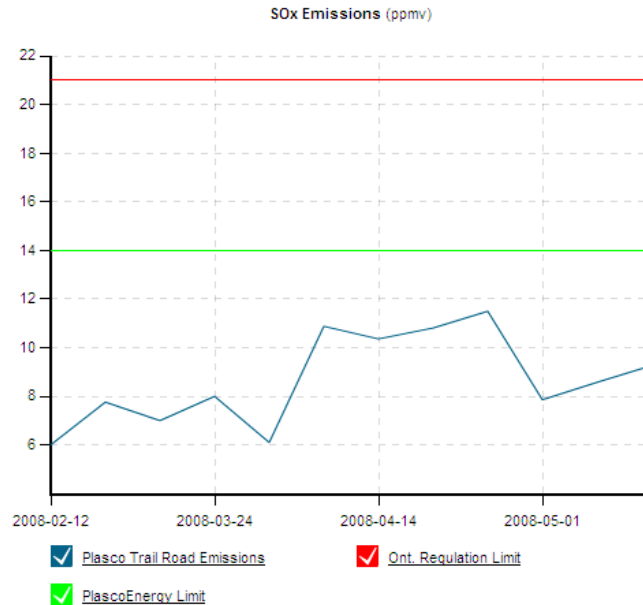
A PARTNERSHIP FOR A ZERO-WASTE OTTAWA



ENVIRONMENTAL PERFORMANCE:

SOx:

chart by amCharts.com



LAST REPORTING DATE:

May 26, 2008

NOx:	60.55	ppmv
HCl:	0.34	ppmv
SO ₂ :	9.26	ppmv
Organic Matter:	6.93	ppmv

WEEKLY NOTES:

This is the data submitted to the Ministry of Environment of Ontario for the weeks of May 12th through to May 25th.

NOTE:

A series of operational changes primarily to the materials handling facilities, within that time frame, has affected Plasco Trail Road's ability to ramp up production rates. A sustained run of 24 hours at the maximum rate would permit triplicate source testing required by our Certificate of Approval for Air. Substantial progress is occurring in increasing throughput rates and Plasco Trail Road expects to have the facility available for testing during the first week in June. A modified pre-test plan is being submitted to the MOE to reflect our revised plans and schedule.

www.zerowasteottawa.com



The Public Advisory Committee

- **Comprised of 10 Ottawa residents that range from involved citizens and members of community associations to professional engineers and environmentalists**

The Committee will:

- ❖ Be Chaired by a City councilor
- ❖ Review, discuss and form opinions on emissions data
- ❖ Independently report to the public and City council on PlascoEnergy's emissions test results
- ❖ Publish statements to zerowasteottawa.com
- ❖ Meet as often as its members feel necessary, but no less than four times a year

Zero Risk Business Model

- **PlascoEnergy builds, owns and operates its patented Conversion System**
 - ❖ No capital required from customers
 - ❖ No operation risk
 - ❖ In operation 12 months after permitting
 - ❖ Environmental performance is guaranteed
 - ❖ Long-term budgetary certainty – competitive tipping fees are fixed for 20 years
 - ❖ Revenue sharing above an agreed threshold



Zero Risk Business Model

- **Municipality assumes no risk for:**
 - ❖ Capital cost
 - ❖ Operating performance and costs over 20 years
 - ❖ Environmental performance



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