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**POTENTIAL FOR ECONOMIES IN TRANSITION
TO LEVERAGE KYOTO FLEXIBLE MECHANISMS:
GENERAL CONSIDERATIONS FOR COAL MINE METHANE**

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I. INTRODUCTION

1. As the paper ENERGY/GE.1/2003/4 (Introduction to the Global Coal Mine Methane Industry) discussed, many of the economies in transition are also significant emitters of coal mine methane (CMM.) Russia, Ukraine, Poland, Romania and the Czech Republic are particularly large sources of methane. In these countries and possibly also in Hungary, Bulgaria and Croatia, there is potential for CMM projects to provide multiple benefits. These nations' coal industries may benefit from the additional revenue streams CMM may bring, and from the enhanced coal productivity due to improved gas drainage efficiencies. Significant socio-economic benefits may come to these mining regions from improved mine safety, improved regional air quality, and jobs created by CMM projects. Nations and companies that have limits on their greenhouse gas (GHG) emissions may benefit from the low cost, high quality emission reductions accruing from CMM projects in Eastern Europe, and the global environment would benefit as well.

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2. This paper serves as a starting point for an investigation into the ways that Eastern European “economies in transition” may benefit from developing their CMM resources, with particular attention paid to the role that the Kyoto Protocol “flexible mechanisms” may play in encouraging investments. The paper also considers several of the key issues that need to be addressed for the Kyoto Mechanisms to encourage development of the CMM industries in the economies in transition, and possible approaches that may be undertaken, concluding with recommendations for roles that the UNECE Committee on Sustainable Energy may take to explore opportunities for the coal sector in transition economies (and elsewhere) to use the flexible mechanisms to realize the benefits accruing from CMM projects.

II. THE KYOTO FLEXIBLE MECHANISMS

3. It is important to understand the basis of the Kyoto flexible mechanisms in order to consider how they may impact CMM projects in transition economies. The Kyoto Protocol was negotiated in Kyoto, Japan in 1997 under the United Nations Framework Convention on Climate Change (UNFCCC). In simplified terms, the Kyoto Protocol sets binding limits on countries listed in its Annex B (essentially developed nations including the transition economies) to meet differentiated reduction targets for their emissions of a ‘basket’ of GHGs. Each Annex B country is allocated a certain emission reduction target. Countries may meet their targets by reducing domestic emissions, or they may trade the rights to emission reductions with other developed or developing nations. This provision is called the “flexible mechanisms”, under which a CMM project may contribute.

4. Of interest for potential buyers or sellers of CMM emission reductions in Eastern Europe are “Emission Reduction Units” (ERUs) undertaken through what is called “Joint Implementation” (JI). One ERU is the equivalent of one tonne of carbon dioxide (CO₂) emissions reduction. JI is the Kyoto Mechanism to implement projects between developed countries i.e. Annex B countries only. JI projects require approval of both the buyer’s and the seller’s governments and must clearly lead to additional reductions beyond “business as usual.” There are a host of intricacies regarding the use and acceptance of ERUs that are not the focus of this paper, but the basic idea is that a company or government in a country needing to meet its emission reduction targets might receive credit for an approved project that reduces GHG emissions in another country with emission targets (UNFCCC, 2002).

5. Because methane is approximately 21 times more potent than carbon dioxide as a greenhouse gas¹, and because a gassy coal mine emits very large quantities of methane, a single CMM project may produce a large number of ERUs. For instance, a project in Russia’s Kuzbass Basin that would introduce advanced in-mine methane drainage, then transport that methane to a coal-fired boiler and convert the boiler to co-fire this methane may cost approximately €1,500,000 and produce over 560,000 ERUs over ten years (EPA, 1997).

III. THE MARKET FOR CMM EMISSION REDUCTION UNITS IN THE TRANSITION ECONOMIES

6. Under the Kyoto Protocol industrialized countries have taken on emission reduction targets averaging approximately a 5% reduction on 1990 emissions. While most emission reductions are expected to be obtained from domestic activity, the Kyoto Protocol provides for

the transfer of credit between countries. Eastern European countries, including the Commonwealth of Independent States (CIS), may be potential net exporters of credits as their emissions are generally expected to be below their targets, and because there are many low cost opportunities for emission reduction projects.

(a) Greenhouse Gas Credit Demand

7. While demand for GHG credits may originate from any country with limits on its emissions, many of the European Union (EU) member countries are likely to look for credits from Eastern Europe. The EU has agreed to reduce its emissions to 8% below 1990 levels. Other countries, such as Japan, have similar targets. For the EU, an 8% reduction is 336 million tonnes of CO₂ equivalent (CO₂e). While the EU has reduced its emissions since 1990, the latest projections from the European Environment Agency (EEA) indicate that policies in place will only reduce emissions by 4.7% by 2010, leaving a gap of 139 MtCO₂e (EEA, 2003.)

8. Current trading in GHG credits gives a rough indicator of the potential revenue that emission reductions may provide if sold. An expert poll taken in early 2003 indicated that 2008 vintage CO₂e credits were trading at between €2.0 and €15.0/tCO₂e, with an average price of €8.0. Considering the anticipated EU demand, this means the ceiling aggregate value from EU countries on CO₂e credits may be €1.1 billion/year (Point Carbon, 2003.)

(b) Supply of CMM Emission Reductions in Eastern Europe/CIS

9. As shown in Table 1, by 2010, emissions of CMM from transition economies including the European part of the CIS are projected to total 82 MtCO₂e (EPA, 2001.) Marginal abatement cost analyses performed by the US Environmental Protection Agency (US EPA) indicate that a significant quantity (9.3 MtCO₂e) of these emissions may be profitable without emission reduction credits, and at a rate less than €8/t CO₂e, the majority (51.9 MtCO₂e) could be profitably developed (US EPA, 2003.) That equals 37% of the estimated 139 MtCO₂e EU emissions target gap.

(c) European Emissions Markets

10. It is reasonable to expect that Western European nations will be natural purchasers of ERUs sourced in transition economies. A number of Eastern European countries have or are likely to join the EU.² Western European nations are the largest foreign direct investors in Eastern Europe, and thus have business experience and interests in the region. Western European nations are actively investing in projects that reduce emissions in transition economies, through a number of different private, public and multi-lateral approaches³ (Mendis et al. 2002). The European Commission has also proposed that the recently enacted EU's emissions trading scheme (ETS) be linked to JI. However, there may be a quantitative limit imposed on the quantity of ERUs that may be deployed to satisfy emission targets.⁴

Table 1

Country	2010 Emissions (MtCO ₂ e) ^a	2010 Reductions <\$0/t CO ₂ e (MtCO ₂ e)	2010 Reductions <\$8.19/t (< €7.51/t) (MtCO ₂ e) ^b
Bulgaria	1.2		
Croatia	0.2		
Czech Republic	3.8		
Hungary	2.2		
Poland	13.4		
Romania	6.5		
Eastern Europe (minus CIS)	27.3	9.3	20.0
Russia	30.5		
Ukraine	24.1		
European CIS Total	54.6	0	31.9
Eastern Europe/CIS Total	81.9	9.3	51.9

^a Source: EPA. 2001. *Non-CO₂ Greenhouse Gas Emissions from Developed Countries: 1990-2010*. September, 2001.

^b Source: EPA. 2003. *International Analysis of Methane and Nitrous Oxide Abatement Opportunities: Report to Energy Modeling Forum, Working Group 21*. June, 2003. Assumes a project discount rate of 10% and a tax rate of 40%.

IV. IMPLICATIONS OF DEPLOYING KYOTO MECHANISMS FOR EASTERN EUROPEAN CMM PROJECTS

11. While Western European nations and energy companies may benefit from the significant quantity of low cost ERUs available in Eastern Europe, the potential benefits to transitional economies – their governments, energy industries, environments and societies – are wide reaching. A study of the potential in the Kuzbass Basin in western Siberia indicated that an aggressive programme to develop coal mine methane projects could result in greater than \$100 million in energy revenues (not counting the value of ERUs), up to 1,100 jobs, tax revenues, local environmental benefits (reductions in SO₂, NO_x, particulates)⁵, and improvements in mine productivity and mine safety (Schultz, 1999). Future analyses could be undertaken to understand the local, regional, and national benefits that different Eastern European countries may achieve through development of their CMM markets through use of the Kyoto flexible mechanisms over and above project energy revenues.

12. These facts are important to note and further consider when examining the role of coal in sustainable development. Robert Priddle, the former Executive Director of the International Energy Agency, quoted in a World Coal Institute document (WCI, 2003), considers that while coal consumption is “environmentally-challenged,” the provision of secure, affordable energy supplies for sustainable development demands that fossil fuels be deployed alongside renewable energy sources. The development of CMM projects is one of the most practical and significant actions that the coal industry and coal consuming industries may take to contribute to sustainable development.

V. BARRIERS TO FULL DEPLOYMENT OF KYOTO MECHANISMS

13. While the Kyoto flexible mechanisms offer significant opportunities for Eastern European countries to partner with other nations to develop their CMM resources, there are several issues that need to be addressed:

- (i) Relatively few in the energy and environment fields know much about CMM projects or their benefits. A thorough understanding of the market potential by all stakeholders (coal operators, local and national governments, foreign investors and purchasers of ERUs) is critical so that the full potential of the CMM market may be developed.
- (ii) Technologies to employ ever more CMM, such as the dilute methane in ventilation air, are developing. It is important that the latest information on technical options be available to potential project developers.
- (iii) Rights to the CMM resource and to the energy revenue, if in doubt, greatly increase the investment risk of projects and lower the prospects for successfully developing projects. Transparent methane ownership rights, licensing regimes, and energy prices and contracts are necessary.
- (iv) In many Eastern European economies, restructuring of the coal industry is underway. Clarity regarding the status and future of coal enterprises is important in identifying the best projects and coal operators to work with in developing projects.
- (v) One of the greatest barriers to CMM projects is a lack of in-country champions of projects with adequate development resources. Expertise and funds for project development need to be identified and made available.
- (vi) Approaches to leverage the Kyoto Mechanisms in order to secure financing are important. While Kyoto ERUs may serve as a vital new revenue stream, they do not necessarily bring up-front funds to capitalize new projects.
- (vii) CMM projects need to have clear emission baselines, demonstrate that they are beyond “business as usual,” and have clear monitoring, verifying and certification procedures in place that are accepted as JI projects that may generate ERUs.

VI. RECOMMENDATIONS TO THE UNECE

14. The UNECE can play an important role in helping develop the Eastern European CMM industry. Specifically, UNECE and its Committee on Sustainable Energy's Ad Hoc Group of Experts on Coal in Sustainable Development can encourage experts on finance and the Kyoto

Mechanisms to collaborate with coal and CMM experts and government officials on the following issues:

- (i) Understand the markets and emerging technologies for CMM in economies in transition, including an assessment, on a country-by-country basis, of potential market and regulatory barriers (e.g. ownership, energy pricing, licensing) and steps to overcome these barriers.
- (ii) Consider the project-level criteria necessary to assure that CMM projects result in real, additional emissions reductions. Prepare guidance to help developers obtain JI status for their projects.
- (iii) Develop a set of focused activities for prospective buyers and sellers of transitional economy CMM-based ERUs to assist them in understanding the market potential and to provide them with guidance in developing JI ERUs.

15. To launch these activities, a series of issues papers that draws upon industry expert advice could be prepared and disseminated and a technical workshop or workshop series convened that would bring together the appropriate players: potential buyers of ERUs, financiers, coal mining operators, project developers and policymakers. Together, these experts can create a clearer path towards employing the Kyoto Mechanisms in order to grow and fully utilise the potential of the CMM industry of Eastern Europe.

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Endnotes

¹ This is based on the Intergovernmental Panel on Climate Change's (IPCC) Second Assessment Report's 100 year Global Warming Potential (GWP) (IPCC/UNEP/OECD/IEA, 1997). The Third Assessment Report gives methane a GWP of 23, but national emission inventories continue to use the Second Assessment Report. See EPA 2002, p. 1-8 for further background.

² Czech Republic, Hungary, Poland are the nations with CMM potential that already are EU members; Bulgaria and Romania are applicant countries.

³ Examples include the Netherlands governmental funding for JI projects through the ERUPT programme, and the Danish government's recent announcement for public investment in project based mechanisms.

⁴ There may be a limit to how many ERUs could help European countries comply with their caps. If credits converted for use in the EU ETS reach 6 percent of total allocated allowances, a review and possible quantitative limit on further trades may occur.

⁵ It is important to note that there may also be negative environmental impacts such as produced water from certain CMM drainage practices, and that the combustion of methane, while resulting in lower emissions than coal combustion, does result in air pollution.