

# Development of Coal Mine Methane in India: Opportunities & Challenges



SR Pump at Moonidih



CMM Based Generator

## Coal : The primary source of energy in India

- India is facing a mammoth task in meeting its ever-increasing energy demand to sustain GDP growth of over 8%.
- **Coal is the main source of energy supply in India and meets about 53%** needs of commercial energy.
- *Coal plays a dominant role in sustaining economic growth of India*
  - **67%** share in power generation
  - **76%** of coal consumed in power generation

## Coal : The primary source of energy in India

- Reserve: **293 BT** as on 01.04.2012, proved reserve **118 BT**.
- India's coal reserve is **7.1%** of world total, which stands reasonably good compared to **0.8%** for oil / natural gas
- *Studies indicates that coal will continue to be main source of energy in the foreseeable future.*
- Coal Industry is gearing itself to meet the challenge but it appears that there will be a need to augment energy supply from other sources.

## Coal : The primary source of energy in India ...

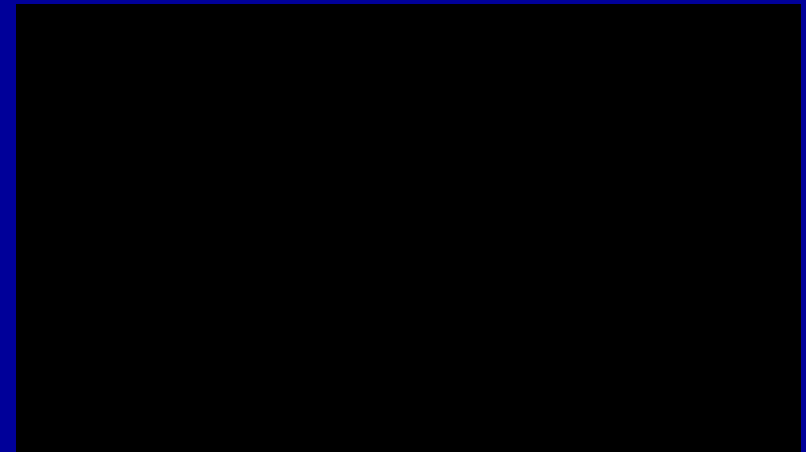
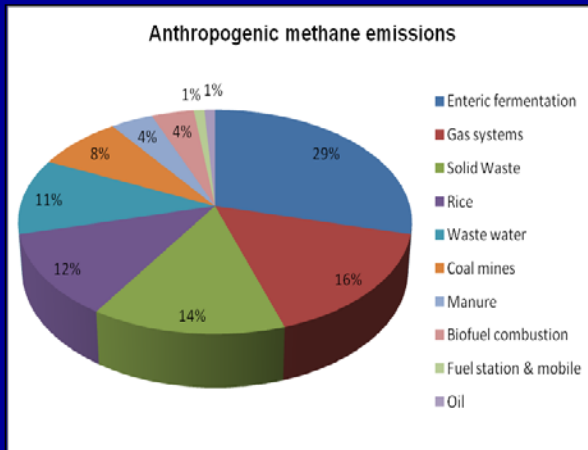
- There is impetus on the development of renewable energy resource and development of new energy resources.
- Coal based non-conventional energy resources like CBM, CMM, UCG etc. and also shale gas fits in this ambit.
- Development of these energy resource will be beneficial both for the coal industry in safety and financial terms as well as on environment front and will facilitate in *meeting the energy requirement to sustain envisaged GDP growth.*

## Coal Usage: A Concern for Environment

- ✓ In spite of reliability of availability, favorable economics in energy generation, use of coal has adverse affect on environment during Mining , Transportation and Combustion.
- ✓ Coal sector contributes to about 8% of the total anthropogenic methane emissions (US EPA estimate).
- ✓The other source of methane emissions are: Agriculture, Landfill, Oil & Gas, animal waste etc.

# Coal Usage: A Concern for Environment

✓ Coal combustion results in greater CO<sub>2</sub> emissions than Oil and Natural Gas per unit of heat output.



# Coal: A Source of Clean Energy

- ✓ Making coal a source of clean energy is a priority area both at Govt. and CIL level to meet the overall objective of low carbon path.
- ✓ With adoption of technologies, coal can be a source of clean and environment friendly energy source.
- ✓ Harnessing methane ahead of mining is one such technology having following advantages:
  - Ensures future mining safe for gassy mines,
  - Prevents release of methane to the atmosphere
  - Provides additional energy from the otherwise wasted resource.

# Opportunities for CBM Development in India

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Excellent opportunities exist for harnessing CBM in India on account of:

- ✓ Large coal inventory of 293 Billion Tonne
- ✓ Occurrence of high rank coal having good prospect of CBM
- ✓ Long history of coal mining
- ✓ Data base on gassiness in mining areas
- ✓ Priority area for development of coal based alternate energy source at Government and Industry level

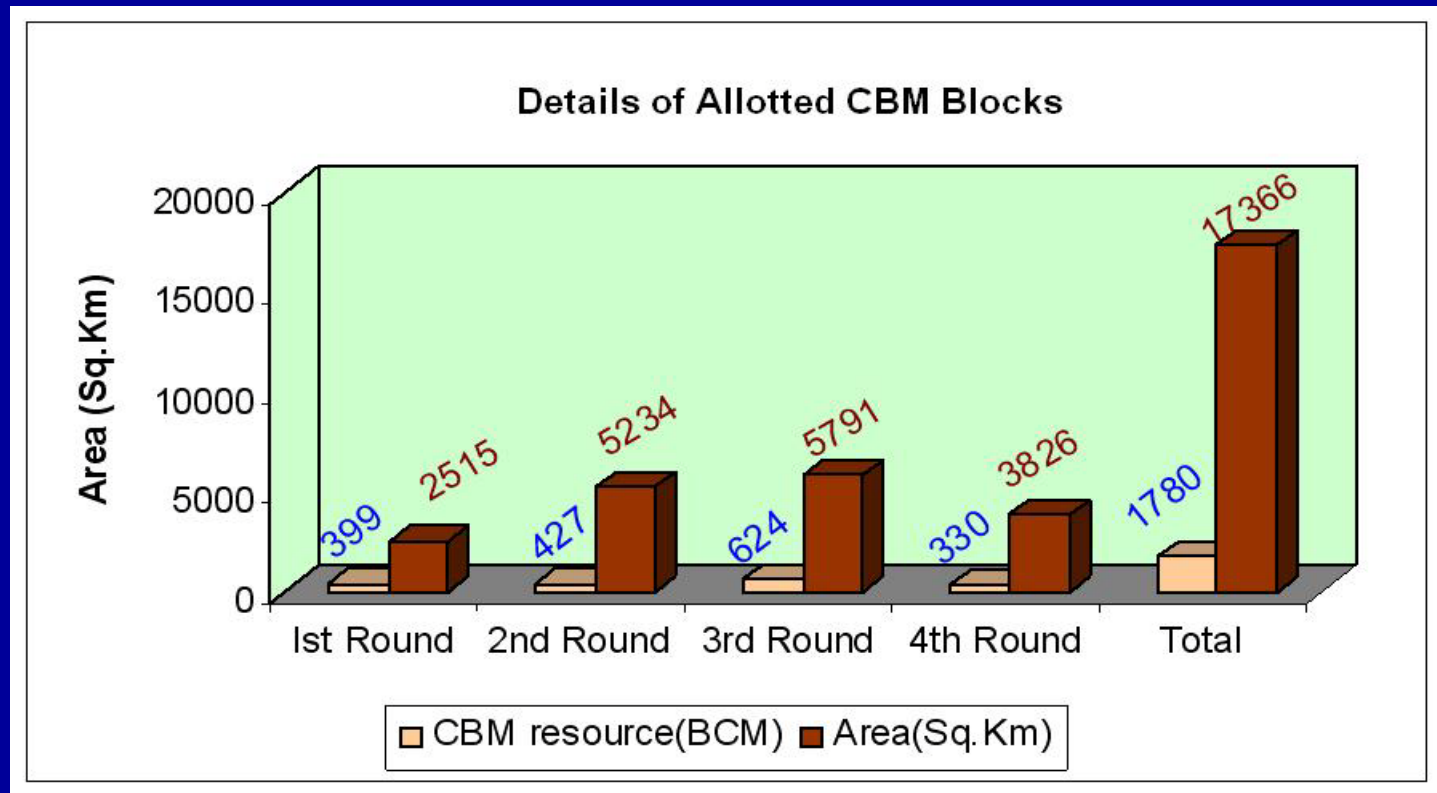


## CBM Development in India: A brief Account

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- Govt. of India has so far allotted 33 CBM blocks covering an area of about 17366 Sq. Km with prognosticated resource of 1.78 TCM in 4 rounds of global bidding.
- The ultimate production potential in the allotted block up to 4th round is about 45 MMSCMD, which may support power generation of about 8300 MW.
- Commercial production has already started in few blocks and at present about 2 to 2.5 lac cubic metre of CBM is produced per day.
- The figure is likely to increase rapidly and it is expected that within a short span of 4/5 years the production will increase manifold.

# Block delineation under CBM Policy by CMPDI

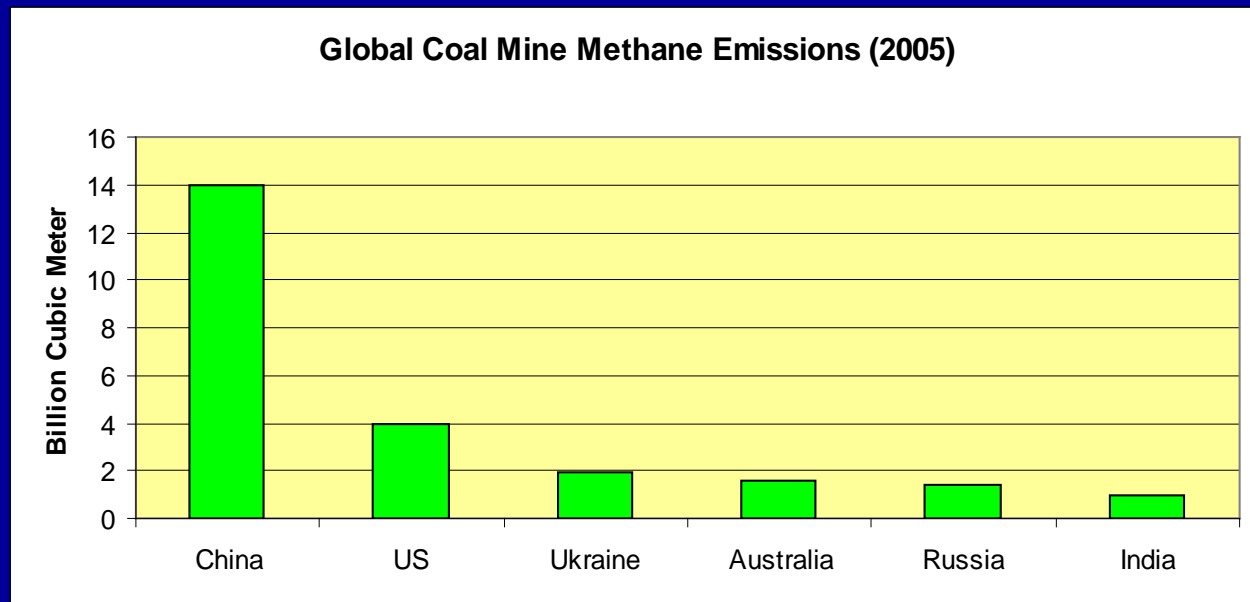


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**Development of  
Coal Mine Methane:  
India's Perspective**

# Commercial development of CMM: A Priority area

- India ranks 6<sup>th</sup> globally with 1 BCM (14.3 MT CO<sub>2</sub>e) of CMM emissions (2005)
- CMM constitutes a significant global source of anthropogenic methane emissions.



# Commercial development of CMM: A Priority area

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- Harnessing and gainful utilization of CMM is a priority area both at Govt and industry level.
- GOI has made CMPDI a Nodal Agency for development of CMM in India.
- CMPDI/BCCL has successfully implemented a Demonstration Project in BCCL mine under GOI/UNDP/GEF funding.
- Successful implementation of this project proved efficacy of CMM extraction technology in Indian geo-mining conditions.

# CBM Recovery and Commercial Utilization- Demonstration Project



CBM Rig unit



SR Pump



Hydro-frac unit



CMM Based  
generator

- 3 CBM wells drilled and 3 potential seams in each well hydro-fractured
- These wells are producing gas after dewatering

# CMM Development: Indian Perspective

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- In India harnessing and utilization of methane (CMM) is slightly different than the industrial practices
- Generally harnessing of CMM is related to high producing underground coal mines with fast moving coal faces.
- In India only about 15% of the total coal production is coming from underground mines.
- In most of these mines the conventional B&P method of mining is being followed and the level of mechanization is low and production capacity is limited resulting in slow movement of coal faces.
- Since the movement of coal faces are very slow therefore conventional pre drainage of CMM from working faces may not be possible.

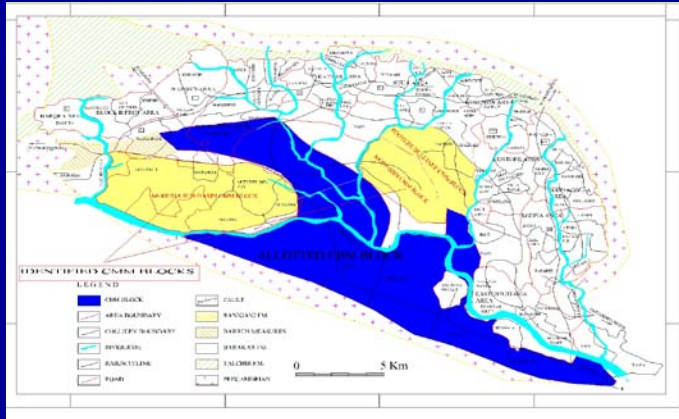
# CMM Development: Indian Perspective ....

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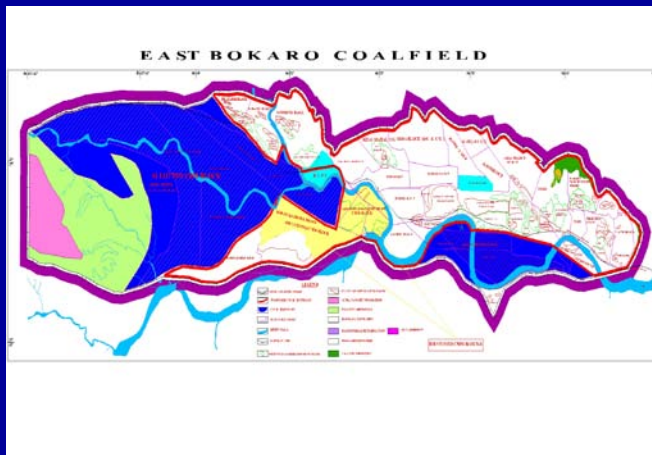
- In India several coalfields (particularly in Damodar Valley CFs) are having multiple occurrences of coal seams having high gas content.
- The cumulative thickness of the coal seam in these coalfields at times is as high as 100 m and the gas content ranges from 5 to 27m<sup>3</sup>/tonne.
- The mining is over century old and coal seams occurring at shallower depth (<300m) have been mined out or are under active mining.
- These coalfields have been considered to be primary target for commercial development of CMM and the target seams for CMM extraction have been considered as virgin seams lying below the worked out seams.
- Further, CMM projects could also be implemented in the projectised areas of large opencast mines.



# Commercial Development of CMM in India: Opportunities



Jharia Coalfield



East Bokaro Coalfield

- ✓ Successful implementation of demonstration project has opened opportunities for harnessing CMM in Indian mining conditions.
- ✓ Five prospective CMM blocks, 3 in Jharia and 2 in East Bokaro coalfield, have been identified.
- ✓ Data dossiers on these blocks have been prepared

# Commercial Development of CMM : Challenges

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- The challenges in development of CMM in India is both on Technical as well as Legal/commercial terms
- Since the target coal seams are lying below the worked out seams, the approach to the target seams will have to be made after crossing several overlying workings/goaves.

# Commercial Development of CMM : Challenges

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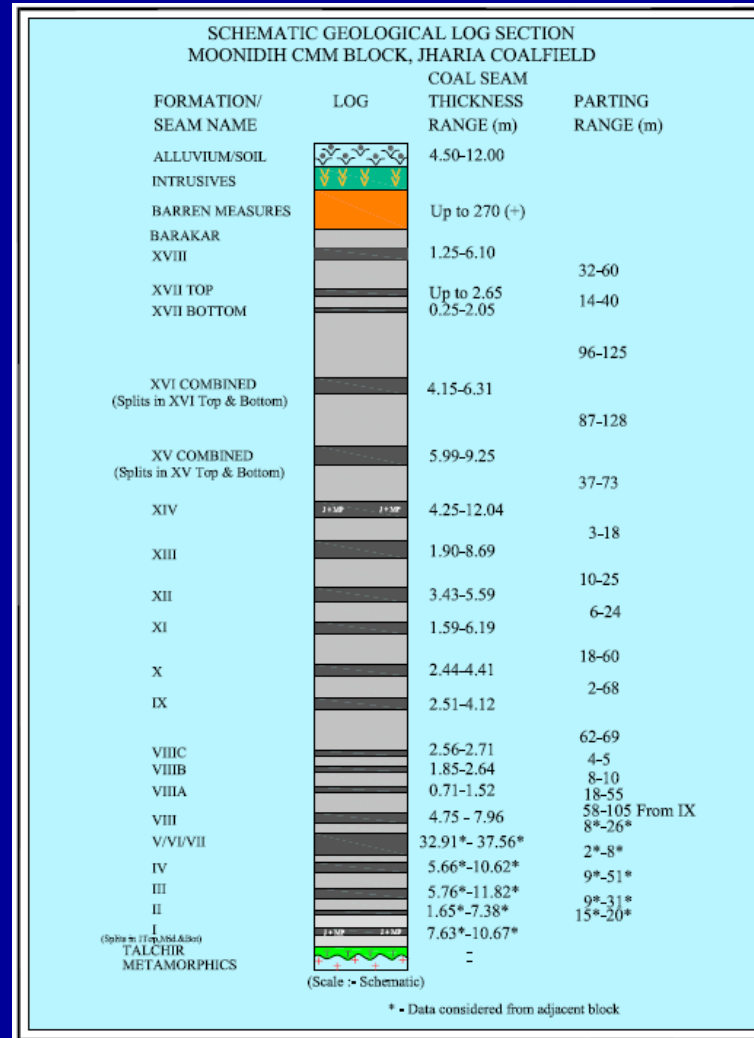
- In the identified coalfields, the permeability is very low ( $<1\text{mD}$ ) and the drilling technology will have to be decided after very careful analysis of the existing conditions.
- Further the effect of de-stressing on the target coal seams because of the mining activities in upper seams/vicinity will need to be examined and studied.
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## Commercial Development of CMM : Challenges

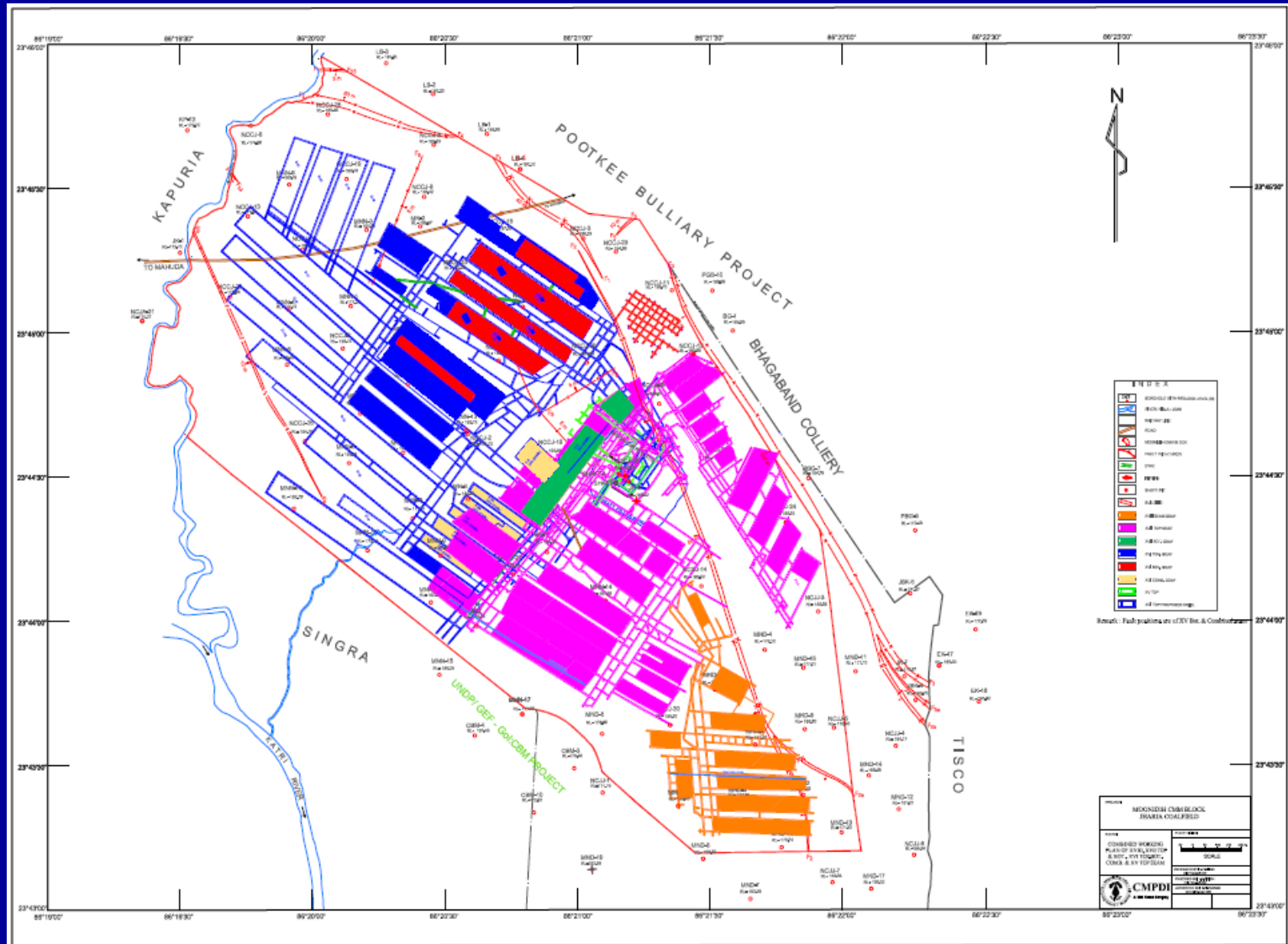
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- In addition to the technical challenges, the ownership of CMM needs to be settled.
- CMPDI being the nodal agency for development of CMM in the country and also pursuing jobs of India CMM/CBM clearinghouse, has taken steps for getting clarity on these issues.
- The matter has been deliberated at the highest level and the issue is now settled and only final orders are awaited.

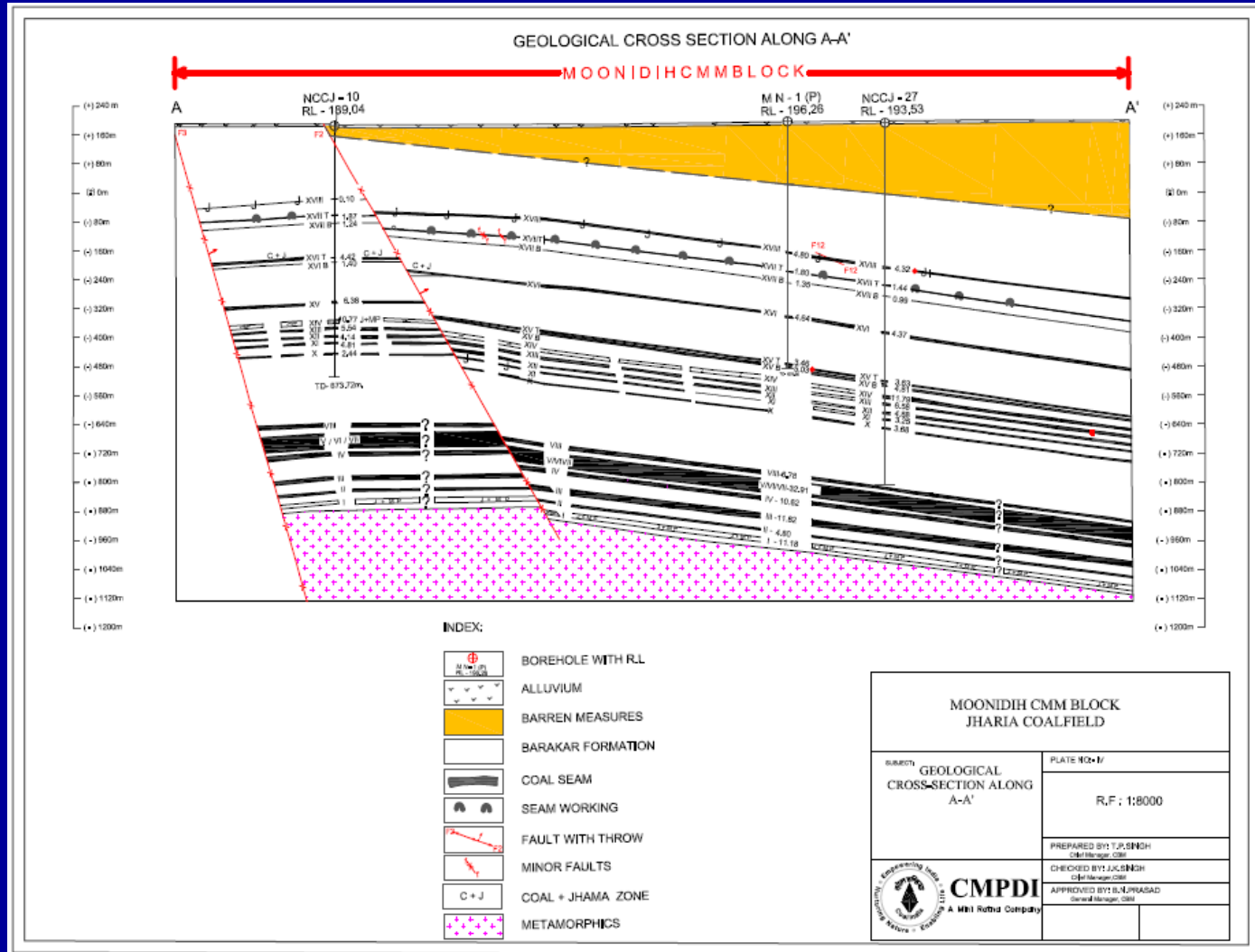
# Commercial Development of CMM : Opportunities & Challenges



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# Commercial Development of CMM : Ways Ahead

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- Stage is now set for taking up commercial development of CMM in India.
- Prospective areas have been identified to start with and a successful demonstration project has proved the efficacy of the process in India geo-mining conditions.
- The identified areas are near to the allotted CBM blocks and are known to be gassy. This fact is well established as large scale mining operations are going on in the upper seams above the target seams.



# Commercial Development of CMM : Ways Ahead

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- Development of CMM is under focus at Govt and coal industry level and is also a prime objective of India CBM/CMM clearinghouse.
- The operationalisation and the issue of ownership is almost settled.
- CMPDI on behalf of CIL will soon float Global Tender for selection of a suitable developer for commercial development of CMM in 5 identified areas.

Thanks  
for  
Your Kind  
Attention

*B N Prasad,  
GM, CBM,  
CMPDI, Ranchi.  
[gmcbm@cmpdi.co.in](mailto:gmcbm@cmpdi.co.in)  
[bnprasad54@yahoo.co.in](mailto:bnprasad54@yahoo.co.in)*