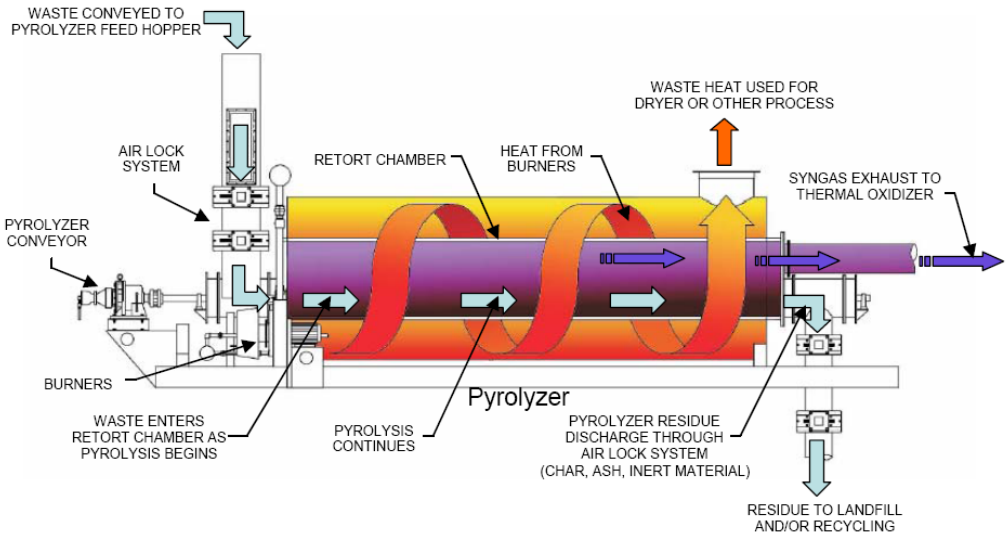
DESCRIPTION OF THE BC&E USA – APS IP, LLC ADVANCED PYROLYSIS SYSTEM:

BC&E USA utilizes APS IP LLC Advanced Pyrolysis System (APS) under an exclusive License Agreement. Fundamentally, pyrolysis, is the thermal decomposition of Biomass in an oxygen free environment. This allows the Biomass to be decomposed into either a solid residue or a gas. The gas, referred to as syngas, therefore has a higher calorific value because it is not contaminated by the products of combustion. Below is a diagram showing the pyrolysis process in simple terms.

PYROLYSIS PROCESS



Prior to processing the Biomass in the APS, is dries and shredded to a size of 2" or less if needed. This allows a greater surface area for faster decomposition. Once shredded, the waste is conveyed to the Pyrolizer feed hopper. The hopper feeds the waste through a dual gate air lock system. This air lock system prevents oxygen from entering the system. When in the retort chamber the waste begins the pyrolysis process at temperatures ranging from 850 – 920 degrees C. The residence time of the waste in the retort chamber is long enough for total thermal decomposition. The syngas in the Pyrolizer is vented to the Thermal Oxidizer for oxidation. The residue, consisting of a high quality carbon char is discharged through the discharge air lock system and can be further processed to value added products including but not limited to Activated Carbon, Soil Supplements, Filtration, Bioplastics, Carbon Capture, coloring, to name a few. Typically, the mass of the residue varies from 20 – 30 % of the incoming waste mass. The burner combustion of Renewable Natural Gas (RNG) is captured from the system and used to heat the outer chamber of the pyrolizer exhausts through the top of the pyrolizer and then is used for drying of high moisture waste streams and for steam production for power generation.

The Thermal Oxidizer is used for volatile organic compounds control. The syngas from the Pyrolizer is introduced and mixed with ambient air for complete combustion. The residence time for the gases in the Thermal Oxidizer is a minimum of two seconds at a temperature of 982 degrees C. This guarantees 99.9% control of VOCs.

The flue gas from the Thermal Oxidizer is vented to a Heat Recovery Steam Generator. The HRSG uses the heat from flue gas to produce steam, which is used in a turbine to produce power.

The flue gas exhaust from the HRSG is vented to a Baghouse. However, prior to introduction to the Baghouse, if the waste feed material has mercury or other heavy

metals, activated carbon is used for control. Typically, the injection rate for the activated carbon is 1 lb/ton of waste treated. After injection of the activated carbon, the flue gas enters the Baghouse at a temperature of approximately 218 degrees C. The Baghouse removes a minimum of 99% of the particulate entrained in the flue gas. The filter bags inside the Baghouse allow the flue gas to pass through the bag, while trapping the particulate on the outside of the bag. Intermittently the bags are pulsed with compressed air to remove particulate for disposal.

After particulates are removed from the flue gas, selective non-catalytic reduction (SNCR) is used for removal of oxides of nitrogen (NOx). SNCR is a proven process used worldwide for control of NOx. The SNCR process uses an aqueous urea solution that is atomized into the flue gas. The resulting product of the chemical reaction is elemental nitrogen (N_2), carbon dioxide and water.

The flue gas exhaust form the SNCR is then routed to a wet scrubber. The wet scrubber is used for acid gas control. Sodium bicarbonate is metered into the wet scrubber solution by a pump linked to a sensor that monitors the water pH, injecting the sodium bicarbonate on an as needed basis to keep the pH neutral within the scrubber. The flue gas temperature at this point in the process is between 85 – 107 degrees C.

The exhaust from the wet scrubber passes through a mist eliminator for removal of water carry-over from the wet scrubber. The mist eliminator removes large water droplets from the flu gas and recycles the water back to the wet scrubber. The exhaust temperature of the system stack is typically 50 degrees C.