The Economics of Successful CMM Project Development

Workshop on Best Practices in Coal Mine Methane Capture and Utilisation

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CMM projects can be attractive investment opportunities

- Only 2 emission pathways: ventilation shafts and degasification wells
- End use technologies proven in the field
- Emissions and emission reductions can be verified
- Manageable scope
- Project design can be replicated at mines with similar conditions
Many factors influence project success

- Gas availability
- Mine plan
- Market access and pricing
- Policy incentives and barriers
- Project structuring
- Capex and Opex
- Financing availability and costs
CMM Utilization Project Development

**CMM Developer**
- Investor/Active Participant
- CBM/CMM Dominant Estate
- Motivated by Gas Production
- Borehole Placement to Produce Gas as Long as Possible
- CBM/CMM Development Across Entire Property
- CBM/CMM Development Only if Economically Possible

**Coal Operator**
- Lessor/Passive Participation
- Coal – Dominant Estate
- Motivated by Improved Coal Production
- Desires Degas Plan with Minimal Impact to Mining Operations
- CMM Drainage May be Required Regardless of Economics of Recovery
- Prefers Surface Drainage
CMM Project Economics

- Project Plan
- Project Financing
- Research and Feasibility
- Risks
- Projected Cash Flow
Important considerations

- Define project scope – surface project only or are subsurface improvements added?
- Appropriately size project
- International vs locally produced equipment
- How is cost of gas supplied to the project accounted for?
- Include cost of spares, warranties, replacement
- Adjustments relating to weather, altitude, political climate, and other factors
- Robust investment-grade financial model
Important considerations

- Use conservative assumptions
  - Costs
  - Revenue sources – avoid “hockey stick” revenue projections
  - Escalators
  - Realistic contingencies

- Taxes, permits and other fees

- Identify, and potentially, quantify risks

- Allocate costs, revenue, profit and distributions consistent with project structure
Optimize plant capacity

Source: Sindicatum Sustainable Resources
Including subsurface improvements may improve economics in some cases

Source: Pre-Feasibility Study for Methane Drainage and Utilization at the TengHui Coal Mine, Shanxi Province, China, May 2019
Project and deal structuring

- MineCo Shareholders
  - $ to MineCo
  - $ to Developer

- MineCo
  - $ to Developer
  - $ to CMM Project

- Developer
  - $ to Investors
  - $ to Supplier
  - $ to CMM Project

- Investors
  - $ to Supplier

- Supplier
  - $ to CMM Project

- CMM Project
  - $$ to MineCo
  - $ to Gas & Site Access

- Gas & Site Access
  - $ to CMM Project
Sources of CMM Project Finance

- Self-Finance
- Forward Purchase
- Vendor financing
- Debt
- Equity
# Project Risks and risk assessment tools

## Risks Associated With CMM Projects

### Project Development Risks
- Inability to obtain agreements with mining company and adjacent land owners. (Legal)
- Indications of marginal gas resource (such as gas quality, rate of flow, and longevity). (Resource)
- Inability to negotiate energy sale agreements. (Commercial)
- Inability to obtain permits. (Legal)
- Insufficient development capital. (Financial)
- Inability to secure financing. (Financing)

### Construction and Operations Risks
- Construction cost overruns or delays in construction completion. (Installation)
- Poor gas productivity (such as flow rate, reliability, and quality). (Resource)
- Technological risk (poor system performance). (Operational)
- Market risk (drop in revenues due to price changes). (Commercial)
- Contractual/legal problems with customers, mine owner/operator, system suppliers, or regulatory agencies. (Legal)
- Mine closing or change in mining plan, causing stranded investment. (Resource)
Integrated approach

Source: UNECE. Best Practice Guidance for Effective Methane Drainage and Use in Coal Mines (2016)
Conclusions

- CMM/AMM projects can be attractive investments
- A financially successful CMM/AMM project depends on many factors
- A profitable project can very quickly become unprofitable without effective planning and execution
- Thorough due diligence and a conservative approach will improve the odds for success
- Creative structuring and financing of the project can mitigate risks and effectively allocate rewards of a project
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