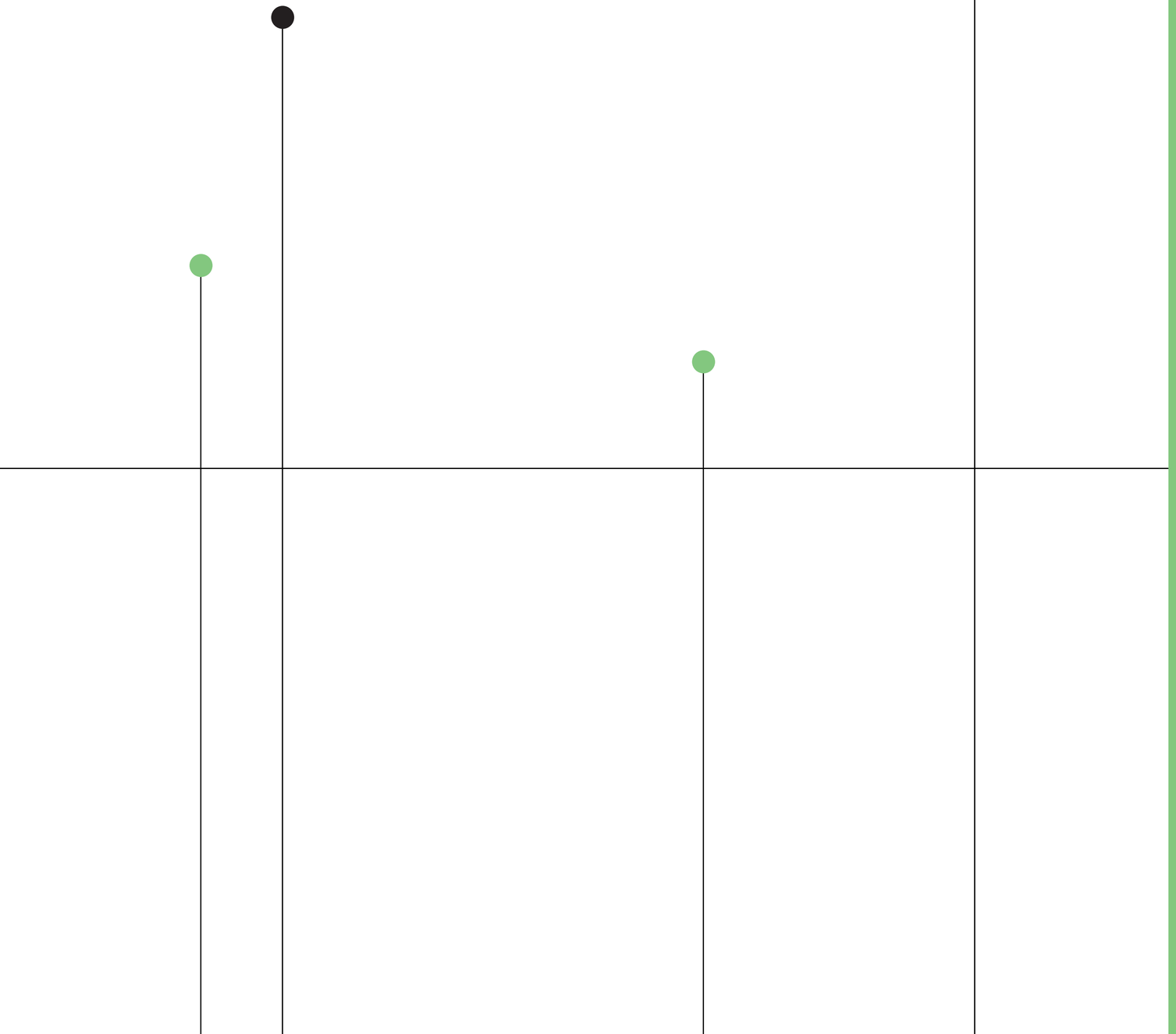
Soaked Streets, Smoggy Skies:

Post-Rain Pollution Peaks in Jabodetabek

Air Quality Report **November_2023**

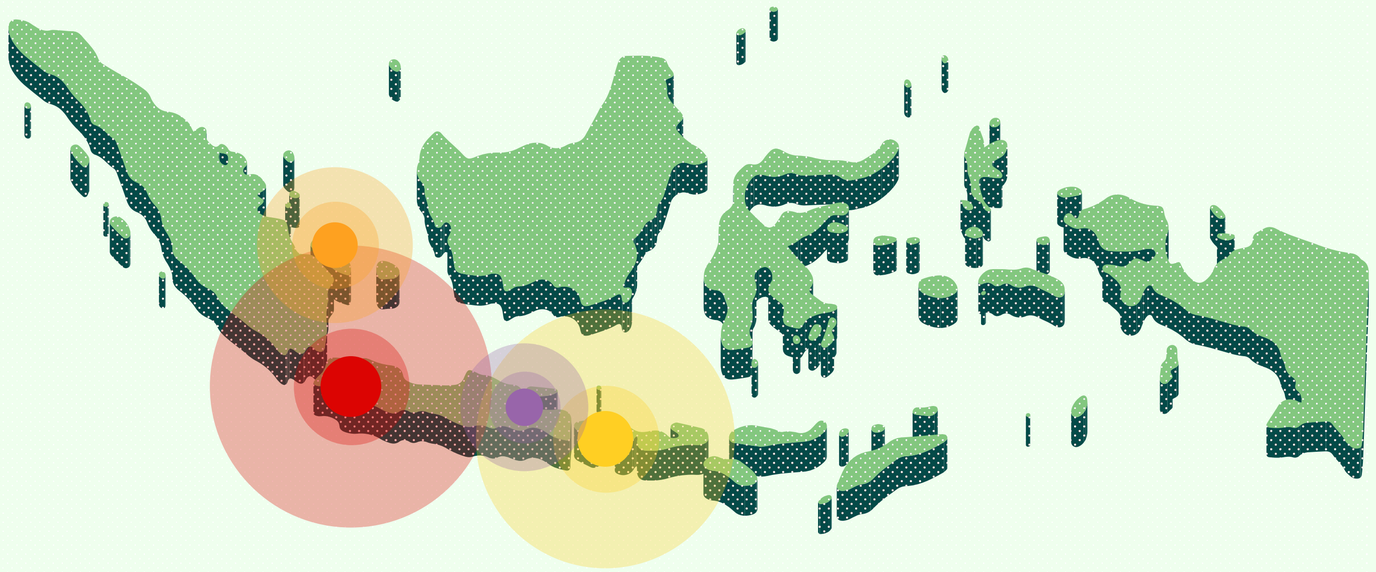


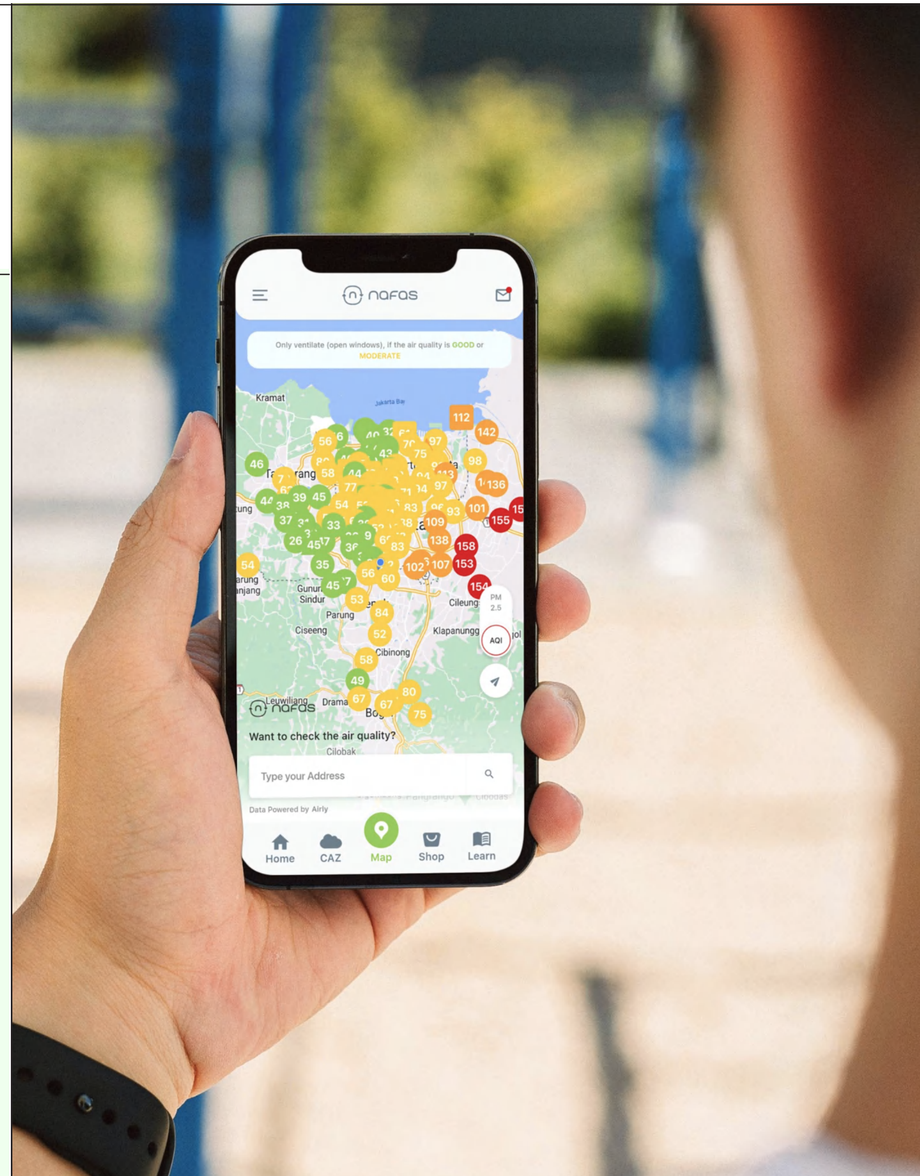
01

nafas & air quality

What is nafas?

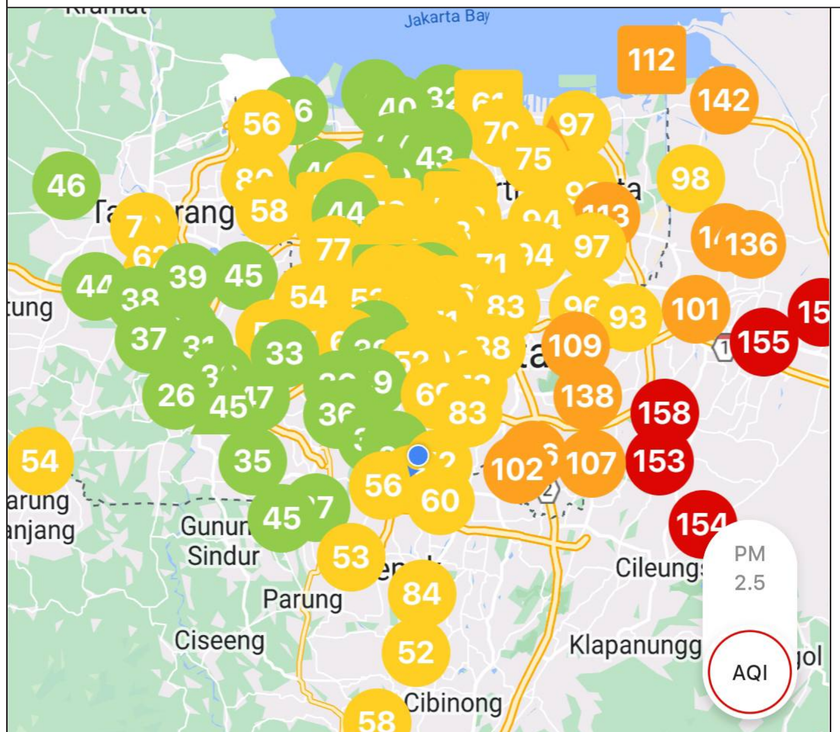
Nafas is an air quality health and wellness company, developing technologies to help urban citizen breathe healthier air

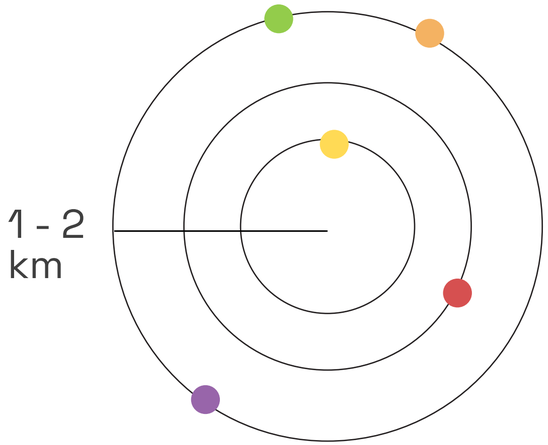




How does nafas the obtain air quality data?

Nafas obtains air quality data from low-cost sensors installed at over 180 locations on the ground. These sensors represent the air quality conditions within a radius of 1-2 km from each point. The data is received in real-time and can be accessed through the Nafas app.





How does nafas interpret the air quality data?

Nafas interprets air quality data using PM2.5 as the primary parameter, following the guidelines set by the US EPA. The results are measured in the unit µg/m³.

AIR QUALITY INDEX

The Air Quality Index, developed by the US EPA, provides a color-coded system to help us easily understand the quality of the air we breathe.

Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy	Hazardous
0 - 12	12.1 - 35.4	35.5 - 55.4	55.5 - 150.4	150.5 - 250.4	>250.4

What is PM2.5?

PM2.5 refers to air pollution particulate matter with a diameter of less than 2.5 micrometers. This size is about 36 times smaller than the diameter of a grain of sand.

Diameter in milimicron

<2,5µm
PM2.5

<10µm
PM10

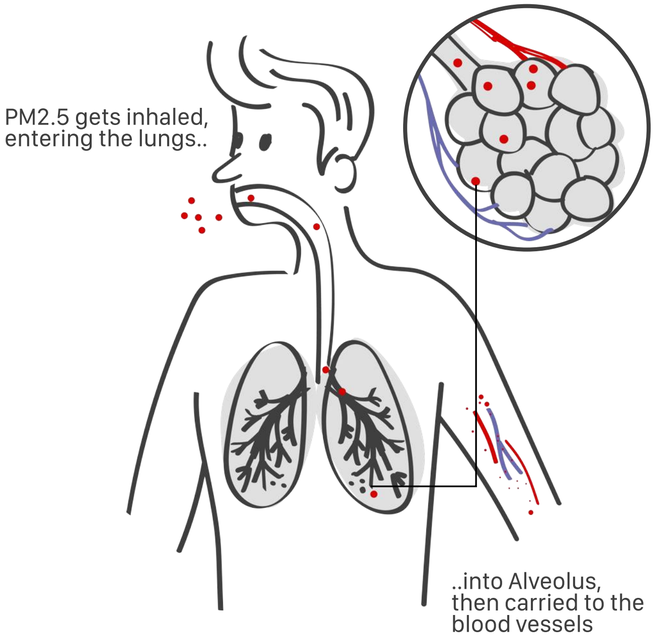
~90µm
A Graind of Sand

Combustion particles
Organic compounds
Metals

Dust
Pollen
Mold

WHY IS PM2.5 HAZARDOUS TO US?

Due to its microscopic size, PM2.5 particles cannot be effectively filtered by our body. Inhaling PM2.5 can lead to serious health issues, including **premature birth, asthma exacerbation, coughing, respiratory distress, coronary heart disease, diabetes, and even lung cancer.**



Sources of Air Pollution

A significant portion of air pollution results from human activities. What are these activities that emit pollutants?

How we mobilize

How we produce

How we generate power

How we manage our waste

Nature can also be one of the sources

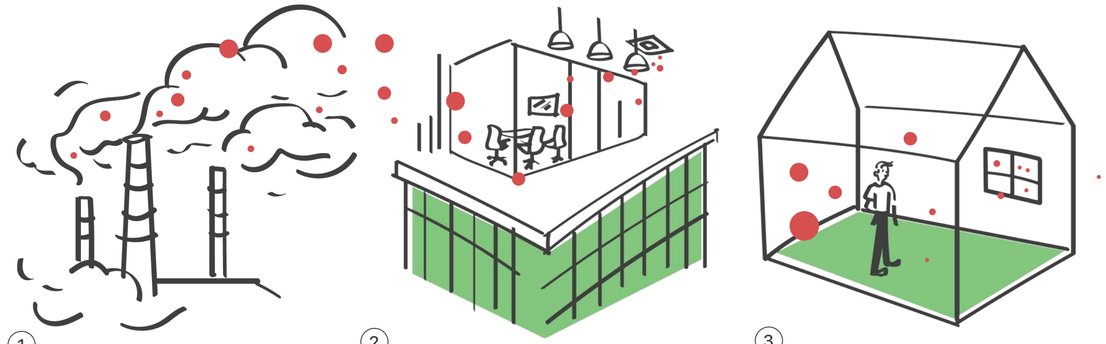
Properties of Air quality

HYPERLOCAL

EXAMPLE

Air pollution can change rapidly, increasing when there are pollution sources in the vicinity and the atmospheric conditions are conducive to the buildup of pollutants.

TRANSBOUNDARY



1 POLLUTION FROM FACTORY CHIMNEY

2 CARRIED BY THE WIND INTO THE CITY, ENTERING BUILDINGS

3 ..AND EVEN HOUSES

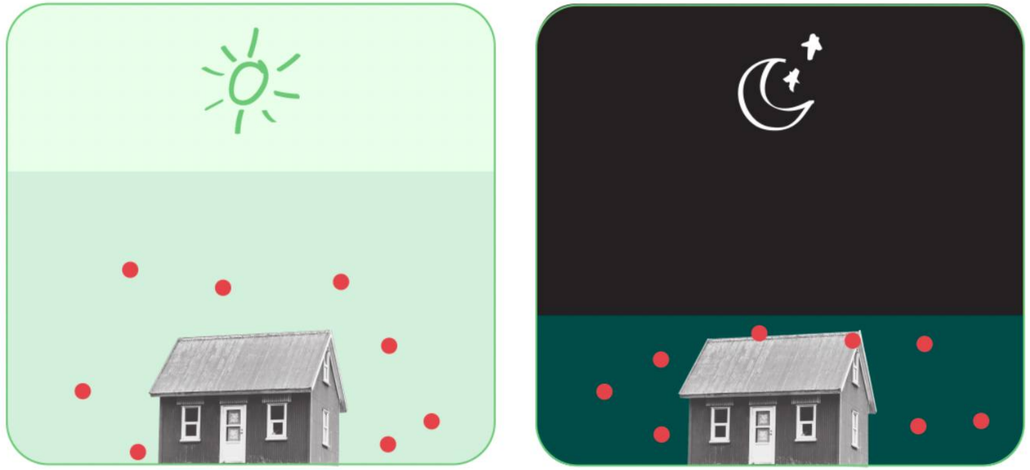
Wind can transport pollutants from their source, carrying them from one area to another, often crossing regional or national boundaries.

The Influence of Atmospheric Conditions on Air Quality

WIND AND RAIN

The direction and speed of the wind, coupled with rainfall, can either enhance air quality by dispersing pollutants or contribute to the decline of air quality by accumulating them.

PLANETARY BOUNDARY LAYER

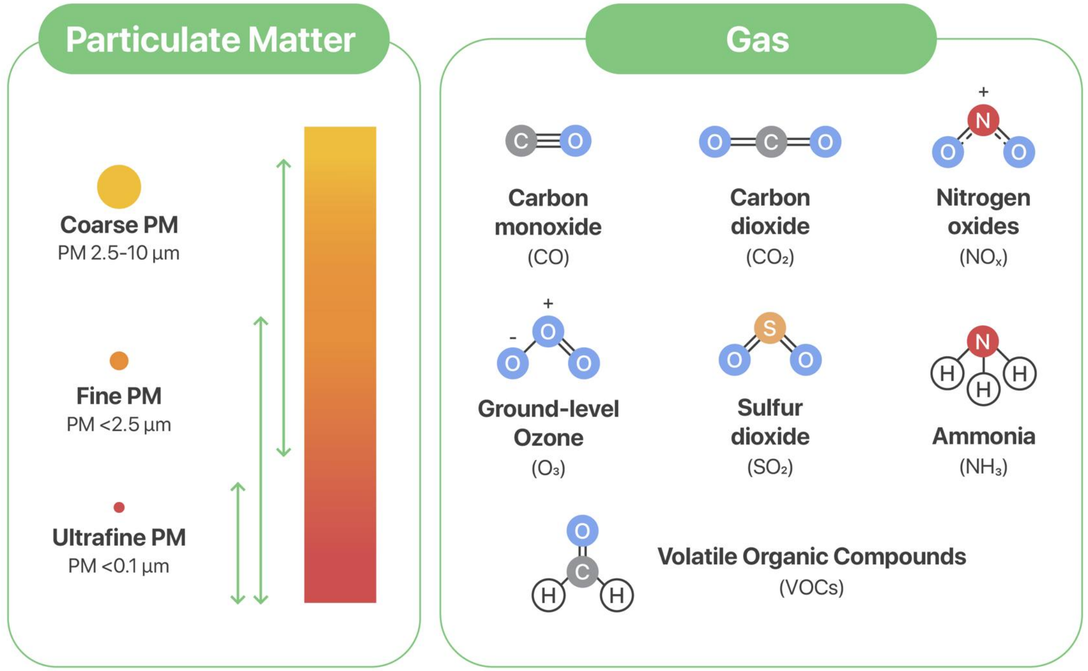


The Planetary Boundary Layer is an atmospheric layer that extends from the Earth's surface up to 800 meters.

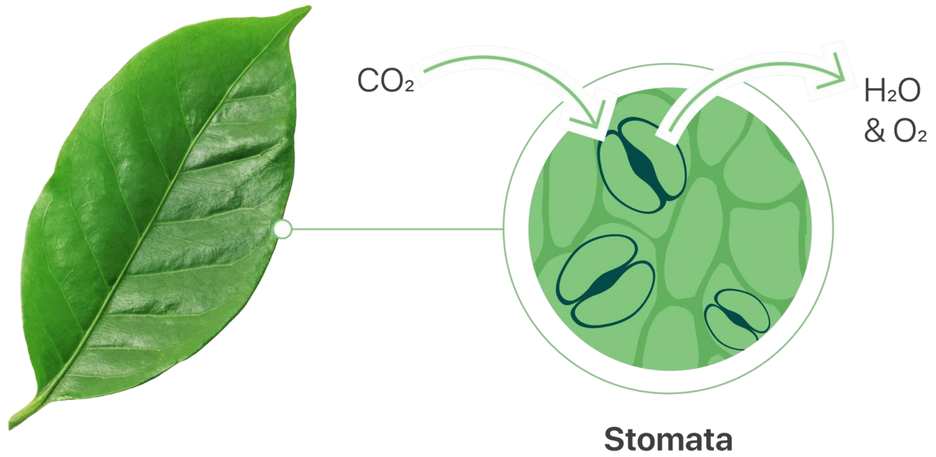
The conditions within this layer vary between morning and night. As the sun sets, the layer's altitude decreases. This reduction causes a higher concentration of pollutants due to the accumulation and limited vertical dispersion.

Why 'Greening' Isn't Sufficient to Combat Air Pollution

Air pollution exists in two primary forms: particulate and gaseous.



Plants and trees can only absorb the gaseous form of pollutants.



However, when these plants take in excessive amounts of certain gaseous pollutants, such as SO2, NOx, and CO, **they can weaken over time.** This is because they are not inherently equipped to handle such a 'burden.'

IMPORTANT TO NOTE 🔎

Deposition Deposition is the process where a substance transitions from a gas phase directly to a solid phase without passing through a liquid phase. This mechanism enables plants to 'trap' particulate pollutants, like PM2.5.

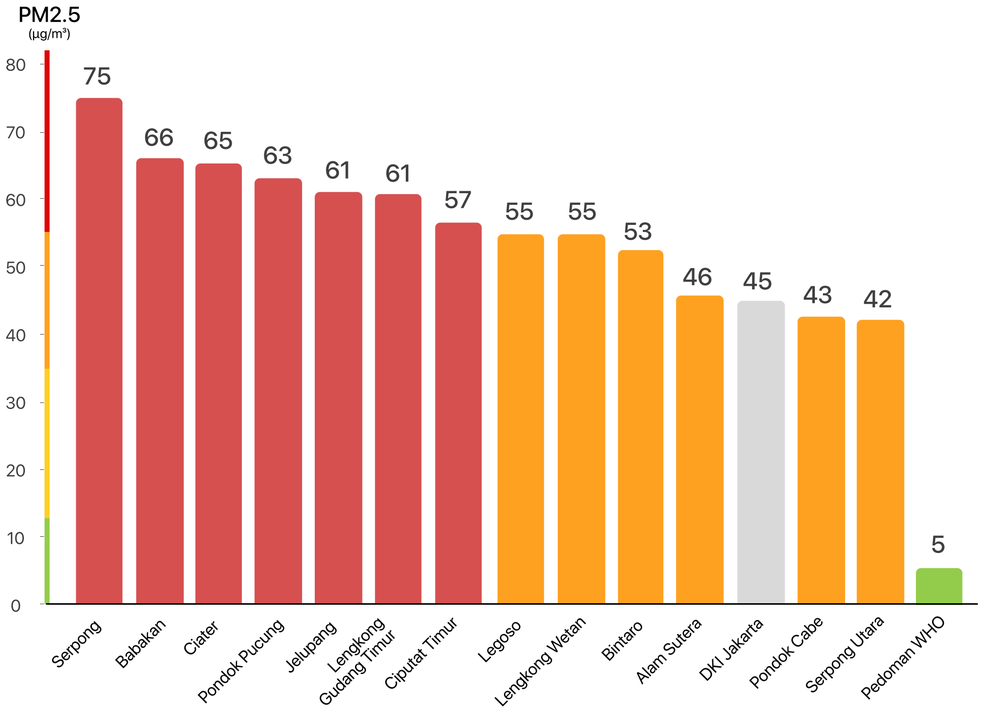
Why 'Greening' Isn't Sufficient to Combat Air Pollution

👩🏻‍⚕️ A study from the US EPA indicates that trees remove only about 0.24% of PM2.5 from the air.

Satellite imagery shows an abundance of green areas in South Tangerang, particularly on the west side.

However, according to the Nafas monthly report from May 2023, despite South Tangerang being synonymous with 'green' residential areas, pollution levels remain high.

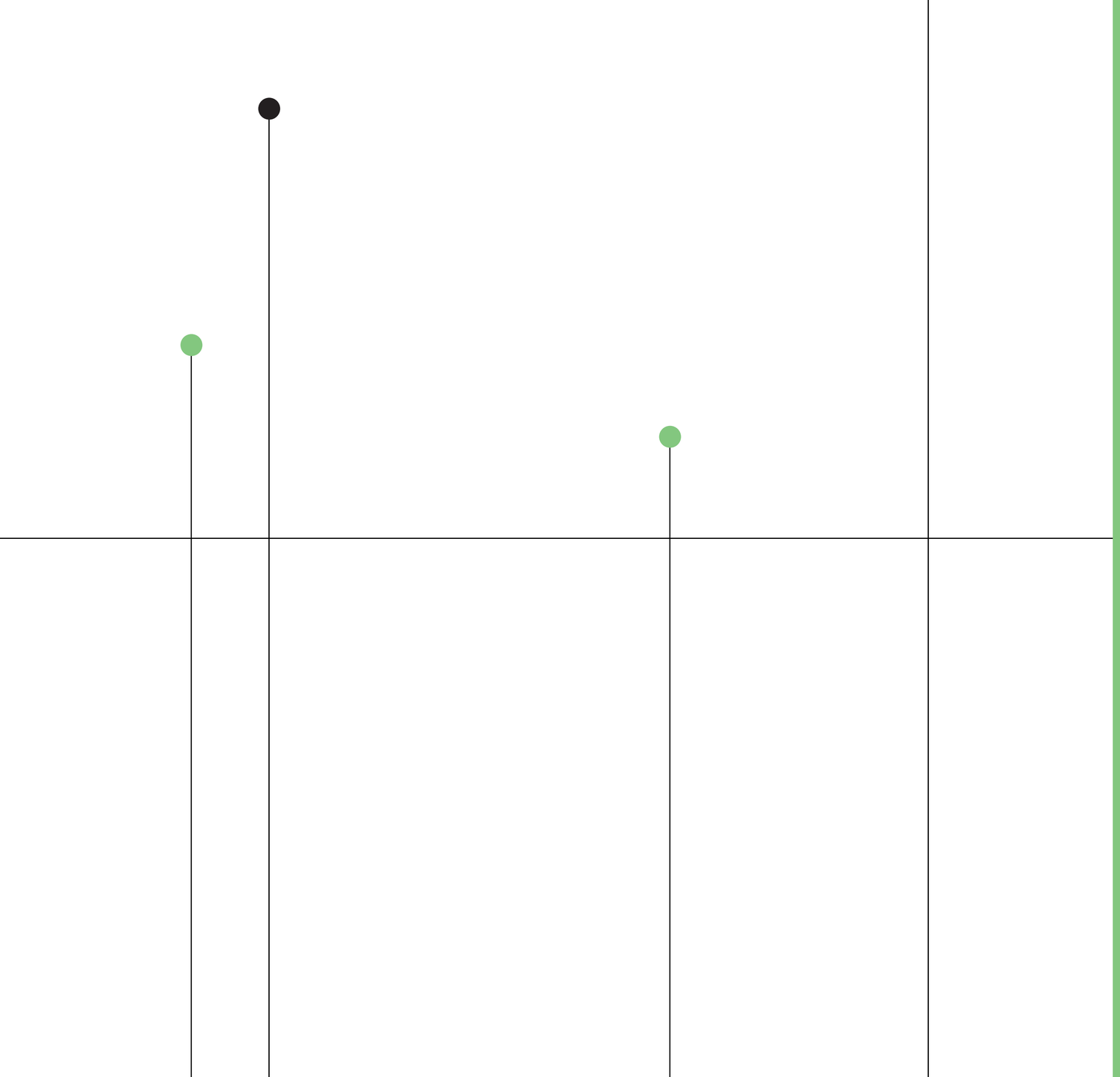
Sumber: fs.usda.gov



Good Moderate Unhealthy for Sensitive Groups Unhealthy Very Unhealthy

What is the conclusion?

SIMPLY GREENING AN AREA IS NOT AN EFFECTIVE SOLUTION TO THE AIR POLLUTION PROBLEM.



Thousands of studies have conclusively demonstrated that prolonged exposure to air pollution can adversely affect the physical and cognitive development of children.

Health Impacts of Air Pollution

SHORT-TERM EFFECT

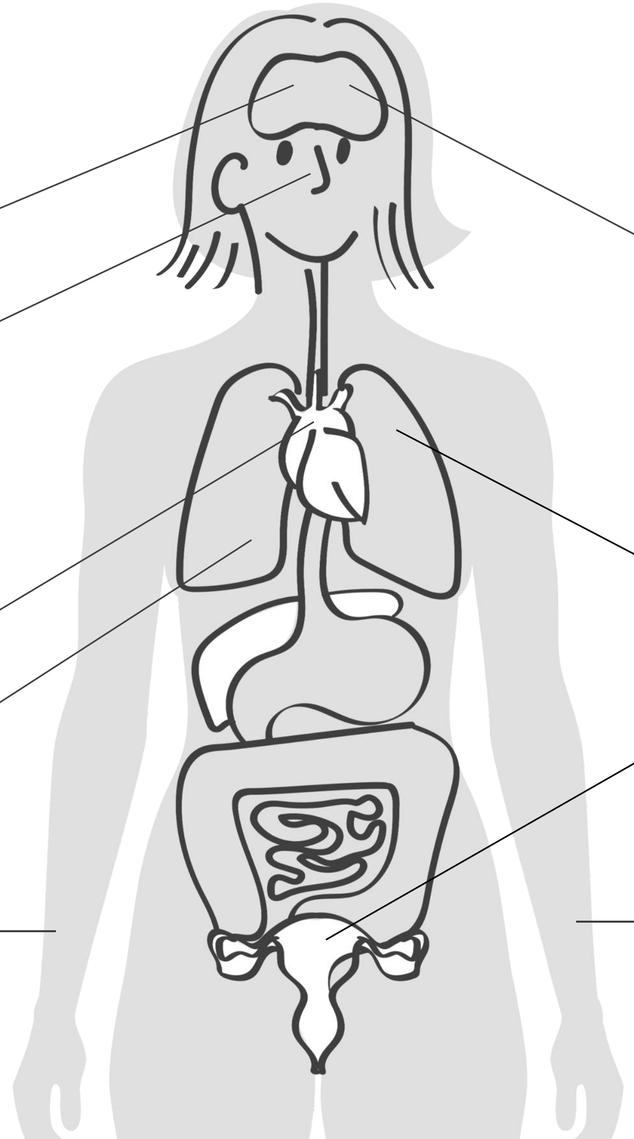
Brain
ADHD (From infancy to childhood)

Respiratory
Influenza, Rhinitis

Heart
Heart attack, arrhythmia

Lung
Asthma, Bronchiolitis

Skin
Atopic dermatitis (eczema), acne, early aging



LONG-TERM EFFECT

Brain
Alzheimer, Parkinson's, stroke, cognitive degradation

Lung
Pneumonia, lung cancer, asthma

Ovary
Premature birth

Whole Body
Blood blockage

Source: Compiled from various research journals.

*This content is for educational purpose. We recommend to consult directly to medical professionals if one or more symptoms appear.

ADHD, influenza, and heightened asthma attacks are just three of the numerous adverse effects of PM2.5 on children

16 µg/m³

Increased risk of ADHD

Children exposed to PM2.5 concentrations of 16 µg/m³ during their first three years have heightened risk potentials. This risk escalates further when PM2.5 levels surpass 50 µg/m³.

Source

15%

Increased risk of influenza

There's a 15% higher risk with every exposure to PM2.5 levels exceeding 10 µg/m³ over a span of 6 days.

Source

3.6%

Increased risk of asthma attack

There's a 3.6% increased risk for every 10 µg/m³ rise in PM2.5 exposure.

Source

Glosarium

a

ATMOSPHERE

A layer of gases that envelops our Earth. We reside in the lowermost layer of the atmosphere, known as the troposphere, which extends from the Earth's surface up to about 12 km.

b

ANNUAL THRESHOLD LIMIT VALUE

This is an air quality standard established by the World Health Organization (WHO). In 2021, the WHO revised the annual threshold limit value, reducing it from 10 µg/m³ to 5 µg/m³. The daily threshold limit value (covering a 24-hour period) is set at 15 µg/m³.

BOUNDARY LAYER

This atmospheric layer extends from the Earth's surface up to 2 km and can vary over time.

g

GROUND-LEVEL AIR POLLUTION

Refers to air pollution that is found very close to the Earth's surface

h

HYPERLOCAL POLLUTION

A phenomenon where air pollution is highly concentrated in a specific, limited area due to the presence of local pollution sources within that vicinity.

p

PM2.5

articles in air pollution that are 2.5 micrometers in size, which is about 36 times smaller than the diameter of a grain of sand.

s

SENSITIVE/VULNERABLE GROUP

This refers to individuals who are particularly susceptible or at a higher risk of being affected by certain conditions. Examples include children, the elderly, individuals with allergies, and those suffering from asthma.

t

TRAPPING LAYER

An atmospheric layer that has the capacity to hold or trap pollutants near the Earth's surface, thereby increasing detectable pollution levels in that area. This is commonly known as the inversion layer.

Nathan
Roestandy

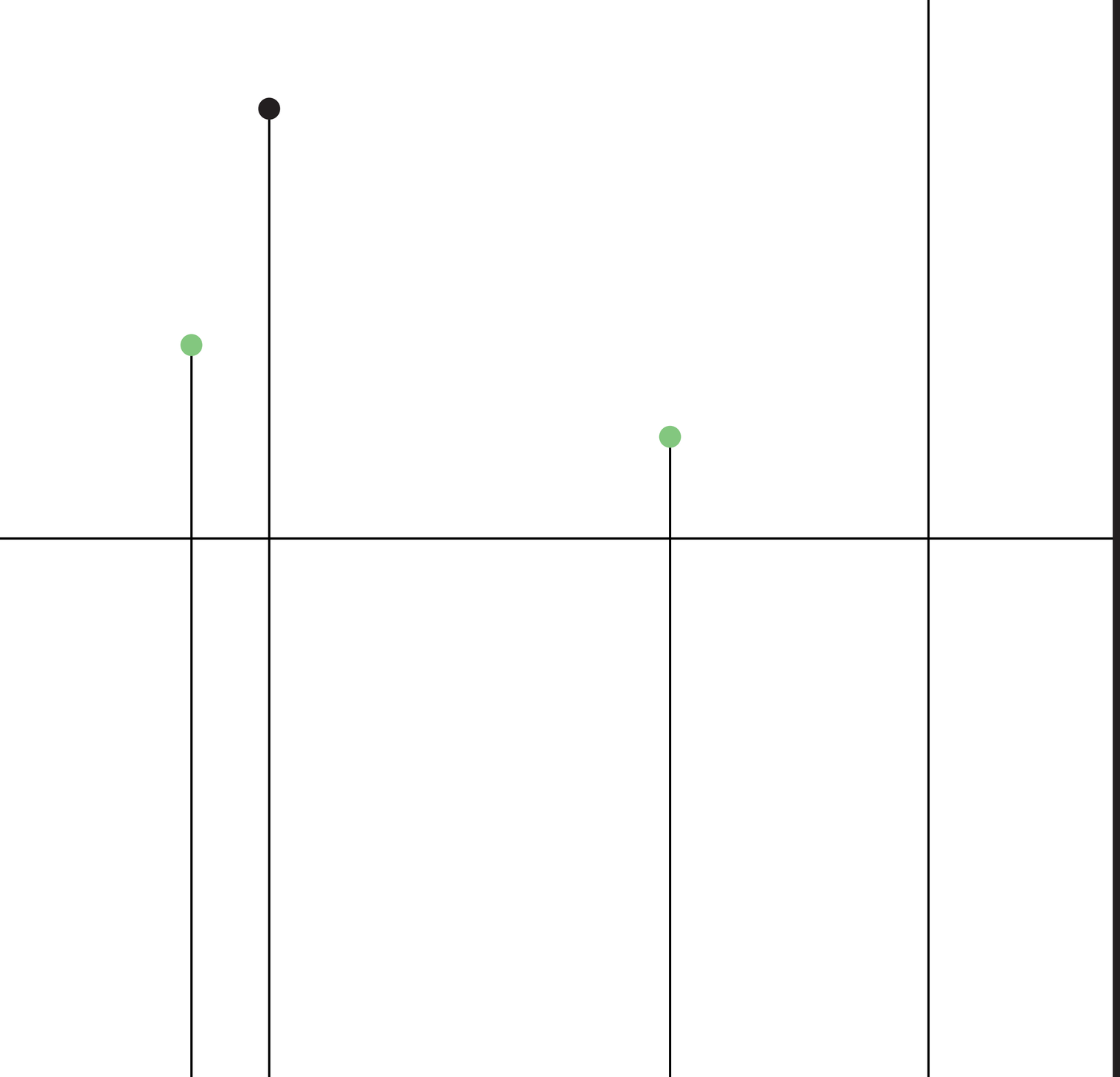
Co-founder &
CEO of nafas

Piotr
Jakubowski

Co-founder &
CGO of nafas

As the year draws to a close, rain showers have been pouring down across many regions with varying intensities, ranging from moderate to heavy. Observations from the Nafas sensors indicate a trend of increasing pollution levels following a brief period of cleaner air after being washed by the rain. This suggests that there are still significant sources of pollution that need to be addressed, and we cannot rely solely on rain to improve air quality.

Let's hope we can consistently breathe fresh air without having to wait for the rain!

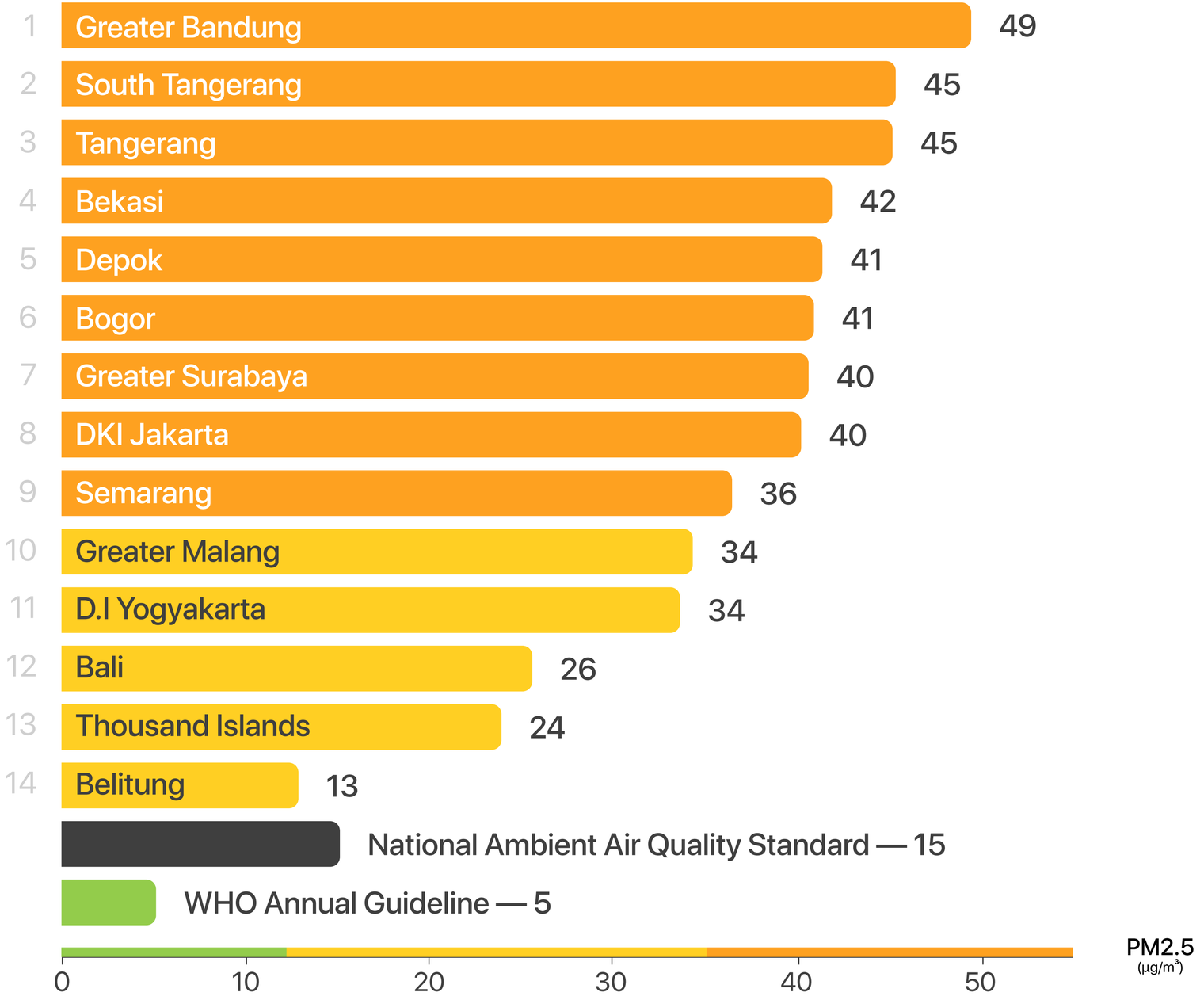


02

november
2023
air quality
data

City Rankings

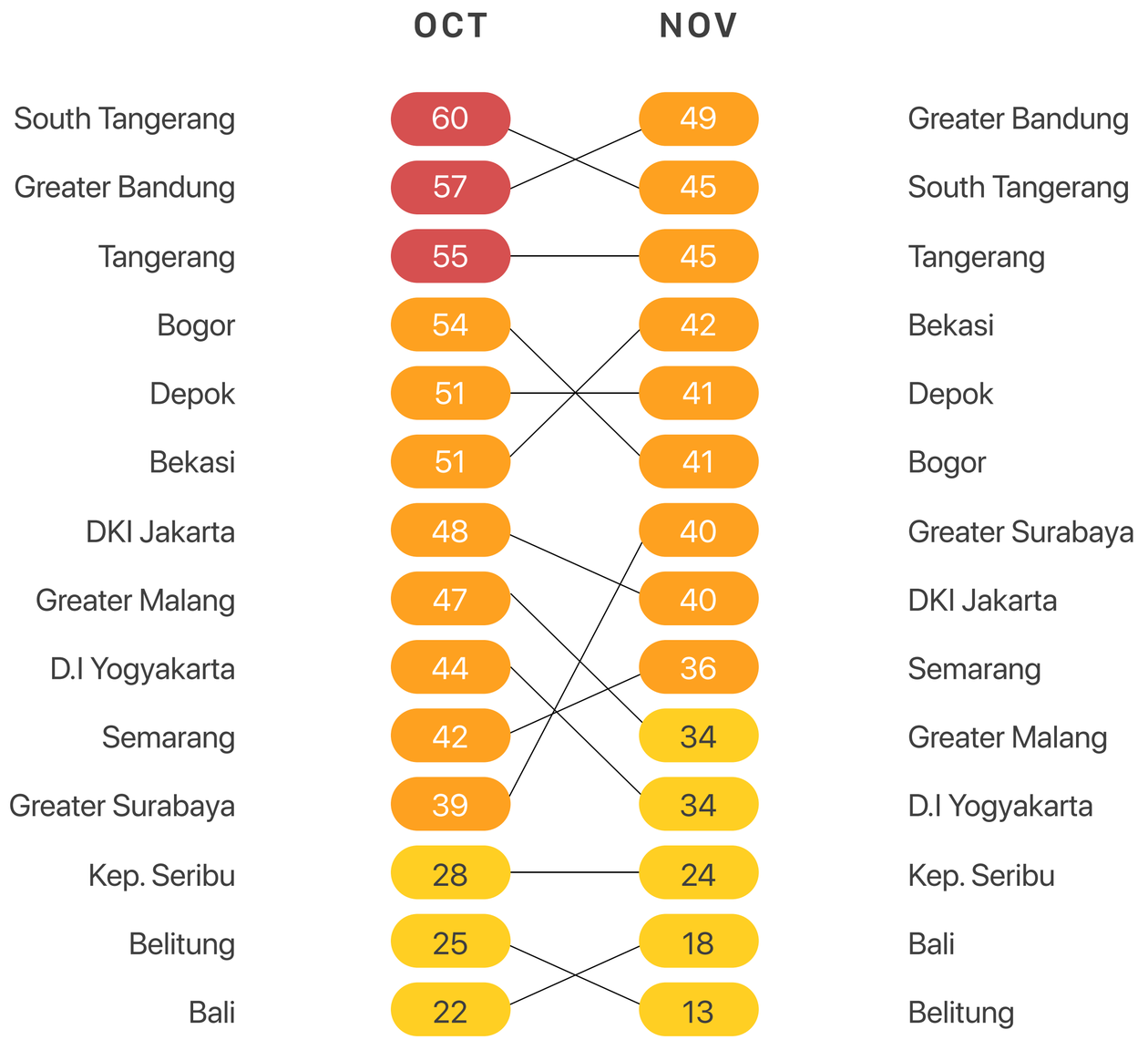
This ranking is determined by the cities with the highest PM2.5 concentration levels in November 2023.



- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

City Rankings

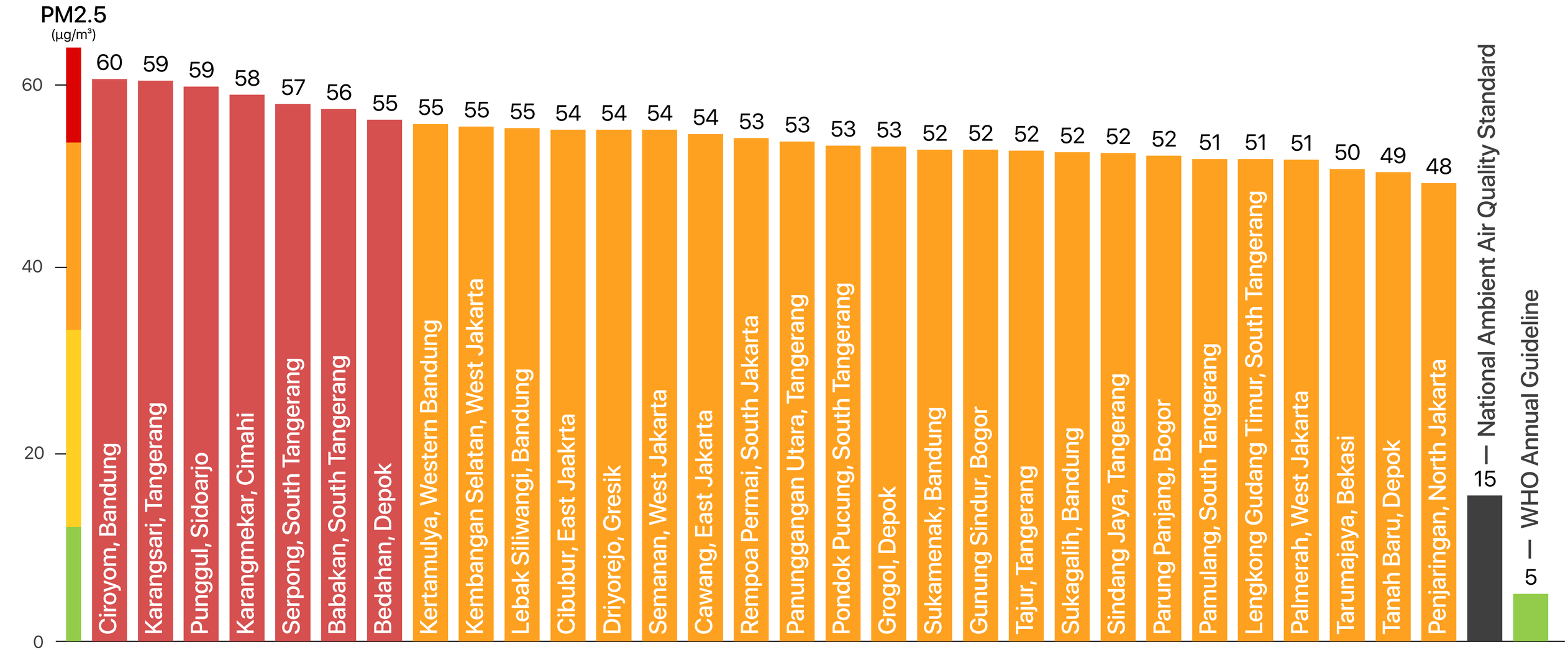
This displays the rankings of cities based on their PM2.5 pollution levels, providing a comparison with the previous month's data.



- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

30 Most **Polluted Locations**

nafas

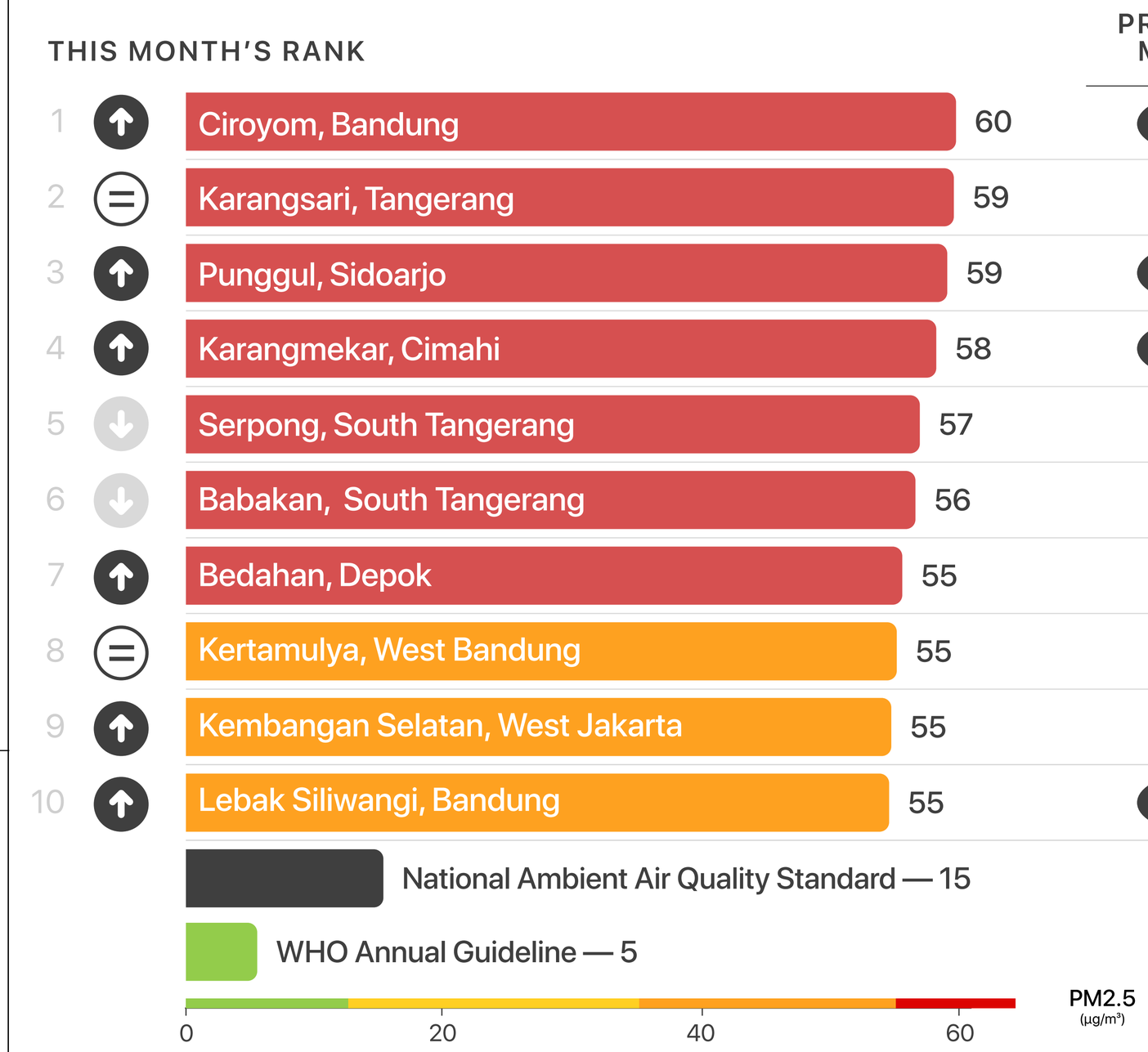


Good · Modetate · Unhealthy for Sensitive Groups · Unhealthy · Very Unhealthy

Top 10 Most Polluted Location

This ranking identifies the sensor points with the highest PM2.5 concentrations in November 2023 and compares them with the conditions from the previous month.

- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy



Cigarettes **Equivalence**

November 2023

The equivalence to cigarette smoke is determined by the daily average of PM2.5.

A concentration of 22 µg/m³ is equivalent to the exposure from one cigarette.

*) Measurement methodology is based on berkeleyearth.org

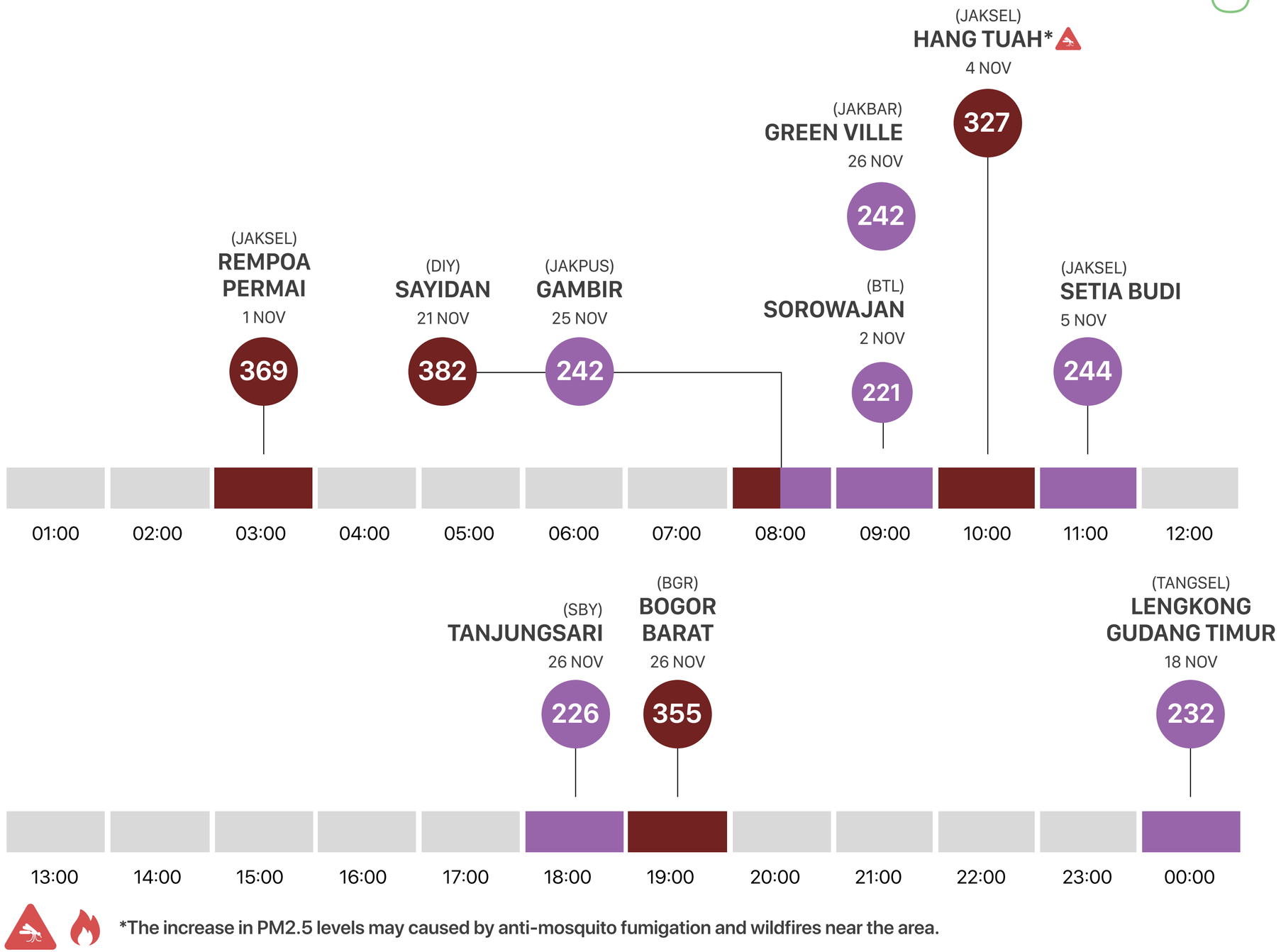
		NUMBER OF CIGARETTES
1	Ciroyom (BDG)	81
2	Punggul (SDA)	80
3	Karangsari (TNG)	80
4	Karangmekar (CMH)	79
5	Serpong (TANGSEL)	77
6	Babakan (TANGSEL)	77
7	Bedahan (DPK)	75
8	Kertamulya (BDG)	75
9	Lebak Siliwangi (BDG)	74
10	Kembangan Selatan (JAKBAR)	74

Top 10 Most Polluted Hours

The ranking is based on the time when the worst PM2.5 pollution occurs on October 2023

Should PM2.5 levels reach the "Hazardous" category, do not panic. Stay alert to notifications, such as those related to mosquito fogging activities. However, remember that spikes in PM2.5 levels can result from various factors, not just one. Stay informed and vigilant!

- Good
- Moderate
- Unhealthy for Sensitive Groups
- Unhealthy
- Very Unhealthy
- Hazardous



*The increase in PM2.5 levels may caused by anti-mosquito fumigation and wildfires near the area.

Alert Nafas

ADA YANG BARU DI APLIKASI NAFAS!

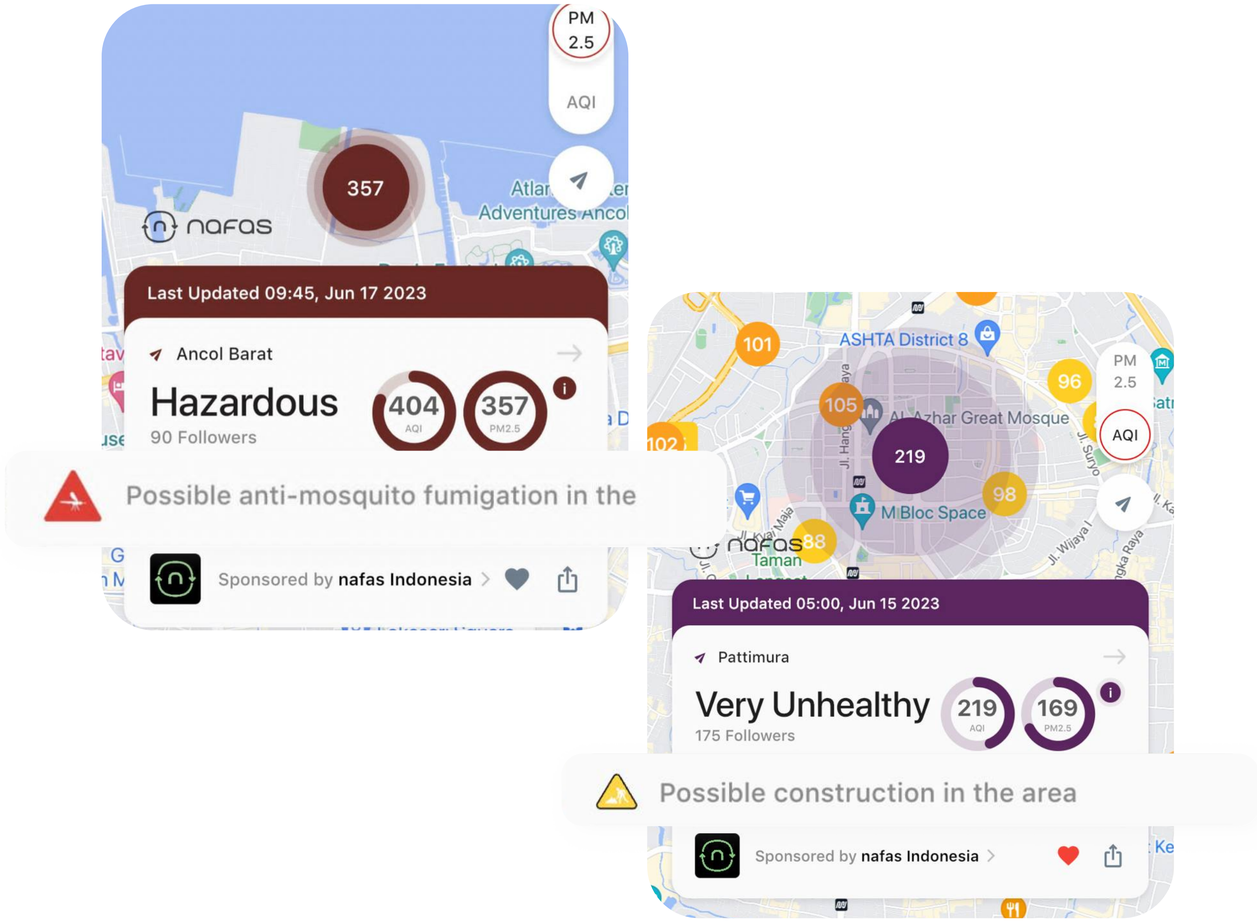
Selain **alert fogging nyamuk,** sekarang kamu juga bisa tahu penyebab tingkat polusi udara di lokasi tersebut meningkat karena adanya alert **kegiatan pembangunan (konstruksi).**

KITA KENALAN SATU-SATU YUK!

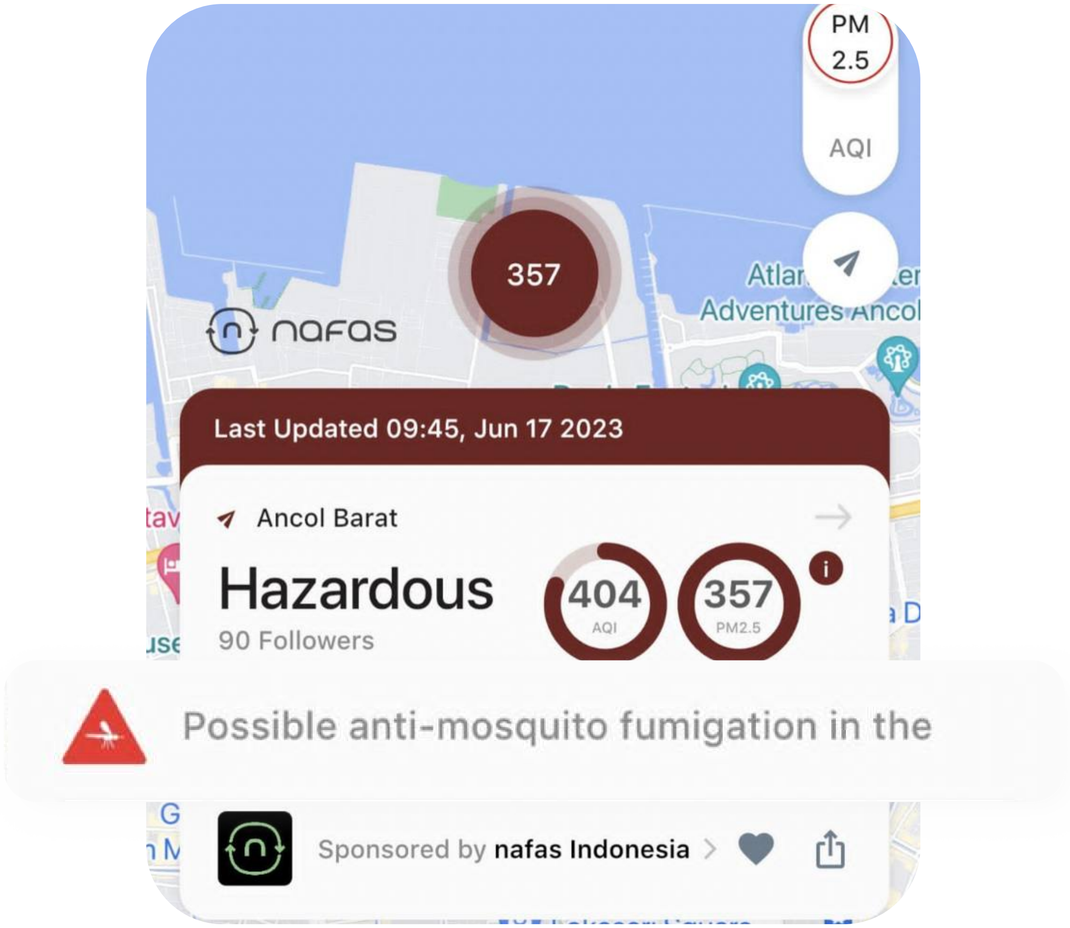
Polusi yang disebabkan **fogging nyamuk** biasanya menyebabkan PM2.5 melonjak drastis secara tiba-tiba (bahkan hingga ke kategori “Beracun”), namun akan kembali normal dalam waktu singkat.

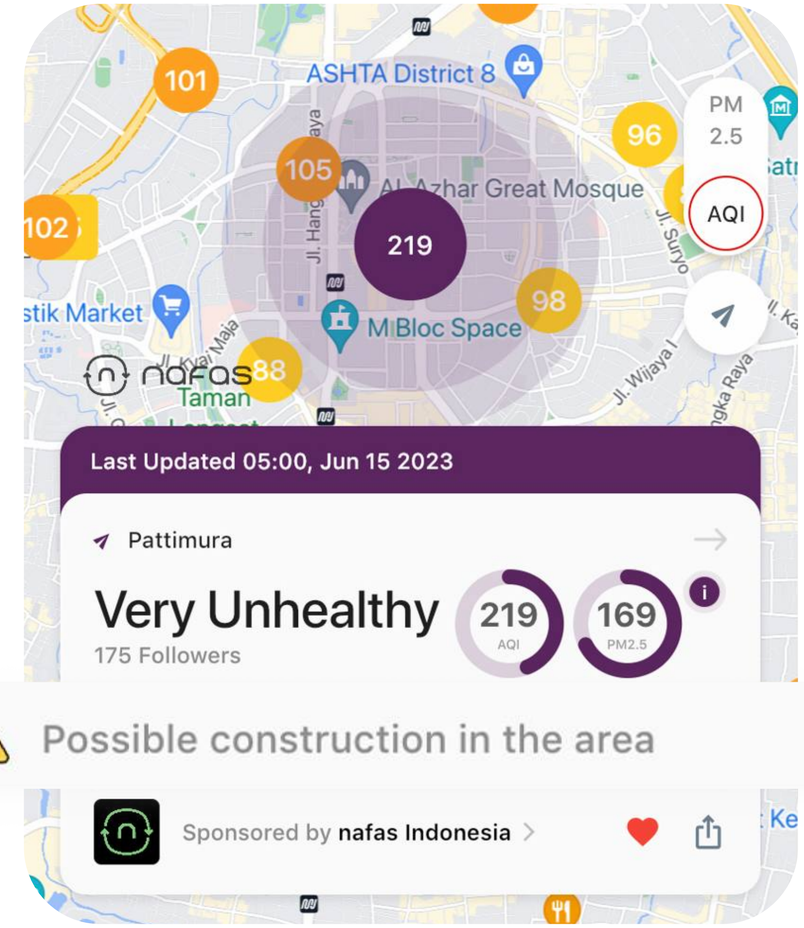
Sementara itu, **alert pembangunan (konstruksi)** cenderung bertahan lama dan terjadi di waktu-waktu yang relatif sama.

Misalnya aktivitas pembangunan di sekitar sensor Pattimura, Jakarta Selatan menyebabkan kenaikan PM2.5 secara rutin pada malam hingga pagi hari.



Alert
Nafas





03

kabar
di udara

November Shades of Grey

4 Nov ‘23, Jakarta

Foto: @Aldhifeb

8 Nov ‘23, Gondangdia

Foto: @elchantr3s

9 Nov’23, Kalibata

Foto: @jason_dharma

10 Nov ‘23, Jakarta

Foto: @WalterWisnu

10 Nov ‘23, Jakarta Pusat

Foto: @RahmetAbabil

25 Nov ‘23, Jakarta

Foto: @Matarael

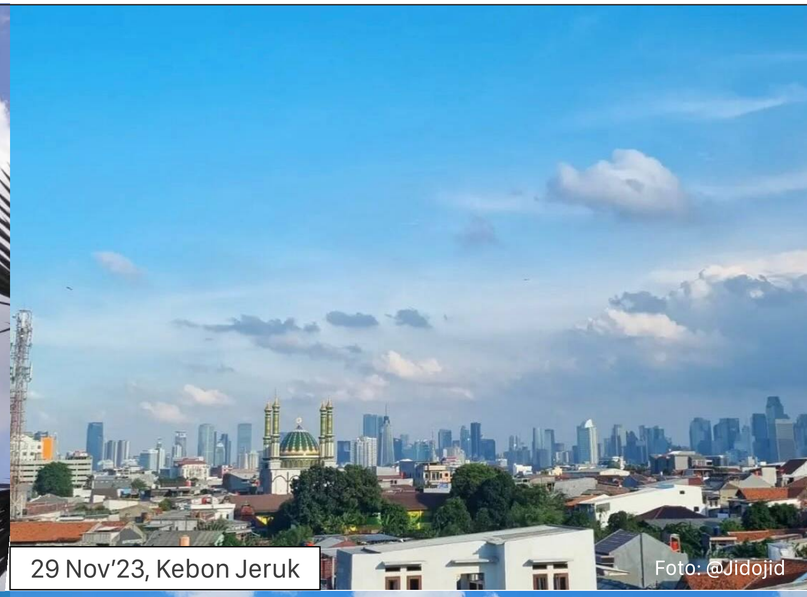
Blue Skies in November

28 Nov'23, Bintaro

Foto: @deadlyykisses

29 Nov '23, Pondok Indah

Foto: @nafasidn



29 Nov'23, Kebon Jeruk

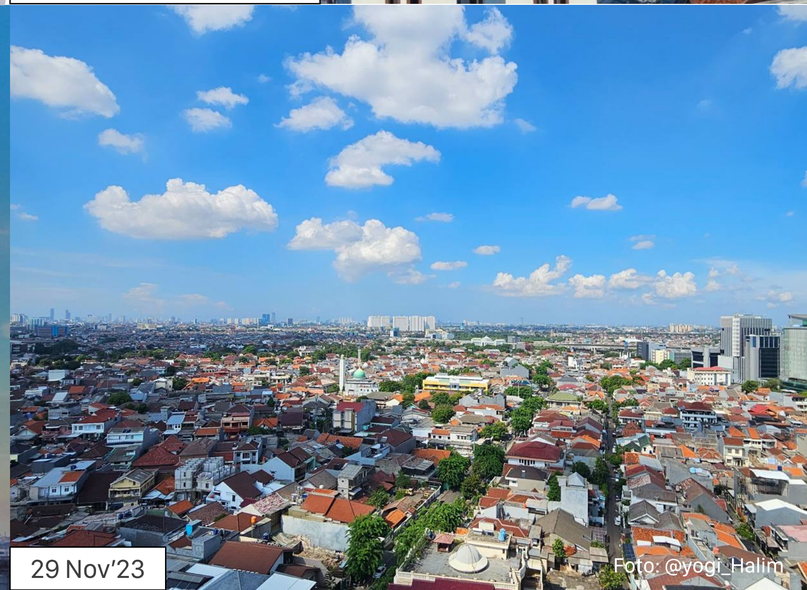
Foto: @Jidojid

29 Nov'23, Wahid Hasyim

Foto: @Fachmikurniawan

29 Nov'23, Grogol

Foto: @jfrAziz



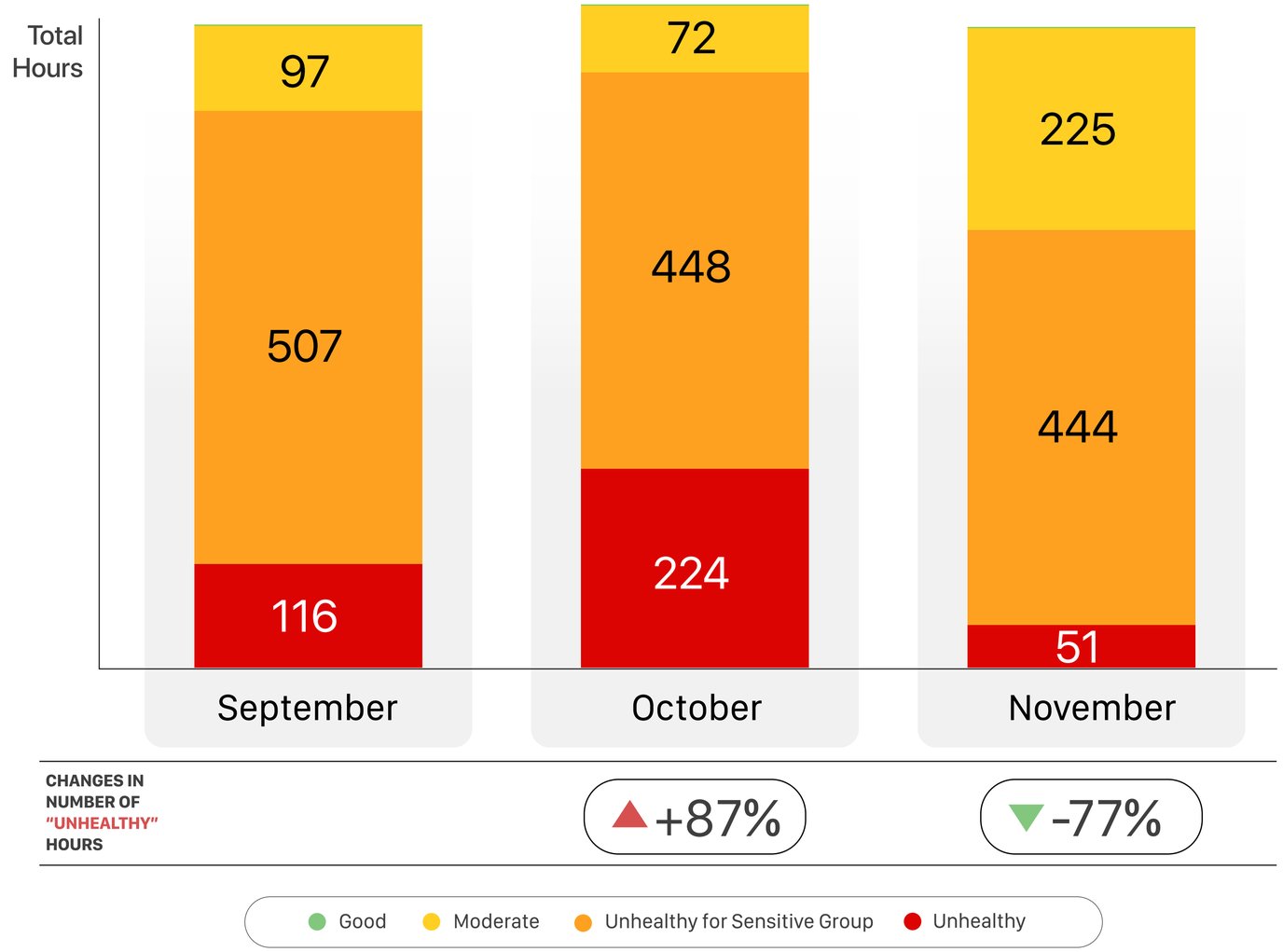
29 Nov'23

Foto: @yogi_Halim

INSIGHT
№ 1

Air Quality Slightly Improves, Although Unhealthy Air Periods for Sensitive Groups Still Predominate

With the onset of the rainy season, there's been a slight increase in the occurrence of moderate or fairly good air quality. The frequency of unhealthy air quality has also decreased by 77%.



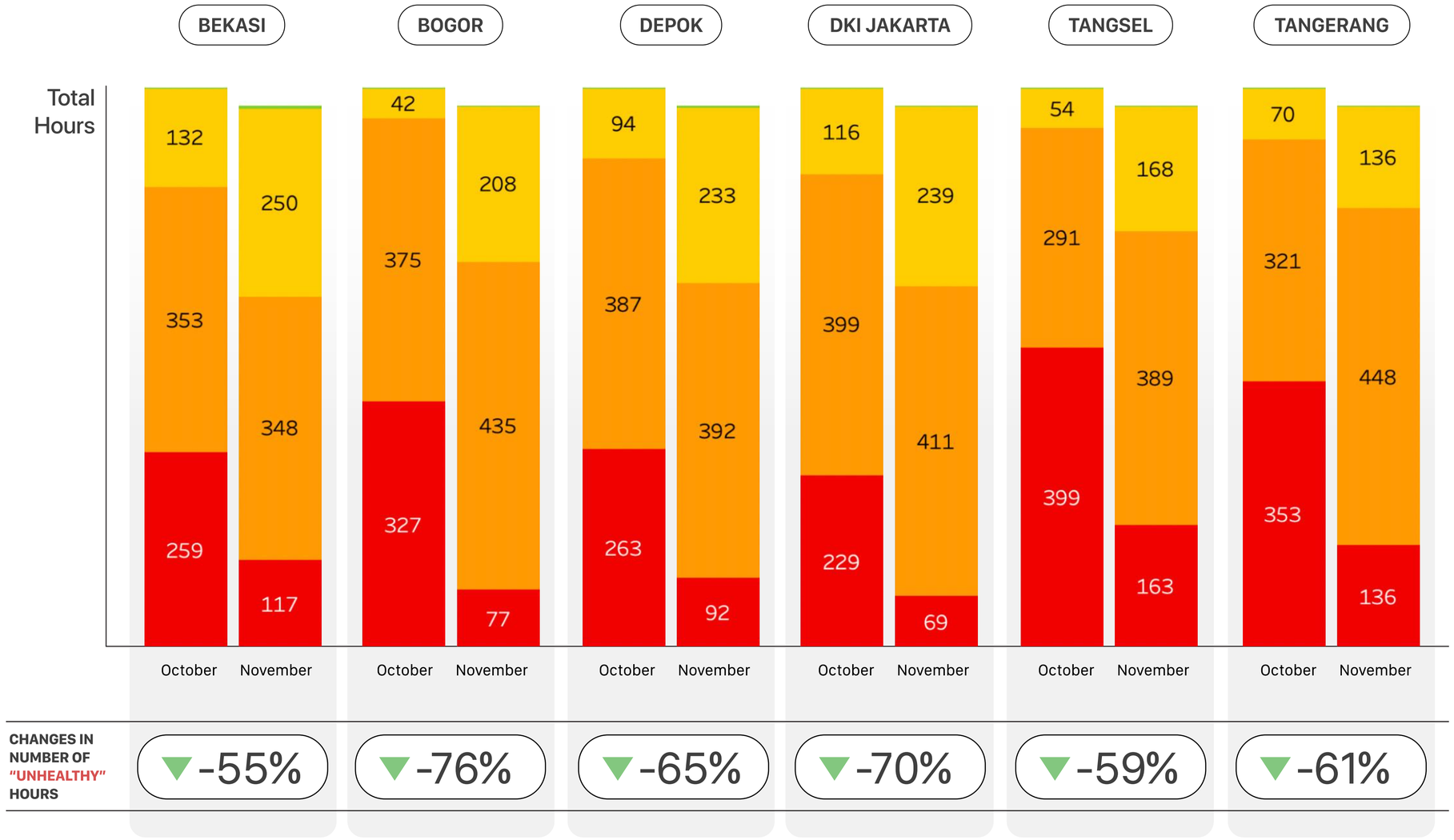
*A slight difference occurs due to the number of days in each month.

INSIGHT
№ 1

Unhealthy Air Levels in Jabodetabek Show a Unified Decline

There's been a noticeable decrease in unhealthy air quality compared to the previous month, indicating a gradual reduction in high pollution spikes. However, this doesn't mean the air quality is completely clean, as the entire Jabodetabek region still faces the threat of unhealthy air quality, particularly for sensitive groups.

- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy



*A slight difference occurs due to the number of days in each month.

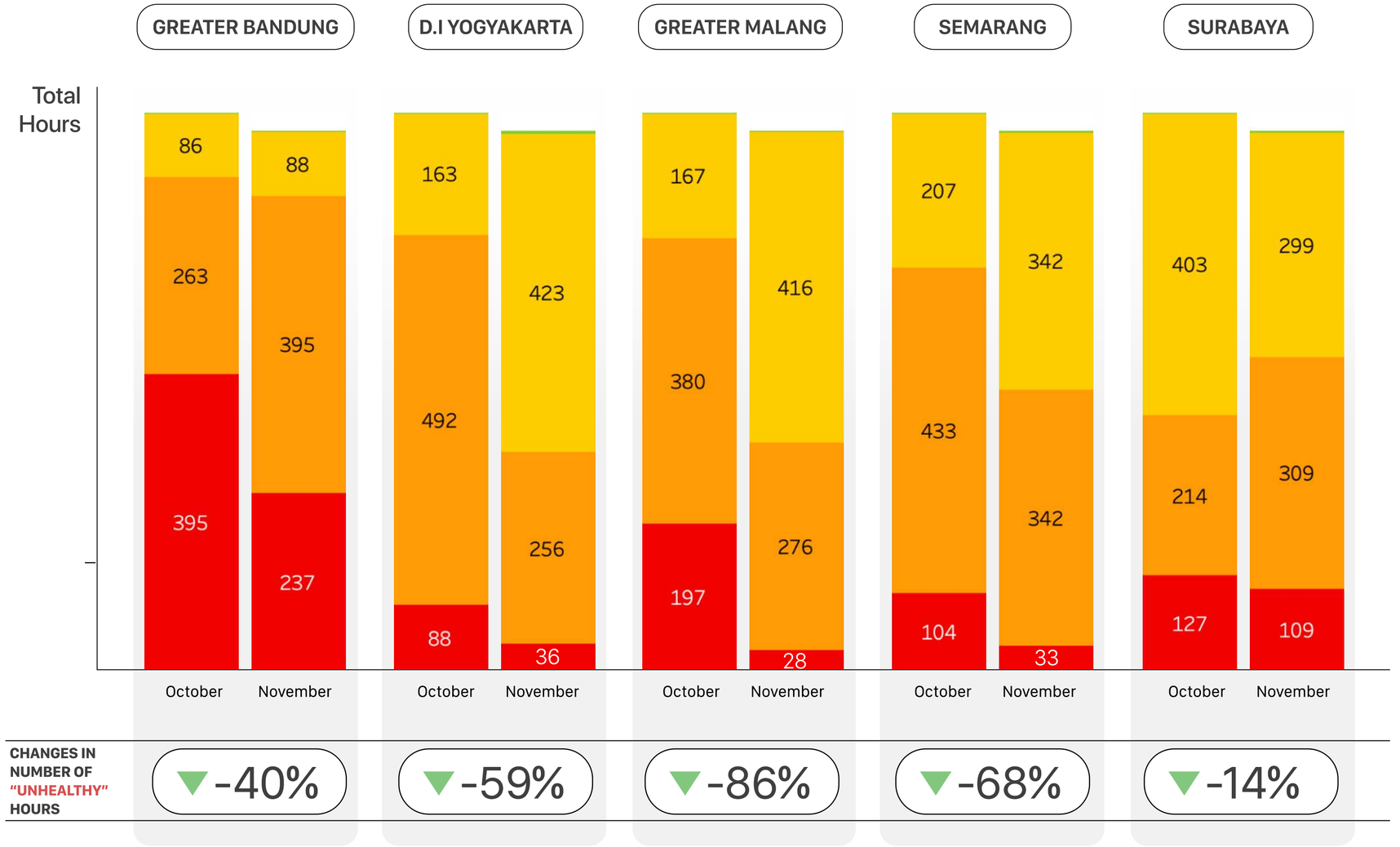
INSIGHT
№ 1

Greater Malang Records the Highest Decrease in Pollution

Among regions outside Jabodetabek, Greater Malang ranks first in experiencing the most significant decrease in high pollution ('Unhealthy' air quality) throughout November.

While not as extensive as Malang, other cities such as Greater Bandung, D.I. Yogyakarta, Semarang, and Surabaya have also witnessed a reduction in pollution, ranging between 14-68%.

- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy



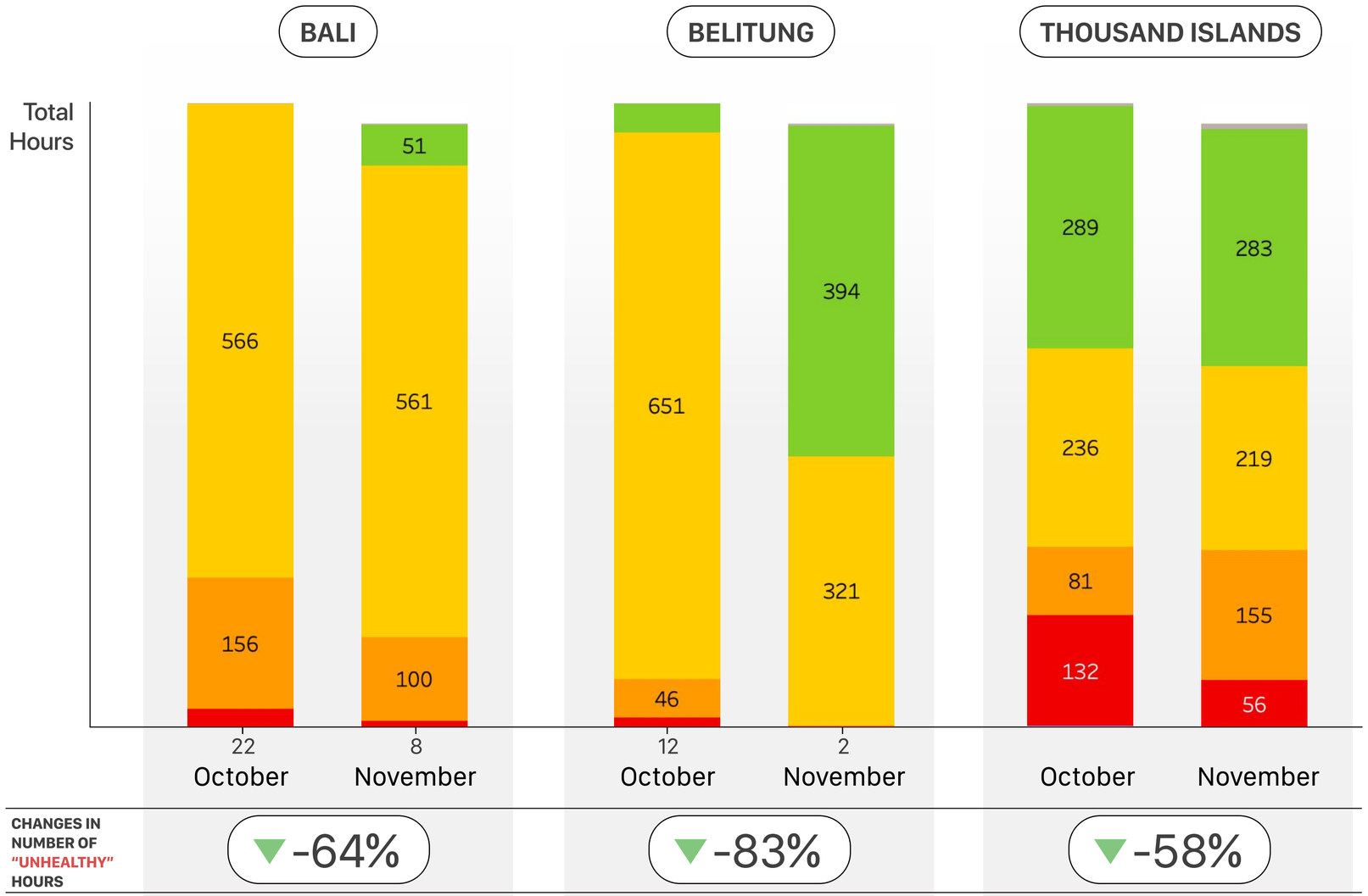
*A slight difference occurs due to the number of days in each month.

INSIGHT
№ 1

As the Year Ends, Fresh Air Enhances Tourist Areas

It's the perfect time to plan end-of-year vacations, as the three favorite tourist destinations of Bali, Belitung, and the Thousand Islands show a decrease in high pollution levels. Simultaneously, there's been an increase in clean air (good category), especially in Belitung.

- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy



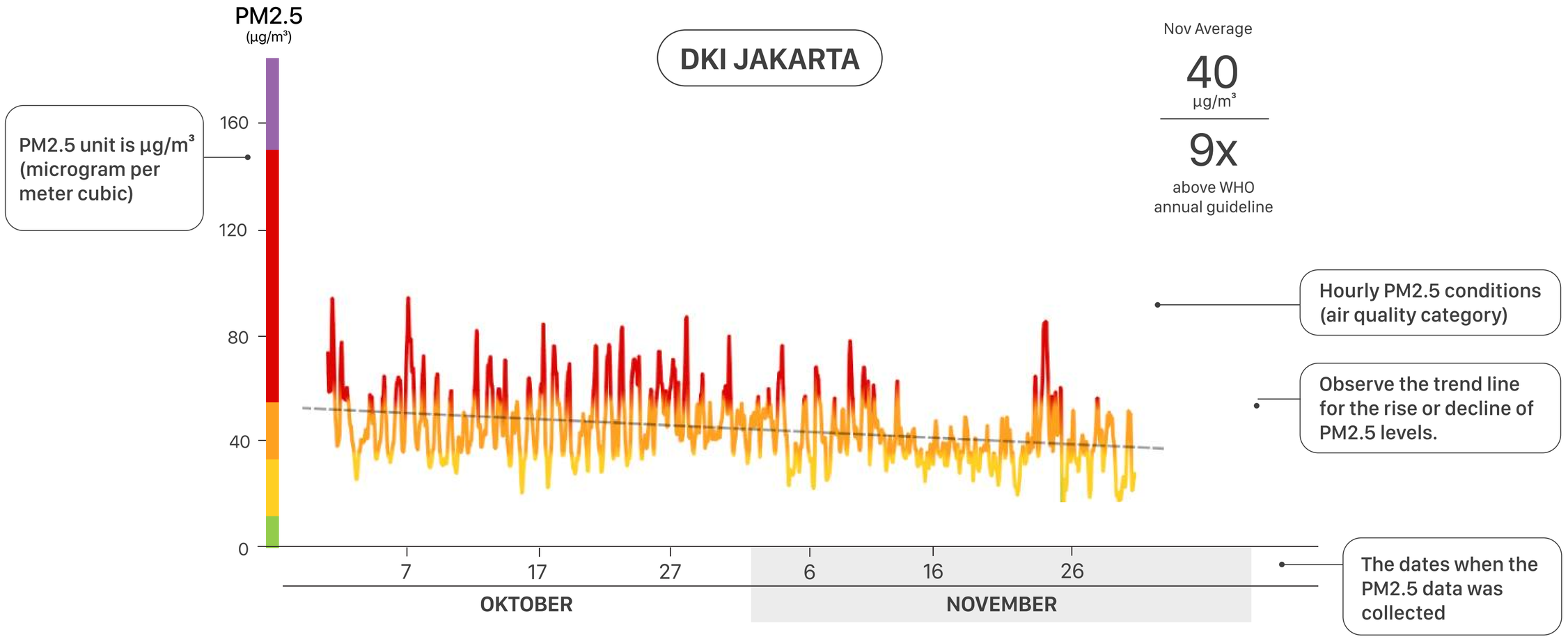
*A slight difference occurs due to the number of days in each month.

INSIGHT
№ 2

Pollution Levels in Jabodetabek Experience a Decline

nafas

Brief Guide to Understanding the Insight Data



INSIGHT
№ 2

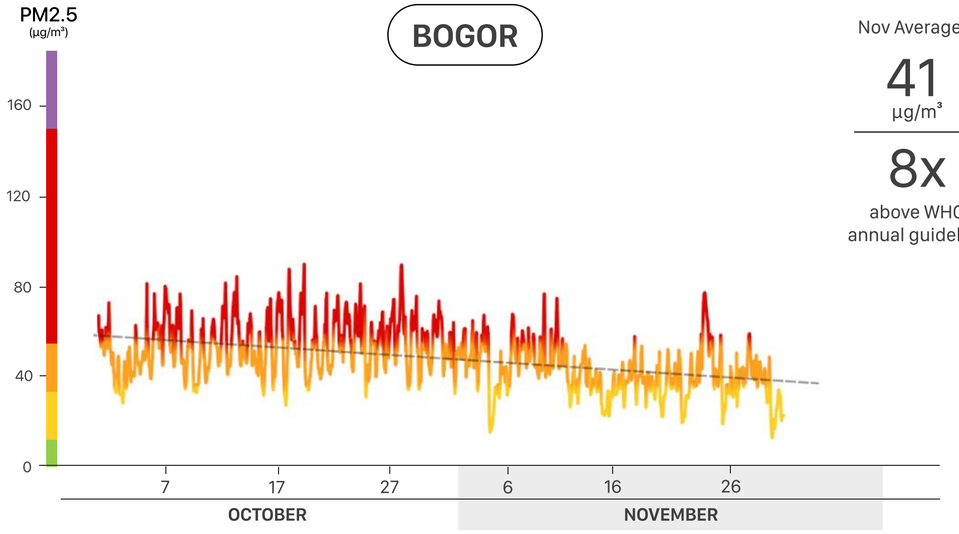
Jakarta Records Lowest Pollution in Jabodetabek for November

nafas

DKI JAKARTA

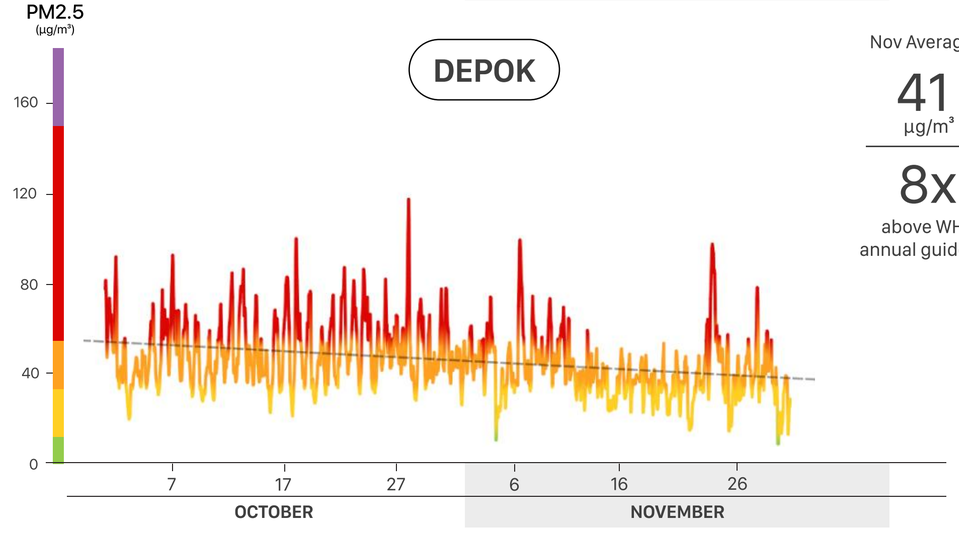
Nov Average
40
µg/m³
8x
above WHO
annual guideline

BOGOR



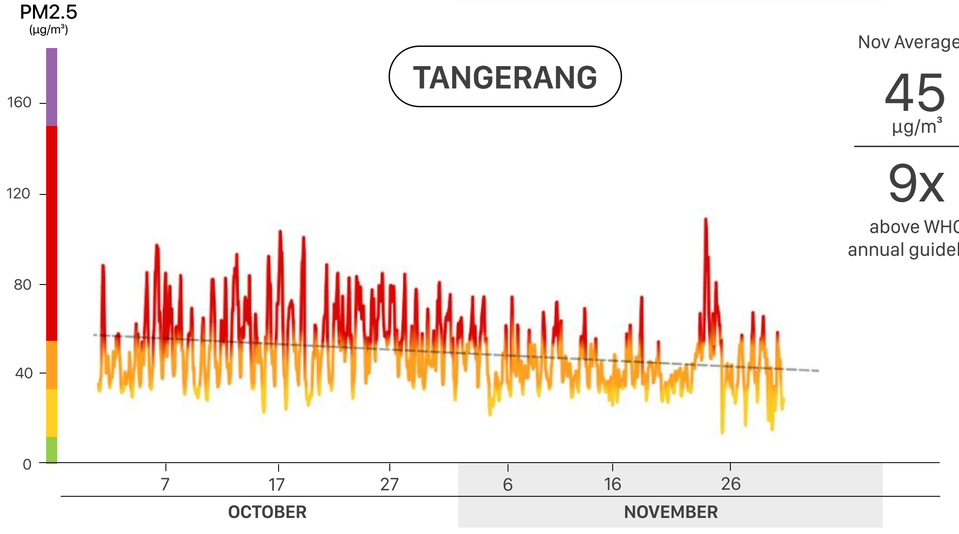
Nov Average
41
µg/m³
8x
above WHO
annual guideline

DEPOK



Nov Average
41
µg/m³
8x
above WHO
annual guideline

TANGERANG



Nov Average
45
µg/m³
9x
above WHO
annual guideline

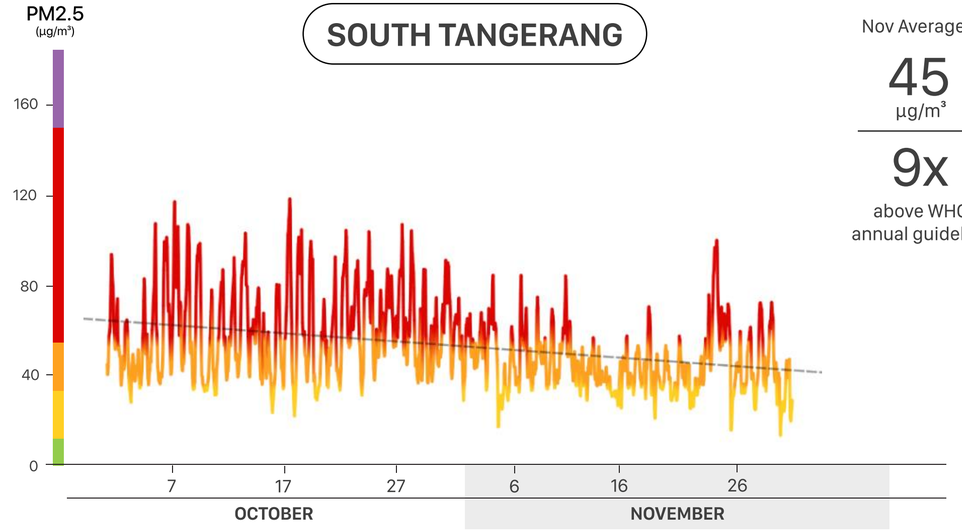
Good · Moderate · Unhealthy for Sensitive Groups · Unhealthy · Very Unhealthy

*) WHO Guideline = Annual exposure limits

INSIGHT
№ 2

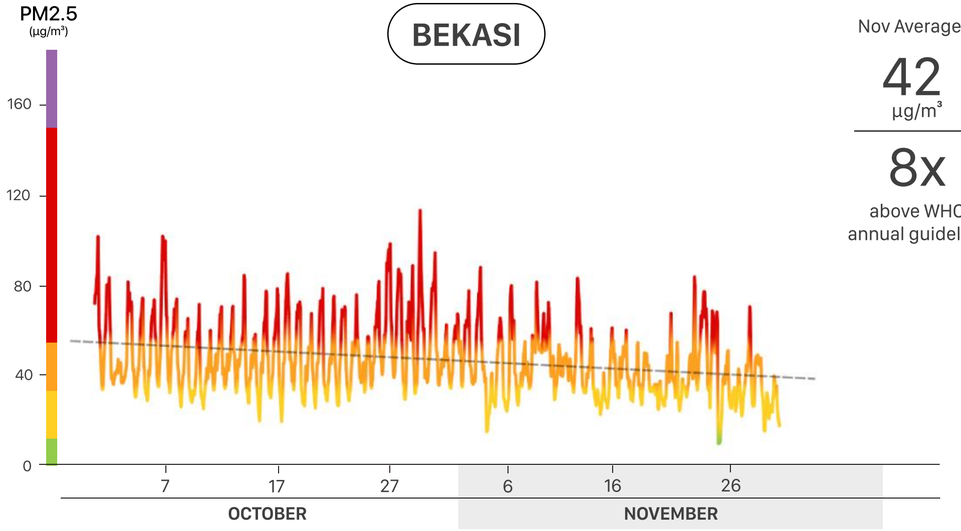
Pollution Decreases Across Regions as Year Ends

SOUTH TANGERANG



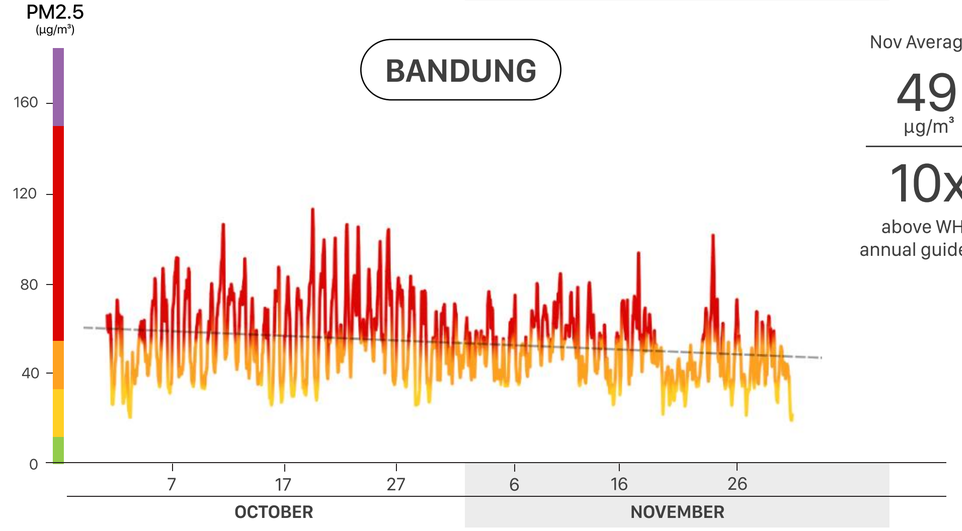
Nov Average
45
µg/m³
9x
above WHO
annual guideline

BEKASI



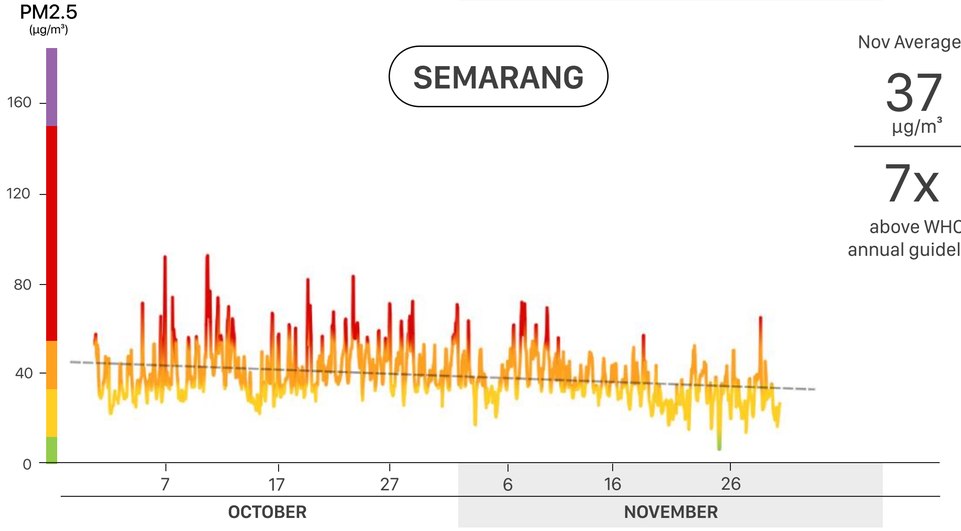
Nov Average
42
µg/m³
8x
above WHO
annual guideline

BANDUNG



Nov Average
49
µg/m³
10x
above WHO
annual guideline

SEMARANG



Nov Average
37
µg/m³
7x
above WHO
annual guideline

Good · Moderate · Unhealthy for Sensitive Groups · Unhealthy · Very Unhealthy

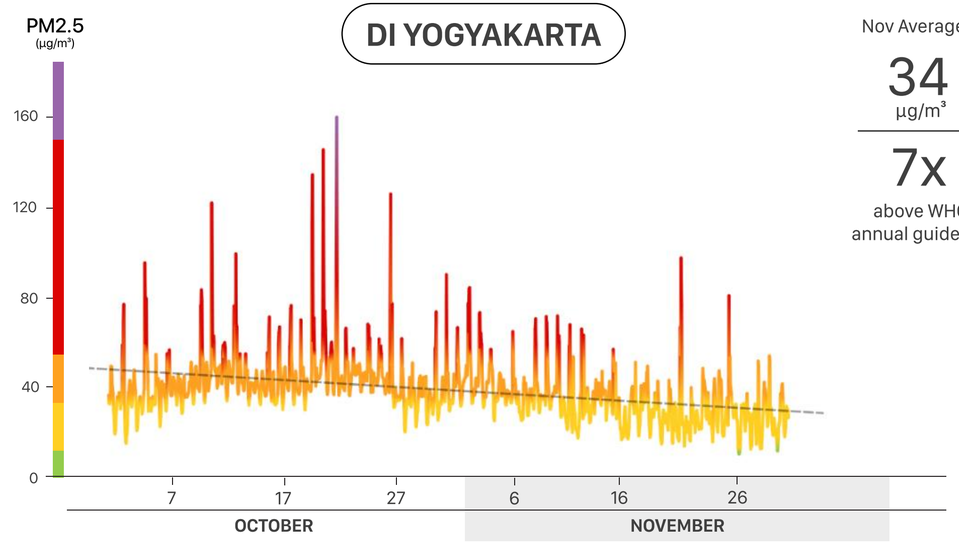
*) WHO Guideline = Annual exposure limits

INSIGHT
№ 2

Greater Malang Sees Drastic Pollution Drop in November

nafas

DI YOGYAKARTA

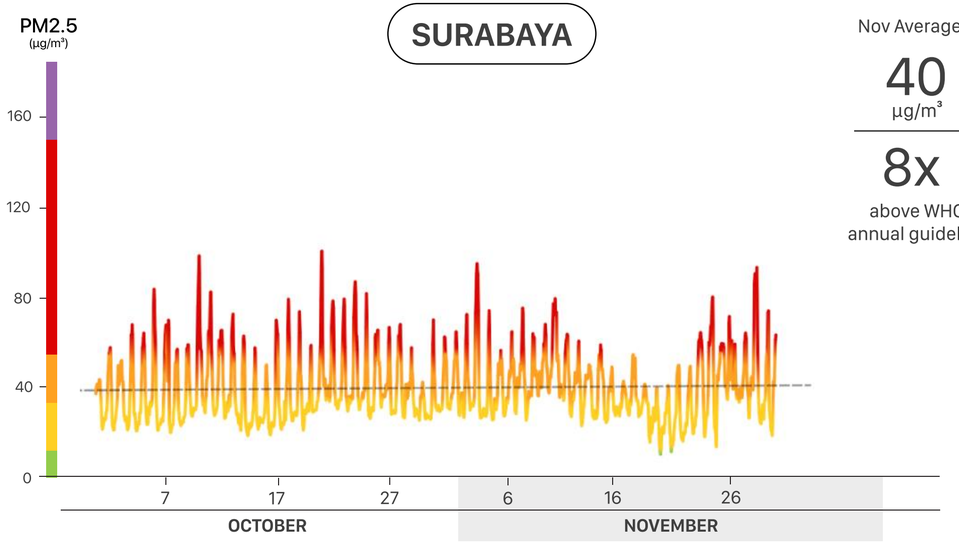


Nov Average

34
µg/m³

7x
above WHO
annual guideline

SURABAYA

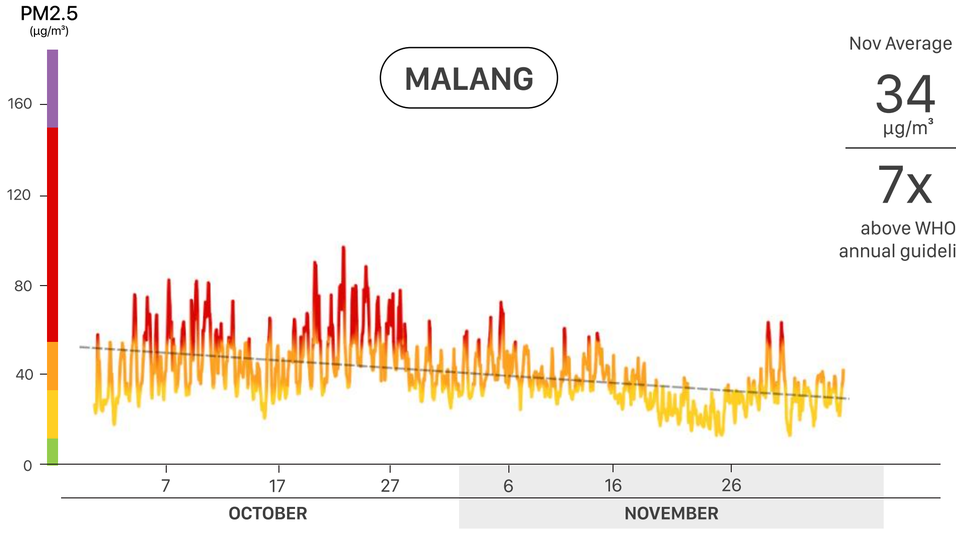


Nov Average

40
µg/m³

8x
above WHO
annual guideline

MALANG



Nov Average

34
µg/m³

7x
above WHO
annual guideline

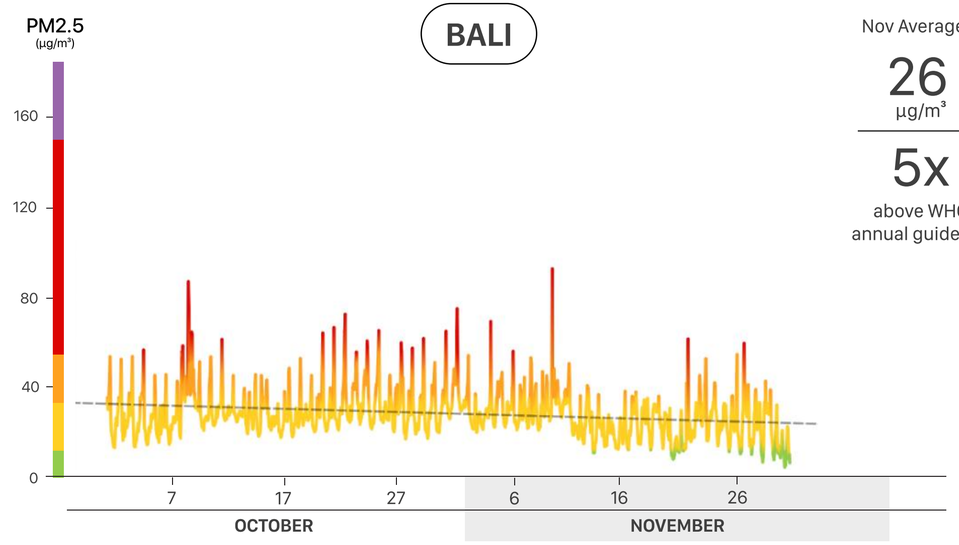
Good · Moderate · Unhealthy for Sensitive Groups · Unhealthy · Very Unhealthy

*) WHO Guideline = Annual exposure limits

INSIGHT
№ 2

Belitung's Air Quality Tops in November

BALI

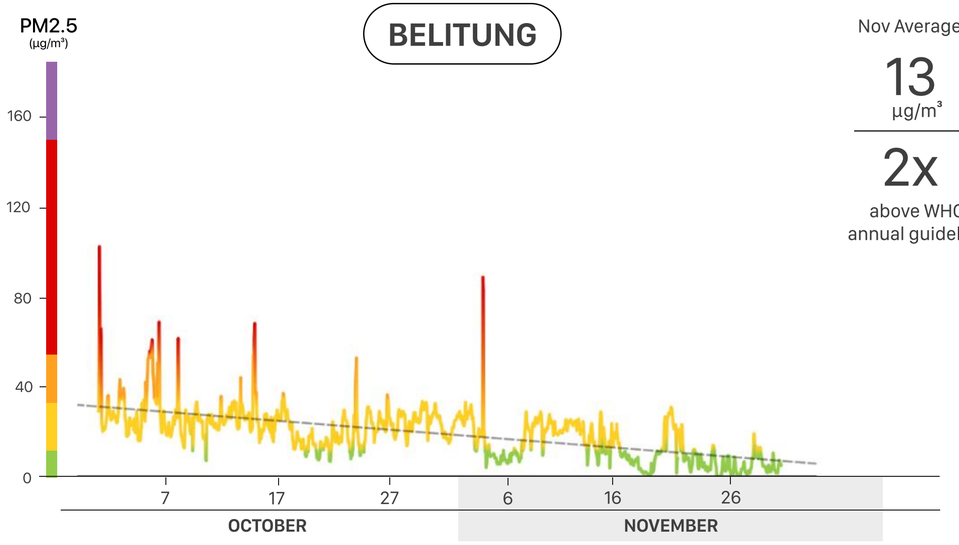


Nov Average

26
µg/m³

5x
above WHO
annual guideline

BELITUNG

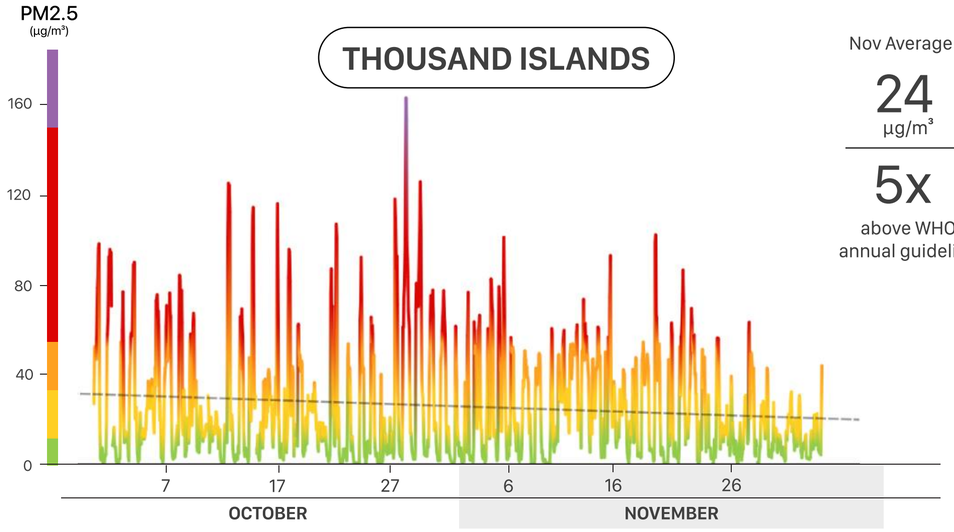


Nov Average

13
µg/m³

2x
above WHO
annual guideline

THOUSAND ISLANDS



Nov Average

24
µg/m³

5x
above WHO
annual guideline

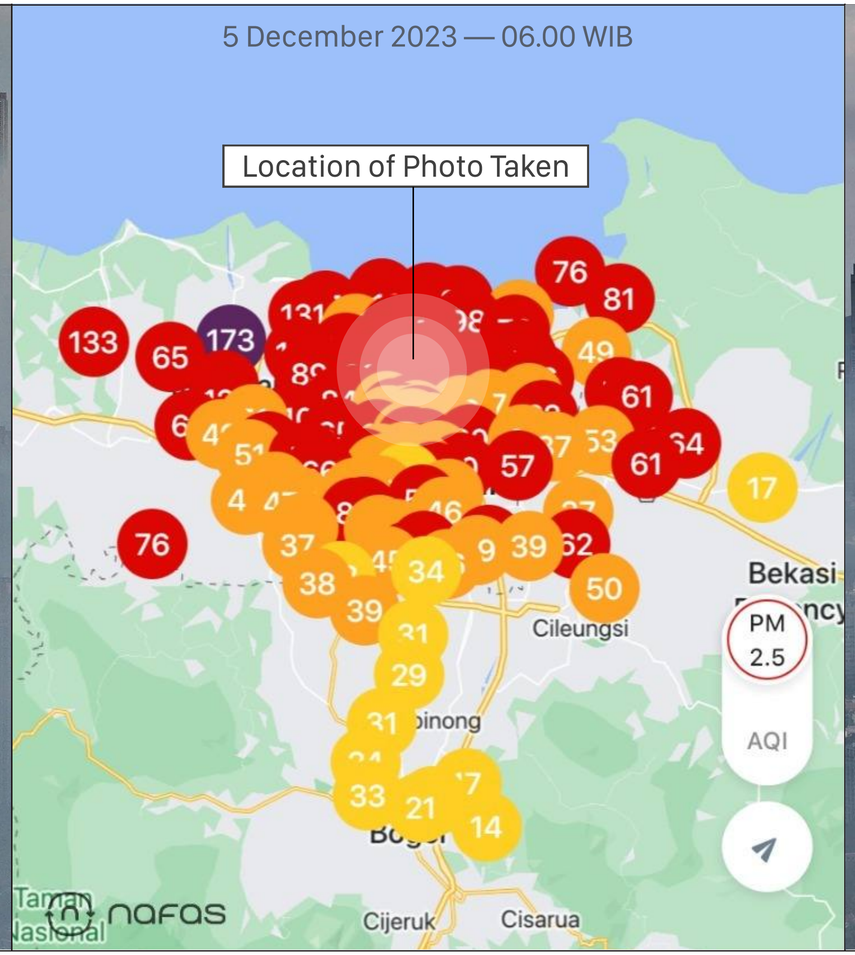
Good · Moderate · Unhealthy for Sensitive Groups · Unhealthy · Very Unhealthy

*) WHO Guideline = Annual exposure limits

INSIGHT
№ 3

Is This Fog or Pollution?

Photo of skyscrapers in Jakarta surrounded by fog went viral on Tuesday, December 5 at 06.00. The owner of the photo said AQI was 165-177 when the photo was taken. It looks like fog, but the color tends to be gray. At the same time, pollution tends to be high



Good Modetate Unhealthy for Sensitive Groups Unhealthy Very Unhealthy

INSIGHT
№ 3

Smoggy Jakarta: Foggy and Highly Polluted

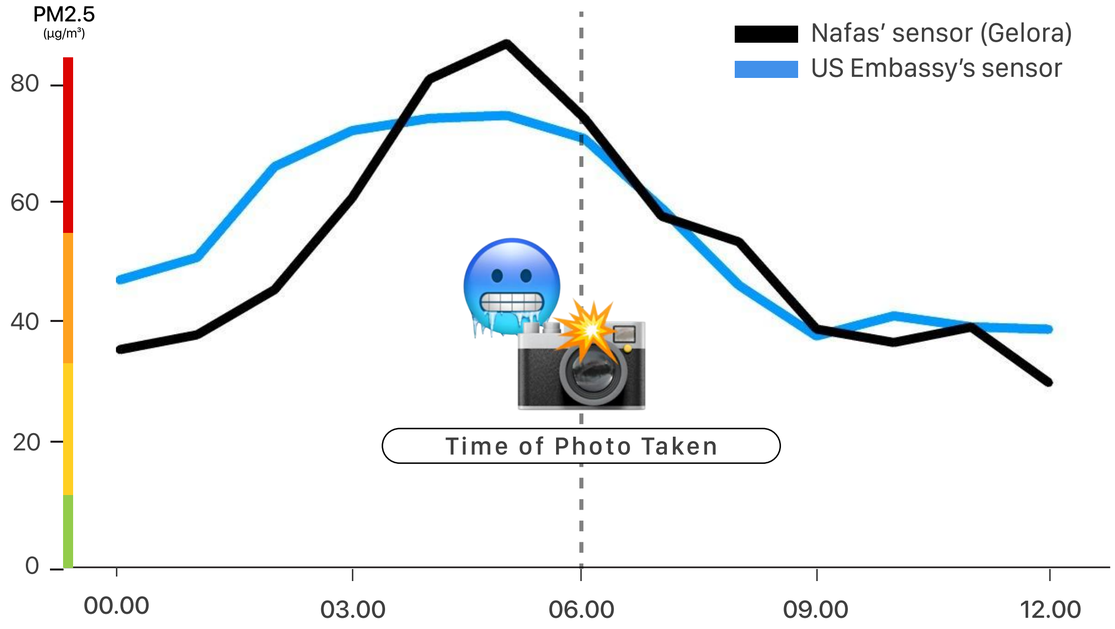
The results of the Nafas team's analysis show that when the photo was taken**, pollution levels that morning were quite high in several areas of Jakarta**, with an average hourly PM2.5 of **55 µg/m³ (Unhealthy for Sensitive Groups) to 90 µg/m³ (Unhealthy).**

The fog photographed is 'fog' mixed with pollutants. Air pollution was observed to be quite high, this indicates that pollutants are trapped near the surface supported by inversion layer conditions which often appear in the morning.

PM2.5 5 December 2023, 03.00 - 09.00 WIB

	03.00	04.00	05.00	06.00	07.00	08.00	09.00
South Jakarta	65	65	62	55	46	43	33
Central Jakarta	54	61	70	78	71	45	33
East Jakarta	62	66	67	62	60	58	40
North Jakarta	50	63	70	78	75	58	38
West Jakarta	79	94	98	90	80	58	38

PM2.5 5 December 2023, 00.00 - 12.00 WIB



The results of monitoring the US Embassy's reference monitor (AQMS) and the Nafas sensor closest to the photo location showed similar results.

*The distance between AQMS and Nafas' sensor is 2.5 KM

Good · Modetate · Unhealthy for Sensitive Groups · Unhealthy · Very Unhealthy

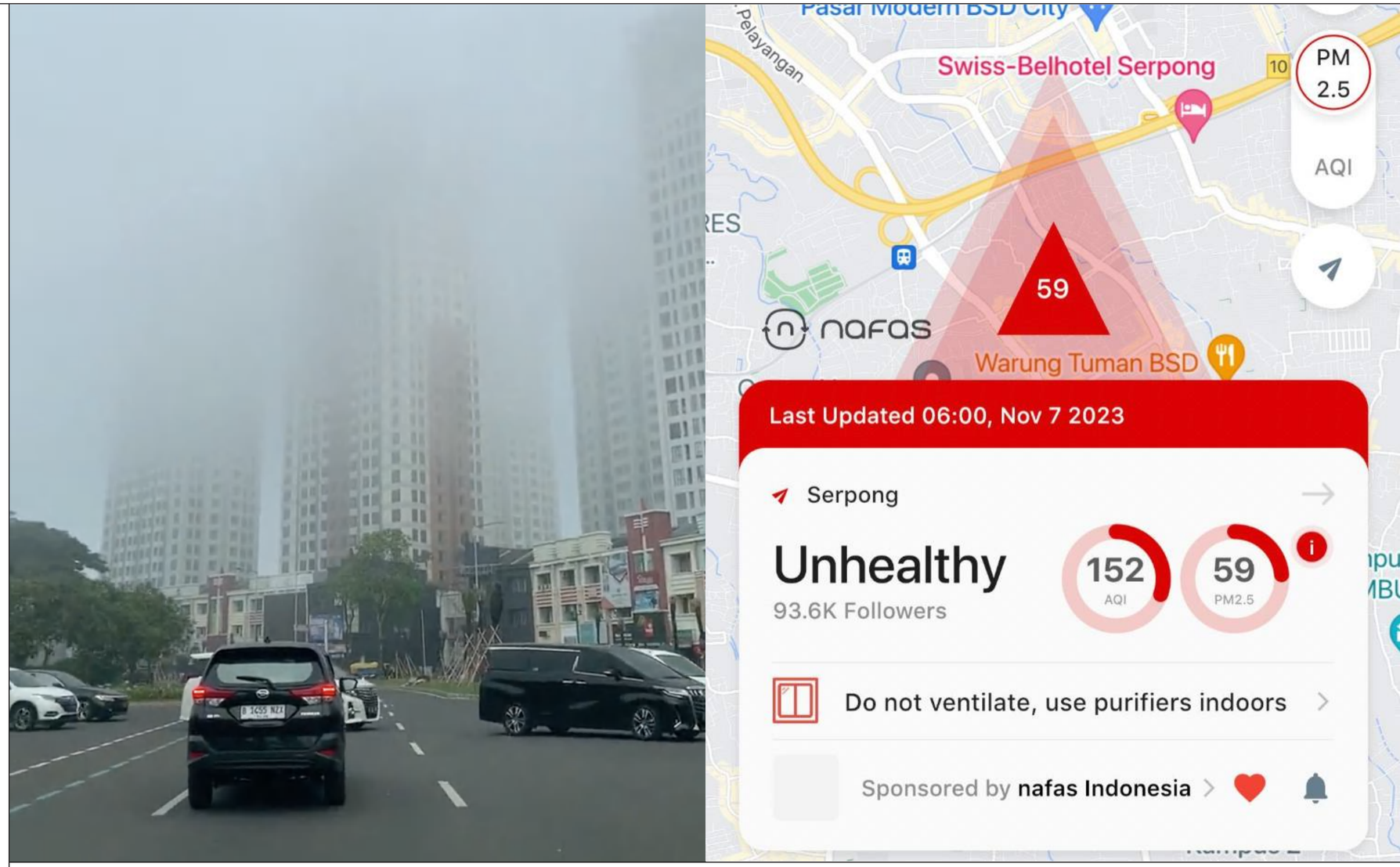
INSIGHT
№ 4

Tangerang Fog Conceals Pollution

A viral report from residents highlighted fog enveloping areas in Tangerang (BSD, Lippo Karawaci, and Gading Serpong) on Tuesday morning (7/11). Simultaneously, the Nafas sensor in Serpong indicated high PM2.5 pollution levels at 59 ug/m3, categorized as Unhealthy.

So, is it fog or pollution?

"The fog's white color suggests it's likely water vapor, not smoke haze. However, fog can still trap pollutants," explains Dennish Ari (@encepdenis), a Weather & Climate Risk Analyst.



Good · Modetate · Unhealthy for Sensitive Groups · Unhealthy · Very Unhealthy

INSIGHT
№ 5

A Tale of Two Skies

nafas

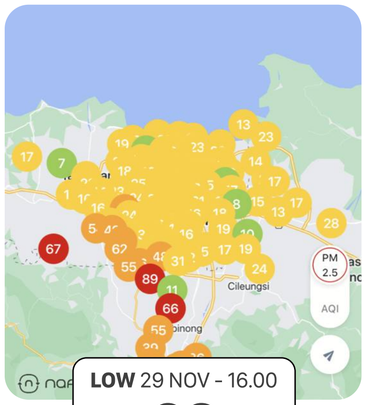
Once again, viral photos showcase the contrasting state of Jakarta's skies within just a few days. A sky that was initially bright blue turned grey with dense pollution smog two days later.

INSIGHT
№ 5

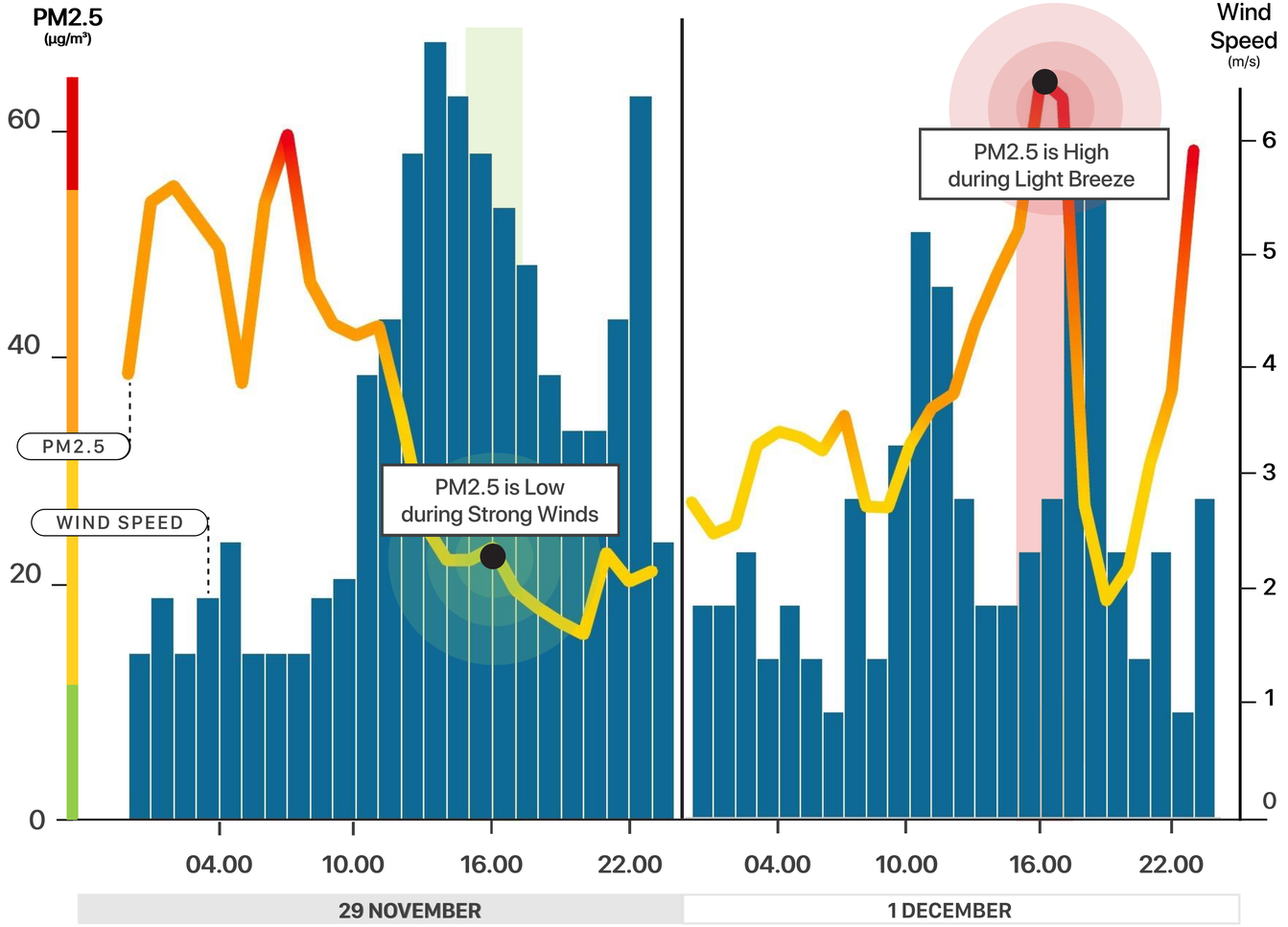
A Tale of Two Skies

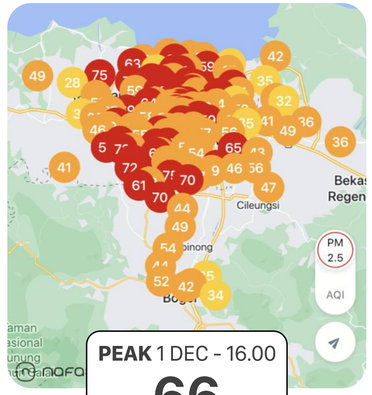
nafas

In just two days, pollution worsens threefold due to weaker winds.



LOW 29 NOV - 16.00
23
µg/m³





PEAK 1 DEC - 16.00
66
µg/m³

Good Modetate Unhealthy for Sensitive Groups Unhealthy Very Unhealthy

INSIGHT
№ 5

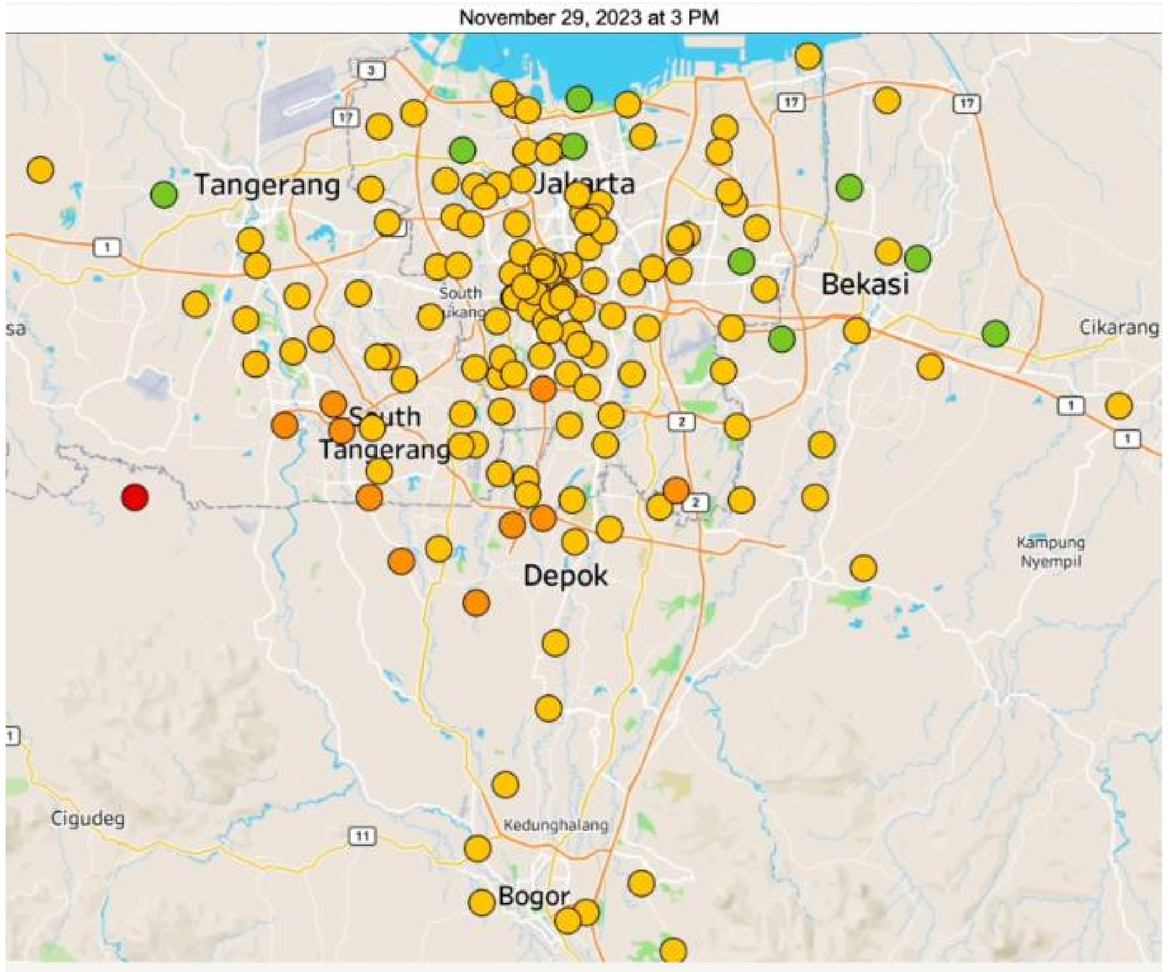
A Tale of Two Skies

The weakening of winds during this period significantly influenced the rapid deterioration in pollution levels.

Wind plays a crucial role in the dispersal of pollutants. While it can help clear air pollution from an area, it can also 'contribute' to air pollution in another.

Check out the sensors timelapse here.

Changs in PM2.5 from 29 November - 3 December 2023



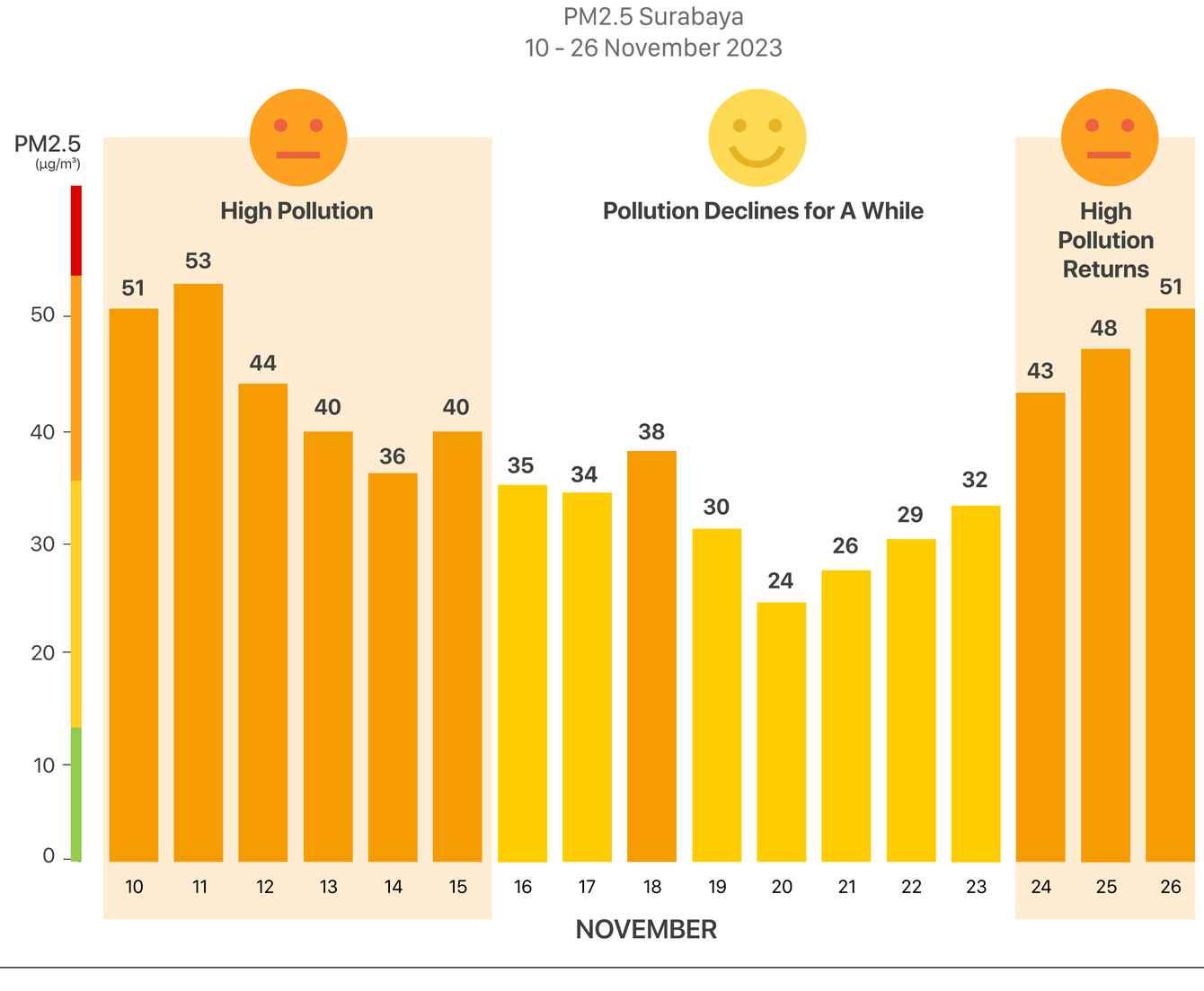
INSIGHT
№ 6

"Surabaya 'City of 1000 Parks': Expectation vs. Reality

Expectation: 🥰
Reality: 😁

Air quality in Surabaya improved at the start of November, but pollution levels rose again in the second and fourth weeks. According to Nafas monitoring, pollution doubled in the last week of the month.

As long as there are numerous and unaddressed pollution sources, the presence of many parks cannot solve the pollution problem. Plants can absorb gaseous pollutants, but particulate pollution like PM2.5 remains freely in the air.



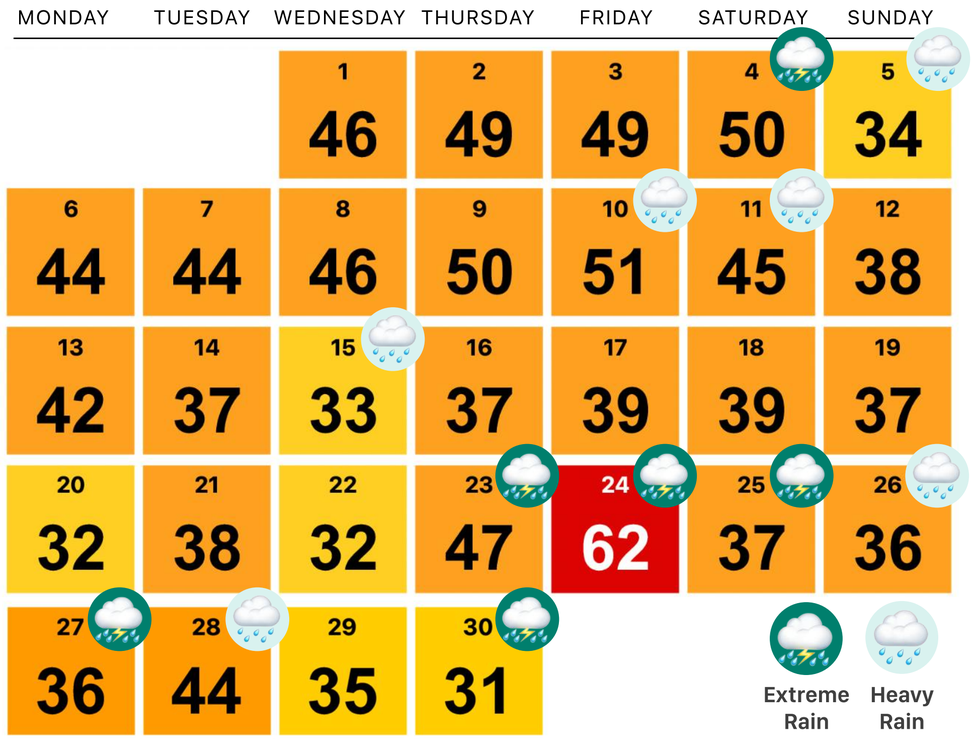
INSIGHT
№ 7

Why Is There Still Pollution After the Rain?

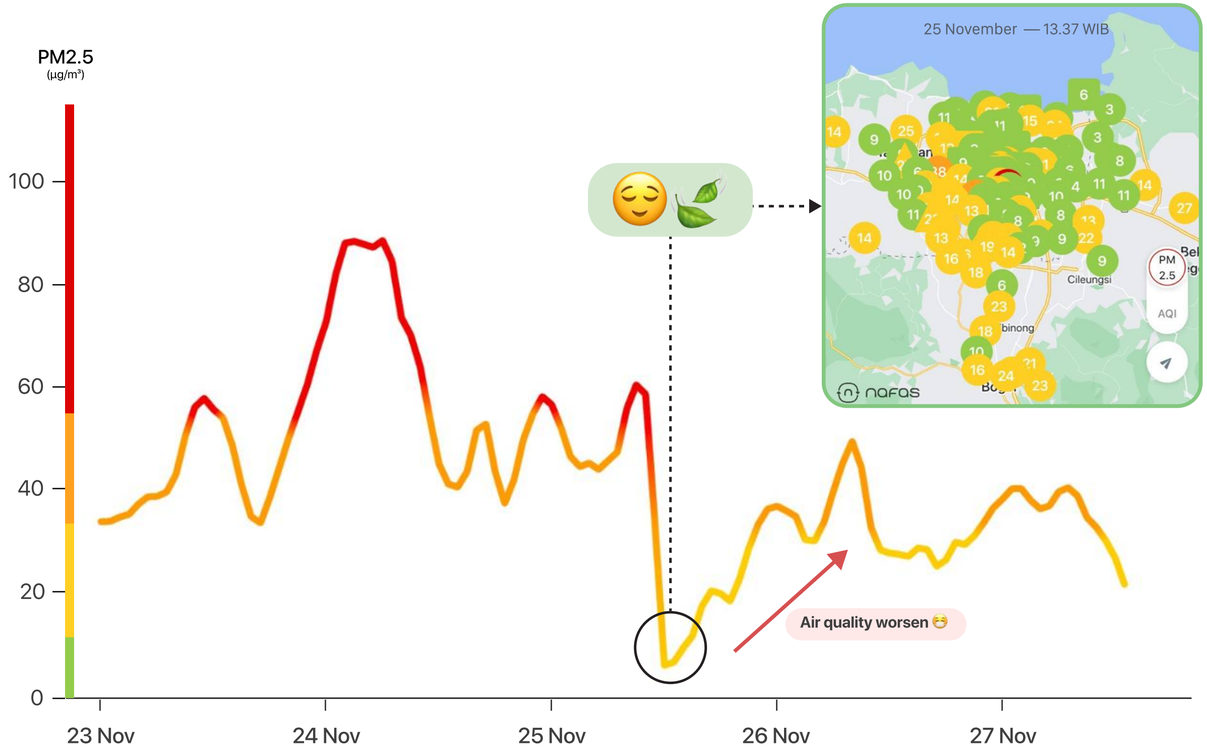
In late November, Jabodetabek began experiencing frequent rains, including extreme rainfalls. The air quality on rainy days varied, ranging from moderately good to unhealthy, influenced by the timing of the rain, the extent of the rain clouds, and wind conditions.

According to Nafas monitoring, air quality slowly worsened from November 25, quadrupling in just 12 hours after the rain. This indicates that rain can only 'clean' the air temporarily.

PM2.5 and Daily Rainfall (November 2023)



PM2.5 Jabodetabek 23-27 November 2023



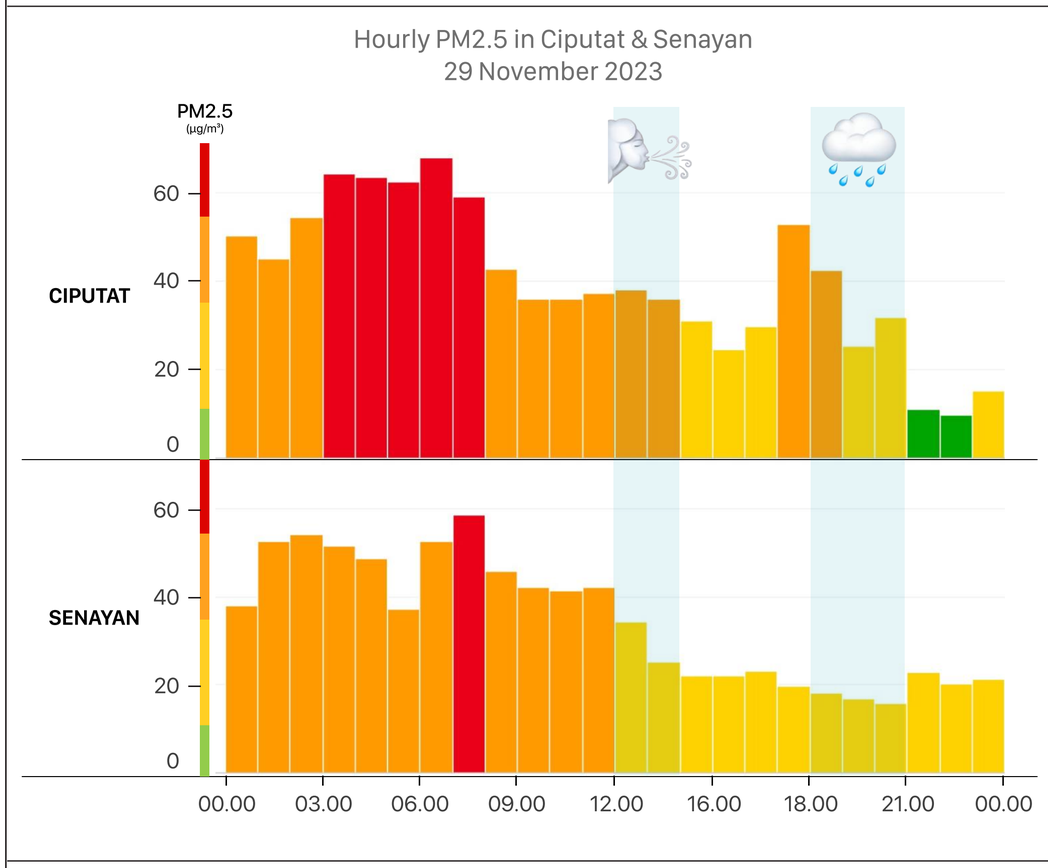
Good · Modetate · Unhealthy for Sensitive Groups · Unhealthy · Very Unhealthy

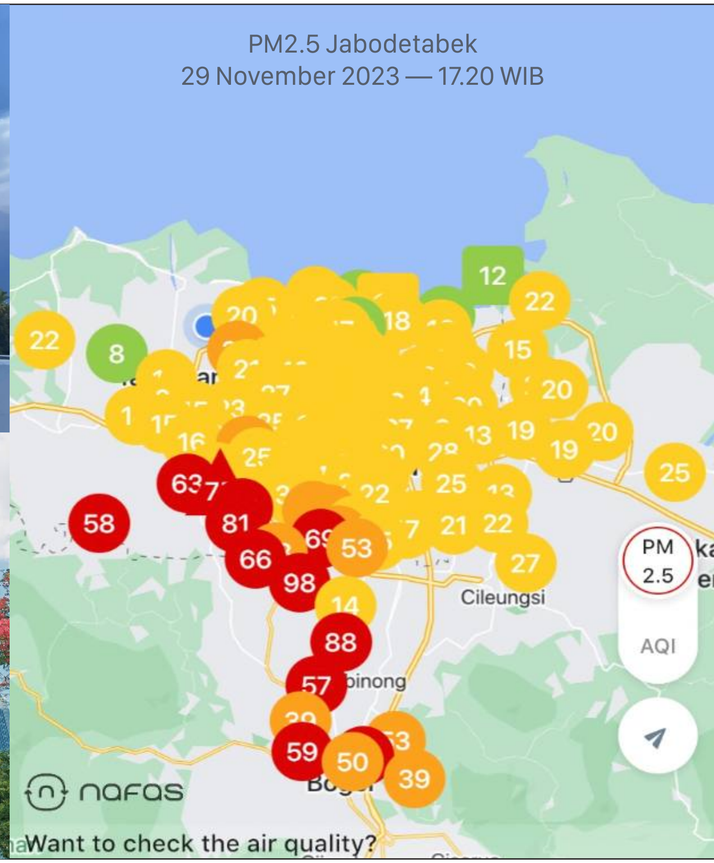
INSIGHT
№ 8

Clear Skies in DKI, High Pollution in Rainy Tangsel

On November 29, while DKI Jakarta enjoyed clear skies, South Tangerang was under grey clouds! As many residents noted the clear weather in DKI Jakarta, Tangsel and Tangerang experienced grey, overcast skies. The air quality there was 85% worse compared to DKI during the evening rain in Tangsel.

Why was the air better in the non-rainy area at the same time? This is due to the rain cloud system 'drawing' winds from various directions. Consequently, pollutants accumulated around the rain cloud areas were detected at high levels. Air quality in Ciputat improved significantly at night after the rain.





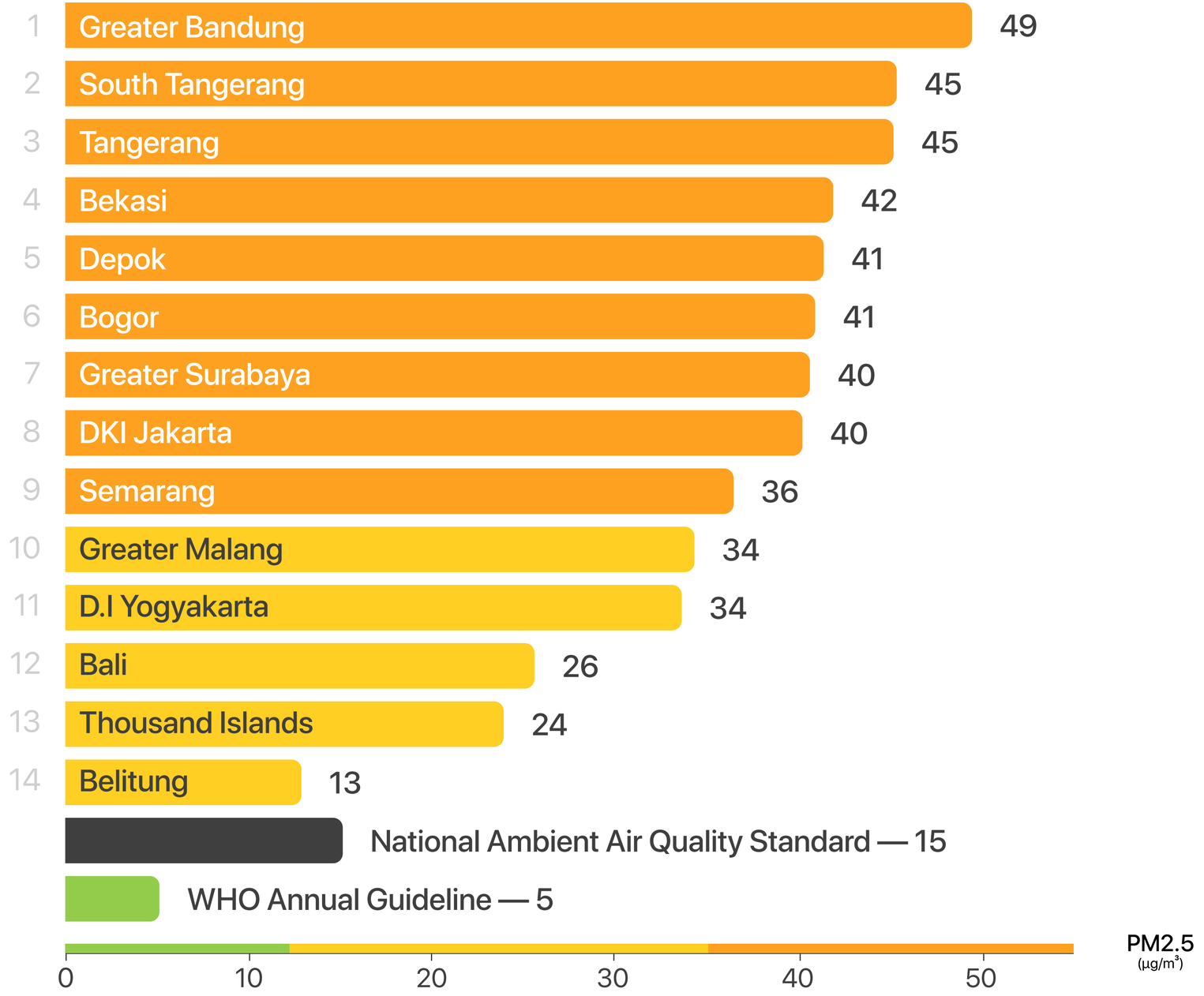
Good · Modetate · Unhealthy for Sensitive Groups · Unhealthy · Very Unhealthy

04

sekilas kota

City Rankings

This ranking is determined by the cities with the highest PM2.5 concentration levels in November 2023.



- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

Greater Bandung

November 2023

Embarking on the top of the pollution rankings, the Greater Bandung's air tend to be unhealthy. Two areas with the most unhealthy PM2.5 concentrations are Ciroyom, Bandung City, with 60 µg/m³, and Karangmekar, Cimahi, with 58 µg/m³.

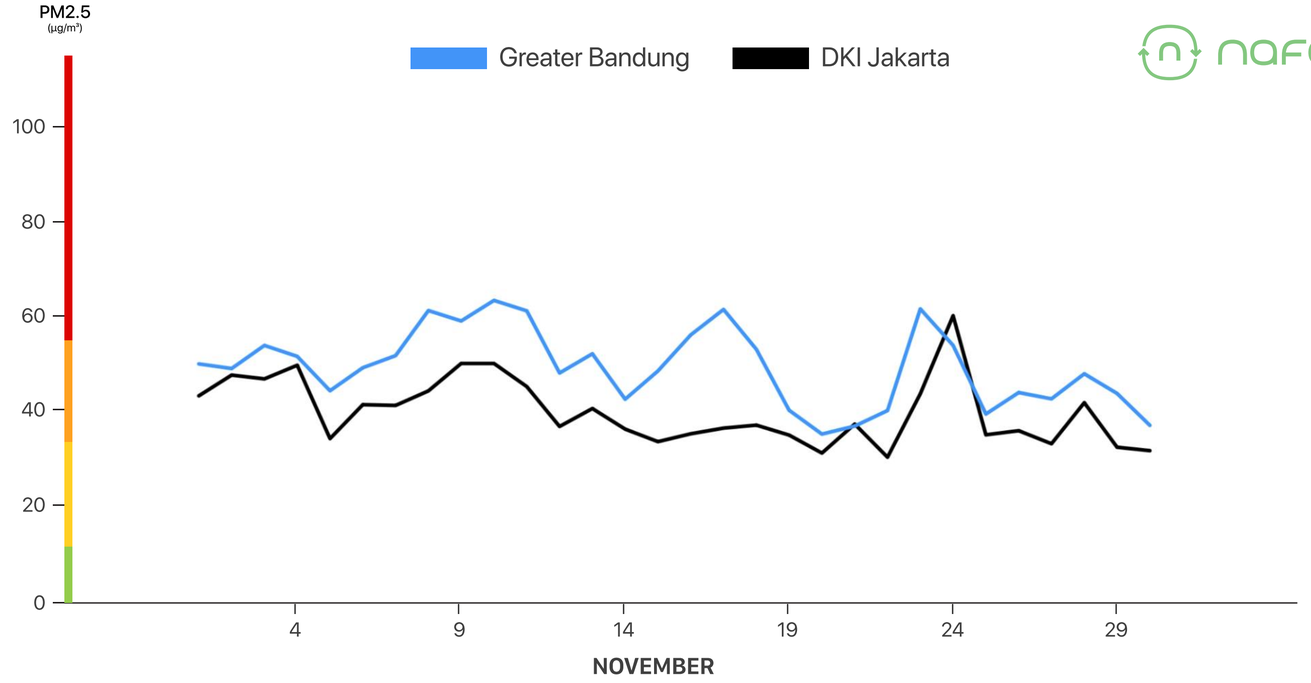
Unfortunately, there is no area with sufficiently good air quality within the Greater Bandung area during November 2023.

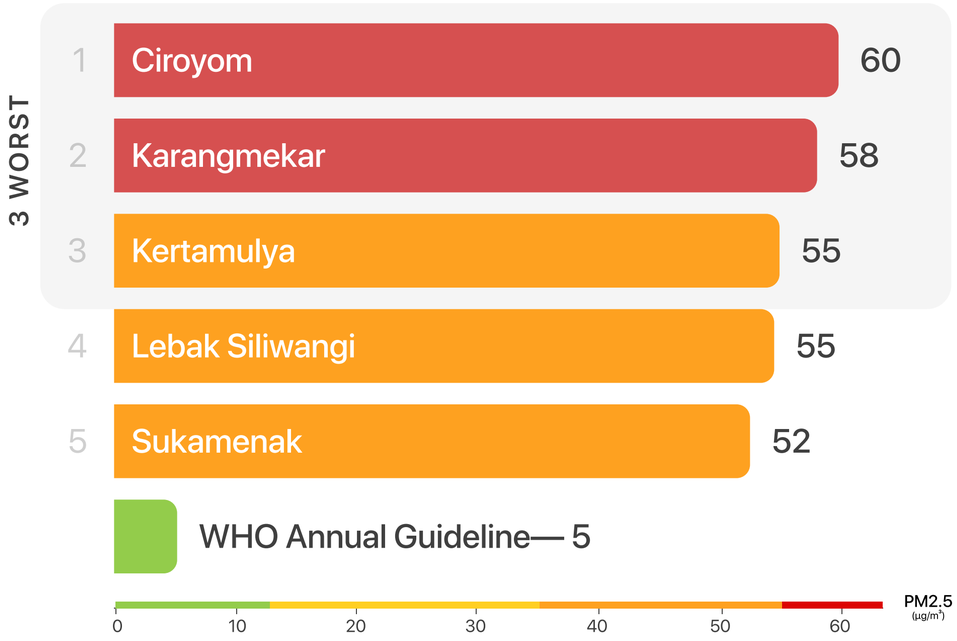
- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

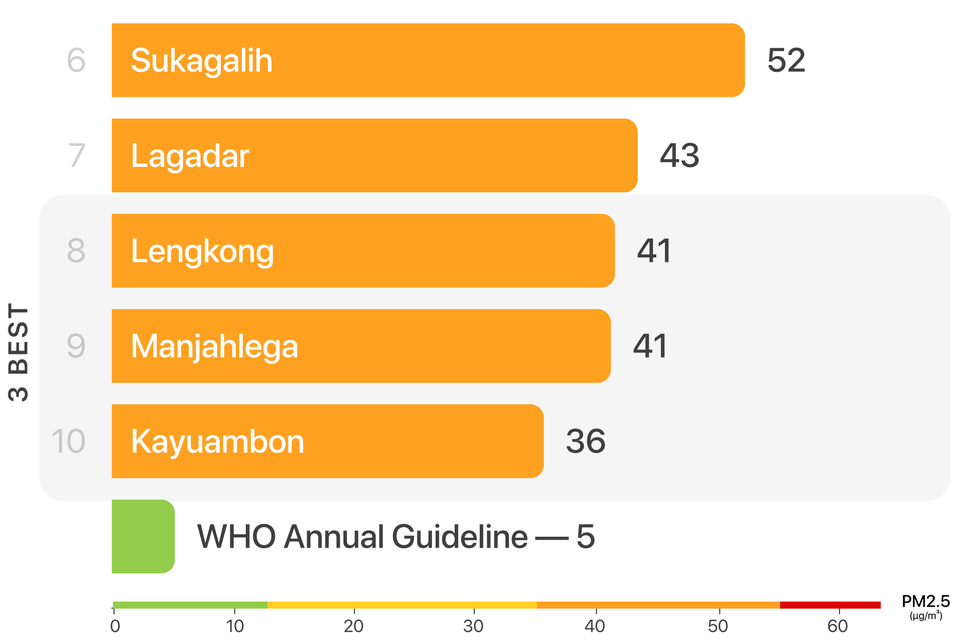
GREATER BANDUNG VS DKI JAKARTA

23%

worse than DKI Jakarta







South Tangerang

November 2023

South Tangerang is no longer the most polluted city in November. However, air contamination remains relatively high. Serpong still falls under the unhealthy category with a PM2.5 level of 57 µg/m³.

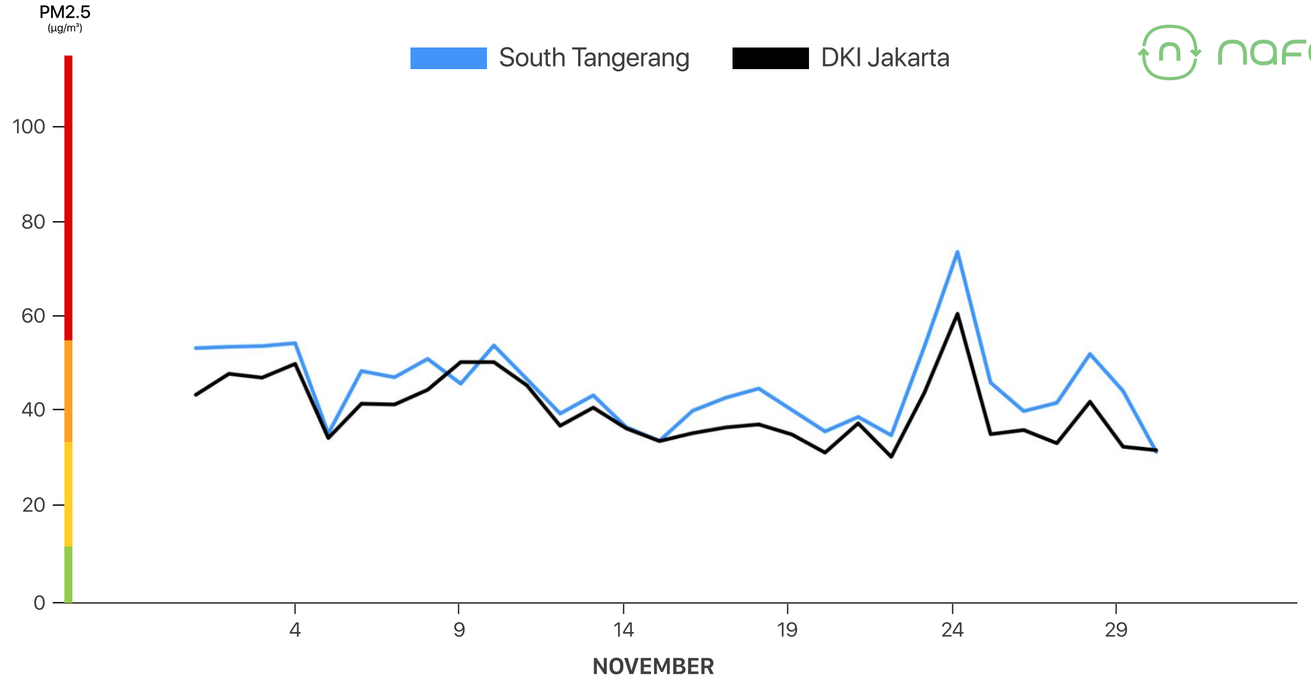
On the other hand, South Tangerang also has areas with relatively good air quality, such as Serpong Utara and Alam Sutera.

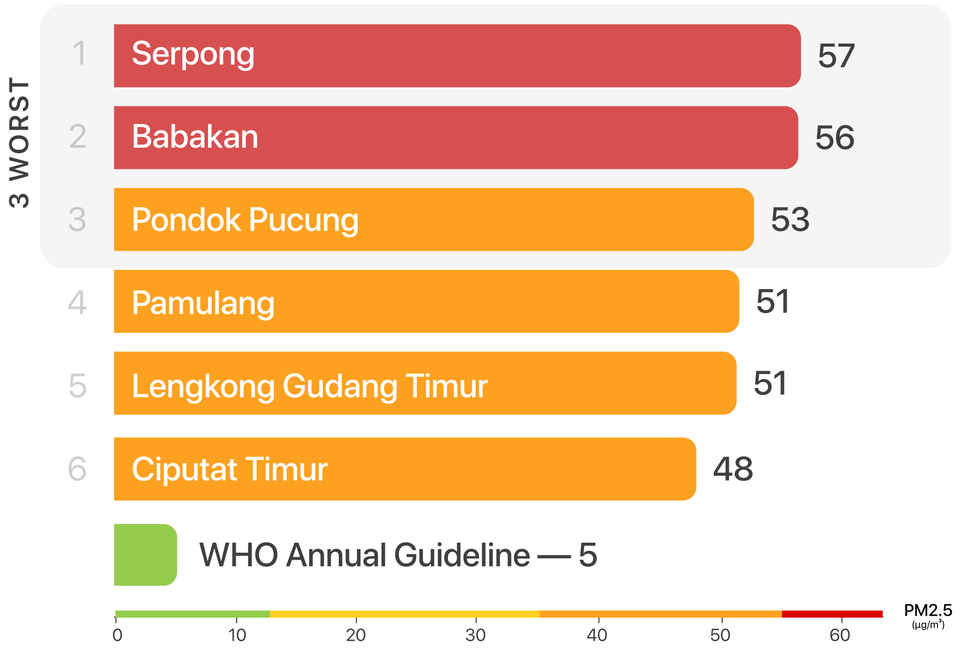
- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

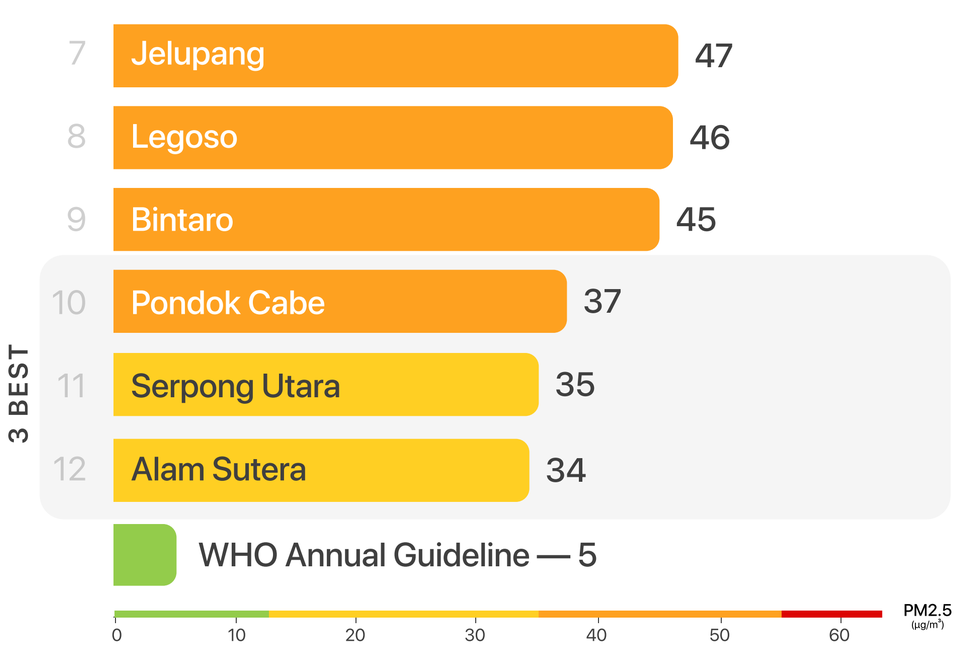
SOUTH TANGERANG VS DKI JAKARTA

13%

worse than DKI Jakarta







Tangerang

November 2023

Despite no longer being at the top, Tangerang still experiences unhealthy air pollution, especially for sensitive groups. The most unhealthy area is indicated in Karangsari, Tangerang City, with a level of 55 µg/m³, which is 11 times above the WHO standard!

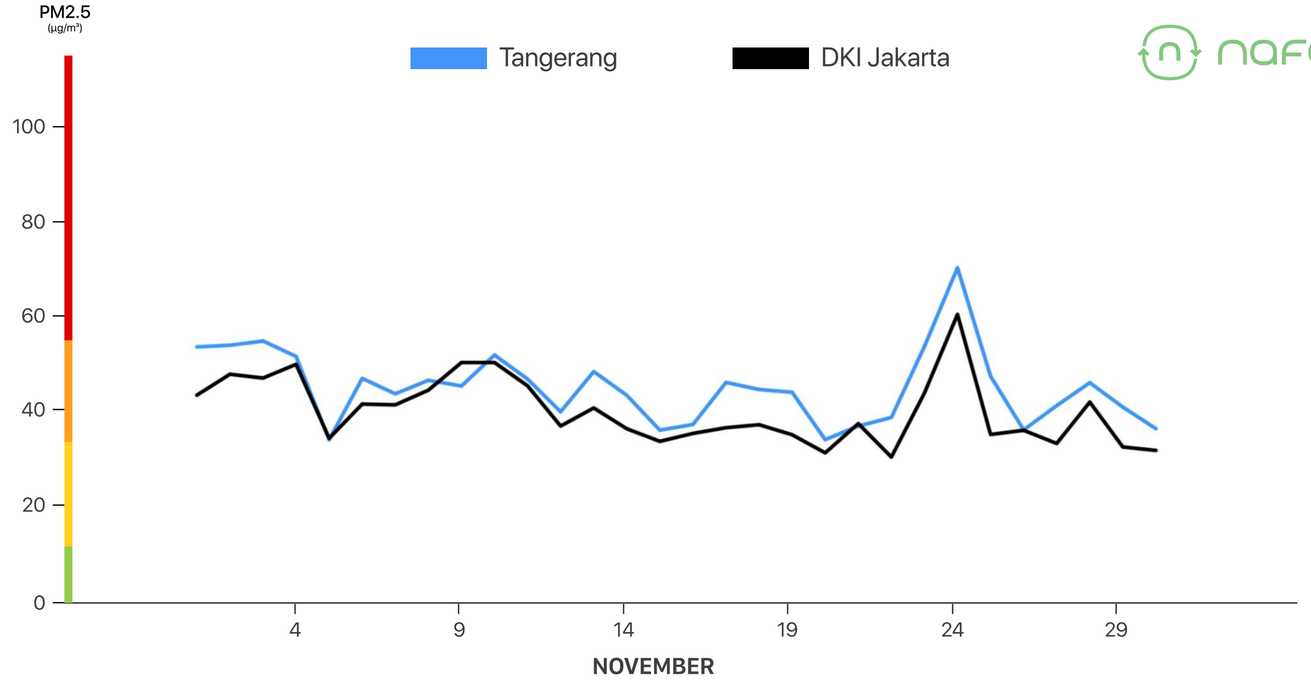
However, there is still a glimmer of hope in some areas of Tangerang with relatively good air quality, such as Periuk, where the PM2.5 level is 33 µg/m³.

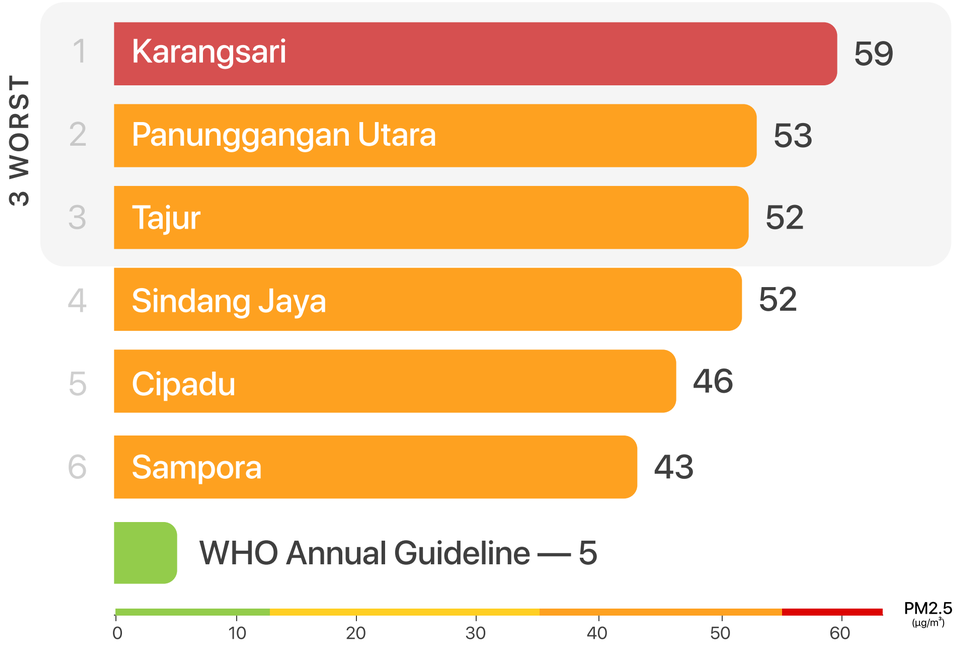
- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

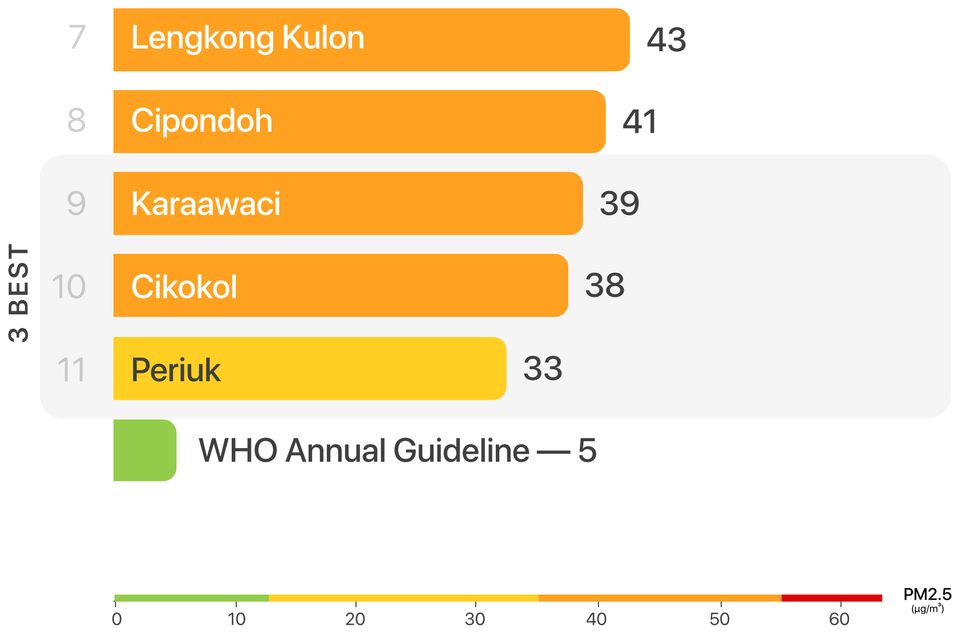
TANGERANG VS DKI JAKARTA

12%

worse than DKI Jakarta







Bekasi

November 2023

Over the past month, Bekasi has been providing less than favorable air conditions for its residents, particularly those belonging to sensitive groups. The range of PM2.5 pollution in the area varies between 38-50 µg/m³.

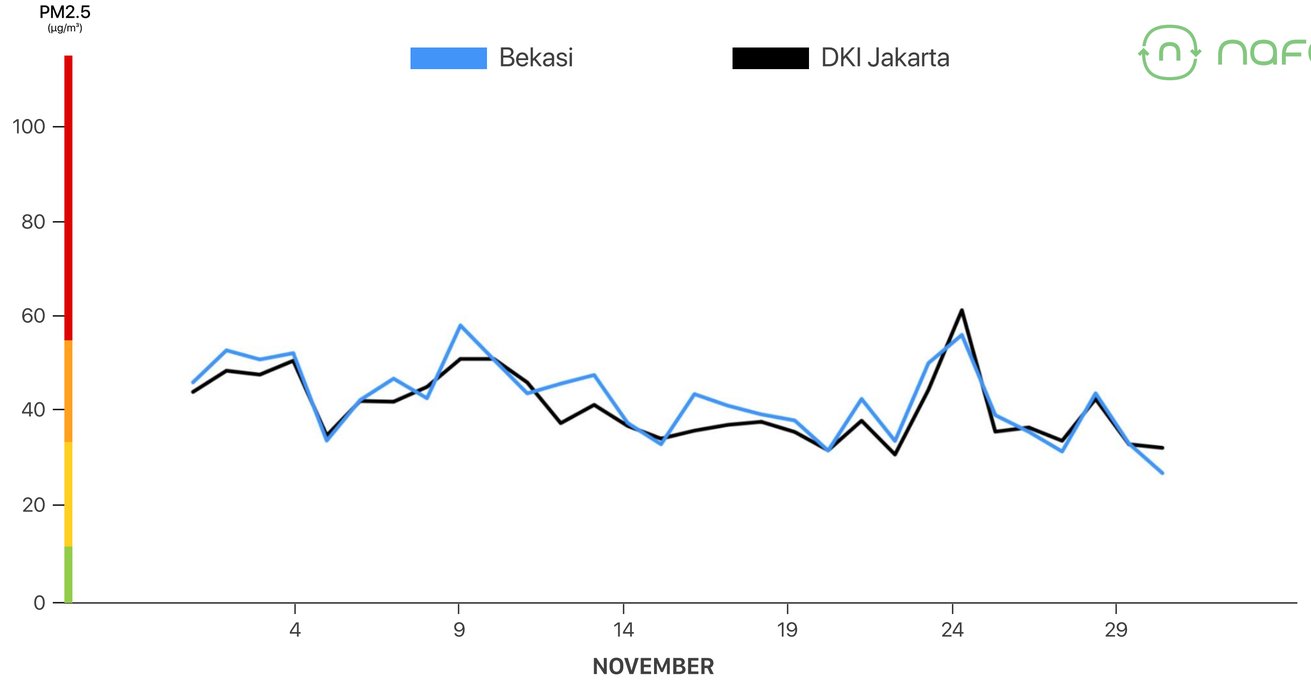
However, there is still hope in certain areas of Bekasi, such as Harapan Indah (35 µg/m³) and Jatibening (28 µg/m³), where the air quality is relatively good.

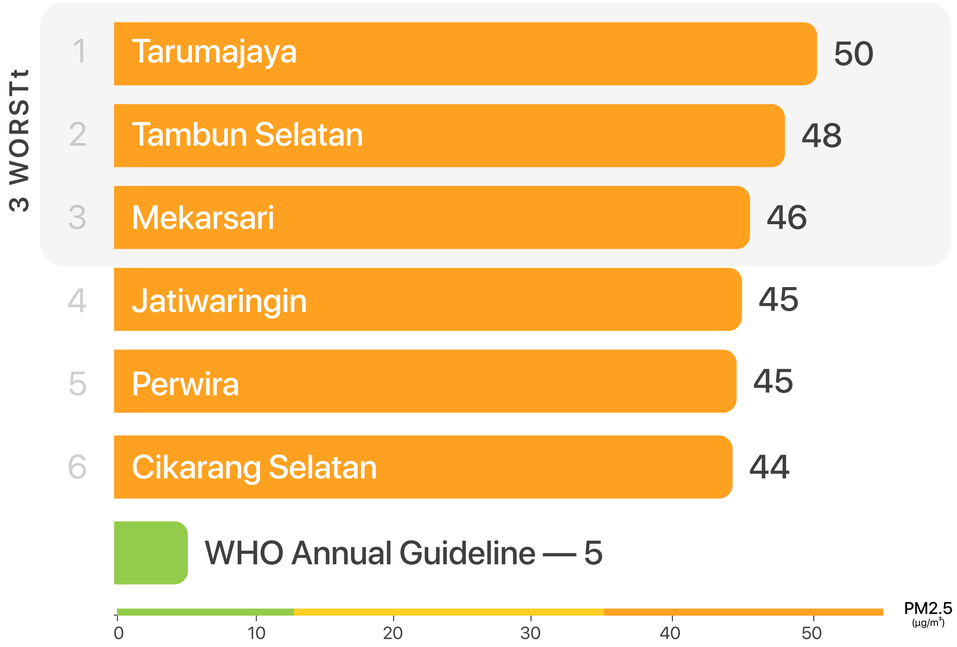
- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

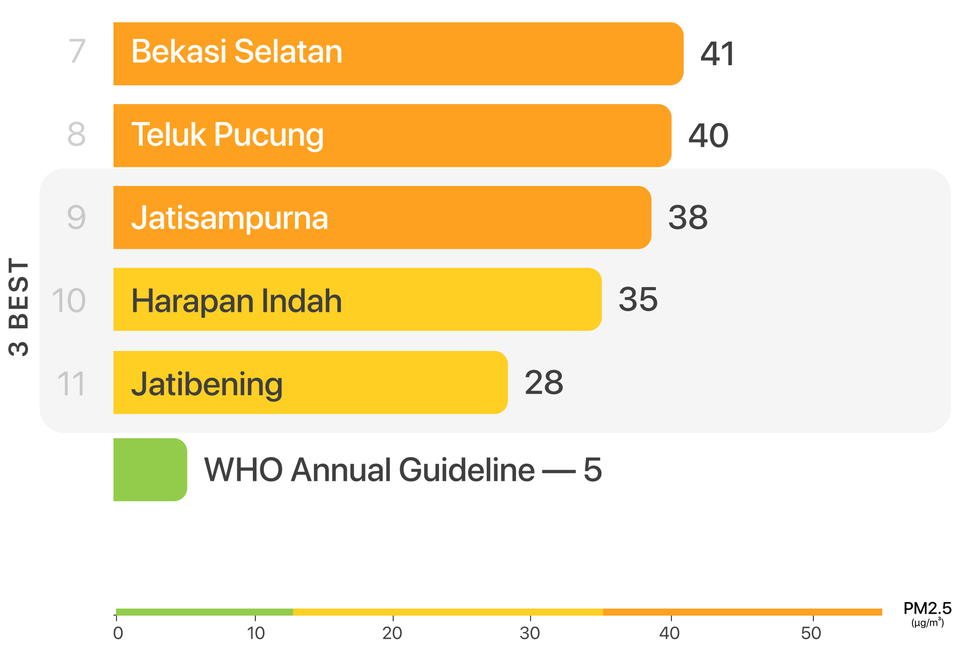
BEKASI VS DKI JAKARTA

4%

worse than DKI Jakarta







Depok

November 2023

Bedahan continues to be the most polluted location in Depok. The average concentration of PM2.5 in that area reaches 55 µg/m³, classified as unhealthy.

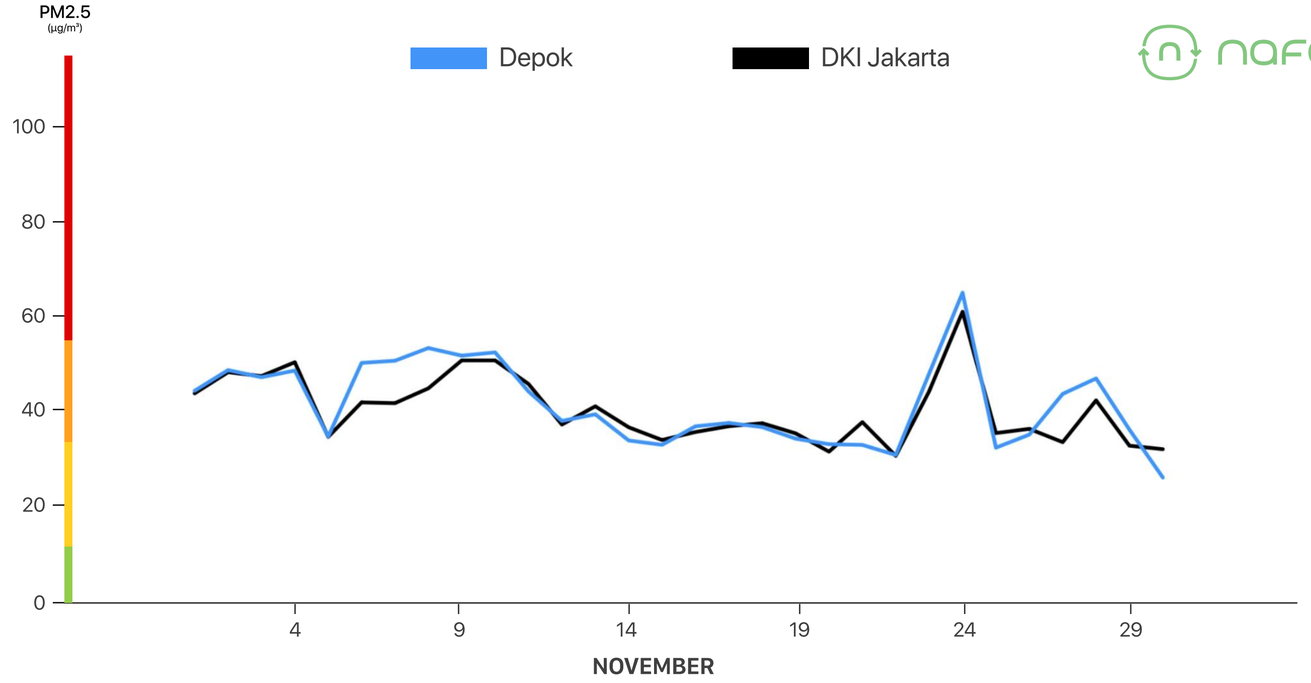
This figure is almost twice that of the lowest area in Depok, which is Cipayung with a PM2.5 level of 28 µg/m³. Meanwhile, there is also air with a moderate status in Beji at 34 µg/m³ and Limo at 32 µg/m³.

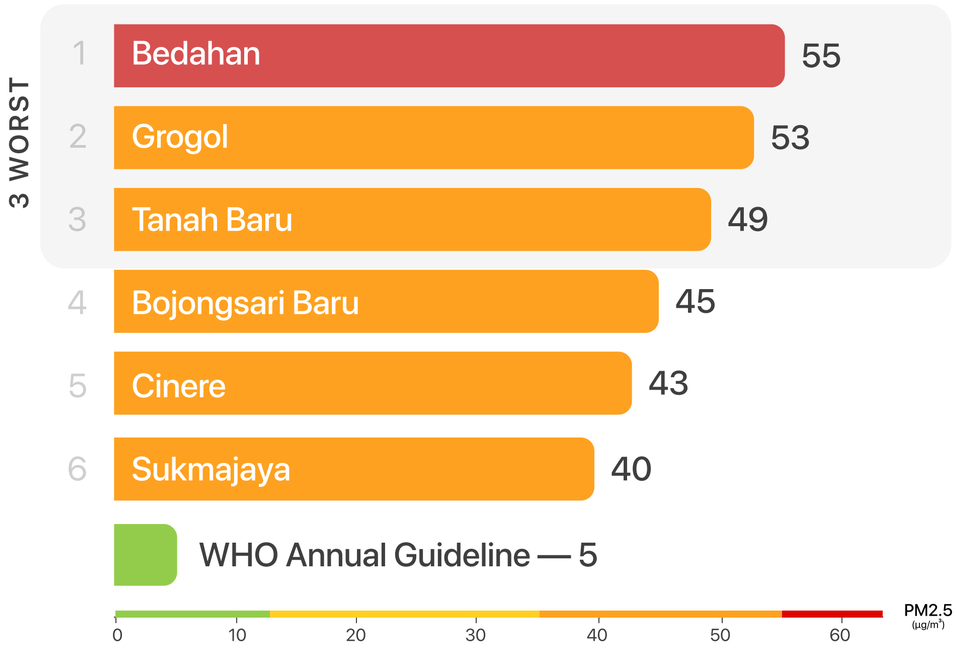
- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

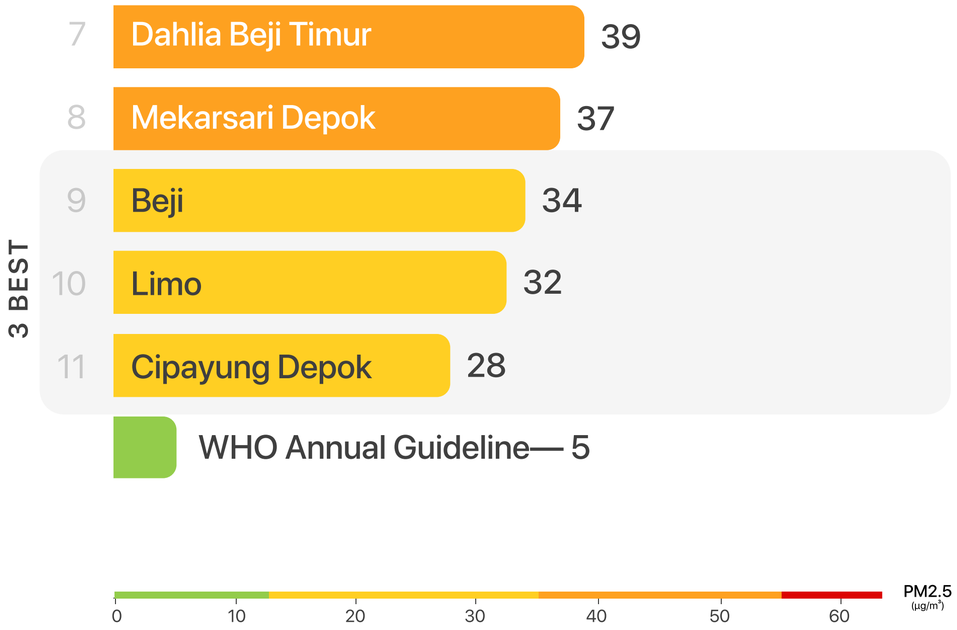
DEPOK VS DKI JAKARTA

3%

worse than DKI Jakarta







Bogor

November 2023

Despite being named as the "rainy city," it turns out that the downpour has not been able to sweep away pollution in this city. There are nine areas with unhealthy air quality for sensitive groups, ranging from Gunung Sindur (52 µg/m³) to Bogor Barat (35 µg/m³).

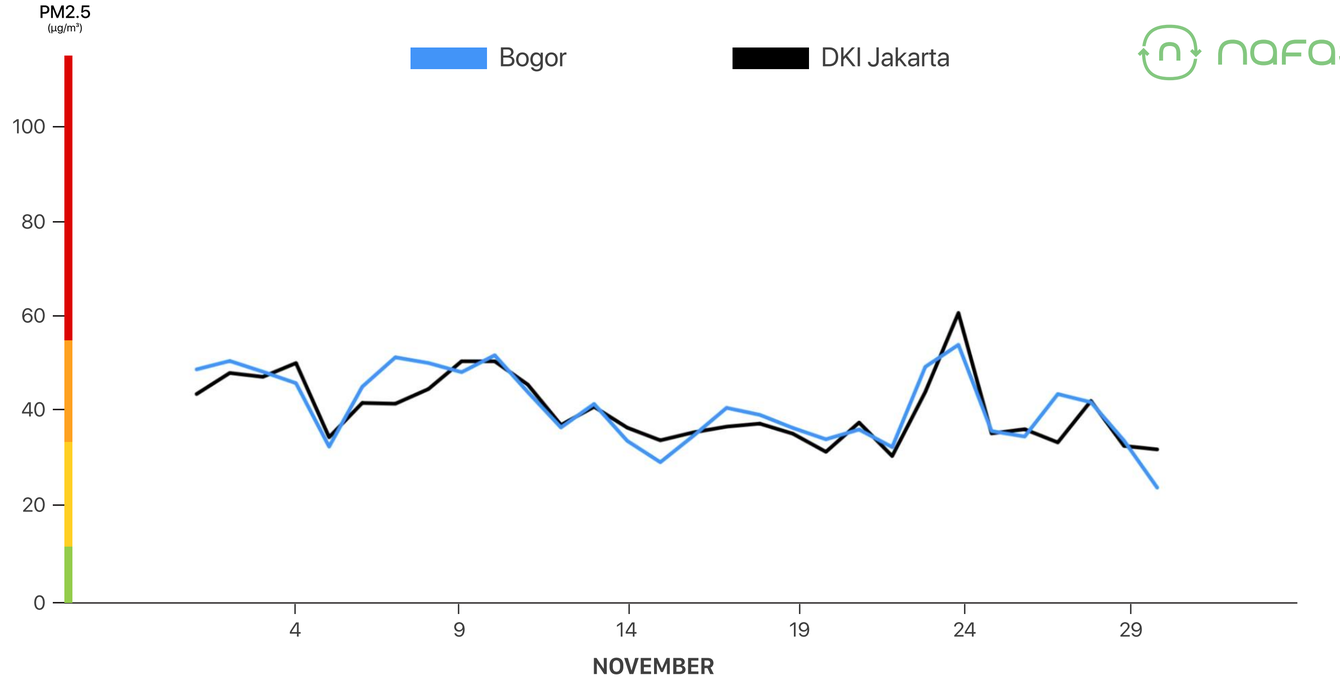
On the flip side, there is relatively good air quality in four locations: Bojong Kulur, Bogor Timur, Sentul City, and Gunung Geulis. This is relatively more than in other cities.

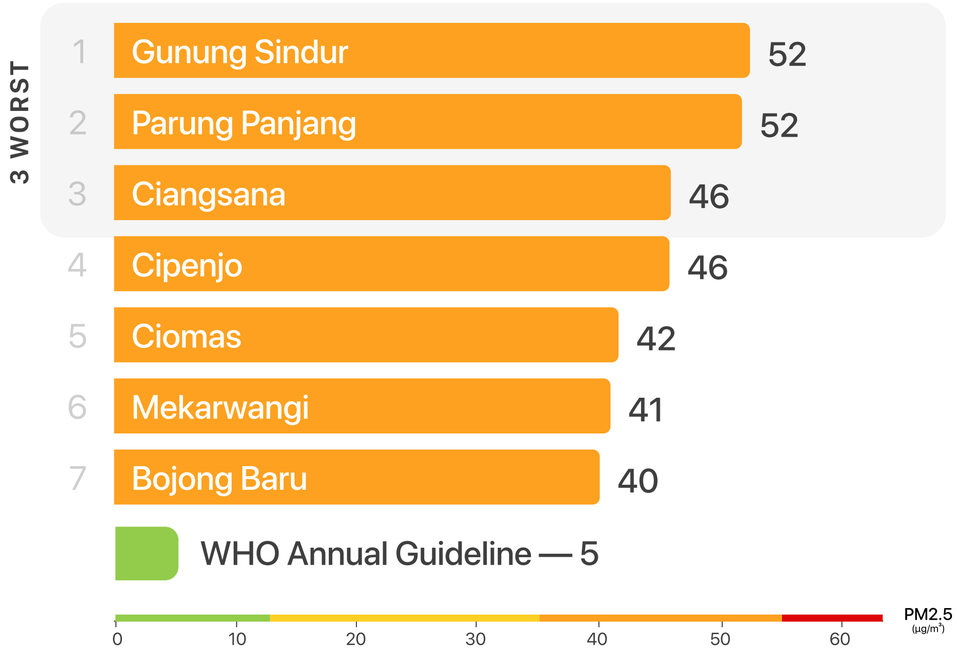
- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

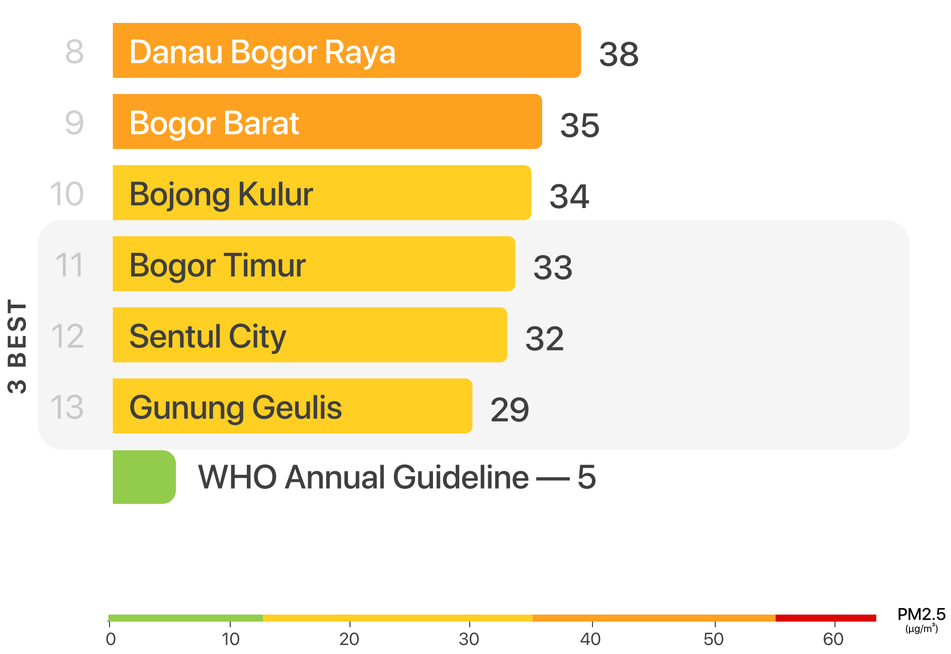
BOGOR VS DKI JAKARTA

2%

worse than DKI Jakarta







Greater Surabaya

November 2023

Surabaya, known as the "city of a thousand parks," is unfortunately not exempt from poor air quality. The majority of areas in Surabaya and its surrounding areas (Gresik & Sidoarjo) experience less than healthy air conditions, particularly for sensitive groups.

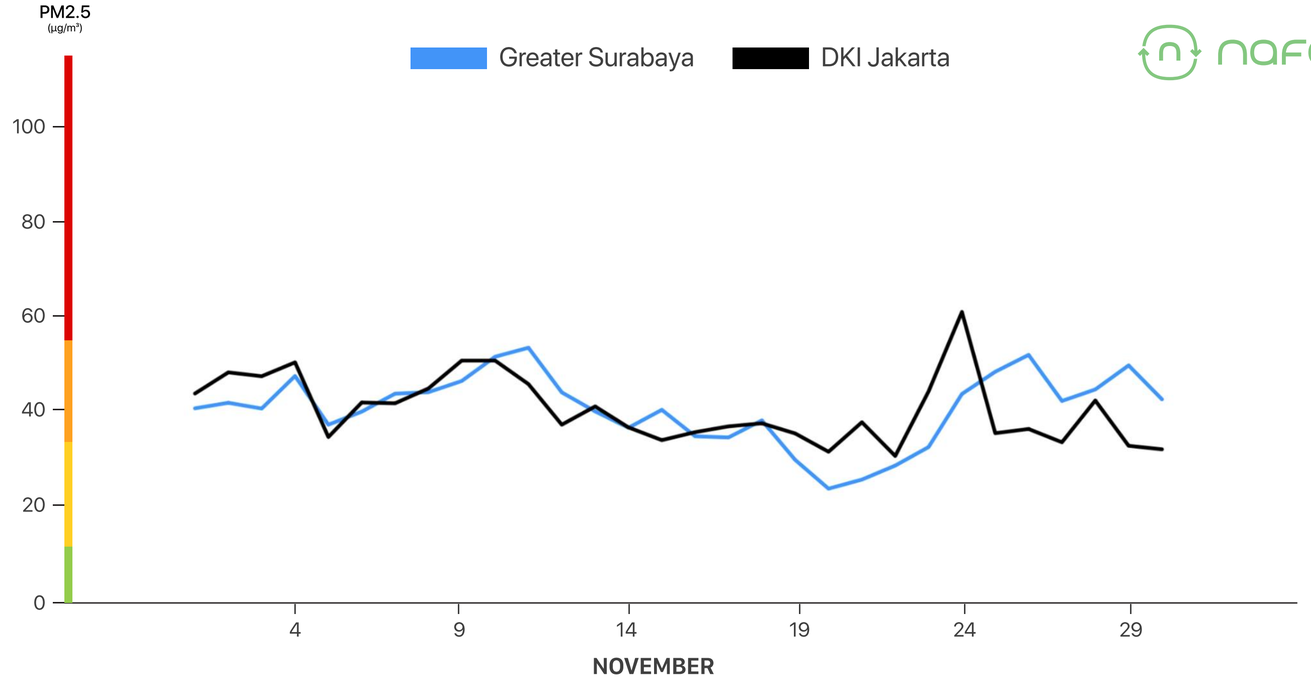
The area with the highest PM2.5 contamination is Punggul, Sidoarjo, with 59 µg/m³, while the lowest is in Jemur Wonosari, Surabaya, with 28 µg/m³.

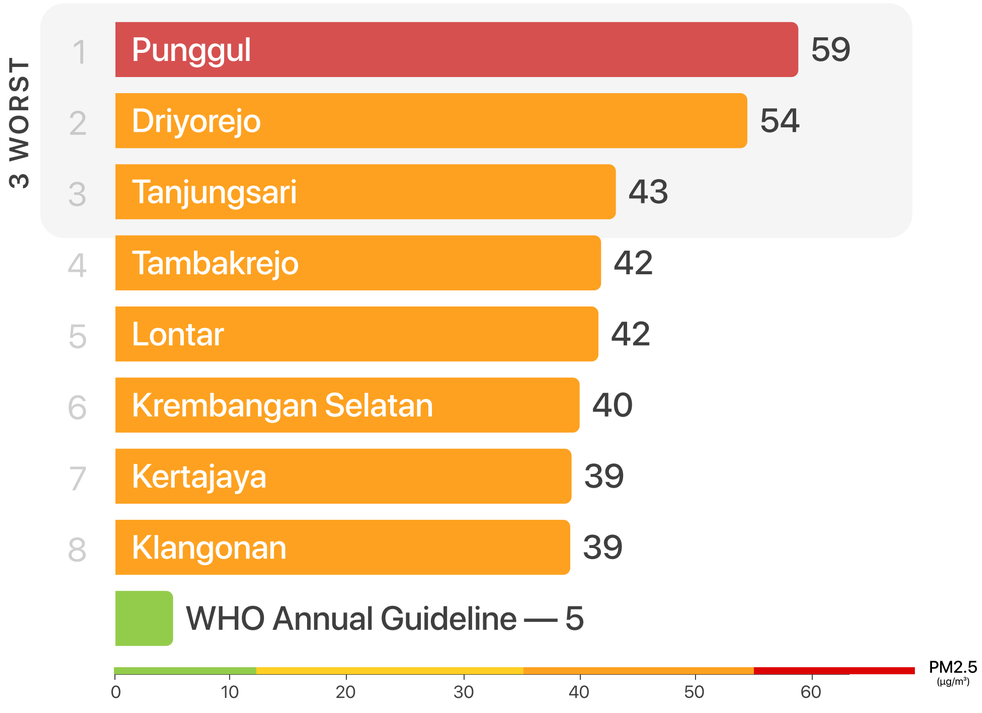
- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

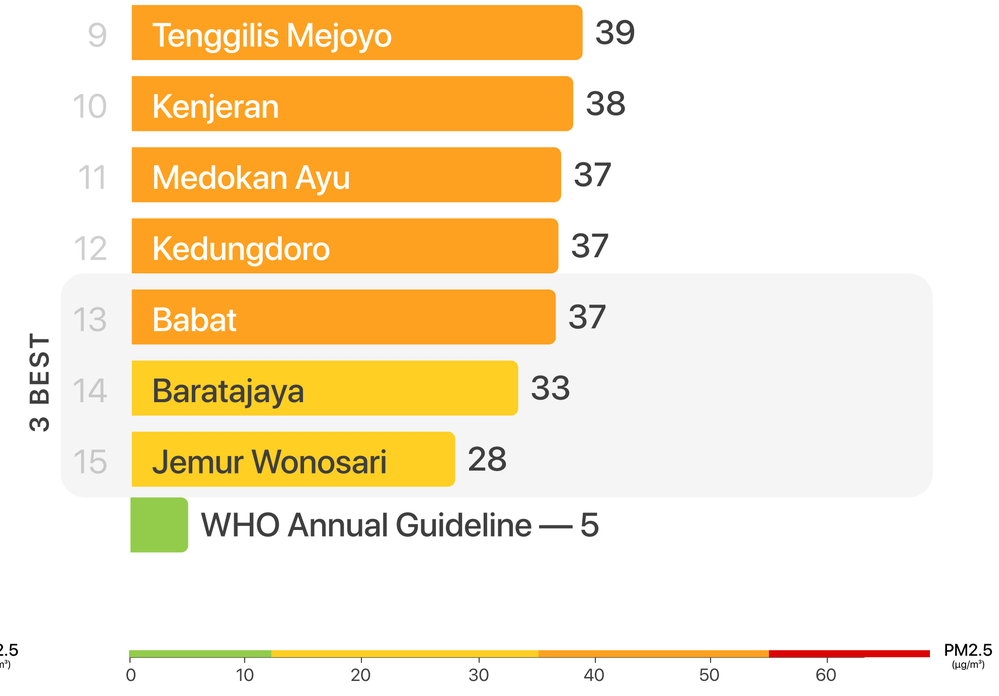
GREATER SURABAYA VS DKI JAKARTA

1%

worse than DKI Jakarta







East Jakarta

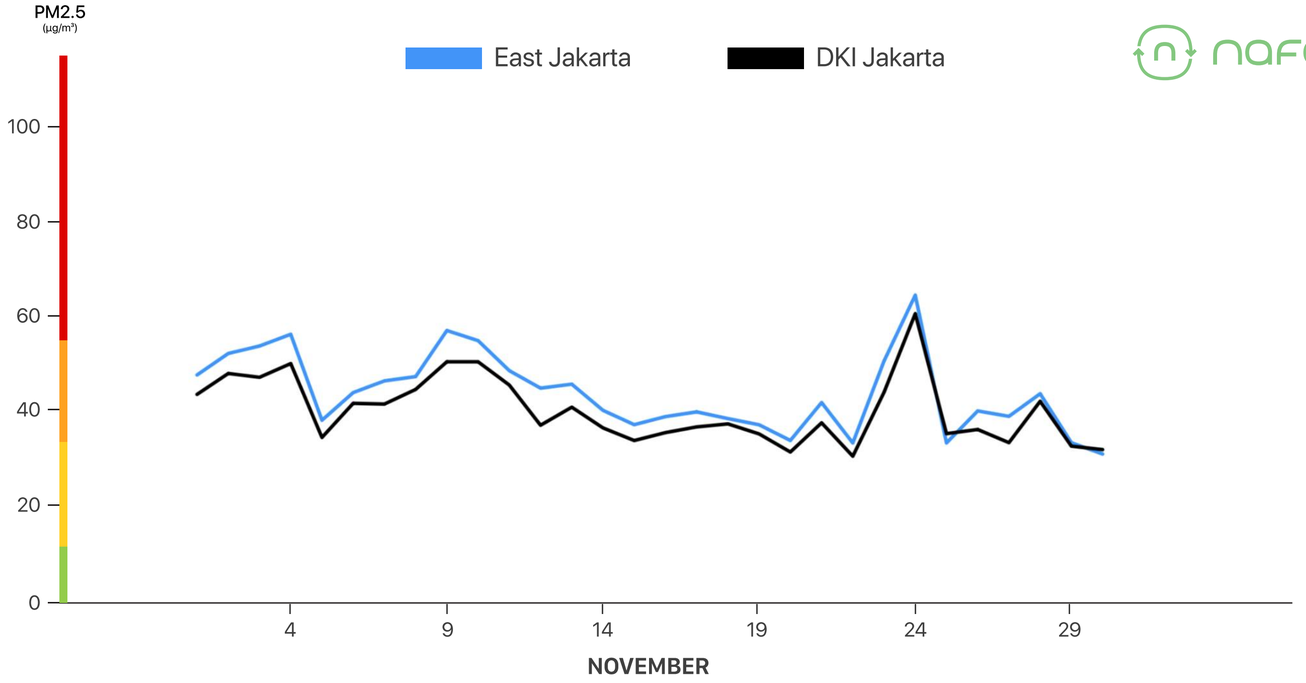
November 2023

Moving into the Jakarta region, East Jakarta has many areas with unhealthy air conditions for sensitive groups, with only two locations having relatively good air quality! The two areas with the most unhealthy air are Cibubur and Cawang, with PM2.5 levels of 54 µg/m³.

Meanwhile, the best air quality in East Jakarta can be found in Cipinang Besar and Duren Sawit, with PM2.5 levels ranging from 30-33 µg/m³.

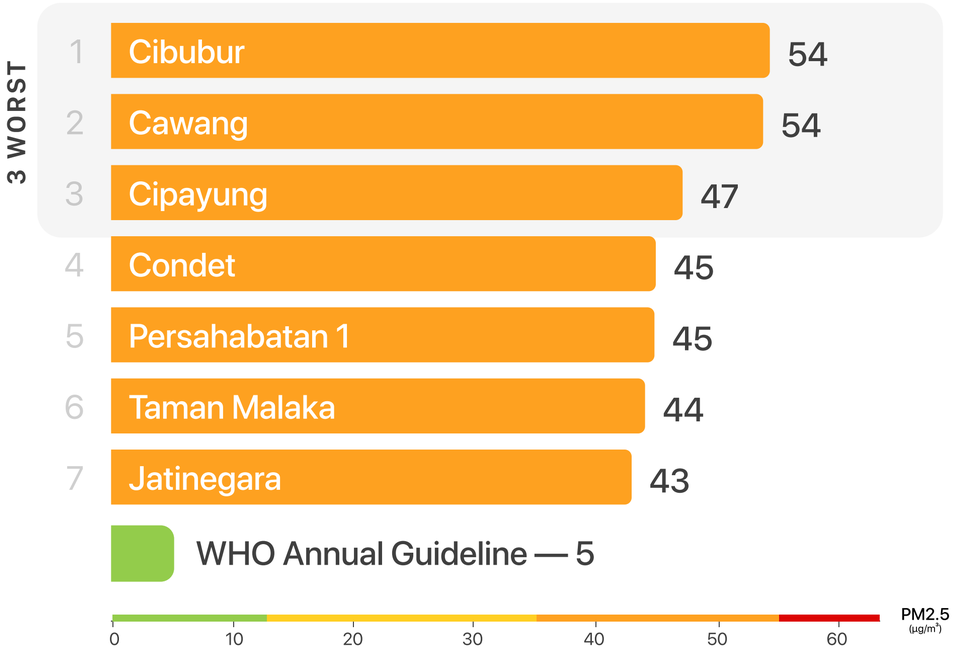
- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

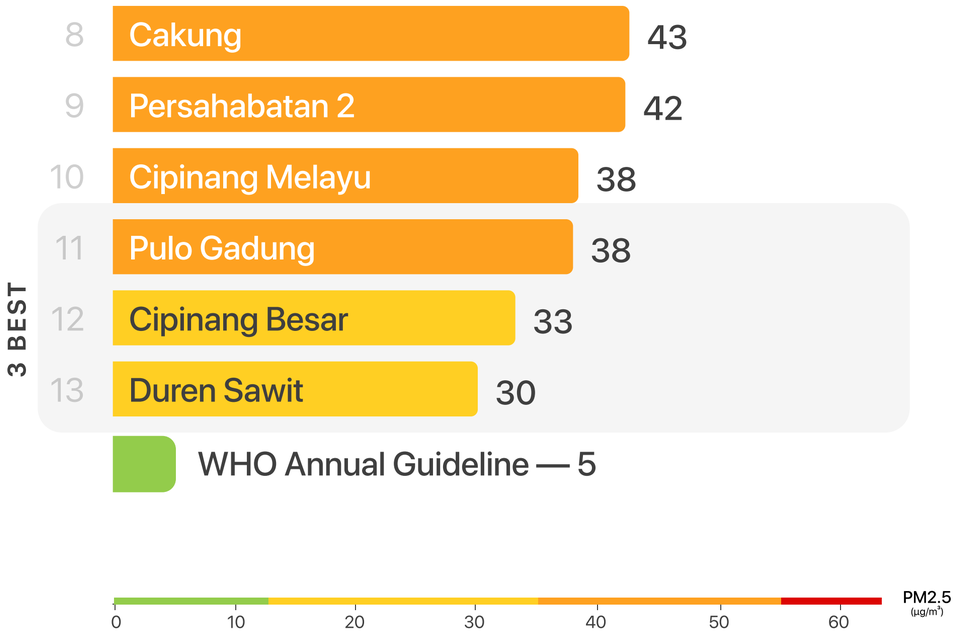
EAST JAKARTA VS DKI JAKARTA



9%

worse than DKI Jakarta





West Jakarta

November 2023

Switching to West Jakarta, the level of air pollution in this area appears to vary significantly.

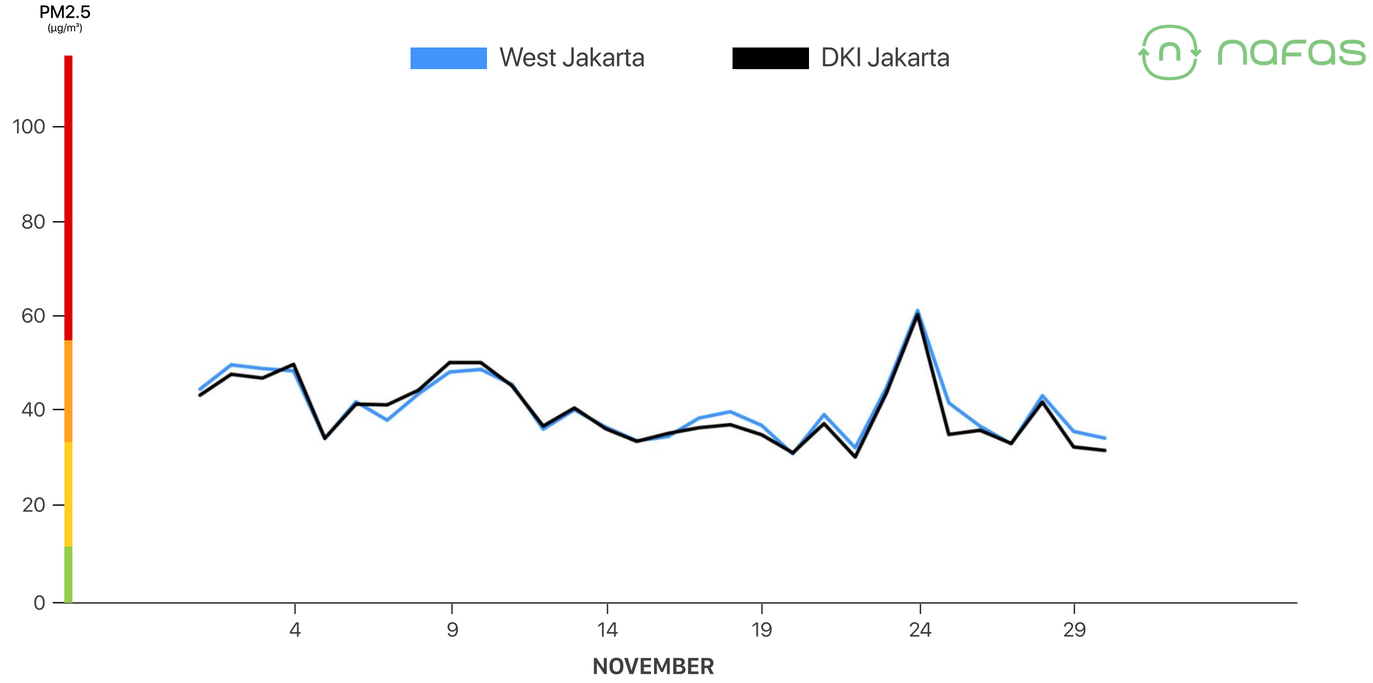
Almost all regions in West Jakarta experience unhealthy air conditions for sensitive groups, except for the Taman Sari area with a PM2.5 level of 31 µg/m³.

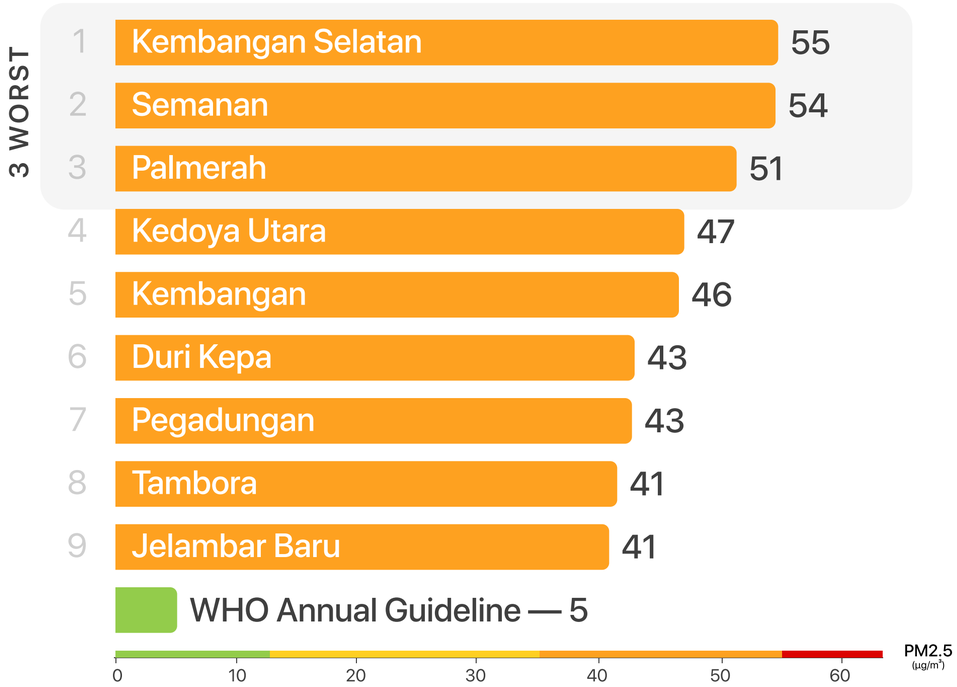
- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

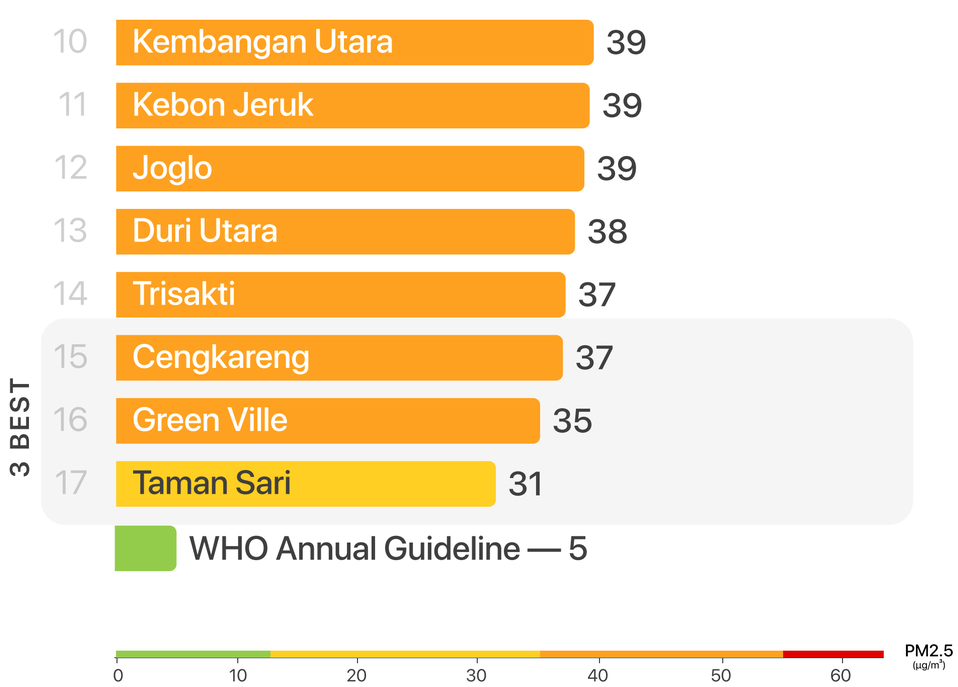
WEST JAKARTA VS DKI JAKARTA

2%

worse than DKI Jakarta







Central Jakarta

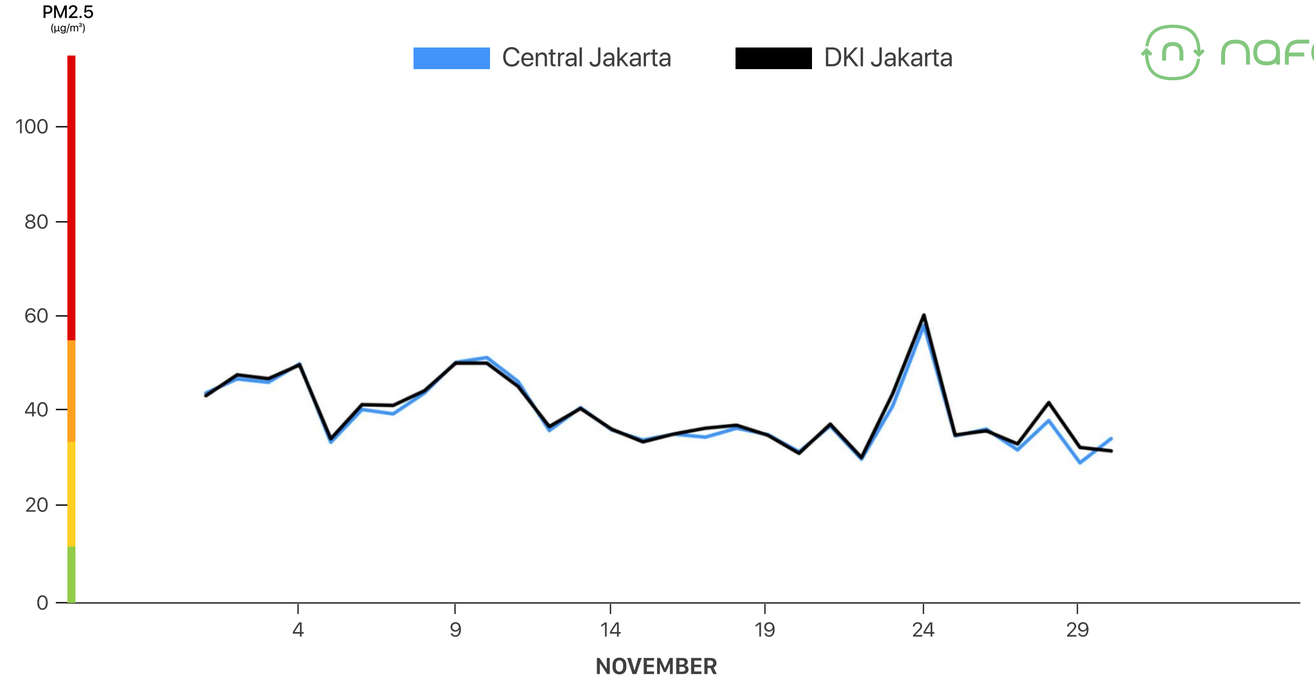
November 2023

Although slightly improved by one percent, air contamination in Central Jakarta still falls within the category of unhealthy for sensitive groups.

There is one exception, which is Menteng Teuku Umar with a PM2.5 level of 35 µg/m³, considered to have relatively good air quality.

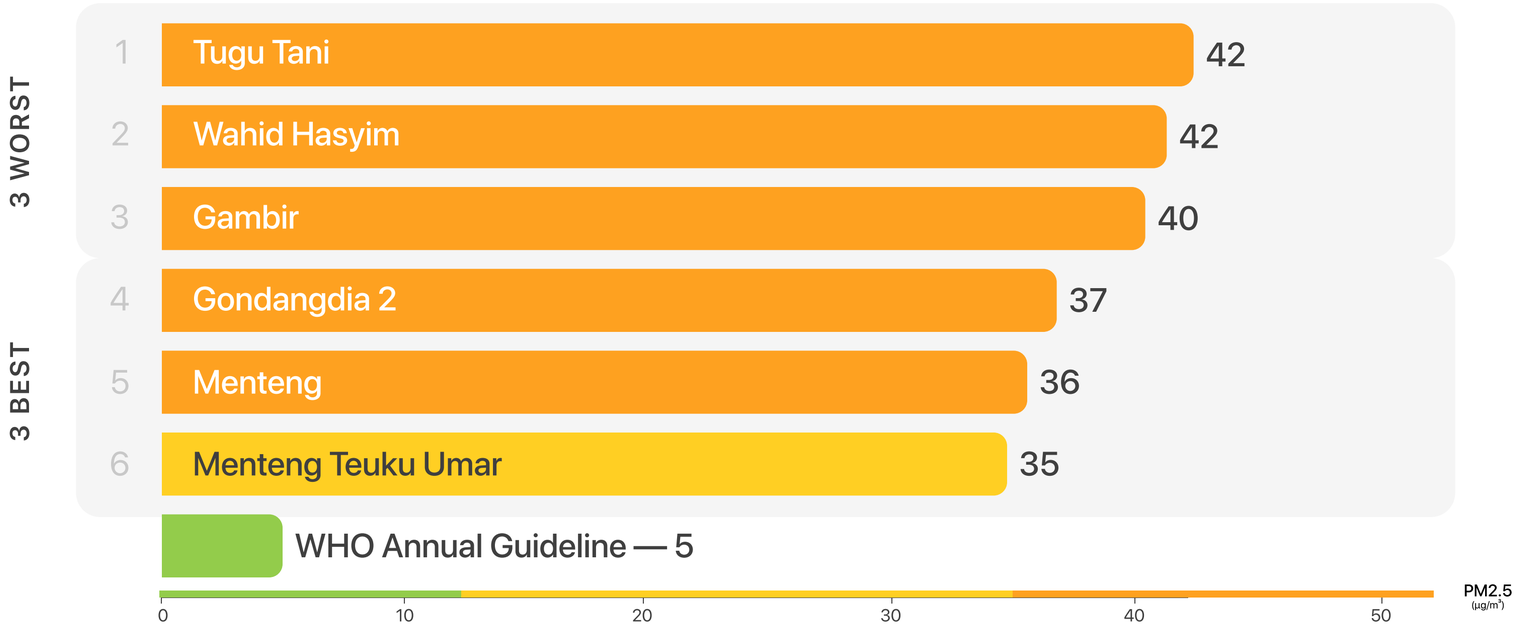
- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

CENTRAL JAKARTA VS DKI JAKARTA



1%

better than DKI Jakarta



South Jakarta

November 2023

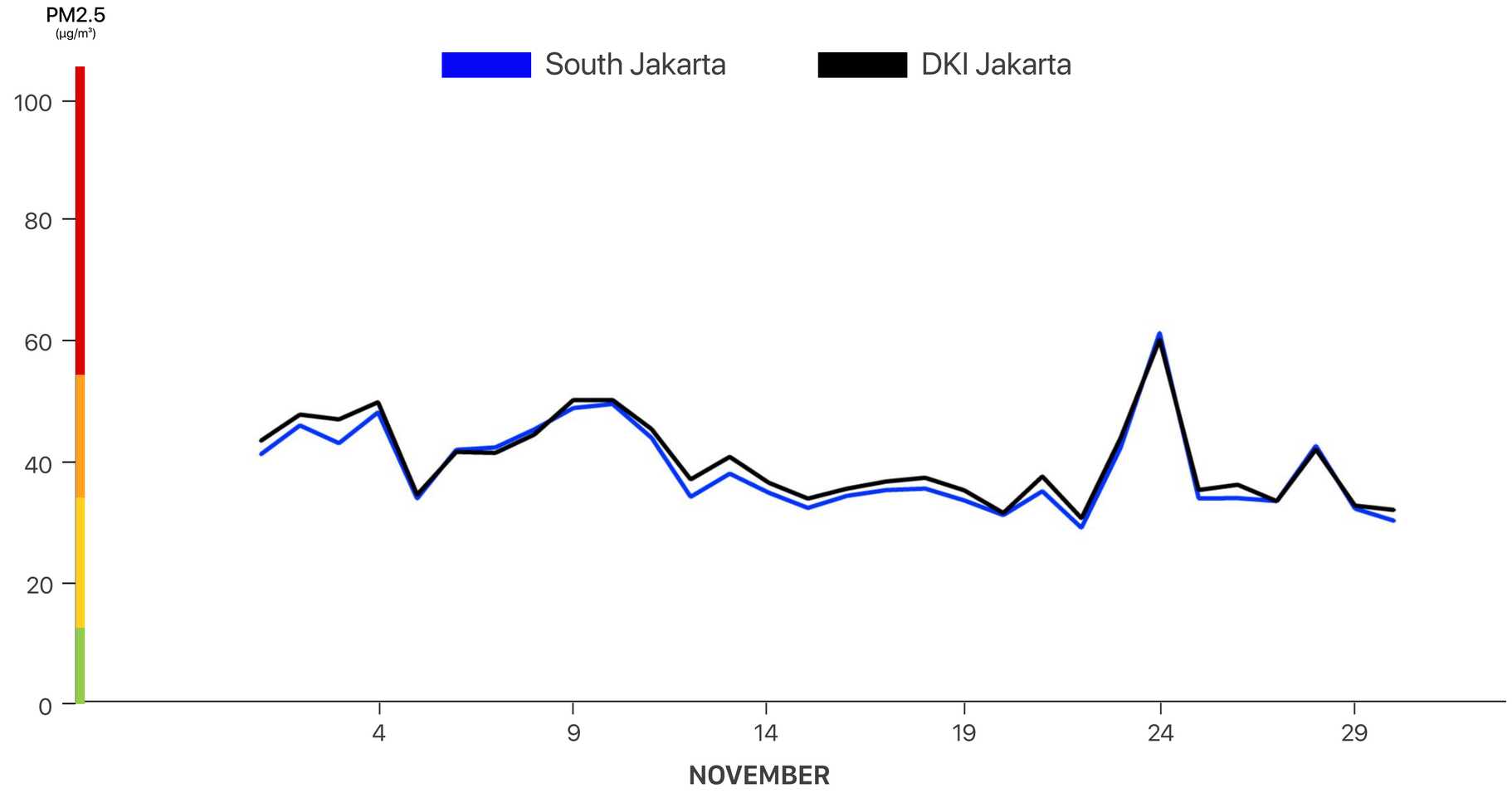
Leading by 3% compared to the average of DKI Jakarta, South Jakarta has relatively fluctuating air conditions. Most of the Nafas sensors in this area indicate less than healthy conditions for sensitive groups, with peaks reaching 53 µg/m³.

On the other hand, there are also four areas with relatively good air quality, with the lowest PM2.5 recorded in Rawa Barat at 30 µg/m³.

- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

SOUTH JAKARTA VS DKI JAKARTA

3% better than DKI Jakarta



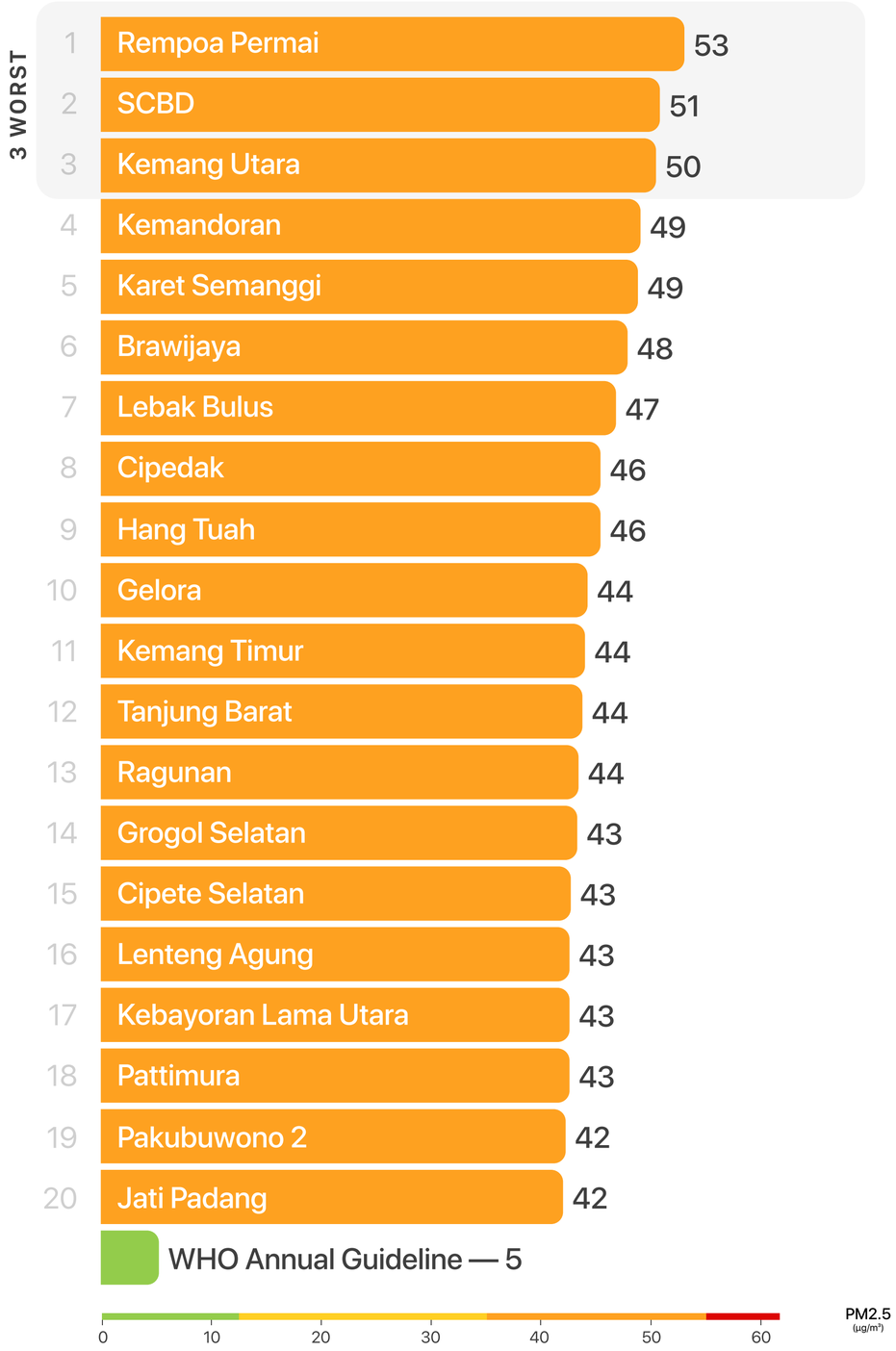
South Jakarta

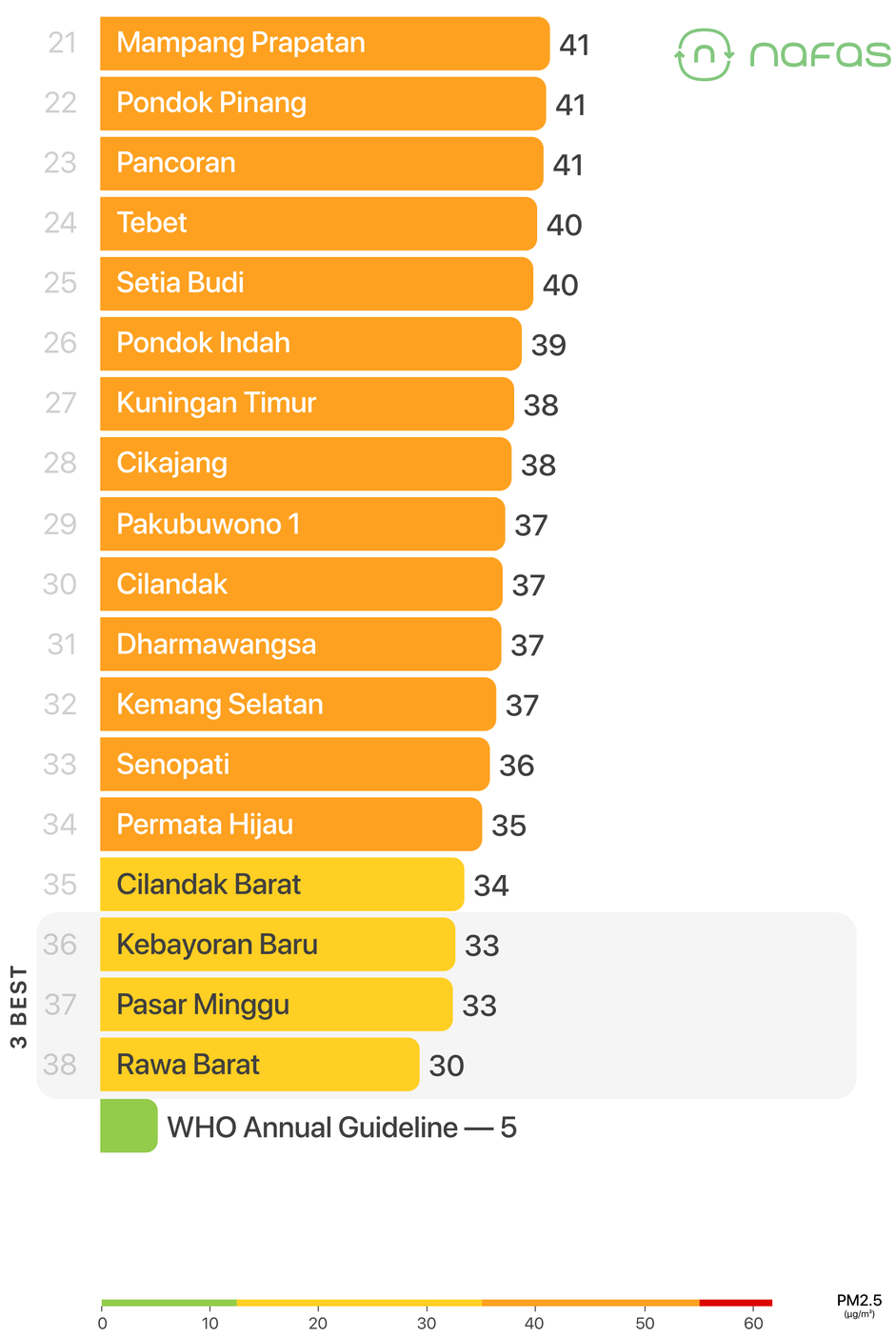
November 2023

Leading by 3% compared to the average of DKI Jakarta, South Jakarta has relatively fluctuating air conditions. Most of the Nafas sensors in this area indicate less than healthy conditions for sensitive groups, with peaks reaching 53 µg/m³.

On the other hand, there are also four areas with relatively good air quality, with the lowest PM2.5 recorded in Rawa Barat at 30 µg/m³.

- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy





North Jakarta

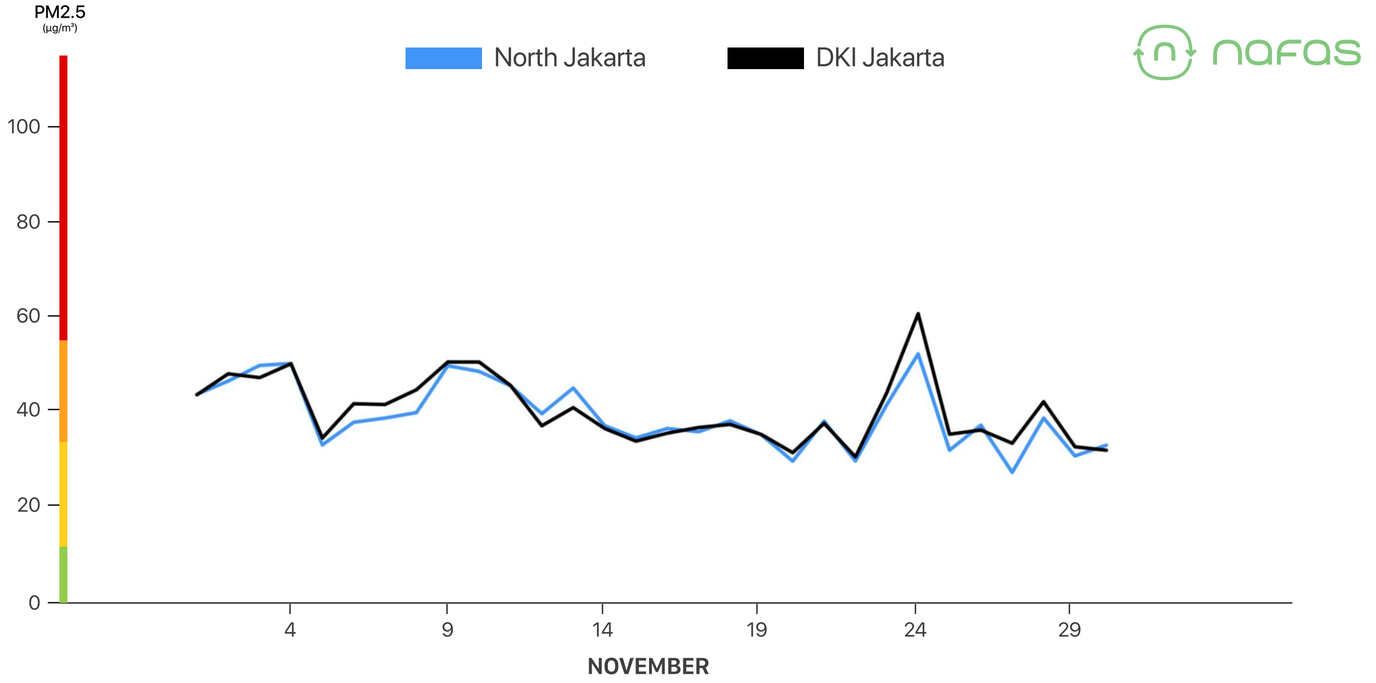
November 2023

Being one of the areas with the best air quality in DKI Jakarta, North Jakarta is in a better position, 3% above the average.

However, one area, Penjaringan, occupies a region with the most polluted air, with PM2.5 exceeding more than 9 times the WHO maximum limit (5 µg/m³).

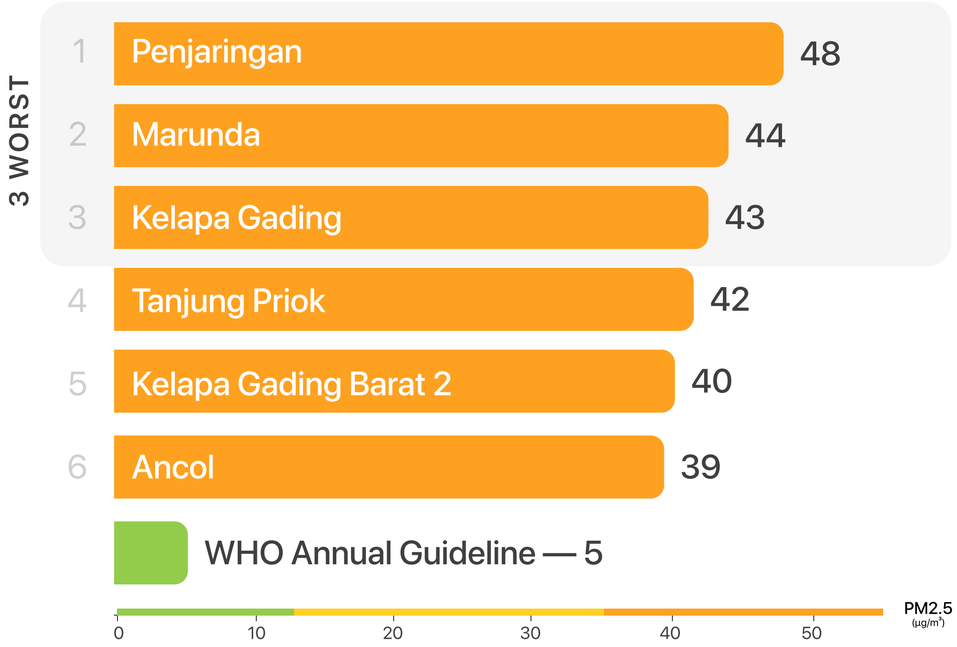
- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

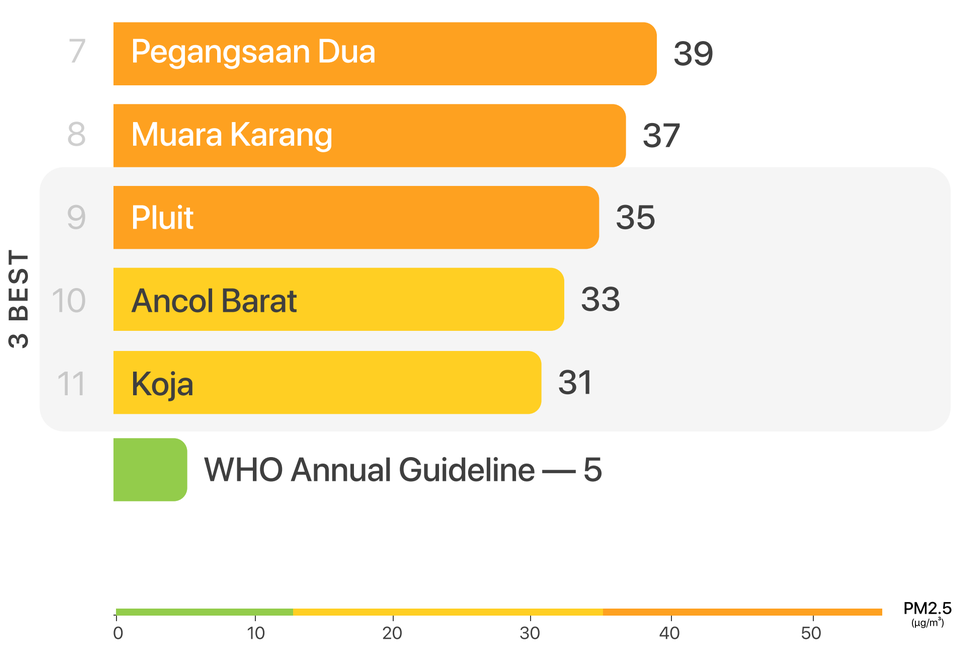
NORTH JAKARTA VS DKI JAKARTA



3%

better than DKI Jakarta





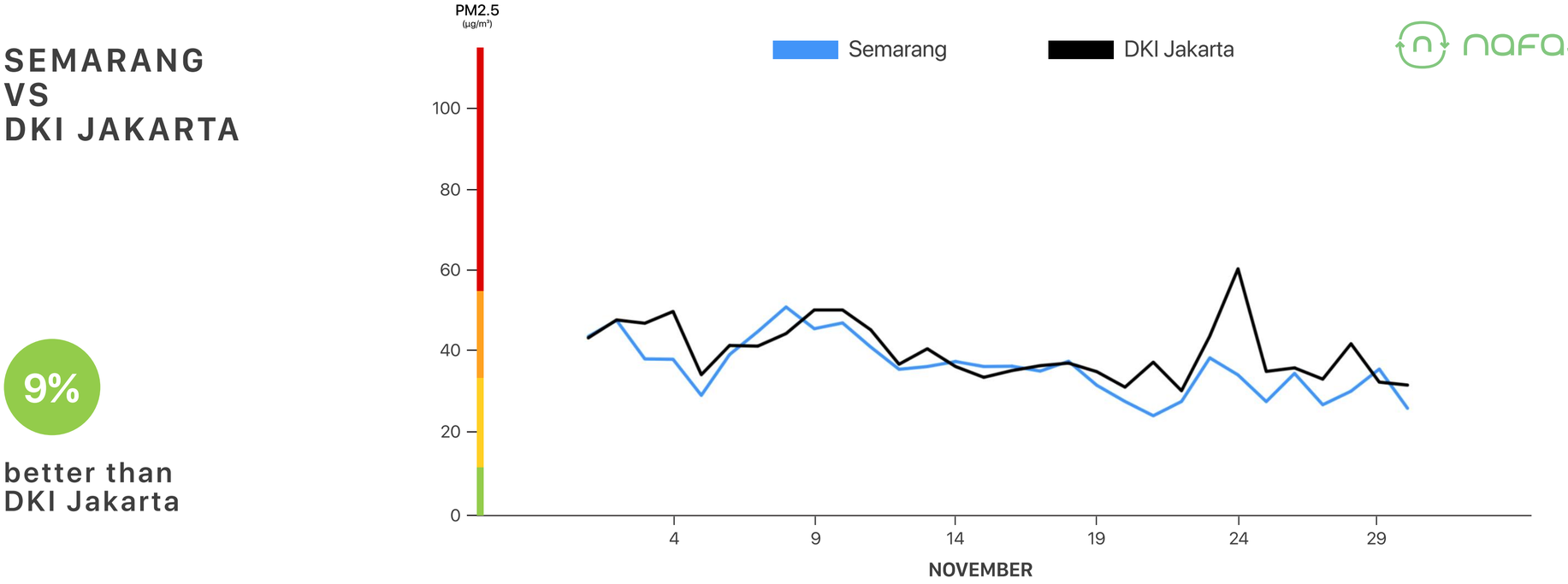
Semarang

November 2023

Generally, air quality in Semarang tends to be better compared to DKI Jakarta. However, almost every area monitored by the Nafas sensor network falls into the category of 'Unhealthy for Sensitive Groups,' except in Ngaliyan, Semarang City.

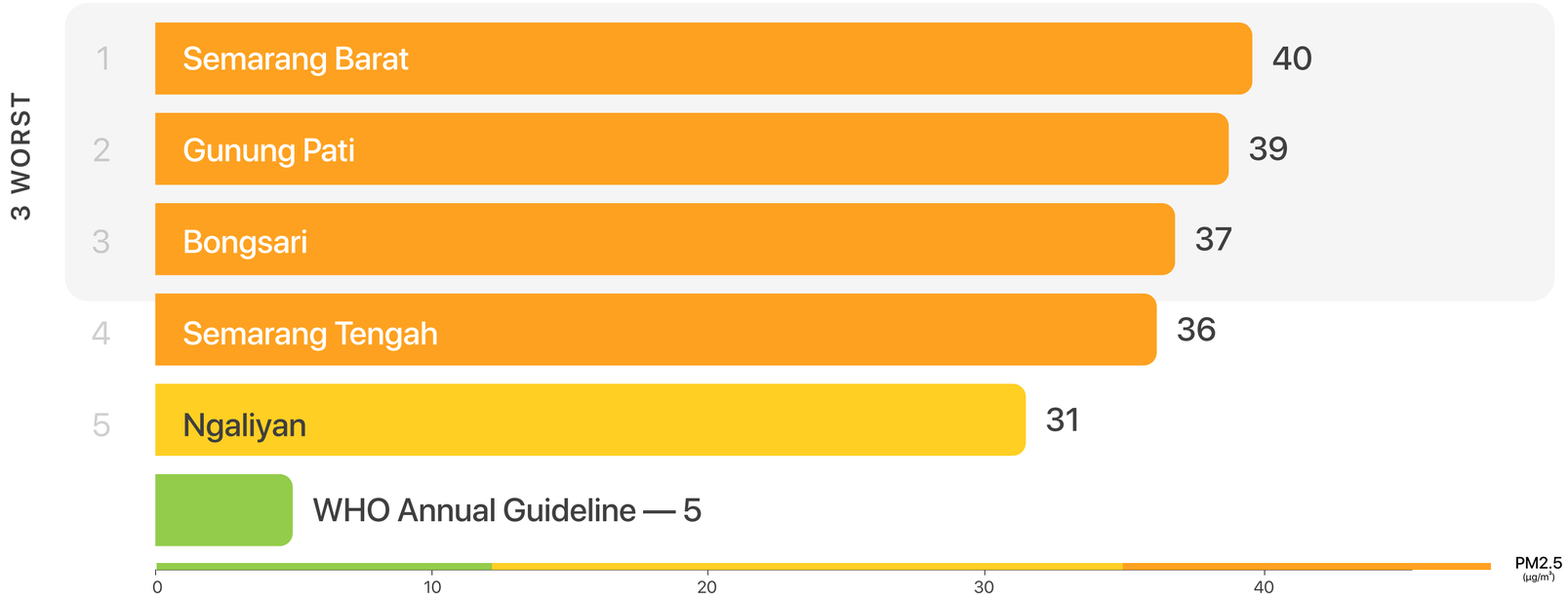
- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

SEMARANG VS DKI JAKARTA



9%

better than DKI Jakarta



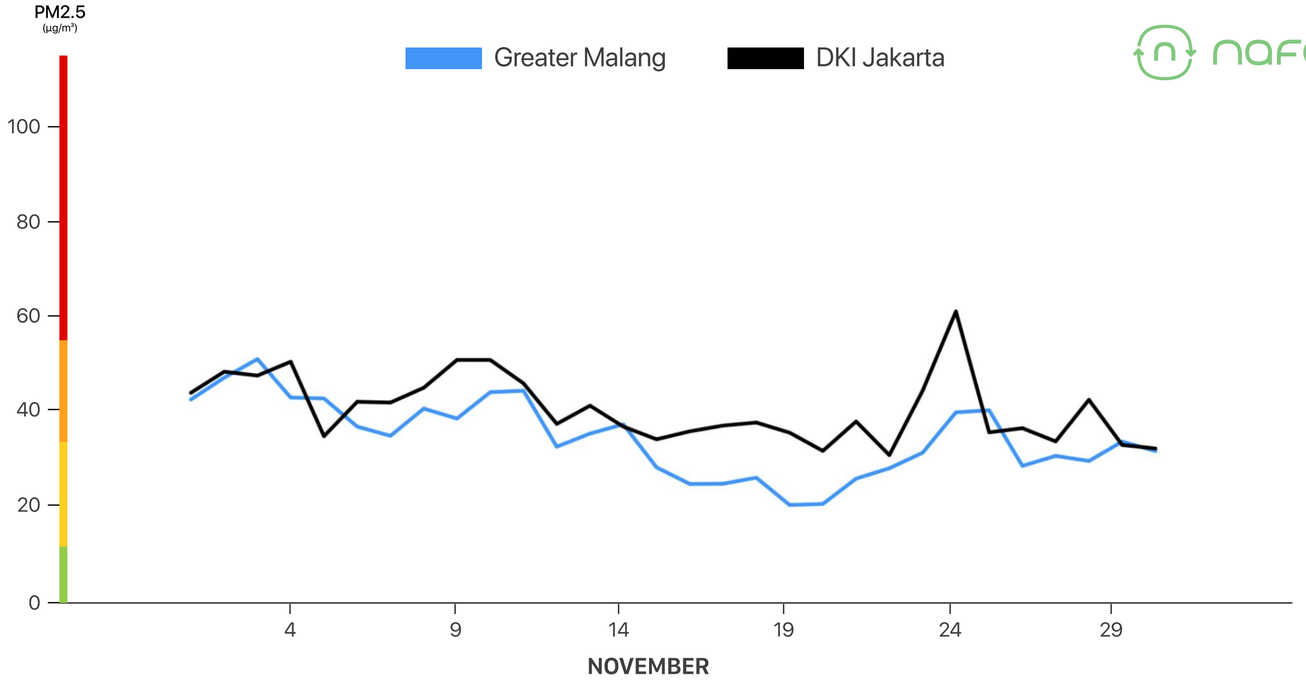
Greater Malang

November 2023

The level of air pollution in Malang Raya has decreased significantly, landing it in a position 15% better than DKI Jakarta. However, Sekarpuro remains the most polluted area with a PM2.5 concentration reaching 40 µg/m³. Other regions tend to have relatively good air quality.

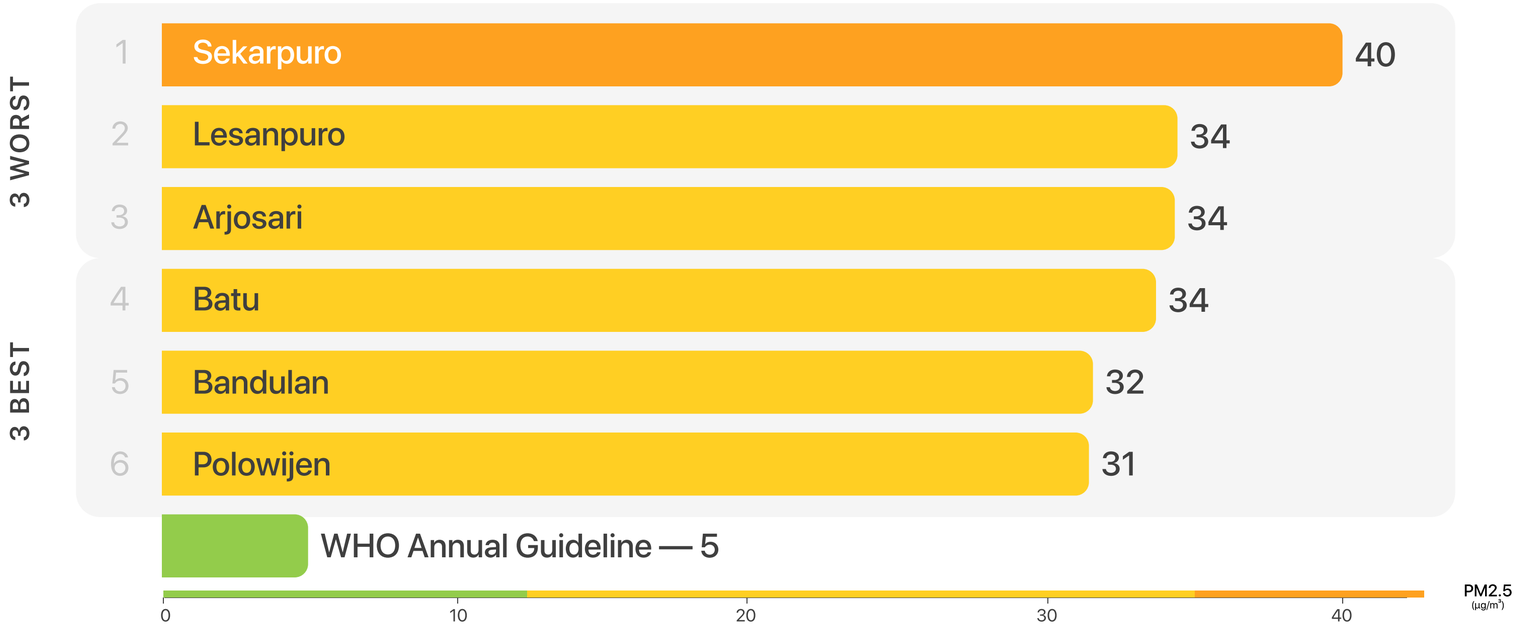
- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

GREATER MALANG VS DKI JAKARTA



15%

better than DKI Jakarta



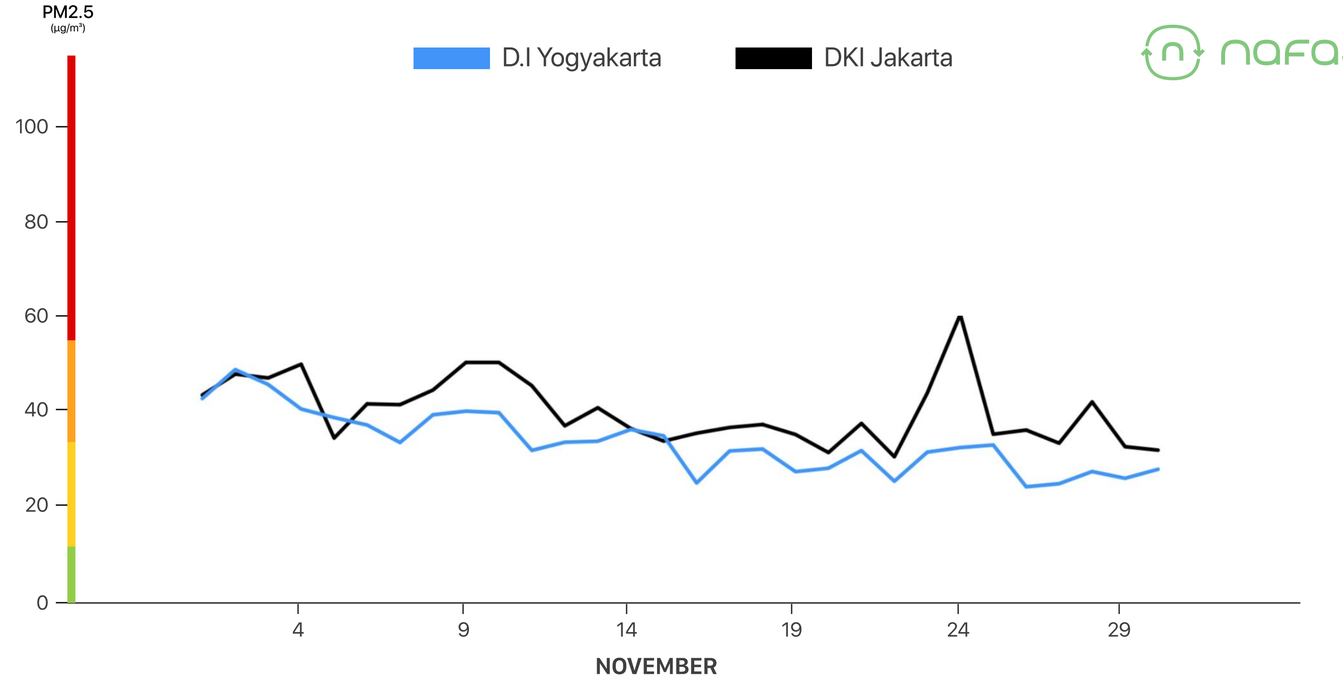
Special Region of Yogyakarta

November 2023

The cultural city of Yogyakarta has relatively friendly air conditions, with the majority of Breath sensors indicating air quality in the range of 26-34 µg/m³. However, there is one area that is quite polluted, namely Sayidan, with a PM2.5 level exceeding the WHO standard by 9 times (45 µg/m³).

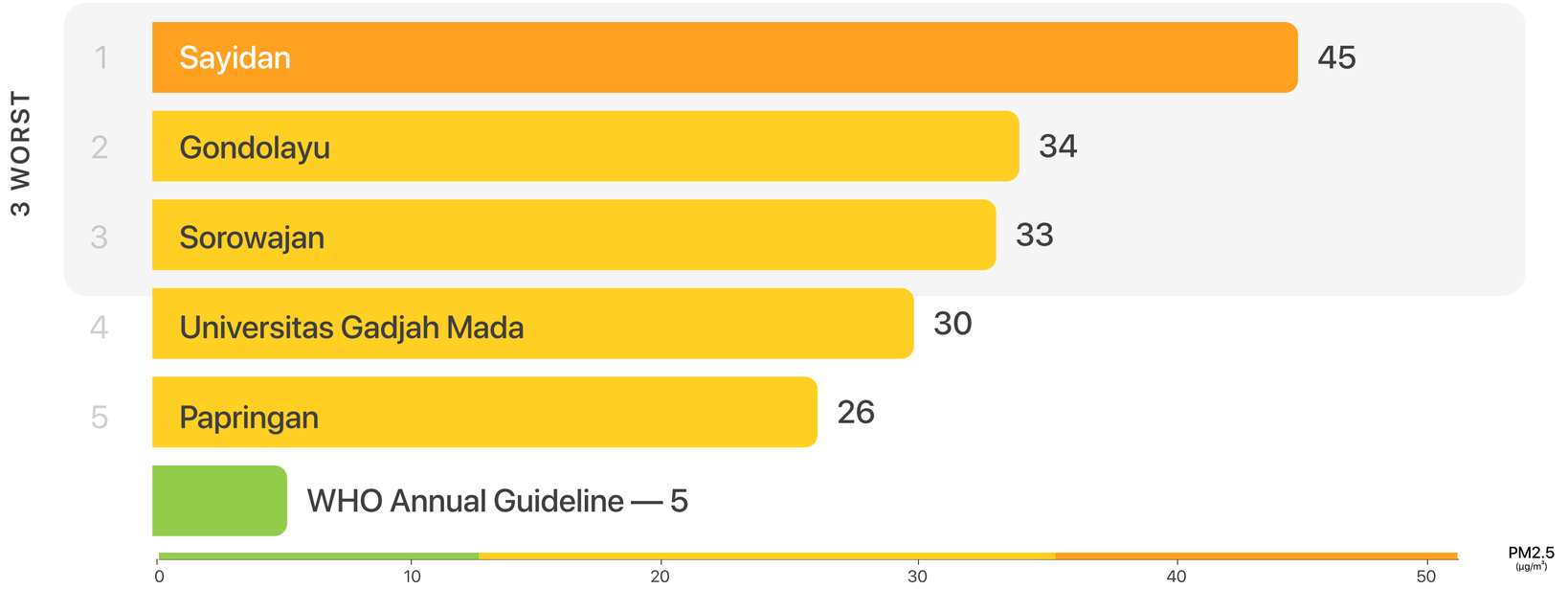
- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

D.I YOGYAKARTA VS DKI JAKARTA



16%

better than DKI Jakarta

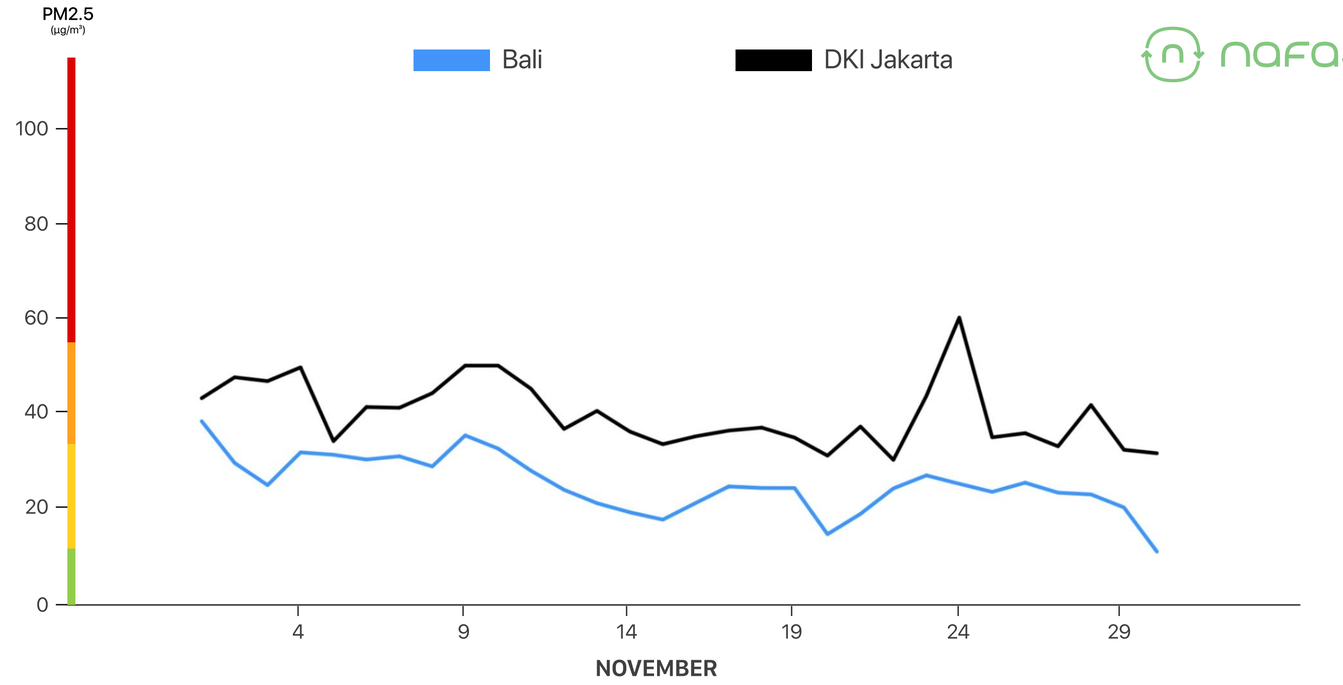


Bali

November 2023

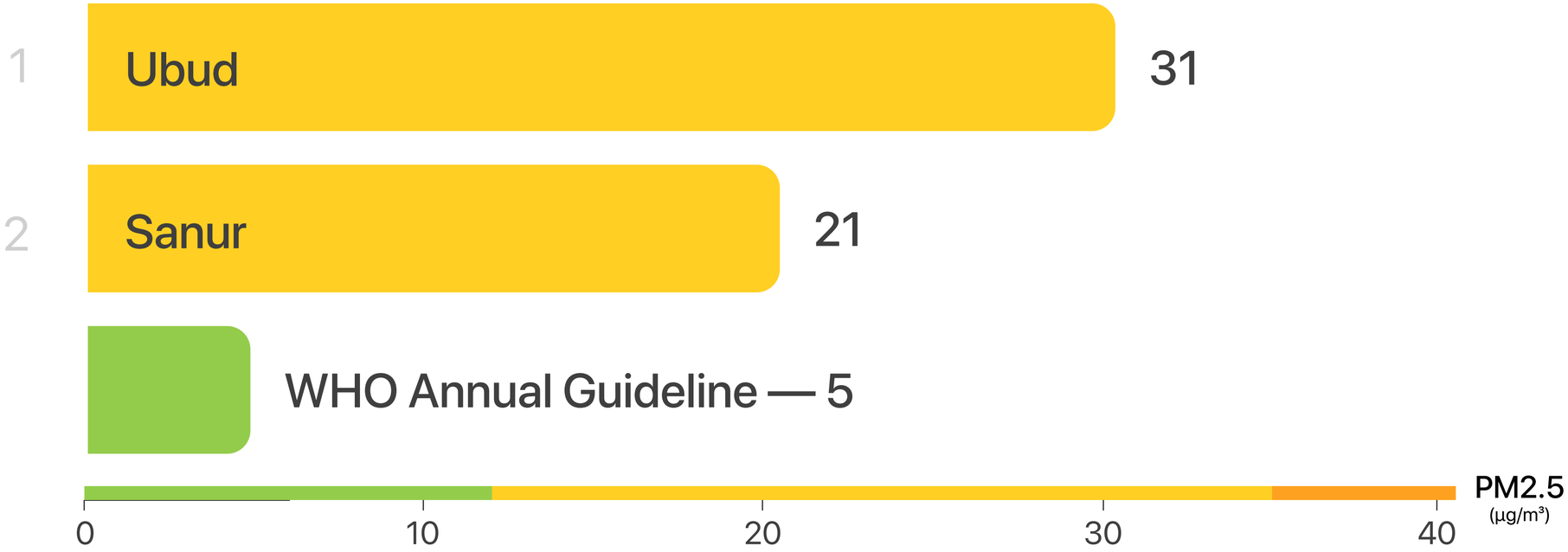
Securing the third position on the podium for the best air quality, Bali demonstrates air conditions that are 35% better than the average in DKI Jakarta! Air pollution also shows a trend that tends to decrease towards the end of November.

BALI VS DKI JAKARTA



35%

better than DKI Jakarta



- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

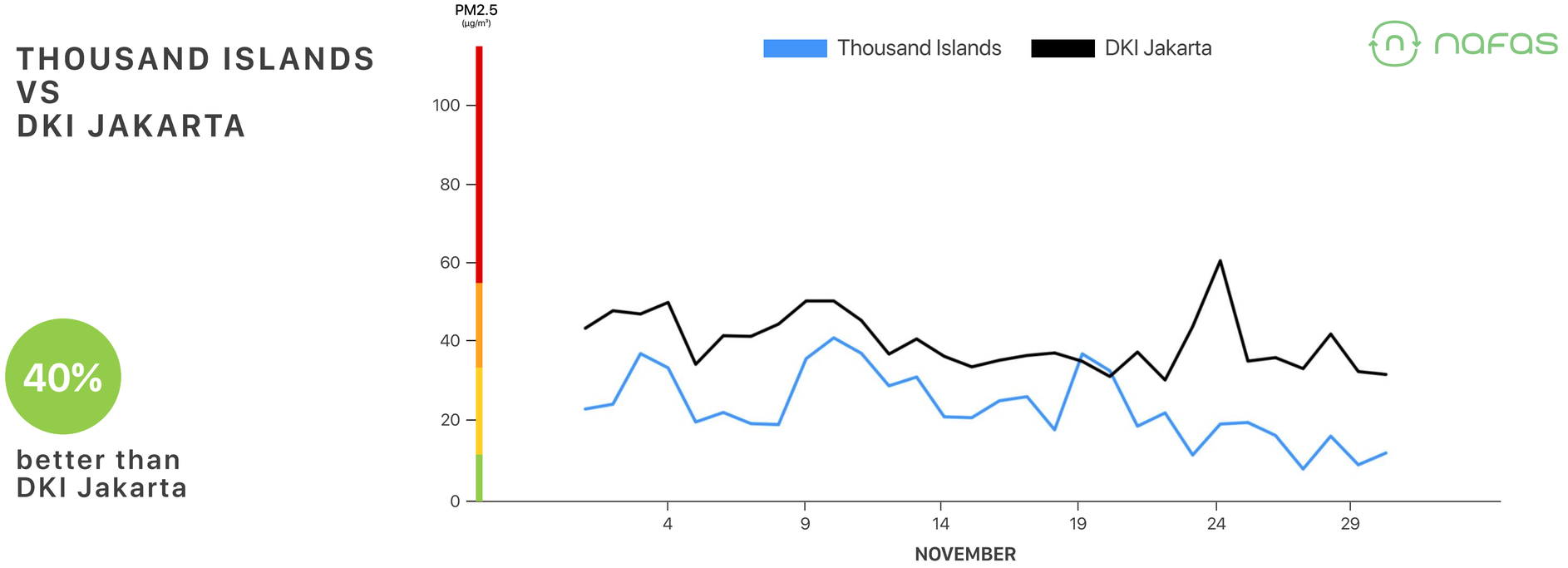
Thousand Islands

November 2023

Air pollution in the Thousand Islands shows a notable decreasing trend in November. The air quality in Desa Laguna, Thousand Islands, indicates a relatively low PM2.5 concentration at 24 µg/m³, which is considered quite healthy!

- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

THOUSAND ISLANDS VS DKI JAKARTA



40%

better than DKI Jakarta

1 Desa Laguna 24

WHO Annual Guideline— 5

Belitung

November 2023

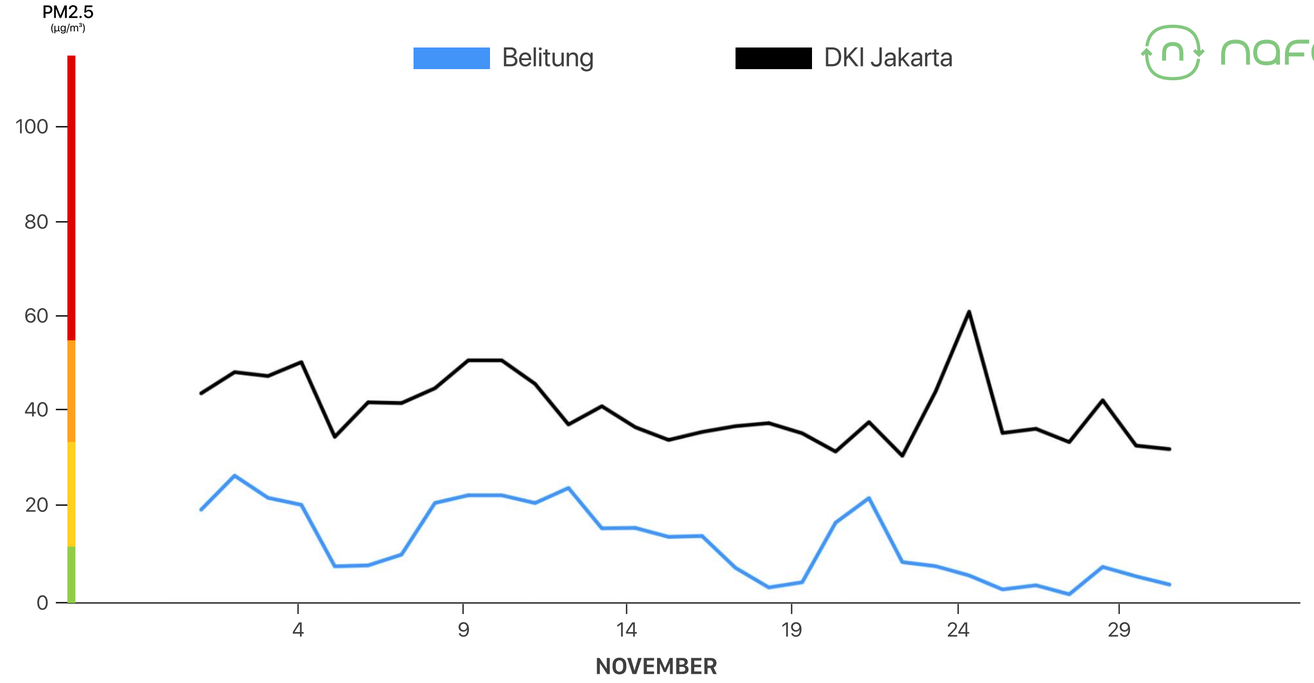
The champion for the cleanest air goes to Belitung again! With an average air quality 68% healthier than DKI Jakarta, this island region successfully maintains its air quality at 13 µg/m³, well within the National Ambient Air Quality Standard (15 µg/m³).

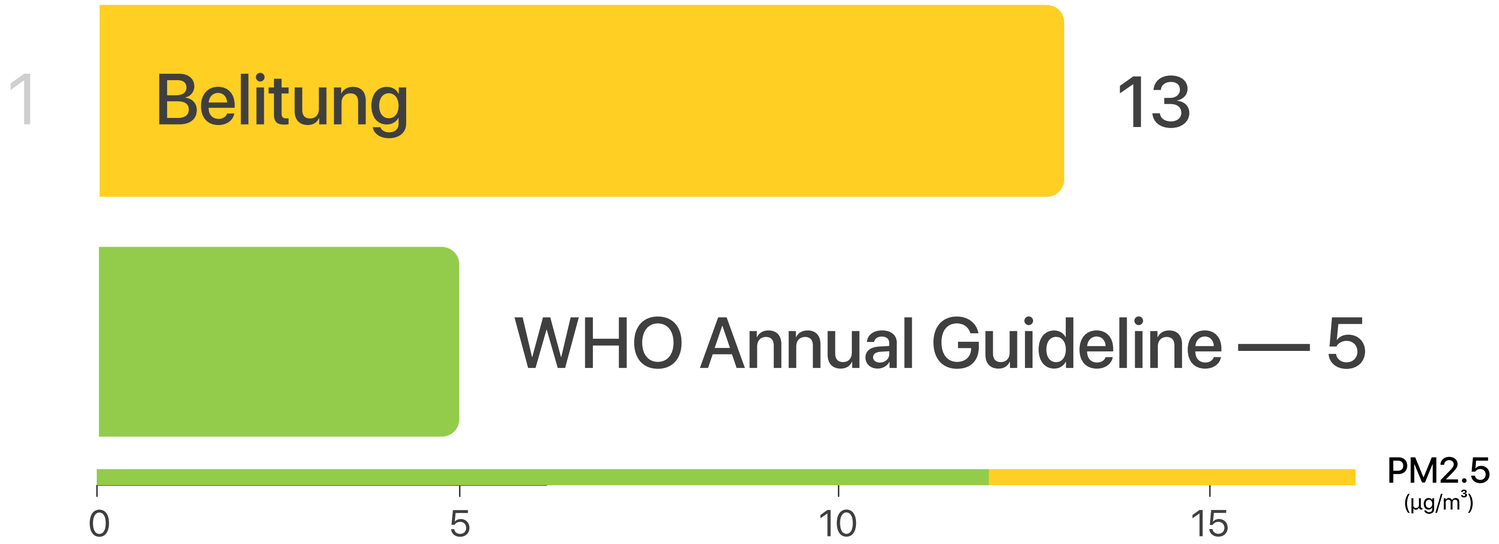
- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

BELITUNG VS DKI JAKARTA

68%

better than DKI Jakarta

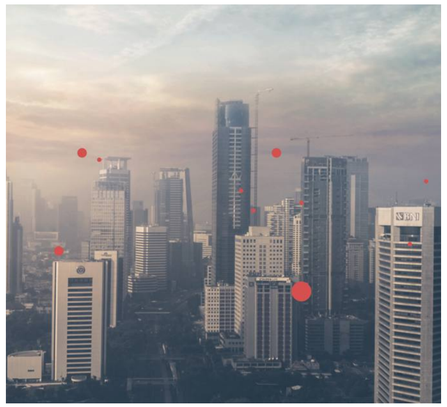




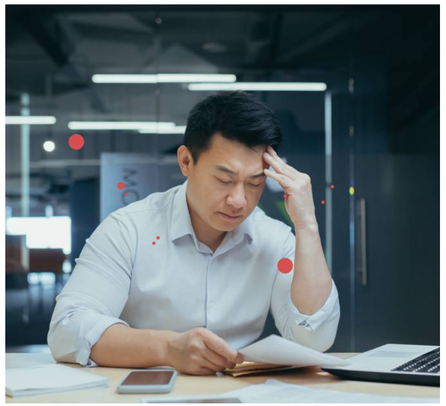
Almost All Outdoor Air Pollution Can Penetrate Indoors

Given the tiny dimensions of PM2.5 particles, they can easily seep through doors and windows in homes, schools, and campuses. In office buildings, pollutants might infiltrate through malfunctioning central air conditioning systems, causing us to breathe air that's nearly as polluted as the outside atmosphere.

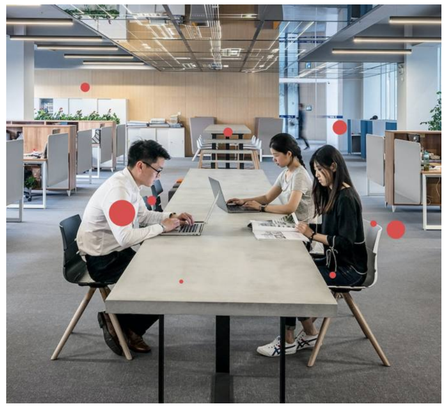
Browse the articles below for a deeper understanding of indoor air quality and its implications for our health.



OurBuildings are Broken



How Indoor Air Pollution Impacts Us in Offices



How Much Pollution Gets Inside Our Offices

Clean Air at the Office: Just a Benefit or Should It be a Standard

How Indoor Pollution Impacts Our Children in Schools

Implementing Clean Air Zones: A Proven Solution for Enhancing Office Air Quality

CAZ Stories is a series of articles that spotlight the significant impact of Clean Air Zones on diagnosing and improving indoor air quality issues for businesses in Indonesia.

Browse the articles below to read some of the inspiring CAZ Stories.

CAZ Stories: Nafas Improved Indoor Air Quality by 89% at Mighty Minds Preschool

CAZ Stories: How Nafas Reduced Indoor Pollution by 70% at AC Ventures Office

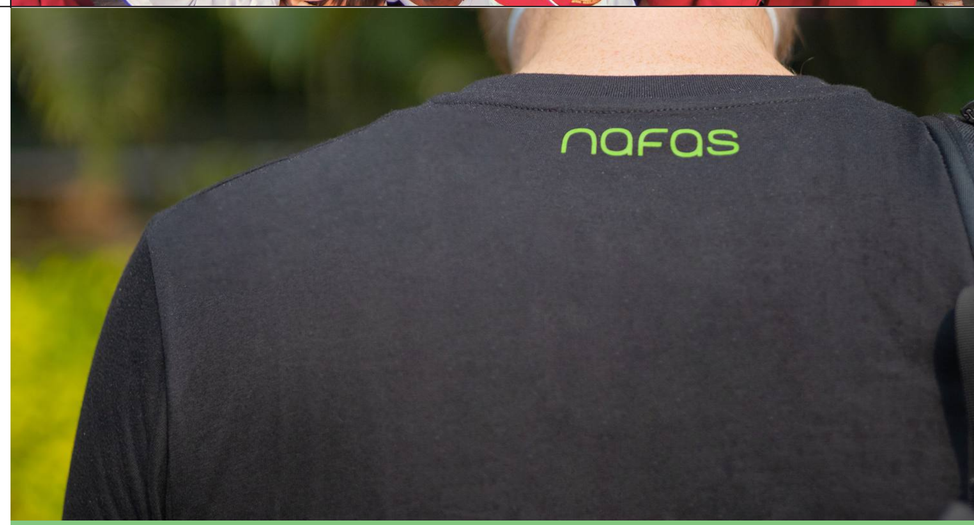
CAZ Stories: A Threefold Improvement in Indoor Air Quality at Pace Performance

Wear. Breathe. Support

The **"Itu Bukan Kabut"** (That's Not Fog) T-shirt is now available at tokopedia

This isn't just any T-shirt; it's a statement of care, woven from sustainable TENCEL™ Lyocell and Modal fibers, ensuring you look good while doing good.

A portion of the sales will directly contribute to the **Clean Air Schools Fund,** dedicated to providing healthy air inside the classrooms across Indonesia.



tokopedia.com/nafasindonesia

Download the app and check the air quality in your area now!

nafas

Available on

Download on the App Store

GET IT ON Google Play

Follow us on social media:

@nafasidn

www.nafas.co.id