Advanced Fixed-Bed Gasifier

COMMERCIAL APPLICATION

The advanced fixed-bed gasifier is a packaged power generation system in the range of 250 kW_e – 10 MW_e. Microgasification power generators provide energy solutions for commercial and industrial clients that have simultaneous waste disposal and power needs. Wood-based fuels (biomass) are the most common application; however, other agricultural and industrial residues and coal can be considered.

COMMERCIAL OPPORTUNITY

Many residues have a high energy value; however, this value is lost as they are transported off-site at a disposal cost and when volume reduction of waste is critical. As corporations seek to lower operational costs and increase revenues, utilization of residues or by-products provides an economically attractive solution.

CURRENT APPROACHES

Steam boiler combustion technology is used to produce electricity from biomass; however, steam boiler combustion is expensive, requires certified boiler attendants, and is environmentally ineffective.

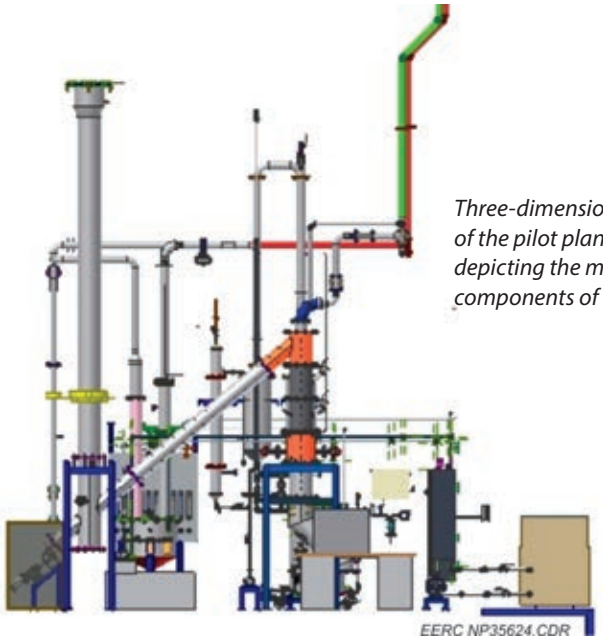
Advanced pilot-scale gasifier.

TECHNOLOGICAL ADVANTAGE

The technology developed by the Energy & Environmental Research Center (EERC) utilizes a downdraft gasifier because of superior gas quality performance relative to updraft fluidized-bed gasifiers. The gasifier design philosophy is based on the production of clean syngas with high conversion efficiency and near-zero effluent discharge from the overall system. The production of clean syngas is achieved by converting the complex organics in the hot zone of the gasifier.

BENEFITS

- Near-zero effluent discharge.
- Completely automated to minimize operational cost.
- Utilizes on-site, low-value by-products and wastes to produce value-added products
- Distributed generation of electricity
- Small footprint enables use in portable applications
- Potential chemical or liquid fuels production
- Packaged to meet the strictest environmental requirements and permits.
- Inherently safe design at low pressure to meet Occupational Safety and Health Administration and National Electrical Code standards, with computerized monitored and logic-based feedback interface.
- Simplified maintenance and recycled process consumables.



Three-dimensional view of the pilot plant gasifier depicting the major components of the system.

MARKET INFORMATION

Numerous industries such as forest products, agricultural processing, and secondary milling can benefit from the waste utilization features of gasification technology. There is an estimated potential application for at least 100,000 units in the United States.

DEVELOPMENT STAGE

The EERC has operated a variety of small-scale gasification systems for testing and performance measurement since 2004. Based on these developments for specific applications, a 100-lb/hr true multifuel pilot system has been installed at the EERC and is being operated to prove long-term viability (illustrated in the figures). The EERC Foundation® looks forward to providing comprehensive solutions for residue disposal and power production in partnership with industry.

Additional ongoing development includes the utilization of syngas for hydrogen and chemical production.

TYPE OF COLLABORATION

The EERC Foundation is actively seeking demonstration and commercialization partners in medium and small commercial applications.

INTELLECTUAL PROPERTY (IP) RIGHTS

Development of a comprehensive package of IP rights is under way by the EERC Foundation, including but not limited to:

- Sandwich Gasification Process for High-Efficiency Conversion of Carbonaceous Fuels to Clean Syngas with Zero Residual Carbon Discharge, Serial No. 61/374,139.

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