Developing the Methane Resources of Ukraine

Ukraine Methane Group

CBM/CMM Development Projects

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Coalseam Methane Recovery and Utilization
BACKGROUND / RATIONALE

Ukraine:
• a developing country that needs to increase energy supply and efficiency
  – CMM/CBM immediately available, with low-cost extraction
• has known coal reserves and underdeveloped coal industry
  – CMM/CBM is local source of alternative clean fuel, available at all active and inactive coalmines, and in the surrounding coal beds
• coal mines need rehabilitation and improvement to mine safety and efficiency
  – CMM/CBM finances coalmine modernization programmes
• can produce methane of sufficient quantity and quality for use as fuel to generate power and heat
  – existing source of gas as by-product of coal mining

CMM-I Project:
• provides improved degasification of active, inactive coalmines and future coal seams
  – increases mine safety and productivity
• creates efficiency of coal extraction and coalmine operations through enhanced drainage/ventilation
  – increases mine profitability
• produces heat and power for use by the coalmine and surrounding community
  – increases energy self-sufficiency and security
• produces local energy to stimulate small enterprise (cottage industry) development
  – increases community economic growth
• creates demonstration of technical and commercial viability for methane industry programme
  – increases regional social stability
CMM–I Project:  
Increased Mine Safety and Mining Efficiency  
Reduction of Emissions  
Clean-Fuel Energy Production

Self-Sustaining Projects Commencing with Two Leading Coalmines in the Donets’k Region

- Upgrading and training for mine degasification safety equipment, best practices, and transfer of technology
- Modernisation and expansion of methane drainage systems
- Utilisation of methane for electricity and heat generation
- Capture of methane for CO₂ Emission Reduction Units
ENHANCED METHANE RECOVERY
Ventilation Shafts/Drainage System
Gob Wells / Horizontal (In-Mine) Wells

**Improve Mine Degasification**
- Rehabilitate existing pump station
- Install new pipe and fittings in selected areas
- Upgrade existing equipment and systems / Install new components

**Improve Wells**
- Drill new ‘Gob’ wells
- Drill new horizontal (in-mine) and cross-measure wells
NEW GATHERING AND METERING SYSTEM
Install Low-pressure Piping and Modern Controls

Design, Engineer, Upgrade Methane Gathering System
- Gas Industry International Standards and Methodology
- Ukraine Manufactured Pipe, Connections, and Valves
- Ukraine Contractor Installation
- Technical Assistance from International Industry Experts

Design, Engineer, Install Methane Metering System
- International Gas Industry Standards and Methods
- Compliance with Kyoto Protocol and UNFCCC Regulations
- Technical Assistance from International Industry Experts
COALSEAM METHANE RECOVERY AND UTILIZATION

Design, Engineering, Installation, and Training

- Modular Plants—Generators, Controls, Heat Exchangers
- Containerised, moveable, compliant with environmental standards
- Computerised remote monitoring and data collection system
- Proven, methane-fuelled engines from Caterpillar, Jenbacher, Deutz
METHANE-FUELLED GENERATION PLANTS
Electric Power and Heat for the Coal Mine and Local Community

Design, Engineering, Installation, and Training—15 Megawatt Electric Power Generator Systems

Two Coalmines of the Makeyevugol Coal Association

- 9 Mw Plant (Six, 1.5 Mw Units) + 6 Mw Plant (Four, 1.5 Mw Units)

- Including generator, all controls, and heat exchanger system
- Containerised, moveable, compliant with environmental standards
- Computerised remote monitoring and data collection system
- Proven, methane-fuelled engines from Caterpillar, Inc.
CMM Project-I
Two Coal Mines of the State Enterprise ‘Makeyevugol’
Donbass Coal Basin, Donets’k

• Long-Term Power/Heat Purchase Agreement (PHPA) for entire output
• All Licenses, Permits, and Approvals for extraction of methane and use of gas for power generation
• All Licenses, Permits, and Approvals for operating power plant
• All Permits and Approvals for sale and distribution of electricity to the end users
CMM Project-I
Demonstration Project for initial Two Coalmines
Donbass Coal Basin, Donets’k

- Total Project Costs = $15.3 Million
- Equity/Equity Financing = $5.350 Million
- Project Finance = $9.950 Million

10-year term; interest rate of less than 7%
Direct Loan from U.S. Government Agency–Overseas Private Investment Corporation (OPIC)
Ukraine Coal Mine Methane
Clean, Economical, Alternative Fuel

– High-Efficiency Natural Gas Power Plants
– Electricity and Heat for Local Communities
– Economic Development Stimulus for New Industries

‘Foreign’ Sponsors

Technical Experts

International Financing Organizations

UKRAINE METHANE Project Company

CMM-I
CMM-2
CBM-I

‘In-Country’ Sponsor

Technical Experts

Coalseams

Global Methane Partners / Covalent Energy
Licence/Use Permit; Approval by GoU and Regional Administration
Gas Connection (Exclusive) from Surface Discharge of Drainage System
Operating Agreements: Pump Station/Degasification System

Off-take Purchaser/Re-Seller-- P/HPA
Co-Sponsor of Community Development/Small Enterprise Programme
Supply Heat/Electricity to Small Enterprises

Project Developer
Arrange, Secure, and Administer Funding/Project Finance
Project Manager/Joint Operator of Pump Station/Degasification System
Producer/Seller of Power/Heat, Technology Transfers

Supply Turn-key Heat/Power Plant-- Generator, Controls, Heat Exchanger
Technical Assistance: Training
Maintenance/Service; Financing Support
International Consortium of Sponsors and Participants

PROJECT TEAM EXPERIENCE

Experienced Project Managers
- expert team with degrees in law, business, and finance; English & Ukrainian language

Internationally Recognized Technical Assistance
- renowned expertise in CMM/CBM; industry leaders in energy and environment

Leading Suppliers of Equipment and Technology Transfers
- multi-national companies, providing engineering, apparatus, service
- U.S. and E.U. government relationships and support
- EPA, DOE, USAID, TDA, OPIC, TACIS, EBRD, ADB, World Bank Group

Government of Ukraine support
- Ministries of Energy/Environment/Economic Development; Regional Administration

Global Methane Partners
- Covalent Energy
- Methane Services Group
- EnergoCapital
- Makeyevugol Coal Association

Advanced Resources International
- REI Drilling
- Caterpillar Power
- Econergy International
- Winrock International