METHANE FROM FLARING TOOLKIT

Measure Efficiency: Methane measurements by satellite to assess flare efficiency –

Can I measure flare efficiency? > Measure Efficiency: Methane measurements by satellite to assess flare efficiency –

Summary

can be used to monitor for flares with anomalous methane emissions. Separate toolkit entries cover the use of satellites for identifying a flare with a performance issue.

Where there is adequate separation between flares relative to the spatial resolution of the satellite it is possible to measure methane emissions and derive efficiency estimates. However, at the current state-of-the art the limits of detection, resolution and accuracy of measurements mean that when measuring methane from flares (using instruments such as hyperspectral imagery) the majority of this capability is currently directed towards the challenge of identifying a flare that has a performance issue, rather than the more complex measurement of measuring destruction efficiency. Measuring efficiency also requires high accuracy measurements of CO_2 and/or data on flare volumes from the operator.

In addition to satellite operators, there are a growing number of service organisations that will process publicly available or privately sourced data and use analytics to give insights to an operator.

How it Works

- Methane is measured using multi-spectral imaging whereby sunlight that is scattered back to space by Earth's surface and atmosphere, is measured and used to detect the unique fingerprints of gases in different parts of the spectrum.
- The sensor measured the total-column of methane in the atmosphere – it is not differentiating between background methane or emissions from different sources that overlap vertically.
- Converting image data into emission rates requires additional data inputs such as windspeed.
- Direct measurement of efficiency by dual high resolution CH4/CO_2 measurements is not currently commercially available.
- Calculating efficiency from flow volumes would require access to production data and accurate wind speed data to model dispersion of the plume. As such, the uncertainty of any method would be high.

Advantages

- ☑ Global coverage provides an overview of changes in flaring
- ☑ Measurements are potentially independent of operator

Limitations

- ☒ Validated measurement of efficiency by dual high resolution CH4/CO_2 measurements is not currently commercially available
- ☒ Multi-spectral imaging is dependent upon daylight and cloud-free cover for the location of interest
- ☒ Quantification is dependent upon additional information, such as wind speed and flow data. Flow data is only available to the operator.
- ☒

The relatively low resolution of current systems means that individual flares cannot always be differentiated when closely located

Measurements conducted over water, ice or snow are subject to light reflection, which impairs data accuracy. Work is ongoing to develop specialised ‘glint mode’ analytics to provide improved data over water

Go Deeper

Case study

No case studies currently available

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Measure Efficiency: Predictive Feedback and Control

Measure Efficiency: Flare Simulations

Measure Efficiency: Aerial measurement of flare efficiency

Measure Efficiency: Drone equipped with dual CH4 and CO2 sensors

Measure Efficiency: Drone equipped with single methane sensor