PROJECT facts

U.S. Department of Energy
National Energy Technology Laboratory

Gasification Technologies

10/2001

Early Entrance Coproduction Plant

Waste Management and Processors, Inc. Pty LLC (WMPI)

PRIMARY PARTNER

Waste Management and Processors, Inc. Pty LLC (WMPI)
Frackville, Pennsylvania

PARTICIPANTS

Nexant, Inc. (A Bechtel Technology and Consulting Company)
San Francisco, California

Texaco Global Gas and Power
Bellaire, Texas

Sasol Technology Ltd
Johannesburg, Republic of South Africa

CUSTOMER SERVICE

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WEBSITE

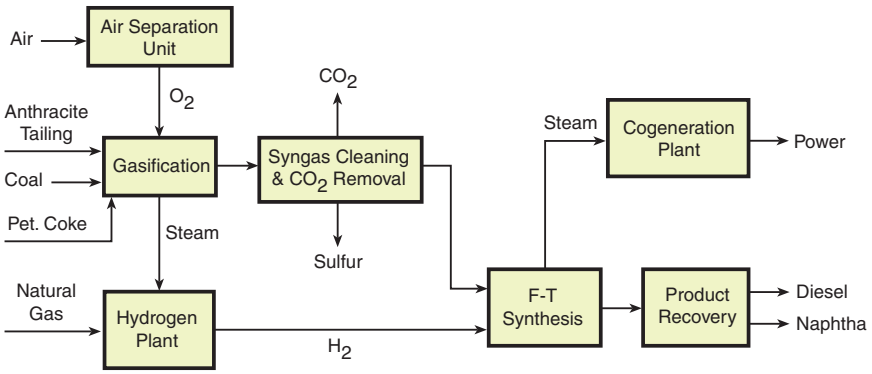
www.netl.doe.gov

Description

Coal-derived fuels and power generation based on gasification both face economic hurdles that need to be overcome before strong commercial markets can be established in the United States. In the gasification-based process, coal is gasified to produce hydrogen and carbon monoxide. The same gases may be used either for fuel gas for power generation or as feedstock for conversion to premium fuels and chemicals. Integration of the two processes — electricity generation and fuel production at one facility — makes sense in several ways: higher efficiency, enhanced revenue products, lower cost and fewer emissions when considering the total plant cycle from feedstock to products, where the feedstock can be coal or other carbon-based materials.

WMPI, along with its subcontractors Texaco, Sasol, and Nexant, are conducting a techno-economic feasibility study leading to preliminary engineering design of a demonstration Early Entrance Coproduction Plant with an objective of commercializing coal gasification/liquefaction technology to produce ultra-clean transportation fuels for Vision 21 applications in the United States. The exact feedstock mix composition will be governed by project economics. The concept will have applications nationwide, as an environmentally sound alternative to land waste reclamation as the coal waste is converted into high-value products.

The following process diagram shows the major steps for the production of power and transportation fuels. A fine coal slurry is pumped into a Texaco gasifier to generate syngas. The cleaned syngas enters Sasol's slurry phase vessel for Fischer-Tropsch (FT) synthesis and product work-up (PWU), which consists of wax hydro cracking and product recovery. Part of the cleaned syngas also enters the combined cycle plant to generate power.



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Goals

The overall goal is to demonstrate the techno-economic feasibility of an Early Entrance Coproduction Plant in the United States that produces ultra clean Fischer-Tropsch transportation fuels with either power or steam as the major co-product, with emphasis on reclaiming and gasifying low-cost coal waste and/or its mixture as the primary feedstocks.

Benefits

Utilization of coal waste not only provides a low-cost feedstock for reducing the price of electricity, but also benefits the environment by reclaiming land and eliminating a potential for acid mine drainage into ground water and streams, a very serious environmental problem. Many such sites are in existence throughout the coal-producing regions of the United States.

Plant emissions will be cleaned to remove pollutants to near-zero levels and CO_2 will be concentrated for ease of capture and sequestration.

Production of high-value co-products will assure the generation of competitive low-cost electricity.

Production of ultra-clean fuels for the transportation sector will result in substantially reduced emissions compared with those produced from current U.S. diesel fuel (30% reduction in particulates, 9% reduction in NO_X, 40% reduction in CO, and 38% reduction in hydrocarbons).