



# Monitoring methane from space

European Gas Research Group – 60<sup>th</sup> Anniversary Conference

December 2021

# Kayrros: leading geospatial analytics for energy and environment



## CUSTOMER BASE

**+80 customers**

Including the world's leading financial institutions and energy companies

**\$3 trillion**

Aggregated market value of Kayrros customers



## KEY METRICS

- Monitoring **200k+** energy assets
- Using **10+** constellations of satellites, source agnostic
- 5bn** position data points processed per day
- 100+** remote sensing & data fusion algorithms



## REGIONAL FOOTPRINT



Paris



Houston



London



Singapore



New York



Bangalore



## TEAM

- Strong tech & science **team of 140**
- 80+ MSc and 15+ PhDs** from world-class universities & schools in artificial intelligence, physics, big data & energy
- 24** nationalities

Key decision makers in the US, Russia and the EU rely on Kayrros data



“[We can measure the carbon footprint] of a large corporation or country.... The Washington Post had a terrific story with the methane pinpointed in Russia and the whole map of methane.”

**John Kerry – US Special Presidential Envoy for Climate**



“After the analytics company **Kayrros** claimed a big increase in methane emissions from Russia, ... President Vladimir Putin dismissed criticism over the gas and said his country would launch its own satellites.”

**Washington Post**



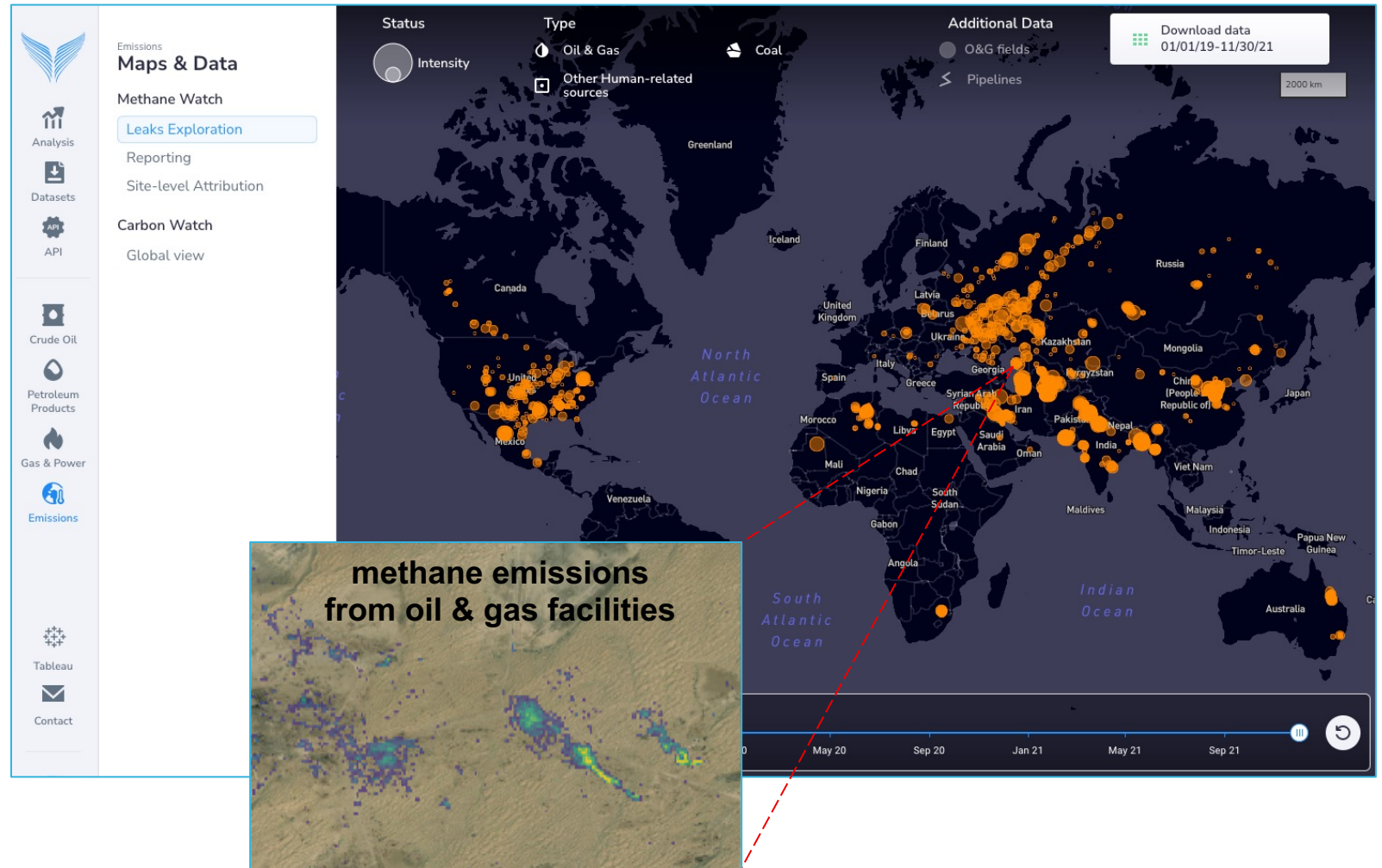
“The European Commission will propose legislation to ... make measuring, reporting and verification of methane emissions mandatory for companies.”

**Kadri Simson – EU Energy Commissioner**

Eliminating methane hotspots is equivalent to 1Gt of CO<sub>2</sub>e per year

## Kayros Methane Watch

map of methane hotspots in the energy sector

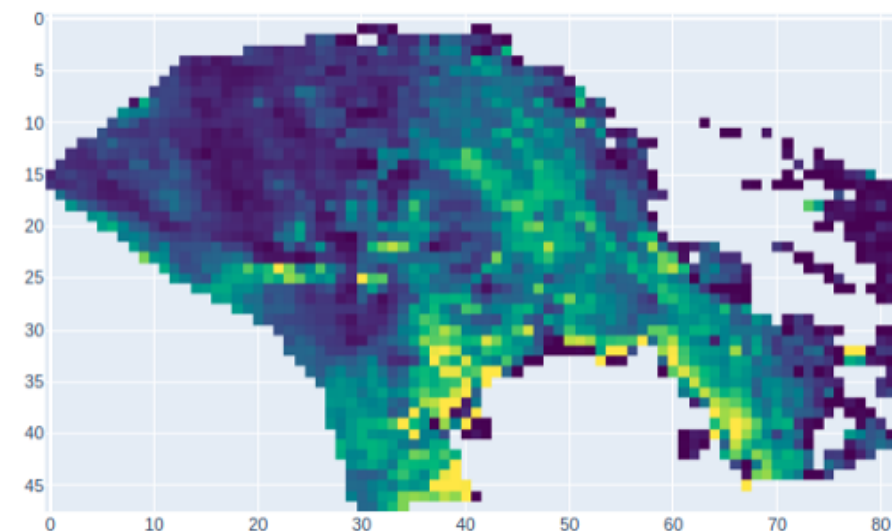


# Satellite analytics provide two methods to estimate methane emissions

## Method 1

### Basin Inversion

Quantify total emissions across an entire oil & gas basin

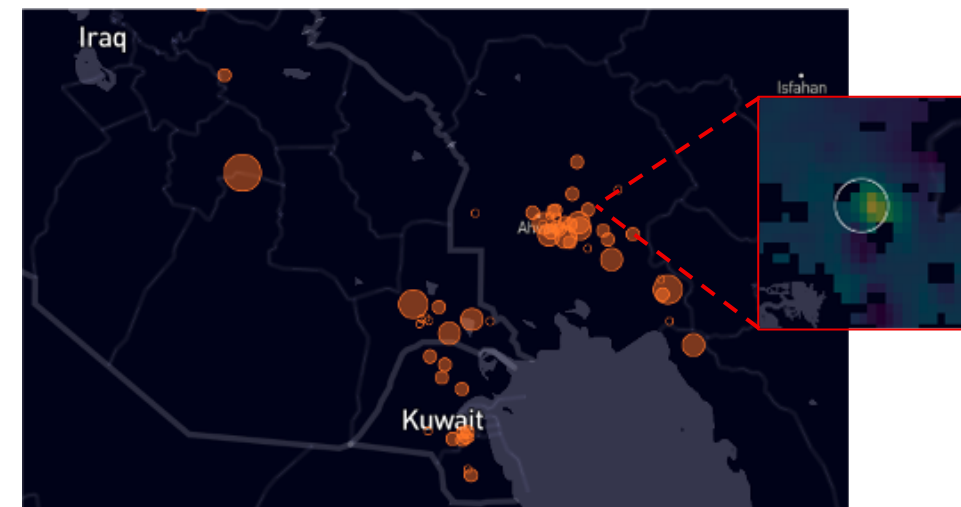


Methane concentrations in Iran-Iraq-Kuwait  
2019-20 average

## Method 2

### Methane Hotspots

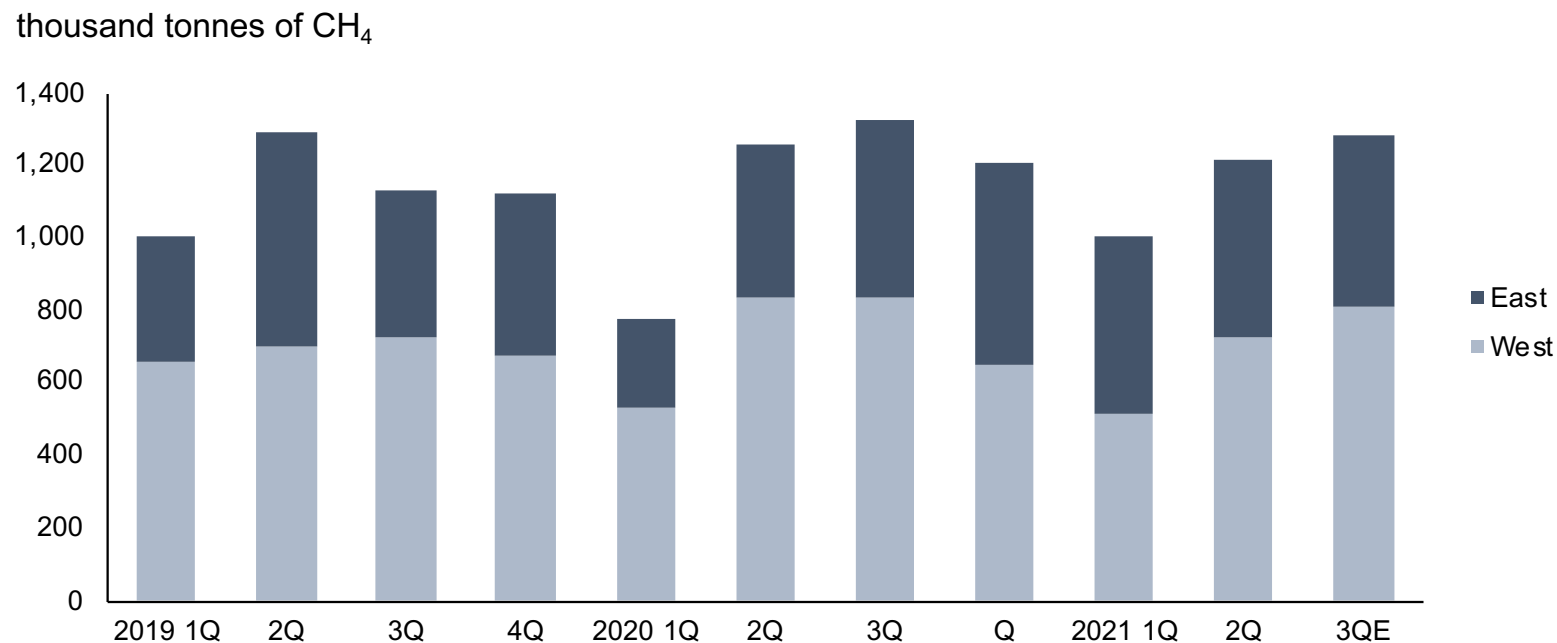
Detect and quantify methane emissions from large sources



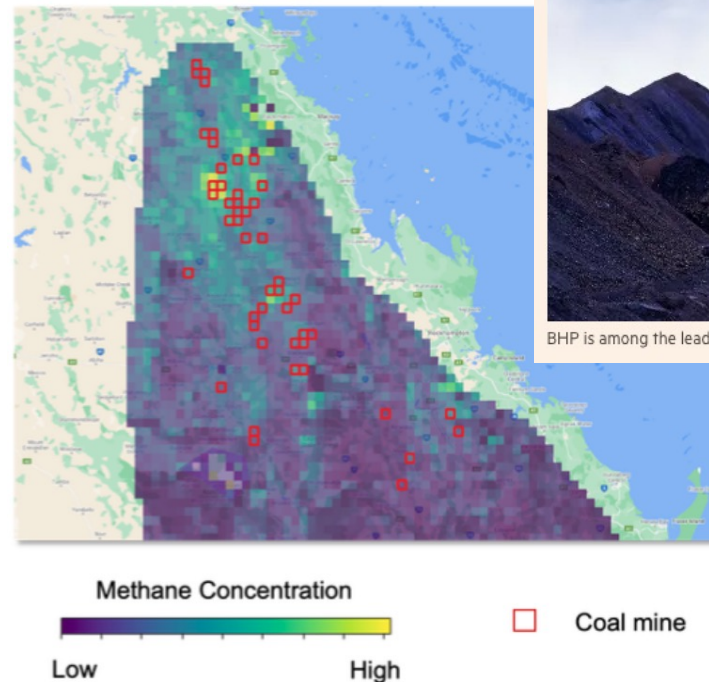
Methane hotspots in Iran-Iraq-Kuwait  
January 2019 to date

Basin inversions  
cover 90%+ of  
total methane  
emissions

## Methane emissions from the Turkmen oil & gas sector



# The same approach can track methane from coal mining



**Average methane concentrations in the Bowen Basin during FY 2019-20**

Source: Kayrros analysis of Sentinel-5P data

Climate Capital Pollution + Add to myFT

## Australian coal region emits 1.6m tonnes of methane a year, study finds

Satellite data show release of gas from Bowen Basin is equivalent to pollution effect of 30m combustion engine vehicles

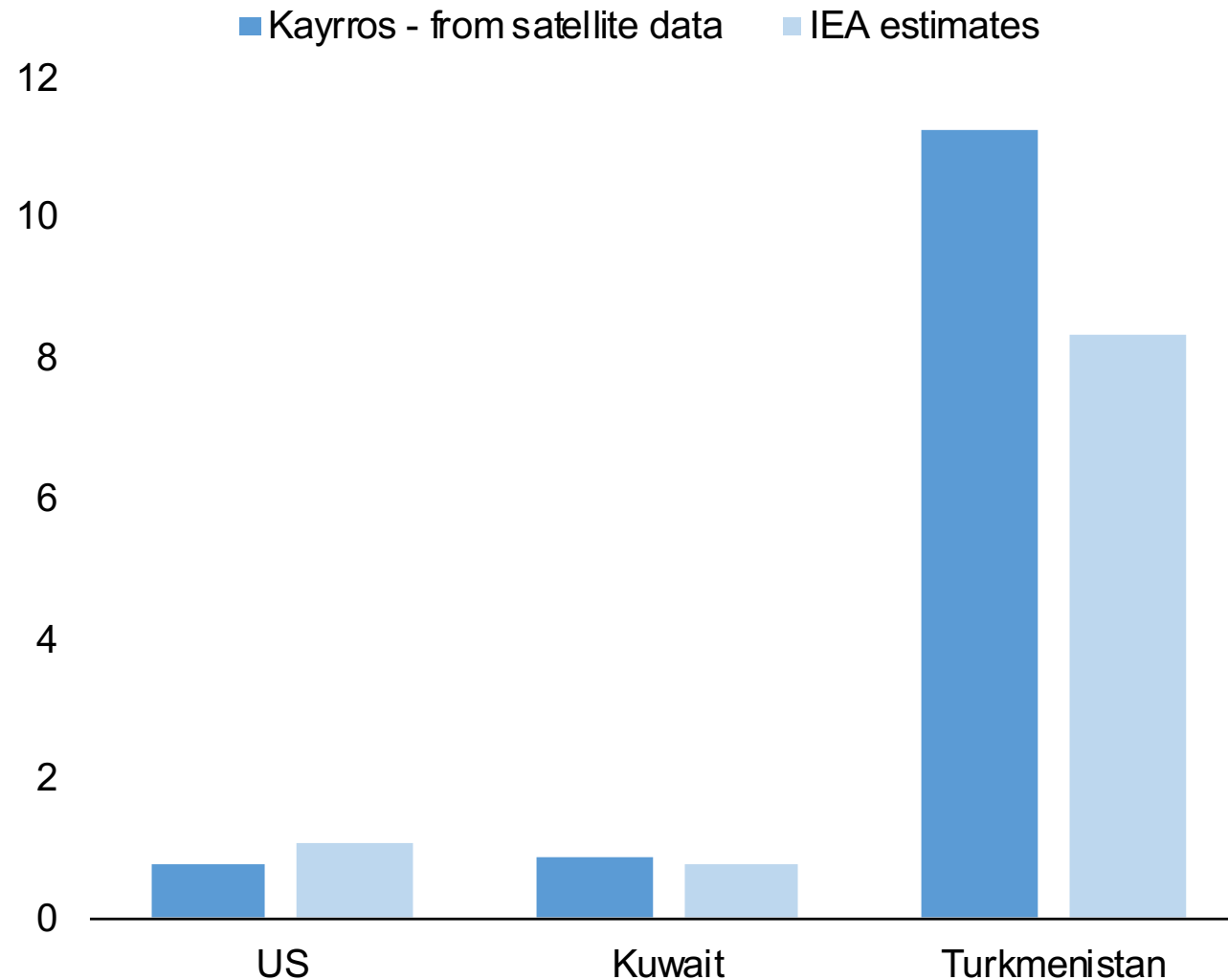


BHP is among the leading producers at the Bowen Basin, which is the world's largest metallurgical coal export region © BHP

Methane quantifications based on inversion models are consistent with IEA estimates

## Methane intensity of oil & gas production

kg of CH<sub>4</sub> per barrel of oil equivalent – 2020 data



Source: Kayrros, IEA, BP. Kayrros coverage of US consists of 3 basins (Permian, Marcellus, Anadarko) responsible for half of total production

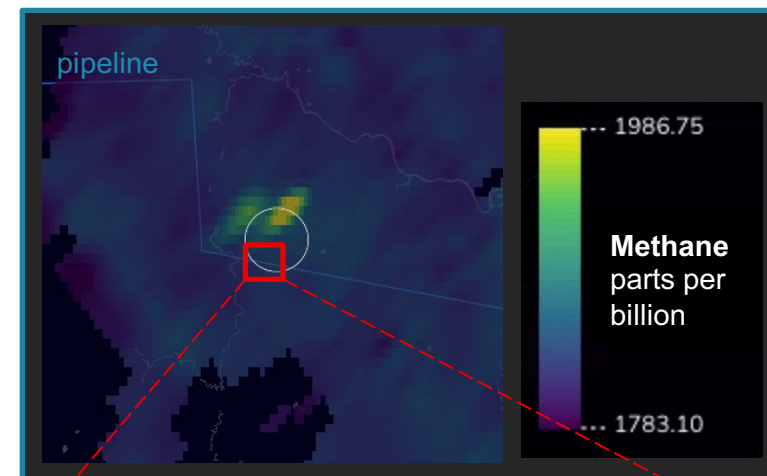
# Methane hotspots account for c.10% of total emissions

## Low-resolution satellite imagery

Methane hotspots

*September 6, 2019*

Two concurrent events detected downwind from a pipeline and quantified at 19 and 62 tonnes of methane per hour

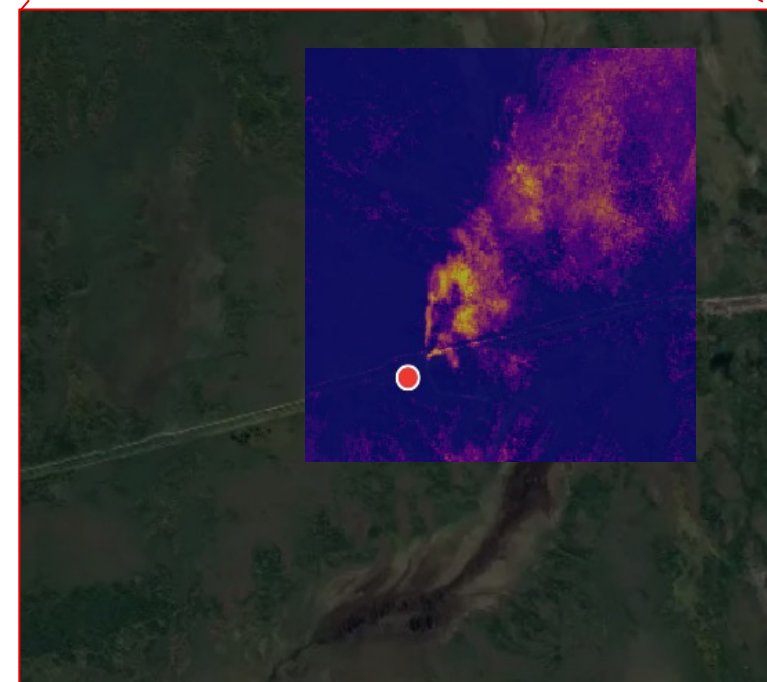


## High-resolution satellite imagery

Methane hotspot

*September 6, 2019*

Emission source identified as a block valve station



# Operators validate methane hotspot detections

**B** Bloomberg.com

## Berkshire Hathaway Gas Pipeline Was Behind Massive ...

What on Earth? The Bloomberg Green newsletter is your guide to the latest in climate news, zero-emission tech and green finance.

1 week ago



## Russia's Gas Pipelines May Save Europe This Winter But ...

Yet, because methane has far more planet-warming power than carbon ...  
French geoanalytics firm Kayrros SAS to pinpoint the plume from...

1 week ago



## Canada Methane Plume Coincided With Work on Gas System

24, releasing natural gas — whose main component is methane — for 10 ...  
Kayrros SAS, a geoanalytics company, estimated an emissions rate of...

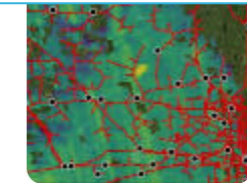
4 weeks ago



## Wisconsin Launches Probe Into Methane Plume Spotted From ...

The state launched a probe after being contacted by Bloomberg News about a plume of methane detected in southwest Wisconsin by Kayrros SAS,...

1 month ago



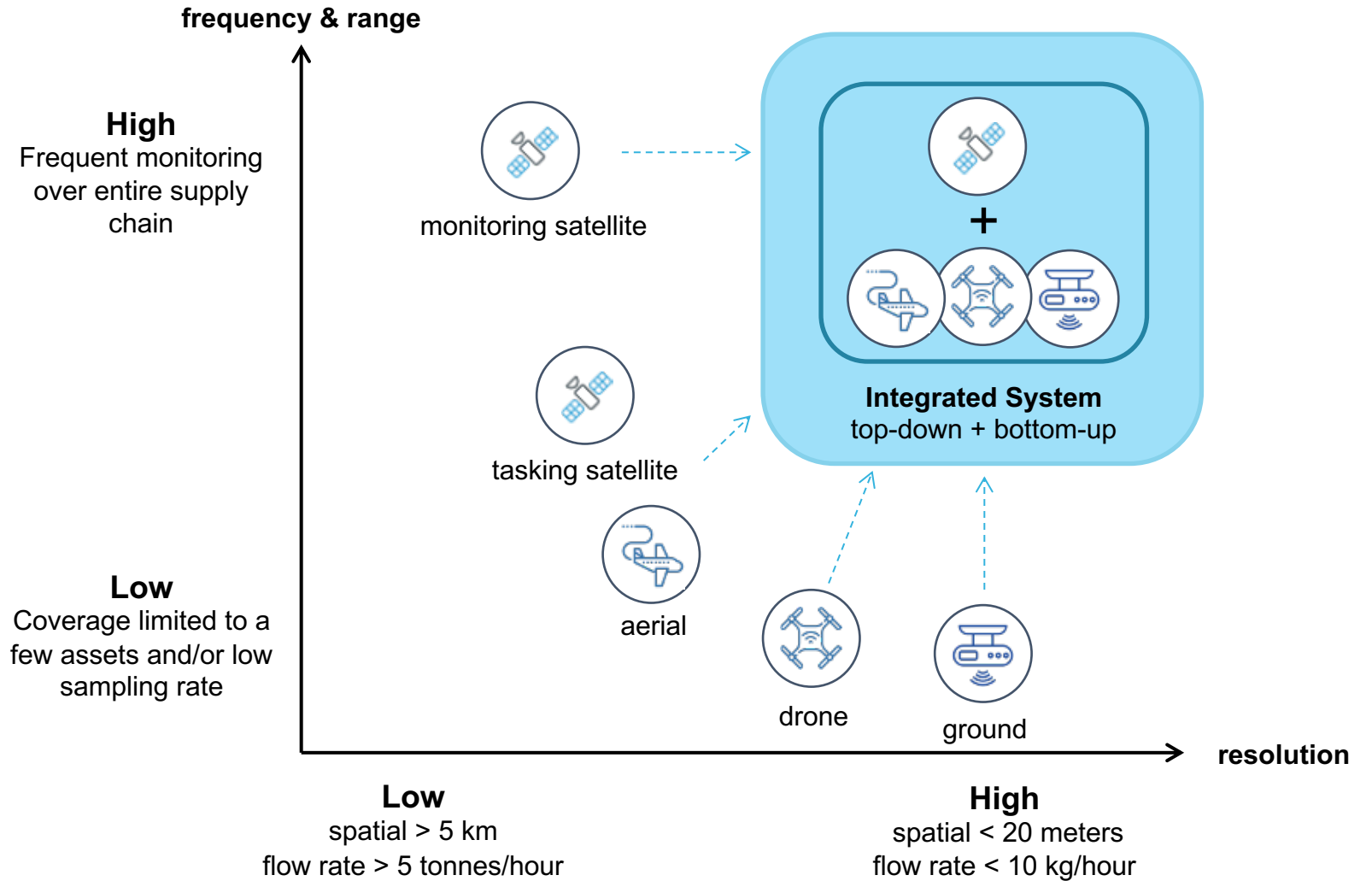
*Reported by*

**Bloomberg**

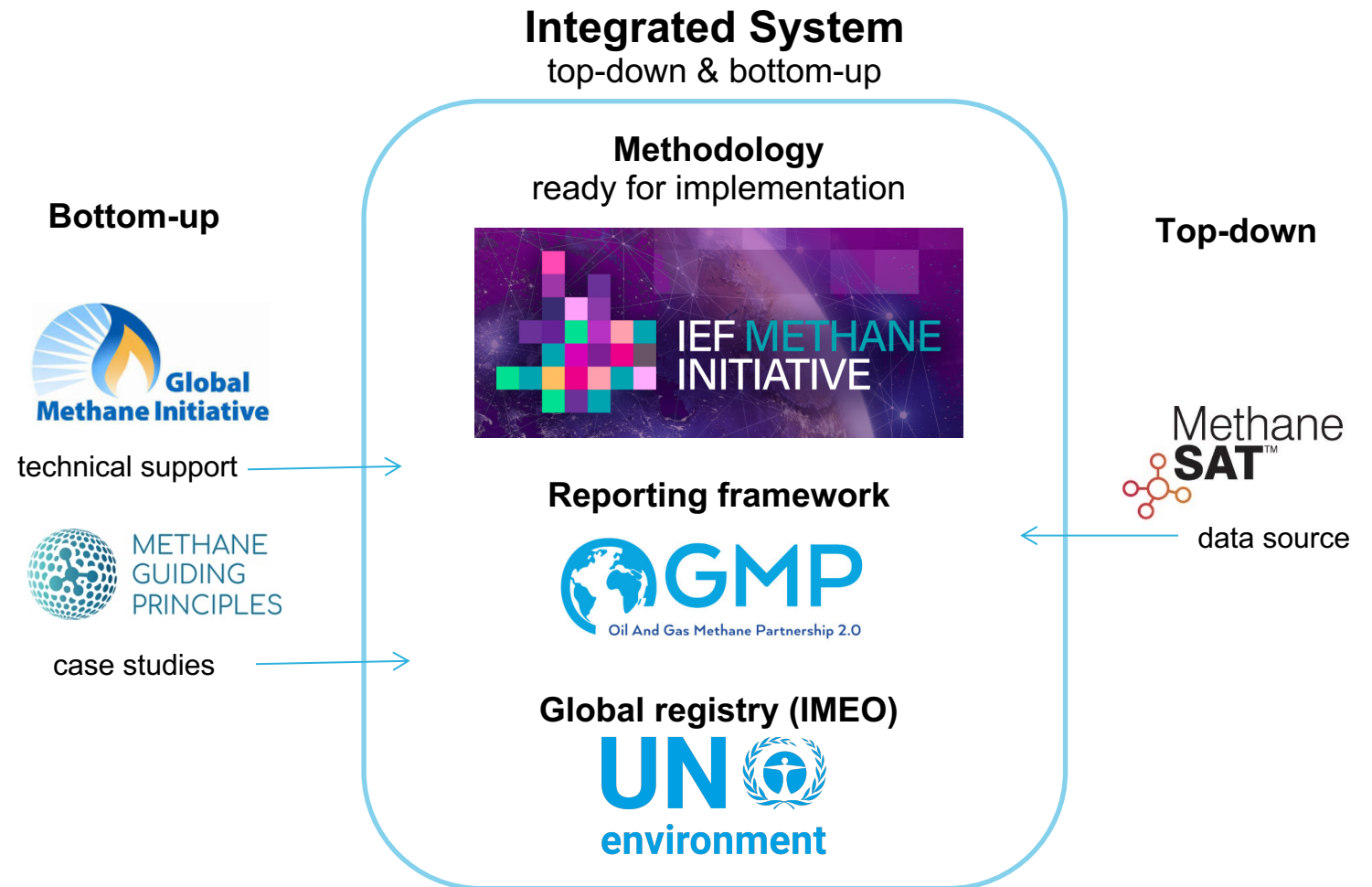
*with data from*



An integrated system is needed to reconcile company reporting with regional inventories



# The IEF-Kayrros methodology complements IMEO and OGMP 2.0



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**PARIS**

33 Rue La Fayette  
FR 75009

**LONDON**

16 Great Chapel Street  
London W1F 8FL

**HOUSTON**

708 Main Street Houston  
TX 77002

**SINGAPORE**

Level 2, 15 Beach Road  
Singapore 189677

[www.kayrros.com](http://www.kayrros.com)

