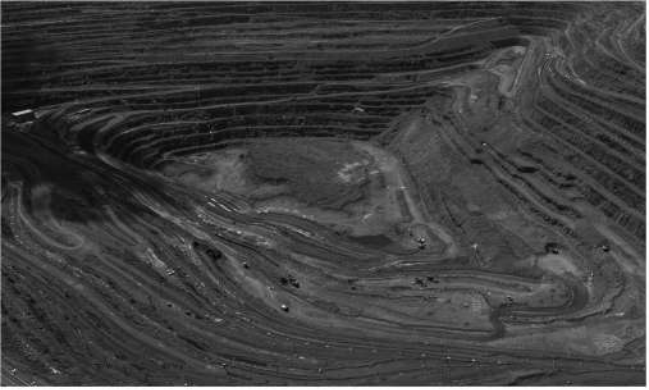

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ICCSA | SOCLEEN

19th MAY '23

Brainstorming & Workshop on

INDIA'S NEED FOR SUSTAINABLE MINING

COAL MINING AND RELATED METHANE EMISSION

@ Y B Chavan Centre, Mumbai

CLIMATE GOALS

TECHNOLOGICAL ROADMAP TO NET ZERO

In Association with

Ministry of Environment, Forest and Climate Change, Government of India | GOVT OF MAHARASHTRA | Maharashtra Pollution Control Board | CII Confederation of India Industry

INTRODUCTION

Mining remains an essential and growing part of the modern industry. It has been estimated that it makes up of about 45% of the total global economy. The mineral production continues to increase as demand for raw materials grows around the world. India has been facing many challenges with regard to need of mining and meeting the developmental needs. Environment management and sustainability paradigms have become acutely important in current times. It is a well-known fact that many current mining practices have serious impacts on both the mining site itself, surrounding environment and society besides creating huge economic burden for future. The present brainstorming workshop focuses on sustainable mining practices required for India so that environmental and climatological burden can be reduced. Further, the workshop also targets to brainstorm on solutions pertaining to the emission portfolio and environmental impacts from coal mining and coal bed, with a focus on methane emissions from the sector which is one of the major drivers of climate change and a hurdle to sustainability of mining practice of the country.

Given above, the brainstorming sessions are divided into two broad thematic areas :

OVERVIEW ON DISCUSSION ON ISSUES PERTAINING TO MINING PRACTICES OF THE COUNTRY AND HOW TO BRING IN SUSTAINABILITY INTO THE SECTOR FROM ENVIRONMENTAL AND CLIMATE POINT OF VIEW.

SPECIFIC DISCUSSION ON COAL MINING AND COAL BED RELATED METHANE EMISSIONS AND DISCUSSIONS ON SUSTAINABLE SOLUTIONS FOR REDUCING THE EMISSION FOOTPRINT .

The above thematic areas are discussed in detail in subsequent sections.

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MESSAGE FROM SUMMIT CHAIR

DR. J. S. SHARMA

Director ICCSA
President, Indian Association for Air Pollution Control (IAAPC), New Delhi
Former Group General Manager-Head Environment,
Oil and Natural Gas Corporation Limited

India is emerging as a Global Leader in Climate Change Initiatives. It has given commitment to achieve net-zero emissions by 2070, during the UNFCCC's 26th Conference of Parties (COP). Hence, it is important for India to continue its efforts to establish a sector-specific baselines datasets, which can help India, delineate an action plan in its focused efforts on reducing GHGs and methane, which have position India in a leadership position in upcoming COPs. With these datasets generated overtime, India will be better poised to take its initiative into a global platform through showcasing India's methane reducing technologies/processes, which have been development and are being implemented across country.

This could be possible when we put together India's technology strength combined with policy in various sectors which are workable and also frugal, leading to large scale multiplier effect. Therefore, it is timely to tackle all sources from different sector emissions arising from human activity and discuss methane emissions and reduction strategies for a positive climate change effect to bring India's ambition of being the leader.

The proposed dialogues across all stakeholders from all sectors will help develop Indian centric strategy from various sectors through cost effective voluntary efforts and deploying known processes. These efforts will assist to capture and profitably use methane emissions. Efforts are needed to compare capabilities, discuss challenges and review emerging technologies for monitoring methane and delineate an action plan for sector-specific efforts which India can implement with a specific timeline.

This series of event "Climate Goals: Technological Roadmap to Net Zero" will not only help develop targeted sector-based methane mitigation strategies but will also strengthen India's position in future climate negotiations.

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THEME - 1

SUSTAINABLE MINING

For attaining sustainability in any sector, it is important to understand the challenges faced by that sector in detail. Here some of the major challenges faced by the mining sector of our country are discussed in brief which forms the basis of discussion during the brainstorming session.






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ENVIRONMENTAL IMPACT OF MINING

There are many issues pertaining to the environment and sustainability in this sector, which are impacting the landscape of the country and also society. Though such activities are mostly remotely located, they start having their repercussions soon.

AIR POLLUTION :

Dust and gases released by the mining process are bad for the health of miners as well as the environment. Over time, exposure to the dust created by mining operations can lead to disease and build-up of scar tissue in the lungs.

Transport system, mining equipment's which are mostly diesel-powered create harmful emissions and when they are combined with dusts of various varieties, the health impacts on miners and habitation nearby are enormous.

WATER POLLUTION :

It has been widely reported that materials left around move during rains and also during transportation to nearby water bodies and many times, seep into ground water. Increased acidity and heavy metal contamination can destroy wildlife and render water undrinkable creating a long term impacts.

Some forms of mining also require the draining of underground water reservoirs called aquifers, which can cause serious impacts — like drying up springs, cutting off rivers, wells drying or getting contaminated and degrading local ecosystems.

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SOIL EROSION :

One of the most visible impacts of mining witnessed is related to soil erosion. Pit mining, for example, hollows out land to extract raw materials. It blasts away land and strips vegetation, leaving the area vulnerable to soil erosion — the wearing away of the topsoil layer of time. Topsoil is necessary for plants to grow, and without it, mining sites can never fully recover.

If not corrected in time, soil erosion can often spread, meaning that mining can lead to effects on the soil beyond the site to far off regions.

MINING METHODS AND THEIR IMPACTS

There are varieties of different methods of mining that have variety of environmental impacts, ranging from minor to major.

- **OPEN - PIT MINING**

  Open-pit mining, one of the most common forms, is one of the most damaging. Miners hollow out a section of land, digging down to create a workable area and extract valuable raw materials. This method leaves behind large pits in the earth and is responsible for contamination of groundwater and surface water.

  The land left behind, if not rehabilitated, is highly vulnerable forwards further erosion. It's often not suitable for plant or animal life. Without human intervention, it may take years or decades for the land to become usable again.

- **UNDERGROUND MINING**

  Underground mining, where miners tunnel beneath the Earth's surface to extract mineral deposits, is rarer than open-pit mining. It has been estimated that it makes up to about 5-6% of all the mining which varies from one country to another. Though it has less surface impacts, it has immense impacts in future due to possible land subsidence and accidents. Under this mining method, rocks and minerals are brought to the surface from tunnels underground. There, toxic chemicals in the waste material can escape into the environment and local waterways if not properly disposed of.

  Underground mining can also sometimes lower the water table. The dewatering can lead to drying up of springs, impact rivers and degrade local ecosystems. Dried ground and dried aquifers (groundwater sources) are an environmental effect of mining

- **SAND MINING AND QUARRYING**

  River sand mining and stone / murrum minings are other types of mining which have shown high impacts if they are not managed properly and can have long lasting impacts on river ecosystem in terms of water availability and flora and fauna..

These negative environmental effects can continue long after a mining company has stopped operations, packed up its equipment and moved on.

What's more, even though rehabilitation can prevent the effects of mining from getting worse over time, not all companies invest in rehabilitating their sites. As a result, many are left alone to pollute the nearby environment for years or even decades to come.

POSSIBLE GREEN SOLUTIONS

There is a need to examine the mining operations afresh, especially the decentralised one, which appears to have smaller footprint but can have long term impacts locally and in a region. Companies can move in the direction of sustainability - especially as pressure from individuals and governments push them to comply with higher standards of environmental and social governance (ESG). Across world, experts of ESG and industry professionals within mining predict that mining operations will have to begin thinking more seriously about sustainability.

For example, some mining companies are experimenting with advanced land rehabilitation schemes that can help reintroduce plant life to former sites. With the use of biosolids - nutrient-rich organics derived from sewage treatment processes that are often used as soil conditioners in agriculture - it may be possible to reintroduce plant life to former mining sites in less than few weeks.

Other, even more ambitious rehabilitation plans are focused on the best possible stewardship of former mining sites. These plans look to not only rehabilitate the land, but also attempt to reintroduce almost 100% of the species that were living there before operations began.

Another area of improvement can be equipment typologies and their upgrades that can reduce the impact of mining on the environment.

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Machines with electric engines are becoming increasingly popular, with some companies, like Swedish mining equipment manufacturer Epiroc, even going so far as to pledge using only electric products over the next few years. Widespread adoption of electric engines could easily help the industry reduce the amount of carbon dioxide and other pollutants such as PM10 - PM2.5 that gets emitted.

Low-impact mining techniques are also becoming more popular. In-situ mining is seeing bigger use in many countries, where the needs of mines and minerals are growing exponentially.

One of the major section which has been ignored for a long time is Society and people. The impacts on those engaged directly in mining and others who are indirectly benefitted through secondary employment and economic progress are rarely counted and discussed. There are millions of direct jobs which are created in this sectors, however, if the sustainable practices are not brought out, these benefits will be slowly eroded and create huge environment and social impacts in future.

Mining continues to be a huge component of the global economy — and in the future, it's likely to only grow larger as the demand for raw materials increases.

Way Ahead

Optimism is key. There is some hope that mining will become more sustainable in the future. The adoption of low-impact techniques and more eco-friendly equipment — plus pressure from environmentally minded individuals and governments — may make the industry more eco-friendly over time.

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THEME - 2

COAL MINING AND COAL BED ENVIRONMENTAL FOOTPRINT AND METHANE EMISSIONS

There are significant environmental impacts associated with coal mining and use. It could require the removal of massive amounts of top soil, leading to erosion, loss of habitat and pollution. Coal mining causes acid mine drainage, which causes heavy metals to dissolve and seep into ground and surface water. Coal mine workers also sometimes face serious health problems, including lung disease from prolonged exposure to coal dust in mines. Methane gas that occurs in coal deposits can explode if it concentrates in underground mines. This coalbed methane must be vented out of mines to make mines safer places to work. In 2020, methane emissions from coal mining and abandoned coal mines accounted for about 7% of total U.S. methane emissions and about 1% of total U.S. greenhouse gas emissions (based on global warming potential). Some mines capture and use or sell the coalbed methane extracted from mines. According to recent reports of EPA, coal mining will be responsible for 10% of global methane emissions in 2030. In India, coal production has increased from 118 Mt in 1980 to 773 Mt in 2019 (Ministry of Coal, 2021).

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According to the Global Methane Initiative (GMI) recent report it is estimated that the worldwide methane emissions from coal mining were around 957.3 Mt CO2eq in 2020 which will further increase in future (GMI 2022). Modeling results from Top-down approach suggested that even under a strong 2°C transition pathway, these emissions would remain significant at around 300 Mt-CO2e until the end of the century (Kholod et al., 2020). Therefore, appropriate bottom-up quantification and understanding of mitigation measures is an important activity as part of GHG inventory preparation for India, which is now the second largest coal producer after China.

Given above, it is important that Coal Mining and Coal Bed related methane emissions are discussed in detail to formulate strategic solutions for the sector with an aim to reduce environmental and climatological footprint while also focussing on various aspects such as technology, policy, finance etc which are required for the Coal mining and Coalbed sector to achieve the above goals in a sustainable manner. Some of broad agenda points to be discussed during brainstorming are given as follows :

- Indian centric strategy for reducing methane emissions from the above focus sector through cost- effective voluntary efforts and deploying known processes.
- How methane emission reductions can help to achieve climate change goals, as well as efforts to capture and profitably to use methane emissions.
- To compare capabilities, discuss challenges and review emerging technologies for monitoring methane.
- Discuss and put together sector specific efforts which India can implement with a specific timeline.
- Suggest roadmap for Methane monitoring guidelines development and its incorporation in India.

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The panel may also focus on discussing points such as Global trends of methane emissions, worldwide Status, and Indian Scenario; Strategy for reducing short-lived climate pollutants from the targeted sector in India; Emission verification and reduction initiatives; Capabilities, challenges and emerging technologies for monitoring and control of methane; Latest studies, policies developments and novel technologies for monitoring fugitive methane emissions, including leak detection, identification, quantification, and long-term monitoring; Prioritization of activities for targeting sector specific plan around mitigating methane emissions; Identifying solution strategies for India on methane emissions, based on their expertise and experience.

PROPOSAL

There is a need to hold a discussion with all the concerned across board to debate and discuss the next steps. This step will need all the operators, advisors, district mining authorities, policy makers, academia and consultants. One event shall be held with all experts and active people in Mumbai and then take the message across all the districts in Maharashtra and India where these activities are rampant for closer discussion and improvement.

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TIME

First Mumbai event in month of April end and follow up events may be planned based on traction and success of this event in Nagpur, Kolhapur, Aurangabad, Pune afterwards.

TARGETED OUTCOME OF THE MEET:

- Awareness on sustainable mining attributes, climate goals, methane emission, by highlighting short term and long-term impacts to policymakers.
- Sector-specific directions for India on sustainable mining and methane emissions with an action plan.
- The importance of emission detection and measurement in responsible sectors, as well as developing long-term strategies that shall focus on decarbonization
- Challenges and opportunities in research and development, demonstration, and deployment of technologies in methane detection and mitigations in responsible sectors.
- The findings that will describe the overall strategy for developing sustainable mining for India which shall help in reducing environmental and methane emissions footprint. The strategy may be shared amongst policy and decision makers for application of technology based solutions for India's resilience towards Climate Goals.

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SPONSORSHIP OPPORTUNITIES...

As the need to address climate change issues are become more urgent and pressing than ever and India's action in curbing climate pollutants has witnessed many specific leadership programs but less efforts have been made to target non-CO2 GHG emissions like methane. Hence it becomes important to make face-to-face connections with policy makers, regulators, energy leaders, key influencers, new market entrants and the global industry to understand the following on methane:

- **Status and S&T Inventions / Implications**
  Capture and profitable use methane emissions, Deploying Known Processes for Control and R&D Needs.
- **Community Implication**
  Behavioural aspect, adoptions and associated challenges
- **Financial Implications**
  Supports available nationally or internationally

The session during the summit and symposium shall not only help your organisation understand the technological R&D and business opportunities for the stakeholders in the sector but will also provide a host of sponsorship, branding & advertising opportunities suited to meet your organisation objectives. From thought leadership positioning, networking opportunities to high visibility branding and advertising campaigns, our packages are designed to maximize benefits and ensure high returns on your investments. The summit would provide networking & collaboration opportunities for :

- **Bilateral Trade**
- **Technology Transfer & Research Collaboration and Centre of Excellence in National Methane Initiate**
- **National / International Joint Ventures**
- **National / International Funding**

WHY SPONSOR

Engage and connect with stakeholders & partners, policy makers, academicians, researchers in different sectors for methane mitigation.

Collaboration in CoE on National Methane Initiative.

Build long term relationship with potential and existing customers.

The conference / Event will be attended by

150-200
Audience

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GOLD PACKAGE : 10 LAKHS

- Up to 10 free event registration with kits
- Solo presentation in front of expert audience
- Logo on conference banner and website as Title Sponsor
- Opportunity to display their organisation details/products
- Name on Inaugural session stage and invitation
- Full page advertisement on registration kits, website/ social media handles
- Lunch with high quality leaders

SILVER PACKAGE : 5 LAKHS

- Up to 5 free event registration with kits
- Expert member in event panel discussions with other experts
- Logo on conference banner and website as Lead Sponsor
- Name on Inaugural session stage and invitation
- Half page advertisement on registration kits, website/ social media handles
- Lunch with high quality leaders

BRONZE PACKAGE : 2.5 LAKHS

- Up to 3 free event registration with kits
- Logo on conference banner and website as Associate Sponsor
- Half page advertisement on registration kits, website/ social media handles
- Lunch with high quality leaders

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