



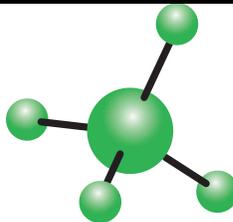
United States
Environmental
Protection Agency

Air and Radiation
(6202J)

EPA-430-F-99-008
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COALBED METHANE OUTREACH PROGRAM

Environmental Protection with a Profit

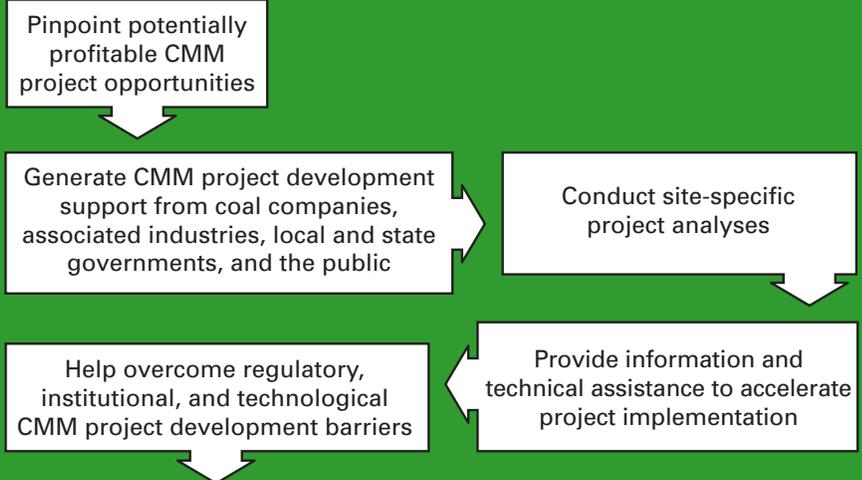


Our Mission

The U.S. Environmental Protection Agency's Coalbed Methane Outreach Program (CMOP)

promotes profitable recovery and use of coal mine methane (CMM), a potent greenhouse gas. By cooperatively working with coal companies and related industries, CMOP helps to identify and implement methods to use CMM productively, thereby preventing its release to the atmosphere and mitigating its climate change potential.

OUR WAY OF DOING BUSINESS



Project!

**CMM
PROJECTS**

*Take Advantage
of the Potential!*



GREENHOUSE GAS REDUCTION



PROFIT



JOBS



MINE SAFETY IMPROVEMENT



ENERGY PRODUCTION

**CMM PROJECTS USE PROVEN TECHNOLOGIES
TO PROTECT THE ENVIRONMENT AND CREATE
PROFITABLE INVESTMENT OPPORTUNITIES.**

ALTERNATIVE APPLICATIONS

Commercial and Industrial Options

- Heating greenhouses (heating costs have been reduced by up to 87% in some cases).
- Cofiring methane in coal-fired industrial and utility boilers.
- Enriching medium-quality gas for pipeline injection.
- Cogenerating with CMM to produce electricity and heat.

Developing Technologies

- Power generation using microturbines or very low-emission fuel cells.
- Methanol production.
- Supplemental fuel for blast furnaces.
- Small-scale liquified natural gas production.
- Brine water treatment (see photo).

Ventilation Air Methane

- Supplement primary fuels in power generations or boilers/ furnaces.
- Heat recovery using thermal oxidizers and catalytic processes.

Mine-Site Uses

- Facility, water, and ventilation air heating.
- Coal drying.



Photo: CMM-fueled evaporator at Morcinek Mine, Poland (courtesy Aquatech Services, Incorporated)

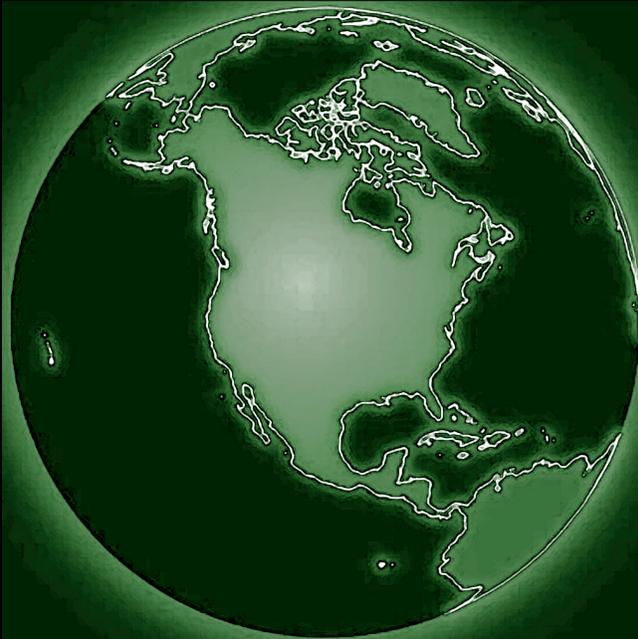


WHAT IS COALBED METHANE?

Coalbed methane is natural gas. It is formed during *coalification*, the process in which plant material forms coal. Contained within the coal seams and surrounding rock strata, coalbed methane generally does not escape into the atmosphere unless exposed by **coal mining activity**. Released into the mines, the gas becomes **Coal Mine Methane**, which must be removed from a coal mine for safety reasons.

Methane is a greenhouse gas **21 times as potent** as carbon dioxide; avoiding its release to the atmosphere can contribute substantially to **protection of the global environment**.

Preventing one billion cubic feet [bcf] of methane emissions is equivalent to ... planting 120,000 acres of trees OR eliminating the emissions from 89,000 automobiles for one year.



Pioneers in CMM Recovery



Photo: Methane drainage well
(courtesy of Jim Walter Resources)

COAL MINE METHANE = \$\$\$

Coal mine methane recovery can:

- Reduce mine ventilation costs,
- Improve safety conditions for miners, and
- Provide profits from sale of high-quality CMM.

It is estimated that in 1999 CMM projects generated \$50 million in direct gas sales!

Seventeen CMM pipeline sale projects were active in the U.S. as of January 2000, **recovering almost 43 bcf of CMM annually, and . . .**

those projects are preventing significant releases of greenhouse gases equivalent to **removing almost 4 million cars** from our nation's roads each year!

PROJECT OPPORTUNITIES

WHY COAL MINE METHANE?

The potential for methane recovery at U.S. coal mines is large. It is estimated that at least **forty percent (88 bcf)** of the methane emitted by underground mines could be profitably recovered in the year 2010. Environmentally, 88 bcf of methane equates with:

- Removing almost 8 million cars from our highways for a year, **or**
- Supplying energy to heat over 1.2 million homes for a year, **or**
- Planting over 10.5 million acres of trees (an area twice that of New Jersey).

PIPELINE INJECTION

CMM can fuel electricity generators. Mines in the U.S. and abroad have demonstrated the practicality of using methane as a fuel for electric power production to:

- Meet on-site electricity requirements, and
- Sell excess power to utilities.

CMM can be sold to natural gas pipelines when methane-rich coal mines . . .

- Produce high-quality CMM with a concentration of at least 95% methane by volume, or
- Drain lower-quality CMM that the developer can economically upgrade to pipeline quality, and
- Are in close proximity to existing natural gas pipelines.

POWER GENERATION



**C O A L B E D
M E T H A N E
O U T R E A C H
P R O G R A M**

For More Information

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