

EO FOR CARBON MARKETS – OPPORTUNITIES AND CHALLENGES

ESA ESRIN - Oct 2023

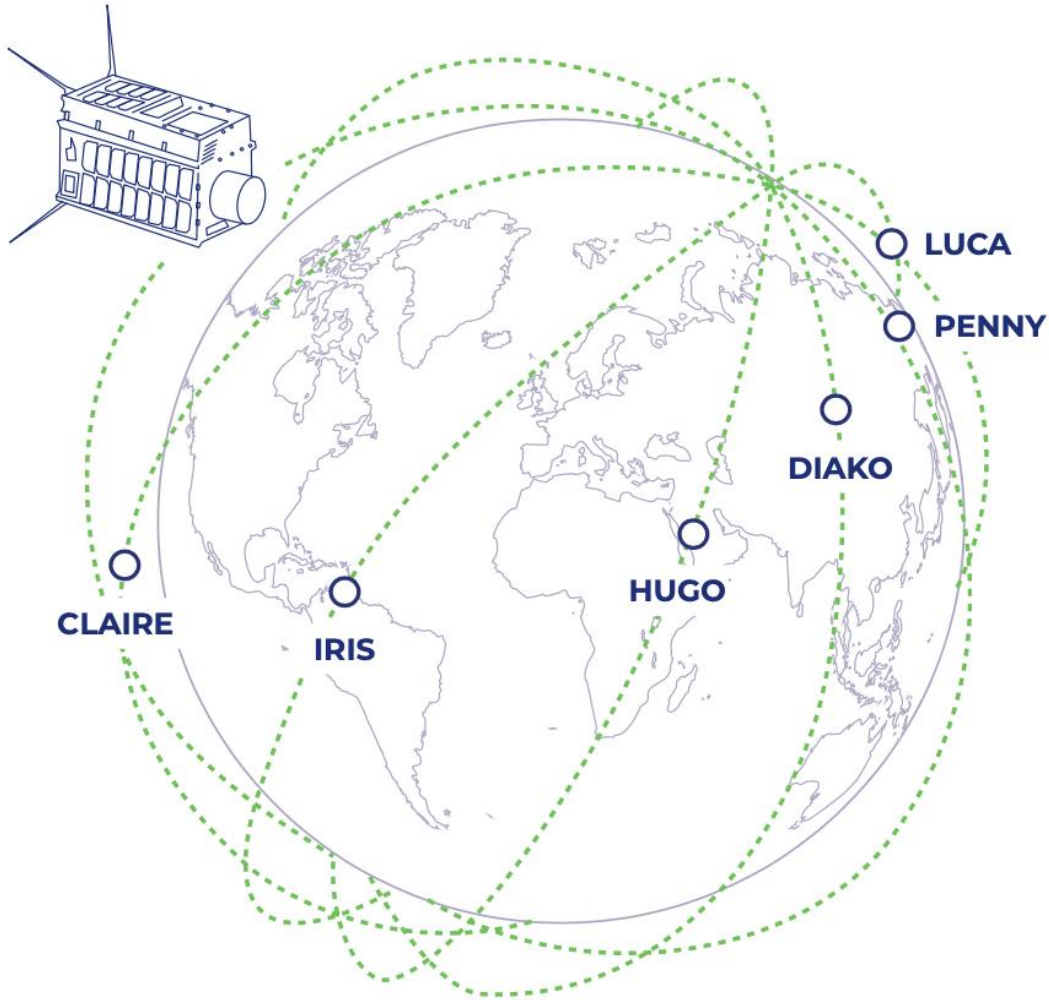
Carles Debart – Director Business Development Europe

cdebart@ghgsat.com



INTRO GHGSAT: METHANE MONITORING SATELLITES

Biggest operational and commercial GHG monitoring constellation



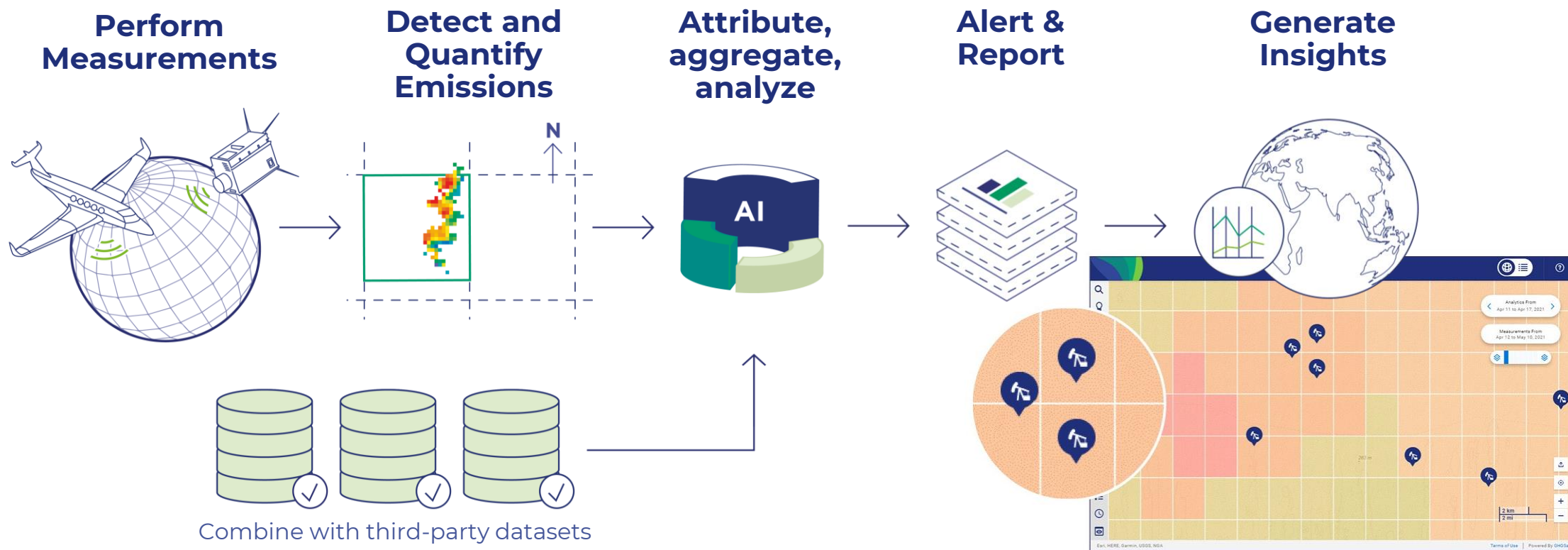
	<u>2022</u>	<u>2023</u>	<u>2026</u>
Satellites in orbit	6	12	100
Facility Measurements per Year	1M+	3M+	20M+

- Can measure facilities anywhere in the world
- Can revisit any targeted facility on daily basis as of end of 2023
- Most important constraints are daylight and clouds
- **Satellite #12 will be tuned for CO2**



TECHNOLOGY

GHGSat workflow - from measurement to insight





GHG EMISSIONS INTELLIGENCE

One solution applicable to multiple emission issues



Energy

Wells, batteries, compressor stations, pipelines, tailing ponds, etc.



Waste Management

Landfills, waste water, etc.



Agriculture

Animal feedlots and waste recovery



Mining

Underground and open pit coal mines, and coalbed methane production



Finance and Carbon Markets

Thermal generation, hydroelectric, biomass, etc.



ROLE OF EO IN VERIFICATION FOR CARBON MARKETS

Challenges of carbon offsets

- Additional
- Not counted double
- No leakage
- Permanent
- Verifiable



Opportunities of EO data

- Combining archive data & future taskings to track pre and post conditions
- Unbiased, independent data
- Worldwide coverage, scalable
- Frequent, increasingly available
- Cost-effective tool for the job

Still Carbon offsets and EO data are sometimes met with skepticism!

CARBON REMOVAL VS CARBON AVOIDANCE



- Main focus in the carbon markets is on carbon removals (i.e. forest carbon, LULUCF)
- Not too much on methane removals

Removing methane is very difficult



Focus on avoiding these emissions instead?

Practical constraints on atmospheric methane removal

Klaus S. Lackner

[Nature Sustainability](#) 3, 357 (2020) | [Cite this article](#)

17k Accesses | 17 Citations | 32 Altmetric | [Metrics](#)

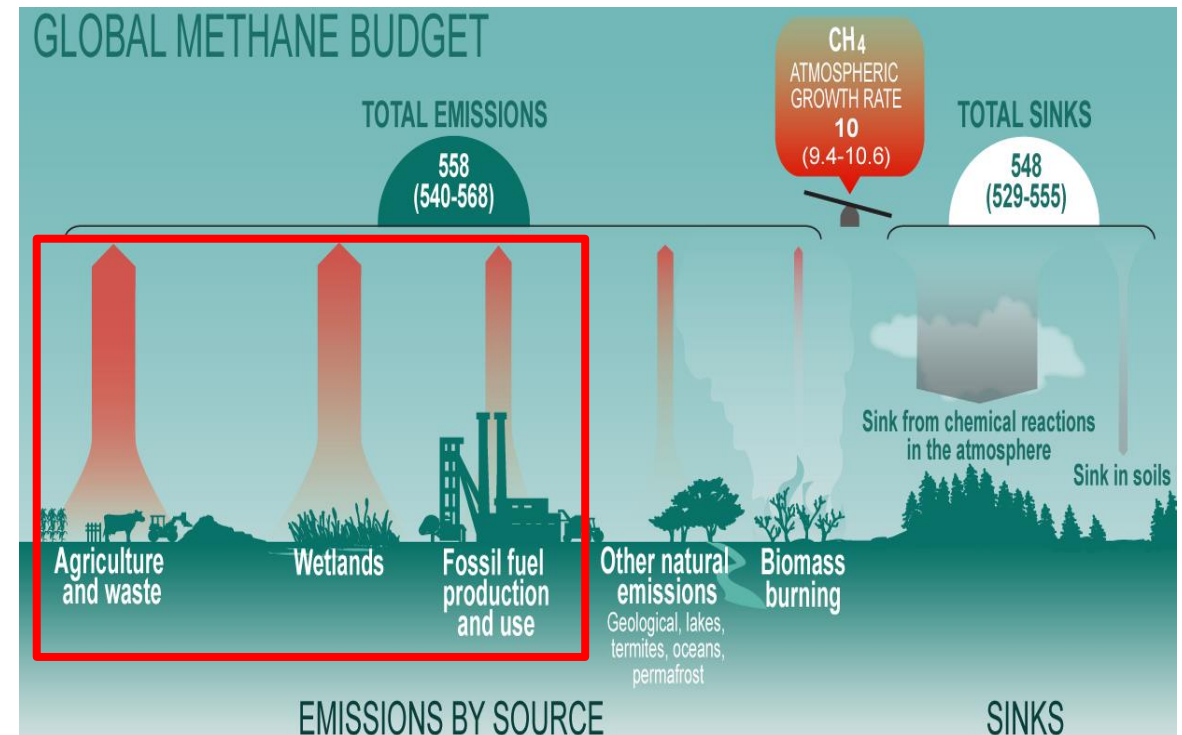
[Matters Arising](#) to this article was published on 23 March 2020

The [Original Article](#) was published on 20 May 2019

Is the destruction or removal of atmospheric methane a worthwhile option?

Peter B. R. Nisbet-Jones[†] , Julianne M. Fernandez, Rebecca E. Fisher, James L. France, David Lowry, David A. Waltham, Ceres A. Woolley Maisch and Euan G. Nisbet

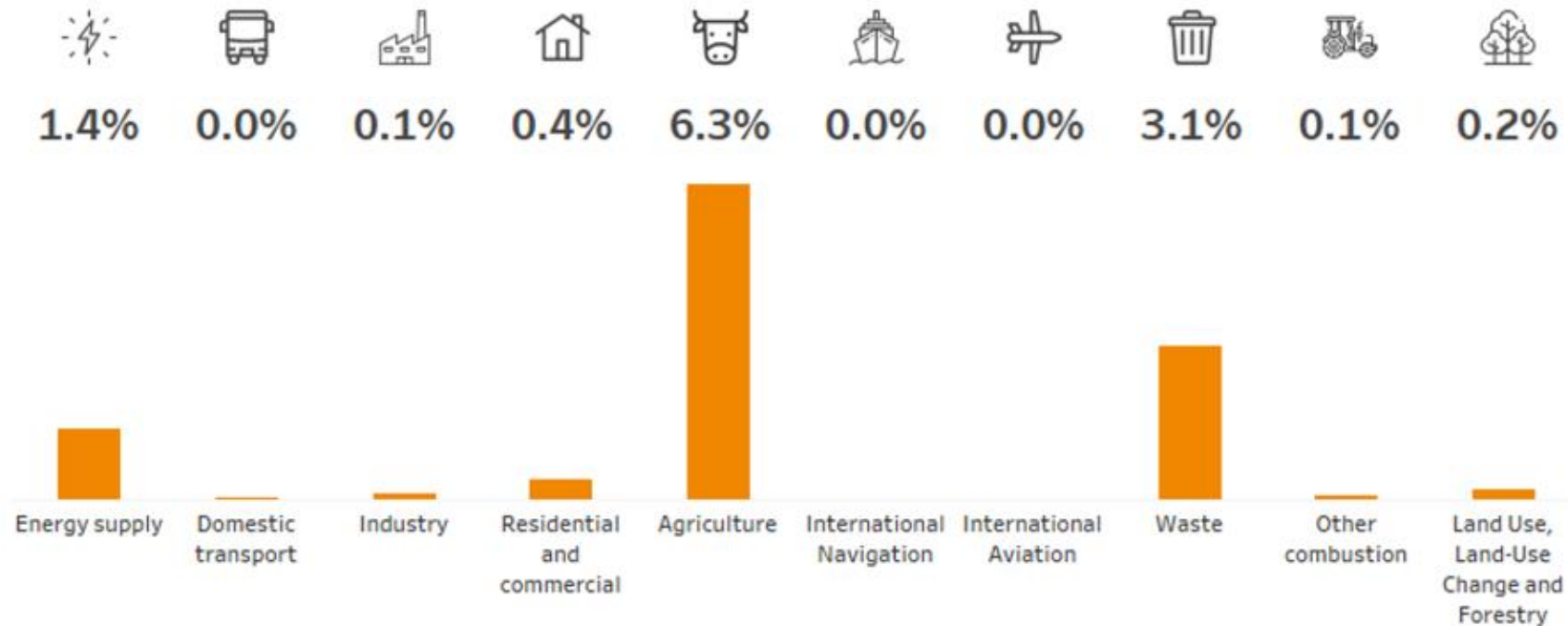
Published: 06 December 2021 | <https://doi.org/10.1098/rsta.2021.0108>



DON'T FORGET METHANE



Methane emissions as Percent of total GHG emissions in 2020
in EU-27



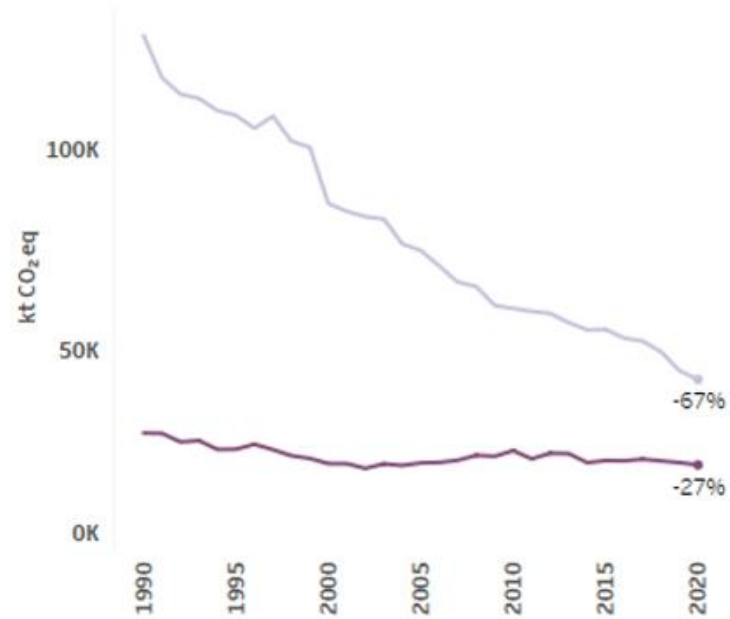
Source: EAA 2023

Have carbon markets overlooked the opportunity to create a new classes of GHG reductions?

DON'T FORGET METHANE



Trends in methane emissions from the energy sector
EU-27



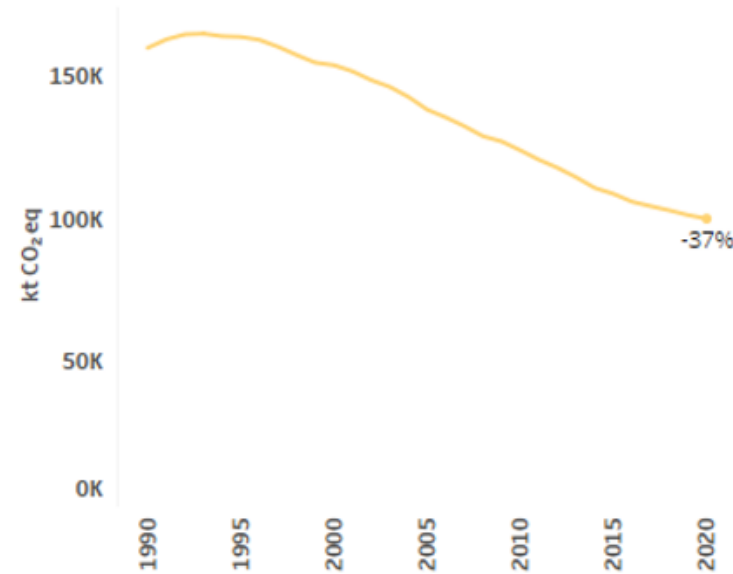
Fuel combustion



Fugitive emissions



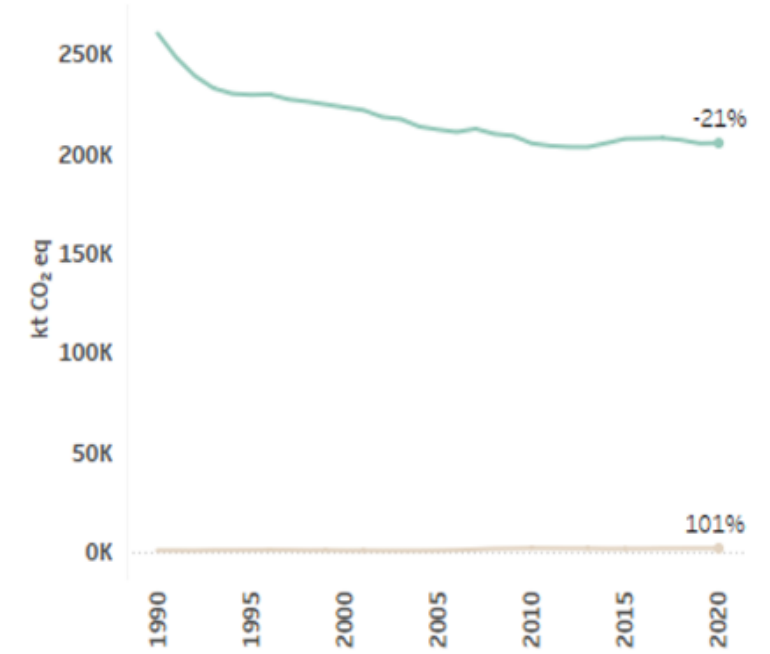
Trends in methane emissions from waste management
EU-27



Waste management



Trends in methane emissions from agriculture
EU-27



Agriculture



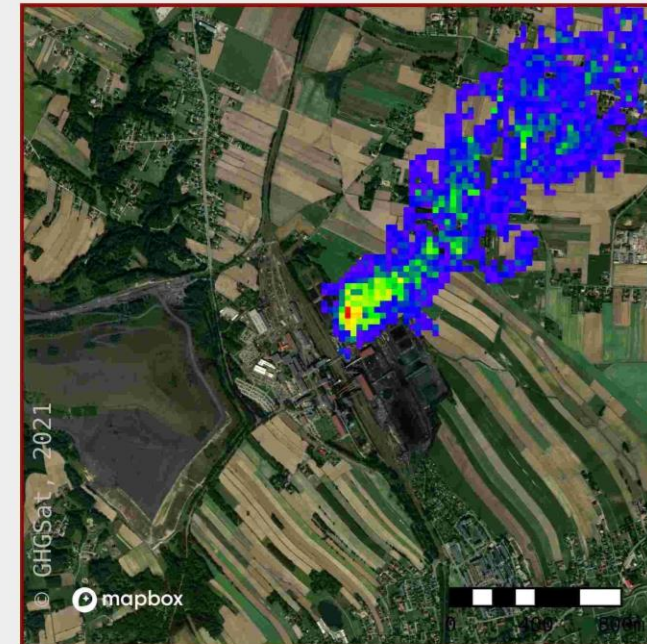
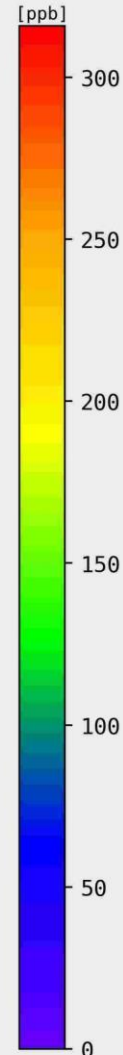
Energy combustion

Source: EAA 2023

DON'T FORGET METHANE – IN EUROPE AS WELL!

Opportunities for emissions avoidance in our backyard

COAL INDUSTRY IN POLAND



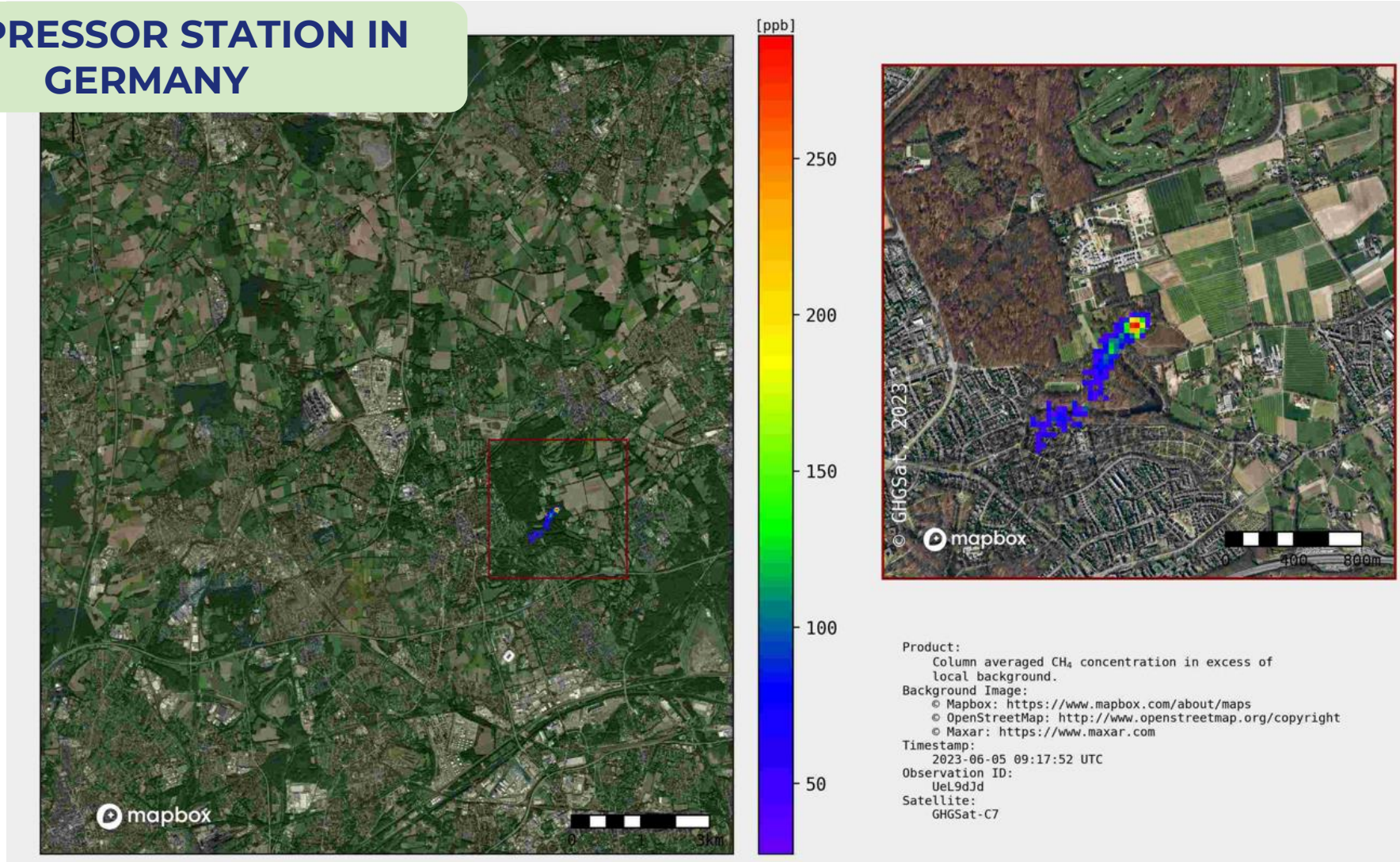
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Column averaged CH₄ concentration in excess of local background.
Background Image:
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Satellite:
GHGSat-C2



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Opportunities for emissions avoidance in our backyard

COMPRESSOR STATION IN GERMANY



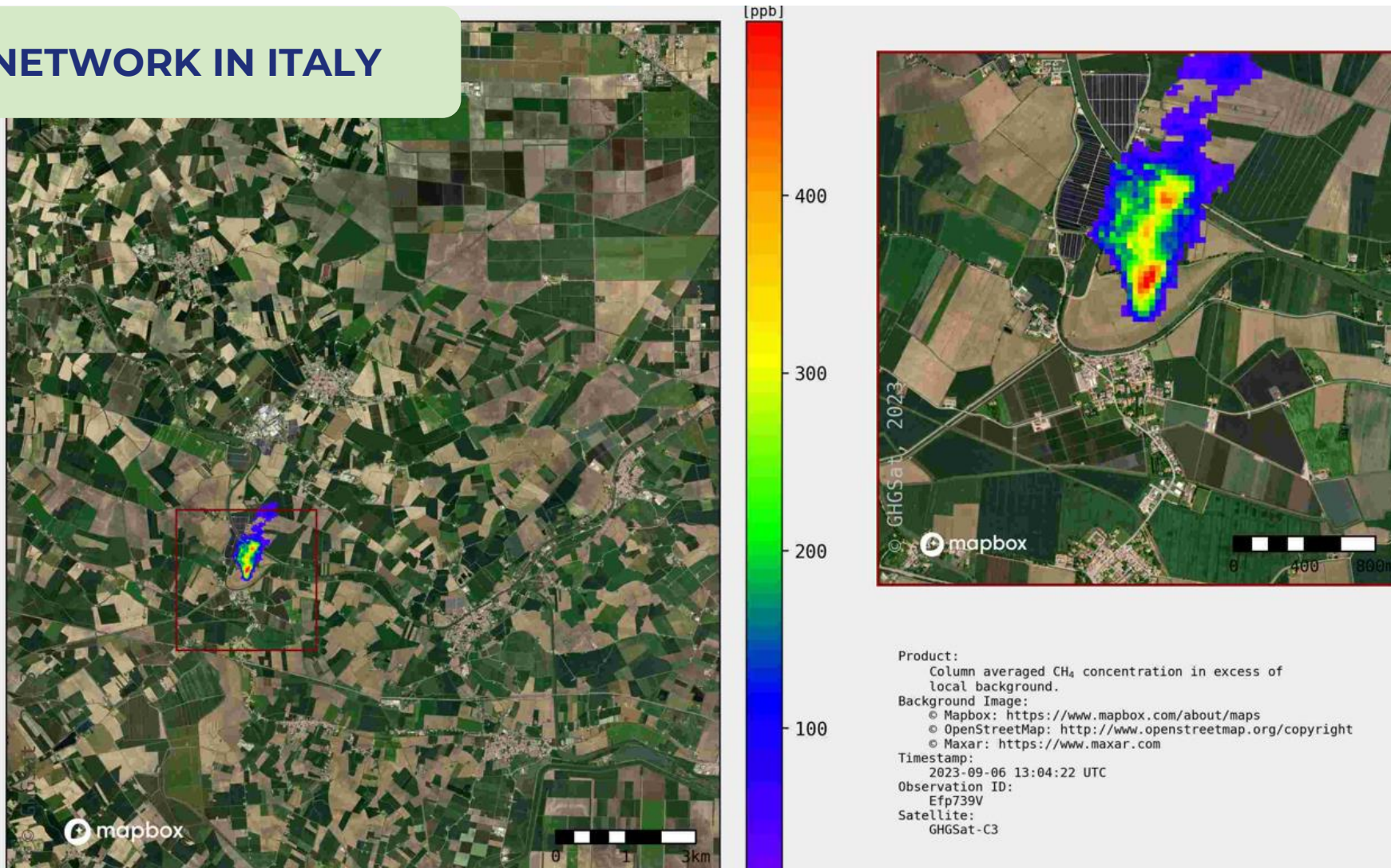
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GAS NETWORK IN ITALY



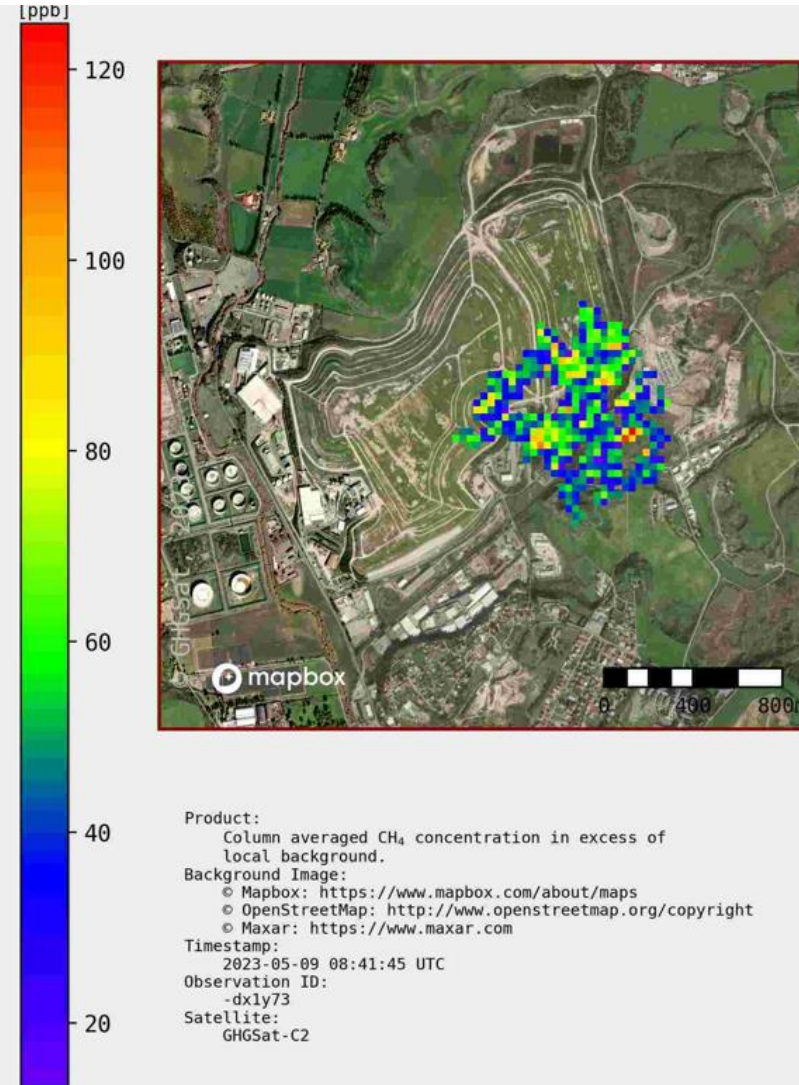
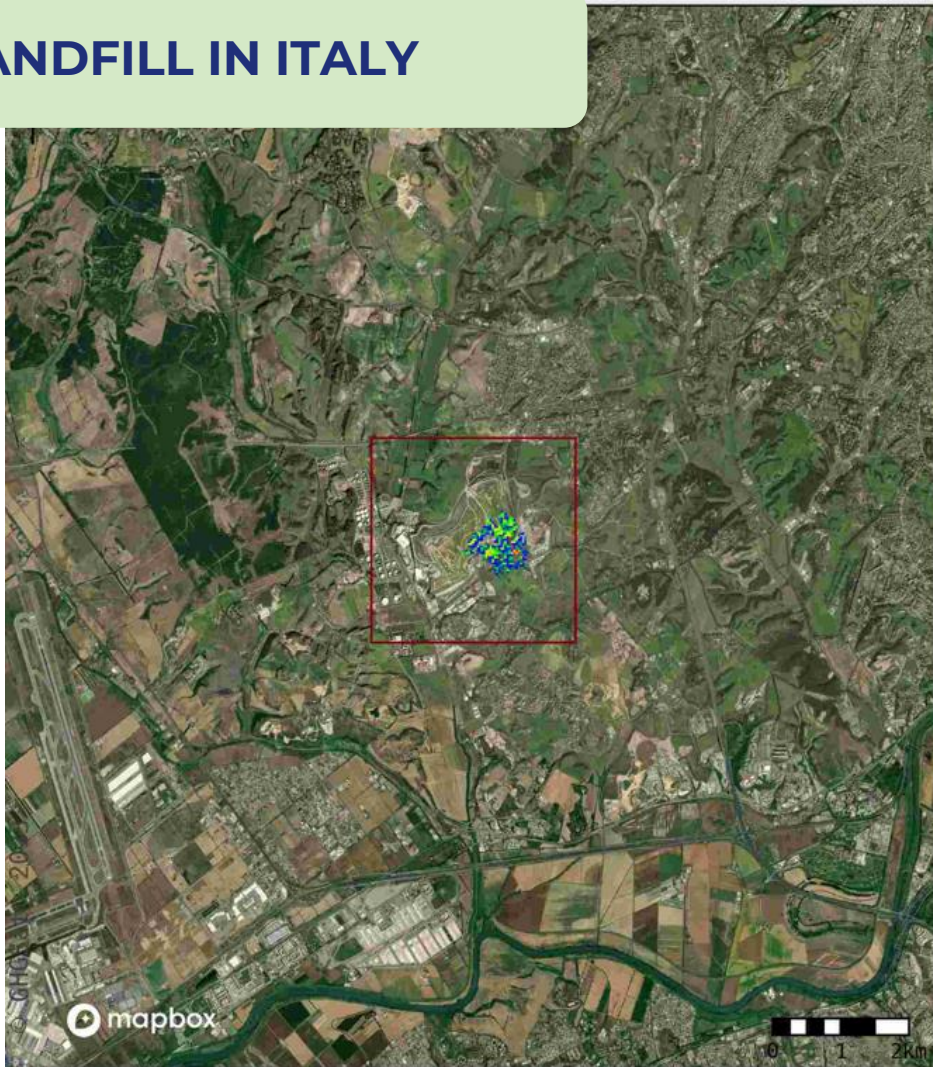
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Opportunities for emissions avoidance in our backyard

LANDFILL IN ITALY



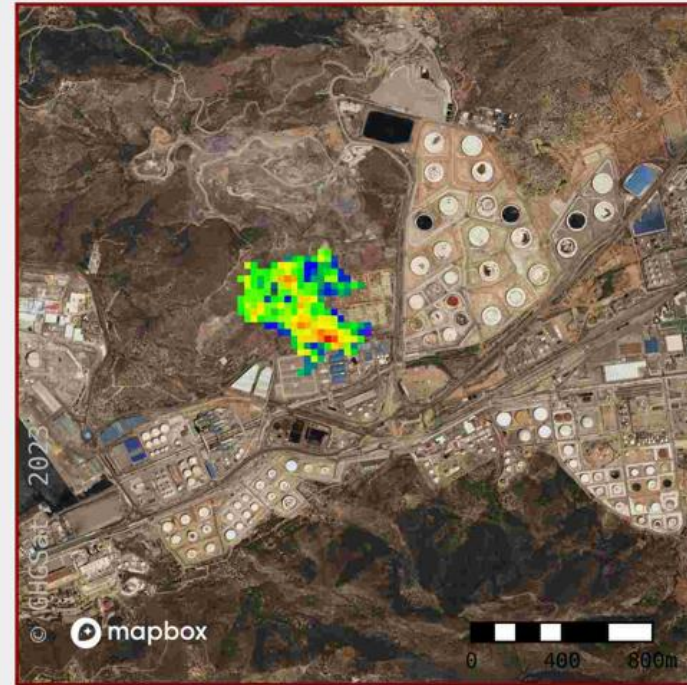
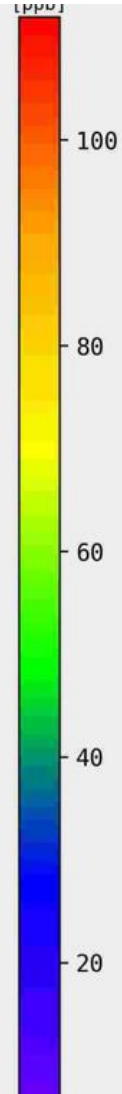
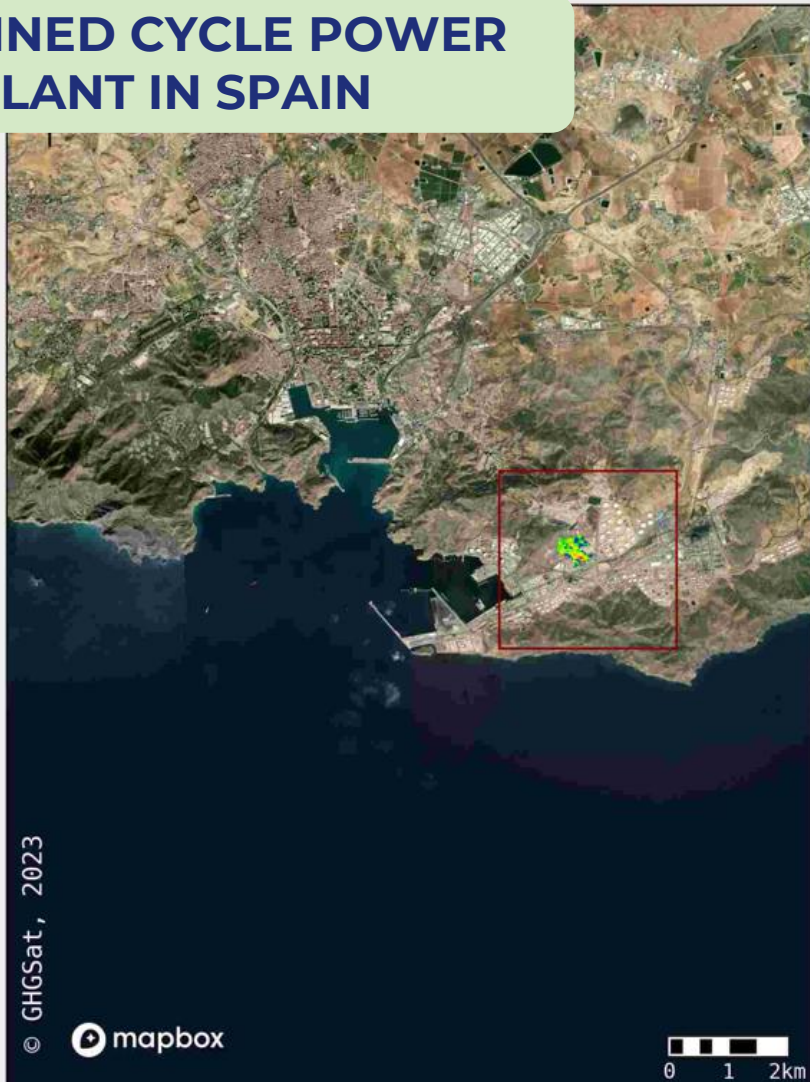
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DON'T FORGET METHANE – IN EUROPE AS WELL!

Opportunities for emissions avoidance in our backyard

COMBINED CYCLE POWER PLANT IN SPAIN



Product:
Column averaged CH₄ concentration in excess of local background.
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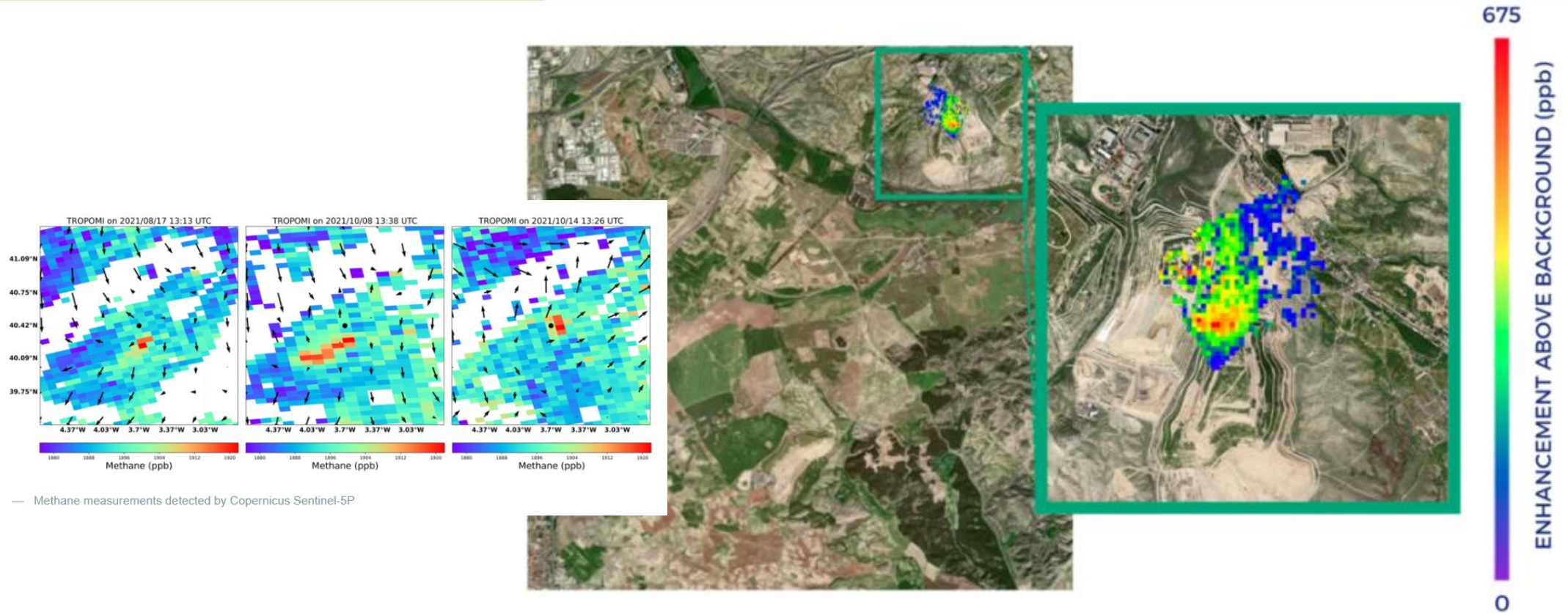
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Opportunities for emissions avoidance in our backyard



LANDFILL SPAIN

→ THE EUROPEAN SPACE AGENCY



— Methane measurements detected by Copernicus Sentinel-5P

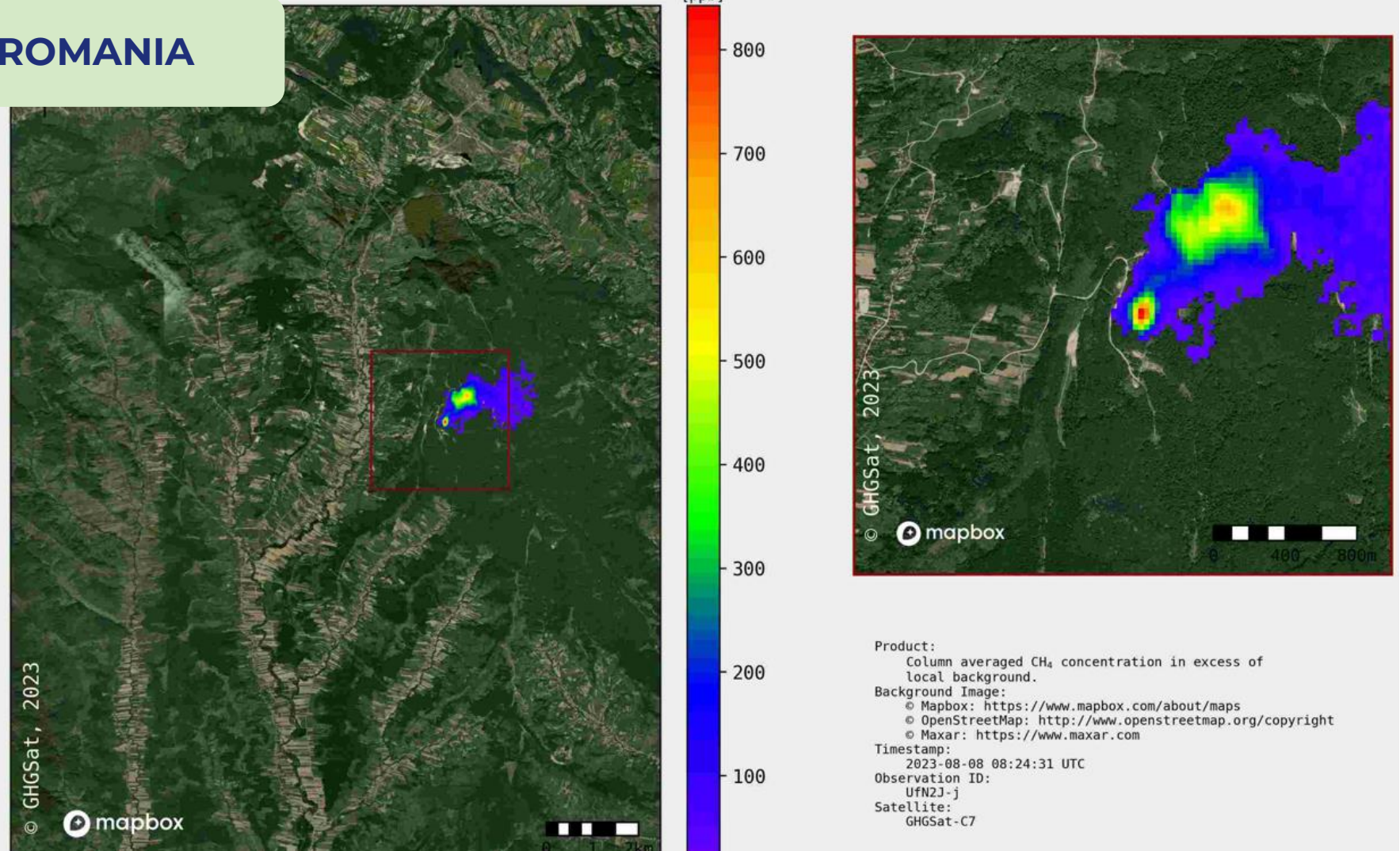
Approved for Public Disclosure

— Methane emissions detected from Madrid landfill on 20 August 2021

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Opportunities for emissions avoidance in our backyard

OIL & GAS IN ROMANIA



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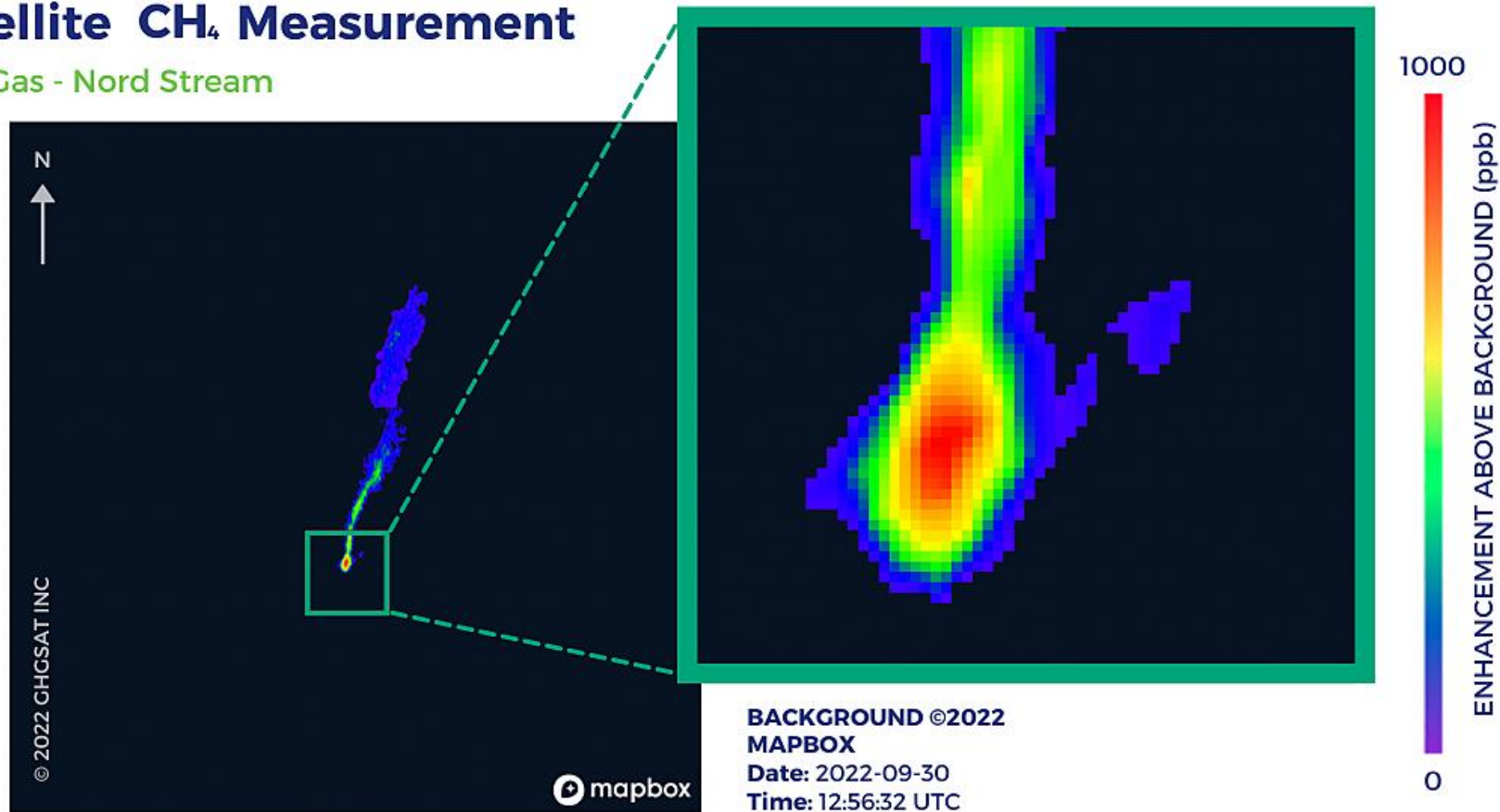
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Opportunities for emissions avoidance in our backyard

GAS PIPELINE – NORDSTREAM SABOTAGE

Satellite CH₄ Measurement

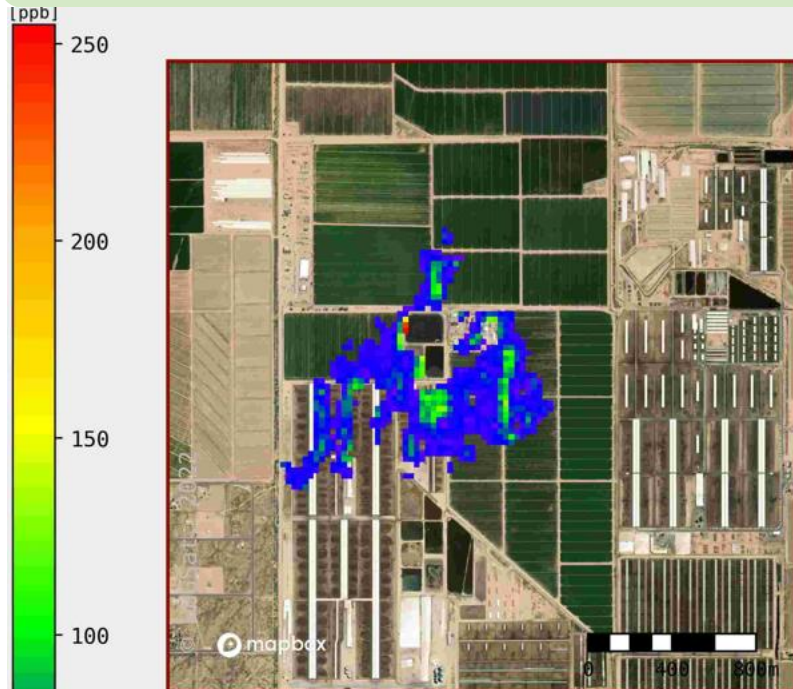
Oil & Gas - Nord Stream



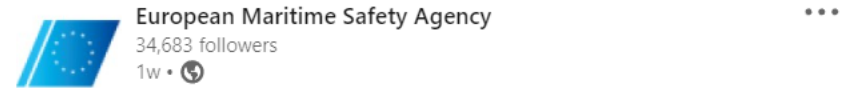
DON'T FORGET METHANE – IN EUROPE AS WELL?

Pushing the boundaries for current and upcoming EU regulations

FARMING? CAP REFORM?



MARITIME INDUSTRY?



Today we're holding a webinar on the extension of the EU Emissions Trading System (ETS) to maritime transport together with the European Commission's Directorate General for Climate Action.

The webinar focuses on shipping companies and verifiers and presents the main elements of the EU ETS and its extension to maritime transport, including the relevant changes introduced to the EU MRV system.



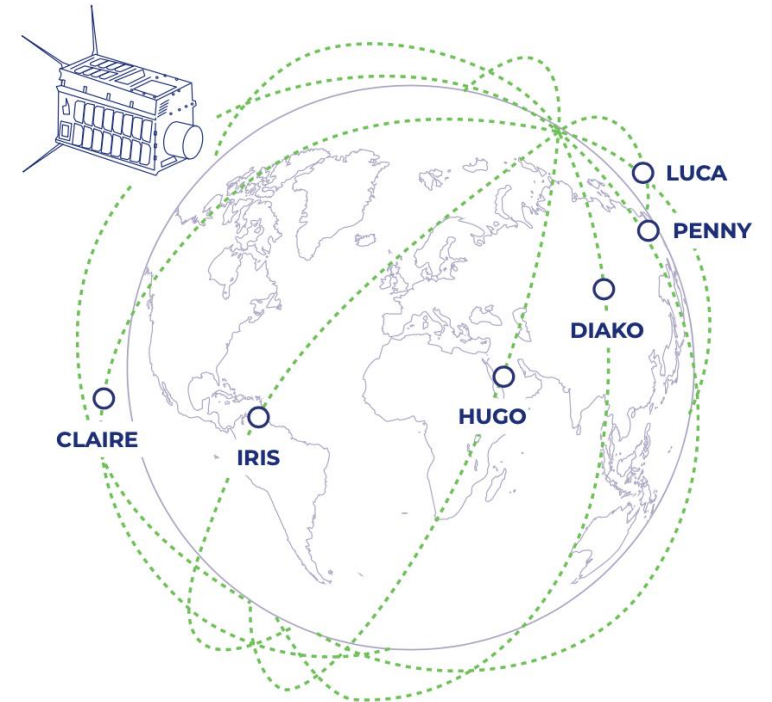
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METHANE AVOIDANCE OFFSETS



Key Take-aways

- **Relatively easy to achieve (compared to other carbon offsets)**
- **High confidence in total volume of offsets**
- **Inherently compliant with additionality principle**
- **Most likely not reversible**
- **Scalable, applicable even at regional level**





FROM PLEDGES TO ACTION

Satellites are critical for a coordinated effort on all fronts to decarbonize the world. We're ready – now.

→ [GHGSAT.COM](https://ghgsat.com)

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