

Advanced Methane Monitoring: Gauging the Ability of U.S. Service Firms to Scale Up

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Summary



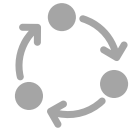
Summary

A growing number of service firms provide the U.S. oil and gas industry with advanced monitoring of methane emissions using various technologies, with a recent report finding that the number of methane mitigation service firms nearly doubled in the past 4 years alone.

According to our survey, half of respondent firms are already capable of not just detecting, but also quantifying, methane emissions at the component level. More than one quarter are already able to survey more than 300 well sites per day.

With new federal methane rules on the horizon, how ready are these firms to scale up their offerings? More than half of respondent firms say that by 2023, they could serve at least 100 more well sites per day than they currently serve. Nearly half (47 percent) say they could scale up to serve more than 500 well sites per day; these respondents comprise those using fixed sensors and/or airplanes and/or satellites.

Definition



Method

In this survey, **advanced monitoring** does not include:

- Method 21
- Portable analyzers
- Acoustic leak detectors
- Audio-visual-olfactory (AVO) inspection
- Handheld Optical Gas Imaging (OGI) leak surveys

Survey

We conducted an internet survey:

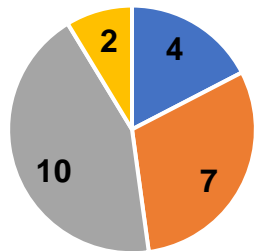
- Open from June 29 through July 21, 2021
- Survey invitation was emailed to 98 firms, 48 of which were pre-identified as relevant to advanced monitoring*
- 9 questions about capabilities, geography, and ability to scale up
- Optional comment box accompanied each question to give respondents the opportunity to provide additional input

*All invited firms were identified in [Find, Measure, Fix: Jobs in the U.S. Methane Emissions Mitigation Industry](#), 2021.

Respondents

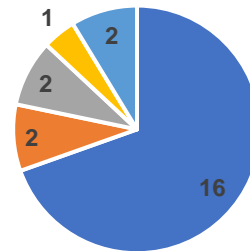
- 23 firms responded
- A “typical” respondent firm is at least 13 years old, has 50 or fewer employees, and \$15 million or less in annual sales.

Age of Firms



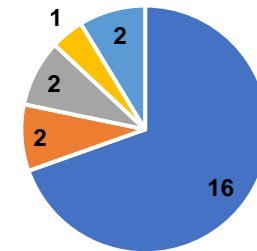
■ 1-5 years ■ 6-12 years ■ 13+ years ■ No data

Size by Employees



■ 0-50 ■ 51-200 ■ 201-5,000 ■ 10,001+ ■ No data

Size by Sales (\$M)



■ \$0-\$15 ■ \$15-\$50 ■ \$51-\$1000 ■ \$10,000+ ■ No data

Limitations

This survey is subject to several limitations. First, we had limited ability to gain access to individuals appropriately authorized to respond on behalf of each target firm. Second, respondents may have self-selected to participate based on their personal viewpoints regarding new methane rules or other factors. These two conditions limited our ability to create a random sample. In addition, the survey's small sample size makes it difficult to generalize results to all relevant firms.

Questions 1-5

- 1) Does your company provide **advanced monitoring** of methane emissions to the oil and gas industry? (Choose one)
- 2) For the methane detection and/or measurement services you provide, what **deployment platform(s)** are you now using? (Check all that apply)
- 3) At what **spatial resolution** are you capable of **detecting** emissions? (Check all that apply)
- 4) Do you offer **emission rate quantification** services beyond just leak concentration? (Y/N)
- 5) At what **spatial resolution** are you capable of **quantifying** emission rates? (Choose range)

Questions 6-9

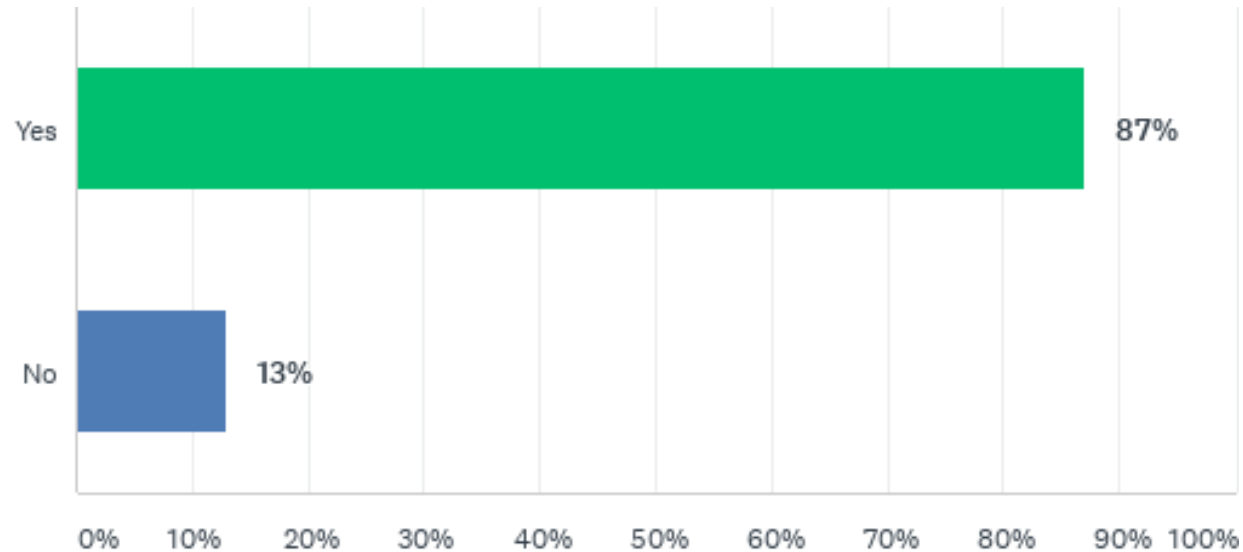
- 6) What **portion of your current business** involves methane detection and/or measurement services using the deployment platforms you listed above? (Choose range)
- 7) What is the **average number of well sites per day** you are currently able to survey using these deployment platforms? (Choose one)
- 8) In **which U.S. basins** are you currently using these deployment platforms? (Check all that apply)
- 9) If new methane rules were put in place, how much would you anticipate **increasing your capacity** for providing these advanced monitoring services? Please express as anticipated average number of well sites you would be capable of serving per day by 2023 (Choose range)

1) Does your company provide **advanced monitoring** of methane emissions to the oil and gas industry? (Choose one)



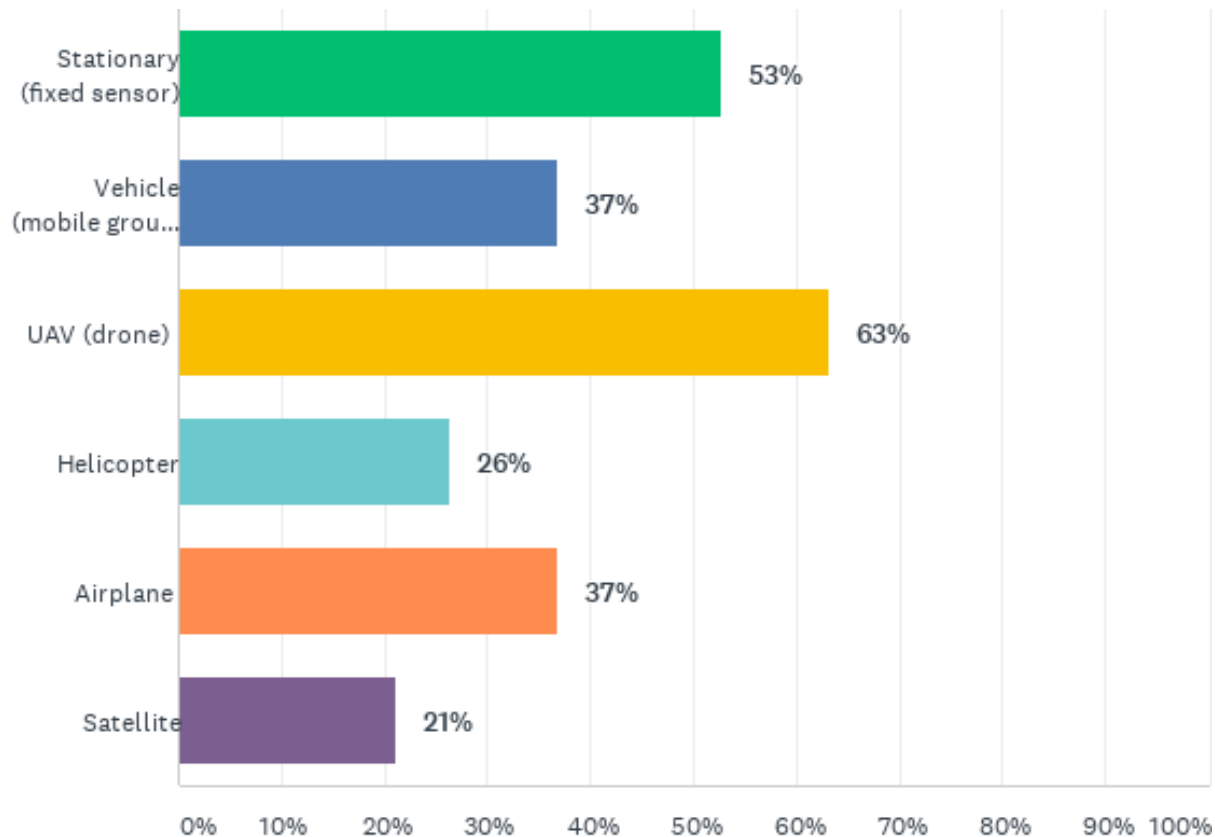
Results

Answered: 23 Skipped: 0



2) For the methane detection and/or measurement services you provide, what **deployment platform(s)** are you now using? (Check all that apply)

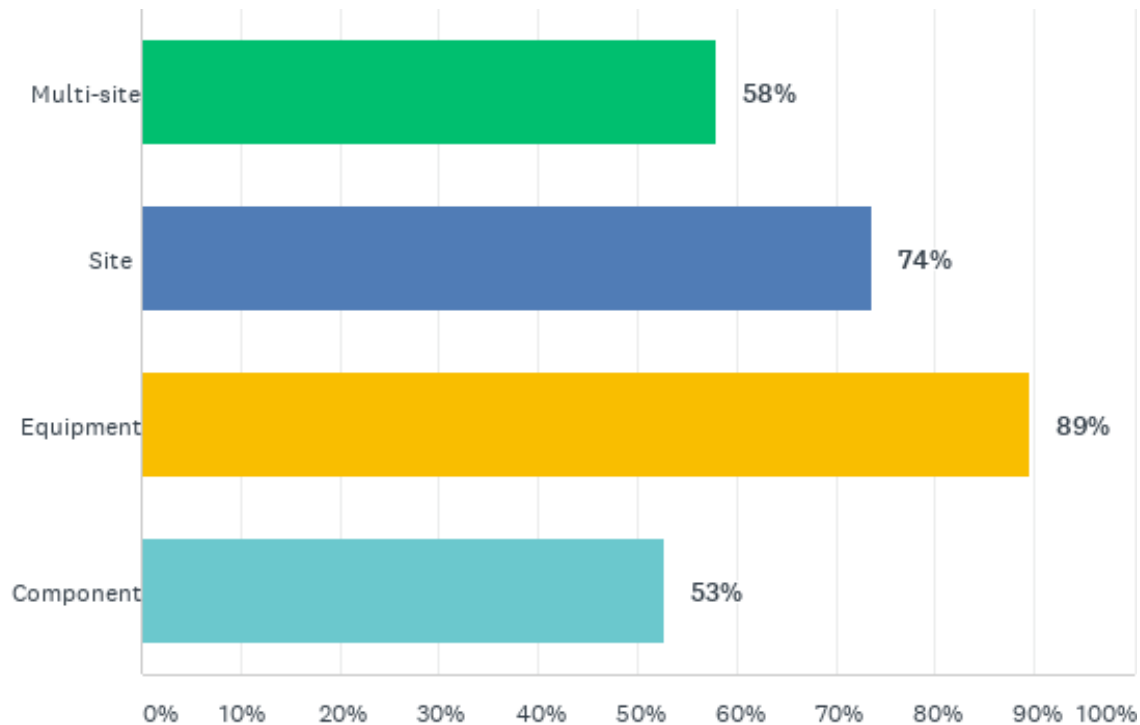
Answered: 19 Skipped: 4



Stationary - "Able to cover areas up to 25 km², including ability to provide spatial map of gas concentration and emissions in near-real-time via cloud computing framework."

3) At what **spatial resolution** are you capable of **detecting** emissions? (Check all that apply)

Answered: 19 Skipped: 4



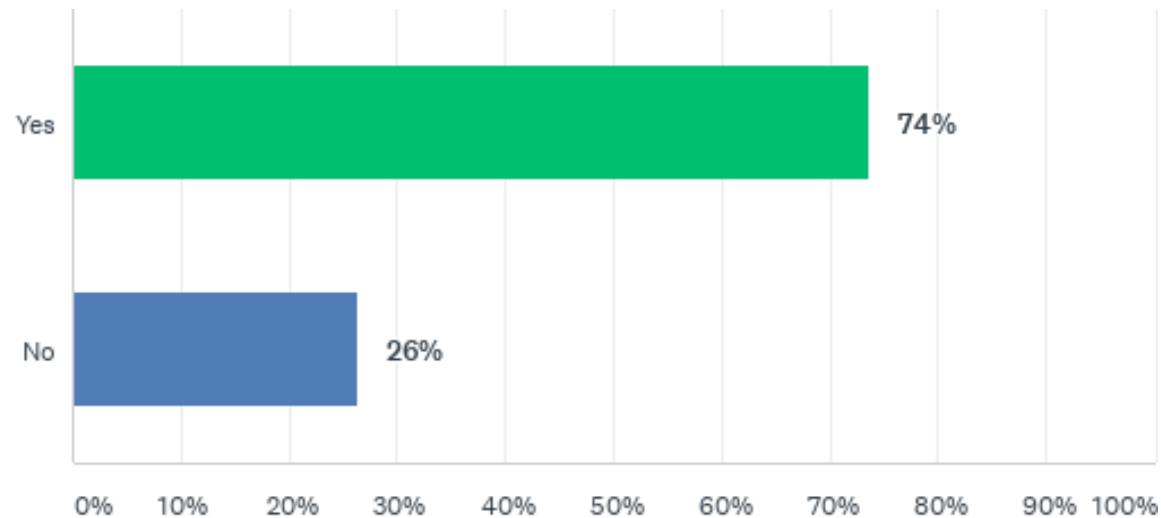
Equipment - "FROM 200M DOWN TO 10M²"

Multi-site, Site, Equipment - "Current satellite is a 30m pixel, more capable for site monitoring. Our next asset will be sub-10m (closer to 7 or 8), therefore individual equipment."

Component - "We are capable of specifying source location within 4 meters using high-resolution satellite imagery."

4) Do you offer **emission rate quantification** services beyond just leak concentration?

Answered: 19 Skipped: 4

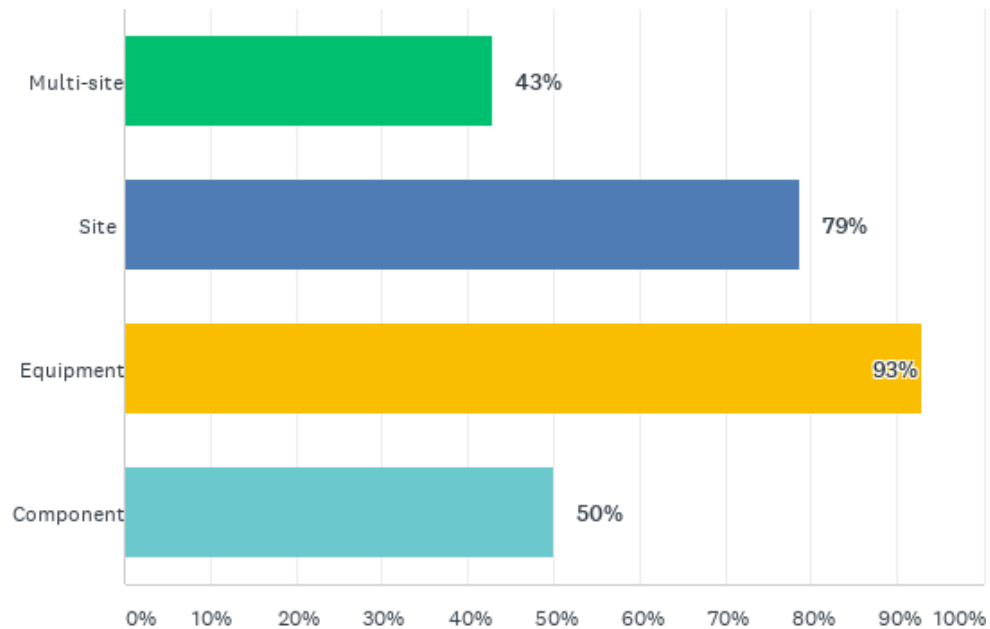


Yes - *“In near-real-time via cloud-based framework over areas up to 25 km²”*

Yes - *“We quantify methane emissions to 10 ppm concentration and 9 kg/hr leak rate using analytics developed to process satellite and aerial data. Our accuracies have been documented to be within +/- 8% of flow and concentration by two separate facilities (METEC and VIVER)”*

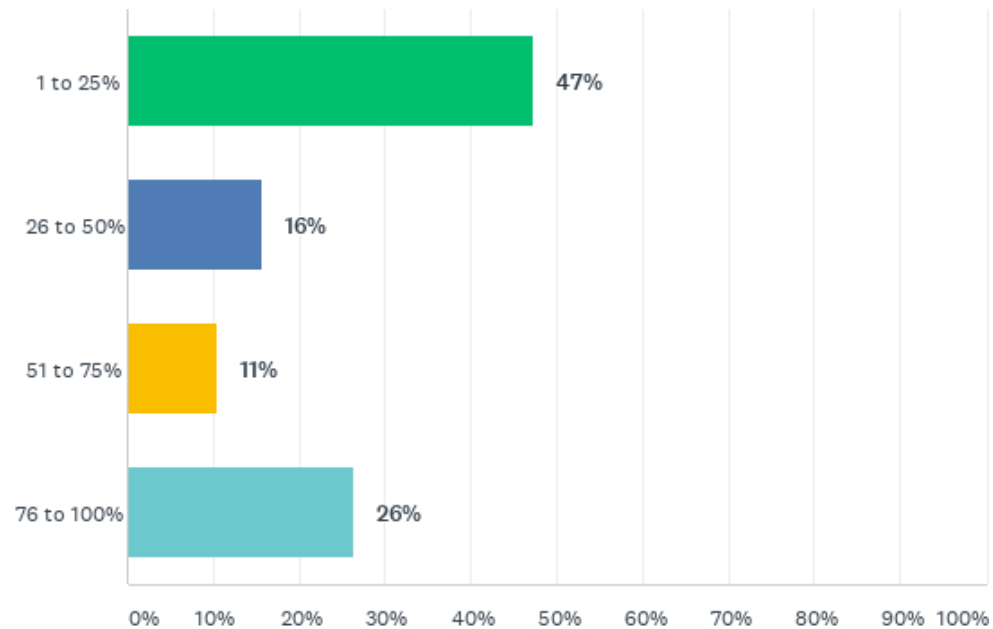
5) At what **spatial resolution** are you capable of **quantifying** emission rates?

Answered: 14 Skipped: 9



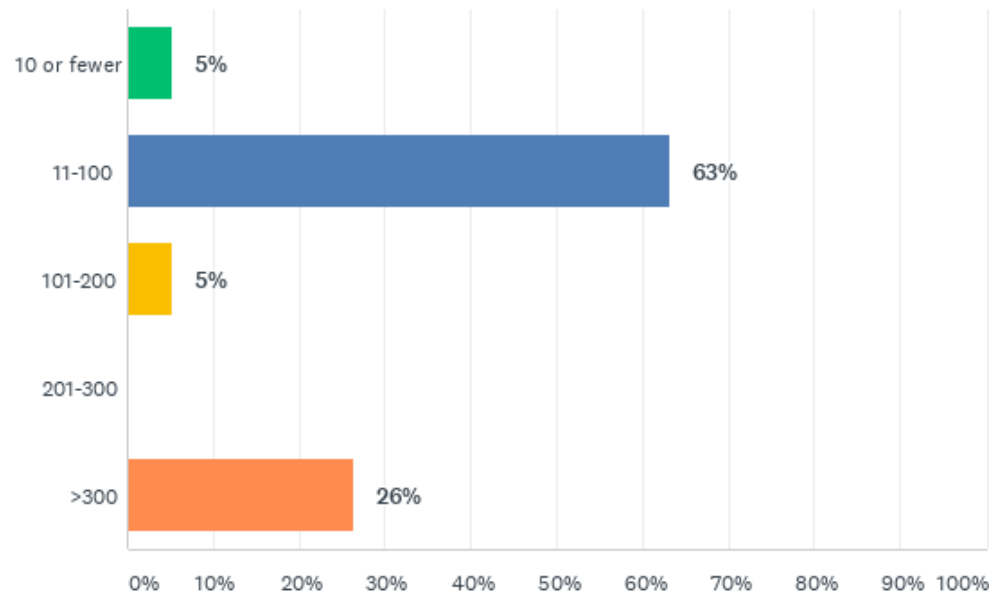
6) What portion of your **current business** involves methane detection and/or measurement services using the deployment platforms you listed above?

Answered: 19 Skipped: 4



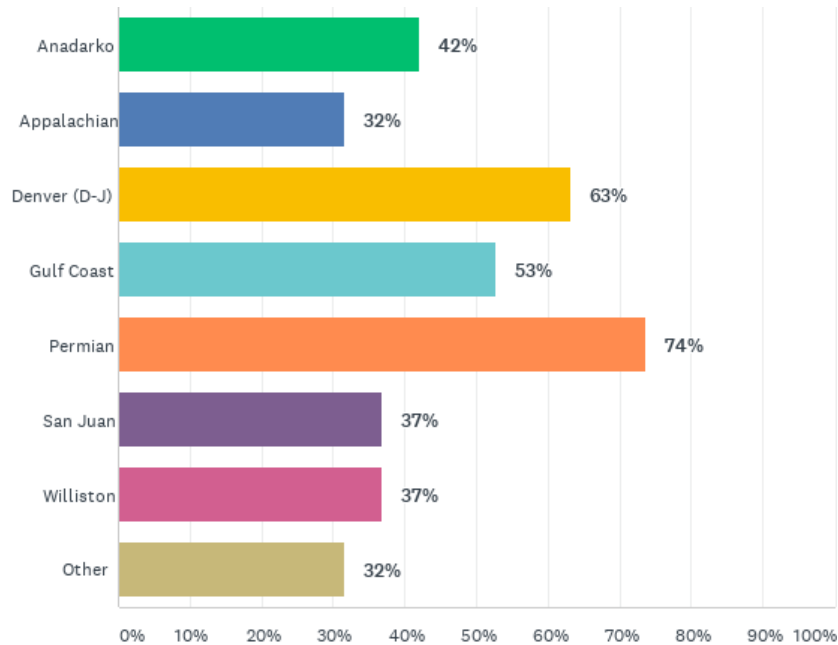
7) What is the **average number of well sites per day** you are currently able to survey using these deployment platforms? (Choose one)

Answered: 19 Skipped: 4



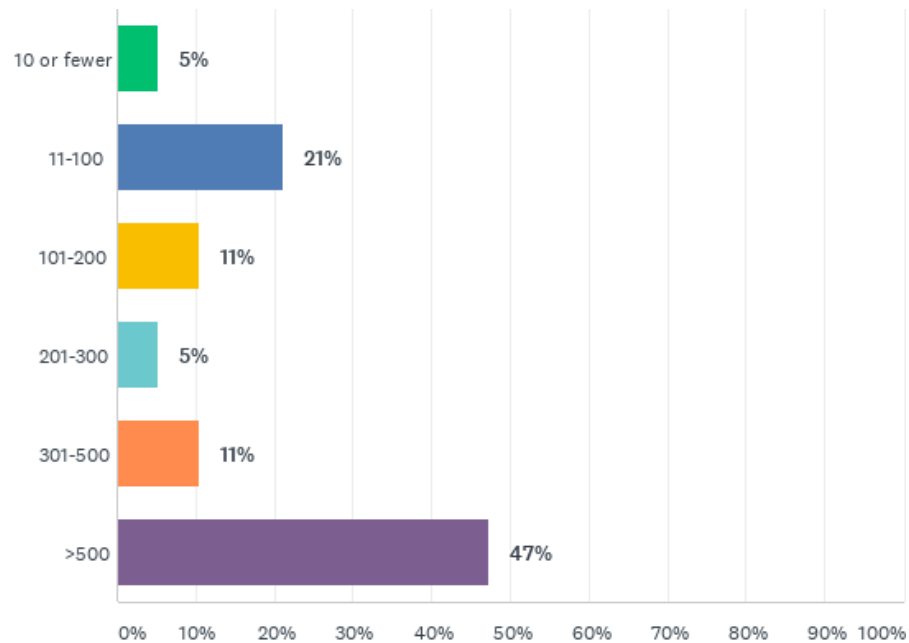
8) In **which U.S. basins** are you currently using these deployment platforms? (Check all that apply)

Answered: 19 Skipped: 4



9) If new methane rules were put into place, how much would you anticipate **increasing your capacity** for providing these advanced monitoring services? Please express as anticipated average number of well sites you would be capable of serving per day by 2023 (Choose one)

Answered: 19 Skipped: 4





Takeaways

1. Among respondent firms, the most-used deployment platforms are UAVs (63%) and fixed sensors (53%).
2. Although satellites are the least-used deployment platform, they are used by 21% of respondent firms—comparable to helicopters, used by 26% of firms.
3. 50% of respondent firms can currently quantify emission rates at component level.
4. 57% of respondent firms say they could scale up to serve at least 100 more well sites per day than they currently serve.
5. 47% of respondent firms say they could scale up to serve >500 well sites per day; these respondents comprise those using fixed sensors and/or airplanes and/or satellites.

Conclusion



Conclusion

This survey sheds light on a set of mature firms with relevant capabilities to perform advanced monitoring of methane emissions across all deployment platforms. Respondents represent nearly half of the advanced monitoring firms previously identified in *Find, Measure, Fix*, so while the sample size is small, it does give a reasonable representation of the relevant firms. Most firms indicated they could significantly scale up their current number of well sites served per day by 2023. Some respondents pointed out that the automated nature of fixed sensor and satellite platforms makes scaling far easier than is the case for other platforms. As for ability to quantify emission rates, half of respondents reported they can currently do so at the component level, demonstrating considerable capabilities not only to cover more well sites, but to measure emission rates at a higher resolution.