美國能源部公布燒煤及石油焦使用流體化床為潔淨能源製程

CLEAN COAL TECHNOLOGY

Clean Coal Technology Programs: Project Fact Sheets 2003

Includes Clean Coal Technology Demonstration Program, Power Plant Improvement Initiative, and Clean Coal Power Initiative Projects

As of May 2003

October 2003

U.S. Department of Energy
Assistant Secretary for Fossil Energy
Washington, DC 20585

JEA Large-Scale CFB Combustion Demonstration Project

Participant
JEA (formerly Jacksonville Electric Authority)

Additional Team Members
Foster Wheeler Energy Corporation—technology supplier

Location
Jacksonville, Duval County, FL (JEA's Northside Station, Unit No. 2)

Technology
Foster Wheeler's atmospheric circulating fluidized-bed (ACFB) combustor

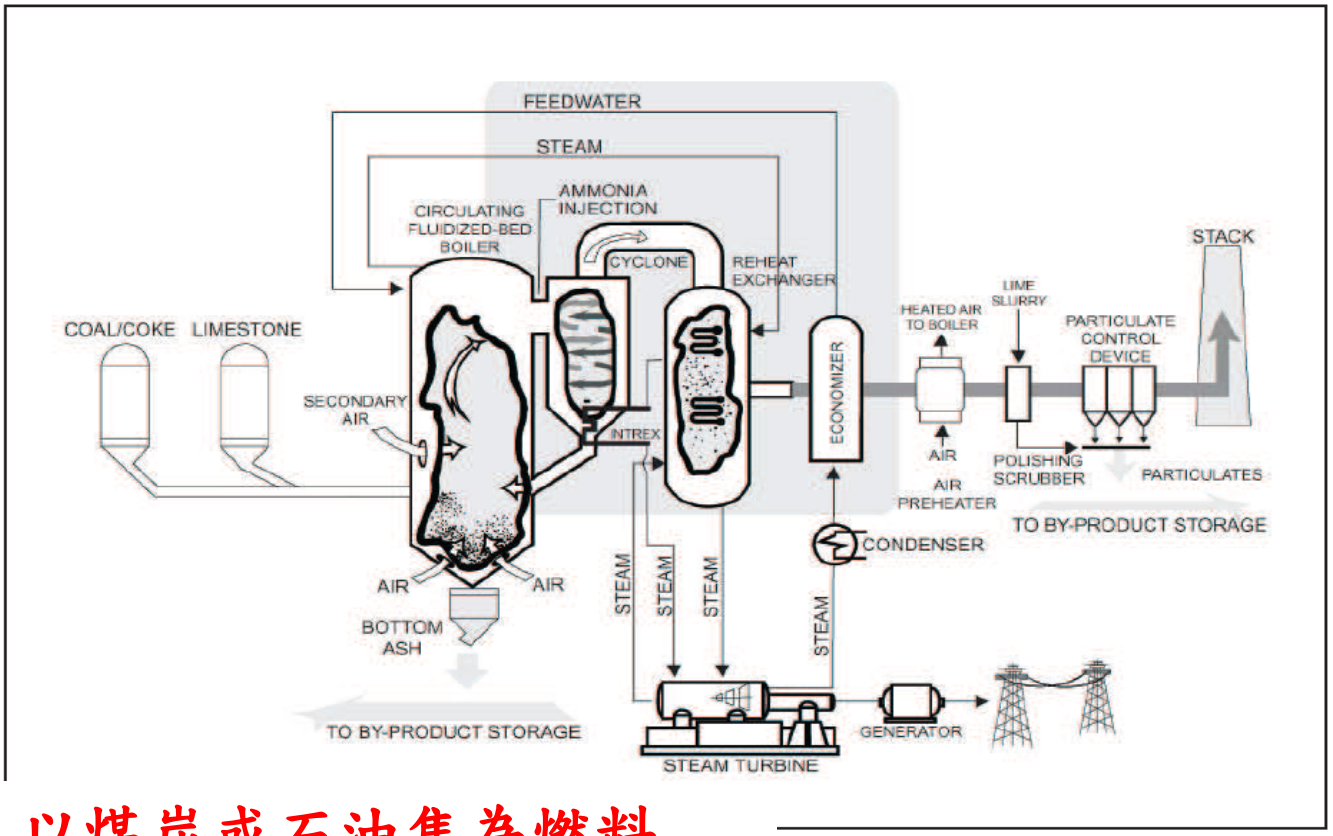
Plant Capacity/Production
297.5 MWe (gross), 265 MWe (net)

Coal
Eastern bituminous, 3.39% sulfur (design)

Project Funding

Total	$309,096,512	100%
DOE	74,733,633	24
Participant	234,362,679	76

Project Objective
To demonstrate ACFB at 297.5 MWe gross (265 MWe net) representing a scale-up from previously constructed facilities; to verify expectations of the technology's economic, environmental, and technical performance; to provide potential users with the data necessary for evaluating a large-scale ACFB as a commercial alternative; to accomplish greater than 90% SO_2 removal; and to reduce NO_x emissions by 60% when compared with conventional technology.



以煤炭或石油焦為燃料

Technology/Project Description
A circulating fluidized-bed combustor, operating at atmospheric pressure, will be retrofitted into Unit No. 2 of the Northside Station. In this process coal or the secondary fuel (petroleum coke), primary air, and a solid sorbent (such as limestone), are introduced into the lower part of the combustor where initial combustion occurs. As the coal particles decrease in size due to combustion, they are carried higher in the combustor when secondary air is introduced. As the coal particles continue to be reduced in size, the coal, along with some of the sorbent, is carried out of the combustor, collected in a cyclone separator, and recycled to the lower portion of the combustor. Primary sulfur capture is achieved by the sorbent in the bed. However, additional SO_2 capture is achieved through the use of a polishing scrubber to be installed ahead of the particulate control equipment.

Steam is generated in tubes placed along the combustor's walls and superheated in tube bundles placed downstream of the particulate separator to protect against erosion. The system will produce approximately 2 x 10^6 lb/hr of main steam at about 2,500 psig and 1,005 °F, and 1.73 x 10^6 lb/hr of reheat steam at 600 psig and 1,005 °F. The steam will be used in an existing 297.5-MWe (nameplate) steam turbine.

The heat rate for the retrofit plant is expected to be approximately 9,950 Btu/kWh (34% efficiency; HHV). Expected environmental performance is 0.15 lb/10^6 Btu for SO_2 (98% reduction), 0.09 lb/10^6 Btu for NO_x, and 0.011 lb/10^6 Btu for total particulates (0.011 lb/10^6 Btu for PM_{10}).