Coal Methane: Potential Energy Prospects for Kazakhstan

UNECE Ad Hoc Group of Experts on Coal in Sustainable Development
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What is coalbed methane (CBM)?

-CBM is natural gas from coal seams.

What is coalmine methane (CMM)?

- CMM is a subset of CBM; methane gas released from coal or coal-bearing strata during coal mining operations.
Methane is a Potent Greenhouse Gas

• 21 Times More Potent Than Carbon Dioxide
• 2nd Only to Carbon Dioxide as a Contributor to Global Warming

Contribution of Anthropogenic Gases to Enhanced Greenhouse Effect

- Methane - 17%
- Nitrous Oxide - 5%
- CFCs, HFCs, PFCs, SF₆ - 9%
- Tropospheric O₃ - 14%
- Carbon Dioxide 55%

Source: IPCC, 1996.

Total = 2.85 Watts/m²
Key Factors in Energy Economy

- Kazakhstan is one of the main coal producers in Central Asia and FSU region
- Kazakhstan is the main coal exporter to Russia and Central Asia industrial regions
- More than 70% of Kazakhstan energy requirements is supported with domestic coal
- Kazakhstan Metallurgical industry bases mainly on domestic coal (80%)
- Social energy consumption of the Central and Eastern Kazakhstan regions rely on coal based power generators
- Coal production in 1999 was 58 mln.ton and grown to 81 mln.ton in 2002
Structure of Methane Emission in Kazakhstan

- Agriculture: 38%
- Wastes: 6%
- Industry: 1%
- Energy & Power: 55%
Kazakhstan - Coal Methane Reserves

Coal Methane Reserves (billion cub.m)
Kazakhstan Coalbed Methane Main Facts Sheet

- Coalbed Methane Reserves: 1.2-1.7 trillion.cub.m
- CBM contents in coal beds is one of the highest among the main coal basins in the world
- Coal Basins: 123
- Major Coal Basins CBM Reserves estimated:
  - Karaganda: 550-750 bln.cub.m
  - Ekibastuz: 75-110 bln.cub/m
- Coalbed Methane Wells: 134
- Coalbed Methane Emission: 870 mln.cub.m/year
- Coalmine Methane Production: 41.2 mln.cub.m
- Coalbed Methane Utilisation: 12.5 mln.cub.m
Methane-gas degassing and utilization process flow chart (Karaganda)
Economic and Social Impact of Coalbed Methane

- Regional & National Economy Improvement
- New energy source reduce dependence on imported Fuels & Gas
- Payment of Local & Republic Taxes
- Thousands of jobs created during Exploration & Development stages
- Several thousands permanent jobs created at Production stage
- Degasification Wells Reduce Risk of Explosions in Coal Mines
Environmental Impact of Coalbed Methane

**Positive**
- Production of cleanest fossil fuel for domestic consumption
- Captures methane from emission into atmosphere
- Atmosphere pollution reducing due to coal replacement in power generators

**Negative**
- Surface disturbance during the drilling operations
- Disposal of produced underground water is an environmental concern
Barriers to Coal Methane Development

- Government control over new investments in the coal industry
- Exploration & Production Legislation needs CBM adaptation
- Lack of Technology
- Lack of Mature CBM market
- Lack of awareness of environmental issues
- Lack of funds for investment in CBM
- Lack of information available to outside investors
- Lack of experience using CBM/CMM
- Trained Local personnel required
Potential Markets for CBM/CMM Gas

- Replacement of Coal in Industrial Boilers
- Replacement of Coal in Electric Power Generators
- Transit to large cities for domestic consumers use
- Government & Private Companies Fleet Fuelling
- Conversation of Private vehicles with compressed gas
Sources of data used:

1. Kazakh Research Institute for Environment Monitoring and Climate, Almaty, Kazakhstan
2. Climate Change Coordination Center of Kazakhstan, Astana, Kazakhstan
3. OJSC Azimut Energy Services, Almaty, Karaganda, Kazakhstan
4. Coal Division of OJSC Ispat-Karmet, Karaganda, Kazakhstan
5. US EPA Coalbed Methane Outreach Program, Washington, DC, USA