

# Satellite Data to Methane Action: UNEP's Methane Alert and Response System

Through the Methane Alert and Response System (MARS), UNEP's International Methane Emissions Observatory (IMEO) has facilitated concrete methane action in Argentina. MARS is the first global satellite detection and notification system providing actionable data on major methane emissions around the world.

In March 2023, UNEP's IMEO provided a MARS notification to the government of Argentina on several major methane emissions events detected from oil and gas facilities in the country. The notification provided detailed information on the location, magnitude, potential sources, and operators of each emissions event.

Based on satellite estimates, one leak was emitting roughly 5.8 metric tons of methane per hour. Every hour, that translates to the same climate impact that 100 passenger vehicles have in a full year. MARS exists to identify large emissions like these and enable targeted action to resolve them.

Thanks to swift action from the Argentinian government and relevant operators, the leak was quickly resolved.

UNEP has continued to monitor the site via satellites and has detected no further emissions.

IMEO continues to engage the government of Argentina and the country's oil and gas industry to raise awareness of MARS, build stakeholder capacity on methane, and address any future emission events as they are detected.

As additional methane-detecting satellites come online and countries and companies expand their engagement, MARS will be able to scale its impact and unlock further transparent, on-the-ground mitigation efforts that can help deliver on the goals of the Global Methane Pledge and the Paris Agreement.





**Figure 1**  
 Estimated location of methane emissions events between Jan 2021 and Aug 2023. Dots are TROPOMI-detected plumes; inset map is EMIT detection in Argentina.

# MARS HAS FOUR COMPONENTS



## 1 METHANE Detect and Attribute



- IMEO works with global mapping satellites to identify very large methane plumes and conducts further analysis with high-resolution satellites and datasets to identify the source of emissions.
- In Argentina, IMEO detected several large emission events from oil and gas facilities using the International Space Station's EMIT sensor. MARS is unique because IMEO can "task" certain satellites to help investigate emissions. In this case, IMEO requested that the Italian Space Agency's PRISMA satellite provide additional monitoring of the leak.

## 2 ALERT Notify and Engage Stakeholders



- IMEO works to notify governments and companies of large emissions events happening across their jurisdictions or operations. It continues this engagement as more information becomes available.
- In March 2023, IMEO notified the government of Argentina about the emission events observed from space, including detailed information on their location, size, potential sources, and operators of the relevant facilities. In this case, a heat exchanger had suffered ruptured tubes, causing methane to unknowingly vent into the atmosphere.

## 3 RESPONSE Stakeholders Take Abatement Action



- It is up to notified stakeholders to determine how best to respond to the notified emissions and share their actions with MARS to show initiative and commitment to environmentally responsible operations.
- The Argentinian government responded quickly, sharing information with the relevant operators so they could take action. After receiving this notification, the operator acted swiftly to remove damaged equipment from service and conduct necessary repairs. They further implemented a leak verification plan to prevent subsequent emissions.

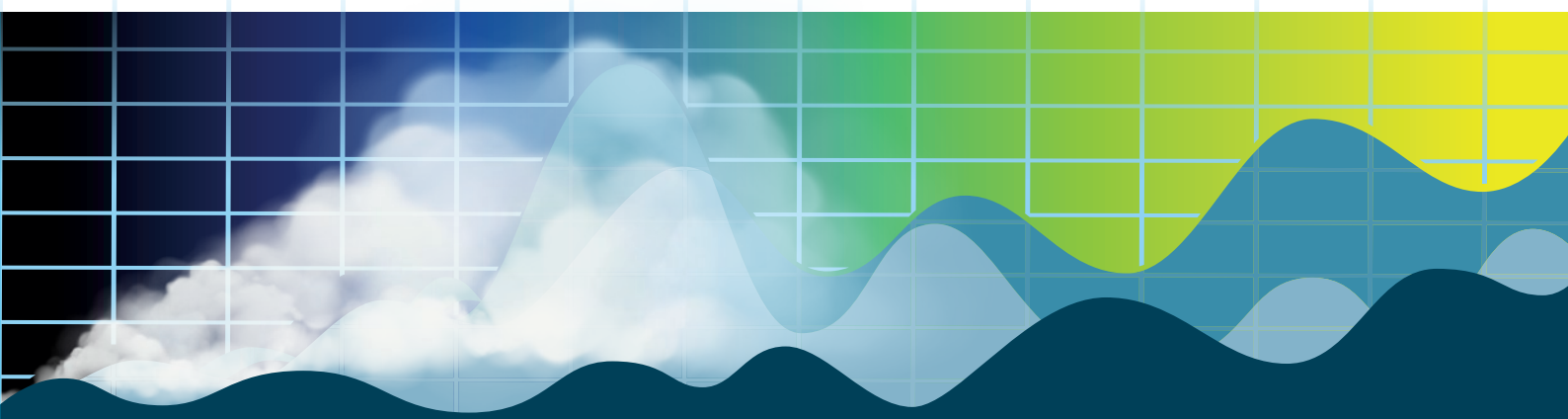
## 4 SYSTEM Track, Learn, Collaborate, Improve



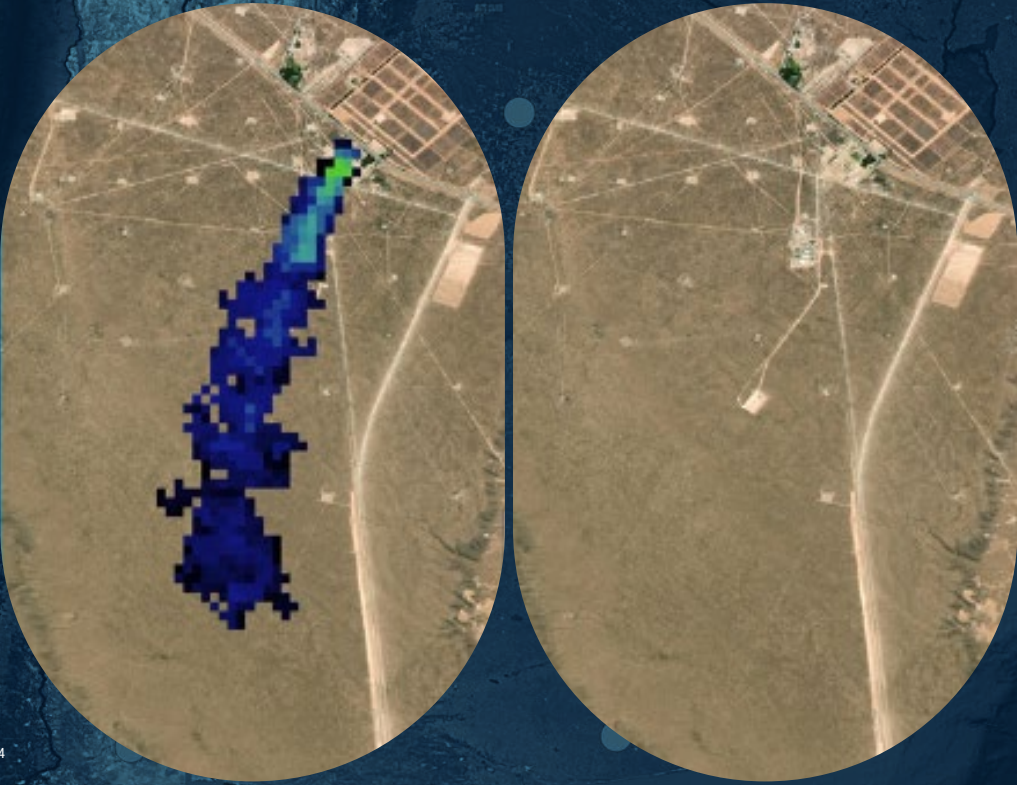
- IMEO continues to monitor notified locations for future emissions as mitigation efforts proceed. Data and analyses are made public 45 to 75 days post detection on the MARS data portal.
- Since the initial notification, UNEP has continued to monitor the Argentinian site and detected no further emissions from the source. IMEO is continuing its engagement with the government of Argentina and industry actors to raise awareness of MARS, build capacity for methane action, and to address new emission events as they arise.



**In implementing MARS, IMEO collaborates with various institutional partners, including the International Energy Agency and the Climate and Clean Air Coalition.**







0.5  
0  
 $\Delta\text{XCH}_4$   
(ppm)

**Figure 2**  
Site of the successful mitigation event pre- and post-MARS notification. Plume on the left from NASA's EMIT sensor, retrieval by UNEP IMEO.

## Why is it critical to curb methane emissions?

**Methane is a powerful greenhouse gas and the second biggest driver of global warming.**

Emissions of methane have soared faster than at any time since the 1980s.

To keep the average temperature increase at 1.5°C, the world needs urgently to reduce methane emissions by about a third, according to the latest Intergovernmental Panel on Climate Change Assessment Report published in April 2022.

Slashing emissions of this powerful greenhouse gas is the single fastest way to tackle climate change in the short-term and move towards a net-zero world.