

PETER FUSARO'S

2025

**WALL STREET
GREEN SUMMIT™**
MARCH 18-19, 2025

ANTOINE HALFF

CO-FOUNDER & CHIEF ANALYST

KAYRROS



Using Advanced AI to Measure Emissions

The world is getting more unpredictable...

- Extreme weather
- Rising share of variable renewables in the mix
- Policy risk
- Shifting market & societal demands
- Geopolitical risk
- Economic warfare
- Supply chain disruptions



... and more transparent

20/20 vision

- Satellite proliferation & commoditization
- AI breakthroughs
- Revolution in image processing
- 24/7 instant visibility

An embarrassment of riches?

- Data overload
- Harmonization & reconciliation issues
- Workflow integration & management



Kayrros: Leader in geospatial intelligence



Founded in 2016



6 Offices



ca. 150 Employees



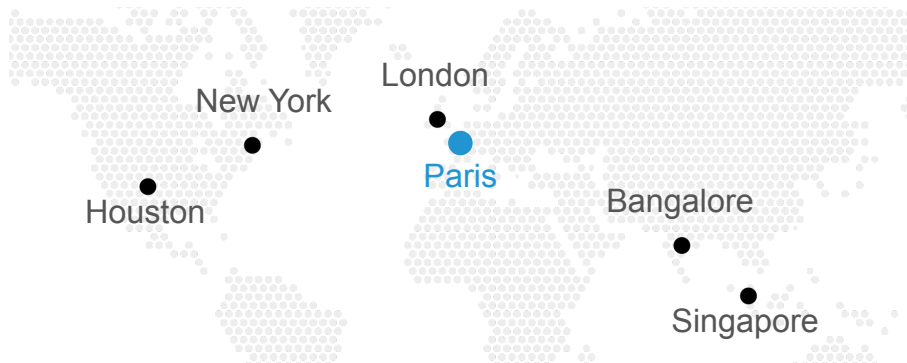
20+ PhDs & 100+ MSc



100+ Clients



Key Industries: Finance, Energy & Government



Advisory Board



Andrew Gould

Chairman
Former CEO of Schlumberger



André Lévy-Lang

Former CEO of Paribas Group



Lord Browne of Madingley

Former CEO of BP

Scientific Board



Alexandre d'Aspremont

CNRS/Princeton



Jean-Michel Lasry

Paris-Dauphine



Pierre-Louis Lions

Fields medal winner



Jose Scheinkman

Columbia

Kayrros has been consistently recognized for its **excellence** & innovation



AI used to analyze data from multiple sources at scale



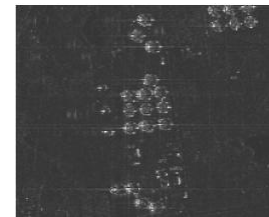
High-Resolution 3D Optical for Volume Measurement (Airbus)



Daily Imagery for Change Detection



SAR Data for Weather-Independent Measurements (e-geos)



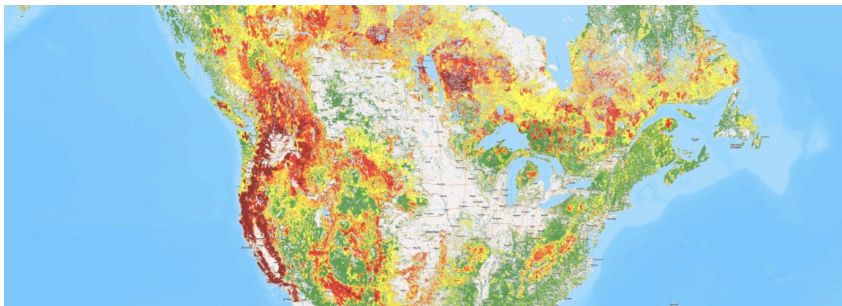
Hyperspectral for GHG Emission Detection & Quantification (ESA)



Device Positioning Data for Mobility Analysis



Two main pillars



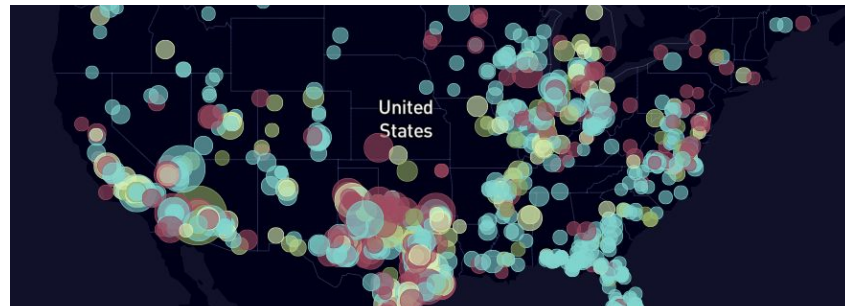
Physical Risk

Adaptation & resilience:

- Wildfires
- Flooding

Climate impact:

- GHG emissions
- Nature & biodiversity
- NBS



Energy

Manage the energy transition

Foster energy security

Boost efficiency:

- Solar and Battery storage
- Data centers, crypto
- LNG
- Crude inventories
- Drilling & frac'ing
- Consumption

GHG emissions monitoring

Methane Watch

Satellites are the cornerstone of any methane monitoring system:

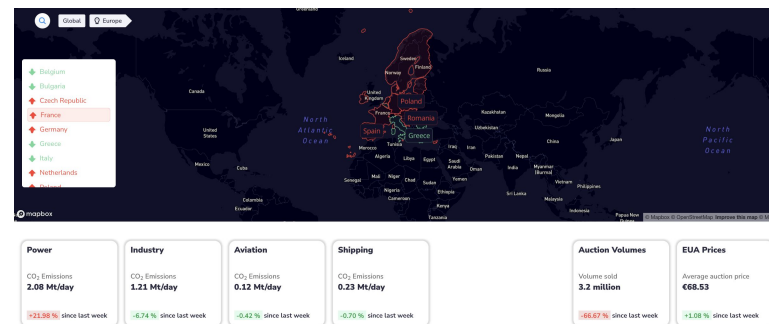
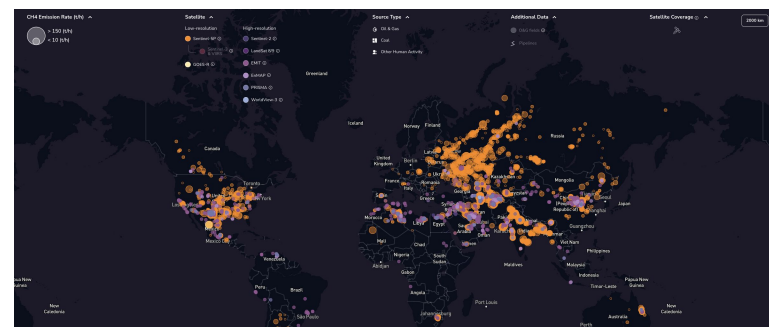
- Super-emitter detection, measurement and attribution
- Basin-, region- & country-level methane inventories
- Supply- chain analysis

Wide discrepancies between observed and reported emissions

Carbon Watch

Satellites provide realtime transparency on demand for carbon allowances

High correlation with officially reported data

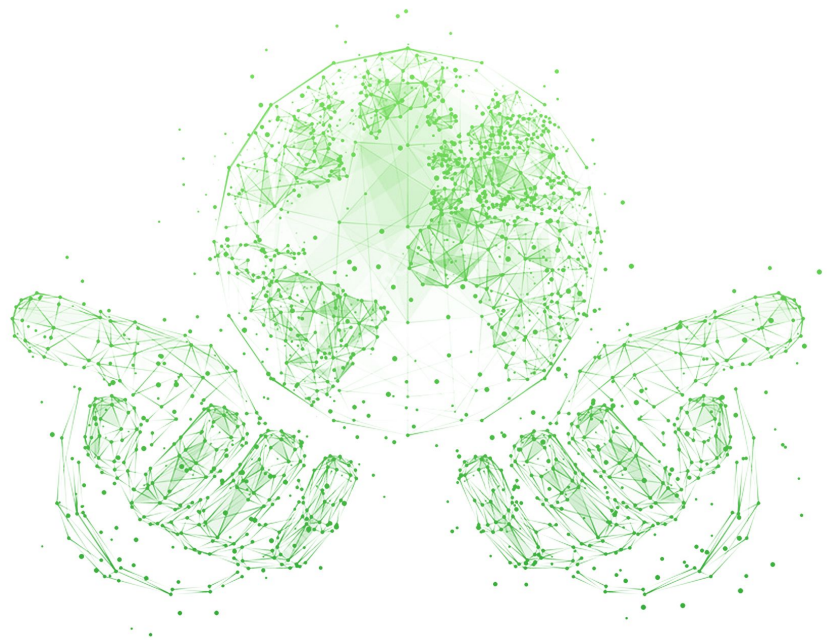


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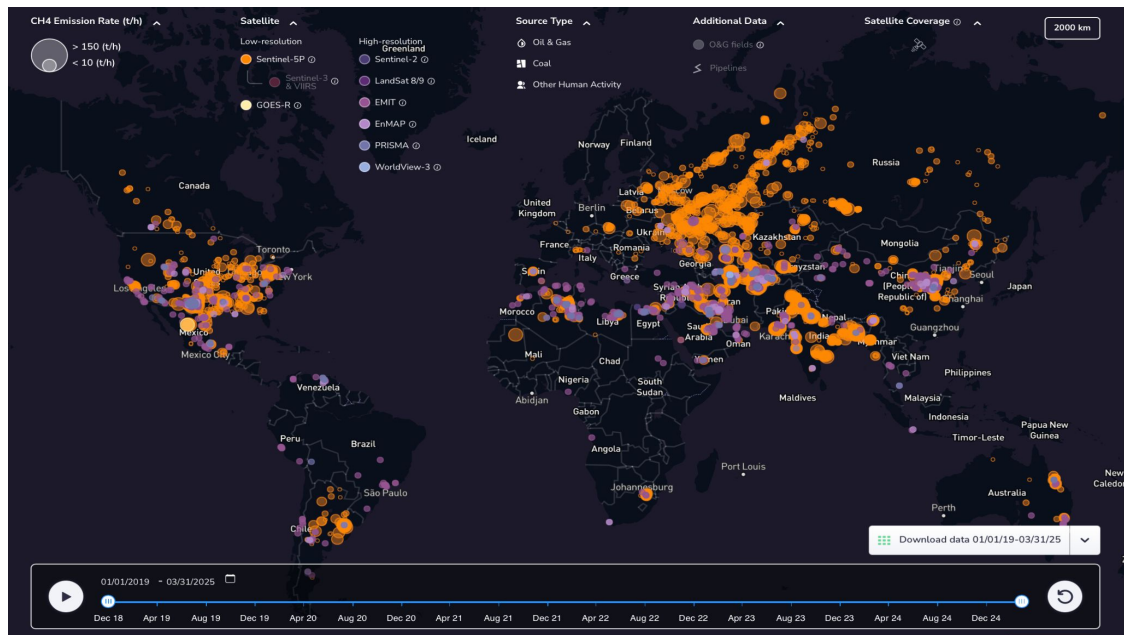
Methane Watch

→ Access to near real-time super-emitter data and basin and regional inventories

GHG emissions monitoring



The first global methane monitoring platform



Tracking super-emitter events globally
at high frequency

Setting national baselines



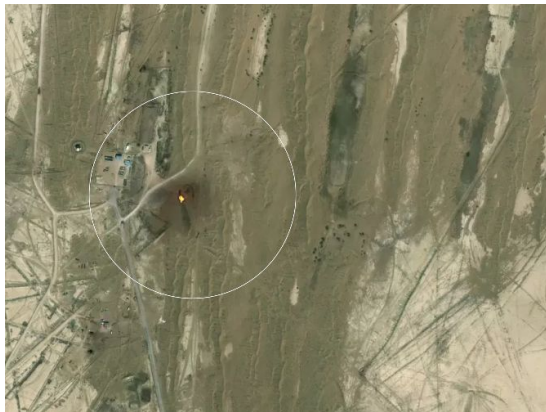
Comparison of total CH₄ emissions in Saudi Arabia between sources



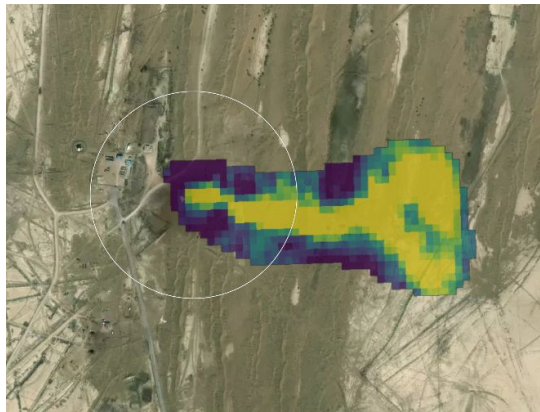
National GHG emissions inventory in Saudi Arabia

- Report on your mitigation actions based on independent inventories
- Identify sectors where to optimize your resources
- Compare discrepancies with adversarial assumptions made by bottom-up approaches

Monitoring local emissions



Example of a lit flare in Western Turkmenistan



Example of a venting event on a flare in Western Turkmenistan



THE WORLD BANK

Analyzing gas flaring activity at the site level

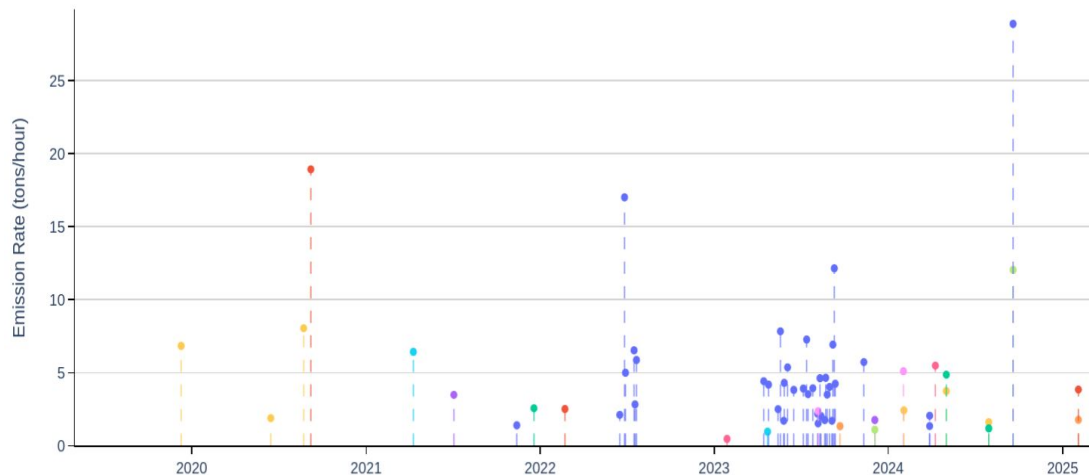
Satellite data directly shows the cessation of flaring followed by numerous methane detections

Benchmarking LNG suppliers



Portfolio de-risking

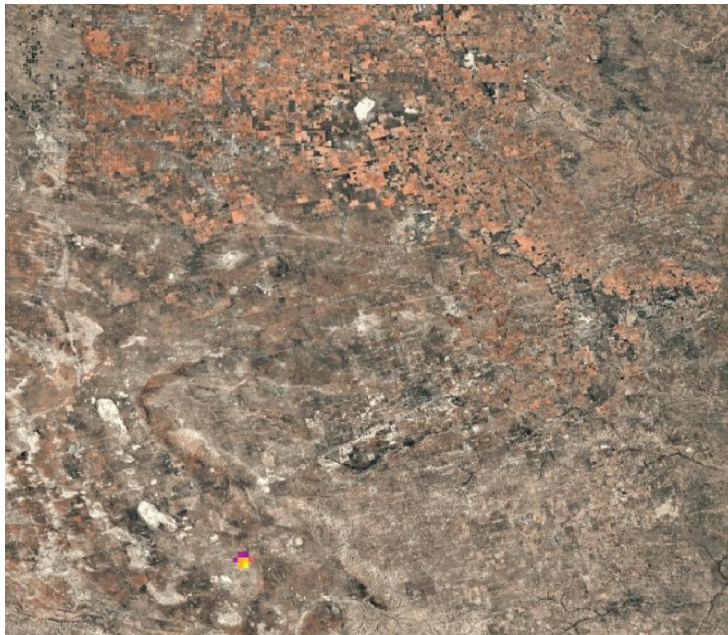
Methane emissions from Company X assets



Conduct due diligence on M&A targets, or improve operational efficiency:

- We tracked all assets operated by company X in Algeria
- Methane events have usually been quickly fixed – most assets emitted just once
- A single asset (blue) accounts for most of the footprint

Tracking methane with geostationary satellites



Example of a venting event on a compressor station in the Permian Basin

Life-cycle of a plume

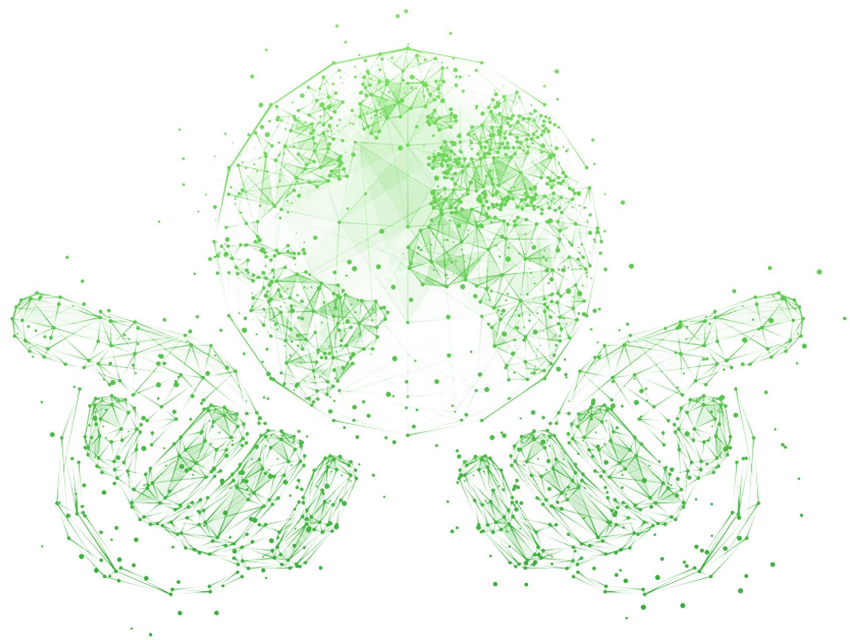
- Large, unreported methane release likely caused by pipeline maintenance
- Kayrros picked up the incident within minutes: one large blast followed by four smaller ones
- Based on GOES-16 images, total release amounted to 840 tons (<> annual emissions of ~15,000 U.S cars)
- Large methane plume drifted 150 km northeast and remained visible for four hours

02

Carbon Watch & US Carbon Watch

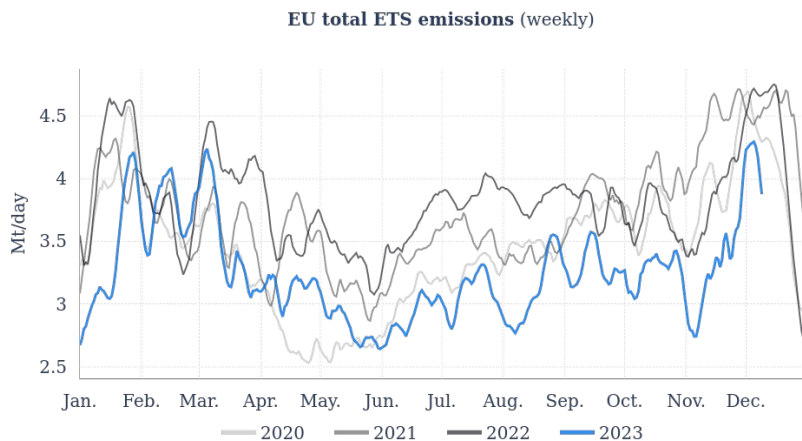
- Access to near real-time demand for carbon allowances in the EU, UK and California, covering 100% of the regulated market with high accuracy, leveraging satellite imagery and AI

GHG emissions monitoring

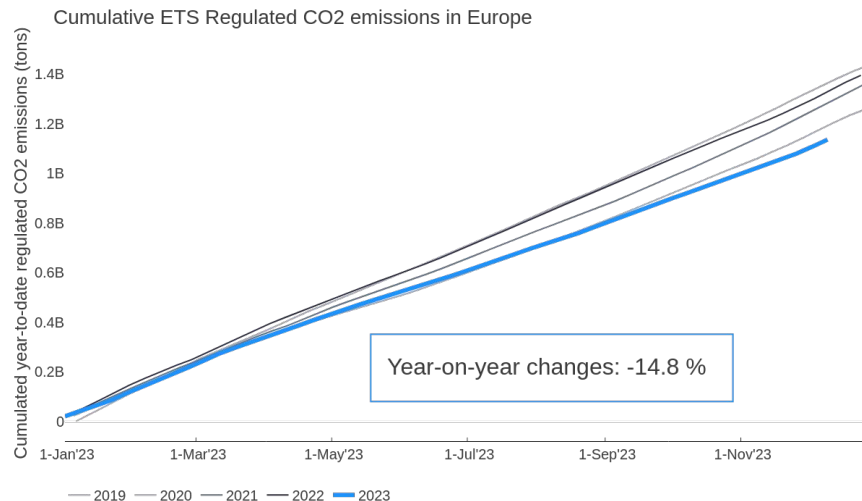


Bringing real-time fundamentals to carbon markets

Enabling EUAs traders to **make the right ETS trades** with a complete, real-time view of demand



Trading edge— accurate access to year-end **EUA demand ahead of the market**



Carbon emissions monitoring by country and sector

CO₂ Emissions [?](#)



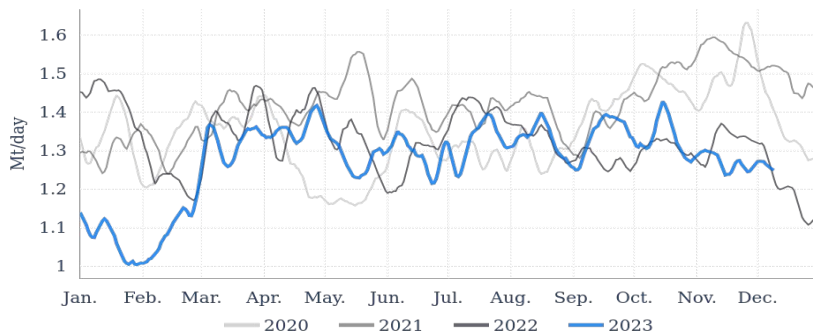
Emission breakdown in Germany



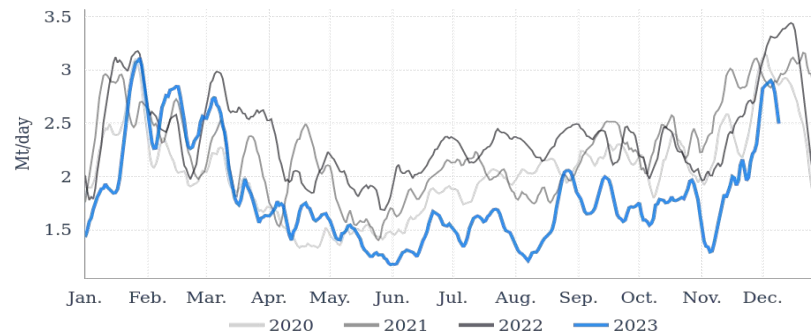
Discover live trends in CO2 emissions

- Understand interplay between all regulated sectors: Industry, Power generation, Aviation, Maritime
- Build EUA aggregate and sector-level S/D balances

EU total industry emissions (weekly)



EU total power emissions (weekly)



Satellite technology for carbon emission monitoring

Heat detection with
Sentinel 2



Fumes detection



Individual flight tracking

Benefits

- ✓ **Accuracy** *Backtested*
- ✓ **Timeliness** *Available at D+3*
- ✓ **Completeness** *100% ETS scope*
- ✓ **History** *Starting 2016 (7 years)*

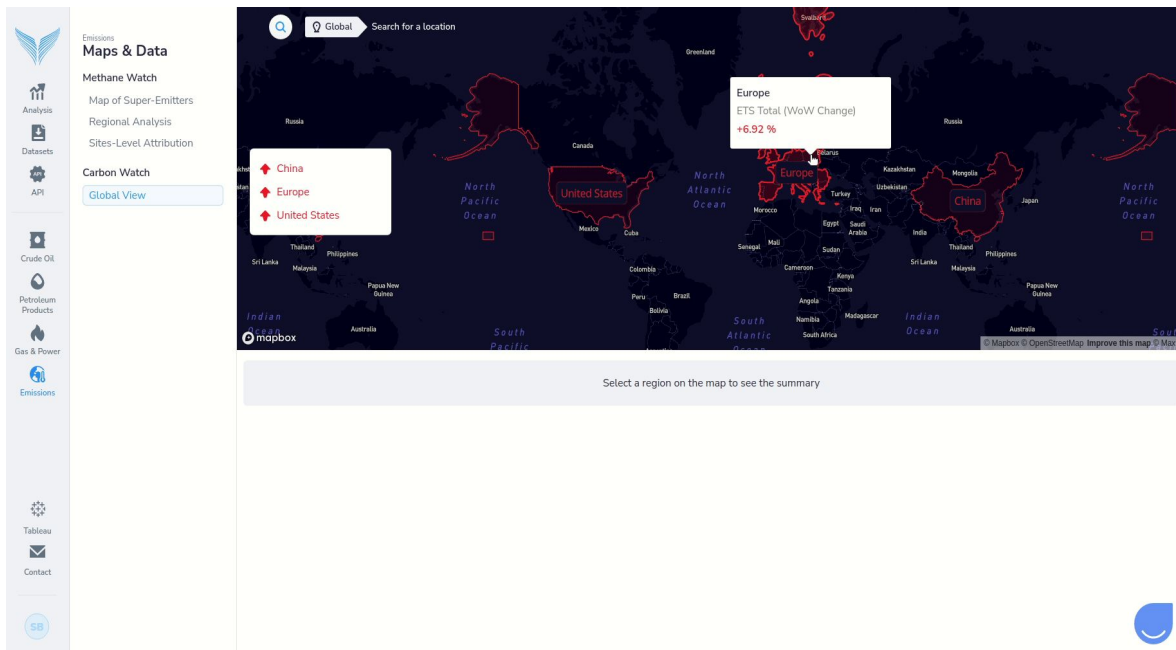
Product deliverables

Historical data: since 2016

Excel downloads

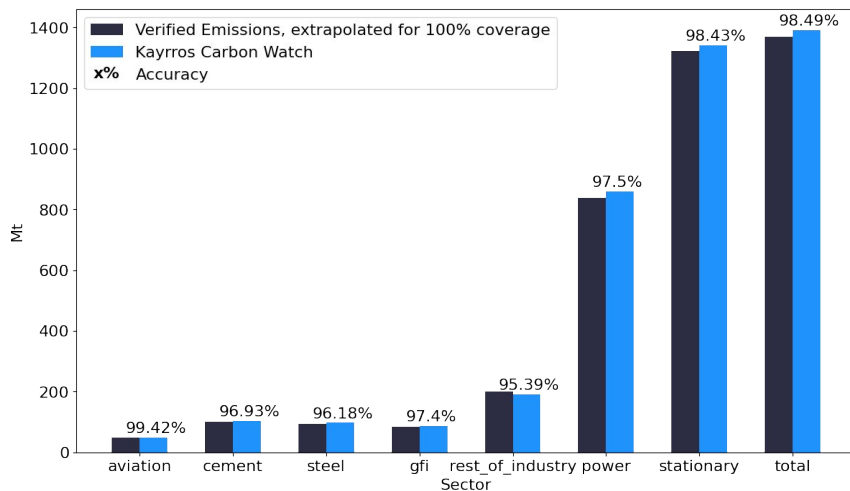
Daily API Updates: Rest & Python

Carbon Watch Platform

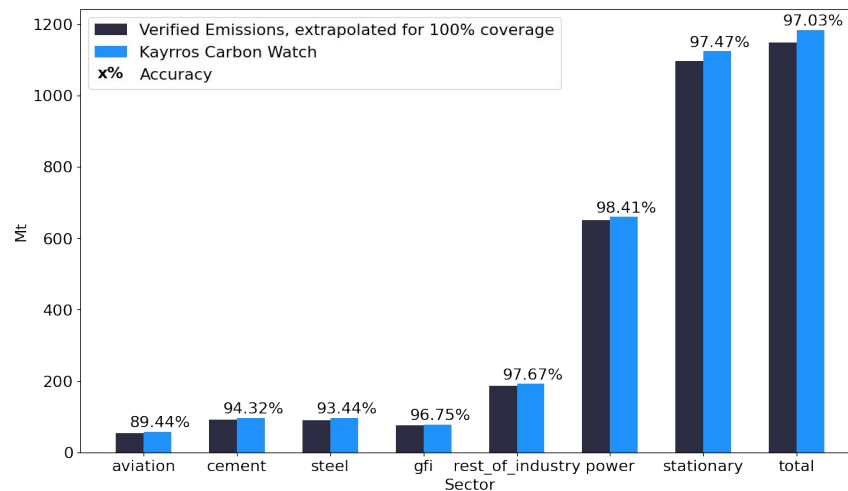


97%+ accuracy year after year vs official EEA figures

Yearly comparison between Kayrros Carbon Watch and Official EEA data

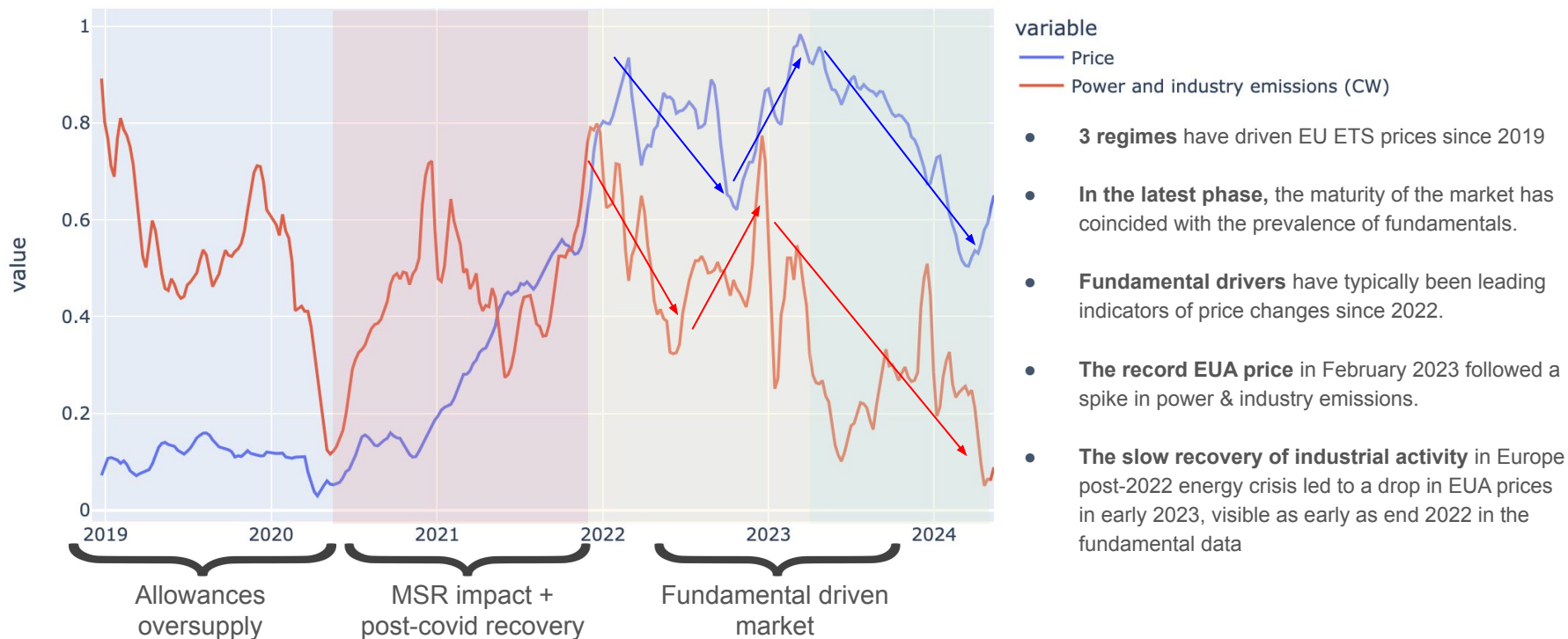


Accuracy : **98.5 %** in 2022 for
total demand of EUAs



Accuracy : **97.1 %** in 2023 for
total demand of EUAs

Demand fundamentals drive EU ETS prices



EU CO2 emissions vs. EUA prices: case studies

The 2021 rally was linked to the announcement of the Green Deal, Fit for 55, and the **post-Covid rebound in emissions**

Price and emissions (normalized) - Zoom on 2020-2021



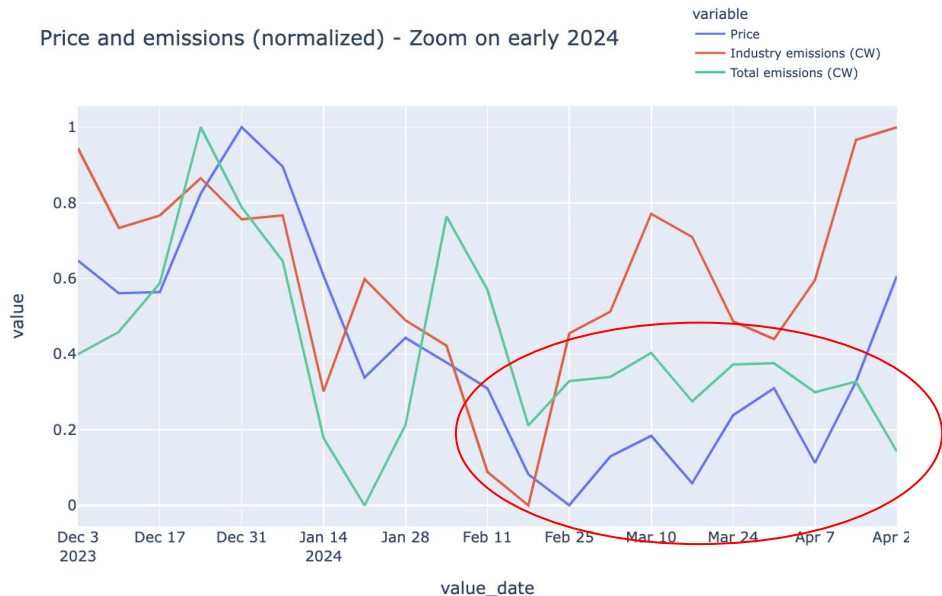
From March 2023 to March 2024, EUA prices declined, **lead by de-industrialization** and unseasonably low winter heating demand, all visible in Carbon Watch data.

Price and emissions (normalized) - Zoom on 2023-2024



German industry CO2 emissions drive short-term prices

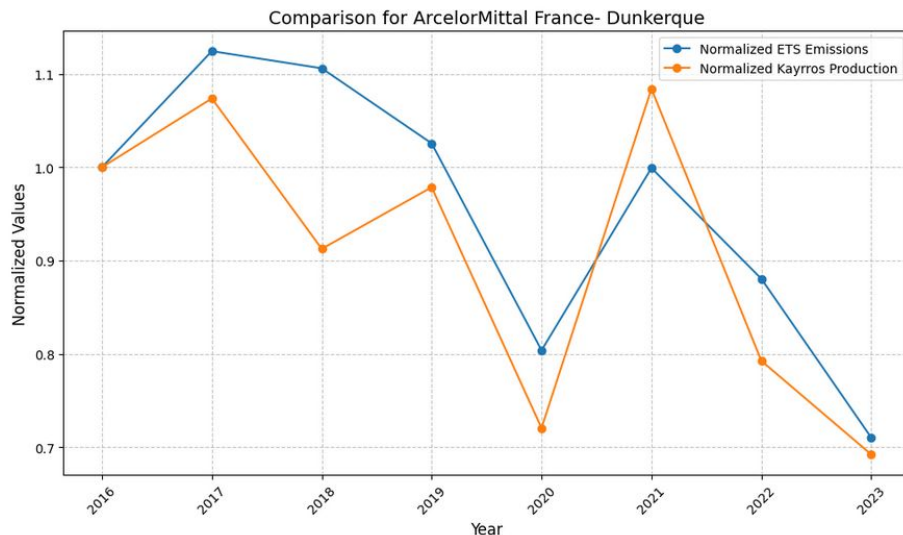
Price and emissions (normalized) - Zoom on early 2024



- The EUA price spikes from March 10th 2024 to early April are consistent with higher emissions in Europe, driven by German industrial emissions
- EUA prices tend to react to demand with a lag, and with a particular focus on Germany
- This rise in German industrial emissions impacting prices was later acknowledged by market experts

Here, carbon prices lag shifts in emission patterns by 3 weeks

Asset-level detection for steel and cement



	Year	ETS_emissions	Kayrros_production (Mt)	Yearly EF
0	2023	5.1708e+06	3.758630	1.37572e+06
1	2022	6.4103e+06	4.303562	1.48953e+06
2	2021	7.27457e+06	5.887123	1.23568e+06
3	2020	5.85166e+06	3.912329	1.4957e+06
4	2019	7.46704e+06	5.314247	1.4051e+06
5	2018	8.05294e+06	4.955616	1.62501e+06
6	2017	8.18686e+06	5.831233	1.40397e+06
7	2016	7.28082e+06	5.430685	1.34068e+06

EU ETS market to heat up in 2026

- Focus on industrial emissions from end 2025

- Full CBAM implementation in 2026

- End of free allowances for regulated industries

- Large carbon trading opportunities to emerge

- Near-realtime transparency will make carbon market all the more efficient



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