

***PTDR-1000***

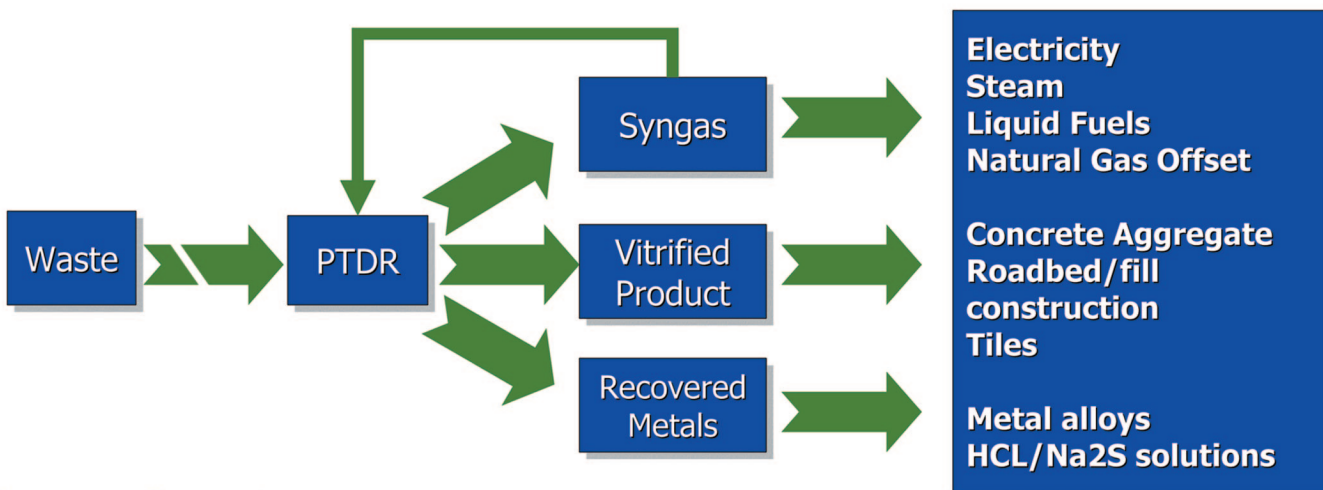
transforming today's waste into  
tomorrow's energy through the power of plasma



# PTDR-1000

PEAT International, headquartered in Northbrook, Illinois, is a waste-to-energy and resources company specializing in the deployment of its proprietary Plasma Thermal Destruction Recovery ("PTDR") technology for the treatment and recycling of a wide range of waste feedstocks, including: industrial, universal and medical waste.

PEAT's PTDR-1000 system is an ideal, turn-key solution for industrial facilities. The PTDR-1000 system provides a permanent, fully self-contained platform for facilities seeking an efficient, environmental and economical terminal treatment and disposal solution.



## Process Overview

The innovative and patented PTDR technology uses heat generated by plasma torches in an oxygen starved (pyrolysis/gasification) environment to first pull apart (dissociate) the molecules that make-up the organic portions of the waste, then, depending on the composition of the waste stream, a controlled (stoichiometric) amount of oxygen is added to reform the dissociated elements of the waste into a synthesis gas ("syngas"), consisting mainly of Carbon Monoxide (CO) and Hydrogen (H<sub>2</sub>). The syngas can then be used in a variety of ways: as a fuel for thermal and/or electricity production or as a feedstock for the production of liquid fuels, such as ethanol.

Waste, when heated to a very high temperature in the controlled atmosphere of the reducing plasma reactor undergoes predictable physical and chemical changes. This high temperature, over 1,000°C (1,800°F) prevents the formation of complex organic molecules and breaks down organics into a gas. These primary molecules are stable above 965°C (1,770°F). Our research reflects that the formation of dioxins or furans is impossible inside the plasma reactor due to the unique process features, including high uniform temperatures and a lack of excess oxygen within the system.

Any inorganic constituents of the waste are melted (vitrified) into an environmentally safe, leach resistant, glass matrix. PTDR plasma reactors are designed to collect the molten metal and glass. The glass and metal layers are removed through controllable tap ports into a slag/metal collection system. The taps are connected to the slag handling system to allow automated removal of the slag upon operator command. Removal of the molten glass presents no hazards of any kind to personnel, requires no special tools and does not disrupt the operating process. The metal layer, which settles on the bottom of the basin in the processing reactor, below the molten glass, is tapped as necessary, depending on the metal content of the waste stream.

This product can be used in a variety of commercial applications including concrete aggregate, insulation, or roadbed construction.

## Warranty Data

PEAT will warranty the system for 12 months from the date of commissioning. The Warranty will be against the manufacturing of equipment and components defects. The warranty does not cover spares, refractory lining, thermocouple and transmitters, other consumables and chemicals. The warranty does not cover equipment or its parts that are damaged due to client's cause, directly or indirectly.



# System Capacity 1,500 kg/hr (3,300 lbs)

- Cart Lifter/Dumper with gravity-based waste feed system (solid & liquid) and hydraulic screw (and drum) crusher or screw feeder
- Plasma Reactor with Secondary Reaction Chamber
- Gas Cleaning and Conditioning System (depending on feedstock composition): Semi-Dry system with a Spray Dryer/Gas Quencher, Activated Carbon Injection, Baghouse Filter, Packed Bed Tower/Polishing Scrubber, indirect heat exchanger, Cooling Tower, Cooling water system; If high sulfur: Spray Dryer/Gas Quencher, Activated Carbon injection, Baghouse Filter, hydrogen chloride scrubber (HCl solution recovery), alkali scrubber (Sodium Sulfide recovery), indirect heat exchangers; If medical waste: a wet system with a High Pressure Venturi, Packed Bed Tower/Polishing Scrubber, indirect heat exchanger, cooling tower and cooling water systems.
- ID fan with breaking resistance and VFD
- Three 400 kWe Plasma graphite electrode Torches with an insulated gate bipolar transistor power supply
- Two 15 kWe, water-cooled, non-transferred arc tap port torches (with single power supply)
- Air Compressor
- Oxygen (90-93% purity) & Nitrogen (98% purity) Pressure Swing Absorption Systems
- Syngas storage/accumulation system
- Syngas Energy Recovery System (Optional):
  - 1,300 kWe via steam cycle generation system
  - 2,000 kWe via gas engines (HRSG and steam)
- Power Panel (s)
- Process Control System with a PLC and SCADA

## Feedstock Requirements

Solid wastes are batch fed (up to 22 hours per day). The feeding system is designed to accommodate 30-gallon (113 liters) waste bags, 400mm x 400mm x 400mm (15.75-inch x 15.75-inch x 15.75-inch) boxes or waste in packed loose solid form. The maximum size of any waste material which can not be twisted/bent can not be more than 400 mm; this means that any part cannot be longer than 400 mm. The feed opening to the system will have clear opening of 600 mm (~ 2 ft) on both sides.

## Utilities & Labor

- Electric supply available: maximum connected load of 2,000-2,500 KWe (depending on the auxiliaries utilized), voltage/Hz as per local standards), 3Phase, (actual consumption significantly lower)
- Process water capacity of approximately 10 cubic meters/hr (~350 ft<sup>3</sup>)
- Natural Gas or LPG capacity of approximately 30kg/hr (1.3 MMBTU) during pre-heating of Syngas utilization system
- The automated process control system allows the PTDR-1000 to be operated by a single trained operator. Another 2-4 employees would be utilized to assist with materials handling (waste receiving/feeding and end product collection) and in-field operations.

## System Footprint

Approximately 2,850 m<sup>2</sup> (~31,000 square feet); this includes the on-site power generating equipment.

