

## **Survey 2017 on Methane Management in Extractive Industries**

### **Document prepared for UNECE by Mr. Richard Mattus**

#### **I. Background**

1. The survey was initiated in December 2017 by the UNECE in Geneva. It was published as a public inquiry on the UNECE web sites of:
  - Committee on Sustainable Energy
  - Group of Experts on Gas
  - Group of Experts on Coal Mine Methane
  - Methane Management page
2. The members of UNECE networks were encouraged to participate and to share the survey inquiry to their networks.
3. UNECE also sent it to extractive industry partners such as International Gas Union, World Coal Association and World Petroleum Council. Also they were encouraged to share the survey inquiry with their networks. Therefore, there is no knowledge of how many potential respondents have received the inquiry to participate in the study.
4. Deadline was end of January, allowing for some responses arriving in February also to participate. In all, 95 responses were registered. Of these, 16 were discarded – 13 for being incomplete (too few boxes ticked and no written info) and 3 for being from wrong respondents (not extractive industries). This leaves 79 responses that are the basis for this analysis. Among these, half have chosen to be anonymous. The identifiable respondents are from most corners of the world.
5. As the basis of the total spread of the survey inquiry is uncertain, the results are to be deemed as not absolute but as indicative of what is typical for methane management in global extractive industries.

## II. Results

6. The results are being presented as a function of the nature of respondents in order to distinguish characteristics of the respective industries. Respondents noting “midstream gas” and “downstream gas” were merged as one category (noted as one if one or both boxes were ticked). The same was done for the categories “midstream oil” and “downstream oil”. Many respondents filled in more than one main activity (Upstream oil/gas, gas, oil and coal, respectively). Their responses have then been processed for each category indicated.

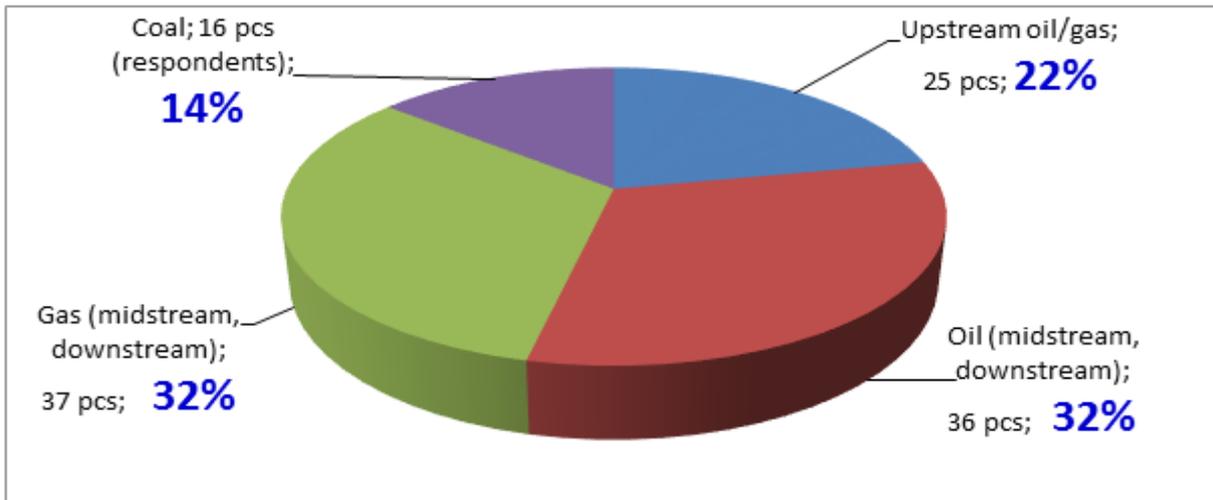


Image 1: Distribution of industrial activity among survey respondents. [Question #1]

7. Out of the 79 respondents, 25 (22%) noted activity in upstream oil/gas, 37 (32%) noted activity in mid- and/or downstream gas, 36 (32%) noted activity in mid- and/or downstream oil and 16 (14%) noted activity in coal. Since these notations amount to 114, the average respondent noted more than one main activity.

8. Questions #2 and #3 concerned whether CH<sub>4</sub> (or other CH gas) emissions are being monitored/calculated and if the results are reported.

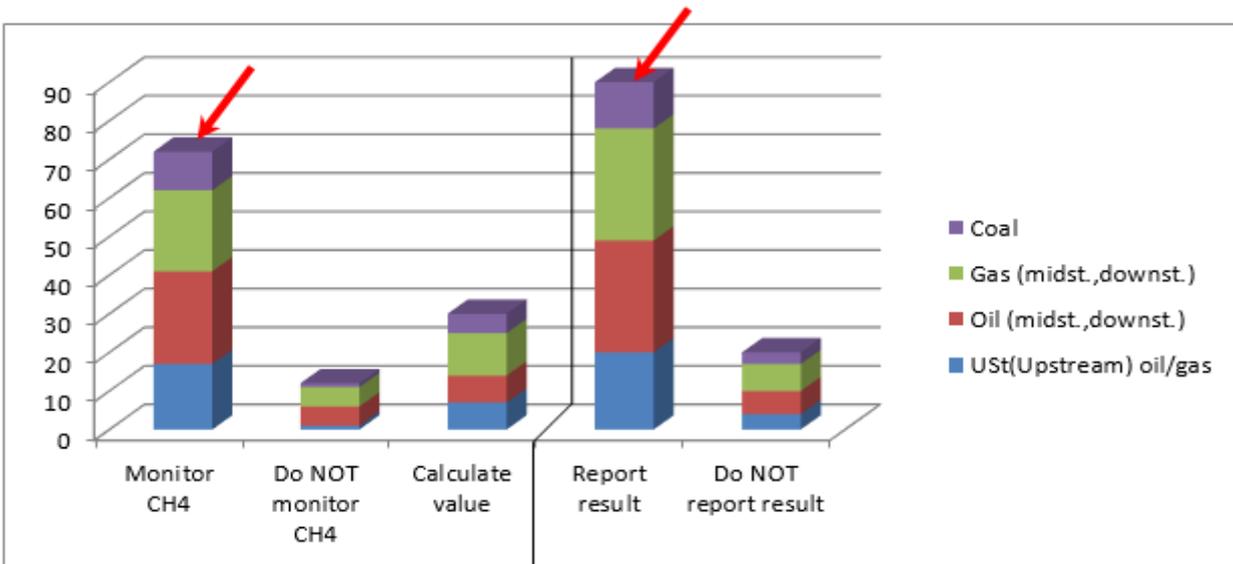


Image 2: Monitoring and reporting CH<sub>4</sub> (or other CH gases) [Q#2 + Q#3]

9. Responses from all industrial sectors included indicate that very few do not monitor their gas emissions and few do not report the results.

10. In all sectors a clear majority of responds answer that monitoring of the gases are mandated by law (question #4).

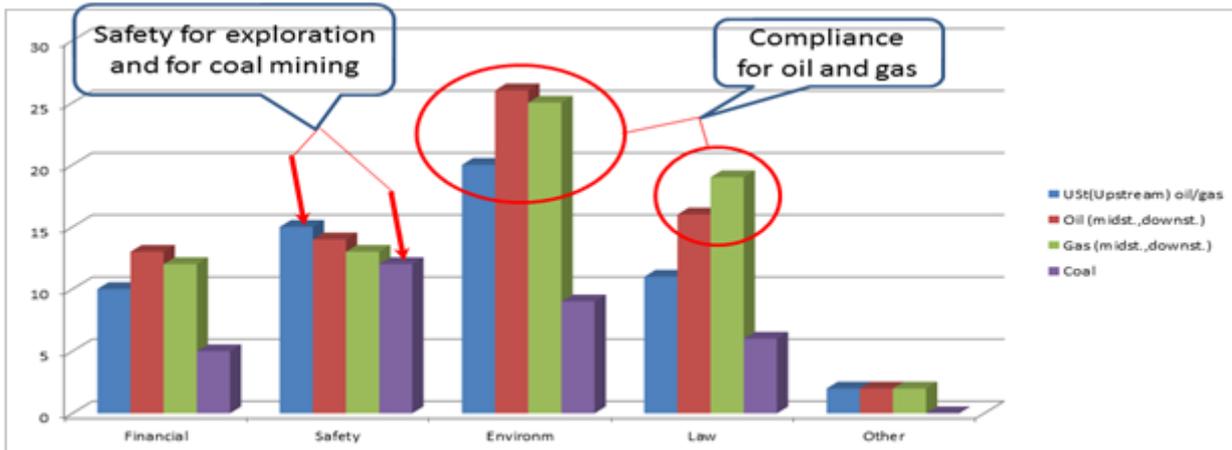


Image 3: Primary purpose of monitoring CH4/CH emissions [Q#5]

11. The primary purposes of monitoring the gases emissions (question #5) was for the oil and the gas industries indicated being “environment” and “law”, which can be understood as compliance to 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.

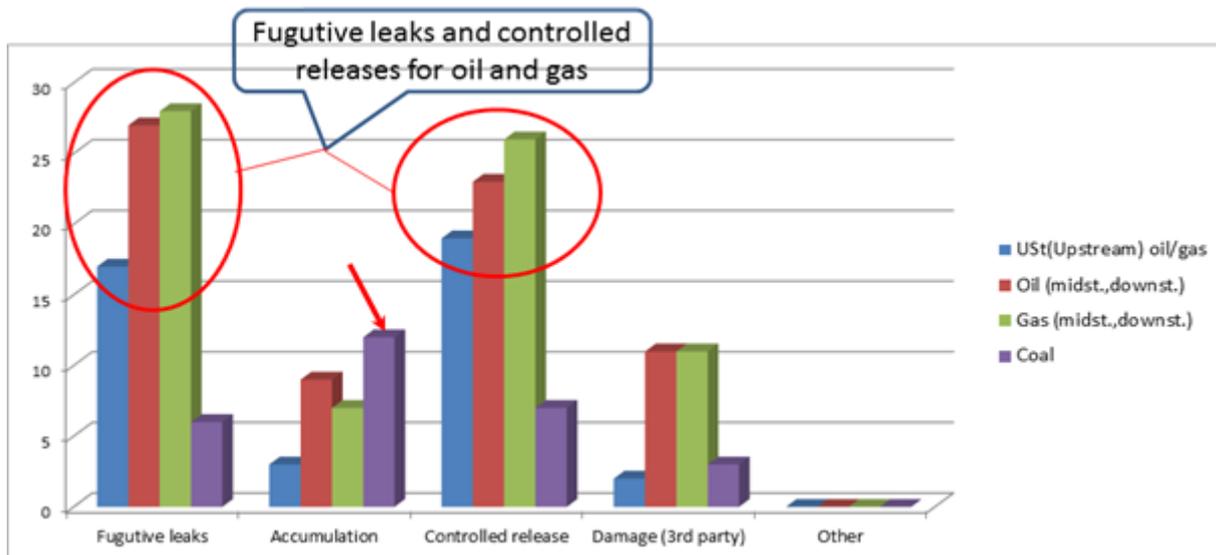


Image 4: Nature of CH4/CH emissions [Q#6]

12. The nature of gases emissions (question #6) was by all oil and gas sectors (exploration as well as midstream/downstream) indicated to primarily be “fugitive leaks” and “controlled releases”.

13. The coal sector highlighted “accumulation” as being the most important source of methane emissions.

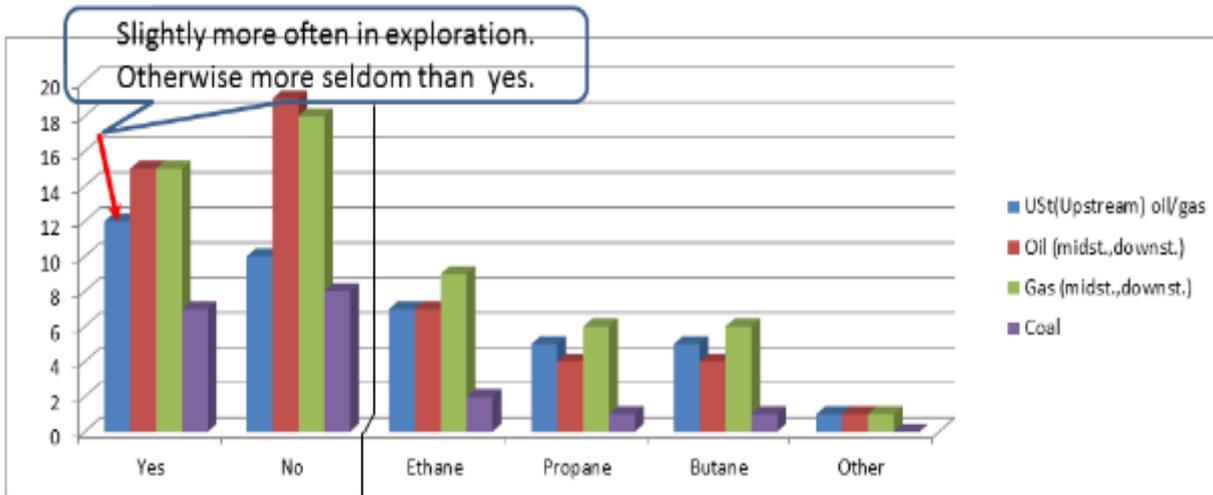


Image 5: Distinguish between methane and other CH gases? [Q#7 + Q#8]

14. Globally around half of industries in each sector included distinguish between methane and other CH (hydrocarbon) gases (question #7, followed by #8 about WHAT other gases), while the other half does not. For exploration is seems a bit more usual to distinguish while in the other sectors, a bit more common not to distinguish.

15. Questions #9 to 12 concerned what components and processes are being monitored.

- # 9 What components of your facilities do you monitor?  
- “All”, “Most”, “Where potential leaks”, “All emitting equipment” ..  
*(Too wide spread to present in graphic form.)*
- # 10 Why those particular components?  
- “Potential emitters”, “Legislation”, “Worker safety” ..
- # 11 What processes do you monitor?  
- “All”, “Most”, “Hazardous work area” ..
- # 12 Why those particular processes?  
- “Potential emissions”, “Regulation”, “Health and safety” ..

Image 6: What components and processes are being monitored and why

16. Responses were too wide spread to evaluate graphically. Key responses were in line with what is shown in image 6, reflecting “most”, “all” or “where potential emissions take place”.

17. Question #13 concerned the frequency of monitoring.

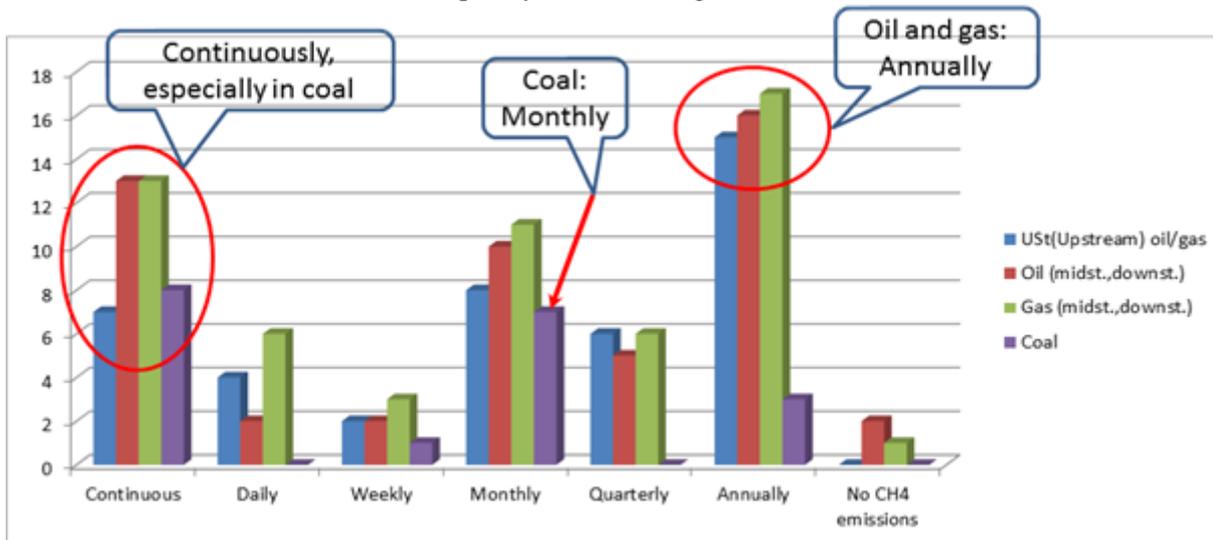


Image 7: Frequency of monitoring CH4/CH emissions [Q#13]

18. In all sectors there is a degree of continuous monitoring of emissions. This is especially the case in coal mines (where the gas in the mine is released into the working environment). Looking at ratios, 8 out of the 16 coal sector respondents noted continuous monitoring. That indicates 50%. For oil and gas (mid- and downstream) the corresponding figures are 13 out of 36 and 13 out of 37, i.e. around 1/3 and for oil and gas upstream, 7 out of 25, i.e. between 1/3 and 1/4.

19. Regular reporting is for the oil and gas sectors (including exploration) done annually and for coal sector monthly.

20. Question #14 was “How do you standardise CH4 emissions in your organisation?” Among the 1/3 of respondents that filled something in, the responses were too wide spread to be presented graphically. These responses mostly covered units of measurement (“scf”, “Nm3”, “t/yr”, “CO2e”..), norms (“EPA 21”, “EN15446” ..) plus some on principles (“BAT”=Best Available Technology”) etc (e.g. “FID”, which is an equipment for measuring gas content).

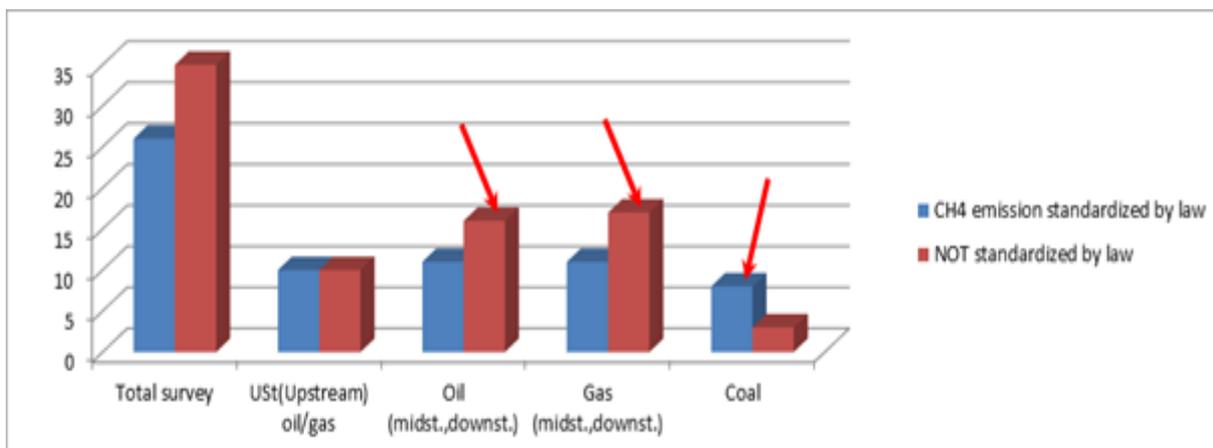


Image 8: Is the CH4 emissions standardization mandated by law? [Q#15]

21. Survey answers indicate that for the global coal sector, CH4 emissions are typically standardized by law, whereas for the global oil and gas sectors, it is not.

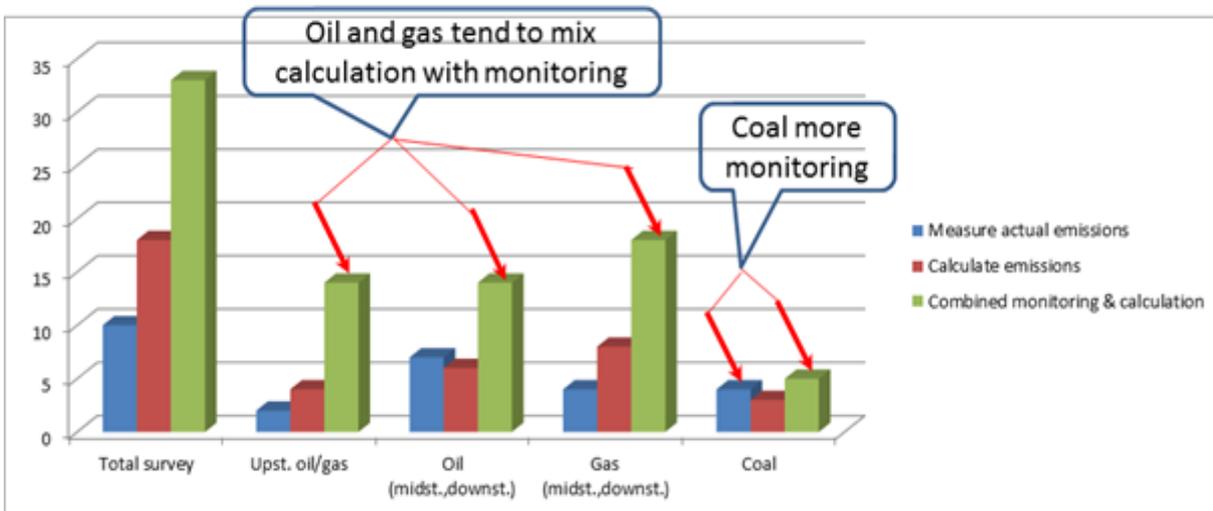


Image 9: Methods/technologies used to monitor CH4 emissions [Q#16]

22. Responses to question #16, the “Methods/technologies used to monitor CH4 emissions” indicate that the global coal sector tend to lean more on actually measuring the real values while sectors of oil and gas, including exploration, tend to lean more on calculations of CH4 emissions values, typically mixed with measurements.

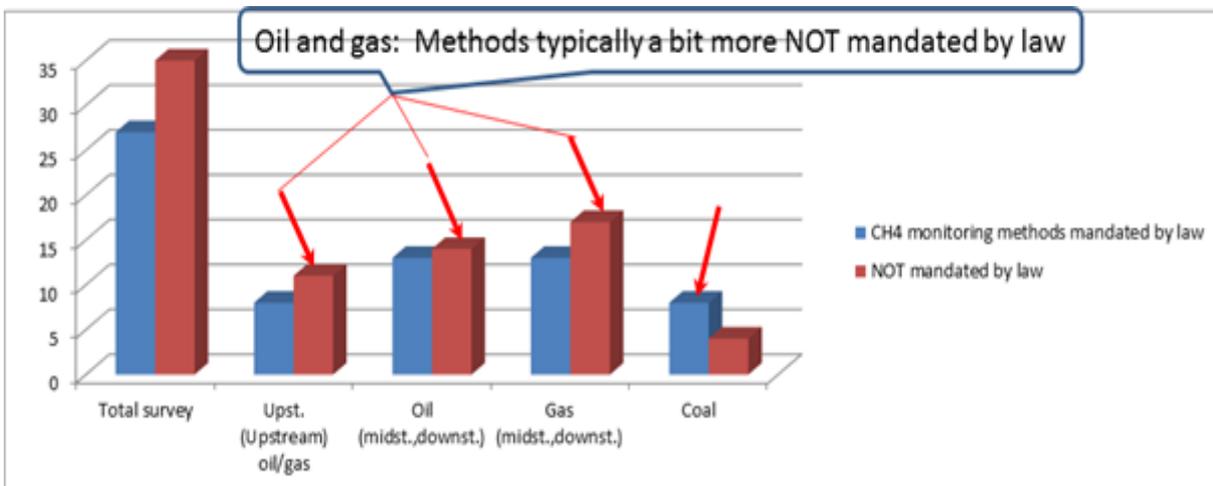


Image 10: Are the methods/technologies mandated by laws/regulations? [Q#17]

23. Responses to question #17 (image 10) indicate that methods for CH4 emissions monitoring typically ARE mandated by law for global coal industry and are NOT for the other industrial sectors covered by the survey.

24. Just over 40% responded to question #18 (Why are these methods chosen?). The spread of answers is too wide to simply be presented graphically, but the included responses in line with; “Best suited”, “no other tool”, “EPA 21”, “Low cost technology”, “used by others”, “BAT”, “Best practice” ..

25. The question #19, “What % of CH4 emissions are included in a Maximum Allowable Emission Target?”, was too unclear to be evaluated.

- 9 respondents answered in numbers (from 0% to 100%)
- 2 respondents referred to different per facility (one said ½% to 1½%)
- 25 responded NA or that they did not understand question
- Remaining 43 (over half) did not respond at all

26. When asked was database(s) they use when using emission factors for calculations (question #20), all (industrial) sectors referred to company standard.

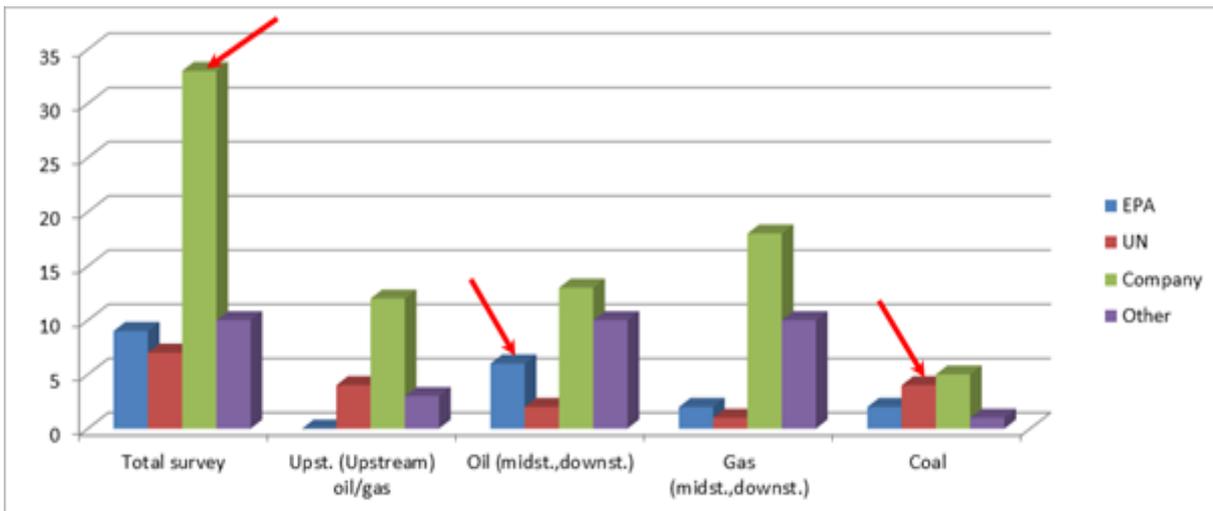


Image 11: Database(s) used when using emission factors for calculations [Q#20]

27. In the oil sector, there was a significant reference to EPA and in the coal sector to the UN. The sectors of oil and of gas also significantly refer to “other”, which was mostly national guidelines.

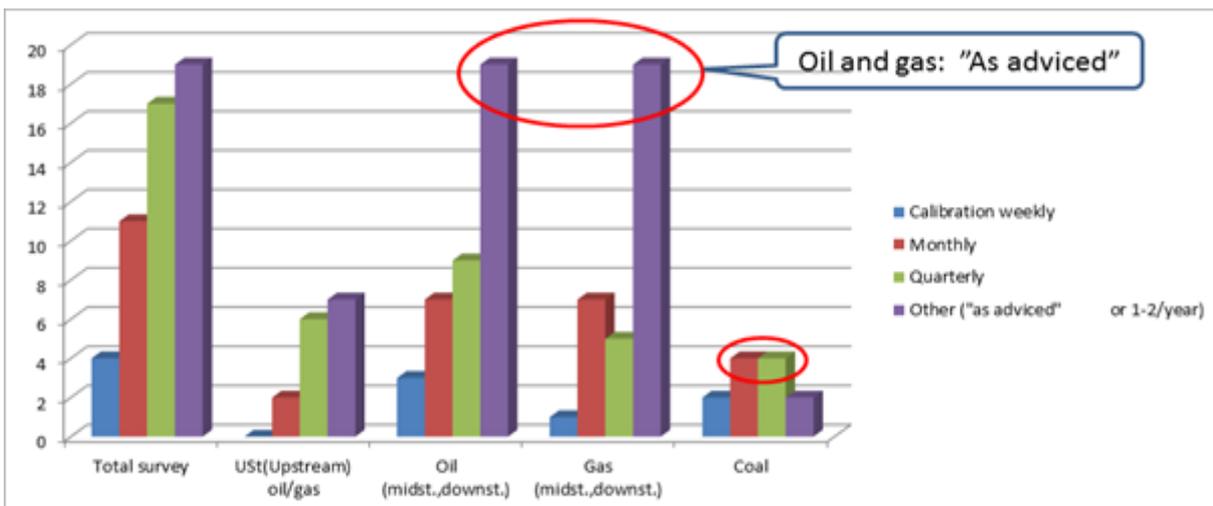


Image 12: How often the monitoring equipment is calibrated [Q#21]

28. The global coal sector indicated that they typically calibrate monitoring equipment monthly or quarterly. The oil and gas sectors mostly noted “Other”, filling in “As advised” (by the equipment manufacturer). This is most likely the same response as for the coal sector.

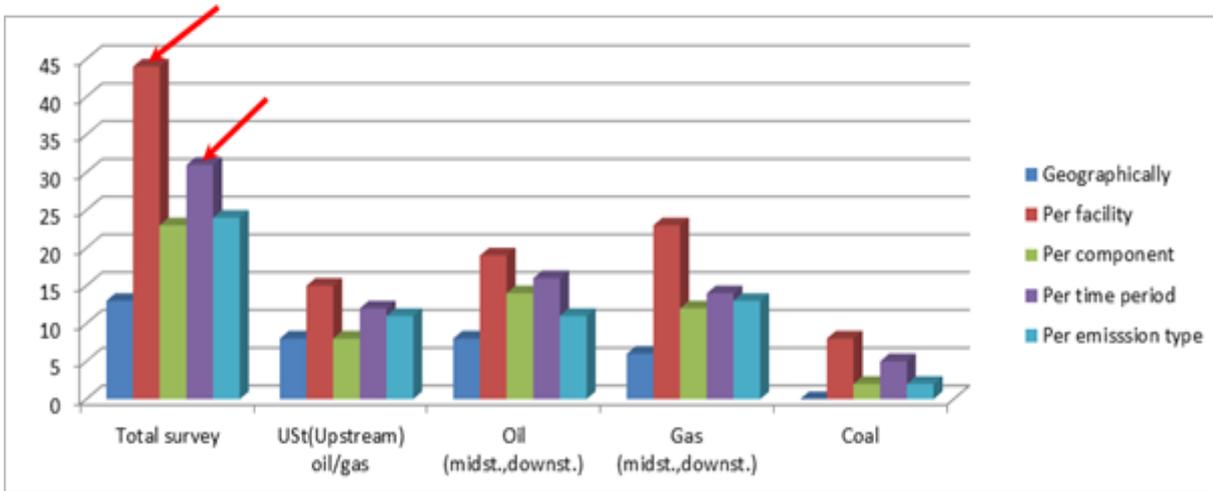


Image 13: How the monitoring results are recorded [Q#22]

29. Questions #22 and #23 concerned how the monitoring results are recorded. Responses to question#22 indicate that the outstanding most significant way to monitor was per facility, secondly per time period.

30. Question #23 was more basic, asking what units are used to record the results. Half of the respondents ignored this question. Most of the rest answered with various units of volume, rate or flow – mostly using SI units.

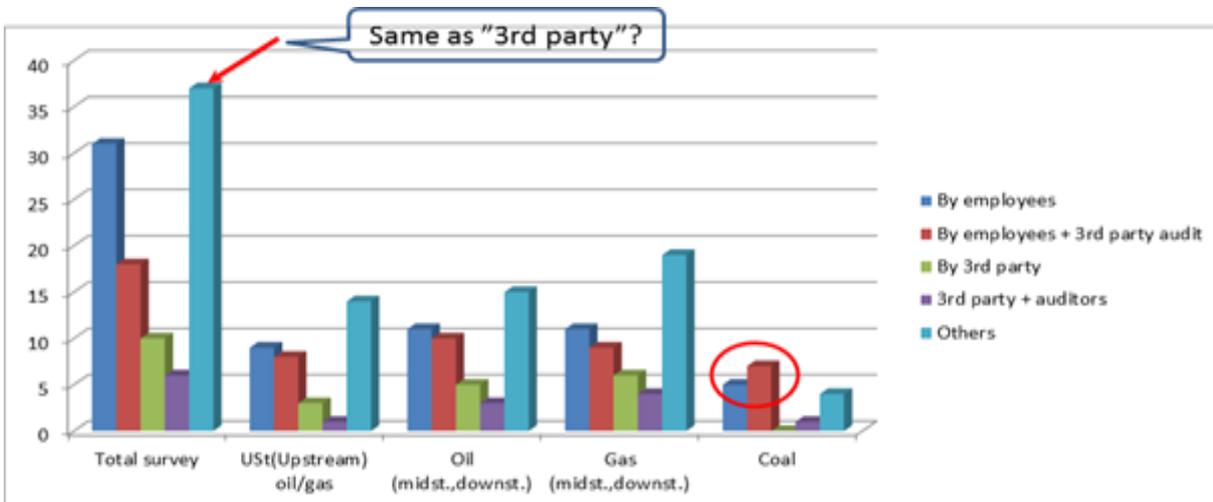


Image 14: How surveys are conducted [Q#24]

31. When asked how methane emission surveys are primarily conducted, the coal sector indicated by employees, with or without 3rd party auditing. The oil and the gas sectors, including exploring, noted “Others”, which most likely means the same as by 3rd party (i.e. not by their own organization).

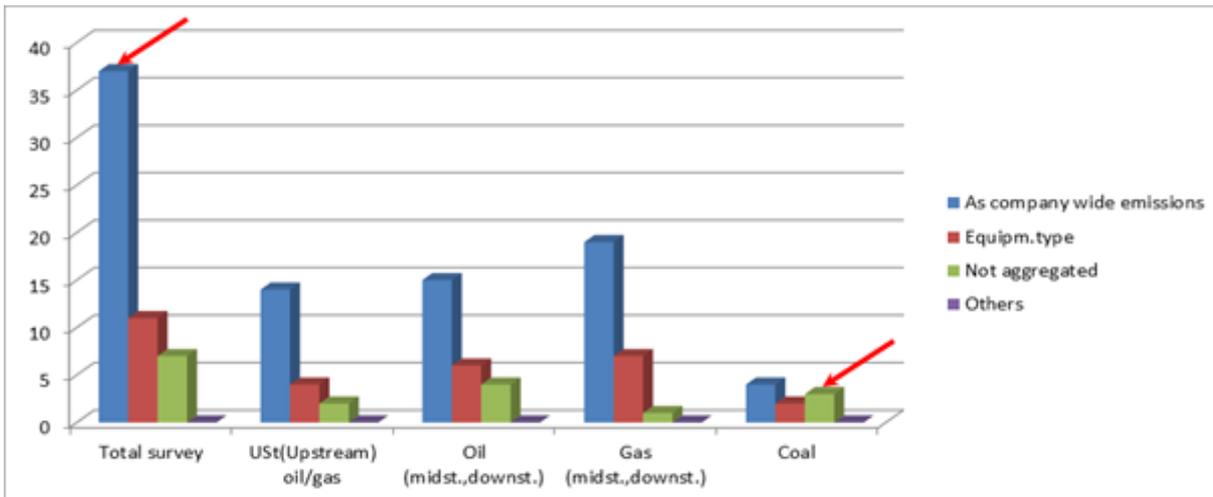


Image 15: How results are aggregated [Q#25]

32. Asked about how emission monitoring results are aggregated, global oil industries and gas industries noted “As company wide emissions” more than anything.

33. For global coal industry, half of respondents did not respond at all and among the responding half, half claimed that the emission monitoring results were not aggregated. This could be reflecting the fact that safety is the most important factor for monitoring the coal mine methane emissions, not the environmental impact.

34. This assumption is also supported by coal sector response to question #26.

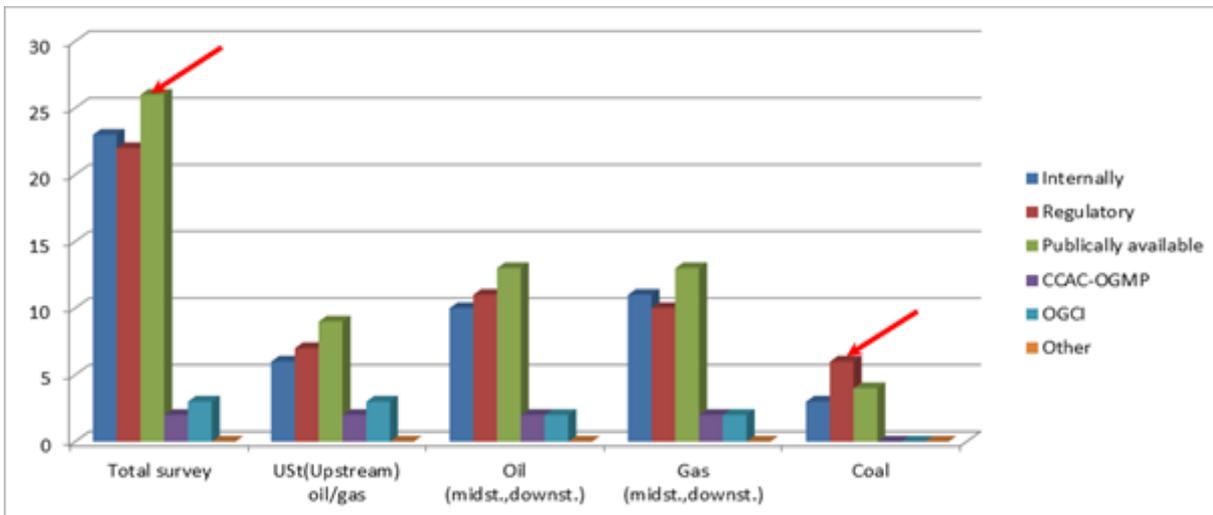


Image 16: How results are reported [Q#26]

35. The top score of response as to how monitoring results are reported among global oil and gas industries was “Publically available”.

36. For the global coal industries, the response was primarily “Regulatory”.

37. Question #27 was what organizations the respondent cooperated with on this topic. Around half of the respondents indicated a wide range of names covering Governmental ministries and agencies,

Intergovernmental organizations (including the UN and the GMI, Global Methane Initiative), universities and research institutions, 3rd party auditing companies and other private companies

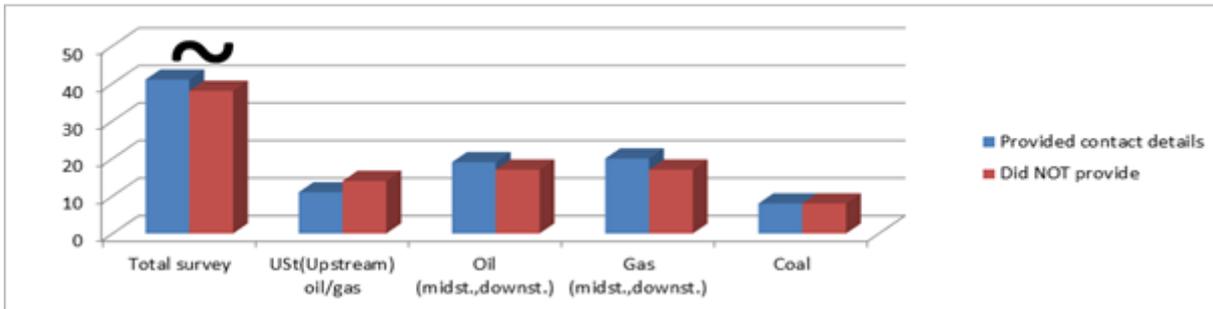


Image 17: Provided contact details [Q#28]

38. Out of the 79 participating respondents evaluated in this survey, around half provided their details (full name and email address).