



Economic and Social Council

Distr.: General
15 December 2020

English only

Economic Commission for Europe

Committee on Sustainable Energy

Twenty-ninth session

Geneva, 25-27 November 2020

Report of the Committee on Sustainable Energy on its twenty-ninth session

Addendum

Managing methane from abandoned coal mines

I. Methane

A. Background

1. Methane is an important and potent greenhouse gas (GHG). The 100-year global warming potential of methane is 25 times higher than that of carbon dioxide (CO₂). Measured over a 20-year period, methane's warming potential is 84 times that of CO₂, and on an instantaneous basis the figure rises to 120.
2. Although methane is considered a short-lived climate pollutant as it remains in the atmosphere for a relatively brief period of time, its atmospheric volumes are replenished continuously and atmospheric concentrations have been rising.
3. About 60% of global methane emissions are a result of human activity. The main sources of anthropogenic methane emissions are the oil and gas industries, agriculture, landfills, wastewater treatment, and emissions from coal mines. Fossil fuel production, distribution and use are estimated to emit 110 million tonnes (Mt) of methane annually, or 29% of anthropogenic methane emissions. Approximately 8% of global anthropogenic methane emissions come from coal mines.
4. Much can be done to reduce methane emissions, which will be essential if countries are to attain their objectives. Additionally, reducing methane emissions offers significant health benefits by improving local air quality especially in the near term. Effective management of methane including from abandoned coal mines is an imperative part of climate change mitigation strategies. Abandoned mine methane emissions typically are not accounted for in national GHG inventories.

B. The need to address coal mine methane

5. Coal and methane are co-located resources in many parts of the world. Global emissions of methane will continue to increase with continued mining. Mining operations

release methane that was formed during coalification and trapped under pressure in the coal seam as well as in surrounding rock strata. The extraction of coal reduces pressure in the coal bed, thereby creating a void and allowing surrounding strata to relax. The pressure relief frees methane to escape into open fractures and ultimately into the atmosphere. Coal mining-related activities, such as extraction, crushing, distribution, and the like lead to the release of a substantial amount of the methane trapped in the coal seam.

6. Key coal producing nations emit over 750 Mt of carbon dioxide equivalent (CO₂e) or 52.5 billion cubic metres of methane per annum. Much of this methane is emitted in low concentrations mixed with air.

7. Methane released during active mining operations is known as coal mine methane (CMM). Methane can be emitted from active underground and surface mines, as well as from abandoned mines and undeveloped coal seams. The United States Environmental Protection Agency (U.S. EPA) estimates that 98% of methane emissions from the coal industry come from underground mines while surface mines contribute only 2% of those emissions.¹

8. Mitigation of methane from coal mines is both needed and possible. A number of projects are ongoing to reduce methane emissions at active and abandoned mines.

C. Abandoned mine methane

9. When mines close, methane emissions decrease but do not stop completely. In most cases, the remaining coal still contains considerable amounts of gas that is slowly released and/or migrates into the abandoned mine from neighbouring, connected coal deposits. This methane is known as abandoned mine methane (AMM). While the gas flow initially declines, it can later stabilize and maintain a near-constant rate for an extended period of time. Abandoned mines continue to emit methane for many years after closure and their emissions remain unchecked and unaccounted in many coal producing regions. If not controlled by adequate seals, the gas will migrate to the surface and escape to the atmosphere. In certain circumstances, it may be vented to avoid build-up and possible leaks through cracks and fractures in the overlying strata.

10. As many countries shift their energy economies away from coal, tackling AMM emissions has become an important issue. This phenomenon, however, is observed not only in countries where coal production is declining and mines are closing, it is also found in those countries where coal production continues to play a significant role in the energy mix and closed mines are replaced by new mines.

11. Methane emissions from closed and closing mines can be substantial and are projected to increase. Estimates of global coal mine methane emissions indicate that AMM represented 17% of the total mine methane emissions in 2010 and forecasts indicate that the proportion may increase to as much as 24% in 2050. To put these numbers in perspective, in 2016, coal mines in the United States alone released 60.5 MtCO₂e of methane.

12. Not all abandoned mines are suitable for commercial AMM projects. Favourable mining and geological conditions are necessary, as are implementation of a proper mine-closure procedure allowing for gas capture, relevant regulations, and financial incentives facilitating development of AMM projects.

II. AMM-related actions taken by ECE

13. The United Nations Economic Commission for Europe (ECE) Group of Experts on Coal Mine Methane (CMM) works on development and dissemination of best practices on effective drainage of methane in coal mines and on economically viable and socially responsible use or destruction of the captured gas. Although traditionally oriented towards

¹ US EPA, 2019, Global Non-CO₂ Greenhouse Gas Emission Projections & Mitigation: 2015–2050, EPA-430-R-19-010, https://www.epa.gov/sites/production/files/2019-09/documents/epa_non-co2_greenhouse_gases_rpt-epa430r19010.pdf

emissions from active mines, the Group of Experts has recognized that the problem persists throughout the whole coal mining life cycle.

14. To raise awareness of AMM opportunities amongst corporate, government and financial decision-makers, the Group of Experts on CMM prepared a Best Practice Guidance for Effective Methane Recovery and Use from Abandoned Coal Mines² (BPG on AMM) (ECE/ENERGY/128 and ECE Energy Series No. 64).

15. The BPG on AMM was issued in 2020 to draw attention to AMM opportunities and hazards by providing accessible high-level guidance for senior corporate, government and financial decision-makers – all of whom play an integral role in decisions to implement best practices.

16. The BPG on AMM does not replace or supersede laws and regulations or other legally binding instruments, whether national or international. The principles outlined in the publication complement existing legal and regulatory frameworks and support development of post-mining projects. The aim is to reduce overall emissions attributable to the coal mining life cycle by optimising recovery and use of methane that would otherwise be released to the atmosphere.

17. The BPG on AMM document complements the Best Practice Guidance on Effective Methane Drainage and Use in Coal Mines³ issued by the Group of Experts on Coal Mine Methane in 2010.

18. In 2011, the Economic and Social Council of the United Nations (ECOSOC) in its Decision 2011/222⁴ invited the United Nations Member States, international organizations and the regional commissions to take appropriate measures to ensure worldwide application of the Best Practice Guidance on Effective Methane Drainage and Use in Coal Mines. The Group of Experts on CMM seeks to obtain a similar decision regarding the Best Practice Guidance for Effective Methane Recovery and Use from Abandoned Coal Mines.

19. ECE organizes capacity-building events to disseminate and promote throughout the world practices, measures, and methods advocated by the BPG on AMM. One such event was a workshop on Post-Mining Perspectives: Capture and Use of AMM and Mine Reclamation and Revitalization of Post Mining Areas organized in Cracow, Poland in February 2020.⁵

III. Further information

20. ECE's work on managing AMM is carried out by the Group of Experts on Coal Mine Methane, a subsidiary body of the ECE Committee on Sustainable Energy. Additional information is available on the ECE web page dedicated to the Group's activities.⁶

² https://www.unece.org/fileadmin/DAM/energy/images/CMM/CMM_CE/Best_Practice_Guidance_for_Effective_Methane_Recovery_and_Use_from_Abandoned_Coal_Mines_FINAL__with_covers_.pdf

³ http://www.unece.org/fileadmin/DAM/energy/cmm/docs/BPG_2017.pdf

⁴ <https://www.un.org/en/ecosoc/docs/2011/dec%202011.222.pdf>

⁵ <https://www.unece.org/index.php?id=53280>

⁶ <http://www.unece.org/energy/cmm.html>