COAL MINE METHANE PROJECT OPPORTUNITY
Kazakhstanskaya CMM-to-Heat Project
Coal Division of ArcelorMittal Temirtau JSC
Karaganda Coal Basin, Kazakhstan

OVERVIEW OF COAL MINE METHANE PROJECT:
Kazakhstanskaya mine is located in Shakhtinsk district of the Karaganda area, 30 kilometers (km) from the city of Karaganda. The mine was commissioned in 1969 with a designed capacity of 2.7 million tonnes per annum (Mtpa) of coal. There are 1,860 employees working at the mine. Since July 1, 1996 the mine has been part of JSC ArcelorMittal Temirtau Coal Division and is a large-scale, highly-mechanized entity.

The mine has produced 64.7 million tonnes (Mt) of coal and had a maximum production output of 2,807 kilotonnes (Kt) in 1973. All produced coal is of KZh coking grade, and total reserves of coking grade coal are 103.4 Mt. Current depth of mining activities is 650-700 meters (working seams D6 and D10).

Existing ventilation and degasification infrastructure includes 8 vertical shafts and 74.9 km of existing roadways. The mine plans to expand the current degasification by 8.5 km. The production plan in 2009 was 1.4 Mt, but the mine increased production to 1.6 Mt in 2010 and 1.8 Mt in 2012 (with 1.8 Mt planned for 2013).

ESTIMATED ANNUAL EMISSION REDUCTIONS: 111,000 MTCO₂E

PROJECT DETAILS
• Name of Project: Kazakhstanskaya CMM-to-Heat
• Name of Mine: Kazakhstanskaya
• Type of Ownership: Private
• Type(s) of assessments performed: Local feasibility study
  • When performed: 2004 (updated in 2007)
  • By whom: USShMD of CD of ArcelorMittal Temirtau JSC

MINE INFORMATION
• Mine owner: CD of ArcelorMittal Temirtau JSC
• Percent Ownership: 100%
• Parent company: JSC ArcelorMittal Temirtau
• Status and type of mine: Active, underground
• Mining Method: Conventional longwall
• Service life of mine: 30-35 years

PROJECT FINANCES
• Projected capital costs: US$ 350,000
• Projected operation and maintenance (O&M) costs for fully implemented project: US$ 60,000
• Estimated Return on Investment (ROI): 5 years

Location Map
(Methane Distribution Among Neighboring Mines)
# HISTORICAL AND PROJECTED MINE DATA

## HISTORICAL COAL PRODUCTION AND METHANE EMISSIONS

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<tbody>
<tr>
<td>Coal (Million tonnes/yr)</td>
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<td>Methane (Mm³/yr)</td>
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<td>Emitted from ventilation system(s)</td>
<td>29.8</td>
<td>25.8</td>
<td>25.7</td>
<td>27.5</td>
<td>27.3</td>
<td>43.8</td>
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<td>46.0</td>
<td>36.5</td>
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<td>23.2</td>
<td>21.6</td>
<td>23.4</td>
<td>20.6</td>
<td>22.6</td>
<td>38.6</td>
<td>28.8</td>
<td>30.2</td>
<td>32.4</td>
<td>7.8</td>
<td>29.4</td>
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<tr>
<td>Vented to atmosphere</td>
<td>6.6</td>
<td>4.2</td>
<td>2.3</td>
<td>6.9</td>
<td>4.7</td>
<td>5.2</td>
<td>7.03</td>
<td>6.8</td>
<td>13.6</td>
<td>0</td>
<td>10.1</td>
<td>6.4</td>
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<tr>
<td>Total Methane Emissions</td>
<td>36.4</td>
<td>30.0</td>
<td>28.0</td>
<td>34.4</td>
<td>32.0</td>
<td>49.0</td>
<td>42.83</td>
<td>43.8</td>
<td>59.6</td>
<td>36.5</td>
<td>58.1</td>
<td>62.4</td>
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## PROJECTED COAL PRODUCTION AND METHANE EMISSIONS

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<td>Coal (Million tonnes/yr)</td>
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<td>Methane (Mm³/yr)</td>
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<td>Emitted from ventilation system(s)</td>
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<td>49.0</td>
<td>55.0</td>
<td>42.0</td>
<td>45.0</td>
<td>15.3</td>
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<tr>
<td>Liberated from drainage systems</td>
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<td>52.4</td>
<td>38.9</td>
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<tr>
<td>Vented to atmosphere</td>
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<td>11.3</td>
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<td>20.1</td>
<td>27.8</td>
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## GREENHOUSE GAS EMISSION REDUCTIONS

### ESTIMATED GHG EMISSION REDUCTIONS AND TOTAL VOLUME OF METHANE ALREADY RECOVERED/UTILIZED

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<tr>
<td>Total CH₄ vented (ave. m³/min)</td>
<td>36.4</td>
<td>30</td>
<td>28</td>
<td>34.4</td>
<td>32</td>
<td>49</td>
<td>42.83</td>
<td>43.8</td>
<td>59.6</td>
<td>36.5</td>
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<tr>
<td>Average CH₄ concentration, %</td>
<td>40-60</td>
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<tr>
<td>Total CH₄ recovered and utilized (Mm³/year)</td>
<td>16.6</td>
<td>17.4</td>
<td>21.1</td>
<td>13.7</td>
<td>17.9</td>
<td>33.4</td>
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<td>18.8</td>
<td>7.8</td>
<td>19.3</td>
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### TOTAL VOLUME OF METHANE EXPECTED TO BE RECOVERED/UTILIZED

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<tbody>
<tr>
<td>Total CH₄ recovered and utilized at Kazakhstanskaya (m³/year)</td>
<td>8,600,000</td>
<td>8,600,000</td>
<td>12,600,000</td>
<td>13,000,000</td>
<td>13,000,000</td>
<td>10,000,000</td>
<td>12,600,000</td>
<td>13,000,000</td>
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<tr>
<td>Total CH₄ recovered and utilized in Coal Mine Group (m³/yr)</td>
<td>23,600,000</td>
<td>23,600,000</td>
<td>27,600,000</td>
<td>28,000,000</td>
<td>19,800,000</td>
<td>18,000,000</td>
<td>23,600,000</td>
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## COAL PRODUCTION AND METHANE EMISSION CHARTS

![Coal production / methane emissions chart](chart1.png)

![Methane Available for Use at Kazakhstanskaya chart](chart2.png)
MARKET ANALYSIS / DEMAND ANALYSIS

Consumers of the heat generated by combustion of CMM in boilers are the mines of ArcelorMittal Temirtau JSC. Drained methane gas is currently used as a fuel in boiler houses of five mines: Lenina, Kostenko, Saranskaya, Shakhtinskaya and Abaiskaya (see map on page 1).

TYPE OF ASSISTANCE SOUGHT

- Financial Assistance
- Technical assistance: Resource assessment, economic assessment, feasibility study
- Assistance with legal issues and licensing documents

PROPOSED TECHNOLOGIES

USE OF CMM AS A FUEL IN BOILERS FOR HEATING PURPOSE

FOR MORE INFORMATION, CONTACT:

Tursyn Baimukhametov
Chief of Scientific Methodology Department
Kazakh Scientific Institute of Safety in Mining Industry
Karaganda, Kazakhstan
Tel.: +7 (7212) 492842
+7 (7212) 560005

Local Project Management:
Alexander A. Shipulin
Head of the Department of Drainage Effectiveness and Special Works
USSHMD of CD of JSC ArcelorMittal Temirtau,
2A Donbasskaya Street
Karaganda, Kazakhstan
Tel.: +7 (7212) 497-115
+7 (7212) 497-270

DISCLAIMER: The information and predictions contained within this poster are based on the data provided by the site owners and operators. The Methane to Markets Partnership cannot take responsibility for the accuracy of this data.