METHANE TO MARKETS PARTNERSHIP
COAL SUBCOMMITTEE MEETING

Methane to Markets

8th Session of the Coal Subcommittee
29–30 April 2008
T Hotel
Cagliari, Sardinia, Italy

MINUTES

Summary

The Coal Subcommittee held its eighth session from 29–30 April 2008, in Cagliari, Sardinia, Italy. The two-day meeting focused on the further development of country-specific strategies for promoting methane emission reduction in the coal sector, as well as potential methods for encouraging Project Network member participation.

Day 1

Opening Remarks and Introduction

Presiding over the meeting were the following:

- Co-Chair Dr. Pamela Franklin, team leader of the Coalbed Methane Outreach Program (CMOP) at the U.S. Environmental Protection Agency (U.S. EPA).
- Co-Chair Mr. Ashok Kumar Singh, managing director of the Central Mine Planning and Design Institute (CMPDI), taking the place of Dr. Subrata Chaudhuri, who retired from this position after the previous Coal Subcommittee meeting.
- Vice Chair Mr. Binchuan Zhang, of the China Coalbed Methane Clearinghouse, standing in for Mr. Huang Shengchu, president of the China Coal Information Institute (CCII).

The meeting commenced at 9:15 a.m. on 29 April. Attendees included Methane to Markets Partner Country delegates, Project Network members, and Administrative Support Group (ASG) staff. A list of delegates and attendees is included as Annex 1.

Dr. Franklin opened the meeting by thanking everyone for attending. She also thanked the attending Italians for being such gracious hosts and for helping to arrange the meeting location. In particular, she expressed her appreciation for the organizational efforts of Mr. Fabrizio Pisanu, head of research and development (R&D) for the Italian mining company, Carbosulcis SpA. She reported that the Methane to Markets Partnership Expo in Beijing was a big success, and that she was looking forward to building on that success.

Mr. Singh said that he felt privileged and honored to be working with Dr. Franklin and Mr. Zhang and was looking forward to working with new Partner Countries Mongolia, Thailand, Pakistan, and The Philippines. He stated that global warming is the biggest challenge that the world is facing today, and that reducing greenhouse gas (GHG) emissions is an important step in solving the problems related to climate change. He believes a good decision was made at the Beijing Expo to develop country-specific strategies

for methane emission reduction. He expressed hope that the deliberations of the Cagliari meeting would fulfill the objective of developing these strategies.

Mr. Zhang thanked Dr. Franklin and Mr. Singh, as well as meeting organizers and attending local officials. He remarked that China has made exciting progress in the coal sector with respect to safety and methane capture and implementation methods.

Dr. Franklin then formally introduced Mr. Fabrizio Pisano, who then introduced Dr. DelRio, the chief of management staff of the Sardinia government. Mr. Pisanu translated Dr. DelRio's comments to English.

Dr. DelRio presented welcoming remarks and proceeded to explain that one of the big efforts of the Italian and Sardinian governments is to support the environment through new energy policies, such as a large pipeline project or a high-powered cable connecting Sardinia to mainland Italy through Corsica. Coal is the main fossil fuel available for Sardinia, so it is important to produce energy with coal in an environmentally friendly way to reduce the GHGs emitted as a result of coal production.

Dr. DelRio stated that Sardinia's government is very interested in reducing GHGs and wants to support social and industrial undertakings that contribute to emission reductions. For example, the government owns part of the Sotacarbo, a company aimed at developing new and advanced clean coal technologies. Sotacarbo's other shareholder is the Ente per le Nuove Tecnologie, l'Engergia a l'Ambiente (National Agency for New Technologies, Energy and the Environment), which is the main energy research institute of Italy. The company is using the best technology available to separate and reduce CO_2 emissions resulting for energy production from coal. Dr. DelRio went on to say that the Ministry of Development has just provided €6 million in funding for research activities in the coalbed areas of Sardinia. Through Sotacarbo, the Sardinian government aims to enrich the infrastructure that supports new industrial and economic initiatives in Sardinia. Dr. DelRio then welcomed everyone and expressed his hope that the day's activities would prove successful.

At Dr. Franklin's suggestion, formal introductions of country delegates, Project Network members, and other attendees followed Dr. DelRio's remarks.

Review and Adoption of Agenda

Following introductions, Dr. Franklin briefly reviewed the meeting agenda.

Dr. Franklin stated that one of the objectives of the Steering Committee in Beijing was for the subcommittees to begin thinking of what barriers, needs, and opportunities exist in each country for methane capture and utilization. She said that a main goal of this meeting was to move forward with that idea in the coal sector, working as a group to assist each country in developing its own strategy. She hoped that by sharing thoughts and observations, countries could draw on experiences from other countries to strengthen or broaden their own strategies. Each country delegation had been asked to come to the meeting to share its initial thoughts about what it thinks would be most effective to help its country move forward. Additionally, the private sector was asked to suggest what it believes is important in terms of moving forward with projects. Dr. Franklin proposed that the more robust strategies resulting from this meeting would then be living documents posted on the Methane to Markets Web site so that they can be viewed by other countries and kept up-to-date.

No one raised any questions or had any comments regarding the meeting agenda, so it was officially adopted. The final adopted agenda is included as Annex 2.

Report from the Administrative Support Group (ASG)

Ms. Erin Birgfeld, ASG Director, presented a brief update from the ASG. She began by providing an overview of the Methane to Markets Partnership's background and organization, and then gave an update on the Partnership's recent growth. As of March 2008, there are 25 Partners and 741 Project Network members. New Partners include The Philippines, Thailand, Mongolia, and Pakistan.

Ms. Birgfeld listed some of the major outcomes of the Steering Committee meeting in Beijing. First of all, she announced that the European Commission had joined the Methane to Markets Partnership and was also welcomed as a member of the Steering Committee. Secondly, the ASG and subcommittees were tasked with developing recommendations for recognizing Project Network contributions and encouraging Project Network member participation.

Ms. Birgfeld stated that the Steering Committee tasked the ASG and Methane to Markets Partnership Expo Task Force with considering whether to hold another Expo in 2009/2010. After various recommendations, the Steering Committee unanimously agreed to hold another Expo. Ms. Birgfeld commented that the ASG is looking for volunteers to serve on the next Expo Task Force. Also, she mentioned that the ASG is still looking for a host country for the Expo and that countries should contact the ASG if they are interested in learning more about potentially hosting the Expo.

Ms. Birgfeld reported that the ASG was additionally tasked with developing a Partnership-wide accomplishments report. She requested that one point person for each country volunteer to provide the ASG with information regarding up-to-date activities in the country with respect to coal mine methane (CMM) projects.

Of particular importance, Mr. Birgfeld noted, were the specific Year 4 charges to the subcommittees. They include:

- Updating action plans (i.e., country-specific strategies) to reflect current issues and activities.
- Continuing outreach efforts to the Project Network.
- Continuing to utilize the Web site, newsletter, and other communication vehicles to promote activities.
- Increasing use of the online tracking system.

Ms. Birgfeld explained that ASG is trying to make the online tracking system on the Methane to Markets Web site more user-friendly, by adding more content for Partners and Project Network members to consult if/when they need information on specific CMM projects. She emphasized the importance of keeping the system updated and encouraged attendees to look at the Web site and contact the ASG if they discovered anything incorrect or missing from the tracking system.

Ms. Birgfeld then briefly provided some information regarding the 2007 Expo. At least eight projects profiled at the Expo are currently moving forward or are in negotiations with potential investors, and the ASG will continue to follow up with all showcased projects to learn how activities are progressing. The ASG will provide a recap at the Steering Committee meeting in late 2008.

Lastly, Ms. Birgfeld listed some upcoming meetings and events, including the next Methane to Markets Coal Subcommittee meeting and Steering Committee meeting, tentatively scheduled for mid-December 2008. She reiterated that the ASG is still looking for a host for this meeting and mentioned that other sector subcommittee meetings would be held in conjunction with the Coal Subcommittee meeting.

After Ms. Birgfeld concluded her remarks, Dr. Franklin opened the floor for questions and reminded attendees that one or two volunteers for the next Expo Task Force would be greatly appreciated. She added that the time commitment would not be overwhelming, consisting mostly of making phone calls or participating in conference calls.

- Mr. Michael Alder, of the Australian Department of Resources, Energy and Tourism, asked if it might be better to have someone like Dr. Franklin or another co-chair to serve as a representative on the Task Force, rather than having one or two Project Network members or delegates represent the subcommittee on the Task Force. He said that in this case, subcommittee members or Project Network members could speak through this representative. He wasn't sure, strategically, how it would work otherwise. Dr. Franklin responded by saying they (the co-chairs) would be happy to do this and that, in fact, this was how it was done in the past. However, she said they wanted everyone to know that if anyone was particularly motivated and had ideas to share regarding the Expo, he or she would be more than welcome to participate as a representative on the Task Force. In other words, the co-chairs would be willing to serve on the Task Force, but anyone else is also welcome to provide insights and be directly involved in the Task Force without necessarily having to go through the co-chairs.

Country-Specific Strategies

Dr. Franklin opened the floor to discuss Documents 1, 2, and 3, which lay the groundwork for country-specific strategies and to provide guidance for the development of these strategies. No questions were raised regarding these documents, and Partner Countries presented their progress towards developing their individual strategies.

United States

Dr. Franklin began her discussion with the United States' domestic strategy for CMM. The strategy is focused on overcoming regulatory and institutional barriers to project development. One of the ways this can be done, she explained, is through technical information exchange. The main U.S. agency is U.S. EPA and its Coalbed Methane Outreach Program (CMOP). CMOP is the entity that does most of the Methane to Markets coal sector work, but U.S. EPA also collaborates with its sister organizations, including the Department of Energy (DOE), the US Trade & Development Agency (USTDA), and the US Agency for International Development (USAID).

Dr. Franklin listed recently conducted U.S. CMM project promotion activities, as well as future activities. Recent activities include:

- A successful conference held in St. Louis, Missouri, USA, in September 2007.
- A technical demonstration project for ventilation air methane (VAM).
- Outreach to the coal mine industry.
- Technical and analytical assistance to an end-use project in the western United States.
- Technical analyses of potential opportunities at abandoned mines and surface mines.

Future activities include:

- Continuing to support the VAM demonstration project.
- Sponsoring a CMM conference in Pittsburgh, Pennsylvania, in October 2008.
- Developing an online financial model to evaluate CMM project opportunities.
- Conducting outreach to sister agencies in the U.S. government in an effort to resolve any bureaucratic issues with project development.
- Increasing outreach efforts to the U.S. coal mine industry.
- Developing a rule for reporting GHG emissions.

Dr. Franklin then continued, discussing the U.S. international strategy to support CMM project development globally. She stated that, while the United States has been involved in international coal mine energy projects since the early 1990s, over the last few years the Methane to Markets Partnership has served as the most effective way to engage Partner Countries in CMM project development efforts. U.S. activities conducted to support the Methane to Markets Partnership include grant solicitation, Expo planning, making the CMM International Database more user-friendly and keeping it up-to-date, updating the CMM global overview country profiles (currently posted on the M2M website), and assisting other countries in developing a robust country-specific strategy. Dr. Franklin asked that attending delegates review their respective country's data and global overview profiles and provide updates or corrections where necessary.

Dr. Franklin described in detail the country-specific objectives and activities that are included in the U.S. international strategy. U.S. goals and objectives for CMM development in other countries range from local project support, including feasibility studies and resource assessment, to capacity building and assistance with legal and regulatory issues. In-depth details regarding specific U.S. activities in China, India, Mexico, Mongolia, Nigeria, Poland, Russia, and Ukraine can be found in Dr. Franklin's presentation on the Methane to Markets Web site.

Dr. Franklin concluded her presentation by once again thanking the Italian hosts, and then opened the floor for questions. No questions were raised.

India

Mr. A.K. Singh began his discussion with a brief overview of India's coal sector. He stated that India is the world's third largest producer of coal with the sixth highest CMM emissions globally, and that the commercial development of CMM is a top priority for the Indian coal industry. Under India's coal bed methane (CBM) policy, formulated by the Indian government in 1997, 26 virgin coal bed methane (VCBM) blocks have been allotted for commercial development to different operators through global bidding.

Mr. Singh pointed out that an increase in coal demand in the last few years has resulted in the allotment of coal blocks within India's CBM blocks, which has caused an overlap in the allotment of coal and CBM blocks. To address this issue, the Ministry of Coal currently is working on a regulatory framework for the harmonious and simultaneous exploitation of CMM and CBM. With this new framework in place, coal mining and CBM activities can take place concurrently and without any safety hazard.

Mr. Singh provided a detailed description of some ongoing activities in India to promote CMM development, including:

- A government-funded demonstration project at the Moonidih and Sudamdih mines.
- Two CMM projects under consideration at the Singrauli and Korba coalfields.
- The establishment of a CMM/CBM clearinghouse in India.

He also listed the major barriers to CMM development in India. These include technical barriers, such as resource assessment and utilization; regulatory barriers; ownership issues of recovered gas and/or carbon credits; and a lack of transportation infrastructure. Mr. Singh recommended five major activities that could help overcome these barriers. They include:

- Learning how best to conduct feasibility studies for potential CMM sites.
- Creating a database for CMM/CBM opportunities.
- Conducting prefeasibility and feasibility studies.
- Preparing data dossiers for potential CMM/CBM project areas.

- Sponsoring intensive hands-on training for running CMM/CBM projects geared toward geologists, mining engineers, and finance personnel.

Government organizations that would be involved in these activities include the Ministry of Coal, the Ministry of Environment and Forest, and the Directorate General of Mines Safety. Involved organizations from the coal industry could include Coal India Ltd, CMPDI, Singareni Collieries Co. Ltd., and Neyveli Lignite Corporation.

After Mr. Singh's presentation, the floor was opened to questions and comments.

- Mr. Gerhard Pirker of GE Energy Jenbacher asked what the government's plan was for utilizing the CBM reserves. He acknowledged that the vast majority may be fed into pipelines, but said that there also seemed to be some opportunity for onsite utilization. As an example, he referred to the energy demand for the mines or for the megacities in areas surrounding the mines. Mr. Singh responded that, yes, the primary objective is to utilize this gas for the power generation. He provided some examples, such as a plan to pipe gas from one of the blocks to a steel plant 20 kilometers away, or Reliance Industries' plan to set up a power station for gas utilization near one of the demonstration projects.
- Mr. Herbert Meiners of DMT GmbH wondered what concentration of methane was expected to be extracted. He also asked about the depth of the boreholes. Mr. Pravat Ranjan Mandal, from India's Ministry of Coal, responded that the gas is almost 96 percent to 98 percent pure methane, and that the boreholes are about 1000 meters deep.
- Ms. Birgfeld read suggestions submitted by Reliance Industries Ltd. (RIL):
    1. U.S. EPA and the Government of India signed the Memorandum of Understanding (MoU) in November 2006 to establish the CMM/CBM clearinghouse in India. The main objectives of the clearinghouse are to bring the required technology and investment to start the project activities in the country. Even after the MoU is in place, it is not set up in India. Expeditious set-up of the clearinghouse is expected to bring momentum to the CMM/CBM activities in the country.
    2. The Coal Subcommittee could consider conducting a workshop and conference on CMM and CBM in India to promote awareness among scientific institutions, universities, coal and oil & gas industry, and policymakers in the government.
    3. U.S. EPA could conduct orientation visits for interested Indian companies/operators and policymakers in the government, regarding the CMM/CBM projects in the United States and other countries. This would help provide firsthand knowledge about the projects, particularly the technical and commercial aspects, through interactions with the CMM and CBM operators and service providers.
        - Mr. Singh agreed with these suggestions. He reiterated that the clearinghouse is expected to be established in the coming months and added that a CMM workshop is being planned for September or October of this year.
- Ms. Birgfeld then presented the following remarks, submitted by ARI, regarding barriers to CMM development in India.
    1. The consensus is that a clear legal and regulatory framework is needed in order to clarify gas rights and ownership issues. Without this, developers will be reluctant to consider a CMM project in India due to the lack of transparency with gas ownership.
        - Mr. Singh replied that gas ownership issues aren't a major problem, and that developers in the coal industry will utilize the gas for their own purposes.
        - Mr. Mandal added that those who pipe or utilize the gas might not be the owners of the coal blocks.

2. The need for training and capacity building is clearly laid out in the strategy, and this is a critical component. However, once there is a clear legal and regulatory framework, developers will enter the market and bring expertise and technology to the CMM sector in India.
3. The demand for energy, whether gas or electricity, is large and growing in India. Pipeline infrastructure might be a constraint to CMM utilization in some cases.
    - Mr. Singh responded that, while pipelines are present in the western part of the country, coal deposits are located in the eastern part, and therefore it will be necessary to establish a pipeline infrastructure for CBM and CMM.

- Ms. Birgfeld then read ARI's recommendations for India's CMM development.

1. Develop a blueprint for CMM commercialization, including short-term, mid-term, and long-term strategies.
2. Establishment of a CMM/CBM clearinghouse in 2008 is vital to data collection, capacity building, information dissemination, and the creation of a central repository for CMM resources.
3. Close coordination between the Ministry of Petroleum and Natural Gas, the Ministry of Coal, Directorate General of Mine Safety, and other agencies is important to facilitate CMM project development.
4. Once the clearinghouse and legal/regulatory framework are in place, feasibility and prefeasibility studies will be necessary and will begin to flow naturally as project developers enter the market.
    - Mr. Mandal explained that the Ministry of Coal already has an understanding with the Ministry of Petroleum and Natural Gas and that they are working together to resolve many CMM/CBM issues.

- Dr. Franklin asked if Mr. Singh could say more about the legal and safety framework in terms of what exactly the framework would be. Would it be addressing the issues of ownership? Also, she wondered what the timeframe would be for developing these regulations. Mr. Singh replied that an important aspect of the framework is for the two overlapping agencies, one for the extraction of gas and one for the extraction of coal, to work together in the allotted CMM/coal blocks.
- Mr. Mandal also stated that attempts were being made by both parties operating in the same area to come to an agreement, and that safety was one of the main issues. He said that discussions are already taking place, and a framework should be finalized within the next few months.

China

Mr. Zhang began his report on China's country-specific strategy by emphasizing the importance that the Chinese government places on CBM/CMM utilization. One reason for this is the concern for safety. Mr. Zhang explained that there has been rapid growth in coal production in China over the last few years, and that gas problems have become a big safety issue, as many coal miners have been killed in gas explosions. Every 5 years, an economic plan is developed in China, and the 11th 5-Year Plan is the first to include CBM in its framework. This is a result of the increasing importance of CMM reduction to the government. Two Central Government organizations dealing with this issue are the National Development and Reform Commission (NDRC) and the State Administration of Work Safety (SAWS). Recently, the Central Government organized a new energy bureau under the NDRC that will deal with specific energy issues relating to CMM development.

Mr. Zhang described the targets for the 11th 5-Year Plan for CMM development, stating that the 2010 national output estimate for CBM/CMM is approximately 10 billion cubic meters (BCM). Half of this

output will consist of CBM to be drained from the surface, with a 100 percent utilization rate, and the other half will be CMM to be drained underground, with a 60 percent utilization rate.

Mr. Zhang provided examples of some of the measures that the Central Government has taken in order to encourage CMM development. Among these were economic incentives, such as tax exemptions or government subsidies for gas drainage or utilization, for coal companies or developers. Other CMM-promoting activities currently underway in China include CMM drainage demonstration projects, technical research support, and infrastructure support and development.

Mr. Zhang provided many CMM-related statistics for China for 2007, most of which can be found in China's country-specific strategy, posted on the Methane to Markets Web site. He concluded by remarking that China would like to organize a CMM/CBM workshop in July 2008 in Guizhou Province.

The floor was opened for questions or comments.

- Dr. Ming Yang of the International Energy Agency (IEA) wondered why the gas use values in Table 3 of the 11th 5-Year Strategy for CMM development were so much lower than the drainage amounts. Mr. Zhang replied that not all of the drained methane can actually be used because of technological limitations.
- Clark Talkington of the United Nations Economic Commission for Europe (UNECE) mentioned that there is a regulation by China's State Environmental Protection Administration (SEPA) that requires any drained methane at concentrations at or above 30 percent to be utilized or flared. He understood the law to apply to both coal mines and landfill gas. He added that he thought the law is supposed to go into effect 1 July 2008 for new installments or expansions and 1 January 2010 for all mines. Ms. Liu Xin of the China Coalbed Methane Clearinghouse said that she had just heard about these regulations but had not seen anything in writing.
- Mr. Talkington also expressed his concern that if there is such a regulation, it is very important to include it in China's strategy. From the perspective of the UNECE, he found it interesting that the cutoff was at 30 percent and wondered if such a law would drive mines to lower the concentrations of the methane but still emit the same amount in the end. Ms. Liu Xin replied that the government would like to encourage coal companies to utilize CMM instead of emitting it, but it is difficult for coal mines to use CMM at concentrations less than 30 percent, so that is probably why they've set this as the limit.
- Lastly, Mr. Talkington remarked that this would also move methane concentrations closer to explosive levels, which brings up safety issues. Mr. Pirker wondered who, in the end, is in charge of deciding these types of regulations. No one had an answer for this question. Concerning safety issues for methane concentrations below 30 percent, Mr. Mandal explained that the most explosive methane concentrations are between 4.5 percent and 15 percent, and that concentrations greater than 15 percent are not explosive.
- Mr. Raymond Pilcher of Raven Ridge Resources, Inc. posed two questions. First, he commented that he was aware of nine demonstration projects that use methane with concentrations between 12 percent and 15 percent, and that there is a draft rule to change the utilization of that gas. He wondered if SAWS had made any decisions regarding that. Secondly, he said he understood that up to 80 percent of the gas drainage in China is below the 30 percent concentration, and he wanted some input regarding this.
    - Mr. Zhang stated that Chinese experts still have serious safety problems with transporting methane at concentrations less than 15 percent, but that supposedly Chinese government officials and experts have approved these types of technology. He added that another consideration is the possibility of adding

lower concentrations of methane to the line instead of emitting it, thus reducing the overall emissions of low-quality methane.

- Dr. Yang said that there are instances where methane concentrations of 8 percent are piped from coal mines, citing the Shuicheng Coal Mine in Guizhou Province as an example. The power generation there has been in operation for more than a year without incident, using revolutionary technology developed in China that involves mixing water vapor with the gas.
- Mr. Pirker disagreed with Dr. Yang, stating that a year of operation without incident is not proof that the operation is safe. He wanted people to understand that this technology is probably not safe and should not be an option at the present time.

More technical discussion followed about optimal methane concentrations for efficient and safe CMM/CBM utilization.

Australia

Mr. Alder presented an update on CMM-related activities in Australia, beginning with a general update on Australian policies concerning climate change and CMM. He stated that a new Australian government was elected in November of 2007, and that three new governmental departments were formed: 1) the Department of Climate Change, 2) the Department of Resources, Energy and Tourism, and 3) the Department of the Environment, Water, Heritage and the Arts. In December 2007, Australia ratified the Kyoto Protocol. New government initiatives include reducing GHG emissions by 60 percent by 2050, implementing a national emissions trading scheme (ETS) by 2010, increasing renewable energy use to 20 percent of the nation's energy consumption by 2020, and investing in R&D on low emission technologies. Mr. Alder described complementary measures being taken as well, including funding the Clean Coal Initiative, developing a regulatory framework for carbon capture and storage, and supporting a Renewable Energy Fund and an Energy Innovation Fund.

Mr. Alder briefly described the GHG Abatement Program, which is providing funding for four projects that convert and utilize CMM. One of these projects operates a 6-megawatt (MW) generator and is the only coal mine in the world to utilize VAM. Additionally, more project contracts are currently being finalized under the Australian Coal Mine Methane Reduction Program, which is expected to reduce emissions by 4.5 billion tonnes from 2004 to 2012.

Mr. Alder stated that the ETS will be the primary mechanism by which Australia will achieve its GHG emission reduction targets. The ETS will be a cap and trade scheme, and it will begin in 2010. Utilization is the key, as opposed to simple abatement programs, because project development might not be worthwhile without carbon credits. He said the short- and medium-term reduction targets have yet to be established, and some issues, such as agriculturally derived methane, are still being worked through.

Mr. Alder then shared his thoughts regarding a country-specific strategy for Australia. He said that Australia already has considerable policy and technical expertise on CMM issues, and that there is no real need for a specific Australian CMM strategy. In general, however, the ASG strategy development process is a useful tool that can be utilized to identify CMM reduction objectives as well as current CMM capacities and barriers in a given country. He suggested that the process be flexible rather than prescriptive, and he proposed making a list of company or government organization contacts that would have specific expertise in areas that would benefit the development of CMM projects in any of the Partner Countries.

- Mr. Marc Stuart, of EcoSecurities Group, asked how long the ETS could be expected to run. Mr. Alder replied that the target is 2050, so the ETS is set to run up to that point, and interim

projection targets are currently under consideration. He expected, at least, that a target would be set for 2020.

- Mr. Stuart also questioned the extent of source coverage within the ETS, specifically with respect to CMM. Mr. Alder explained that he couldn't say definitively whether CMM would be covered, considering that the design of the system is still being prepared. However, he expected that CMM would likely be included.
- Lastly, Mr. Stuart asked if there would be any international access to Australia's credits. Mr. Alder stated that those developing the ETS are keeping in close contact with what's happening at the international level, but that this is still one of those design features that is being worked through.
- Dr. Franklin commented that, in the past, Australia has been keen to engage in project development in China. She wondered if this would continue to be a focus, either within the private sector or in government agencies. Mr. Alder replied that the government is currently more focused on the ETS than on Methane to Markets, but that Australia still has a variety of initiatives with China, and that at some level there will still be an ongoing effort to work with China to reduce CMM.

European Commission

Mr. Kai Tullius of the European Commission (EC) presented a brief introduction about the plans being made regarding CMM development. He stated that a country-specific strategy doesn't apply to the European Union (EU), but that there are steps the EC could take to help countries with project development. These activities include co-financing projects in other countries, along with workshops or conferences. Mr. Tullius reported that a call for proposals on a European level was recently opened for CMM projects, and that the EC is trying to set aside a project budget. The EC's geographical focus is limited to existing programs, particularly in Eastern Europe, although they would also be open to countries like India or China, depending on the funds available for specific projects.

- Dr. Franklin asked if the recent proposal opened for CMM projects could be published on the Methane to Markets Web site. Mr. Tullius explained that it is an official European procedure and can only be published on the EC's Web site. However, he didn't think there would be a problem with Methane to Markets posting a link to the publication.

Italy

Mr. Pisanu reported on CBM-related activities in the Sulcis area of Sardinia. He described some of the R&D activities happening at Carbosulcis S.p.A., the only active coal mine in Italy. Feasibility studies for VAM, AMM, and CMM in underground mines are among these activities. Additionally, carbon capture and storage (CCS) and enhanced coalbed methane (ECBM) applications are under consideration for non-minable areas of the Sulcis basin. Statistics regarding these activities can be found in Mr. Pisanu's presentation, posted on the Methane to Markets Web site.

Mr. Pisanu listed the partners with which Carbosulcis is working for ECBM/CCS project development. All partners are research institutions located in Europe with expertise in a variety of areas, such as soil and gas analysis, hydrology, reservoir characterization, and seismic data acquisition. Mr. Pisanu concluded by stating that this research will be underway in the next month.

- Mr. Talkington wondered if the abandoned sections of the mine were completely sealed. Mr. Pisanu replied that part of the mine's main galleries run next to the abandoned mine, so it is not completely sealed.
- Mr. Singh questioned whether there was a problem with the spontaneous combustion of certain concentrations of drainage methane in the mines. He also asked what the methane concentration would be in the sealed off areas. Mr. Francesco Melis, of Carbosulcis, stated that the possibility

of spontaneous combustion will be one of the things to look at in its research, as the company has not yet studied this problem. He added that the methane concentrations in the sealed off areas are generally quite low. He emphasized, however, that the company is still conducting studies and that experts are needed to help with these issues.

Mexico

Mr. Torres Flores Ramon Carlos of Mexico's Ministry of Environment and Natural Resources (SEMARNAT) explained that Mexico is not an important producer of coal, but that the potential for methane capture is a high priority. He presented Mexico's approach to encourage CMM project development, beginning with a basic list of national-level initiatives. These initiatives include a National Development Plan to promote environmental sustainability and an energy program to promote CMM recovery. Additional initiatives include an Environment and Natural Resources Program to enhance GHG reduction and a National Strategy on Climate Change to support research and identify measures for climate change mitigation.

Mr. Torres gave a brief overview of Mexico's coal sector, including some facts about its regulatory framework. He stated that concessions for mine exploitation are granted to private companies, and that private companies cannot conduct CBM recovery activities unless special drilling is done under oil concessions granted by PEMEX, Mexico's state oil monopoly. This regulatory framework is not suitable for CMM/CBM project development and is one of four main barriers to CMM/CBM development in Mexico. Limited information about coal mine reserves and methane gas, a lack of financial incentives, and the fact that private entities can be denied the required permit to exploit gas from a coal mine are the three other barriers Mr. Torres described.

- Dr. Franklin wondered how long it might take to develop suitable regulations for CMM project development. Mr. Carlos replied that discussions of the energy reforms for the whole sector have already started, and that technical discussions about specific standards have advanced, but are not yet complete.

Russia

Mr. Litvak began his update noting that he was a representative of the Siberian Coal Energy Company (SUEK), Russia's largest coal producer and exporter, and noted that he is not the official delegate from Russia on the M2M Subcommittee. He stated that SUEK intends to increase its coal production based on Russian government policies, which call for an increase in coal's share of total energy production. He said that the company aims to move to cleaner coal technologies.

Mr. Litvak then presented a brief update on Russia's regulatory framework. First of all, he reported that Law 250, an amendment to an electricity law, had been passed. This law provides for the stability of special tariffs, fiscal incentives for investment, and renewable energy obligations. He considered it a very significant step forward on the legal and regulatory front, stressing that CMM is included in the list of renewable and alternative energy sources considered in the law. However, various sub-laws within the framework are still awaiting approval and government resolution. Mr. Litvak pointed out that there is a program within the IEA designed to assess development and provide support for renewable energy efforts in Russia, and he suggested that this group focus on working with Russian intergovernmental groups and colleagues to address the issues of this new legal framework.

Mr. Litvak stated that the Russian government had passed a number of resolutions on the Kyoto Protocol, and explained that three of eight submitted renewable energy projects were natural gas leakage projects. He noted, however, that the additionality of these projects was questionable in terms of emission trading. He added that Russia was working with The World Bank to study options for a green investment scheme, and that he believes every reduction unit will eventually find its place in the market.

Ukraine

Mr. Borys Gryadushchyy of the Donetsk Research Institute of Coal Mining presented some general information about the Kyoto Protocol and some of the effects it has had on the countries that have ratified it. He also presented various hypotheses for the causes of global warming and pointed out the significance of emission reduction for the well-being of our planet. On the subject of coal mines, he emphasized the importance of coal mine safety and clean technology developments. Ukraine submitted a draft country strategy summary prior to the Subcommittee meeting.

Mr. Gryadushchyy expressed his thanks to the ASG for requesting updates for the Global Overview chapters and International CMM Database, and he said he would review the Ukraine profile and data set.

Poland and Nigeria

Dr. Franklin conveyed the apologies of delegates from Nigeria and Poland, two Partner Countries that were not represented at the meeting. She briefly summarized a strategy submitted by Mr. Jacek Skiba from the Central Mining Institute of Katowice, Poland. Then she presented a brief overview of Nigeria's draft strategy. These two documents are attached as Annex 3.

Project Network Member Presentations/Input

United Nations Economic Commission for Europe (UNECE)

Mr. Talkington gave a report from the UNECE, beginning with a brief description of the organization. He explained that UNECE's Sustainable Energy Division hosts an Ad Hoc Group of Experts on Coal Mine Methane that meets annually. The issue of coal has always been an important concern. The UNECE is not a project-oriented institution, but instead is focused on capacity building, technical assistance, and bringing people together for dialogue. He stated that the next meeting would be in Geneva in October 2008, and he encouraged participation from the Coal Subcommittee.

Mr. Talkington described a number of projects in which the UNECE is involved, including workshops and financial projects. Additionally, the UNECE has involved the insurance industry because of safety concerns with CMM drainage. It is also working with a law firm to get suggestions for legal and regulatory solutions in developing countries/economies in transition. Another task the UNECE has taken on is developing a glossary of common terminology for the coal sector. This glossary has gone out for public comment and will be posted soon on its Web site. He noted that it will be a living document that can be updated as needed.

- Dr. Franklin wondered if the glossary included a definition for "gassy mine." Mr. Talkington replied that it did not, probably because each country might have their own threshold for what is considered "gassy," and each country has their own specific regulatory framework.

International Energy Agency (IEA)

Dr. Yang of the IEA presented some coal statistics for China for the years 2007 and 2008, pointing out that there has been an 8 percent increase in CMM and suggesting that the released CMM will be stabilized due to CMM activities. He described some aspects of Chinese policy supporting CMM development that were previously mentioned by Mr. Zhang. He explained that CMM project financing in China is not really a big challenge, because the coal sector is now a very attractive investment for commercial banks.

Dr. Yang reviewed the Chinese CMM technologies, including the transmission of gas with 8 percent methane concentrations. He conceded that most of the audience thought this to be dangerous because it is within the explosive range of methane, but that he thought it was safe. He also stressed that VAM use technologies and degasification technologies for coal seams were severely lacking in China.

Dr. Yang described IEA's strategies and activities in China, as well as in Russia, and explained that IEA will help with policy dialogue, technology transfer, and project financing. He reported that an IEA workshop in China is being planned for March 2009.

- Mr. Singh and Mr. Mandal had a number of questions regarding some of the statistics in Mr. Yang's slides. After discussion, Dr. Yang made the following points:
  - Most emissions come from small-scale, private coal mines, where CMM cannot really be utilized. This is because, even though the coal mines might have money, the CMM knowledge isn't always there.
  - These mines are in remote areas, far away from other cities, making it very difficult and dangerous for developers to get to the mines. Therefore, many experts are not willing to work at these mines.
  - For some of the mines, the coal seam height may only be half a meter, and technology just isn't viable for this small scale.
- Mr. Pilcher commented that it would be really helpful to get more specific data, such as how much methane is emitted from small mines, how much is emitted from large mines, and the distributions of drainage gas concentrations. If the Partnership really wants successful outreach, he stressed that it needs to work hard to develop a statistical database and determine where the most dangerous areas are with respect to these small mines. The Partnership also needs to figure out how to get simple and easy-to-use technology to these mines to give the owners some kind of economic incentive.

MEGTEC

Mr. Richard Mattus presented a technology application update on energy produced from coal mine ventilation air methane (VAM). He reported that WestVAMP, a VAM project in Australia has been operating successfully for over one year. The combination of ventilation air and drainage gas has a methane concentration of only 0.9 percent, but it effectively generates the steam that drives a 6 MW power plant turbine. This is one of three VAM VOCSIDIZER system concepts, the other concepts being VAM mitigation only and VAM to thermal energy.

Mr. Mattus next described a VAM project at an abandoned coal mine being operated by CONSOL Energy in the United States. This project is simulating various concentrations of VAM. He said this is purely a demonstration project, and the intention is to eventually move to project to an operating mine.

Mr. Mattus concluded by saying that MEGTEC is now prepared to roll out VAM application installations on a broad basis, and that in most cases, they will be abatement (i.e., mitigation only) projects or VAM to thermal energy projects. Production is planned to start in China within a year, but there are also prospects in Australia, Europe, and the Americas. Information regarding the progress of these projects will be released via the Methane to Markets Partnership.

- James Marshall of Raven Ridge Resources, Inc. asked if the CONSOL project will still be an abatement project when moved to an operating mine. Mr. Mattus said that was likely to remain an abatement project.
- Mr. Singh wondered what the minimum methane concentration was to keep the project going, and Mr. Mattus replied that the ventilation gas needs to be at least 0.2 percent methane.
- Mr. Zhang asked how much energy must be consumed to operate the power plant, and Mr. Mattus answered that about 300 to 350 kilowatts were used for every 125,000 cubic meters of VAM.

Project Network Involvement

One of the key goals of this meeting was to get feedback from Partner Countries and Project Network members regarding ways to improve private sector involvement in the Methane to Markets Partnership. The ASG created a white paper in order to provide options for encouraging Project Network participation in Partnership activities and to acknowledge contributions from the Project Network. The white paper is included as Annex 4.

Overview of ASG White Paper
To start, Ms. Birgfeld listed three options for the enhancement of Project Network member participation:

- Issuing meeting invitations from Partner Countries
- Increasing the appeal of Subcommittee meetings to Project Network members
- Acknowledging Project Network attendance at Subcommittee meetings

Secondly, Ms. Birgfeld suggested three potential ways to recognize Project Network contributions to the Partnership through a formal award:

- Recognizing Project Network members
- Recognizing project achievements
- Recognizing specific technologies

Lastly, Ms. Birgfeld proposed the following three approaches to informally acknowledge Project Network involvement:

- Enhancing the Project Network section on the Methane to Markets Web site
- Developing case studies to feature Project Network members
- Highlighting Project Network contributions at the 2009 Partnership Expo

Discussion

- Mr. Talkington commented that the U.N. faces similar issues when trying to balance government concerns and involving the private sector. His understanding was that awards were more American-oriented, and that they aren't looked upon favorably by European-based sectors.
- Mr. Alder agreed, saying that choosing winners can create division, and that members of the private sector are more likely to be attracted to technology information exchange, demonstration projects, and learning lessons from other participants' projects. Informal acknowledgement, he thought, would be the best way to go.
- Mr. Pirker also concurred, noting that non-Americans might find awards to be peculiar. The main goal of Methane to Markets in terms of the Project Network is to provide a communication platform for information exchange among governments, developers, equipment suppliers, and the like.
- Mr. Marshall pointed out that there are already plenty of venues, such as conferences and workshops, for technology exchange. Policy issues, on the other hand, fail to get recognized. He highlighted the need to communicate commonalities between countries; for instance, how barriers that one country overcomes might be applicable for Project Network members of another country.
- Ms. Birgfeld agreed, stating that these were good reasons for having a meeting that offers more than just the discussion of administrative issues. She suggested co-locating meetings with technical workshops or other key events.

After closing remarks, the meeting was adjourned for the day, with the intention of continuing this discussion the next day.

Day 2

After opening remarks from Dr. Franklin, updates on emerging carbon markets in the United States and globally were presented. A representative of the Italian Ministry of Economic Development also talked about Italy's zero emission strategy. Dr. Franklin then presented a summary of the key points discussed over the course of the meeting.

Carbon Market Presentations and Discussion

Update on the United States and Global Carbon Market from Carbon Trader Perspective

Mr. Stuart presented the current status and trends of the Emissions Trading Market. He described the Clean Development Mechanism (CDM) as a radical experiment to link developed and developing countries in terms of capital and technology. It is supposed to support both global emission reductions as well as sustainable development, but after 5 years, Mr. Stuart reported, signs are mixed. He said he felt that the market is only partially living up its potential.

After describing some emission policy basics, Mr. Stuart highlighted the positive and negative aspects of the CDM. He explained that, while more than 1,000 projects are registered and more than 3,000 additional projects in the process, the system is overly complicated, and it is becoming too difficult for small projects to gain access. It can now take up to a year for projects to get registered, and such an enormous throughput was never anticipated. On a positive note, Mr. Stuart said it is estimated that from 2008 to 2012 these projects will reduce 2.5 billion tonnes of GHG emissions in developing countries. However, the rapidly approaching deadline for the Kyoto Protocol framework has decreased the incentive for investment in the next set of projects.

Mr. Stuart then gave a brief overview of EcoSecurities Group, and explained the variability in price of EU allowances (EUAs) and voluntary emission reductions (VERs). He also explained negative interpretations of the CDM and provided his responses to these ideas.

Mr. Stuart shared his thoughts regarding emission reduction opportunities in CMM. He stated that without credits, he believed there is very little incentive for utilizing or even destroying emitted methane, but that credits create a financial incentive to do so. He expected VAM to be a major market in the CMM market for carbon credits.

Mr. Stuart reported that there are currently eight registered CMM CDM projects, one under review, and 54 in the validation process. Most of these projects are located in China. He described three cases for CMM utilization: 1) thermal energy, 2) electricity generation, and 3) injection to the natural gas grid. He explained that while the coal mine sector is just gaining momentum, it is possible that after 2012 the CDM market for CMM projects will have diminished significantly or disappeared altogether. While the voluntary market could possibly fill the gap, this is probably not likely because coal mining is a tough sell in a market focused on projects that tell a story.

Mr. Stuart concluded by emphasizing the need for longer term commitments to policy and a simplification of the process. Then the floor was opened for questions and comments.

- Mr. Litvak was curious about the current status and progress of U.S. legislation regarding carbon trading markets. Mr. Stuart responded that we need to wait for a new administration, and then at least a year.

- Mr. Talkington remarked that government agencies tend to have incredible resilience and wondered if the dwindling Kyoto timeframe was really such a big issue. Mr. Stuart agreed about the resilience of government agencies but clarified that the problems resulting from the short Kyoto time commitment had nothing to do with the U.N. and everything to do with demand.

Voluntary Emission Reduction Market

Mr. Pilcher (Raven Ridge Resources) presented an overview on CMM project development in the US voluntary carbon market from the project developer perspective. He began by noting the relatively small overall number of U.S. CMM projects. He conceded that there are a few large projects, but he said, in general, a coal mine is not as concerned with developing a gas or power generation project as it is with mining coal.

Mr. Pilcher described the key issues in a GHG project accounting system, as well as some proposed U.S. legislation relating to GHG emission caps for the years 2010 through 2050. He also pointed out that CMM offset projects are few and far between in the United States, partly because the validation process can be very difficult. He explained what can give an offset credit value, stressing the importance of additionality.

To conclude, Mr. Pilcher emphasized that a CMM project should be evaluated based on income generated from the sale electricity, gas, or other products. Additionally, even though the voluntary market could add value to a project, the verified emission reductions (VER's) value can vary greatly. For instance, new legislation can change its value, so it is very important to hold fast to very strict practice standards in order to keep its value consistent.

- Mr. Stuart asked what those strict standards would consist of. Mr. Pilcher responded that there isn't a specific standard in which everyone believes just yet. He explained that there are some issues with the technical side of CMM projects, and that what needs to be done at a higher level is to make sure there is no uncertainty regarding when the extracted gas actually becomes a credit.
- Mr. Talkington commented that a big challenge at the U.N. is that the coal companies are doing really well and making so much money that the potential revenue generated by CMM projects isn't substantial enough to garner the U.N.'s attention. He wondered how the regulators and validators view this situation. Mr. Pilcher replied that he couldn't speak for the regulators, but that for the validators, the main issue is additionality—whether methane capture and/or use is above and beyond business as usual. For a coal mine, the rates of return would have to be huge to make the project worthwhile.

Report from GE Energy Jenbacher

Mr. Pirker of GE Energy Jenbacher provided an update on business activities relating to CMM utilization in gas engines. He reported that the company's worldwide installations currently total about 360 MW and are mostly located in Australia, Germany, China, and the United Kingdom. He briefly touched on policy and spoke of some technical aspects of CMM utilization. He stressed the importance of having strict safety regulations for coal mines, stating that from his perspective, enforcement can still be greatly improved.

Report from the Italian Ministry of Economic Development

Dr. Eng. Marcello Capra of the Directorate-General for Energy & Mineral Resources Ministry of Productive Activities presented an Italian perspective on a zero emissions strategy. He began by briefly describing Italy's energy demand and production. Energy from oil and natural gas make up the bulk of the demand as well as the production. Oil's share of total energy production is expected to

decrease to nearly zero in the next decade, while natural gas production is expected to reach 60 percent of the country's total energy production. Coal production, on the other hand, is not expected to change much in the next 20 years. Dr. Capra reported that in 2003, peak demand was greater than the power capacity, and this resulted in two major blackouts. He indicated that Italy could face similar problems in the coming decades. Additionally, he stated that in 2004, GHG emissions were 12 percent above the 1990 level, even though Italy committed to a 6.5 percent reduction from the 1990 level by 2008-2012 under the Kyoto Protocol.

Dr. Capra listed activities—such as increasing energy efficiency and diversifying energy sources, suppliers, and infrastructures—that should be done in the short term and long term to overcome these issues. He also explained some GHG emission reduction legislation currently being proposed, such as the ETS Directive for the post-2012 period, the Renewable Energy Directive, and the Carbon Capture and Sequestration (CCS) Directive on the geological storage of CO_2.

Dr. Capra examined new issues for coal in Italy, including the prospect of the ETS and a National Allocation Plan at the EU level. He explained that coal receives strong opposition at local levels and stressed the importance of developing a new technology roadmap for coal combustion and zero emissions. He also emphasized the need to involve stakeholders in the development of a long-term strategy for zero emissions.

Dr. Capra highlighted the major players in energy R&D, including national and international programs, as well as project supporters and government organizations. He then presented an overview of CO_2 underground storage and its application to zero emission goals in Italy. He concluded by summarizing the Sardinian coal initiative, which involves enhancing CBM testing in the Sulcis area, further R&D of clean coal technologies (CCTs), and a 600-MW power generation project to be launched soon.

Closing Remarks from Dr. Roberto Pilu

Dr. Roberto Pilu, President of the District Council of Cagliari, gave closing remarks. He thanked everyone and stated that this meeting was very relevant in terms of the current economic and energy issues facing Italy and the rest of the world. He expresses his appreciation and support for the attempts being made to reduce GHG emissions worldwide.

Wrap-Up and Summary

After thanking Dr. Pilu, Dr. Franklin presented some key take-home points for the meeting. First, she listed the next steps for country-specific strategy development:

- Encouraging the remaining countries to develop strategies and send them to the ASG.
- Updating strategies already drafted by addressing issues discussed during the meeting.
  - Upon being asked if a consistent format for these strategies was desirable, general consensus was that the formats should be flexible and needn't be consistent between countries.
- Aiming to have revised strategies available on the Web site by the end of June.

Dr. Franklin then stated the recommendations of the group for enhancing Project Network participation:

- Improving subcommittee meetings by co-locating meetings with technical workshops or other key events and setting aside time for focused discussion and presentations from the Project Network.
- Formal awards for Project Network members or projects were not recommended.

- Recognition of successful projects was suggested, through case studies online, in outreach materials, and at meetings.

Dr. Franklin closed by reviewing general steps that still need to be taken:

- Identifying representatives to participate in the Expo Task Force, as well as a coordinator for a Partnership-wide report.
- Developing ideas for future subcommittee meetings.
- Revising the Project Network list on the Web to be more user-friendly.
- Requesting updated information for the Global Overview country profiles and the International CMM Database.

[Include the final ppt with agreed upon next steps in the Annex]

After brief closing remarks from the co-chairs and vice chair, the meeting was adjourned on 30 April.

30 April 2008 - Afternoon

Site visit hosted by Carbosulcis SpA

Carbosulcis S.p.A. is a company owned by the Autonomous Government of Sardinia. Carbosulcis holds the coal mining concession for the "Mineria Monte Sinni" and manages the concession for coal mining in the only active Italian coal mine.

The site visit included a visit to the Italian Center of Coal Culture in Carbonia. This included an underground tour of the Serbariu mine which operated from the 1930s until the 1960s and a tour of the "sala argani" (winch room) used to control the transport of miners and coal through the descent and ascent of cages in the shafts. The center includes an exhibit about th4e history of coal, the Serbariu mine, and the town of Carbonia. It also showcases the evolution in coal mine technologies. The mayor of Carbonia greeted and spoke with the delegation of visitors.

The site visit also included a stop at the Carbosulcis coal mine in Nuraxi Figus, including a bus tour of the surface facilities and a refreshment break at the mine headquarters.


SG
Co-Chair
Co-Chair