

# Coal Mine Methane Projects and Opportunities in India


Presented by

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# Outline

- **CMM project essentials**
  - CMM project benefits
  - Essentials for viability of CMM projects
  - Worldwide progress in CMM development
  - Policies and schemes implemented by countries for CMM development
- **India's current position in CMM industry**
  - Overview of Indian coal sector
  - Significant opportunities, but no recovery efforts
  - Key reasons for slow pace of CMM utilization
- **Harnessing CMM potential in India**
  - Thrust areas to make headway in CMM development
  - Initial captive use demonstration could trigger CMM Industry
  - Likely Evolution of CMM industry in India
  - Opportunities galore for global players
  - ICF's services in CMM project development

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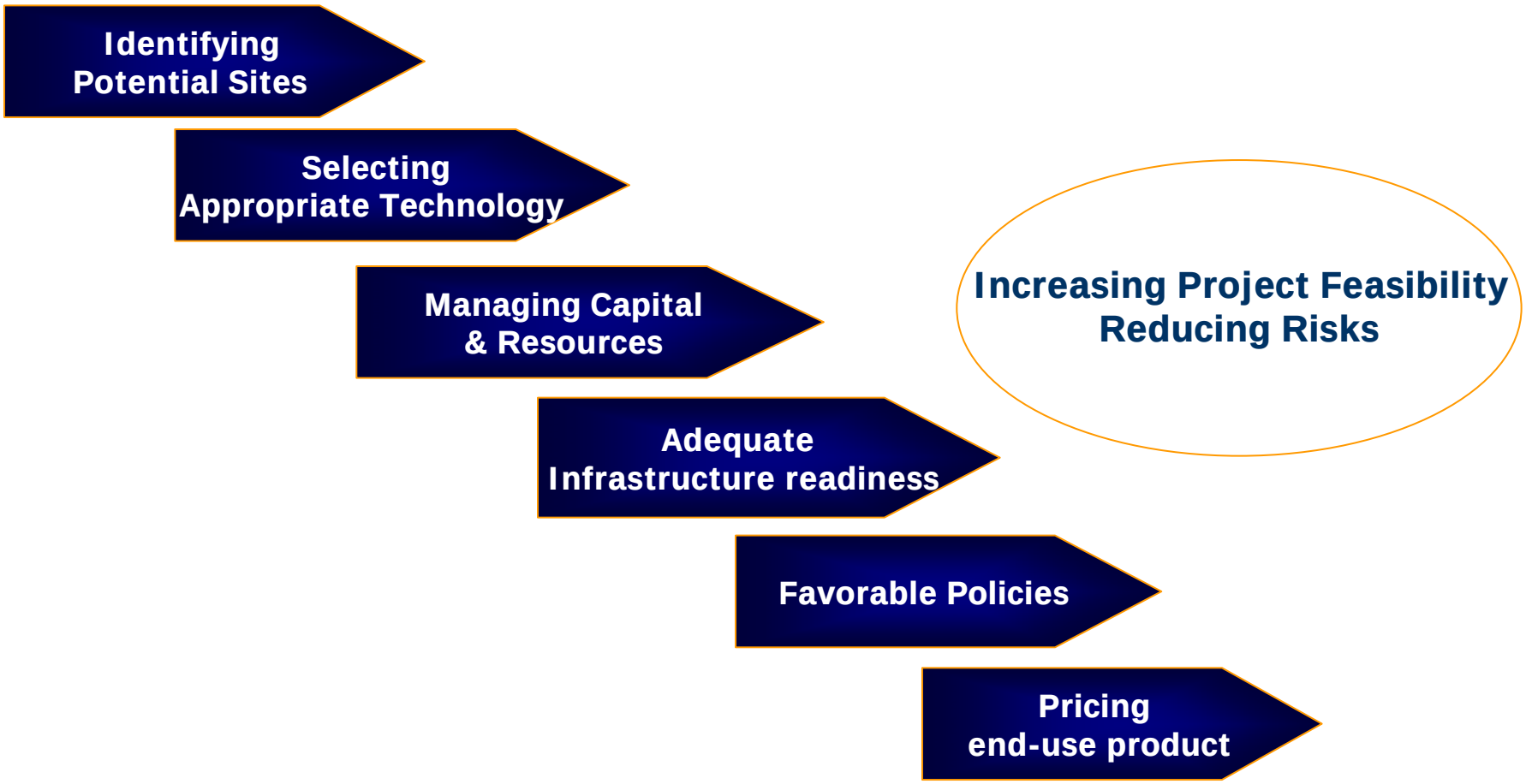
# Numerous benefits make CMM projects hard to overlook

- Increasing energy demand exerting pressure on conventional fuels
- Depleting fossil fuel reserves – CMM is additional source of energy
- Recovery of CMM leads to cost savings and improved mine safety
- Reduction in GHG emissions – Methane having 23 GWP
- Act as distributed generation source, requires less infrastructure

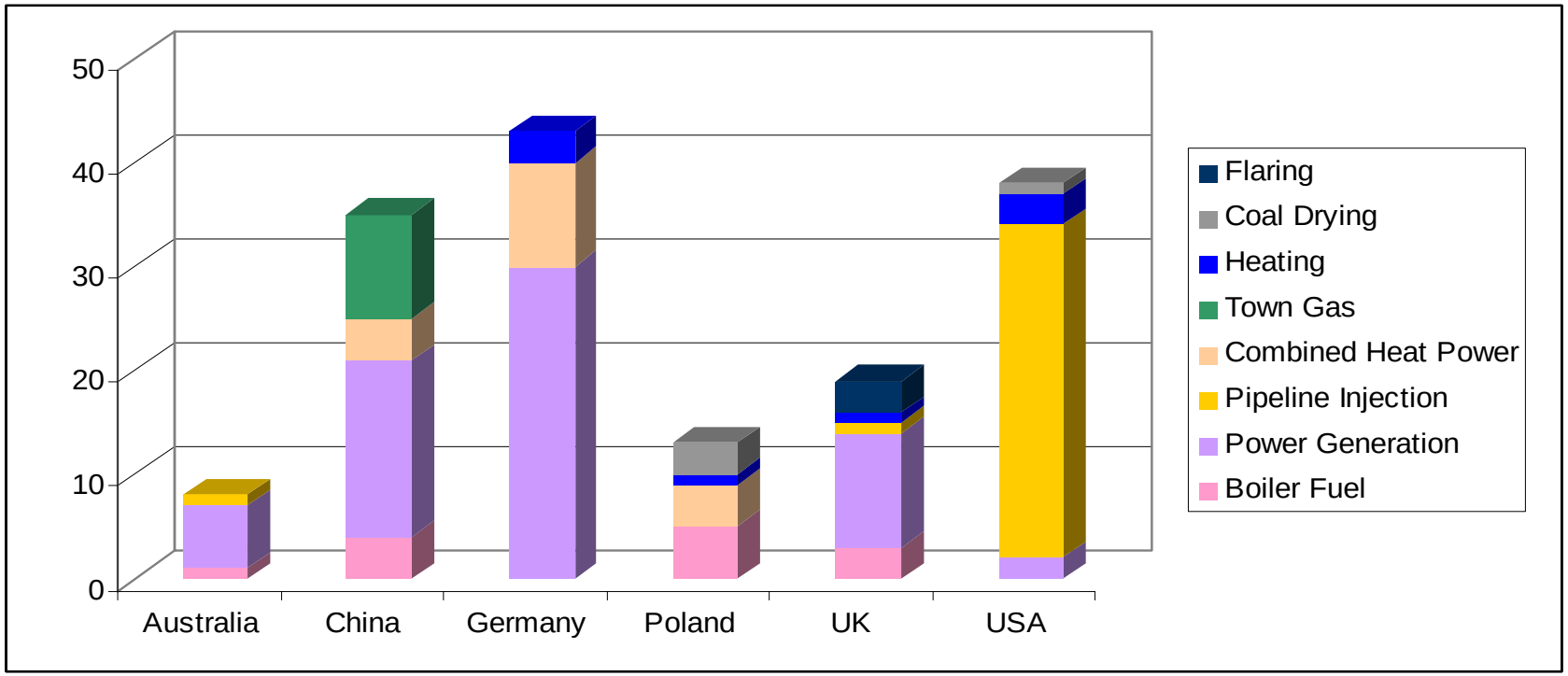
# Essentials for viability of CMM project



# Worldwide progress in CMM development is encouraging

- More than 150 projects operating worldwide; around 30 in development phase
- 13 countries have CMM recovery at active/abandoned mines
- More than 3.5 billion cubic meters of methane emission avoided per year

**Number of CMM utilization projects (Source: M2M database)**



# Policies and schemes implemented by countries have bolstered CMM development

- Australia is forerunner in implementing market based incentives
- Germany provides Feed-in-Tariff for CMM same as renewable

| Drivers of CMM Development | | | | |
|---|---|---|---|---|
| **Australia** | **China** | **Germany** | **United Kingdom** | **United States** |
| Kyoto Obligation | CDM Market Opportunity | Clarity on Gas Ownership | Depleting Fuel Resource | Stringent Mining Standards |
| NSW GGAS Scheme | Grants to CMM Projects | Feed-in-Tariff for CMM | Kyoto Obligation | Rising Crude Prices |
| QLD Gas Scheme | Ease in Grid Connectivity | No Royalty on CMM | New Technology | Environmental Concerns |
| New Technology | Tax Exemption | New Technology | Climate Change levy Exemption | New Technology |
| Funding to CMM | | Depleting Fuel Resource | | Robust Gas Infrastructure |

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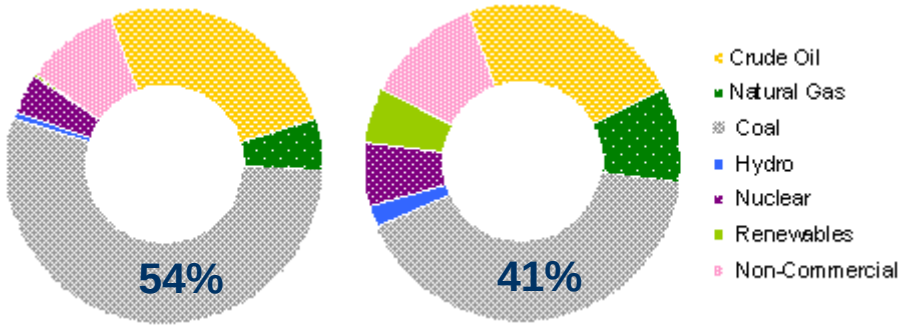
# Coal will continue as major energy source for India

- India is 3rd largest producer of coal today
- 56% of primary energy comes from coal as against 29% globally
- 60% power generation from coal against 40% globally
- IEP* projects decline of coal in energy mix from 54% to 41% by 2031-32 if India makes maximum efforts to move towards cleaner energy mix

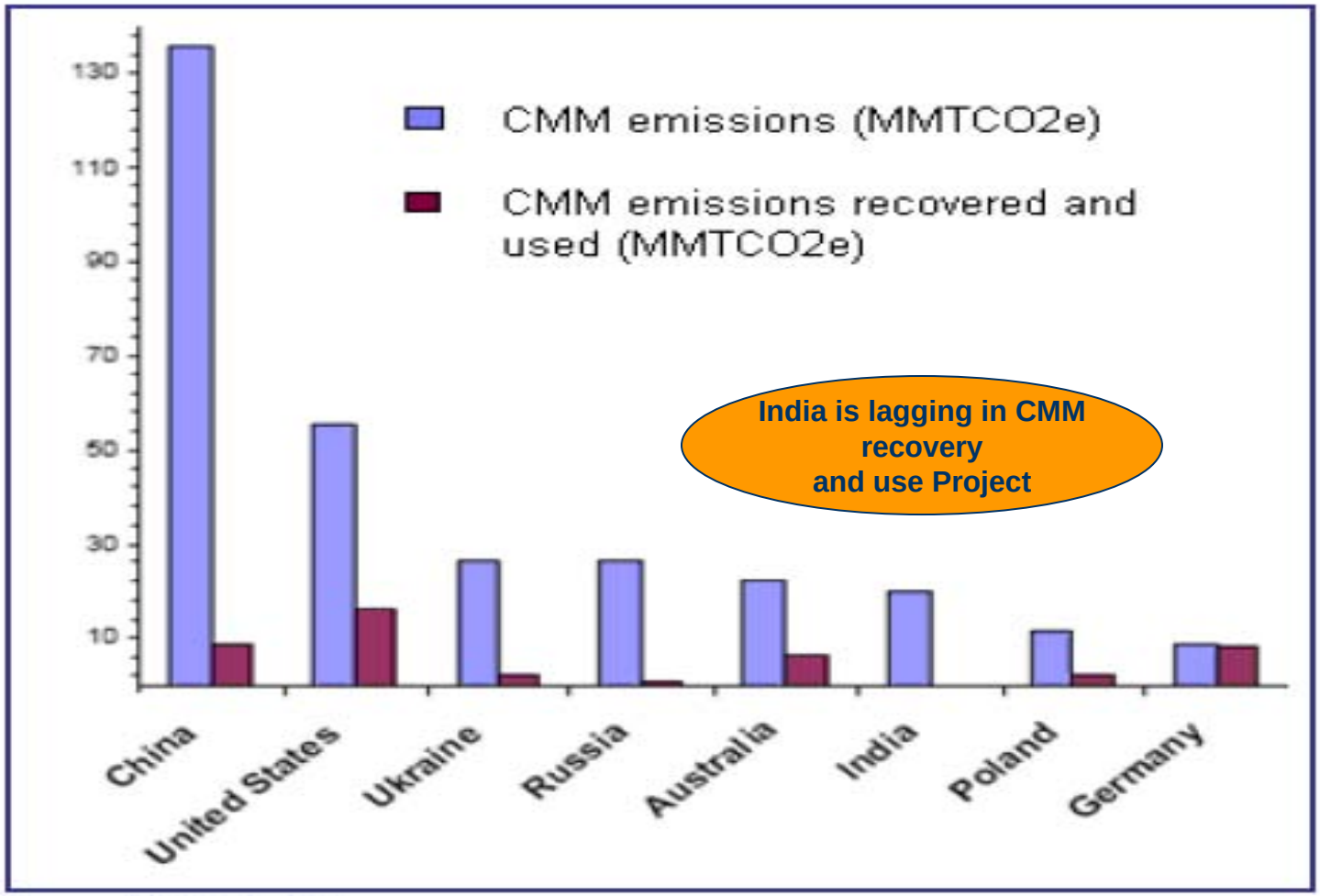
**Projected Fuel mix in 2031-32***




- Mines having good quality coal have higher gas content

| Category of mines | Gassiness (m3 of gas per tonne coal mined) | No of mines |
|---|---|---|
| D-I mine | <1 m3 | 222 |
| D-II mine | >1 to 10 m3 | 102 |
| D-III mine | >10 m3 | 18 |

# Despite tremendous opportunity, no recovery efforts so far




Source: US EPA 2008

# Reasons for slow pace in CMM utilization in India

- Majority of mining (85%) is done open cast
- Mining using old technology; Focus till date is only on ventilation
- Lack of policy to curb methane release – Current guidelines apply to methane concentration not on volume released
- Lack of proven technology for use of low quality gas and VAM
- Lack of market based scheme to incentivize investments
- CMM resource estimation has not been done
- No mechanism to compensate investment in case project fails

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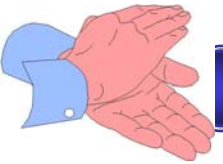
# Thrust areas to make headway in CMM development



## Positives so far

- Establishment of CBM clearing house
- Well laid CBM policy
- Imported coal, gas and LNG prices make Coal based gas attractive
- GAIL is building gas pipeline between North and East which will pass through coal regions

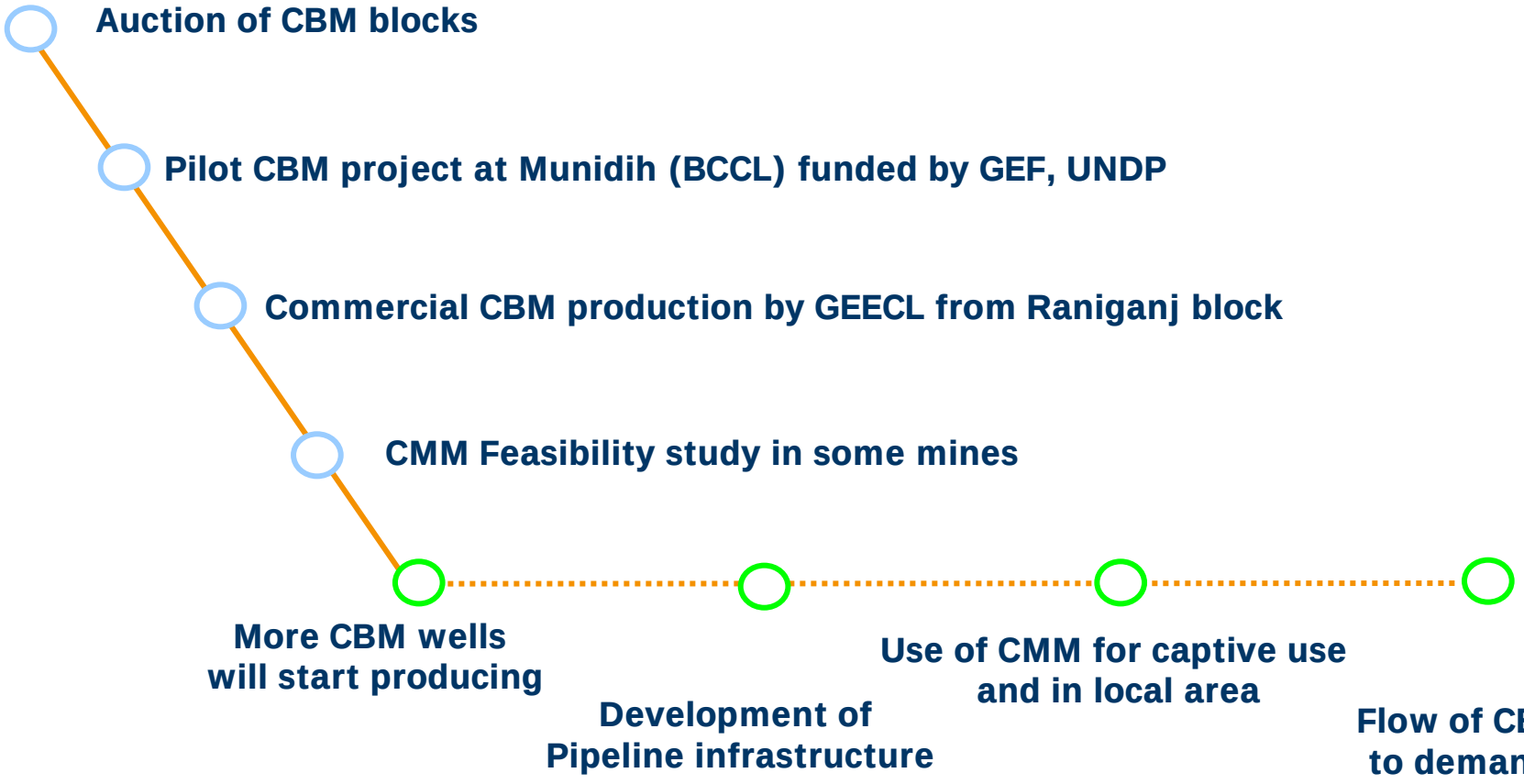
## Suggested ways to go forward

- Technology
  - Adapting technology to smaller scale and to suit Indian conditions
- Policy
  - Policy to curb methane volume release
  - Mandatory policy for pre-mining degasification
  - Transparent dissemination of information for evaluating commercial viability
  - Expediting private participation
  - Market creation for clean energy technology
- Finance
  - Reliable cost recovery mechanism
  - Channalize finance through international co-operation
  - Financing using Govt. subsidies/incentives

# CMM projects by coal owners for captive purpose can be implemented with minimal fuss

- Implementing pilot level demonstration projects
- Less infrastructure required for local consumption
- Capable to finance such projects
- No legal issues related to ownership of gas

# Changing mining trend and pursuing clean technology will trigger evolution of CMM industry in India



# Once proven, India becomes a very large market for global players

- Demonstration of technology adaptation through pilot projects
- Training to operate technology and capacity building
- Knowledge transfer of best practices through training/workshop/tours
- Direct investment in recovery and end use projects
- Indirect investment in customization of technology and various services

# ICF can help in achieving your goal

- Feasibility study for CMM project development
- Conducting end use analysis study for CMM
- Regional demand – supply market analysis
- Governmental policy and regulatory impact analysis
- Designing enterprise's climate change and sustainability policy
- Evaluating financial benefits under the emerging global emission trading schemes

# For more Information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