

Plasma Gasification Creating Renewable and Sustainable Energy

Presented to



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A naturally occurring plasma display over Atlanta



What is Plasma Gasification?

• What is Plasma?

- Fourth state of matter
- Electrically charged gas
- Lightning
- 12,000 deg F

What is Gasification?

- Converts waste into hydrogen and carbon monoxide
- End product?
 - Fuel to generate heat, steam and/or electricity
 - Produce ethanol or diesel



Wastes Treated? Garbage, Biosolids, Coal Ash, Hazardous Waste, Medical Waste

MSW is a RENEWABLE Energy Source

- U.S. produces ~246 million tons of Municipal Solid Waste (MSW) annually; approximately 4.54 lbs. per person per day.*
- MSW recognized as a RENEWABLE
 energy source
- Approximately 50-70 percent of typical MSW is "carbon neutral" and does not contribute to global warming

• Eliminating landfilling of organic materials reduces methane emissions which are 20 Source: U.S. EPA, Municipal Solid Waste in the United States: 2005 Facts and Figures/St. Lucie County Solid Waste Dept., 2006 times more significant than CO₂ in global

MSW = Valuable <u>RENEWABLE</u> Energy





1 Ton of MSW

1 Barrel of OIL

Westinghouse Plasma Torch in Operation



Temperature of visible plume is > 10,000° F

Photo courtesy of Westinghouse Plasma Corporation (WPC) a subsidiary of Alter NRG

The Plasma Gasification Process



Plasma Gasification Flexibility



Gasification is not incineration

Gasification creates Carbon Monoxide and Hydrogen – An energy rich gas stream

WPC Plasma Technology Milestones



Plasma technology used since 1989 by GM and Alcan with over 500,000 hours of Industrial Use

Adding Commercial Facilities



Pune, India 2009 – Under Commissioning for Hazardous Waste World's 1st Commercial-Scale Plasma



Mikata Japan 2002 – 30 tpd MSW & Biosolids

World's Largest Plasma Gasifier for WTE



Utashinai Japan 2003 – 200 tpd MSW & ASR

WPC WTE in Japan – Utashinai

- Hitachi Metals Ltd. chose the WPC technology for two commercial-scale Waste-to-Energy facilities in Japan
- The largest facility in Utashinai, Hokkaido fully operational since 2003
 - Can process up to 220 tpd of MSW and auto shredder residue
 - Net electricity output to the grid





Geoplasma's Proposed St. Lucie County, Florida Project

- Developing a Waste to Energy (WTE) project on existing landfill
- 600 ton/day facility will convert all Class I MSW into ~18 MW of renewable energy
- 20-year agreement for delivery of MSW

Proposed Facility Layout



Plasma Gasification

Innovative Technology Commercially Proven Versatile Waste Capability Sustainable/Renewable Environmentally Preferable



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For additional information see:

http://science.howstuffworks.com/plasma-converter.htm http://www.waste-management-world.com/articles/article_display.cfm?ARTICLE_ID=368649 http://www.scientificamerican.com/article.cfm?id=world-changing-ideas