



Approach

We use satellites, other remote sensing techniques, and artificial intelligence to deliver a detailed look at global emissions that gets even better over time.

Every day, humanity pumps greenhouse gases into the Earth's atmosphere. Measuring those emissions starts with knowing where they're coming from and what is causing them. So Climate TRACE identifies the locations of large sources and observes them over time.

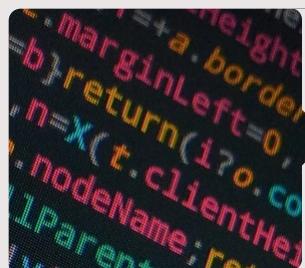




...not just the obvious things, like fossil-fueled power plants and factories, but also the tricky ones that move, such as ships and planes.



...as well as the less-obvious ones, like landfills and fields for rice cultivation.



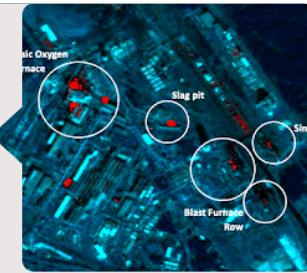
We combine many sources of information, because the more we know about each emissions source, the better our dataset becomes.



Satellite imagery is one important way that we document emissions-causing activities. We might see a smoke or water vapor plume from above.

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Then we look for the signature of a furnace from infrared imagery.



We assemble these observations on an ongoing basis, to understand how facilities change over time.

Then we gather what's known as "ground truth" data (snippets of precisely measured emissions or activity from highly reliable sources such as on-the-ground sensors verified by a third party). The advantage of ground truth data is that they are highly accurate.

But the disadvantage is that most emitting facilities worldwide don't have such highly accurate data, or it can't easily be verified by a third party.

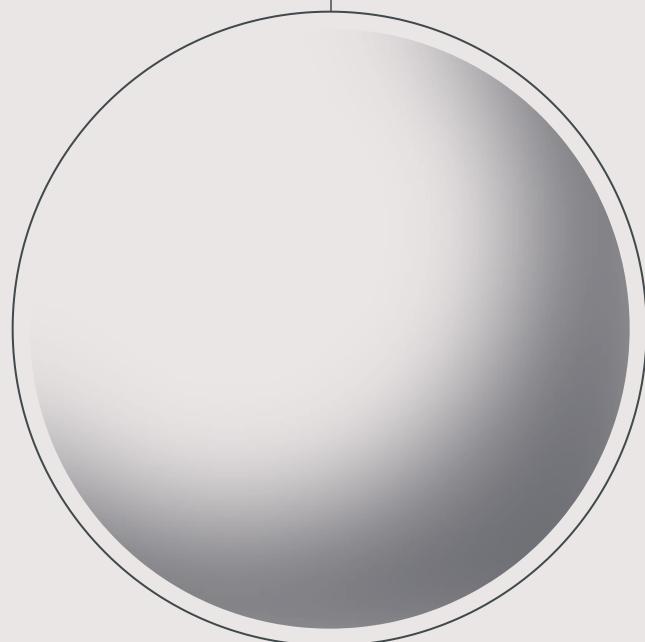
So, we then train artificial intelligence algorithms until they can look at satellite imagery or other globally available data and accurately predict the ground truth data. We only keep the algorithms that pass our rigorous quality control measures (by being able to accurately predict the ground truth data).

Then we use those high-quality algorithms to look at nearly every facility worldwide we have found, so they can accurately translate the activity we're seeing through satellite imagery and other approaches into quantified emissions estimates.

That allows us to produce a detailed, timely, and

independent global inventory of emissions from every country and territory and more than 350 million individual emitting facilities, farms, forests, and other assets.

With more and more information streaming in from space and from sensors around the globe, those emissions estimates are continuously improving.



→ [Explore map](#)

Methods and Scientific Publications

A key purpose of Climate TRACE is empowering climate action through radical transparency. As part of our own commitment to transparency, we make full and detailed documentation of our methodologies available for download. Our work is also grounded in a commitment to scientific rigor. Documentation on the methodologies behind our emissions estimates for each sector as well as a comprehensive list of the peer-reviewed research that underlies our work is available on our [GitHub page](#).

Contact us



Climate TRACE offers free data analysis and other support to select organizations, especially for high-impact use cases. Please [contact us](#) for support inquiries and consideration.

News & Insights



FEB 26, 2024

As Arctic Ice Thaws, Questions Around Arctic Shipping Heat Up

Ocean shipping could climb significantly in the years ahead, with maritime trade expected to triple by 2050. But there are concerns that the changing climate will open up previously unnavigable or unviable trade routes — especially in the Arctic.



DEC 27, 2023

Conversations With The CLIMATE TRACE Wise

We recently caught up with Nick Wise, CEO & Founder of OceanMind, about emissions estimates for the shipping industry.



DEC 02, 2023

Climate TRACE Unveils Open Emissions Database Of More Than 352 Million Assets

The Climate TRACE inventory includes every country and territory in the world, every major sector of the global economy, and nearly every major source of greenhouse gas emissions. Tesla, Polestar, Boeing, and others have already moved swiftly to leverage the new dataset to pinpoint decarbonization opportunities in their supply chains.

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