Building A Cleaner & Healthier Indonesia
Air pollution is both an environmental and health problem

According to the WHO, air pollution is the #1 environmental threat to human health around the world

- Human activity causes pollution
- Concentrations of pollutants like PM2.5 increase
- People breathe more pollution at higher concentrations
- People get sicker and die earlier
WHAT IS NAFAS?
Nafas is building Indonesia’s largest air quality ecosystem, making breathing healthy air quality a reality in polluted cities

Outdoor Air Quality Monitoring

Mobile App

Locally Developed & Manufactured IoT Devices

Clean Air As A Service Subscription Solution

- Over 180+ outdoor air quality monitors in 15 cities
- Continuous data helps people make lifestyle decisions
- Over 6 million data points per month
- <5 days deployment time for new sensors

- Displays real-time data from outdoor air quality network
- Shares information to users to make lifestyle decisions based on air pollution
- Connects and controls locally developed IoT devices
- Provides access to air quality data - indoor and outdoor

- One of the only consumer electronics R&D startups in Indonesia
- Air monitor fully designed and manufactured in Indonesia
- Air purifier electronics designed and assembled in Indonesia
- Awaiting TKDN certification

- Indonesia’s first connected indoor air quality management system - including monitoring and filtration
- Assetless subscription model with zero upfront cost to business
- ESG and Sustainability ratings for Workplace Health & Safety fulfilled using real data

Jabodetabek | Bandung | Surabaya

Yogyakarta | Semarang | Bali

WHAT IS NAFAS?
Today, Nafas Has the Largest Outdoor Air Quality Network in Indonesia

Current Network: 180+ Sensor Locations in 15 Cities
Nafas Conducts Analysis of Air Quality Data In Ways Never Before Seen in Indonesia

- Individual Location Analysis
- 24 Hour Averages
- Regional Differentiation
- Transboundary Pollution Analysis
- Impact of Atmosphere
- Comparison of Indoor vs Outdoor Pollution

Source: Nafas internal dashboard
Jakarta consistently falls into the top worst polluted capitals in the world.

<table>
<thead>
<tr>
<th>Year</th>
<th>Ranking</th>
<th>Capital</th>
<th>Pollutant Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>12/107</td>
<td>Jakarta</td>
<td>94.6</td>
</tr>
<tr>
<td>2020</td>
<td>5/85</td>
<td>Jakarta</td>
<td>46.2</td>
</tr>
<tr>
<td>2021</td>
<td>9/92</td>
<td>Jakarta</td>
<td>39.7</td>
</tr>
<tr>
<td>2022</td>
<td>20/116</td>
<td>Jakarta</td>
<td>57.1</td>
</tr>
</tbody>
</table>

Source: IQAir
All Nafas Sensors Network
(Java, Bali, Belitung, Kep. Seribu)
2021 - 2023

PM2.5
(µg/m³)

2021: 42
2022: 38
2023: 38

- Green: Good
- Yellow: Moderate
- Orange: Unhealthy for Sensitive Groups
- Red: Unhealthy
City Rankings

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

1. South Tangerang - 60
2. Greater Bandung - 57
3. Tangerang - 55
4. Bogor - 54
5. Depok - 51
6. Bekasi - 51
7. DKI Jakarta - 48
8. Greater Malang - 48
9. D.I Yogyakarta - 47
10. Semarang - 44
11. Surabaya - 42
13. Belitung - 28
14. Bali - 22

- Good
- Moderate
- Unhealthy for Sensitive Group
- Unhealthy

National Ambient Air Quality Standard—15
WHO Annual Guideline—5
City Rankings

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

<table>
<thead>
<tr>
<th>City</th>
<th>SEP</th>
<th>OCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tangerang</td>
<td>57</td>
<td>60</td>
</tr>
<tr>
<td>South Tangerang</td>
<td>56</td>
<td>57</td>
</tr>
<tr>
<td>Bogor</td>
<td>48</td>
<td>55</td>
</tr>
<tr>
<td>Bekasi</td>
<td>48</td>
<td>54</td>
</tr>
<tr>
<td>Greater Bandung</td>
<td>48</td>
<td>51</td>
</tr>
<tr>
<td>Depok</td>
<td>45</td>
<td>51</td>
</tr>
<tr>
<td>DKI Jakarta</td>
<td>44</td>
<td>48</td>
</tr>
<tr>
<td>Semarang</td>
<td>39</td>
<td>47</td>
</tr>
<tr>
<td>D.I Yogyakarta</td>
<td>38</td>
<td>44</td>
</tr>
<tr>
<td>Greater Malang</td>
<td>37</td>
<td>42</td>
</tr>
<tr>
<td>Surabaya</td>
<td>36</td>
<td>39</td>
</tr>
<tr>
<td>Kep. Seribu</td>
<td>27</td>
<td>28</td>
</tr>
<tr>
<td>Belitung</td>
<td>22</td>
<td>25</td>
</tr>
<tr>
<td>Bali</td>
<td>21</td>
<td>22</td>
</tr>
</tbody>
</table>

- **Good**
- **Moderate**
- **Unhealthy for Sensitive Group**
- **Unhealthy**
Top 10 Most Polluted Location

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

<table>
<thead>
<tr>
<th>Rank</th>
<th>Location</th>
<th>PM2.5</th>
<th>Previous Month</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Serpong, South Tangerang</td>
<td>76</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Karangsari, Tangerang</td>
<td>75</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Babakan, South Tangerang</td>
<td>71</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>Parung Panjang, Bogor</td>
<td>71</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Tarumajaya, Bekasi</td>
<td>70</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>Sindang Jaya, Tangerang</td>
<td>69</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Semanan, West Jakarta</td>
<td>68</td>
<td>RE-ENTRY</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>Kertamulya, West Bandung Regency</td>
<td>68</td>
<td>NEW</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Bedahan, Depok</td>
<td>68</td>
<td>RE-ENTRY</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>Kembangan Selatan, West Jakarta</td>
<td>66</td>
<td>NEW</td>
<td>1</td>
</tr>
</tbody>
</table>

National Ambient Air Quality Standard — 15
WHO Annual Guideline — 5
# Cigarettes Equivalence

**October 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 berkeleyleaf.org

<table>
<thead>
<tr>
<th>Rank</th>
<th>Location</th>
<th>Number of Cigarettes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Serpong (TANGSEL)</td>
<td>107</td>
</tr>
<tr>
<td>2</td>
<td>Karangsari (TNG)</td>
<td>106</td>
</tr>
<tr>
<td>3</td>
<td>Babakan (TANGSEL)</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Parung Panjang (BGR)</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>Tarumajaya (BKS)</td>
<td>98</td>
</tr>
<tr>
<td>6</td>
<td>Sindang Jaya (TNG)</td>
<td>98</td>
</tr>
<tr>
<td>7</td>
<td>Semanan (JAKBAR)</td>
<td>96</td>
</tr>
<tr>
<td>8</td>
<td>Kertamulya (BDG)</td>
<td>96</td>
</tr>
<tr>
<td>9</td>
<td>Bedahan (DPK)</td>
<td>96</td>
</tr>
<tr>
<td>10</td>
<td>Kembangan Selatan (JAKBAR)</td>
<td>93</td>
</tr>
</tbody>
</table>
Air pollution is a growing problem in Indonesia, both outdoors and indoors.

Jakarta’s outdoor pollution can be 20x above WHO guidelines.

Most of the planet’s population is affected by excessive PM2.5 exposure.

Up to 100% of outdoor pollution gets indoors.

We don’t realize that whatever’s outside is actually inside as well.
Air pollution: A bigger indoor problem

Nafas has identified that nearly 100% of outdoor pollution gets inside our buildings - offices, schools and residences

Outdoor air quality and indoor air quality follow nearly identical trends - the following data is from RDTX Tower, Mighty Minds Pre-School and Dharmawangsa Residence.

This means that when pollution is high outside, it’s very highly likely high inside too.
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Air pollution: A bigger indoor problem

Nafas has identified that nearly 100% of outdoor pollution gets inside our buildings - offices, schools and residences
The impact of PM2.5 pollution goes beyond health and into human cognitive performance - as discovered by Harvard.

- **6%** Increase in Absenteeism
  For every 10 μg/m³ increase of PM2.5 above 15 μg/m³

- **26.6** working hours lost
  For every 1 μg/m³ increase of PM2.5

- **4/5** cognitive tests failed
  Slower response times and worse accuracy for office workers at PM2.5 above 12 μg/m³
Almost 100% of outdoor pollution gets inside.
Indoors we have full control over air quality conditions and the largest chance to impact human health.
Indoor Health & Safety

Air quality data transparency is critical to ensuring the health & safety of employees, staff and families that are living in Jakarta.
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Nafas x Halodoc Health Study

Each time PM2.5 in Jabodetabek increased by 10 ug/m³, number of teleconsultations on Halodoc would increase up to 34% within 48 hours.
Nafas x Halodoc Health Study

Each time PM2.5 in Jabodetabek increased by 10 ug/m3, number of teleconsultations on Halodoc would increase up to 34% within 48 hours.
Thank You