

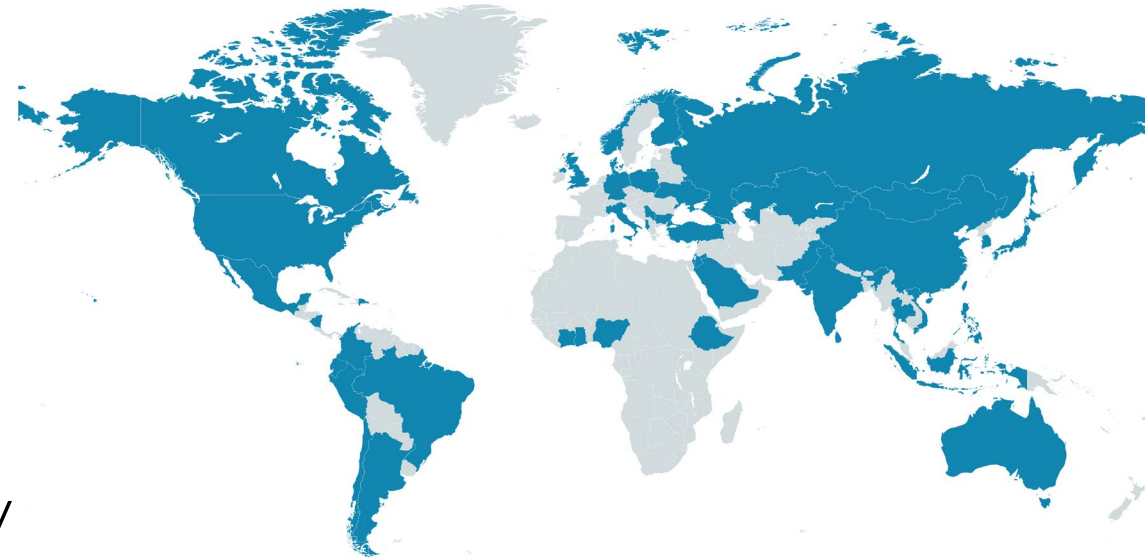
**Item 10: Twelfth Joint Meeting of UNECE
Group of Experts on CMM & JT and 31st
GMI Coal Mines
Subcommittee Meeting**

22 March 2022

Global Methane Initiative (GMI)



- GMI is an international partnership of 45 countries and hundreds of private sector and multilateral partners focused on reducing methane emissions across five key sectors: oil & gas, coal mining, landfills, agriculture (manure), wastewater.
- Aim to provide the tools, resources, and expertise to enable countries to reduce methane quickly and cost-effectively
- Secretariate: US Environmental Protection Agency (as well as cross-sector technical expertise)



■ GMI Partner Countries

Strategic Alliances



Subcommittee Meeting Agenda: March 23



- **Welcome** (Volha Roshchanka, Coal Mines Subcommittee Co-Chair, EPA)
- **Keynote Address from the Subcommittee Co-Chair from India** (Manoj Kumar, Coal Mines Subcommittee Co-Chair, CMPDI)
- **Keynote Address from the Subcommittee Co-Chair from China** (Liu Wenge, Coal Mines Subcommittee Co-Chair, CCII)
- **Secretariat Update** (Monica Shimamura, GMI Secretariat)
- **Country Updates from Delegates**
- **Subcommittee Updates and Accomplishments** (Liu Wenge, Coal Mines Subcommittee Co-Chair, CCII)
- **Subcommittee Action Plan** (Volha Roshchanka, Coal Mines Subcommittee Co-Chair, EPA)
- **Summary of Action Items and Adjourn**

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Subcommittee Co-Chairs

- Liu Wenge, Co-chair
China Coal Information Institute (CCII) (China)
- Manoj Kumar, Co-chair
Central Mine Planning & Design Institute Ltd (CMPDI) (India)
- Volha Roshchanka, Co-chair, U.S. Environmental Protection Agency (EPA) (United States)

Welcome to Our New Coal Mines Subcommittee Delegates!

■ Two new Coal Mines Subcommittee Co-Chairs

- China – Liu Wenge
- India – Manoj Kumar

■ Several New Delegates

- Australia – Shon Fletcher
- Australia – Tamara Pavlovic
- Colombia – Gustavo Adolfo Raad de La Ossa
- Colombia – Gloria Gheorghe
- Turkey – Metin Aktan
- Turkey – Dilan Duman
- Turkey – Hasan Hüseyin Erdoğan
- Mongolia – Melscho Mendbayar
- Mongolia – Demchig Tserenkhand



Goals of the Coal Mines

- Goal: To reduce the impacts of climate change by providing international leadership to mitigate global methane emissions through the abatement, recovery, and use of methane from coal mines.
- Focus of the Subcommittee is to:
 - ✓ Promote the recovery, abatement, and utilization of coal mine methane (CMM), ventilation air methane (VAM), and abandoned mine methane (AMM)
 - ✓ Encourage collaboration to build capacity and develop strategies and markets
 - ✓ Work to remove barriers to methane mitigation project development to improve worker safety, enhance mine productivity, increase revenues, and reduce greenhouse gas (GHG) emissions.



GMI Tools Support All Steps in Project Development

Gather Background Information

- [CMM Country Profiles](#)

Identify Project Opportunities

- Prefeasibility and feasibility [studies](#) in GMI countries

Evaluate Coal Mine Methane (CMM) Resources

- [Training](#) on how to conduct prefeasibility studies

Assess the Market for CMM

- CMM market [studies](#) for select countries

Analyze Cash Flows

- CMM Cash Flow [Model](#)

Develop and Operate a Project

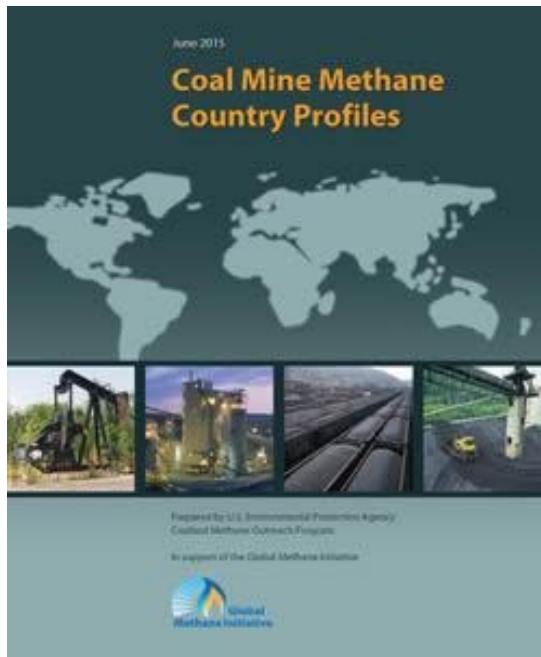
- CMM Mitigation and Utilization Technologies [Database](#)



GMI Tools for Coal Mine Sector

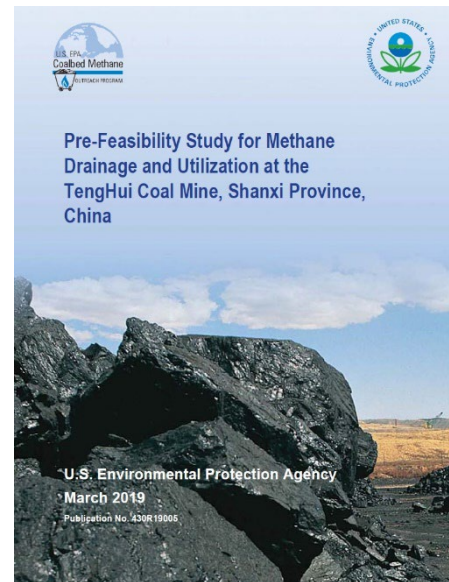
1. Gather background Information:

- [CMM Country Profiles](#):

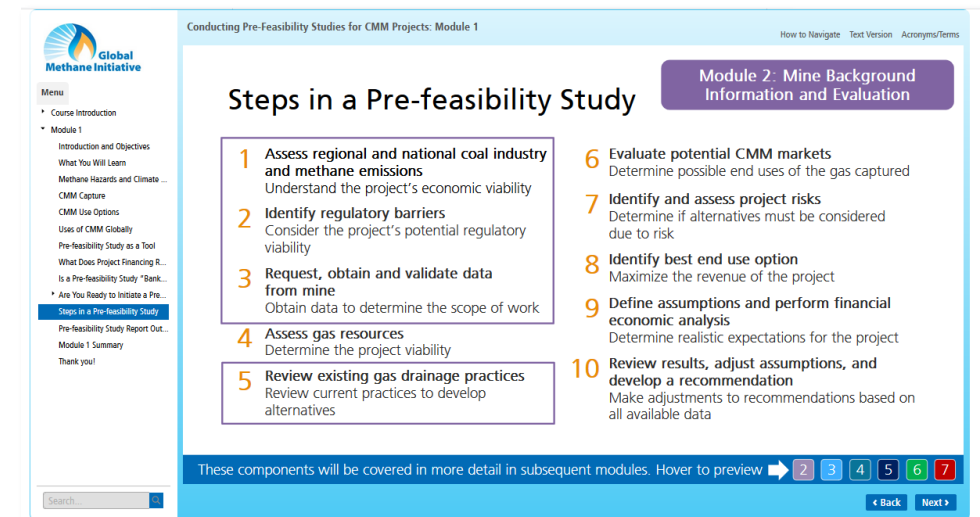


2. Identify project opportunities

- Prefeasibility and feasibility [studies](#):
 - Over 50 studies in 11 GMI Partner countries



3. Evaluate CMM Resources: [Training](#) on how to conduct pre-feasibility studies at active and abandoned coal mines



Conducting Pre-Feasibility Studies for CMM Projects: Module 1

How to Navigate Text Version Acronyms/Terms

Module 2: Mine Background Information and Evaluation

Steps in a Pre-feasibility Study

| | |
|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 1 Assess regional and national coal industry and methane emissions Understand the project's economic viability | 6 Evaluate potential CMM markets Determine possible end uses of the gas captured |
| 2 Identify regulatory barriers Consider the project's potential regulatory viability | 7 Identify and assess project risks Determine if alternatives must be considered due to risk |
| 3 Request, obtain and validate data from mine Obtain data to determine the scope of work | 8 Identify best end use option Maximize the revenue of the project |
| 4 Assess gas resources Determine the project viability | 9 Define assumptions and perform financial economic analysis Determine realistic expectations for the project |
| 5 Review existing gas drainage practices Review current practices to develop alternatives | 10 Review results, adjust assumptions, and develop a recommendation Make adjustments to recommendations based on all available data |

These components will be covered in more detail in subsequent modules. Hover to preview

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GMI Tools for Coal Mine Sector

4. Assessing the Market for CMM:

- CMM market [studies](#) for select countries

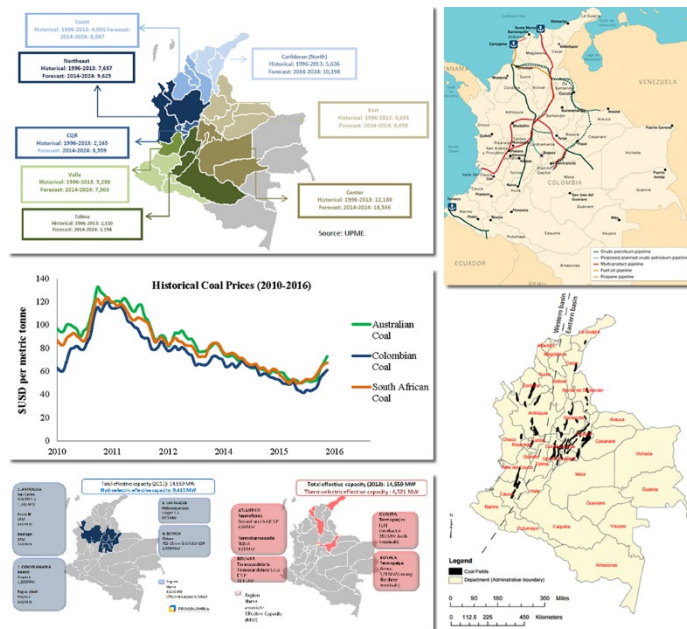
5. Analyzing the Cash Flows:

- CMM Cash Flow [Model](#)



6. Developing and Operating the Project:

- CMM Mitigation and Utilization Technologies [Database](#)
- CMM Project [List](#)

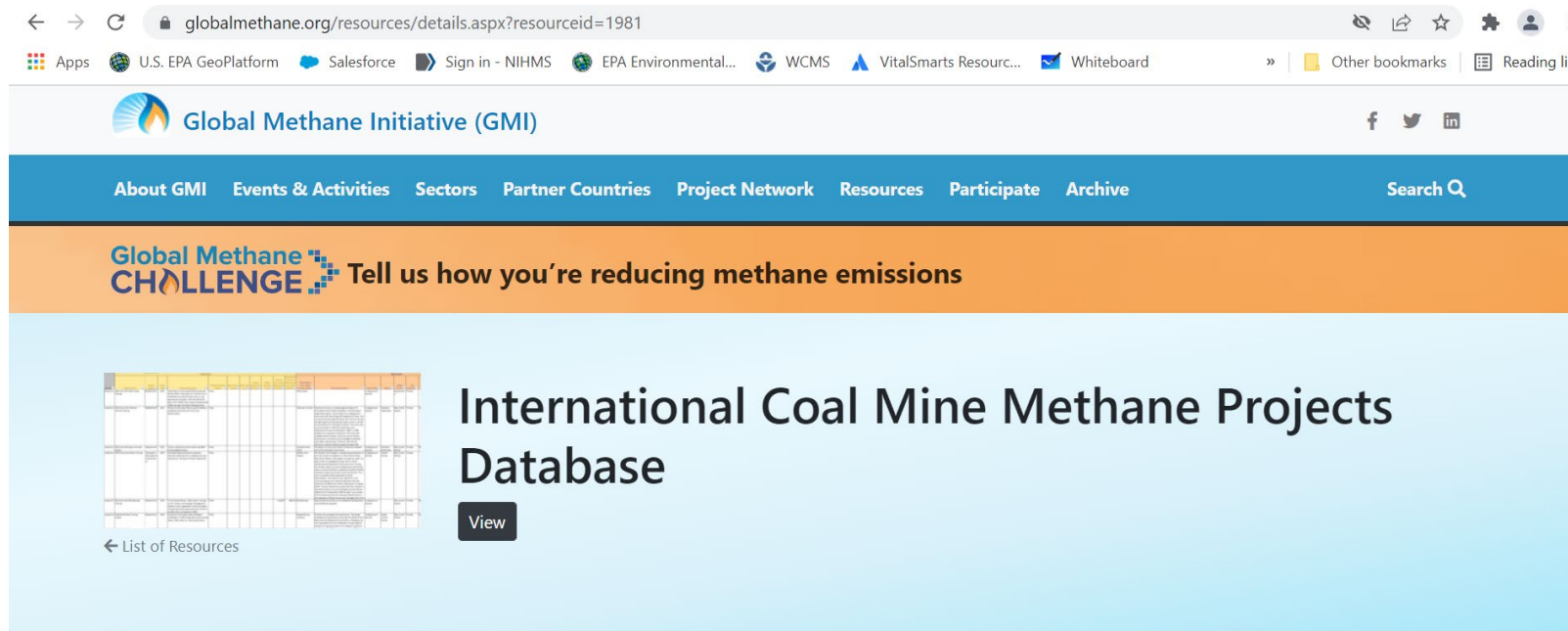


Methane Combustion

| Gas Engines | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| COMPANY | DESCRIPTION |
| Caterpillar | Mines often vent medium quality gob gas instead of using it, because gob gas requires enrichment and treatment prior to pipeline injection. However, fuel for power generators does not require pipeline quality gas. Generally, IC engines can be adapted to generate electricity using coal mine gas with a methane concentration as low as 25%. Regulations in most countries require a minimum of 25% CH ₄ concentration for utilization and some require 30% CH ₄ . While all internal combustion engines powered by CMM are capable of producing electricity, several also have the capability for waste heat recovery and co-generation. There has been considerable consolidation among engine manufacturers in recent years and the list below in some cases includes different brands produced by the same manufacturer. |
| http://www.cat.com/power-generation 888-614-4328 toll free in United States and Canada +1 (309) 675-2337 international http://www.cat.com/en_US/support/contact-us.html | Caterpillar has introduced a range of larger, more efficient gas generator sets that can be fueled by CMM, landfill methane, or natural gas. The CMM fueled CAT™ G3520C Gas Engine produces 2077 kW with an efficiency of about 40% and NOx ratings as low as 0.5 g/bhp-hr. Minimum methane concentration for gas engines may be as low as 25%. Large installed base of CMM power generation, mainly in Australia and China. http://www.cat.com/power-generation |

New in 2021: Int'l CMM Project Database

- International Coal Mine Methane Projects Database: best available source of information on operational and former/future CMM projects globally.



The screenshot shows a web browser displaying the Global Methane Initiative (GMI) website. The URL is globalmethane.org/resources/details.aspx?resourceid=1981. The page features the GMI logo and navigation menu. A prominent orange banner reads "Global Methane CHALLENGE Tell us how you're reducing methane emissions". Below this, a section titled "International Coal Mine Methane Projects Database" includes a thumbnail image of an Excel spreadsheet and a "View" button. A "List of Resources" link is also visible.

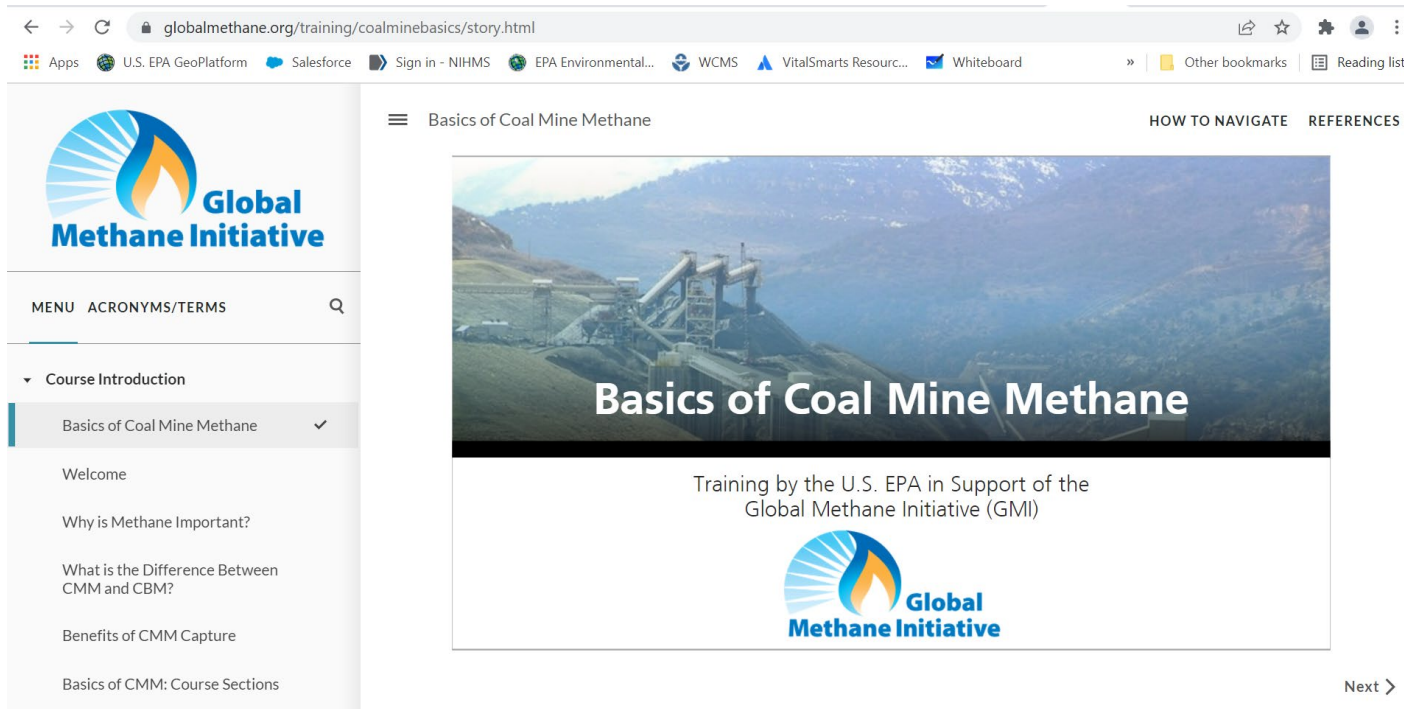
Sector: Coal Mines

Year: 2021

This Excel document contains information on over two hundred coal mine methane recovery and utilization projects operating, in development, or planned around the world in both Global Methane Initiative partner and non-partner countries.

New in 2022: CMM Basics Training

- New [training](#) that provides information about methane that is emitted through coal mining and summarizes potential mitigation options
- Thank you to the Coal Mines Subcommittee delegates for review and feedback!



The screenshot shows a web browser displaying the training page for 'Basics of Coal Mine Methane'. The browser address bar shows the URL globalmethane.org/training/coalminebasics/story.html. The page features the Global Methane Initiative logo in the top left corner. A navigation menu on the left includes 'MENU ACRONYMS/TERMS' and a search icon. Under the 'Course Introduction' section, 'Basics of Coal Mine Methane' is selected with a checkmark. Below this, a list of course sections is visible: 'Welcome', 'Why is Methane Important?', 'What is the Difference Between CMM and CBM?', 'Benefits of CMM Capture', and 'Basics of CMM: Course Sections'. The main content area has a header 'Basics of Coal Mine Methane' and links for 'HOW TO NAVIGATE' and 'REFERENCES'. A large image of a coal mine is shown with the title 'Basics of Coal Mine Methane' overlaid. Below the image, it states 'Training by the U.S. EPA in Support of the Global Methane Initiative (GMI)' and includes the Global Methane Initiative logo. A 'Next >' link is located at the bottom right of the page.

Thank you!

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Co-Chair, Coal Mines Subcommittee
Global Methane Initiative

Director
Coalbed Methane Outreach Program