



FWD: POWER, LLC

Business and Technical Briefing

**Fwd: Power**

*bringing new energy to communities*

***To develop and operate facilities that achieve complete recycling of waste and produce energy and material byproducts that are commercially viable in the marketplace.***

**One ton of MSW produces a net of up to 850 kWh of electricity using the FWD Power Process.**

**The average household in the United States uses about 11,200 kilowatt-hours of electricity each year.**

**With the FWD Power Process, one ton of MSW can power a home for up to four weeks.**

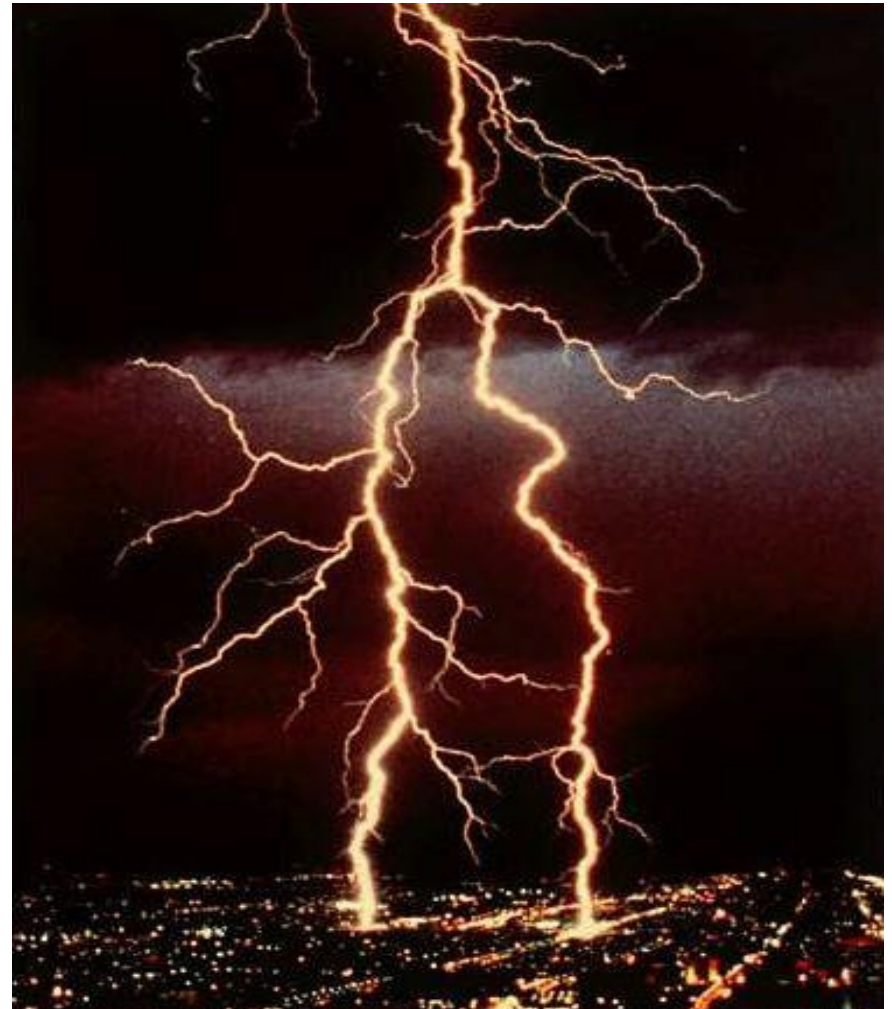
**Nationally, up to 18% of electrical demand could be generated from MSW.**

## FWD Power's Proprietary technology converts waste to clean energy:

- Clean renewable energy – the total recycling solution
- Gasification - not incineration – no fly ash, no bottom ash, nothing to landfill
- Not traditional gasification – no combustion; no ash, no char, nothing to landfill
- Next generation plasma gasification – no plasma torches
- Graphite arc plasma – no co-reactants, no dilutive working gas
- Rich, clean syngas – no combustion gases, no dioxins and no furans
- No pre-sorting or preprocessing of waste stream
- Lower capital cost compared to other WTE processes
- Not experimental – technology proven in other industrial applications

## What is PLASMA?

- “Fourth State” of matter
- Ionized gas at high temperature capable of conducting electrical current
- Lightning is an example from nature









## Waste Inputs

- **Municipal Solid Waste**
- **Biomass**
- **Medical waste**
- **Hazardous waste**
- **Biosolids**
- **Electronic waste**
- **Industrial waste**
- **Incinerator ash**
- **C & D**
- **Other wastes**



- **Synthesis Gas**
  - Steam
  - Electricity
  - Chemical feedstock
  - Liquid fuels
- **Metals**
- **Slag**
  - Rock wool
  - Building products
  - Building aggregate

## ■ CH2M HILL

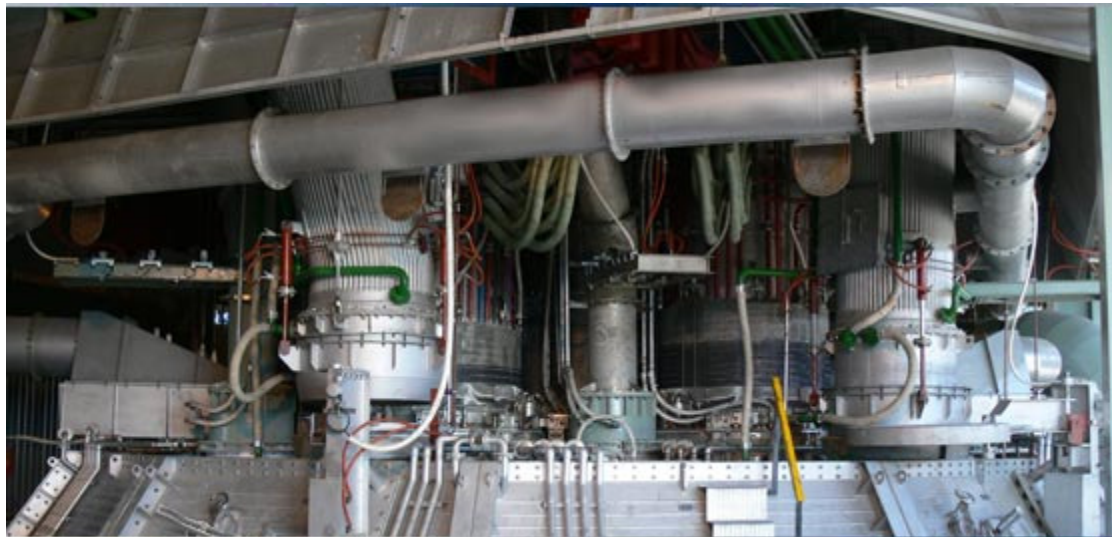
- Global leader in full-service engineering, consulting, construction, and operations
- Headquartered in Denver, Colorado with more than 25,000 employees and USD\$6.4 billion 2008 revenue
- Global operations span six continents
- Markets we serve
  - ◆ Energy and Power
  - ◆ Infrastructure
  - ◆ Facilities
  - ◆ Environmental
- Ranked #1 in Program Management for 6 consecutive years by *Engineering News-Record*
- Experienced in gasification processes and advanced power generation technologies – Steve Jenkins & Jim Riley





## ■ Tenova Pyromet

- One of the world's foremost designers and builders of submerged arc smelting furnaces
- Headquartered in South Africa. Plants in Europe, China, and the U.S.
- PWR & Pyromet have executed an exclusive global supply agreement



## **I. Feasibility study and business case analysis**

Site due diligence and feasibility analysis with conclusions about feedstock inputs, supply logistics/transportation, end products market analysis, plant layout and process configuration analysis, site selection study, project cost analysis, projected financial models. 4 – 6 months

## **II. Preliminary engineering and project financing**

## **III. Detailed engineering and permit applications**

## **IV. Construction**

## **V. Startup, training, operations and maintenance**

Total 24 – 36 months (permits dependant)





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