

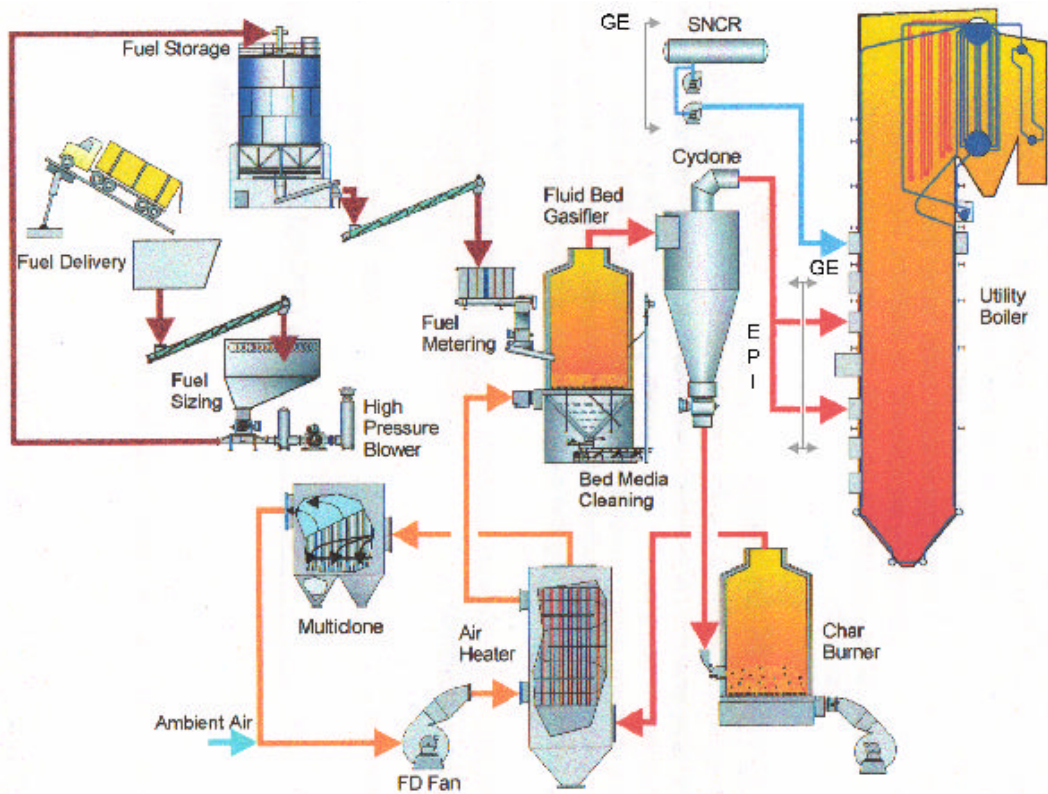
Black & Veatch and Energy Products of Idaho (EPI) have announced results of a study examining the technical feasibility and economic viability of biomass as a supplementary fuel source in existing power plants.

The study, conducted in conjunction with the Nebraska Public Power District (NPPD), identified a promising green power alternative that uses biomass gasification. Employing biomass gasification at existing power plants can improve air quality and provide green power at a considerably lower cost compared to the development of a new biomass power plant.

Biomass gasification technology uses any material of biological origin, such as wood waste, agricultural residues, and yard waste as fuel, converting the energy of the solid biomass waste into a low-Btu biogas. The study determined that the substitution of biogas for a percentage of coal can significantly reduce NO_x, SO₂, mercury, carbon dioxide and other pollutants, especially when the biogas is used in a reburn configuration. Another potential advantage is that renewable biomass fuels can be purchased at low cost, which enhances the profitability of existing fossil fuel assets.

Shown is the process by which a variety of biomass substances can be gasified and used in conjunction with conventional fuels. The new study shows the process can be retrofitted into many existing coal fired power plants.

Drawing courtesy of Energy Products of Idaho.



"This technology represents one of the lowest-cost renewable energy sources we have evaluated to date," said Black & Veatch project manager Ryan Pletka. "That alone should make it an option for power providers to consider when they develop their strategic renewable energy plans." Availability of suitable biomass fuel in the vicinity of a project site is crucial to the feasibility and continued operation of the system. Projects can also be affected by new and existing emissions regulations and the status of renewable energy incentives available from federal and state governments. Overall, it is believed that the incentives for projects of this scope can provide improved environmentally safe operations that would earn additional revenue for the owner. "The ideal project location would be a utility plant with a combination of high coal costs, access to low cost biomass or waste material, looming NO_x reduction requirements, and state mandates or incentives for renewable energy," says Pletka. "There are several states in the eastern half of the country that have all these features. However, the presence of any of these is potentially enough to ensure project viability. Additional credits from reduction of NO_x, SO₂ and other emissions only serve to improve the economics of the project."

Pletka says the study found that a small "green premium" of 1.4 to 1.8 cents/kWh would be sufficient to guarantee economic viability at the proposed site. That subsidy could be provided through retail green power programs, the sale of renewable energy credits on the wholesale market, or expanded tax incentives for renewable generation. He notes that the provision providing a 1.8 cent/kWh tax credit for wind-generated electricity has been proposed for biomass cofiring. "If these credits are not available, the investigation found that a biomass fuel cost approximately \$0.80/MBtu less than the current coal cost could justify the project."

In 1973, EPI provided the first fluidized bed combustion (FBC) system in the U.S. capable of converting waste biomass into usable energy in Coeur D'Alene, Idaho for Idaho Forest Industries. In 1981, the company performed the first retrofit of a stoker-fired boiler to fluidized bed on Northern States Power's French Island Unit 2 plant in Lacrosse, Wis. and in 1985, EPI built the first fully commercial fluidized bed biomass gasification power plant – Catalyst Energy's Crisstad Plant in North Powder, Ore. "EPI's biomass gasifier add-on for coal-fired boilers is a unique system that combines the production of green, renewable energy with effective NO_x reduction in a single unit," said EPI Business Development Manager Pat Travis. "The normal problems and disadvantages inherent with directly co-firing biomass in coal boilers, such as excessive wear on pulverizers, fouling and slagging of tubes, ash contamination, etc., are completely eliminated or minimized through the use of EPI's gasifier. The use of biomass gasification with coal-fired boilers creates a true win win situation for the utilities and the environment."

Black & Veatch and EPI evaluated the technical feasibility and economic viability of the system as a biomass gasification retrofit at the NPPD Sheldon Station. The biomass gasification system was sized to displace about 17 percent of the boiler coal heat input, which produces the equivalent of about 18 MW of green power. The estimated cost for the biomass gasification system could vary from \$8 million to \$13 million, depending on options for biogas cleanup and modifications to the existing boiler systems. NO_x reduction from the reburning of the biogas was projected to be about 40 percent. EPI believes that, depending upon individual boiler configurations and operating parameters, significantly higher reductions of NO_x are possible.

The analysis featured the use of VISTA, an evolution of the widely used Coal Quality Impact Model (CQIMTM) that Black & Veatch developed for EPRI in 1989. The VISTA analysis provided a complete examination of the effects of the biomass gas on the existing unit's performance, availability, fuel costs, operation and maintenance costs and other parameters. The data has been combined with other information to develop a comprehensive economic model of the proposed project. The model found that the strongest impacts on project economics are availability of credits for NO_x reduction, and availability of credits for renewable energy.

The U.S. Department of Energy funded the study through the Western Regional Biomass Energy Program. Copies of the study can be downloaded from the EPI Web site at www.energyproducts.com. PE

This article was written by Steve Blankinship, Associate Editor of POWER ENGINEERING and appears in the November 2002 issue.

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POWER ENGINEERING/NOVEMBER 2002 •