

# COALBED METHANE EXTRA



## Cofiring Coal Mine Methane With Coal Can Yield Higher Efficiency and Less Air Pollution

Cofiring with coal mine methane (CMM) in coal-fired boilers at industrial and utility plants creates strategic opportunities for reduction of pollution and gains in boiler efficiency. When properly retrofitted and optimized, cofiring can cost-effectively reduce emissions of nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), and particulates, improve carbon burnout, and increase combustion efficiency in boilers.

### Environmental Benefits

Recent studies by the United States Environmental Protection Agency (U.S. EPA) found that coal plants can achieve significant reductions in NO<sub>x</sub> emissions with marginal inputs of CMM gas for cofiring. Assuming a conservative NO<sub>x</sub> offset cost of \$500 per ton, U.S. EPA estimates that the additional value of reducing NO<sub>x</sub> with cofiring amounts to approximately \$0.55 per million Btu of CMM. In addition, utility boiler operators could find the value of NO<sub>x</sub> emission reductions increasingly useful (see insert).

Coal boiler operators can also use CMM to achieve measurable reductions of sulfur and particulate

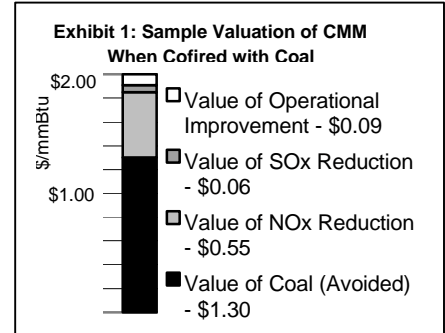
emissions. Estimated values for these and other benefits from a specific CMM cofiring case are presented in Exhibit 1. This estimate does not include the potential value of greenhouse gas (GHG) offset credits at the coal mine or lower GHG emissions at the power plant.

### Efficiency Benefits

In addition to air pollution benefits, cofiring also improves carbon burnout and combustion efficiency. By injecting CMM into specific areas of the boiler, operators can redress a variety of boiler performance concerns such as slag buildup and slow boiler startup. CMM can replace more expensive startup fuels like oil. The ease of boiler conversion and the low capital cost of retrofitting for cofiring represents a low risk approach to improving boiler performance.

### Potential Projects

U.S. EPA's Coalbed Methane Outreach Program (CMOP) has already identified nine gassy U.S. coal mines within 20 miles of utility boilers. A more detailed assessment of the potential at five power plants, owned by a single utility, resulted in the identification of 14 feasible project options. More than 75 percent of the cofiring project options identified in the assessment yielded internal rates of return (IRRs) above 20 percent. CMOP found a similar



range of positive IRRs for industrial cofiring projects. These assessments indicate that three factors largely determine project viability: the distance of the pipeline needed to transport the CMM gas; the flow rate of the CMM gas; and the value of the CMM gas as determined by displaced fuel costs. The results of this assessment are presented in a report entitled "Cofiring with Coalbed Methane" (available from CMOP upon request).

### Industry Experience

The Gas Research Institute has documented the benefits of gas cofiring at many utility and industrial boilers. More than 370 coal-fired utility boilers in the United States have gas cofiring capability and, in 1995, consumed more than 70 billion cubic feet of conventional natural gas for ignition, warm-up, and load carrying.

Cofiring is a cost-effective technology that typically pays investment returns within 1.4 to 3.1 years. The investment varies with the methane input to the boiler, which depends on boiler design, gas availability, and the needs of the boiler operator. The equipment required to retrofit boilers is commercially available, meets all relevant environmental and safety codes, and in many cases, is already in place.

In summary, cofiring methane in coal boilers economically reduces NO<sub>x</sub> emissions, reduces other pollutants, improves boiler operation, and offers profitable returns on investment.

### U.S. EPA NO<sub>x</sub> Emissions Regulations

U.S. EPA is tightening federal standards for ground-level ozone (smog) emissions in 22 states in the eastern half of the United States. Cofiring methane in coal boilers significantly reduces NO<sub>x</sub> emissions (a precursor to ozone formation) and earns rapid investment returns.

The 50 largest utility generating companies in the eastern half of the U.S. make up 73 percent of national electric utility NO<sub>x</sub> emissions. The American Public Power Association reports that utilities expect the Midwest and Ohio Valley states to bear the most significant reductions.

In an effort to facilitate implementation, U.S. EPA plans to issue a supplement to this proposal in early 1998 that encourages the development of a "cap and trade" program, which would reward early action (see lead article for potential opportunities) and grant more flexibility to those facilities that need more time to implement controls.

U.S. EPA plans to issue the final rules by September 1998. For more information, visit [www.epa.gov/ttn/oarpg/otagsip.html](http://www.epa.gov/ttn/oarpg/otagsip.html).



## Past Events

On November 6, 1997 in Morgantown, WV, the North American Coalbed Methane Forum (NACBMF) held their bi-annual conference focusing on current coalbed methane issues and developments. Contact Dr. Kashi Aminian for conference proceedings at (304) 293-7682.

## Upcoming Events

### International Conference on Coal Seam Gas and Oil

The University of Queensland and Indiana University will conduct an international conference on coal seam gas and oil from March 24-26, 1998 in Brisbane, Australia. Scientists and engineers from a broad range of disciplines will discuss the status of current research on coal-related oil and gas resources. Papers and case studies will cover exploration science and technology, production, economics, regulatory requirements, and environmental considerations. Contact Allison Moon at (+61 7) 3369 0477 or link to <http://www.im.com.au/coalseam/> for registration information.

### North American Coalbed Methane Forum and Coalbed Methane Outreach Program (CMOP) Conferences

On April 8, 1998, the NACBMF will host a technical conference in Pittsburgh, Pennsylvania. Contact Dr. Kashi Aminian for more information at (304) 293-7682.

On April 9, 1998 at the same venue in Pittsburgh, U.S. EPA will sponsor the 3<sup>rd</sup> annual CMOP conference entitled "Marketing Your Coal Mine Methane Resource." Contact Roger Fernandez at (202) 564-9481 for more information.

### International Conference on Coalbed Methane - Technologies of Recovery and Utilization

On May 27-29, 1998, the Central Mining Institute in Katowice, Poland will conduct an international conference in Szczyrk. The conference will focus on resource assessments, new technologies, power system applications, case studies, and environmental protection. Contact Jozef Dubinski at (+48 32) 583-022 or by fax at (+48 32) 596-533 for more information.

## Recent Publications

***Coalbed Methane Potential in the Appalachian States of Pennsylvania, West Virginia, Maryland, Ohio, Virginia, Kentucky, and Tennessee – An Overview*** by Paul C. Lyons, U.S. Geological Survey Open-File Report 96-735. The report focuses on the CBM potential of the central and northern Appalachian Basin by providing an overview of key project constraints, detailed geographic information, and production data. (67 pp)

***Identifying Opportunities for Coal Mine Methane Recovery at United States Coal Mines: Draft Profiles of Selected Gassy Underground Coal Mines:*** U.S. EPA profiles 64 U.S. coal mines that are candidates for the development of methane recovery and use projects. This report describes technical, economic, regulatory and environmental issues, 15 successful methane recovery projects, gassy mine operating statistics, news, estimates of methane emissions, and other data useful for determining methane recovery potential. (326 pp)

***Coalbed Methane Legislation and Recovery in Alabama, Pennsylvania, Virginia, and West Virginia:*** This U.S. EPA white paper briefly reviews CBM legislative issues and history. The paper presents correlating trends in regional production and economic impacts and reserve estimates in selected eastern coal mining states. (6 pp)

***Technical and Economic Assessment to Upgrade Gob Gas to Pipeline Quality:*** U.S. EPA reviews integrated gob gas enrichment systems for mine site application. The report examines average costs of enrichment projects in a typical mine setting for a variety of feed gas qualities and daily flows. U.S. EPA also begins the process of evaluating promising technologies that have not yet been proven in commercial field trials. (28 pp)

***Abandoned/Closed Mine Storage of Coal Mine Methane:*** This U.S. EPA report, which is due out April 1, will introduce the reader to the market context, key technical issues, and benefits of coal mine methane storage in abandoned/closed mines. The report will also briefly summarize storage potential, project feasibility, and ownership issues of U.S. abandoned mines. (38 pp)

## For Further Information

Please call us toll-free at 1-888-STAR-YES for general inquiries, to order publications, or receive a full listing of available publications. For more specific requests, please direct all written correspondence to:

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Washington, DC 20460  
**Fax: (202) 565-2077 (new)**

Or visit our web page at:  
<http://www.epa.gov/coalbed/>

## Contact Information

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