PowerHouse ENERGY

Leading Alternative Energy Solutions

Integrated Biomass & Waste-to-Energy System

Overview

PowerHouse Energy (PowerHouse) is a leading provider of on-site clean energy systems and long term energy off-take services, using both traditional and renewable forms of fuel to generate electric and thermal energy in an economically and environmentally responsible manner.

PowerHouse serves commercial, industrial and government energy consumers to provide reliable, efficient turnkey energy systems and supply using a portfolio of state-of-the-art power generation and waste/biomass-to-energy equipment. Recently PowerHouse purchased worldwide exclusive and non-exclusive licenses to manufacture, use and sell the patented Pyromex gasification system and has integrated Pyromex technology with its on-site power generating systems.

The Pyromex ultra-high temperature gasification system is environmentally approved and permitted (Germany) to process 23 different organic waste materials and has the capacity to recover 95-97% of the entrained energy without any emissions. Pyromex is capable of converting other challenging resources such as Lignite (brown coal), toxic waste and used tires into syngas fuel for power generation or reforming into a liquid synthetic diesel fuel (Syndiesel) for transportation.

25 TPD Plant – Germany (2011)

Technical Application

The Pyromex system relies on standard waste pre treatment equipment to sort, size and condition (25-30% moisture) the waste material in-feed. The pre-treated waste is fed into the Pyromex reactor chamber using an auger in an oxygen free environment. The reaction is powered by highly efficient electrically induced thermal energy to ultra-high temperatures of 1200^{0}c - 1700^{0}c in an oxygen controlled reactor chamber.

The produced syngas is scrubbed before use to remove all unwanted contaminants which are recovered as solid particulate matter and disposed of according to local environmental compliance requirements. The Pyromex gasification process represents the ultimate organic materials-to-energy conversion process- eliminating toxic residues and harmful emissions such as NOx, SOx, toxic ash, tars, dioxin or furans.

Reformer Reactions

$C_nH_m \longrightarrow CH_4 + H_2 + C$

$CH_4 + H_2O \longrightarrow CO + 3H_2$

$C + H_2O \longrightarrow CO + H_2$

$C + CO_2 \longrightarrow 2\,CO$

Environmental Advantages:

- Electric power generation with very low emissions
- No residual dangerous substances to dispose of post-treatment
- No environmentally harmful emissions
- Treats all types of organic waste, including hazardous and toxic material
- Meets the highest environmental compliance requirements

Syngas Uses:

- Syngas as a fuel can be substituted for natural gas in a fuel cell, turbine or engine power generation
- The production of electricity through a fuel cell using the Syngas directly
- Further reforming of syngas to hydrogen, syndiesel or other liquid transportation fuels.
- Heating and industrial applications replacing natural gas or oil in furnaces

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25 TPD Commercial Model

Equipment Advantages:

- Modular, upgradeable in 5 - 25 - 100 ton per day modular configurations
- 10-15% the size of common waste treatment plants
- Suitable for small compact two level structures
- Simple electric system with few moving parts
- No smoke stack emissions generated or emitted
- Syngas composition matches a variety of off-take requirements
- Continuous feed - designed for 24 X 7 extended operation
- A variety of energy recovery technologies possible
- Approx 17% of produced syngas is used to power the Pyromex system

Economic Advantages:

- Low energy consumption requirements
- Reduced costs for treatment and maintenance
- Lower capex investment cost compared to waste treatment plants
- Greater power output per ton than common waste treatment plants

Specifications for 25 Ton/Day Standard Unit	
Typical Syngas Composition – 400Btu/Cu-Ft	50% H2, 35% CO, 10% CH4, 5% Inert gas
Other Syngas Compositions up to- 700Btu/Cu-Ft*	60% CH4, 23% H2, 12% CO, 5% Inert gas
Length X Width X Height (feet)	15'L X 4'W X 4'H
Weight Pounds	2,600 Lbs
Electrical Consumption All Components	300kW/Hour
Start-Up / N2 Purge Shutdown	6 Hours / 1 Hour

*Other Syngas concentrations are adjusted in a non catalytic methanation process to match generation products.

Contact Information:

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