Coal Subcommittee Action Plan

Adopted by Subcommittee: October 2015

Introduction

The Global Methane Initiative (GMI) Terms of Reference (TOR)[1] states that each Subcommittee should develop an Action Plan. The *Charge to the Subcommittees* suggests that the Action Plans "identify needs, opportunities, and priorities for project development in the sector and for interested Partners … with input from members of the Project Network." The *Charge to the Subcommittees* outlines specific elements that should be a part of the Action Plan, including:

- Overview of methane recovery and use opportunities and descriptions of available technologies and best practices;
- Identification of key barriers and issues for project development;
- Identification of possible cooperative activities to increase methane recovery and use in the sector;
- Discussion of country-specific needs, opportunities, and barriers; and
- Outreach to engage Project Network members.

Under the Methane to Markets (M2M) Partnership, the Coal Subcommittee developed an action plan for the Subcommittee's specific activities for Years 2 through 5 of the Partnership.[2] This plan effectively served the Subcommittee through 2014. During the initial 5-year period, the Coal Subcommittee focused the largest share of effort on outreach and capacity building to identify coal mine methane (CMM) project opportunities, to introduce the global mining community to the technologies and practices available to recover and use CMM, and to foster engagement among the key stakeholders including the coal industry, the financial sector, project developers, multilateral institutions, equipment suppliers and government.

The transition from M2M to the Global Methane Initiative (GMI) elevated the partnership to a more prominent role among global climate initiatives, and membership expanded. In keeping with the original objectives of M2M, the first 5-year period for the GMI focused on implementing projects to achieve real and measureable emissions reductions, including developing a supportive framework to encourage project implementation and operation. Following its action plan, the Coal Subcommittee was instrumental in identifying and promoting industry best practices for methane management in coal mines to improve mine safety, harness otherwise wasted energy resources and reduce greenhouse gas emissions. The Subcommittee also continued to identify and promote project opportunities supporting feasibility, pre-feasibility and scoping studies in many countries. During the period of 2010 through 2014, GMI countries saw significant expansion in the number of coal mine methane projects.

[1] See: http://www.globalmethane.org/about/terms.aspx

[2] See: http://www.globalmethane.org/documents/coal_actionplan_0506.pdf

The Coal Subcommittee Action Plan provides a blueprint for the important activities and priorities of the Coal Subcommittee to advance coal mine methane projects. The action plan recognizes and takes into account the work program and accomplishments to date, while also acknowledging the dynamic and rapidly changing environment encasing the global energy sector, particularly the coal industry, and also global carbon and environmental markets.

For a full list of GMI Coal Subcommittee activities and accomplishments, visit the coal section of the GMI website at ***https://www.globalmethane.org/coal-mines/index.aspx.***

Table 1 summarizes ongoing or planned activities (updated, July 2015).

Date	Activity	Anticipated Participants
5-8 October 2015	U.S. Coal Mine Methane Track at the International Pittsburgh Coal Conference – Pittsburgh, PA, USA	Global coal industry Government officials Project Network members
27 October 2015	GMI Coal Subcommittee meeting – Geneva, Switzerland	Coal Subcommittee members UNECE Group of Experts UNECE member states Project Network members
28 October 2015	UNECE Group of Experts on Coal Mine Methane – Geneva, Switzerland	UNECE Group of Experts UNECE member states Coal Subcommittee members Project Network members
28 – 30 March 2016	GMI Global Methane Forum and Coal Subcommittee Meeting – Washington DC, USA	GMI Steering Committee GMI Coal Subcommittee Project Network Climate and Clean Air Coalition members
Q2 2016	GMI Coal Subcommittee meeting – TBD	Coal Subcommittee members Project Network members
October / November 2016 (Provisional)	UNECE Group of Experts on Coal Mine Methane - Geneva, Switzerland	UNECE Group of Experts UNECE member states Coal Subcommittee members Project Network members

The Coal Subcommittee's Action Plan identifies three main types of activities:

(1) Developing overview materials,
(2) Identifying and addressing key barriers to project development, and
(3) Identifying country-specific needs and opportunities.

Each of these three elements is discussed in more detail below.

Each element of this action plan incorporates cooperative activities to increase methane recovery and use in the sector as well as outreach to engage Project Network members. Through the Coal Mine Methane Subcommittee's regular meetings and contacts among Partner countries and their private sector

counterparts through the Project Network, the Subcommittee will continue to pursue cooperative activities on a bilateral or multilateral basis that meet the identified needs and overcome key barriers to CMM project development.

Encouraging private sector organizations to join the Project Network will continue to be a vital component of the Subcommittee's activities in each of the specific areas identified above. Each country should work to establish open lines of communication with the relevant private sector parties to ensure active participation in the ongoing activities of the Partnership. In addition to private actors, non-governmental agencies in GMI countries, regional and multilateral agencies, and international financial institutions have also played critical roles in supporting the Subcommittee's plan.

To further this objective, the GMI Administrative Support Group (ASG) developed a comprehensive Coal Subcommittee website (https://www.globalmethane.org/coal-mines/index.aspx) with portals to key websites and tools to make information accessible to all.

1) Development of overview materials, including recovery and use opportunities and descriptions of available technologies and best practices

Methane is produced from underground and surface mines and as a result of post-mining activities including coal processing, storage, and transportation. Underground mines are the single largest source of coal mine methane emissions in most countries. At active underground mines, methane must be removed from underground operations for safety reasons. Large-scale ventilation systems remove the methane by moving massive quantities of methane through the mines. At some active and abandoned mines, methane is also produced from degasification systems (also known as gas drainage systems) that employ vertical and / or horizontal wells to recover methane.

There are a variety of profitable uses for coal mine methane (CMM), and the optimal use at any location depends on factors such as the quality of methane, the availability of end-use options, and project economics. The range of CMM projects includes natural gas pipeline injection, electric power production, co-firing in boilers, district heating, mine heating, coal drying, vehicle fuel, flaring, and manufacturing or industrial uses. Technologies have also emerged to oxidize the low-concentration ventilation air methane (VAM) to produce thermal energy, including regenerative thermal oxidation, which is used in commercial methane destruction operations at operating mines in three countries.

Successful CMM projects require a thorough methane resource assessment and analysis of gas liberation; effective integration of mine degasification and utilization with mining operations; and an available, accessible market for the methane. Thus, the first task for project development is to begin with an assessment of the opportunities for CMM project development.

The Subcommittee has accomplished the task of compiling country-specific information into "Coal Mine Methane Country Profiles"[3] -- updated in 2015 -- as well as compiling a global database of CMM projects and project opportunities.[4] These informational work products (e.g., deliverables or reports), freely available to the GMI community through the internet, are intended to provide important

[3] " https://www.globalmethane.org/tools-resources/coal_overview.aspx

[4] https://www.globalmethane.org/coal-mines/cmm

background on the resource potential, regulatory framework, and prospective markets for CMM in 37 coal mining countries around the world. The CMM Profiles and Projects Database also provide references for important data sources and regulatory citations to support more detailed follow-up with in-country experts.

The Coal Subcommittee has also held many technical and policy workshops since the initiation of M2M/GMI in late 2004. The level of detail is commensurate with the experience of the audience and workshop host's expressed objectives for the workshops. The Subcommittee will continue to produce workshops where they will bring true value added to participants from a broad selection of Partner countries.

While these activities in themselves do not directly lead to methane emissions reductions or utilization, they contribute to the overall knowledge base to encourage such projects and ultimately to ensure their successful implementation.

Specific activities: Informational Work Products (available at: https://www.globalmethane.org/coal-mines/index.aspx)

- Regular updates to "Coal Mine Methane Country Profiles" document
- Regular updates to the Coal Mine Methane Technology Database
- Updating and revising project information currently listed in the GMI International Coal Mine Methane Projects Database

2) Identify and address key barriers to project development

The Coal Subcommittee recognizes that under the Initiative, priority is given to activities that have the greatest chance to achieve emissions reductions in the near term. However, a number of important barriers to project development can be addressed that are associated indirectly or in the longer-term with emissions reductions.

CMM project developers face a range of technical, economic, and institutional issues that impede progress. The key barriers identified by the Subcommittee that inhibit develop of CMM projects are the following:

(1) Lack of clarity about CMM ownership and regulatory issues, as well as the hurdles presented by existing regulations;
(2) Lack of appropriate technology and technical knowledge;
(3) Lack of demonstration of the technical or economic feasibility of these projects in a specific situation; and
(4) Lack of financing or understanding of how to obtain financing.

The Subcommittee activities that address these barriers include the following:

(4) Information-based activities;
(5) Technology transfer activities;
(6) Technical feasibility studies and technology demonstrations; and
(7) Activities that build capacity for project financing and investment.

Below, each of these major types of barriers are briefly discussed, along with potential solutions and specific activities proposed by the Subcommittee to address each of these barriers to support project development and methane emissions reductions.

1) Barrier: Legal and regulatory issues

One key barrier is lack of understanding about the legal, regulatory, and economic framework in emerging economies with potential for project development. Barriers that many countries face include lack of clarity about ownership of coal mine methane; lack of transparency in regulatory regimes or the processes for obtaining rights to gas in many countries; lack of information about the ways in which infrastructure, economic factors such as taxes or incentives, and market barriers may impact a project; or lack of standardization or harmonization of technical terminology.

The Coal Subcommittee will continue to support information-based activities that provide critical information about barriers to project development, such as content about market, economic, or legal issues, and options for addressing and overcoming those barriers. These activities may not directly lead to methane emissions reductions or utilization, but they contribute to the overall knowledge base and therefore encourage project development and successful implementation. Specific examples of such information-based activities include producing reports and white papers that are made widely available to the GMI community, covering topics such as ownership and regulatory issues and recommendations for standardization and harmonization of terminology and standards in the CMM field.

Informational activities to address these barriers include

- Updates to White Paper "Legal and Regulatory Status of CMM Ownership in Key Countries: Considerations for Decision Makers" (*original publication by US EPA in July 2014*[5])
- Workshops on overcoming regulatory and market barriers in Partner countries

Informational work products (e.g., deliverables or reports) are expected to be made widely available to the GMI community through the Coal Subcommittee's internet portal, and workshops should be open to participants from a broad selection of Partner countries.

2) Barrier: Lack of technology or technical knowledge to implement CMM recovery and utilization projects

A second key barrier is lack of technology or technical knowledge to implement CMM recovery and utilization projects.

Specific barriers include

- Lack of technical expertise to conduct resource assessments;
- Lack of technical expertise to effectively conduct drainage activities, pre-mining and during mining, and recover methane;
- Lack of technical expertise to design effective and efficient utilization systems for specific project needs;
- Lack of technical expertise to coordinate project activities for gas and / or electricity production with appropriate end users; and

[5] https://www.globalmethane.org/documents/CMM-Ownership-Policy-White-Paper-July2014.pdf

- Lack of appropriate technology such as horizontal or directional drilling equipment, gas upgrade technology, monitoring technology, or end-use technology.

The Coal Subcommittee will engage in a variety of technology-transfer activities to provide specific training or knowledge, which might include, for example, the development of informative guidance documents, execution of workshops, enhanced training seminars, and/or study tours. Through these activities, countries with more developed CMM industries and technologies can provide assistance to countries where such activities are developing or nascent. Such technology transfer activities provide an opportunity to build capacity within each country through development of a core group of knowledgeable practitioners. These activities help to ensure that long-term, sustainable methane emissions reductions will be achieved.

These activities do not typically have directly-associated methane emissions reductions but by building technical capacity for project development, they help to ensure that long-run methane emissions reductions will be achieved. The activities can be undertaken in the short term and on an ongoing basis as appropriate and necessary.

Specific examples of technology-transfer activities include

Workshops are a commonly-used technology transfer mechanism and provide a relatively short-duration (typically one to three-day) opportunity to explore a specific topic or aspect of project development.

Examples of Technology-Transfer Workshops:

- Coal Mine Methane and Coalbed Methane Technical Workshop in Bogotá, Colombia, June 4, 2015, sponsored by ANH, the National Mining Agency of Colombia and US EPA
- Workshop on the Development of Coal-based Non-Conventional Energy Resources in India, Ranchi (Jharkhand), India November 12, 2013, sponsored by CMPDI, India Ministry of Coal, and US EPA
- Coal Mining Methane Abatement Seminar Sydney, Australia September 4, 2012, Sponsored by Australia Department of Resources, Energy and Tourism

Extended training or seminars may be used in specific circumstances, for example to provide on-the-ground training in operation of technical equipment.

Example:

- USAID / US Department of Labor is providing training to operate directional drill at mine site in Ukraine. The host mine will get to keep the drill (project value ~ US $1.4 million)

Effective technical guidance documents can be widely disseminated in multiple languages at an effective cost and can be tailored to specific audiences with specific skills sets. In addition, they can supplement workshops, seminars and other technical training.

Example:

- The UNECE released the “Best Practices for Effective Methane Drainage and Use in Coal Mines” in 2010, available in 7 languages. A revision is underway and is expected to be complete in 2015/2016.

Study tours provide an opportunity for participants to witness first-hand projects that are operating and to observe their physical and regulatory working environment. They also provide an opportunity for extended conversations with key players.

- None identified at this time

Information centers (or "clearinghouses") provide a source of in-country technical and regulatory expertise, data collection about existing or potential projects and opportunities, and consulting services for in-country as well as foreign project developers and investors.
Examples:

- US EPA continues to support the India Coalbed Methane/Coal Mine Methane Clearinghouse through a cooperative agreement
- The UNECE is in discussions with the Polish Government to host an International Centre of Excellence in Poland

Sponsor travel from delegates from developing Partner nations to participate in appropriate coal mine methane conferences and symposia. *Example:*

- GMI sponsors travel for delegates to attend Coal Subcommittee meetings
    - GMI and UNECE sponsor travel for delegates to participate in meetings of the UNECE Group of Experts on Coal Mine Methane

3) *Barrier: Lack of demonstrated feasibility and demonstration of successful CMM projects at specific sites.*

A third key barrier is the lack of demonstrated technical and economic feasibility studies and demonstrated technical success at specific project sites. Usually these types of analyses are required before a project developer can obtain external funding for a project.

To address this barrier, the Coal Subcommittee will support technology feasibility and demonstration projects to assess the technical and economic viability of specific projects at their site. Specific activities include conducting pre-feasibility studies, detailed economic and technical feasibility studies, and technology demonstrations. By supporting these activities, the Subcommittee helps to move projects closer to commercial implementation. Technology demonstrations actually achieve methane emissions reductions, albeit on a relatively small scale.

<u>*Specific activities*</u> include
Technical and Economic Pre-Feasibility Analysis is a thorough but cost-effective first analysis to assess the viability of a CMM project, and may be sufficient where CMM projects are self-financed or for an indicative offer of financing from a third-party**.**
Example:

- US EPA has developed numerous pre-feasibility analyses for coal mines in China, India, Mongolia, Kazakhstan, Poland, Russia, Turkey, and Ukraine.

Technical and Economic Feasibility Studies are more detailed and thorough studies of technical, economic, and market factors impacting a CMM project, and are generally necessary when seeking third-party financing.
Example:

- US EPA has developed five, full-scale feasibility studies for coal mines in China.

Technology Demonstration Projects

- None currently identified

4) *Barrier: Lack of financing or capacity to obtain financing for CMM projects*

A fourth key barrier is the lack of financing required for project development, as well as the lack of understanding of how to apply for funding or investment from multilateral and other financial institutions.

Coal mine methane projects are typically quite capital-intensive and individual mines or project developers may not be able to finance a project with private funding. The mines and project developers may also not be familiar with the type of documentation to present to financial institutions for project funding (e.g., the way in which key information should be presented in "bankable documents") whether from financial institutions or alternative funding mechanisms.

To address this barrier, the Coal Subcommittee will provide the capacity for project developers to obtain project financing through analysis of key issues, sponsoring project financing workshops, and supporting Project Expos where project developers can directly market their projects to interested investors and financiers.

Solution: Promoting Project Financing and Investment Capacity-Building to enable project developers to obtain project financing from multilateral and other financial institutions.

Specific activities include:

Identification of sources of finance and capacity building

- GMI participated in the development of the World Bank's Pilot Auction Facility to incentivize investment in methane mitigation projects through the establishment of a "pay for performance" scheme. The first auction is expected to be held in 2015, although CMM is not expected to be included. CMM projects could be included in future auctions.

Project Financing Workshops

- None currently identified.

GMI Expos and Partner-wide meetings are forums for Projects, Technologies, Financing, and Policy where GMI partner countries and Project Network members engage while also reviewing presentations on project opportunities.

Examples:

- Methane Expos have been held in 2007 in Beijing, China, in 2010 in New Delhi, India, and in 2013 in Vancouver, Canada.
- Partner-wide meetings have been held in the following years and locations: 2005 (Buenos Aires, Argentina); 2009 (Monterrey, Mexico); 2011 (Krakow, Poland). The next Partner-wide meeting is planned for March 2016 in Washington DC, USA.

3. Identifying country-specific needs and opportunities

Many members of the Coal Subcommittee have submitted country-specific Methane Action Plans that identify country-specific needs, opportunities, and priorities. Learning the specific needs of Partner countries will be an ongoing activity of the Coal Subcommittee. Through June 2015, the following countries have developed action plans, and these plans are available on the GMI website[6]: Australia, China, Colombia, European Commission, India, Mexico, Nigeria, Turkey, Ukraine, and the United States. Member countries are encouraged to update existing Action Plans in anticipation of the Global Methane Forum in March 2016. All member countries that have not previously drafted an action plan are encouraged to do so before the Partner-wide meeting. Tools are available on the Coal Subcommittee web page (https://www.globalmethane.org/coal-mines/index.aspx) to assist in updating a revised plan or

[6] https://www.globalmethane.org/coal-mines/index.aspx

drafting a new plan. These include revised guidance on elements to include in the action plan[7] released in 2013, and GMI CMM Country Profiles[8] that were updated in 2015.

Conclusions

The Coal Subcommittee is committed to work cooperatively in activities that will help to develop and disseminate information about opportunities for coal mine methane project development and address the key barriers to project development: lack of information, lack of technology and technical knowledge, lack of demonstration for project feasibility, and lack of financing or financing capacity. The Subcommittee will conduct these activities in a way that promotes cooperation among the Partner nations and the private sector Project Network. The Subcommittee will also continue to work to understand the needs and priorities of individual countries within the Initiative.

[7] https://www.globalmethane.org/documents/GMI_PartnerSectorActionPlansAppendix_REV_June2013.pdf
[8] http://www.epa.gov/cmop/international/cmm-country-profiles.html