

# EmisiMap: Indonesia's NOx Hotspots Explorer

Satellite-based platform to reveal NOx emissions and stationary emitters across Indonesia



## What is EmisiMap?

EmisiMap is an online platform that visualizes nitrogen oxide (NOx) hotspots across Indonesia using satellite observations combined with detailed infrastructure mapping.

By linking NOx emission patterns with nearby energy, industrial, and extractive facilities, EmisiMap enables the public to understand pollution and its sources clearly.

## Why Satellite Data?

  
Provides independent, objective evidence

  
Reveals pollution where monitoring is limited

  
Offers national coverage, even in remote areas

  
Allows analysis over time for transparency and accountability

## What Do You See on the Map?

### Large plants, small cities

**Nine hotspots** across Java, Sumatra, and Kalimantan shift the pollution burden of large-scale facilities onto remote communities

### Urban, with fossil power

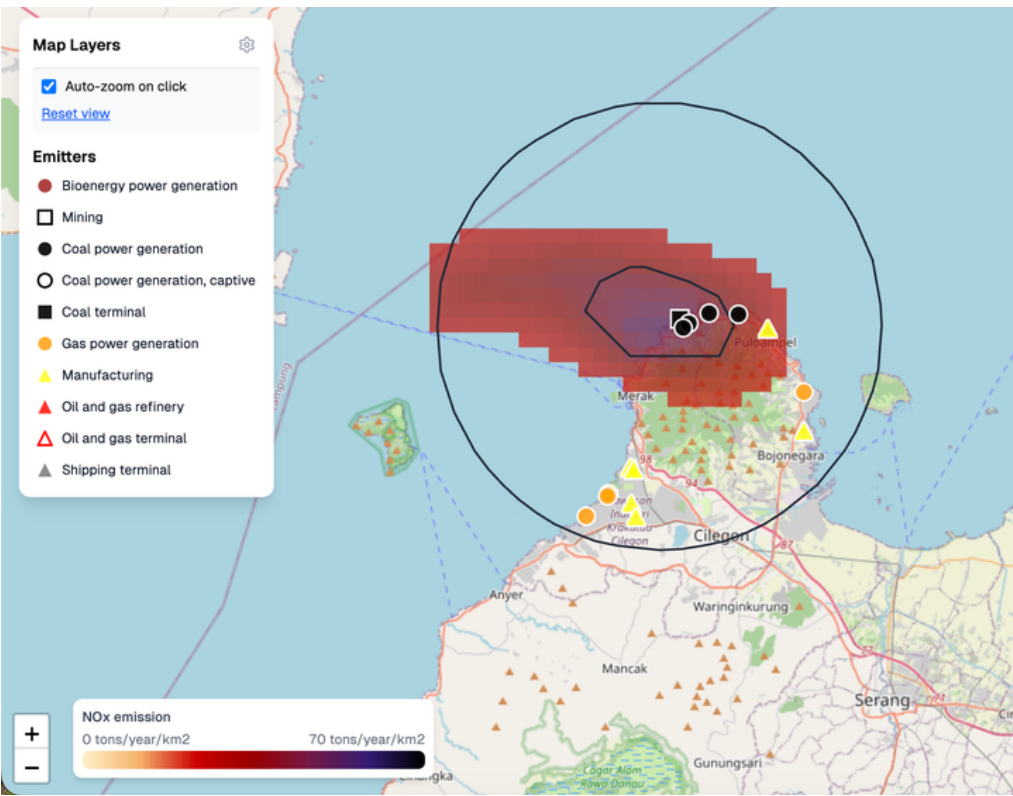
**Nine urban hotspots** stem from power plants, thermal boilers, and local traffic, exposing the urban population to pollution

### Nickel processing

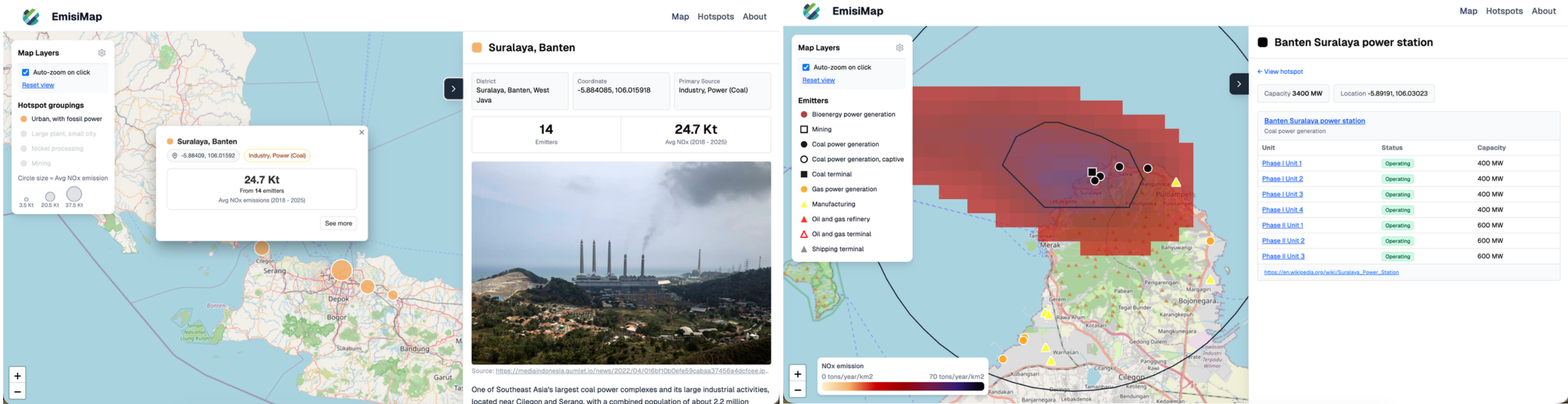
**Six hotspots** driven by nickel processing, pushing emissions in Sulawesi and North Maluku past Greater Jakarta levels

### Mining

**Five hotspots**, primarily over Kalimantan's coal mines are driven by heavy diesel fleets, transport, and mine-mouth power grids

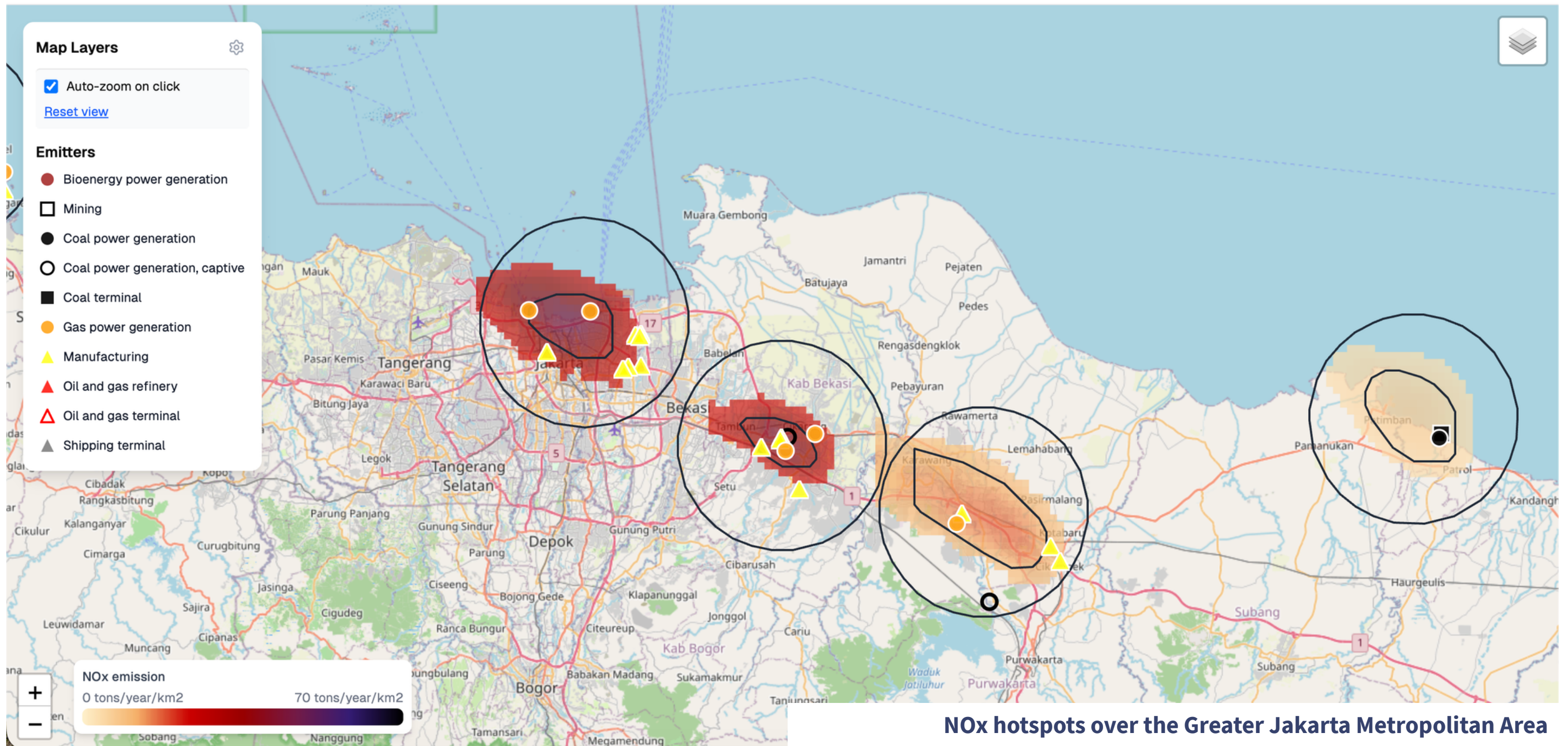


NOx dispersion shown for each hotspot



Details provided for each NOx hotspot

Details provided for all emitters shown within 15 km radius



## Why It Matters?

**Air pollution is often invisible, yet it carries severe public health and environmental impacts.**

By combining satellite observations with infrastructure data, EmisiMap makes these emissions visible and traceable to specific locations and activities. CREA aims to **enable policymakers, civil society, researchers, and journalists** to identify key stationary emitters to NOx pollution, ask targeted questions, and support evidence-based environmental governance.

## Methodology

### Data Inputs



Satellite data from Sentinel-5P (TROPOMI) and weather data to calculate NOx emissions



Asset-level stationary sources from Global Energy Monitor and Climate TRACE



Emitters include power generation facilities and energy- and emissions-intensive industrial sites

### Data Processing



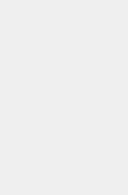
1 Convert NO<sub>2</sub> observations to NOx



2 Apply the flux divergence method (Beirle et al., 2023) to estimate emissions



3 Identify local hotspots around infrastructure clusters



4 Render spatial layers in the interactive dashboard

### Why this Method?



Proven approach for short-lived pollutants



Reduces modelling complexity



Suitable for near-real-time regional monitoring



Offers directly interpretable patterns