United Nations ECE/ENERGY/GE.8/2019/3

Economic and Social Council

Distr.: General
14 January 2019

Original: English

Economic Commission for Europe

Committee on Sustainable Energy

Group of Experts on Gas

Sixth session
Geneva, 25 and 26 March 2019
Item 8 of the provisional agenda
Joint Meeting of the United Nations Economic Commission for Europe and the Oil and Gas Subcommittee of the Global Methane Initiative

Methane Management in Extractive Industries: Best Practice Guidance – Overview

Note by the secretariat

Summary

At its twenty-third session, 19–21 November 2014, the Committee on Sustainable Energy considered the potential role for the United Nations Economic Commission for Europe (ECE) in developing norms and standards in the area of methane management. The Committee requested that the relevant ECE expert groups prepare a coordinated, solutions-oriented report about methane management in extractive industries with a focus on establishing a baseline, benchmarking and scale of current methane emissions in those industries, with the aim of giving clear guidance to policy makers.

Following the request by Committee, the ECE Group of Experts on Gas and the Task Force on Methane Management in Extractive Industries operating under the Committee undertook work to identify best practices in monitoring, reporting, verification, and mitigation of methane emissions along the oil and gas value chains.

The first draft of a publication on best practices has been prepared and submitted for review by a broad stakeholder community. This document serves as an overview of the above-mentioned draft. It is based on the introductory remarks contained in the draft, enriched by key points from each of its chapters.

The objective of this document is to bring the work on best practice guidance for methane management in the extractive industries to the attention of the ECE Group of Experts on Gas, and to provide it with a basis for discussion on the matter during the meeting

GE.19-00551(E)

I. Introduction

A. Key messages

1. Natural gas can play an important role in helping the United Nations Economic Commission for Europe (ECE) member States' efforts to decarbonize their energy systems. Natural gas is the cleanest-burning fossil fuel and is increasingly accessible, affordable, abundant, and flexible.

2. Methane emissions from oil and gas supply systems represent safety risks if they are not managed properly. Methane is a highly flammable gas that is regularly contained at high pressures. In addition, methane is a precursor of tropospheric ozone and a short-lived but powerful greenhouse gas. Consequently, its emissions not only represent a waste of energy resources but are also a significant driver of climate change.

3. Several international initiatives are focused on methane management in the oil and gas sectors. This document on Methane Management in Extractive Industries: Best Practice Guidance document (hereafter BPG) is intended to complement other initiatives and will draw from and refer to ongoing work and results achieved.

4. BPG addresses methane management at corporate, national and international levels, with an emphasis on the role that coordination and collaboration at the different levels can play in enhancing methane emission reduction efforts.

B. Objectives of the guidance document

5. BPG aims to provide guidance to oil and gas owners and operators, government regulators, and policymakers in development and implementation of effective monitoring, reporting and verification (MRV)[1] practices, as well as in mitigation actions to reduce methane emissions.

6. To effectively address methane emissions from the oil and gas sector, actions are needed at the facility, company, and the national levels. Furthermore, they should be also encouraged and influenced by initiatives at the international level. All three decision and action levels are covered in BPG, and the aspects of coordination and cooperation between them are emphasized.

7. If and when they are adopted, the practices presented in BPG will enhance the sustainability credentials of the oil and gas sector and facilitate long-term planning for these industries by:

(a) Demonstrating the global oil and gas sector's commitment to safety, corporate and social responsibility, environmental stewardship, as well as climate change mitigation;

(b) Establishing a global dialogue on methane management in the oil and gas sector; and

(c) Creating vital linkages among the oil and gas industry, the Governments, and international stakeholders.

[1] MRV practices referred to throughout this document encompass detection of emission sources, direct measurements at source and other methods being used for quantification of emissions, as well as various methods and procedures being applied to report and verify emissions levels and changes in emissions.

8. BPG is intentionally "principles-based". It does not aim to present one comprehensive and prescriptive approach to MRV and mitigation of methane emissions from the oil and gas sector. Conditions vary across oil and gas facilities, and legal, political and institutional aspects differ by jurisdictions. Therefore, technologies, methodologies and principles for methane emissions' MRV and mitigation are outlined in a way that provides a general basis for their adaptation to local conditions. The exact form of the adaptation will inevitably vary depending on circumstances governing in each situation. Case studies are also included in the BPG to illustrate the diversity of approaches and experiences related to application of the principles.

9. There are numerous international initiatives, including both public-private partnerships and collaborative efforts by industry associations, that focus on oil and gas sector methane emissions. BPG refers to and makes use of the knowledge and experiences gained from these initiatives to avoid duplication of efforts. For example, the Technical Guidance Documents[2] published by the Oil and Gas Methane Partnership (OGMP) of the Climate and Clean Air Coalition (CCAC) are used extensively and referenced in the BPG's sections on company and facility level MRV, as well as in sections dedicated to mitigation practices. Important results from the Oil and Gas Climate Initiative (OGCI)[3], the Guiding Principles[4] and other relevant initiatives are also recalled, drawn from, and duly referenced.

C. Issues

10. Even under a scenario of stringent climate policies and measures, oil and gas will play a key role in the future energy system and will foster economic growth and social progress. The future supply mix will be determined by implemented policies and measures and by market competition wherein the costs and sustainability attributes of energy alternatives will be decisive factors. In the Sustainable Development Scenario presented in the International Energy Agency's (IEA) World Energy Outlook 2017[5], which assumes a global reduction of energy related greenhouse gas emissions by more than 40%, oil and gas still account for 48% of total primary energy supply in 2040, a drop of 7% from their 2016 share. Total oil volumes will drop by 25% percentage points and gas 15 percentage points over that period. As a consequence of the continuing role of oil and gas, methane emissions along the entire oil and gas value chain, from exploration and extraction to end use delivery, should be given an increased attention.

11. Methane is a short-lived climate pollutant with an atmospheric lifetime of about 12 years. Its ability to trap heat in the atmosphere, the so-called global warming potential, is 84 times greater than that of carbon dioxide over a 20- year time horizon. Recent research shows that methane emissions are responsible for about one quarter of man-caused global warming.[6] Consequently, addressing the issue is of great importance, particularly in the context of applying near-term measures to curb climate change.

12. Oil and gas sector operations account currently for 25% of global anthropogenic methane emissions.[7] According to several projections this share is likely to increase

[2] http://ccacoalition.org/en/content/oil-and-gas-methane-partnership-technical-guidance-documents

[3] https://oilandgasclimateinitiative.com/oil-and-gas-climate-initiative-sets-first-collective-methane-target-for-member-companies/

[4] http://www.ccacoalition.org/en/resources/reducing-methane-emissions-across-natural-gas-value-chain-guiding-principles

[5] https://www.iea.org/weo2017/

[6] IPCC fifth assessment reports Chapter 8, available at https://www.ipcc.ch/report/ar5/wg1

[7] https://www.earth-syst-sci-data.net/8/697/2016/essd-8-697-2016.pdf, and IEA World Energy Outlook 2017.

significantly.[8] IEA predicts that in the absence of new and more stringent measures, by 2040 methane emissions from the oil and gas sector will increase by 40%.[9]

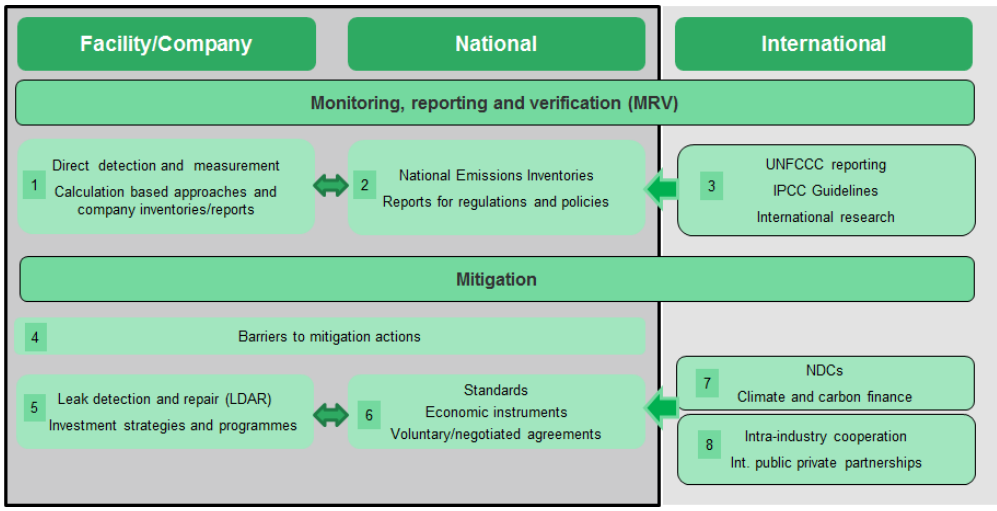
13. The sustainability of oil and gas supplies could be improved considerably through targeted and cost-efficient measures to reduce methane emissions. IEA estimates that 75% of global methane emissions from the oil and gas sector are technically feasible to eliminate (at currently expected oil and gas supply levels). Moreover, according to the same assessment, almost 50% of their overall quantity can be reduced at no net costs.[10]

D. MRV and mitigation

14. While MRV and mitigation are distinct activities, they are also strongly related. Mitigation can be most effective and cost-efficient when based on sound MRV practices. Cross-cutting aspects such as leak detection and repair programmes or MRV practices required for compliance checks of regulatory standards are also important and therefore are addressed in BPG.

15. MRV and mitigation practices at the facility and company level are often interrelated with those that developed at national level. Similarly, national level practices might be influenced by international guidelines and commitments, particularly those established under the United Nations Framework Convention on Climate Change (UNFCCC). These linkages are shown in the Figure, as well as the main components of MRV and mitigation at each level.

Figure 1.
Linkages and components of methane emissions MRV and mitigation



Facility/company level MRV

16. Companies quantify emissions to comply with reporting requirements of public authorities, for company internal purposes, or to have a sound basis for developing and implementing mitigation strategies and actions. Emission quantification can be based on a variety of information sources: (i) direct detection and measurement, and/or (ii) calculation-based approaches. There are several methodological approaches and technologies available

[8] https://www.globalmethane.org/documents/gmi-mitigation-factsheet.pdf
[9] See Chapter 10 Figure 10.13 in the IEA World Energy Outlook 2017
[10] See Section 10.4 of the IEA World Energy Outlook 2017

for quantification. Even if in certain instances there is a lack of advanced equipment available for large scale monitoring of methane emissions, this is an area where a considerable technological progress is being constantly made.

National level MRV and international guidelines and reports

17. Monitoring, reporting and verification of methane emissions at the national level serves three distinct purposes:

(a) inform the design and implementation of relevant policies and measures;

(b) provide information for regulatory compliance and enforcement, and for a review of the progress towards emission reduction targets; and

(c) provide input for preparation of national emission inventories, e.g. as part of inventories and progress reports submitted under the UNFCCC requirements;

18. The principal methodological basis for calculating methane emissions has been developed by the Intergovernmental Panel on Climate Change (IPCC).[11]

Barriers

19. Empirical studies show that a large part of methane emissions from the oil and gas sector can be eliminated at no, or very low, net costs. Furthermore, the necessary capital expenditures are often also relatively modest. However, up until now, these opportunities for a cost-efficient climate mitigation have remained untapped. The barriers, which prevent actions from being taken are presented in BPG, as are also policies and measures that could be applied for at different levels their removal.

Strategies and action at the company level

20. Ultimately decisions and actions to reduce emission are taken at the company level. Companies typically establish strategies and action plans for investments and improvements in operational practices. A good starting point is to have an available company-wide inventory of methane emissions. The next step is to evaluate methane emission reduction opportunities through examination of technology options and analysis of costs and economic return on measures that are to be taken. The actual mitigation alternatives selected for implementation might include simple improvements to operational practices, leak detection and repair (LDAR) activities, as well as larger investments in standalone projects or broader programmes. All these measures are discussed in BPG, including also presentation of abatement options for twelve different emission sources and a detailed data available in one of the annexes to the document.

National policies and measures

21. Practical experiences with existing policies and regulations are not only be thoroughly reviewed in BPG but are also followed by a broader discussion on how local conditions and national circumstances influence and shape national policies and undertaken measures to reduce emissions. The document also contains elements of “best practices and lessons leant” from some jurisdictions, which are relevant to consider. BPG presents also the ways how different measures, such as technical/emissions standards, economic instruments, and negotiated agreements between industry and national authorities, can function.

[11] https://www.ipcc-nggip.iges.or.jp/public/2006gl/

International framework conditions and carbon pricing

22. BPG also discusses certain aspects of international framework conditions and carbon pricing. It can be expected that national policies and measures implemented at the national level will be increasingly influenced by the processes run by UNFCCC and other international initiatives, which are triggered by the concern over methane's contribution to climate change. As all the ECE member States are signatories to the Paris Agreement, costs-and-benefit considerations suggest that many of them should give priority to methane mitigation, as steps undertaken in this regard can largely help them to meet the objectives set in that document. Barrier analyses have shown that economic incentives can help to spur the action, e.g. through penalizing emissions and rewarding their reductions ("carbon pricing"). Carbon and climate finance belong to this category and conditions for methane mitigation should be eligible for such financing.[12]

II. Methane emissions in the oil and gas industry

Key messages

23. Global estimates of methane emissions from the oil and gas sector vary by some 20 per cent - from the lowest to the highest published numbers - and discrepancies for certain individual countries are even larger.

24. Unreliable estimates reflect poorly developed quantification methods and a shortage of primary data in many countries.

25. Approximately half of the global methane emissions from the oil and gas sector comes from the ECE region, with upstream emissions (oil and gas production/processing) representing the dominant share.

26. The respective contribution of the different emission sources varies significantly between countries, and the results from one of them cannot be translated to another.

27. Typically, most emissions are attributed to a small number of emissions points (so-called "super emitters"). Addressing these sources represents a low hanging fruit for methane reduction efforts.

III. Monitoring, reporting and verification

Key messages

28. A combination of direct measurements and calculations-based methods will always be required, but new technologies capable of improving technical feasibility and reducing costs of methane measurements are emerging.

29. Sound methods and procedures for quantification are essential not only for developing methane reduction strategies and plans, but also for monitoring the progress.

[12] Carbon finance can be defined as payment in exchange for transfer and ownership of verified greenhouse gas emission reductions, which can potentially be used to meet the purchasing country's emission reduction obligations. Climate finance is defined as financial flows directed towards low-carbon and climate-resilient development interventions with direct or indirect greenhouse gas mitigation or adaptation benefits.

30. Available data, as well as the currently utilized methods are often inadequate for preparing reliable national inventories of methane emissions. Scaling up the efforts to retrieve information about local and national conditions and circumstances is essential, as is also collaboration between the industry (which has data and technical insight) and the public institutions responsible for setting up and managing national inventories.

IV. Mitigation

Key messages

31. Methane emissions reductions are effective mitigations measures. Large near-term benefits can be achieved at relatively low costs in terms of capital expenditures and - in majority of cases - without imposing any net cost on the investors.

32. Regulatory barriers, as well as lack of knowledge, awareness and financial incentives effectively hinder many of the opportunities that could otherwise be exploited. Understanding these barriers is essential for planning and implementation of mitigation measures.

33. Implementation of mitigation measures at the company level requires: emissions inventories, a good overview of abatement options/technologies including cost- and impact-assessment of each of them, as well as sound procedures for executing projects and monitor their results.

34. Policies and regulations for methane emission are case-specific. They can vary significantly in accordance with conditions of each given state and still be effective and cost-efficient. There are, however, certain general principles, examples of good practices, regulations, and policies that all countries should consider. Importantly, new technologies for detection and measurement will increase the scope and efficiency of the regulations in the field in question.

35. International framework conditions, including regulations and procedures developed under UNFCCC, are becoming increasingly important for methane mitigation. Methane emission reduction should be more prominently and explicitly covered in the member States' planned contributions to the objectives of the Paris Agreement (Nationally Determined Contributions (NDCs). International carbon and climate finance, as one element of carbon pricing, could also play an important role in incentivizing mitigation.