

Waste to Energy

Gasification and Power Generation

Herb Kaiser
732-241-6070
herbkaiser@se2sol.com

Loading



- Unsorted, un-processed municipal, industrial, or agricultural solid waste are delivered to the gasification facility.
- Waste is loaded into the system's Syngas Generator via direct dump, conveyor, grapple, or end loader.
- When the loading of that vessel is completed, the vessel is sealed and the process is ready to start.

Starting



- Environment temperature is elevated in the Syngas Generator by energizing its electric heating array.
- Internal temperature of this vessel reaches 260 to 400 degree C. (approximately 1 hour).
- Air supply to the vessel is modulated to maintain an optimum Oxygen concentration to sustain a substoichiometric environment within the vessel.
- Temperature and oxygen concentration is monitored and maintained by a Process Logic Controller (PLC).

Gasification



- Under these conditions the gasification event begins producing a flow of combustible gas vapor.
- Carbon in the waste feedstock converts in large part in this atmosphere to the combustible gases – CO, CH₄ and Hydrogen – “syngas”.
- The syngas is vented out of the Syngas Generator into the Secondary Gas Processor where the gas is refined and processed to make it available for fueling the engine/generator.

Generation



- The engine runs an electricity generator.
- Engine exhaust generates hot air which is diverted into a steam boiler.
- The boiler exhaust is reclaimed into a hot water system
- The amount of electrical power, steam, and/or hot water generated is dependent on the daily type and throughput of feedstock and volume of syngas.

Configuration

- Syngas Generators can be made to adapt to almost any location.
- Vessel geometry is not important, so square, rectangular, circular or octagonal shapes can be employed to suit specific site conditions.
- The engine(s) and generator(s) should be enclosed in a building, but the Syngas Generators can be designed to operate outside in virtually any climate.
- Vessel working tons range from 11 to 73 tons per day, distributed and/or duplicated for higher tonnage.

Energy Recovery

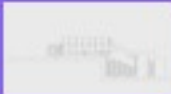
- Options (per hour per 24 hour cycle) generates:
 - Electricity - 205 to 1,300 kWhs
 - Hot water - 3,100 to 21,000 gal/hr at 140 degrees fahrenheit
 - Steam (low pressure) - 1,700 to 11,500 lb/hr at 15 psi
 - Steam (high pressure) - 1,690 to 11,200 lb/hr at 150 psi
 - Refrigeration - 95 to 640 rated tons

Features



- Batch process allows for the reduction of a total day's feedstock in one or more gas generator vessels.
- Cycle from loading through cool-down and ready for reload is 24 hours.
- When continuous syngas supply is required to support 24 hour electrical power generation, multiple vessels are provided.
- With unique engine technology, diesel fuel can be used.
- Where MSW has not been sorted or separated, the system will provide about 95% reduction in volume and about 80% reduction in weight.
- Materials left (fine and inert ash, glass, ceramics, aluminum, and metals) are evacuated, processed, and sold.
- Over 20 years, no occurrence of air emissions or ash quality not meeting the regulatory requirements

Advantages



- Batch processing advantages over conventional continuous feed:
 - There is no tip floor where feedstock sits waiting for loading.
 - All incoming feedstock is directly loaded in the syngas generator(s).
 - Vessels are air tight, no smell, insect, rodent, or bird activity.
 - Absence of tipping floor operation reduces space requirement.
 - Capital cost and operating/maintenance expense of a conveyor system or other mechanical loading device are eliminated.
 - No shredding or pre-processing required for the feedstock.
 - Bulky items/furniture/tires/other big items load as delivered.

Project Plan

- Design and engineer the system(s) for a specific feedstock and energy recovery demand
- Manufacture the equipment
- Install the system at the customer's site(s)
- Train operators
- Provide operator and maintenance manuals
- Provide limited warranty on parts and labor
- After sale follow-up for 1 year
- Offer extended service and maintenance agreements for a separate fee

Next

- Your procurement process?
- Your timeframes?
- Your decision criteria?
- Your funding requirements?
- Strategy and analysis (assessment)
- Full presentation - proposal
- Demonstration/site visit
- Agreement