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Item 4 (b) of the provisional agenda
Improving the environmental footprint of energy systems:
Methane management in extractive activities

Current practices in monitoring methane emissions in extractive activities: survey results and analysis

Note by the secretariat

I Introduction

1. At its twenty-fourth session, the Committee on Sustainable Energy was presented with a document (ECE/ENERGY/2015/1) which showed that available data on methane emissions in extractive industries is relatively sporadic and often based on estimated data and models. As the document explained, this situation was due to the lack of a common technological approach to measuring, reporting and verification (MRV) of methane emissions.

2. In response, the Committee requested the establishment of a task force reporting to the Committee with representatives of the Groups of Expert on Gas, and on Coal Mine Methane, and other stakeholders to undertake further work to assess the baseline, benchmarking and scale of current methane emissions in extractive industries.

3. At its twenty-fifth session, the Committee took note of the report providing an update on methane management in extractive industries (ECE/ENERGY/2016/2) and requested that the Task Force on Methane Management in Extractive Industries prepare a further report based on a survey of current MRV practices for submission to the twenty-sixth session of the Committee.

4. Following the above-mentioned request, the secretariat presents to the Committee an analysis of the results of the survey that was disseminated among stakeholders operating in extractive industries. This is contained in section II. A copy of the survey itself is provided in Annex I.

5. Based on a need for further work on measuring, reporting and verification of methane emissions in extractive industries that was clearly identified by the results of the survey, the Committee is requested to consider extending the mandate of the Task Force on Methane

Management in Extractive Industries, as well as its request for the Groups of Experts on Gas, and on Coal Mine Methane to continue working on this subject throughout 2018-2019.

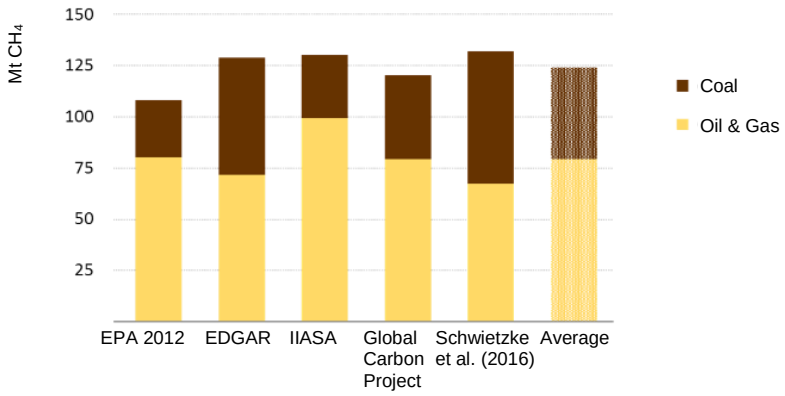
II. Current practices in monitoring methane emissions in extractive activities: survey results and analysis

A. Background

6. Methane is a significant driver of global warming. It is one of the most potent greenhouse gases with a 20-year global warming potential 56 times that of carbon dioxide (CO_2) (Intergovernmental Panel on Climate Change (IPCC)) and a 100-year global temperature potential 21 times greater than CO_2[1]. Methane is considered a short-term climate pollutant by virtue of the fact that its residence time in the atmosphere is relatively short, at 12 years, compared with the much longer residence time for CO_2. However, while residence time is important for individual molecules, the greenhouse effect of methane is the consequence of the total population of methane molecules in the atmosphere over a given period. As long as the total volume of methane in the atmosphere is maintained or increased, the relevant figure for methane's global warming potential is the higher figure. The main sources of anthropogenic methane emissions are agriculture (including fermentation, manure management, and rice cultivation), landfills, wastewater treatment, coal mines, and the oil and gas industries.

7. Reducing methane emissions would slow the accumulation of greenhouse gases in the atmosphere and hence the rise in global temperatures. Unfortunately, there is not a complete, verified picture of the amount of methane being emitted globally and currently available information on methane emissions, largely based on estimates and models, is often uneven and incomplete. Further, there is a range of estimates from various sources (Figure 1).

Figure 1
Current global Methane Emissions from Oil, Gas, and Coal Activities



There are few studies that assess methane emissions globally but they are largely aligned. However a large gap exists between top-down and bottom-up estimates of emissions

8. According to the results obtained to date, most equipment and facilities in the natural gas sector exhibit very low emissions and leakage rates. On the other hand, the equipment and facilities that do feature emissions or leaks can have very significant methane emissions,

[1] http://unfccc.int/ghg_data/items/3825.php

and the top five per cent of emitters contribute fully half of total estimated emissions. The so-called super emitters exist at all stages of the supply chain, and they are a consequence of either malfunctions or operational errors.

9. Technologies for detecting and quantifying methane emissions, as well as standard national/regional methods for reporting them are available[2]. However, the technology deployed, the programmes for their applications, and the approaches to recording emissions are not harmonised and it is often complicated to make comparisons of the data. On a global scale, there is neither a common technological approach to monitoring and recording methane emissions, nor a standard method for reporting and verifying them. Consequently, the level of the uncertainty with regard to available data is very high. There is a need for common evaluation methodologies for each part of the fossil energy chain worldwide and for enhanced dialogue and cooperation at international levels if methane emissions in the extractive industries are to be addressed comprehensively.

10. A number of key conclusions emerge from the literature that has been assessed and the meetings that have been held. As reported by the International Energy Agency and as noted above, there is high uncertainty regarding the methane volumes being emitted as emissions are often estimated without sufficient verifying measurement. While there are many anthropogenic sources of methane emissions, it appears that the reduction potential in economic and volume terms is highest for oil/gas. The super emitters described above can be intermittent or transient, and their performance can change day to day. Further innovation on technology to reduce the costs of measurement and monitoring will be important but should not preclude policy actions, especially as leak detection and repair can be highly effective and economic. Few countries have reduction policies for methane emissions from the oil and gas sectors for climate change, but there often are regulations related to concerns over air quality and safety. Specific needs that have been identified include:

(a) The scope and standards for measuring, monitoring and reporting.

(b) Transparency and sharing of best practices within industry and across regions.

(c) Need for flexibility in measures if new data emerge to ensure consistency with policy goals.

(d) Need transparency, credibility, collaboration among government, civil society and industry.

11. The Group of Experts on Gas noted that methane management in the extractive industries has attracted attention and that information regarding methane emissions has improved with further work. Further, significant effort and resources are going into remediation and a range of practices exists. However, essential conclusions remain unchanged:

[2] See: (a) United Nations Framework Convention on Climate Change, available at: http://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf, see in particular Article 4, Article 10, and Article 12 of the Convention; (b) US Environmental Protection Agency, Greenhouse Gas Reporting Program available at: https://www.epa.gov/ghgreporting, see in particular Emission Calculation Methodologies (https://www.epa.gov/sites/production/files/2015-07/documents/ghgrp_methodology_factsheet.pdf) and Report Verification (https://www.epa.gov/sites/production/files/2015-07/documents/ghgrp_verification_factsheet.pdf); (c) Norwegian Environmental Agency 2016: "Cold venting and fugitive emissions from Norwegian offshore oil and gas activities – summary report", available at: http://www.miljodirektoratet.no/no/Publikasjoner/2016/Juni-2016/Cold-venting-and-fugitive-emissions-from-Norwegian-offshore-oil-and-gas-activities--summary-report/

(a) Data collection is neither rigorous and comprehensive nor are estimates used verified.

(b) Procedures for monitoring, reporting, and verification (MRV) and remediation are variable.

(c) Enormous opportunity is there for knowledge enhancement and remediation.

12. The desire was expressed for more transparent and uniform emissions reporting across regions, independently verified, with shared guidance on best available technologies and approaches. There also was a call for more stringent, intelligent, and timely emissions detection and remediation. The Group of Experts concluded that:

(a) Work on best practice guidelines and methods to manage and reduce methane emissions should continue.

(b) It is necessary to update and refine data in national inventories on volumes of methane emissions from gas.

(c) United Nations Economic Commission for Europe (ECE) activities on methane emissions should strengthen collaboration with the range of international mechanisms, companies, organizations and associations.

(d) All interested parties should be invited to join this effort.

13. ECE is exploring current practices and technologies along the value chain in key energy-related extractive industries, namely coal, natural gas and oil, with the objectives of: (a) determining and promoting best practices for measurement, reporting, and verification (MRV) of methane emissions in these industries, and (b) identifying best practices to reduce methane emissions.

B. Mandate

14. The Committee on Sustainable Energy at its twenty-third session, 19-21 November 2014, considered the potential role for ECE in developing norms and standards on methane management. The Committee recommended that work be done to agree on common philosophies, standards, and technologies for monitoring, measuring, recording, verifying, and reporting methane emissions at each stage of production, processing, storage, transmission, distribution, and use of fossil fuels, whether coal, oil, or natural gas, while recognizing that there will be adaptations to specific situations. Additionally, it was agreed there is a need to mitigate methane emissions, including identifying appropriate mechanisms for mobilizing needed resources, and to fund a detailed study on a common basis across the entire ECE region.

15. In this context, the Committee requested that the relevant ECE groups of experts prepare a coordinated, solutions-oriented report on methane management in extractive industries. The focus of the report was to be establishment of a baseline, benchmark and scale of current methane emissions in those industries, with the aim of giving clear guidance to policy makers and the oil and gas industry (see ECE/ENERGY/96, para. 46 and ECE/ENERGY/2015/L.1/Rev.1). The Committee authorized creation of a Task Force on Methane Management in Extractive Industries for the purpose of coordinating work in the mandated field (see ECE/ENERGY/99, para. 44).

16. Having a broad overview of, and access to the range of actors and multiple relevant projects conducted worldwide (see Figure 2), the Task Force is informed about work that has been and is being done in the field in question and can direct its own activities to issues that remain unexplored or knowledge that lacks sufficient detail. The activities and deliverables of the Task Force have been selected to build on existing data. In order to obtain the broadest

possible set of data the Task Force cooperates with all partners whose expertise and information contribute to its work. Using a wide network of ECE partners, the Task Force serves as a convenient tool for information exchange and coordination of efforts between stakeholders that are involved in the process.

Figure 2
Relevant projects conducted worldwide

Institutions & associations	*Scope of activity*	*Current activities*
UNECE	- Intergovernmental body	Best practices on CH_4 management
IGU	- Advocacy & Technical - Global - Entire gas chain	Group of Experts on CH_4 emissions – Coordinates the activities on CH_4, provides input and offers advice to industry and policy-makers.
OGCI	- Lobby, advocacy & Technical - Global - Upstream	Collaborating on research to fill the gaps in CH_4 data, managing CH_4 emissions and detection technology to help companies and policy-makers.
International Association of Oil & Gas Producers	- Technical - Global - Upstream	Analysis of the CH_4 emissions upstream at global and regional level. Collaboration with different activities.
SIGTTO	- Technical - Global - Gas Tanker and Terminal Operators	CH_4 management in gas tankers
iea International Energy Agency	- Intergovernmental body	WEO 2017, special focus on methane emissions in oil/gas
gie Gas Infrastructure Europe	- Lobby and advocacy - Europe - Transmission, storage, LNG terminals	Key messages on CH_4 emissions
NGVA europe	- Lobby and advocacy - Europe - Gas companies and NGV manufacturers	Report on the LCA of natural gas in Europe
marcogaz TECHNICAL ASSOCIATION OF THE EUROPEAN NATURAL GAS INDUSTRY	- Technical - Europe - Gas infrastructure and utilisation	Reports on CH_4 emissions from transmission, distribution, storage and LNG terminals and on best practices to reduce CH_4 emissions.
GERG	- Technical - Europe - Gas industry	Harmonised methodology for distribution and transmission
DBI GUT Gas- und Umwelttechnik GmbH	- Technical - Germany + Central EU	Report on "Critical Evaluation of Default Values for the GHG Emissions of the Natural Gas Supply Chain"

C. Project

17. In order to achieve the requested outcomes, ECE is undertaking an extrabudgetary project. Funding for parts of the project has been secured and approved by the ECE Executive Committee (EXCOM). Additional funds are being sought. The objective of the project is to explore methane management methods and technologies along the value chain in key energy-related extractive industries, namely coal, natural gas and oil, for the purpose of determining and promoting best practices for monitoring, measuring, recording, reporting and verifying methane emissions in these industries, and developing best practices for remediation.

Figure 3
Project Structure

Coal
SED Lead: Group of Experts on Coal Mine Methane
Partners: Global Methane Initiative – Coal Subcommittee, World Coal Association

Downstream Gas
SED Lead: Group of Experts on Gas
Partner: International Gas Union

Upstream Oil and Gas
SED Lead: Committee on Sustainable Energy
Partner: World Petroleum Council

Downstream Oil
SED Lead: Committee on Sustainable Energy
Partner: World Petroleum Council

SED: ECE Sustainable Energy Division

18. From consultation with stakeholders, it is clear that stakeholder communities differ significantly across and within the sectors, so it is not sufficient to create three groups on coal, natural gas and oil. The project has therefore been structured along four subject-specific pillars namely: Coal, Downstream Oil, Downstream Gas, and Upstream Oil and Gas (see Figure 3). Work undertaken within the framework of each of these pillars is conducted by subsidiary bodies of the Committee on Sustainable Energy, as well as by ECE external partners. The results of their work will be reviewed, compiled, and transformed into prescribed deliverables by the Task Force on Methane Management in Extractive Industries.

19. The project will develop in five phases, each building on existing efforts. The first phase of the project focuses on defining, understanding, and determining the magnitude of problems related to methane emissions in extractive industries through the following activities:

(a) review of existing data on volumes of methane emissions along the value chain in key energy-related extractive industries;

(b) compilation of data on the volume of methane emissions in extractive industries in the ECE region;

(c) assessment of actual volumes of methane emissions along the value chain in extractive industries in ECE member States, and determination of the most important sources of such emissions along the value chain in extractive industries;

(d) review of the available information regarding strategies, practices and/or technologies for monitoring, measuring, recording, reporting and verifying methane emissions in the ECE member States, including national regulations and information from the governments, industrial sites operators, academia, and NGOs;

(e) assessment of the strategies, techniques and methods used for monitoring, measuring, recording, reporting and verifying methane emissions in extractive industries in the ECE member States.

20. The second stage of the project will build upon the information gathered in the first stage and will comprise compiling, analysing and comparing obtained data for the purpose of developing comprehensive best practices for monitoring, measuring, recording, reporting

and verifying methane emissions. The third phase, drawing from the experiences obtained during the two previous stages of the project as well as from the experience of the industries in addressing methane emissions, will develop best practices for prevention and abatement of methane emissions in extractive industries. The fourth stage, building on the results of the three initial stages of the project, will focus on opportunities to monetize methane emissions abatement, and on developing a replicable business model in this regard for each of the extractive industries in question. The fifth, final stage of the project will consist of the following activities:

(a) Dissemination of the products developed in the second, third and fourth stages of the projects (i.e. of (1) best practices for measuring, monitoring, reporting and verifying methane emissions in extractive industries; (2) best practices for prevention and abatement of methane emissions in extractive industries; (3) business models allowing to monetize methane emissions abatement);

(b) Development of a model training unit, and delivering demand-driven capacity-building workshops on measuring, monitoring, reporting, verifying, and preventing methane emissions.

D. Survey

21. The ECE secretariat in concertation with the secretariats of the International Gas Union (IGU), the World Coal Association (WCA) and the World Petroleum Council (WPC) and other industry experts, prepared a survey of how methane emissions are monitored currently. The objective of the survey was to provide an initial overview of how methane emissions in extractive industries are monitored, measured, recorded, and reported across the extraction, processing and transport segments of the respective value chains.

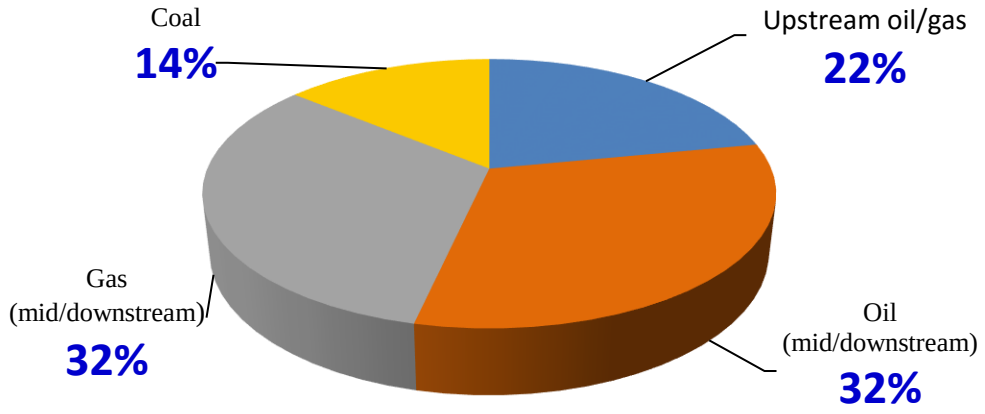
22. The survey was initiated in December 2017 by ECE. A copy of the survey is included in Annex I. The survey was published as a public inquiry on the ECE website, including the web pages belonging to the Committee on Sustainable Energy; the Group of Experts on Gas; the Group of Experts on Coal Mine Methane; and Methane Management. Members of ECE networks were encouraged to participate and to share the survey with their networks. ECE also circulated the survey to extractive industry partners such as IGU, WCA and WPC who were encouraged to share the survey with their members.

23. In all, 95 responses were registered. Of these, 16 were discarded – 13 for being incomplete (too few boxes ticked and no written information) and three for being from wrong respondents (not extractive industries). The remaining 79 responses were the basis for this analysis. Identifiable respondents, approximately half of the total, are from most parts of the world. The results of the survey are indicative of what is typical for methane management in global extractive industries.

E. Survey Results

24. Respondents who indicated they were involved in either “midstream gas” or “downstream gas” were merged into a single category, and the same was done for the categories “midstream oil” and “downstream oil”. Out of the 79 respondents, 22 per cent noted activity in upstream oil/gas, 32 per cent in mid and/or downstream gas, 32 per cent in mid and/or downstream oil and 14 per cent in coal (Figure 4).

Figure 4
Distribution of Survey Respondents



25. With respect to whether methane (or other CH gas) emissions are being monitored/calculated and if the results are reported, results indicate that most monitor and report their emissions (Figure 5). In all sectors a clear majority of respondents answered that monitoring of the gases is mandated by law (Figure 6). The primary purposes of monitoring the gases emissions for the oil and gas industries was "environment" and "law", which can be understood as compliance with rules and regulations and to an extent also to maintaining goodwill. For the coal industries, "safety" was indicated as the most important purpose for monitoring. The nature of emissions are fugitive leaks and controlled releases (mainly for gas and oil industries) and accumulation of gas (coal). Globally around half of industries in each sector distinguished between methane and other hydrocarbon gases. For exploration it is more usual to distinguish this while other sectors do not.

Figure 5
Gases Monitored

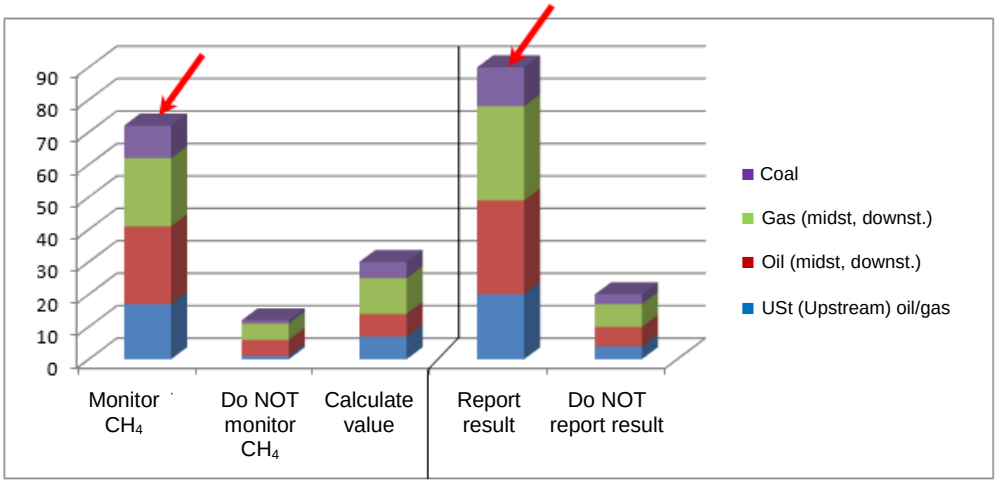
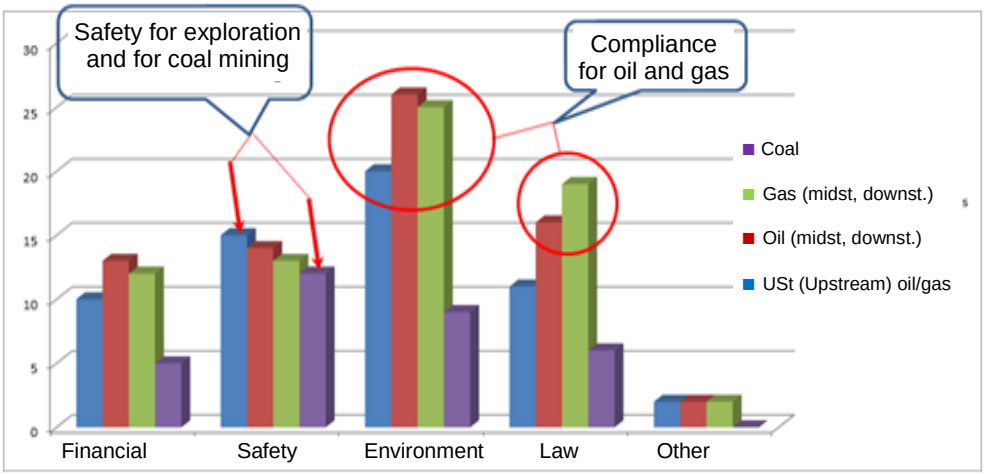


Figure 6
Primary Purpose of Hydrocarbon Monitoring



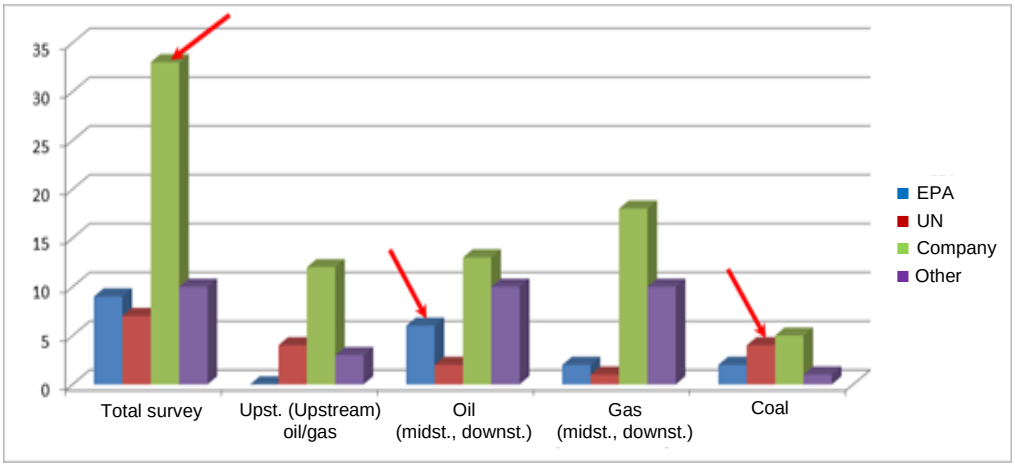
26. In all sectors there is a degree of continuous monitoring of emissions – continuous monitoring is present in all sectors, but especially in coal, plus monthly for coal and annually for oil and gas. In coal mines, gas in the mine is released into the working environment and can create an important risk of explosion. Looking at ratios, half of the coal sector respondents noted continuous monitoring. For oil and gas (mid and downstream) between one quarter and one third of respondents noted continuous monitoring.

27. Methane emissions standardization is mandated by law more often for coal than for oil and gas. Regular reporting is for the oil and gas sectors (including exploration) done annually and for coal sector monthly. In response to the question how the respondent standardizes methane emissions, the responses were wide spread. Most covered units of measurement ("scf", "Nm3", "t/yr", "CO_2e"..), norms (U.S. Environmental Protection Agency (EPA) 21 "EPA 21", "EN15446") whereas others addressed on principles ("BAT"=Best Available Technology" or "FID", which is equipment for measuring gas content). Survey answers indicate that for the global coal sector, methane emissions are typically standardized by law, whereas for the global oil and gas sectors, they are not.

28. With respect to the methods and technologies used to monitor methane emissions, the global coal sector tends to measure real values, while the oil and gas sectors, including exploration, tends to lean more on calculations of methane emissions values, typically mixed with confirmation measurements. Methods for methane emissions monitoring typically are mandated by law for global coal industry, but not for the other sectors covered by the survey. The explanation of the choice of methods included responses in line with "Best suited", "no other tool", "EPA 21", "Low cost technology", "used by others", "BAT", "Best practice" , and the like.

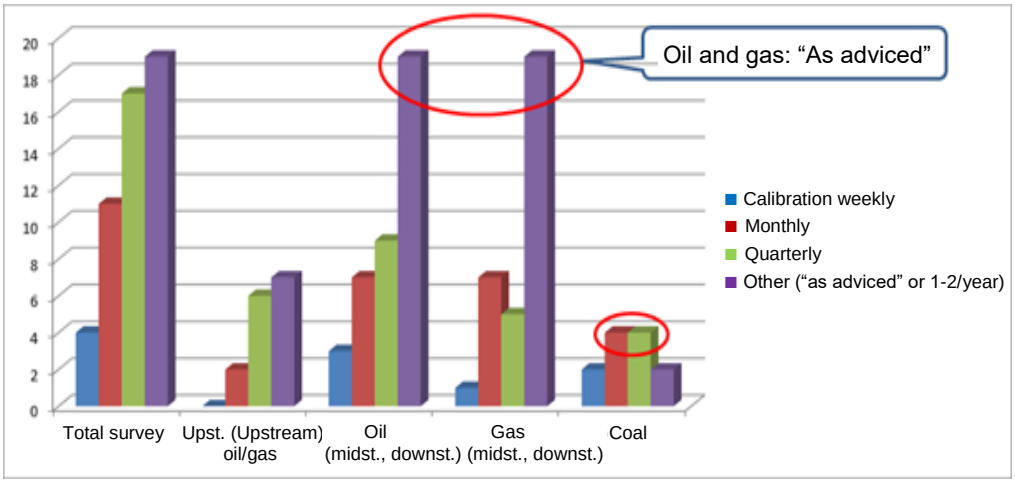
29. When asked what database(s) they use when using emission factors for calculations, all sectors referred to their own company standard (Figure 7). In the oil sector, there was a significant reference to EPA and in the coal sector to the United Nations. The sectors of oil and of gas also significantly refer to "other", which was mostly national guidelines.

Figure 7
Databases used when using emission factors for calculations



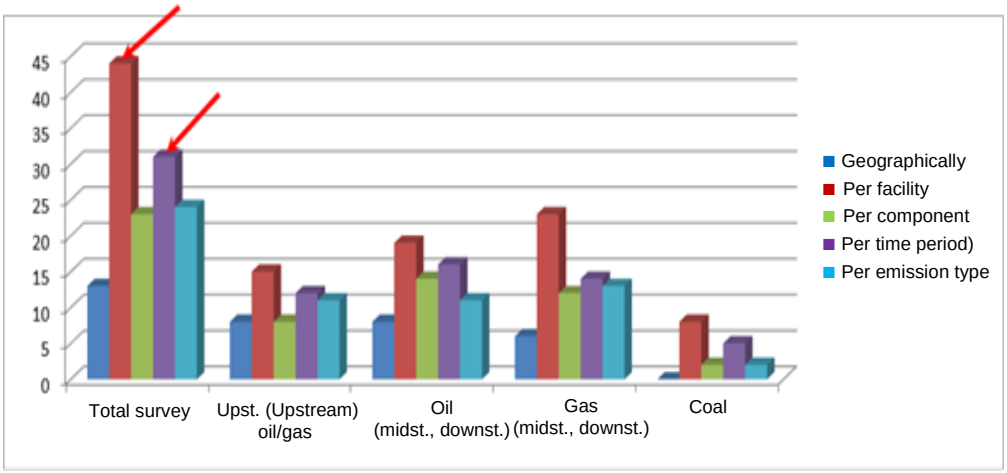
30. The global coal sector indicated that it typically calibrates monitoring equipment on a monthly or quarterly basis (Figure 8). The oil and gas sectors mostly noted "Other", filling in "As advised" (by the equipment manufacturer). The two responses are not necessarily different.

Figure 8
Frequency of equipment calibration



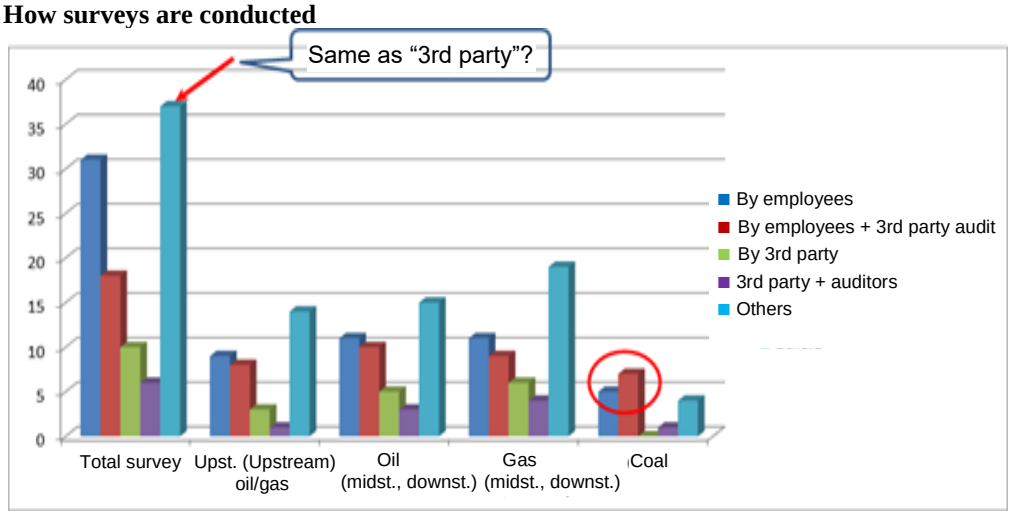
31. For the questions related to how monitoring results are recorded, responses indicate that the most significant way to monitor was per facility, followed by per time period (Figure 9). In terms of the units used to record results, half of the respondents answered with various units of volume, rate or flow – mostly using SI units.

Figure 9
How monitoring results are recorded



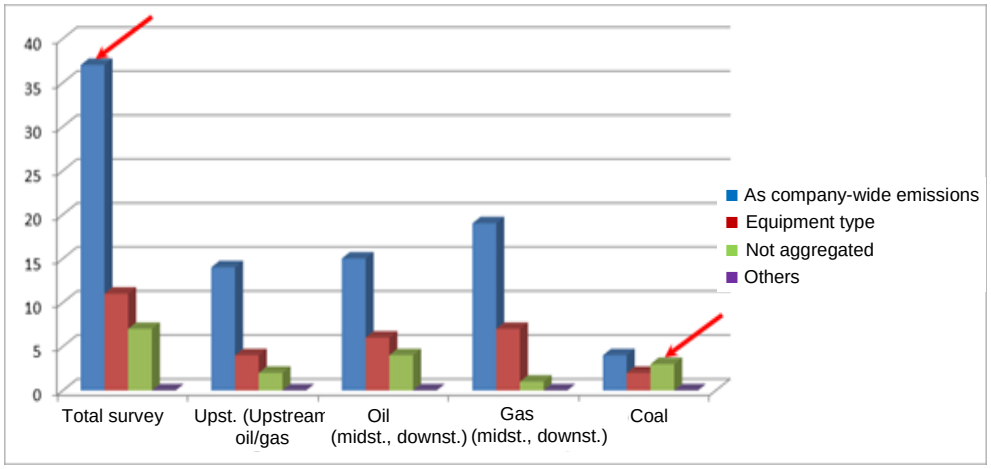
32. When asked how methane emission surveys are primarily conducted, the coal sector indicated by employees, with or without third party auditing (Figure 10). The oil and the gas sectors, including exploration, noted "Others", which most likely means the same as third party (*i.e.*, not by their own organization).

Figure 10
How surveys are conducted



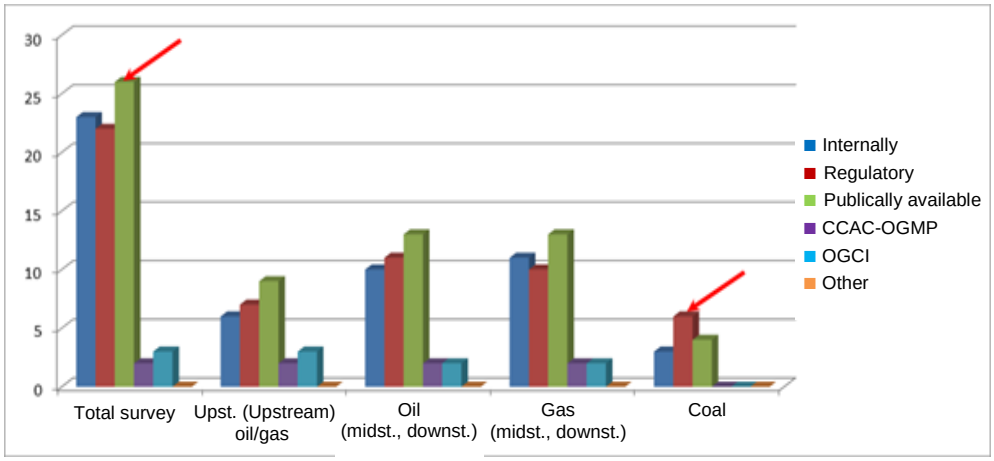
33. Asked about how emission monitoring results are aggregated, the global oil industries and gas industries noted "As company-wide emissions" more than any other reply (Figure 11). For the global coal industry, half of the respondents did not respond at all and among the responding half, half claimed that the emission monitoring results were not aggregated. This result may reflect the fact that monitoring in the coal industry is linked to safety as opposed to environmental factors.

Figure 11
How monitoring results are aggregated



34. This possibility is supported by the coal sector's response regarding how results are reported: regulatory, as opposed to publically available), which was the top response for the global oil and gas industries (Figure 12).

Figure 12
How the results are reported



35. The survey inquired about what organizations a respondent cooperated with on methane management. Around half of the respondents indicated a wide range of names covering governmental ministries and agencies, intergovernmental organizations (including the United Nations and the Global Methane Initiative), universities and research institutions, third party auditing companies and other private companies.

Annex I

Survey on Methane Management in Extractive Industries

I. Objectives

The objective of this survey is to provide an initial overview of how methane emissions in extractive industries are monitored, measured, recorded, and reported across the extraction, processing and transport segments of the respective value chains.

The survey is being conducted anonymously and its results will be aggregated into a summary report to inform the development of Best Practice Guidance in Managing Methane Emissions. Respondents who advise of their contact details will be invited to engage with UNECE on any follow-up work to develop the guidance.

II. Survey Questions

1. You are active in which industry? (More than one answer is possible)
   a. Upstream Oil and/or Gas[1]
   b. Downstream Oil
   c. Downstream Gas
   d. Midstream Oil
   e. Midstream Gas
   f. Coal

2. Do you monitor methane or other gaseous hydrocarbon emissions in your operations?
   a. Yes
   b. No
   c. No, but we calculate emissions (please elaborate)

   _____
   _____

3. Do you report the results of your monitoring operations?
   a. Yes
   b. No

4. Is the monitoring and/or the reporting mandated by law or regulation?
   a. Yes (please specify which law or regulation below)
   b. No
   c. In some operational regions, but not all

   Comments:

   _____
   _____
   _____
   _____

[1] Upstream refers to exploration and production and includes searching for potential underground or underwater crude oil and natural gas fields, drilling exploratory wells, and subsequently drilling and operating the wells that recover and bring the crude oil and/or raw natural gas to the surface.

5. What is the primary purpose of the monitoring and reporting program? (More than one answer is possible, but please indicate which is the primary purpose)
   a. Financial - Avoiding commercial losses
   b. Safety
   c. Environmental
   d. Mandated by law
   e. Other (please specify)
      i. _____
      ii. _____

6. How do you define methane or other gaseous hydrocarbon emissions? (More than one answer is possible)
   a. Fugitive Leaks - Unintentional leaks from pipelines, valve seals, et al.
   b. Natural accumulations of methane in the resource2
   c. Controlled releases - Intentional venting, blow downs, at al.
   d. Third party plant damage releases
   e. Other (_____)

7. Do you distinguish between methane and other gaseous hydrocarbons in your monitoring and reporting?
   a. Yes
   b. No

8. If yes, what other gaseous hydrocarbons do you include in your monitoring programme? (More than one answer is possible)
   a. Ethane
   b. Propane
   c. Butane
   d. Other? _____

9. Which components of your facilities do you monitor?
   a. _____
   b. _____
   c. _____
   d. _____
   e. _____

10. Why those particular components?

    _____
    _____
    _____
    _____

11. Which processes do you monitor? Add additional lines if required.
    a. _____
    b. _____
    c. _____
    d. _____
    e. _____

[2] This terminology is generally a reference to methane found in reserves where it is not the primary product being extracted. Examples of this include methane found in coal or oil reserves.

12. Why those particular processes?

_____
_____
_____
_____

13. What is the frequency of your monitoring program and does it vary based on component, age, potential risk level, etc.? (More than one is acceptable but provide below the explanation behind the difference)
    a. Continuous
    b. Daily
    c. Weekly
    d. Monthly
    e. Quarterly
    f. Annually
    g. Our systems do not emit methane

    Comments

_____
_____
_____
_____

14. How do you standardize methane emissions in your organization?

_____
_____
_____
_____

15. Is the methane emissions standardization mandated by law or regulation?
    a. Yes (please specify based on which law or regulation in comments)
    b. No

    Comments:

_____
_____
_____
_____

16. What methods/technology(ies) do you use to monitor methane emissions? (Please explain if necessary)
    a. Measurement of all equipment and assets
    b. Calculate emissions [based on throughputs or some other accepted approach]
    c. Combined approach of monitoring and calculations

    Comments/Additional information:

_____
_____
_____
_____

17. Are the methods/technologies mandated by law/regulations?
    a. Yes (please specify which law or regulation below)
    b. No

    Comments:

    _____
    _____
    _____
    _____

18. Why were those methods/technologies chosen?

    _____
    _____
    _____
    _____

19. What % of methane emissions are included in a Maximum Allowable Emission Target?

    _____
    _____
    _____
    _____

20. When using emissions factors for calculations, what database(s) do you use?
    a. EPA
    b. UN
    c. Company data
    d. Other (please specify)

21. How often is the monitoring equipment calibrated
    a. Weekly
    b. Monthly
    c. Quarterly
    d. Other

22. How are the monitoring results recorded?

    Level of detail/disaggregation (More than one answer is possible)
    a. geographical region
    b. facility
    c. component
    d. time period
    e. emission type

23. How are the monitoring results recorded?

    What units are used to record the results?

    _____
    _____
    _____
    _____

24. How are surveys conducted?
    a. Primarily by employees
    b. Primarily by employees with third party auditing
    c. Primarily by third party providers
    d. Primarily by third party providers with company auditing

25. How are the results aggregated?
    a. Company-wide emissions
    b. Equipment type
    c. Not aggregated
    d. Other
        i. _____

26. How are your results reported? (More than one answer is possible)
    a. only internally
    b. only for regulatory purposes
    c. national Inventory
    d. publicly available (if so, please provide links)
    e. CCAC-OGMP
    f. OGCI
    g. Other (_____)

27. What organisations do you cooperate with on this topic?
    a. _____
    b. _____
    c. _____
    d. _____
    e. _____