Methane Roadmap Action Programme
(M-RAP)

Coal Mine Methane - CCAC M-RAP NDC Enhancement
Opportunities and Examples Workshop
Increasing Ambition on Coal Mine Methane Abatement: Resources and Best Practices

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The views expressed are those of the presenters and do not necessarily reflect the views of the United Nations nor those of the Global Methane Initiative
UNECE & GMI: OVERVIEW

- United Nations Economic Commission for Europe (UNECE) is one of five UN Regional Commissions

- Global Methane Initiative (GMI) is an international public-private partnership focused on reducing barriers to the recovery and use of methane as a valuable energy source from key sectors:
  - Oil & Gas, Coal Mines, and Biogas (Agriculture, Municipal Solid Waste and Wastewater)

Long-standing partnership between UNECE and GMI

- 56 member States
- UNECE Groups of Experts on Coal Mine Methane and Just Transition & on Gas
- Global mandate by UN Economic and Social Council to disseminate Best Practice Guidance for effective management of coal mine methane

- 49 Partner Countries
- 1,500+ Project Network members

GMI Partner Countries represent approximately 75% of methane emissions from human activities.
**Methane action** contributes to the achievement of the Paris Agreement (1.5°C target), the Global Methane Pledge & SDGs

Coal mine methane emissions **mitigation** is needed in parallel with measures to transition away from coal production and consumption.

Methane mitigation in this sector takes place through capture and use of coal mine methane, which:

- Is among the most effective near-term options to reduce the carbon footprint of the mining sector
- Enhances mine safety and productivity
- Localizes energy production
- Improves air quality and health
TECHNOLOGIES AND PRACTICES FOR METHANE CAPTURE AND USE/DESTRUCTION AT COAL MINES

- Mitigation approach varies by country and mine conditions. For example, not all coal mines are gassy.
- Mitigation technologies exist at varying costs; cost-effectiveness depends on circumstances.
- Underground coal mines have the highest potential for mitigation; Ventilation Air Methane shafts represent large (but low concentration) point sources that accounts to 60-80% of emissions in some countries.

### TECHNICAL DESCRIPTION

**Before mining**

- **Surface Coal Mines**
  - Pre-drainage (high CH4%) + use/destruction

- **Underground Coal Mines**
  - Pre-drainage (medium CH4%) + use/destruction

**During mining**

- Gob drainage (medium CH4%) + use/destruction
- Capture and destroy Ventilation Air Methane (very low CH4%)

**After mining**

- Pre-closure engineering planning, i.e., filling shafts & installing pipework for production of abandoned mine methane (AMM) (declining CH4%)
- Installation of wells to capture + use/destroy AMM (declining CH4%)
POTENTIAL STEPS TO INCLUDE COAL MINE METHANE ABATEMENT IN NDCS

1. Understand the context, such as emission sources, relevant policies, priorities and goals
   • What are the sub-sources of methane emissions from coal mining? Surface vs. underground? Operating vs. Closed?
   • Who owns methane in coal mines?
   • What government agencies regulate air quality and coal mine safety?
   • Are there incentives for capture and use of methane from coal mining?

2. Engage relevant stakeholders
   • Solicit input on policy ideas, feasibility, costs, and impacts
   • Listen to industry perspectives and local community concerns
   • Collect and clarify technical information and data for subsequent analyses, program design, reporting
   • Inform stakeholders on policy proposals or new rules
POTENTIAL STEPS TO INCLUDE COAL MINE METHANE ABATEMENT IN NDCS

3. Establish baseline
   • Map the country’s operating and closed coal mines; identify mines that are gassy vs. non-gassy
   • Can safety measurements be used to estimate baseline emissions?

4. Set goals and include goals in the NDCs
   • Is the objective to improve understanding of methane emissions sources?
   • Should methane emissions be mitigated from top sources?
   • Are there examples of successful coal mine methane mitigation projects in country?
   • Are mitigation technologies readily available in country?

5. Develop policies and programs
   • Will policies and programs be prescriptive, performance-based, economic, or information-based?
   • Identify policies that already work well in the country
   • Assess feasibility of mitigation options, including potential markets for mine methane or reductions
   • Can underground coal mines be closed to ensure subsequent utilization of methane?
   • Identify “low-hanging fruit”: underground coal mines with high potential for successful abatement
6. Implement policies and programs
   • Plan for access to financing for project developers and implementers
   • Track data to ensure compliance and meeting of goals

7. Evaluate, report, and adapt
   • Determine status of policy implementation
   • Track and verify emission reductions
   • Gather input from stakeholders
   • Report achievements towards climate goals

GMI and UNECE resources for these steps are listed in the appendices. Please reach out for any assistance.
Globally, there is limited experience regulating methane emissions from coal mines. However, there is extensive experience supporting coal mine methane (CMM) projects by reducing barriers and creating incentives, such as:

- Clear forms of methane ownership in coal mines, including easy transfer of ownership to third parties
- Cost-reflective prices on energy are beneficial for CMM projects—it is hard to compete against low-cost, subsidized fuel
- Strong implementation of safety requirements
- Access to energy markets: both in terms of legislation and physical infrastructure
- Effective environmental policies, such as carbon markets, feed-in tariffs/obligations
- Tax incentives: reduced/removed royalties and/or taxes on production, income, capital purchase
- Strong institutional support, i.e., designated CMM authorities and regulatory agencies, can help identify policy options, technical barriers and reduce transaction costs for CMM
GMI tracks CMM projects around the world:

- It is the most comprehensive database of global projects, although data gaps exist
- About 250 projects identified in 14 countries
- China accounts for 60% of global coal production and hosts the largest number of CMM projects (83)
  - Policies in China vary by province and include subsidies (feed-in tariffs, exemptions from royalties, rebates on income taxes) and loans for CMM utilization
- United States: 57 known CMM projects
  - CMM projects are incentivized through publicly-available data on emissions from coal mines, state-level carbon markets and renewable energy portfolio standards
Top 3 project end uses for CMM globally:
- power generation
- combined heat and power (CHP)
- flaring

Ventilation Air Methane (VAM) projects in China have increased: 16 projects enrich VAM with drainage gas to produce steam electricity

An updated global CMM project list will be posted on the GMI website soon.

Please sign up for GMI newsletter to receive notifications: https://globalmethane.org/communications/index.aspx
## NEW EU REGULATION ON COAL MINE METHANE

<table>
<thead>
<tr>
<th>CH4 EMISSION SOURCE (from underground coal mines)</th>
<th>MONITORING REQUIREMENTS</th>
<th>MITIGATION REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venting from ventilation shafts</td>
<td>Continuous source-level direct measurements and quantification on all exhaust ventilation shafts [07/2025]</td>
<td>Vventing &gt; 5 t CH4/kt steam coal prohibited [2027] Vventing &gt; 3 t CH4/kt steam coal prohibited [2031] (exemptions in case of an emergency)</td>
</tr>
<tr>
<td>Venting from drainage stations</td>
<td>Continuous source-level direct measurements and quantification of total releases of vented methane [07/2025]</td>
<td>Vventing prohibited [2025] (exemptions apply)</td>
</tr>
<tr>
<td>Flaring from drainage stations</td>
<td>Continuous source-level direct measurements and quantification of total releases of flared methane [07/2025]</td>
<td>Flaring must achieve ≥ 99% efficiency [2025]</td>
</tr>
</tbody>
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Source: Adapted from The Oxford Institute for Energy Studies, Energy Insight: 153
UNECE AND GMI RESOURCES AVAILABLE TO SUPPORT COUNTRIES IN MITIGATING COAL MINE METHANE EMISSIONS

- Best Practice Guidance documents providing accessible, high-level guidance for senior corporate, government and financial decision-makers to lower the carbon footprint of the coal industry

- Training on assessing the potential of developing projects to capture and/or use Coal Mine Methane

- Expert advice
  - Exchange of best practices and lessons learned on coal mine methane abatement in countries around the world & various forms of collaboration through participation in UNECE Group of Experts on Coal Mine Methane and Just Transition and its Task Forces on: (i) Methane Emissions Reduction, (ii) Just Transition, and (iii) Safe Operations and Closure of Coal Mines

- Technical cooperation
  - Support on the development of legislation / regulation / incentive schemes to enhance coal mine methane mitigation
  - Support in building national monitoring, reporting and verification (MRV) programmes and frameworks for methane emission inventories
Including methane emission reduction targets in NDCs and country development plans is an effective way to achieve the goals committed through the Paris Agreement & the Global Methane Pledge.

Coal mine methane abatement measures are effective and, when reasonable, should be included in NDCs:
- Technologies are available at varying costs (depending on country and mine-specific conditions)
- Emissions are concentrated in few points (vs. distributed, like in gas value chain)
- Mitigation enhances mine safety

To enhance action on coal mine methane, countries can adopt regulation for any stage of mining or incentivize projects by offering financial benefits.

Support is available for countries that wish to seize methane abatement opportunities.
For follow-up discussions, please contact us:

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Appendix: Additional Resources
1. Understand context through
   - CMM Country Profiles
   - Training: Basics of Coal Mine Methane

2. Engage stakeholders
   - Brainstorming session notes on challenges to project development, on solutions to top issues, and on potential actions to scale up mitigation of methane emissions from coal mines

3. Establish baselines
   - Best Practice Guidance on Monitoring, Reporting, Verification and Mitigation
4. Set goal and include in NDC
   - International CMM Project List

5. Develop policies and programs
   - Reports on CMM and AMM ownership status in different countries and relevant policies

6. Implement policies and programs
   - Trainings on how to conduct pre-feasibility studies at active and abandoned coal mines