

Introduction

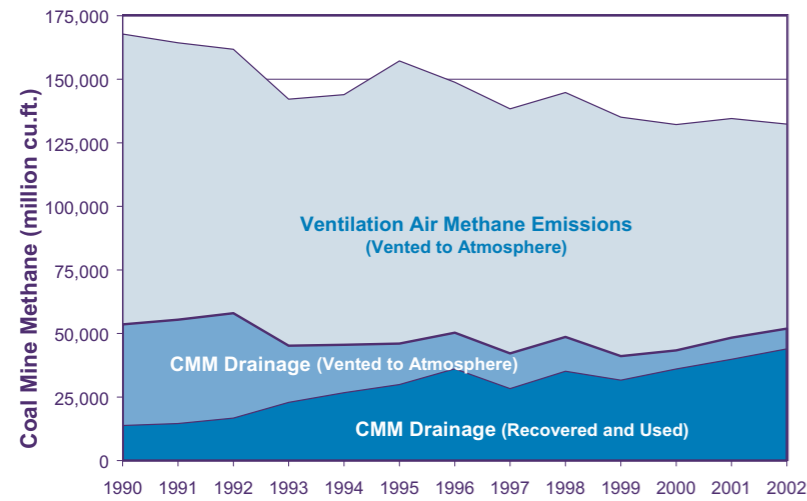
The U.S. Environmental Protection Agency's (EPA's) Coalbed Methane Outreach Program (CMOP) works with the coal mining industry to promote the recovery and utilization of coal mine methane (CMM). Because CMM poses a hazard to miners, it is intentionally released before, during, and after mining activities through mine ventilation systems. In some cases, degasification systems (also referred to as "drained" gas) are necessary to supplement ventilation.

Methane is also a potent greenhouse gas (GHG) that is more than 20 times as effective at trapping heat in the atmosphere as carbon dioxide over a 100-year period. However, if it is collected and used for energy, methane is a valuable fuel source. Recovering CMM benefits the environment by reducing GHG emissions, produces a valuable energy source that can be profitably utilized in a number of ways, and improves mine safety and productivity.

This brochure provides an overview of U.S. government agencies and international organizations that provide different financing mechanisms and support to develop CMM projects.

How much CMM is available for profitable recovery?

About 130 billion cubic feet (Bcf) of CMM were emitted in the United States in 2002—the equivalent of 53 million metric tons of carbon dioxide. Of that total, ventilation air methane emissions accounted for more than 80 Bcf of emissions. Mines used 44 Bcf of drained gas in 2002, while emitting the remaining 8 Bcf from drainage systems.



What are potential markets for CMM?

Natural gas pipeline or local distribution sales

The majority of CMM recovery projects in the United States involve selling the methane directly to natural gas pipelines. The gas might require processing to remove contaminants or blending (called "spiking") with higher-quality gas to increase its heating value to meet pipeline specifications.

Electricity markets

Using CMM to produce power via turbines or internal combustion engines is a potentially profitable way to generate revenue by selling



Financing Coal Mine Methane Projects:

Opportunities for Environmental, Economic, and Energy Gains



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For information about CMM recovery and utilization, visit our Web site at www.epa.gov/cmop

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that energy to the electricity grid. Alternatively, mines can reduce costs by using the power generated onsite to run ventilation fans and other equipment.

Alternative uses

There also are a number of alternative uses for CMM:

- Onsite use to offset mine costs associated with coal drying or mine heating in winter time.
- District or regional heating.
- Manufacturing and processing end uses (e.g., dimethyl ether, carbon black, methanol, or desalination).
- Fuel to power fuel cells.
- Vehicular fuel in the form of liquefied natural gas (LNG) or compressed natural gas (CNG).
- Flaring.

Carbon markets

Methane emissions reductions associated with CMM projects might be traded in emerging carbon markets. Contracts could generate revenue for coal mines at a fixed price per emission reduction for a number of years.

What are typical project investment costs?

Capital investment costs for CMM projects vary greatly depending on the project scope and site-specific requirements. Capital investment requirements might include: drilling and infrastructure costs for drainage wells; connection to the nearby natural gas pipeline; installation of a processing plant to remove contaminants; and procurement of equipment such as compressors, engines, microturbines, and/or generators. Other upfront investment costs include feasibility studies and analyses, engineering, permitting, and royalties. Similarly, operating costs will vary greatly depending on the site's characteristics. Detailed feasibility studies and cost analyses are required to accurately gauge individual project costs and projected returns on investments.

How are CMM projects financed?

A number of financial resources are available to private developers of CMM projects, including grants, loans, and guarantees.

Private investment

In the United States, the vast majority of direct project funding has come from the private sector—from mining companies or private investment firms that have provided the capital investment for gas processing, blending, and transport for pipeline sales.

Specialists in carbon markets. Some private investors and brokers are focusing on financial investments in GHG emission reductions. A number of brokerages and specialists offer assistance in GHG emissions transactions. A partial list can be found at <www.epa.gov/coalbed/resources/reports/fin/ghgas.html>.

U.S. government agencies

For CMM recovery and utilization projects located in the United States, several government agencies provide funding resources.

Department of Energy (DOE) grants have provided funding for a number of demonstration projects, including those using CMM to produce power via internal combustion engines and fuel cells.

- DOE's Inventions and Innovations Grants Program is conducted through the Office of Energy Efficiency and Renewable Energy (EERE). These grants are open to U.S. citizens, U.S.-owned small businesses, or U.S. institutions of higher learning. <www.eere.energy.gov/inventions>
- DOE's National Energy Technology Laboratory (NETL) sponsors research to advance fossil energy exploration, supply, and end-use technologies. Its primary mission is to ensure that U.S. fossil energy resources can meet increasing demand for affordable energy. <www.netl.doe.gov> Solicitations for research funding are posted on the Web site at <www.netl.doe.gov/business/solicit/index.html>.

Small Business Administration Loan Programs. The Small Business Administration (SBA) operates a loan fund that assists small businesses engaged in energy technology and energy efficiency by guaranteeing loans if key conditions are met. SBA's CAPLines Loan Program provides federally guaranteed revolving lines of credit to small businesses. <www.sba.gov/financing/loanprog/caplines.html>

EPA's Environmental Finance Program assists communities in funding environmental projects by helping to lower costs, increase investment, and build partnerships. <www.epa.gov/efinpage>

International project financing

For international CMM recovery and utilization projects, a number of U.S. government agencies provide assistance.

Overseas Private Investment Corporation (OPIC) supports projects in developing countries and countries in transition by insuring U.S. investments overseas, providing financing through loans and loan guarantees, and financing private investment funds. <www.opic.gov>

U.S. Export-Import Bank (Ex-Im Bank) helps finance overseas sales of U.S. goods and services, and provides credit insurance, as well as loan guarantees and project finance. <www.exim.gov>

U.S. Department of Commerce BISNIS Finance Link provides export assistance service for U.S. companies seeking financing, particularly in the Newly Independent States of the former Soviet Union. <www.bisnis.doc.gov>

U.S. Trade and Development Agency (US TDA) provides funding for feasibility studies that will promote the export of U.S. goods overseas, including drilling equipment and power production equipment for CMM recovery. <www.tda.gov>

United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP) provide grant funding through the Global Environment Facility (GEF) to developing or transitional economies. <www.gefweb.org>



A natural gas pipeline.

World Bank. The World Bank's mission is to fight poverty and improve the living standards of people in the developing world. It provides loans, policy advice, and technical assistance and knowledge sharing services to low- and middle-income countries. <www.worldbank.org>

- The International Finance Corporation (IFC), part of the World Bank, has a mandate to further economic development through the private sector. Working with business partners, it invests in sustainable private enterprises in developing countries and provides long-term loans, guarantees, and risk management and advisory services to its clients. <www.ifc.org>

Asian Development Bank (ADB). An independent, multilateral financial institution dedicated to reducing poverty in Asia and the Pacific, the ADB provides financial support for regional or country-specific development projects through grants and loans. The ADB has supported CMM projects in China. <www.adb.org>

Where can I learn more about financing CMM projects?

Resources describing financial resources in more detail and other information, including CMM and financial experts, can be found by visiting the CMOP Web site at <www.epa.gov/cmop/resources/reports/finance.html>.

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