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**Economic Commission for Europe****Committee on Sustainable Energy****Twenty-eighth session**

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Item 5(e) of the provisional agenda

**Sustainable resource management:****Groups of Experts on Energy Efficiency, Renewable Energy and Coal Mine Methane****Best practice guidance for effective methane management in the oil and gas sector: monitoring, reporting and verification (MRV) and mitigation****Note by the secretariat****Introduction**

1. At its twenty-third session held in Geneva, 19-21 November 2014, the Committee on Sustainable Energy requested that the relevant United Nations Economic Commission for Europe (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 policymakers (ECE/ENERGY/96, para. 46).
2. A Task Force on Methane Management in the Extractive Industries was established under the Committee on Sustainable Energy to undertake the work. The Task Force together with the Group of Experts on Gas and the secretariat developed the Best Practice Guidance for Effective Methane Management in the Oil and Gas Sector: Monitoring, Reporting and Verification (MRV) and Mitigation, which addresses the issue of methane emissions along the oil and gas value chains. The work was supported financially by the United States Environmental Protection Agency (EPA). The document, which will be published as ECE Energy Series 65 and ECE/ENERGY/129, was reviewed by the Group of Experts on Gas at its fifth session and subsequently issued for public comment for a period of 60 days. The Best Practice Guidance is hereby presented to the Committee for endorsement.
3. Growing atmospheric methane concentrations are of major concern for efforts to address the challenge of climate change. Methane has a global warming potential significantly higher than that of carbon dioxide, ranging from 28 to 84 depending on the timeframe used for the comparison. Human activities are not the only source of methane emissions, but they are an important and growing source. The energy industries have recognized that they are responsible for an important share of these emissions from activities in the production, transformation, and delivery of energy and are taking important steps to remedy the problem for both commercial and environmental reasons. It also is increasingly clear that the scope and scale of those emissions are poorly understood. This initial analysis of best practices in the monitoring, reporting, and verification of methane emissions from the

upstream oil and gas industries is an important step in addressing an important contributor to global warming.

4. The natural gas industry has an important contribution to make in the transformation of the world's energy system to lower carbon sources. The contribution includes not only for home heating and power generation, but also for transportation and for enabling greater deployment of intermittent renewable energy sources. However, if the challenge of methane is not addressed, then the sustainability credentials of the industry will be challenged. Understanding the scale of the challenge and implementing appropriate mitigation strategies will help burnish the sustainability credentials of natural gas, and the developed best practice document is an important first step in that process.

## **I. Scope and objectives of the guidance document**

5. The document provides guidance for developing and implementing effective quantification/monitoring, reporting and verification (MRV) practices, as well as for mitigating methane emissions, from the oil and gas sector. It is meant to serve as a resource for a broad audience, including owners and operators of oil and gas facilities and policymakers at all levels of government, with the purpose of contribution to sound MRV practices and effective and cost-efficient. It is intentionally "principles-based", recognizing that conditions vary greatly across oil and gas facilities, and that legal, political and institutional aspects differ by jurisdiction.

6. The document covers many aspects of methane management, along two dimensions:

(a) Physical dimension: all of the oil and gas supply systems are included, from exploration, extraction, gathering and processing, to long distance transmission and transportation, and finally refining and distribution to end users, and covering natural and technical circumstances that diverge greatly;

(b) Institutional dimension: methane management practices are addressed at the company, national and international levels, as well as discussions on how coordination and collaboration at the different levels can help enhance methane emissions reduction.

7. There are numerous initiatives, including new regulations, public-private partnerships and industry collaborations, focusing on tracking and reducing methane emissions from the oil and gas sector, as well as broader research and other efforts to improve knowledge of characteristics and scale of the problem. The best practice guidance presents some of these initiatives and, in some cases, draws heavily on the technical guidance documents they have developed to inform the discussion of best practices for methane MRV and mitigation. The reader is encouraged to explore these documents as useful complementary information when considering MRV and mitigation plans.

## **II. The issues**

8. Oil and gas supplies will continue to play a role in a future sustainable energy system to support economic growth and social progress, even under a scenario in which stringent climate policies and measures are implemented. The Sustainable Development Scenario presented in the International Energy Agency (IEA) World Energy Outlook 2017, assuming a global reduction of energy-related greenhouse gas emissions of more than 40% by 2040, still has oil and gas accounting for 48% of total energy supplies in 2040, down from 55% in 2016, with total oil volume contracting 25% and gas increasing 15% for the period.

9. It can be assumed that the world's energy supply mix will be determined by implemented policies and measures and by market competition wherein the costs and sustainability attributes of energy alternatives are decisive factors. The enduring role of oil and gas obliges increased attention on methane emissions from the entire oil and gas value chain from exploration and extraction to end use.

10. Methane is a short-lived climate pollutant with an atmospheric lifetime of about 12 years. Its ability to trap heat in the atmosphere, also known as its global warming potential

(GWP), is according to the fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) 28 more potent than carbon dioxide (CO<sub>2</sub>) over a 100-year time horizon and 84 times higher than CO<sub>2</sub> over a 20-year horizon. Recent research shows that methane emissions are responsible for at least one fourth of manmade global warming we experience today, and methane emissions are on the rise. Because of its relatively short atmospheric lifetime, reducing methane emissions presents an important opportunity to reduce the rate of warming over the near term.

11. Currently, oil and gas sector operations account for nearly one fourth of global anthropogenic methane emissions, and there are several projections indicating that emissions could increase significantly. IEA predicts oil and gas methane emissions will increase some 40% by 2040 in the absence of new abatement measures. However, the sustainability of oil and gas supplies could be considerably improved through targeted and cost-efficient measures to reduce the emissions. For example, IEA has estimated that 75% of global oil and gas methane emissions are technically feasible to eliminate (at currently expected oil and gas supply levels), while 45% can be reduced with no net costs. Other studies have lower estimates but there is a common view that the potential for low costs abatement is significant.

12. Many oil and gas companies already have procedures in place to increase flare efficiency and to detect and remedy methane emissions at their facilities to avoid safety risks. In addition, many companies and governments are now increasing their methane MRV and mitigation efforts as contributions to climate change mitigation. This guidance document, together with a number of other international initiatives, builds on this work.

### **III. MRV and mitigation**

13. 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. This interplay of MRV and mitigation is important and is addressed in the document.

14. Cost-efficient and effective mitigation measures typically rely on sound results from MRV methods and practices. MRV is also important for design and implementation of policies and regulations since reliable quantification and reporting of emissions is essential for monitoring compliance and assessing progress of emission reduction efforts. With respect to technology application and practices, MRV and mitigation can also be integrated, as for example with so-called leak detection and repair programs.

15. MRV and mitigation practices at the facility and company level are often interrelated with those developed at national level. Further, national level practices can be influenced by international guidelines and commitments, particularly those established under the IPCC and the United Nations Framework Convention on Climate Change (UNFCCC) and the Oil and Gas Methane Partnership (OGMP).

### **IV. Structure of the best practice guidance**

16. After methane emission levels and emission reduction opportunities are briefly surveyed in Chapter 2 of the document, MRV and mitigation are subsequently discussed in Chapter 3 and Chapter 4. This is the core of the document and is further supported by two technical annexes: Annex I on emission sources and mitigation techniques, and Annex II on emission detection and quantification technologies.

17. Chapter 3 discusses approaches and practices for MRV at the facility, company and national levels. It also covers the interplay between the levels, and the influence from international processes such as those under UNFCCC, intra-industry associations and public-private initiatives, and international research.

18. In the same way, Chapter 4 on mitigation starts with the facility and company perspective followed by a discussion of mitigation policies and regulations at the national level. This chapter also discusses commonly encountered barriers to implementation of mitigation opportunities believed to be cost-efficient, with a view toward informing policies and regulations that may address these barriers. Finally, this chapter covers aspects of

international climate policies, including carbon pricing, which can help enhance methane mitigation efforts.

19. Chapter 5 presents key conclusions and summary for policymakers.
20. Chapter 6 presents case study examples of MRV and mitigation best practices.
21. Two annexes are included in the document:

(a) Building on the nine 'core' emission sources of methane defined by the Oil and Gas Methane Partnership (OGMP) and explained in the OGMP Technical Guidance Documents, Annex I describes in detail 12 emissions sources, including mitigation techniques and applicable emission detection equipment and quantification methods. The presentation is based on a number of sources referenced in the annex. More categories are listed than in the Technical Guidance Documents of OGMP since not only upstream emission sources are covered;

(b) Annex II presents a brief overview of various methane detection and quantification technologies currently available. This is primarily based on the Climate and Clean Air Coalition's Technical Guidance Document and the United States Environmental Protection Agency (EPA) Gas STAR Program.

22. The full version of the document is posted to the ECE website.<sup>1</sup>

## V. Recommendations

23. The Committee on Sustainable Energy is invited to endorse the Best Practice Guidance for Effective Methane Management in the Oil and Gas Sector: Monitoring, Reporting and Verification (MRV) and Mitigation (ECE Energy Series 65 and ECE/ENERGY/129).<sup>2</sup>

24. The Committee on Sustainable Energy is recommended to request that the relevant groups of experts to engage, with the support of the secretariat, in dissemination activities of the Best Practice Guidance as mandated in their respective work plans.

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<sup>1</sup> [https://www.unece.org/fileadmin/DAM/energy/images/CMM/CMM\\_CE/BPG\\_Methane\\_final\\_draft\\_track\\_changes\\_190910\\_\\_CSE\\_.pdf](https://www.unece.org/fileadmin/DAM/energy/images/CMM/CMM_CE/BPG_Methane_final_draft_track_changes_190910__CSE_.pdf)

<sup>2</sup> *Id.*