



COALBED METHANE EXTRA



Electric Power Industry Restructuring - Opportunities for CMM Producers

Electric power industry restructuring offers substantial new marketing opportunities for coal mine methane (CMM) producers. As states adopt restructuring legislation they are converting the power industry from a regulated monopolistic system into an open, competitive retail market in which non-utilities can play a major role. In a restructured industry, power producers can tailor their product to fit the energy and environmental needs of particular customers, be they utilities, power marketers, or end users. At the same time, a number of market forces are making electricity generated from clean fuels such as CMM increasingly attractive. With open access to electric transmission lines and

CMM project developers now have expanded options to sell electricity that they produce.

proven CMM power generation technologies already available, CMM producers now can adopt innovative CMM marketing approaches to successfully compete in the new electric power market.

Market Incentives

Electricity demand is expected to grow from 1.3 – 1.5 percent per year through 2020, with over 90 percent of new generation capacity being coal- or gas-fired.¹ Four

large markets with above average prices for electricity exist in or near gassy coal mine regions: Northeast, Mid-Atlantic, Florida, and Midwest. Most eastern CMM producers are located within a reasonable transmission distance to centers of high electricity demand and high electricity cost. One aspect of restructuring requires that

public electric utilities owning, controlling, or operating transmission lines offer others the same transmission services they provide themselves. Thus, CMM producers who use their gas for electric power generation can access the existing transmission system to reach such expanding markets.

Furthermore, in areas where electricity demand and price are high, mines can use their CMM to

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Early Greenhouse Gas Reduction Bill - Update

In a speech before the National Association of Manufacturers in Washington, DC on December 2, 1998, Senator John H. Chafee stated that he intends to actively promote enactment of the "Credit for Early Action" legislation, which he proposed on October 10, 1998 with Senators Joseph Lieberman and Connie Mack. According to Senator Chafee's office, early in 1999 the Senator is expected to reintroduce the bill for consideration by the 106th Congress, where it will be referred to the Senate Committee on Environment and Public Works (and possibly as many as three other committees).

The bill would provide incentives and give credit to companies that voluntarily reduce greenhouse gas emissions before

possible future carbon reduction targets are established. If passed, it would constitute an important step in meeting President Clinton's call for legislation "that rewards companies for early action" as elucidated in his recent State of the Union speech. The benefit and viability of such legislation was recently underscored when Connie Holmes of the Global Climate Coalition characterized it as "an interesting approach that recognize[s] the important voluntary efforts business and industry have made in the past five years" (*Mining Week*, January 25, 1999). In Senator Chafee's words, "America can and should reward companies that take such positive steps to position themselves, and the U.S., for the environmental and economic future."



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fuel a distributed power generation system. This can reduce the mine's electricity cost, and, if electricity production exceeds the mine's demand, excess power would be available for sale directly to local commercial, industrial, or residential users, or back to the grid.

Utilities may themselves seek out the benefits offered by distributed, CMM-fueled power generation systems. Distributed systems generating electricity near CMM fuel sources can take advantage of the relatively low delivered fuel cost (e.g., the cost of locally produced CMM compared with the cost of transporting natural gas to a large power plant). Such systems could cost-effectively delay or even supplant the need for grid system upgrades to meet increased demand. Distributed power systems also have less transmission loss because they are located adjacent to their markets.

Environmental considerations provide additional market incentives. The 1990 Clean Air Act provides ample impetus for utilities to seek the benefits of CMM-derived electricity. When it is cofired with coal, CMM contributes to power production while also reducing NO_x and SO_x emissions. Such CMM-derived reductions can contribute monetary, as well as environmental, value to utilities because NO_x and SO_x emissions credits have been regularly and actively traded for some time.

Productively using CMM reduces

greenhouse gas emissions, and a viable domestic and international market for greenhouse gas emission reduction credits appears to be evolving. In the U.S. Senate, a bill was recently introduced that would establish a means of giving credit, under any future greenhouse gas emissions reduction system that the U.S. may adopt, to companies that voluntarily reduce their greenhouse gas emissions. Such credits would have monetary value in a carbon emissions trading market. In fact, some

major companies already have entered into substantial greenhouse gas credit deals.²

New Marketing Approaches

Adopting innovative marketing approaches will increase the likelihood that CMM producers can capitalize on the opportunities that electric power industry restructuring offers. These approaches include taking advantage of "green energy" marketing options, developing strategic

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Need Help Locating Potential Coal Mine Methane Buyers or Sellers?

How can I identify potential coal mine methane buyers? Is my methane-producing coal mine near any existing gas pipelines? Is my business located near any supplies of low-cost natural gas?

While these once were difficult questions to answer, the newly available **C**ustomer **I**dentifier for **C**oalbed and **L**andfill Methane **O**utreach **P**rogram system (CICLOPs) facilitates locating both coal mine methane (CMM) sources and potential users for that gas! The interactive system was developed by the Department of Energy's Argonne National Laboratory through a grant from the USEPA Coalbed and Landfill Methane Outreach Programs. Freely accessible over the Internet, CICLOPs now allows easy access to nationwide information on gassy coal mines, landfills, potential users of methane, and natural gas pipelines. It can be used to locate and characterize methane sources (i.e., coal

mines and landfills) and potential end users, as well as to locate gas pipelines that may offer gas transportation opportunities.

CICLOPs applies the principles of geographic information systems to display data in a clear, user-friendly format. Starting with a map of the United States, a series of mouse clicks allows users to zoom in on a selected locale in a stepwise fashion. With each successive click, the level of resolution increases, and more information on the area of interest is displayed in map and table form.

Interested parties can rapidly access detailed information by following the simple guidelines presented in the accompanying "Step-By-Step CICLOPs User's Guide" (see page 6). Navigating through the system can be learned literally in minutes, making CICLOPs both a valuable and efficient tool for coal mine methane producers and end users.



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partnerships, and “bundling” energy product sales.

« Green Energy »

New power marketing approaches to retail sales may capitalize on the “green energy” concept. Except in rare instances, CMM does not contain sulfur so it does not contribute to the atmospheric SO_x burden. As stated above, CMM cofired with other fuels in utility boilers actually reduces existing level of both SO_x and NO_x emissions. Moreover, power producers can provide a net reduction in greenhouse gas emissions by combusting CMM rather than releasing it to the atmosphere. Environmentally conscious consumers and businesses may prefer to obtain some of their power from clean energy sources and may be willing to pay a premium for such power.³

« Strategic Partnerships »

Entering into strategic partnerships constitutes a sound marketing strategy for CMM producers. Formal business ties between coal mines, utilities, and marketers can provide both long-term stability as well as improved pricing options. Coal mines may enter relationships with utilities wherein they self-generate all or a portion of their electricity needs from CMM, provide coal to the utility, sell excess electricity (to the utility or others), and generate emissions credits for purchase (by the utility or others). Alternatively, coal mines may join with gas developers who

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Recent Publications

Information Pack: International Coalbed Methane Fact Sheets (9/98)

These reports survey coalbed methane (CBM) potential and activities in China, the Czech Republic, India, Poland, Russia, South Africa, Turkey, and Ukraine. They address the potential role of CBM in each country's energy economy; identify existing policies affecting and government bodies overseeing CBM development; specify barriers to such development; and list donor organizations, companies, and investors active in CBM development projects. The fact sheets also summarize projects that have been undertaken to date in each country. The report series was originally included in the proceedings of the joint U.S. EPA/World Bank Seminar and Roundtable on Coalbed Methane Development and Potential held in Washington, DC on September 10, 1998.

A Guide to Coal Mine/Greenhouse Projects (11/98)

This report assesses three ways that greenhouse operations can take advantage of various underground coal mine resources to lower costs and increase revenues. These are using (1) coal mine methane for greenhouse heating, (2) coal mine methane to generate electricity for greenhouses, and (3) coal mine water for greenhouse irrigation and

humidity control. The report will assist greenhouse operators in evaluating possible sites for construction of new, large greenhouses that may increase profits by using potentially low-cost coal mine resources.

Gas Storage at the Abandoned Leyden Coal Mine Near Denver Colorado (11/98)

The Leyden facility, operated by Public Service Company of Colorado, is the only underground coal mine in the U.S. being used to store natural gas. This report uses the Leyden experience to demonstrate the practicality and benefits of providing high-deliverability coal mine methane (CMM) storage in closed underground coal mines. Storing CMM during low demand periods could provide CMM producers with the latitude to sell their gas at times when demand and price are high. The report addresses both the technical and economic aspects of gas storage at the Leyden Mine, and highlights the potential profitability that such storage can offer CMM project developers. Furthermore, this study illustrates that the CMM storage concept detailed in CMOP's *Technical and Economic Analysis of Coalbed Methane Storage in Abandoned Mine Workings*, EPA-430-R-98-019 (see description in the September, 1998 *Coalbed Methane Extra*) is credible.

Note:

These reports can be ordered by calling 1-888-STAR-YES, or can be downloaded directly from the CMOP World Wide Web site at <http://www.epa.gov/coalbed>.



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can defray part or all of the methane drainage system development and operation cost, and provide ready access to gas sales markets.

« Bundling Energy Sales »

Electric industry restructuring combined with deregulation in the natural gas industry is expected to promote convergence and integration of gas producers, pipeline companies, and power producers to provide customized (bundled) service packages for specific energy consumers. Such energy service bundling is happening

The value of CMM may be enhanced by bundling its sale with that of other energy products and/or emissions credits.

already, with some marketing groups offering "total Btu packages" that provide all of a client's energy needs regardless of their fuel requirements (coal, oil, gas, electricity, or any combination thereof). Thus, rather than marketing CMM exclusively, its value can be enhanced by bundling CMM with sales of coal, gas, and/or electricity, as well as with NO_x, SO_x, and/or greenhouse gas credits. That would allow CMM to become part of an overall energy package that may have greater potential marketability than would CMM alone.

Technological Options

Technologies appropriate for a variety of power production settings are available to prospective new players in the restructured electric power industry. Numerous such technologies already exist and have been

proven feasible and practical, while others are just emerging. Among the proven technologies are internal combustion engines, simple-cycle and combined-cycle gas turbines, cofiring in coal boilers, and cogen-

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Upcoming Events

North American Coalbed Methane Forum **Washington, Pennsylvania** **April 21, 1999**

The next North American Coalbed Methane Forum biannual meeting has been **RE-SCHEDULED to April 21, 1999**. The Forum will be held at the Holiday Inn Meadow Lands in Washington, Pennsylvania, USA. A reception the evening of April 20th will precede the meeting. For additional information on conference content and schedule, contact Kashy Aminian, Forum Coordinator, by phone at (304) 293-7682.

USEPA/CMOP **Spring Conference**

Unlike previous years, this year the U.S. Environmental Protection Agency's Coalbed Methane Outreach Program *will not hold* a Spring conference. CMOP will be represented, however, at the biannual North American Coalbed Methane Forum's meeting (see above). Direct your questions to Roger Fernandez, U.S. Environmental Protection Agency, on (202) 564-9481 or at fernandez.roger@epa.gov.

International Coalbed Methane Symposium **Tuscaloosa, Alabama** **May 3-7, 1999**

The 1999 International Coalbed Methane Symposium will be held May 3-7, 1999 at the Bryant Conference Center on the University of Alabama campus in Tuscaloosa, Alabama, USA. The symposium will focus on both basic and innovative technologies for coalbed methane extraction and utilization. Contact Gwen Hood, Conference Coordinator, at (205) 348-7192 for more information.

Mine Ventilation Symposium **University of Missouri-Rolla** **June 7-10, 1999**

The University of Missouri-Rolla will host the 8th U.S. Mine Ventilation Symposium on its campus June 7-10, 1999. The symposium will address a host of topics, including theoretical, technical, and economic aspects of methane drainage. For more information, contact Dr. J. C. Tien via e-mail at tien@umr.edu, or visit the symposium Web site at <http://www.umr.edu/~tien/symp.html>.



CMOP Changes Web Site Address !

The Coalbed Methane Outreach Program's World Wide Web site has changed servers. The new server supports improved Web site content presentation, thereby enabling us to better serve the coalbed methane community. Those accessing our site through links in other USEPA sites automatically will arrive at the new server location. Persons who use a bookmark to our old address, however, will need to enter our new address into their bookmark list.

In addition, we have substantially expanded the list of documents that can be downloaded in electronic form directly from our Web site.

Please visit us at <http://www.epa.gov/coalbed>. Your comments on the utility of our Web site and suggestions for its improvement are appreciated.



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eration. Emerging technologies include fuel cells and micro turbines, as well as systems that can extract energy from coal mine ventilation air. The availability of new technologies and methods of using CMM allows producers to direct their product to large-scale utility systems. Other small-scale power generation concepts enable mine operators to cost-effectively operate their own captive systems and take advantage of the substantial opportunities offered by distributed power generation.

Conclusion

Electric power industry restructuring provides the flexibility necessary to increase CMM use in generating electricity, and a host of market trends provide incentives supporting that use. CMM can be sold directly to utilities; electricity generated from CMM can be sold to consumers, power marketers, or utilities, or can be used directly onsite; CMM can be marketed as green energy; and its sale can be bundled with that of other energy resources and emissions credits. Restructuring creates these and potentially other new market opportunities for innovative power producers, thus increasing CMM demand and profits.

¹ Gas Research Institute, 1997,

² "Electric Generation Sector Summary, via GRI web site at <http://www.gri.org>.

² See article in May 1998 Coalbed Methane Extra on the recent US\$6 million trade between Niagara Mohawk Power Corporation and Suncor Energy Inc.

³ The Tennessee Valley Authority is planning to conduct a regional test this year to ascertain how many of its customers actually are willing to pay a premium to purchase green power (source: Utility Environment Report, January 29, 1999).

CMOP Contact Information

Address inquiries about *Coalbed Methane Extra* contents or about the USEPA Coalbed Methane Outreach Program to:

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Please update us if your contact information (address, e-mail, or phone/fax number) changes.

Order CMOP reports by calling 1-888-STAR-YES.

Also, visit the "Document Download" pages on our World Wide Web site at <http://www.epa.gov/coalbed>.



Step-By-Step CICLOPs User's Guide*

« « « Coalbed Locator Maps » » »

1. Access CICLOPs on the Internet at <http://ciclops.dis.anl.gov>. Note that users must be running Netscape Version 4.5 (or higher) or Internet Explorer Version 3.0 (or higher) as their Internet browser for the mapping program to function properly.

2. Click on the "Coalbed Locator Map" button in the menu at the left-hand side of the Home Page. The next screen to appear will be a map of the entire United States. Notice that there is a pull-down menu below this (and subsequent) maps. That menu allows the user to (1) zoom in (the preset default) on a selected area, (2) zoom out to a larger scale, (3) re-center the map (center the existing map on another target location), (4) label coal mines, (5) identify end users, or (6) label pipelines.

By checking any of the three boxes at the top of the map you have the option to "Always show: Coal Mines, End Users, Pipelines" on subsequent maps. However, this is not recommended for the larger-scale maps because they will display more information than can be visually resolved. Also, coal mines, end users, and pipelines all will be displayed automatically in the smaller-scale maps that you create as you continue your search – see below.

3. Use the mouse pointer to select (click on) the geographic area (state) in which you are interested. The next screen will zoom in to an area 534 miles across, displaying the state selected

as well as portions of surrounding states. At this scale, no details will yet be displayed unless one or more of the "Always show: Coal Mines, End Users, Pipelines" options were selected previously.

Each map initially will be centered where you clicked the mouse on the previous map (but you can re-center the map using the pull-down menu selection beneath the map).

4. Again, use the mouse to select the area of interest within the subject state. The next four mouse clicks will display maps of ever greater magnification, with each displaying specific information automatically (unless the "Always show ..." selection is enabled). First a map 53 miles across will appear displaying coal mines (indicated by green dots), roads, and county boundaries. The next click will reveal a map 16 miles across displaying cities and towns. At the next click, a map 5 miles across will appear displaying end users (indicated by red plus signs) and pipelines (indicted by blue dashed lines). Clicking again only increases the scale of resolution (e.g., makes the map scale 1 mile across).

5. Retrieve descriptive information for a coal mine, potential end user, or pipeline by making the appropriate selection from the drop-down menu beneath the map and then clicking on the facility of interest. The facility's name will be displayed on the

Available Characterization Data*

Mines

- Name of mine
- Name of basin
- Name of coalbed
- Current owner
- Contact name
- Phone number
- City/state/zip code
- Coal production
- Total methane
- Ventilation emissions
- Degasification emissions
- Emissions/ton of coal
- Degasification efficiency

End Users

- Map reference number
- Company name
- Address
- Phone number
- SIC code
- SIC category

**Note: Some data elements may be unavailable for some facilities.*

map. In addition, when either the "Label Coal Mine" or "ID End User" selection is chosen, a separate dialogue box will appear listing useful information for the facility (see box). Note that when the "ID End User" option is invoked, data for potential commercial or industrial end users within 5 miles of the selected location will be displayed.

** For questions regarding or assistance in running the CICLOPs system, contact Jennifer Herbert (herbertj@smtplink.ead.anl.gov) or Dan Miller (djmiller@anl.gov) at Argonne National Laboratory.*