

Protection of ambient air in Krakow



Protection of ambient air

Regulations for the protection of ambient air are laid down by the **Environment Protection Law**.

The air quality in Krakow is influenced by the following factors:

- Krakow's geographical situation – in a valley surrounded by hills,
- calm atmosphere and frequent temperature inversions – poor ventilation in the city,
- emissions.

For many years, the goal of achieving the required air quality has been high among the priorities of Krakow's local authorities. Numerous actions are undertaken to improve the quality of air and to allow residents to live in a healthy environment. **Those actions are carried out in accordance with the guidelines covered by the Air Protection Programmes (Polish: *Programy Ochrony Powietrza, POP*), adopted and updated every three years.**



What is the Air Protection Programme?

The Air Protection Programme is a remedy document constituting local law. The Air Protection Programme aims to indicate the reasons why air quality standard thresholds are being exceeded, and subsequently determining corrective actions that will help improve the air quality.



What is the creation process of the Air Protection Programme?

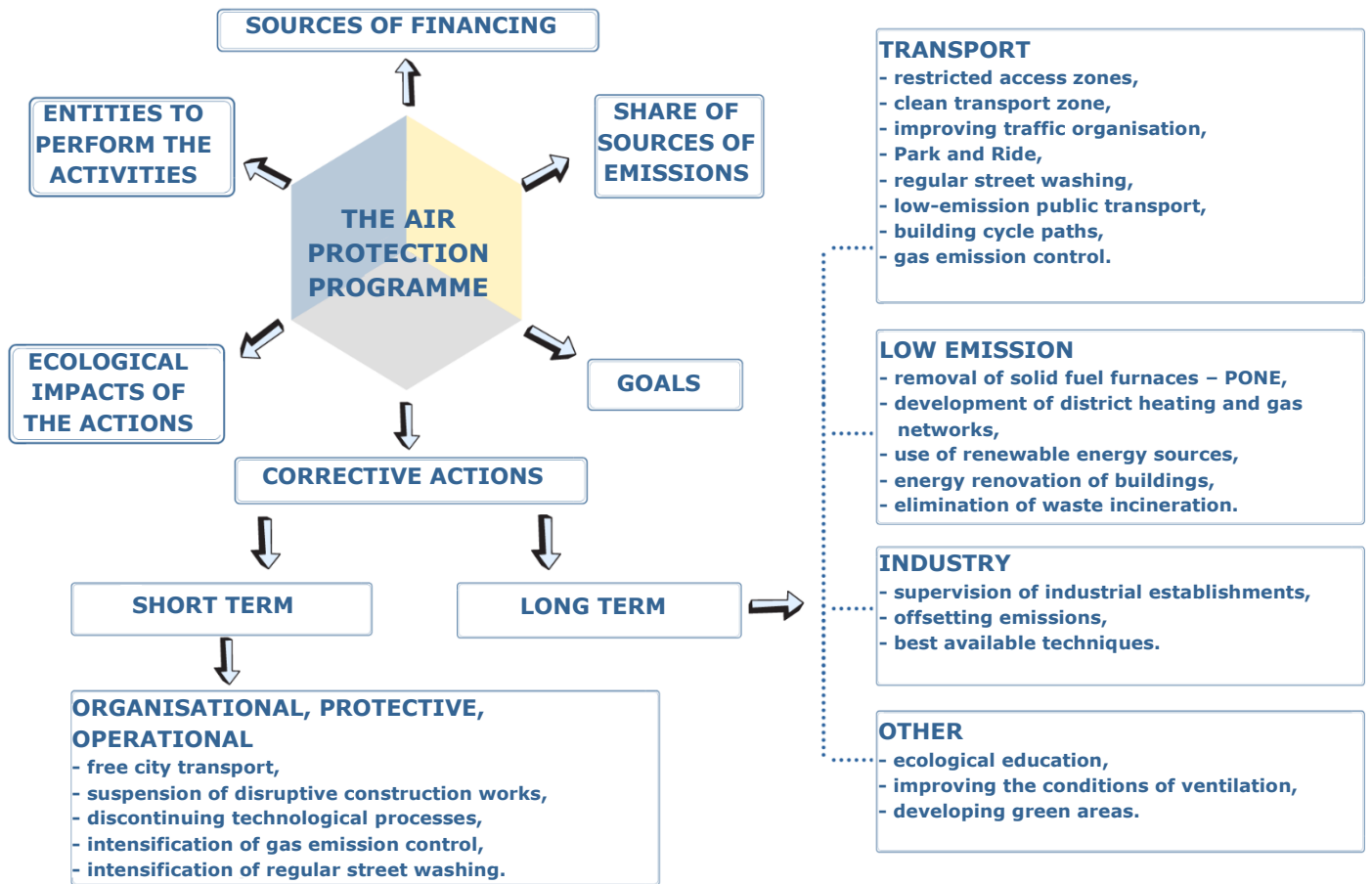
The first step of the process is assessing the air quality.

In the second step of the process – if the thresholds for air-borne substances are exceeded – the Provincial Board is obliged to develop a corrective action plan.

The third step is to determine the following, under the Air Protection Programme:

- the area falling within the scope of the programme – in our case, the current POP covers the following zones: the metropolitan area of the City of Krakow, the area of the city of Tarnów and the Małopolskie Province,
- the substances for which the quality standard thresholds have been exceeded,

- the actions necessary to restore the standards,
- a schedule of material and financial actions,
- the entities responsible for exercising the actions.



The Air Protection Programme for the Małopolskie Province

In 2005, because the thresholds for air-borne substances were exceeded, the first Air Protection Programme was developed by the governor of the Małopolskie Province. The next programme was developed in 2009 by the Provincial Board and updated subsequently in 2013, 2017 and 2020.

Air Protection Programmes for the Małopolskie Province:

- POP 2005: <https://edziennik.malopolska.uw.gov.pl/legalact/2005/749/5405/> (text in Polish),
- POP 2009: <https://edziennik.malopolska.uw.gov.pl/legalact/2010/56/377/> (text in Polish),
- POP 2013: https://edziennik.malopolska.uw.gov.pl/WDU_K/2013/6007/akt.pdf (text in Polish),
- POP 2017: https://edziennik.malopolska.uw.gov.pl/WDU_K/2017/811/akt.pdf (text in Polish),
- POP 2020: https://edziennik.malopolska.uw.gov.pl/WDU_K/2020/6337/akt.pdf (text in Polish),



The Air Protection Programme for the Małopolskie Province 2023

The Air Protection Programme for the Małopolskie Province 2023 is currently binding. The new update is available on the website: <https://powietrze.malopolska.pl/program-ochrony-powietrza/>



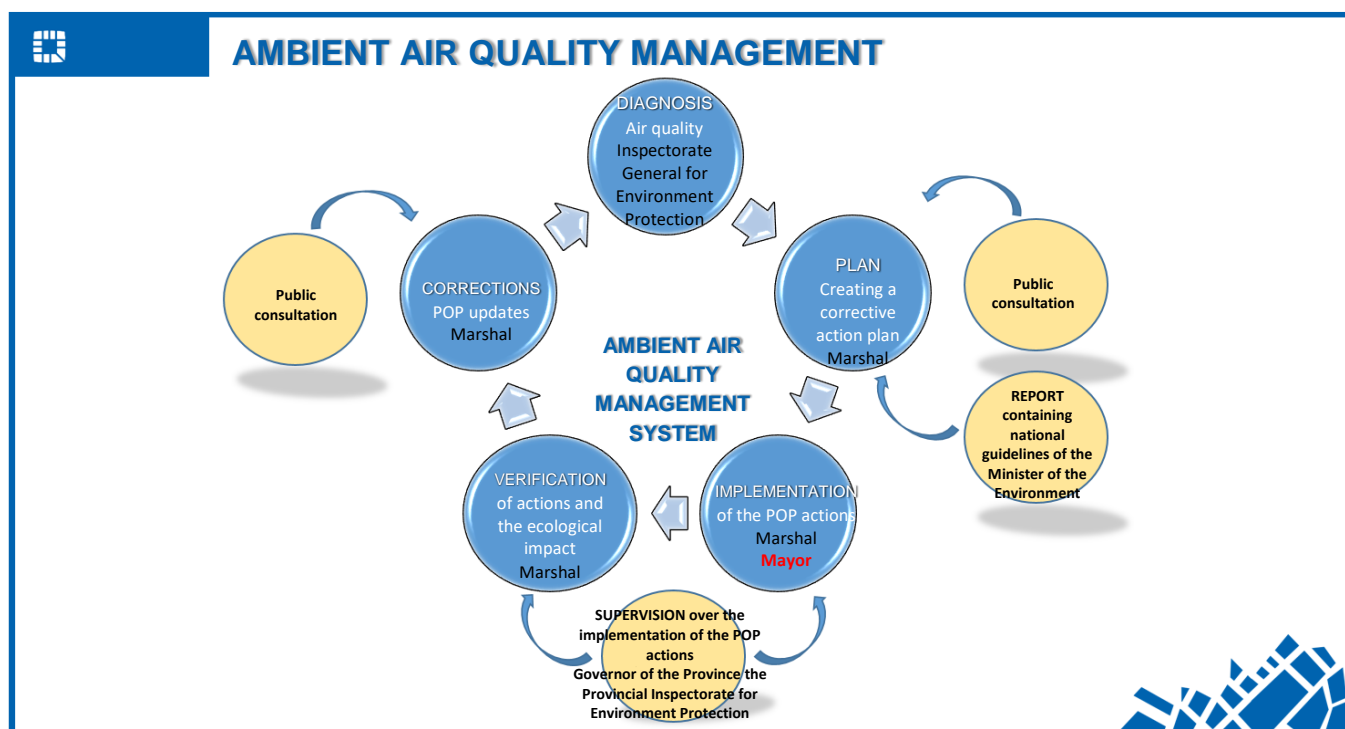
Implementation of the Air Protection Programmes 2008–2022

Documents summarising the implementation of the Air Protection Programmes for the Małopolskie Province in the years 2008–2022 are available on the website of the Marshal's Office of Małopolskie Province (link: <https://powietrze.malopolska.pl/program-ochrony-powietrza/efekty-realizacji/> – text in Polish).

The ecological impact

In 2023, the Municipality of Krakow was subject to an inspection by the Małopolskie Provincial Inspector for Environment Protection. The purpose of the inspection was to assess the actions performed under the Air Protection Programme in 2017–2019, with a particular focus on the extent to which they have actually been implemented and achieved the planned ecological impact.* The inspectors of the Provincial Inspectorate for Environment Protection stated that the actions under the POP for the Municipality of Krakow had been performed in good time and had achieved the required ecological impact.

* The ecological impact is reflected by reductions in pollutants introduced into the air achieved as a result of implementing the corrective actions set out under the programme.



Anti-Smog Resolution

On 15 January 2016, councillors adopted a resolution limiting the operations of installations that function on the basis of burning fuels, introduced to the area of the Municipality of Krakow.

SINCE 1 SEPTEMBER 2019, THE BURNING OF SOLID FUELS IN THE AREA OF THE CITY OF KRAKOW HAS BEEN PROHIBITED.



What are the provisions of the Anti-Smog Resolution?

No solid fuels are allowed in installations

Fuels allowed for combustion:

- Gaseous fuels, i.e. high-methane or nitrogen-rich natural gas (including liquefied natural gas), propane-butane, agriculture biogas or other types of flammable gas,
- light fuel oil.

However, the resolution does not restrict the possibility of using district heating, electricity, heat pumps, photovoltaic installations and solar collectors.

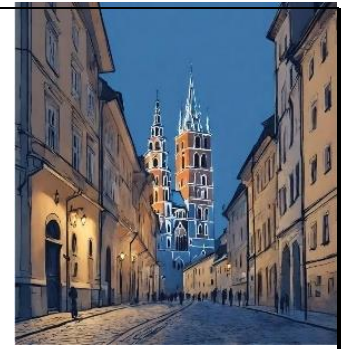
The resolution does not apply to installations requiring an integrated permit, a permit for emission of gases and dust into air or the registration of the installation – Article 96(8) of the Environment Protection Law.

Link to the resolution (text in Polish):

https://edziennik.malopolska.uw.gov.pl/WDU_K/2016/812/akt.pdf



**Installations used in gastronomy
(e.g. pizza ovens, barbecues and grills)**



USE PERMITTED	USE PROHIBITED
<p>Devices and equipment used in mobile gastronomy facilities, i.e. during events or occasional parties (because, in accordance with the definition set out in the Environment Protection Law, these devices and equipment are not installations, hence the provisions of the Anti-Smog Resolution are not applicable).</p>	<p>Installations used in gastronomy adapted to handle not more than 500 people a day.</p> <p>These installations are not subject to registration pursuant to Article 152 of the Environment Protection Law.</p>
<p>fixed installations and installations permanently operating in one place – if they are installations used in gastronomy adapted to handle more than 500 people a day.</p> <p>Such installations are subject to registration at an environmental protection agency pursuant to Article 152 of the Environment Protection Law. Pursuant to Article 96(8) of this law, they are exempted from the prohibition imposed by the Anti-Smog Resolution.</p> <p>Entities using such installations are obliged to register the installations.</p> <p>The Provincial Inspector for Environment Protection may suspend the operation of an installation that has not been registered or is operating in breach of the requirements set out in the notice (pursuant to Article 367 of the Environment Protection Law).</p>	



Barbecues, grills, grates, roasters and smokehouses used by residents

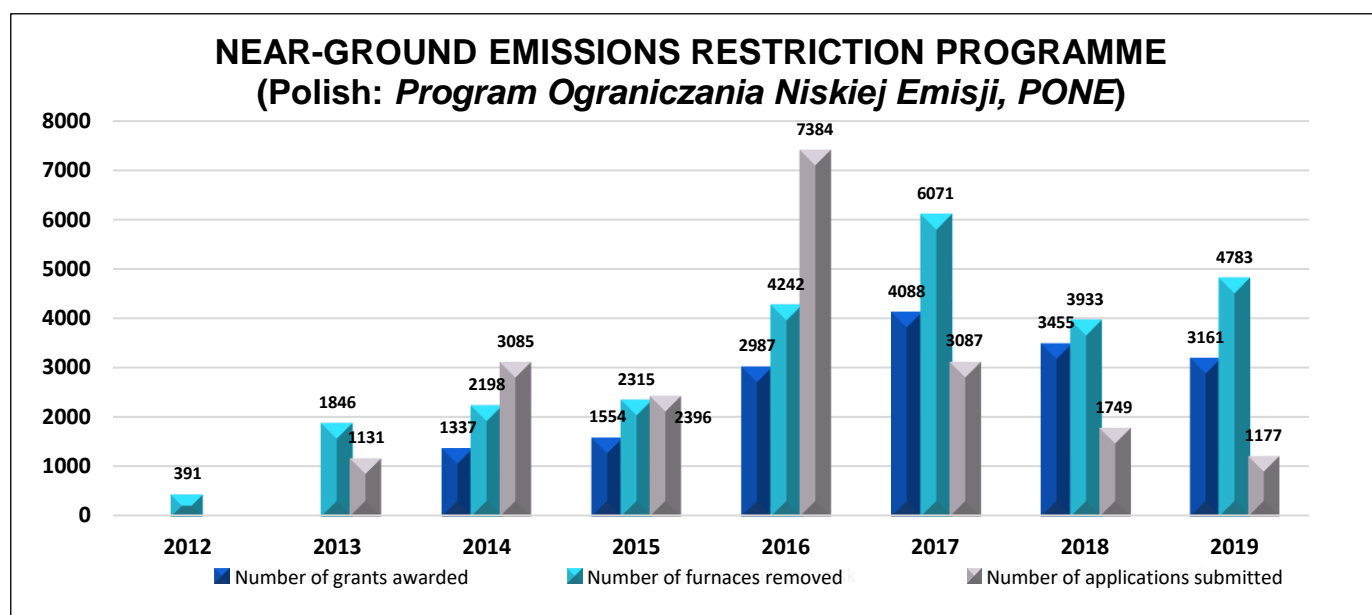


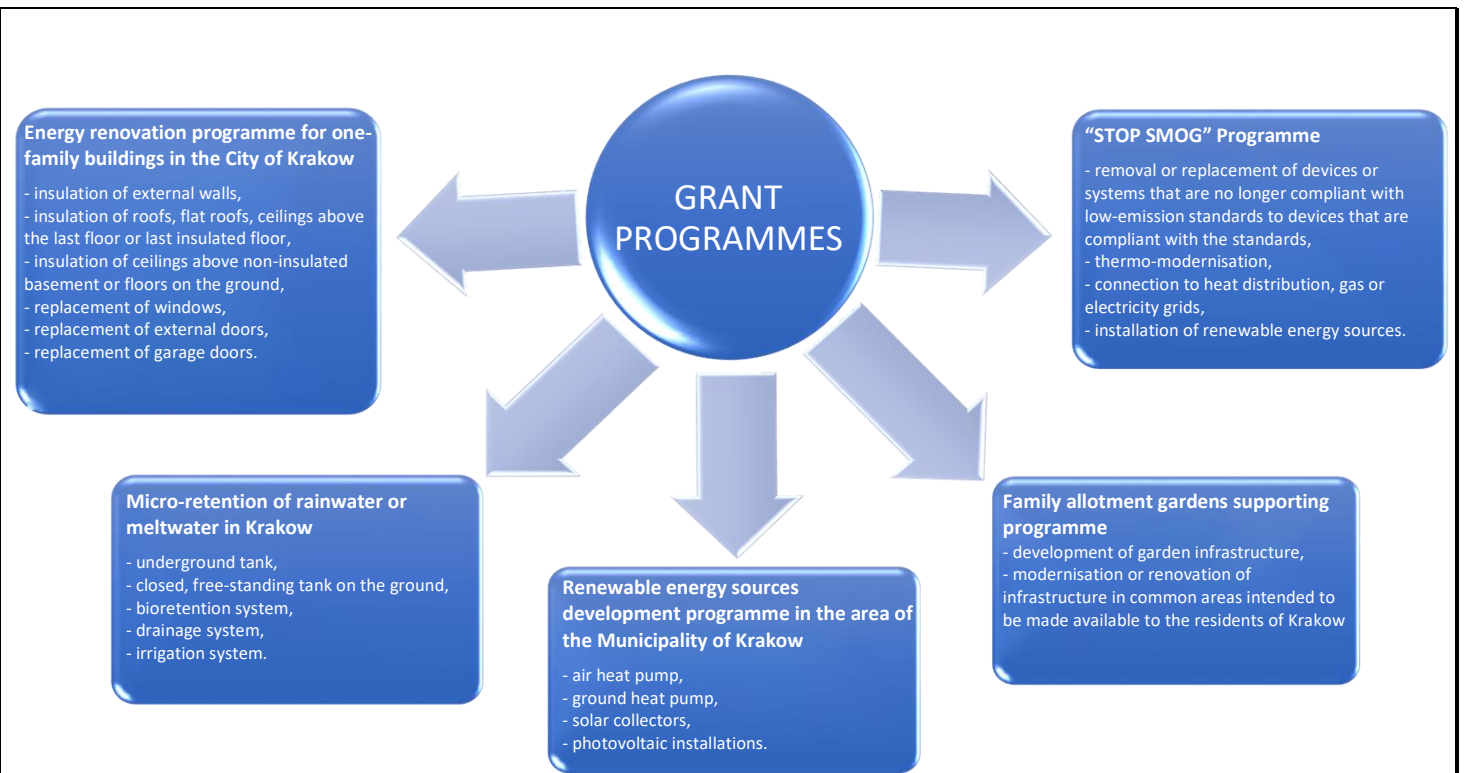
USE ALLOWED	USE PROHIBITED
<p>portable lightweight garden equipment (barbecues, grills, grates, roasters)</p> <p>Smokehouses – if the emissions are introduced into air in an organised manner, i.e. using technical measures intended for this purpose, then such an installation requires an emissions permit or must be registered (depending on the scale of emissions produced) due to the controlled technological process of generating smoke with specific characteristics, taking place in the smokehouse.</p>	<p>stationary installations, i.e. fixed, heavyweight equipment (barbecues, grills, grates, roasters), constructions permanently operating in one place.</p> <p>Smokehouses – if the emissions are introduced into air in an disorganised manner, i.e. not using technical measures intended for this purpose (a technical measure: e.g. chimney, mechanical ventilation).</p>

Experience of the Municipality of Krakow

The air quality has improved thanks to the consistent execution of policy by the City in cooperation with the Air Protection Programmes developed under an air quality management system.

The large-scale grant programmes and support programmes for residents that have been implemented were of vital importance. The success would not have been possible without the significant involvement of the residents of Krakow and their participation in the process of replacing furnaces. The residents of Krakow have shown considerable responsibility and ecological awareness by deciding to replace their furnaces. As a result of these actions, the share of local sources of pollution in the City, and their influence on concentrations at measuring stations, has significantly decreased. Currently, almost 100% of the city's buildings are ecologically heated.





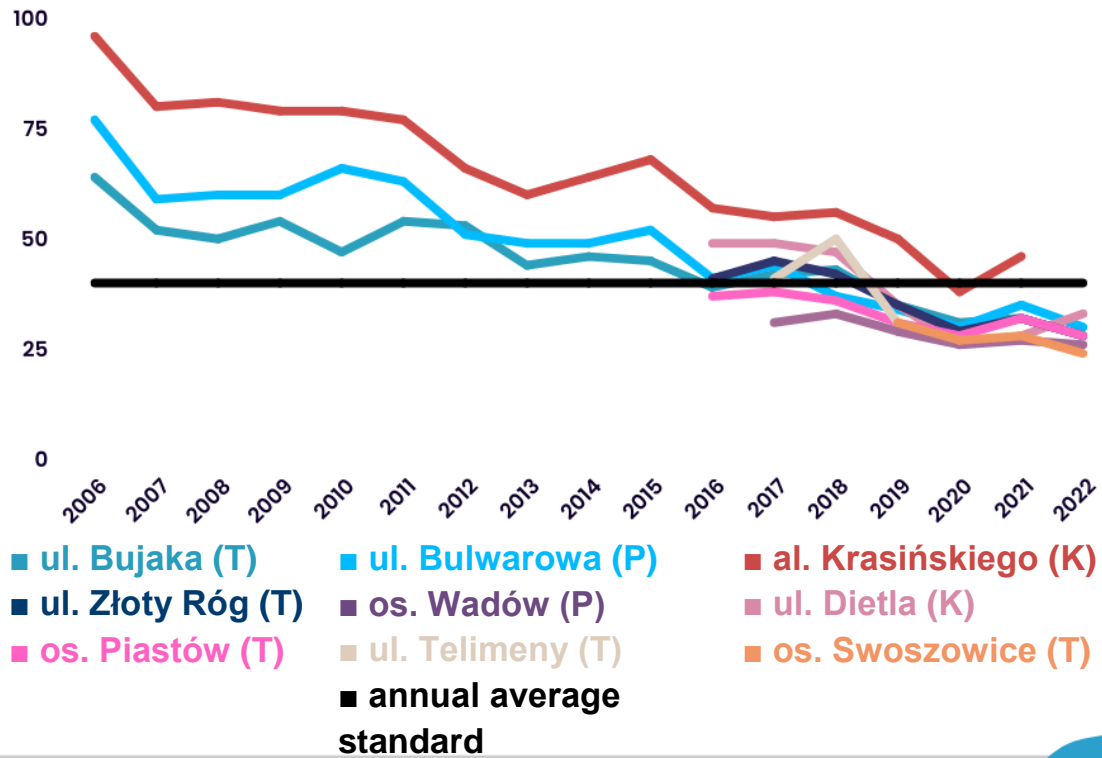
Implementation results

As a result of consistently implemented actions in accordance with the Air Protection Programmes, the concentrations of substances recorded by monitoring sites are continuously dropping.

PM10 particulate matter

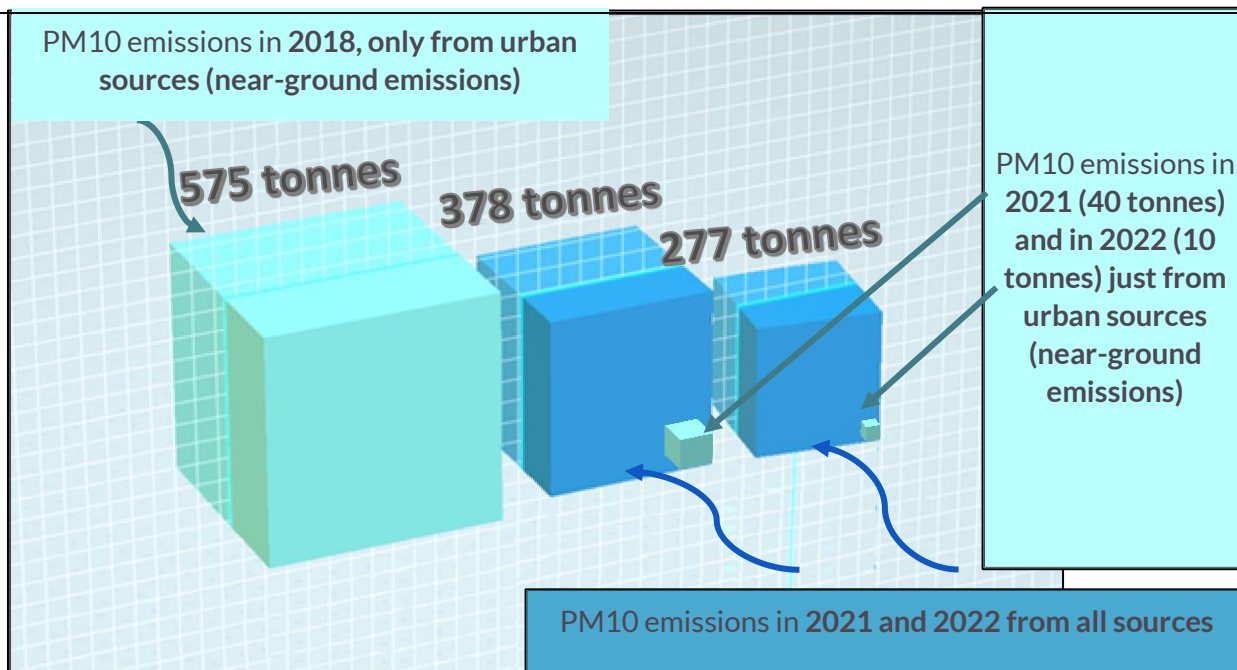
In 2022, seven out of eight monitoring stations recorded values of **the annual average concentration of PM10 particulate matter** complying with the standard (a renovation of the City Heat Distribution Company's installation meant there was no assessment for al. Krasieńskiego in 2022).

ANNUAL AVERAGE CONCENTRATION OF PM10 PARTICULATE MATTER 2006–2022

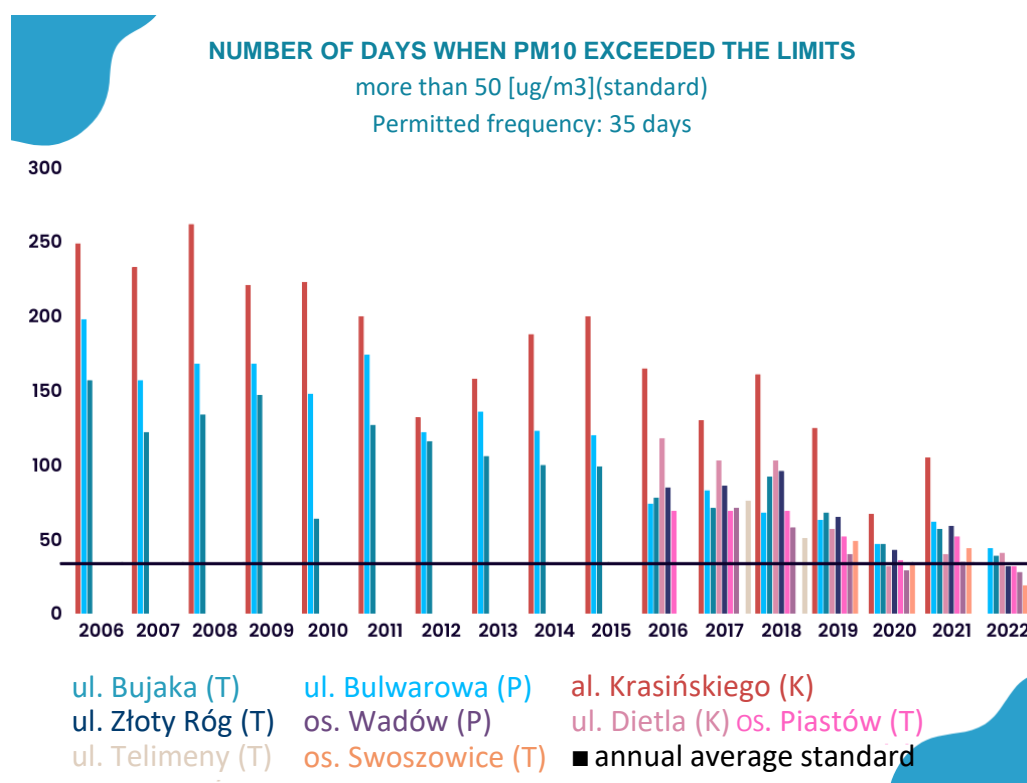


Legend:

Sign	Explanation
K	Communication monitoring station
P	Industry monitoring station
T	Urban-background monitoring station
—	Annual average standard for PM10 particulate matter - 40 µg/m ³



Over the past years, there has been a consistent decrease in the number of days where the **daily average concentration of PM10 particulate matter** has exceeded the limit value.



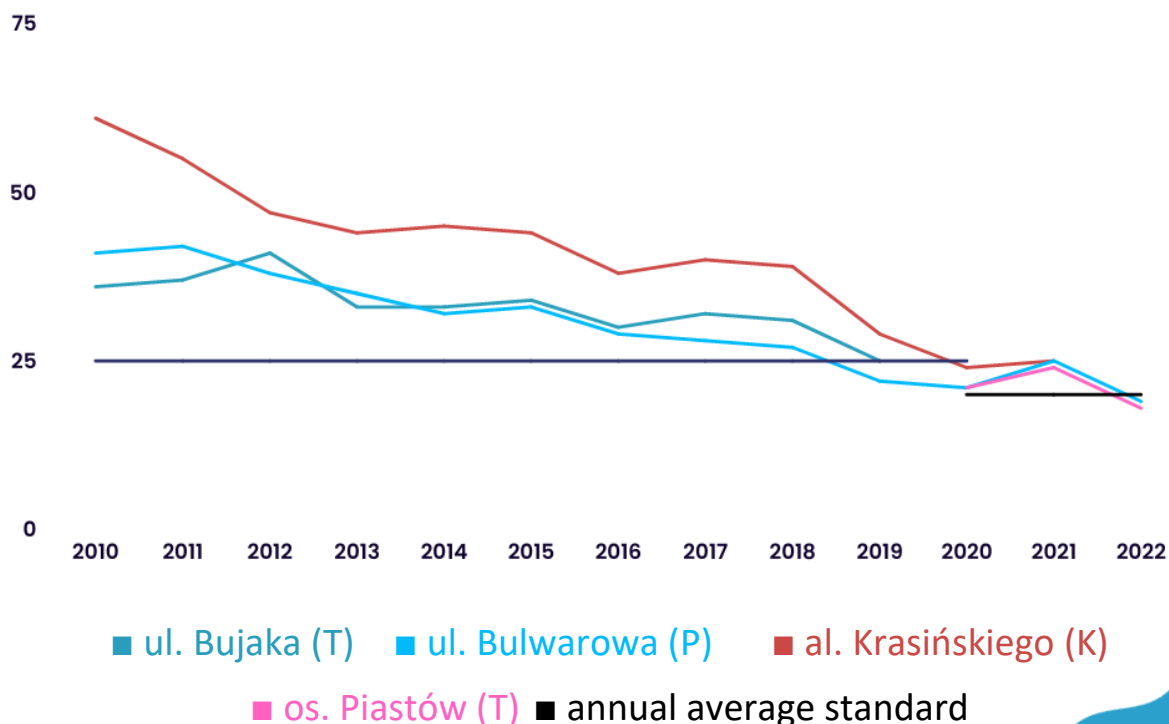
Legend:

Sign	Explanation
K	Communication monitoring station
P	Industry monitoring station
T	Urban-background monitoring station
—	Annual average standard for PM10 particulate matter – 40 µg/m ³

PM2.5 particulate matter

In addition, the annual average concentration of PM2.5 particulate matter has shown decreasing trends over many years. In 2022, a stricter standard (introduced from 2020 onwards) was kept for stations ul. Bulwarowa and os. Piastów (a renovation of the heat distribution installation meant there was no assessment for al. Krasieńskiego in 2022).

ANNUAL AVERAGE CONCENTRATION OF PM2.5 PARTICULATE MATTER 2010–2022

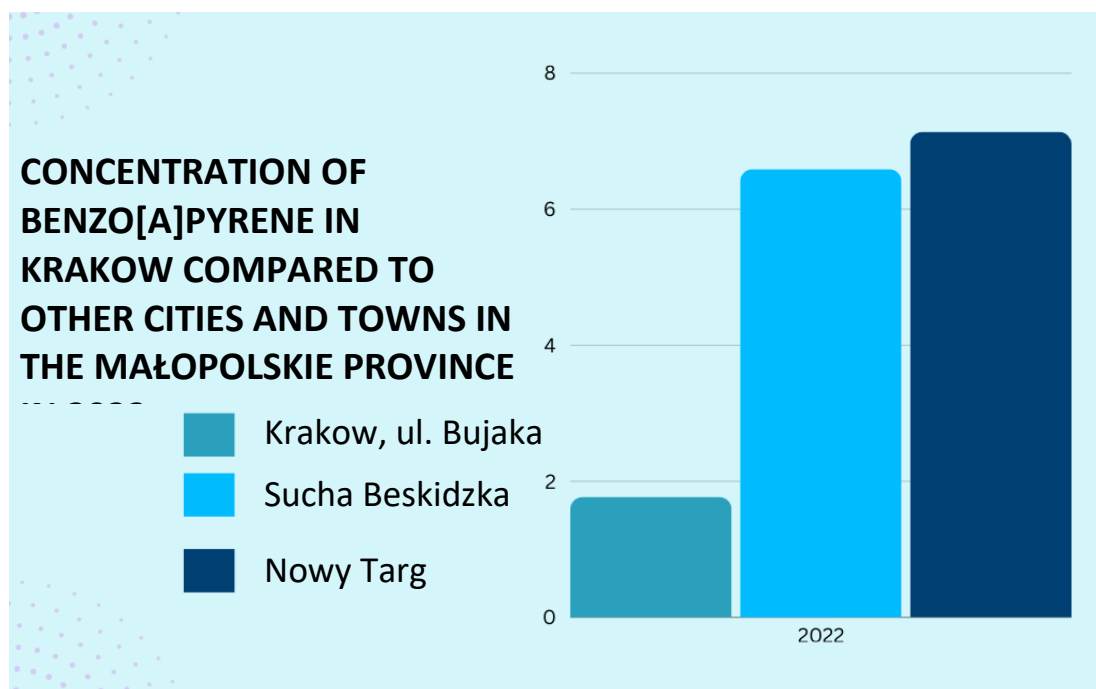


Legend:

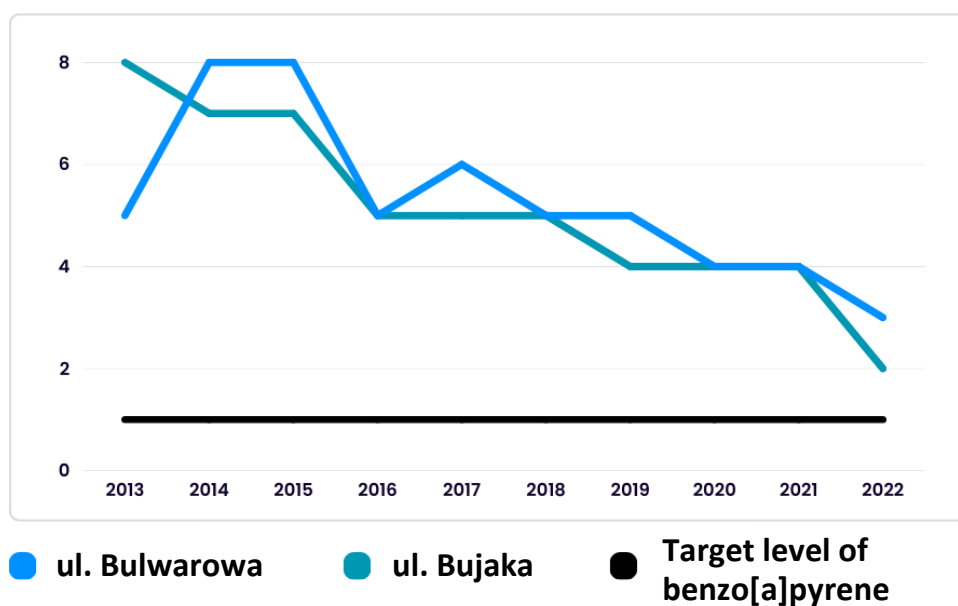
Sign	Explanation
K	Communication monitoring station
P	Industry monitoring station
T	Urban-background monitoring station
—	Annual average standard for PM2.5 particulate matter – 20 µg/m ³ (until 2020 – 25 µg/m ³)

Benzo[a]pyrene

The annual average concentration of benzo(a)pyrene (limit value of 1 ng/m³) was around 5 ng/m³ at the urban-background station (ul. Bujaka) up to 2016. In 2022, its value had decreased to 1.77 ng/m³. For reference: Sucha Beskidzka – 7.14 ng/m³, Nowy Targ – 6.59 ng/m³.



ANNUAL AVERAGE CONCENTRATION VALUES OF BENZO[A]PYRENE 2013–2022

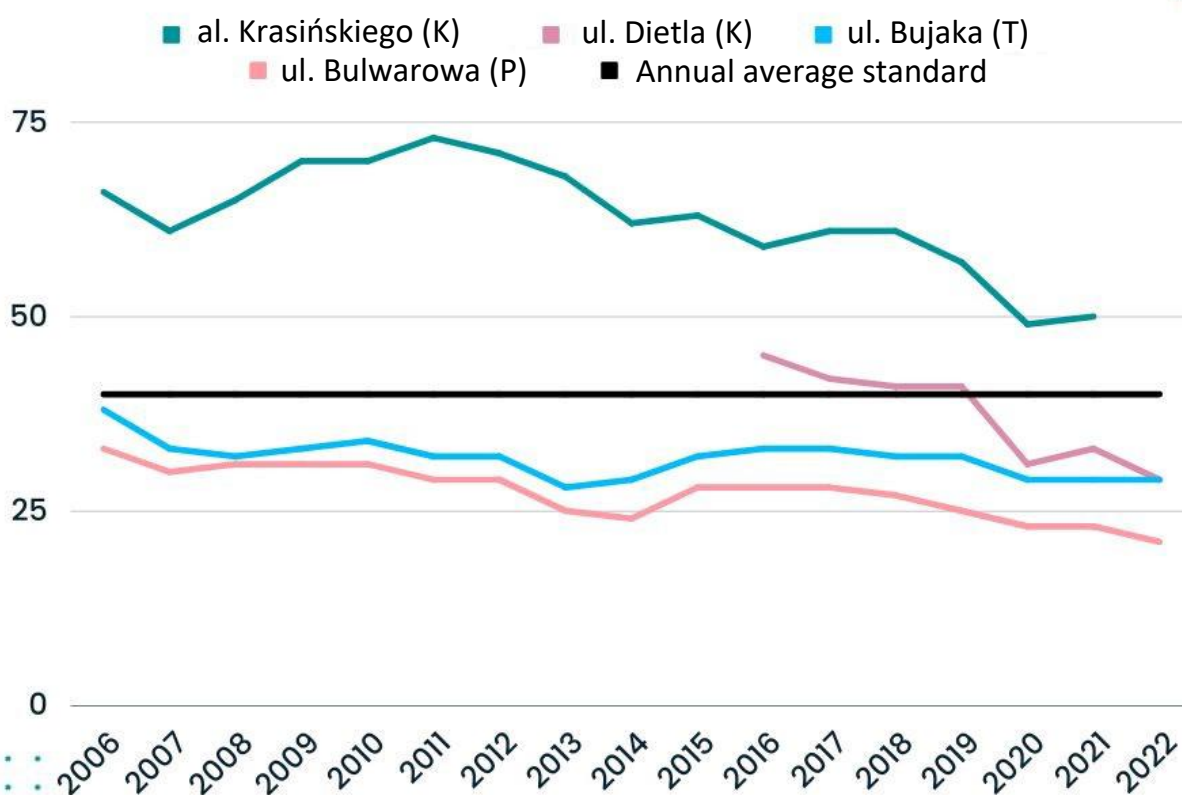


Nitrogen dioxide

At the urban-background and industry monitoring stations, the annual average concentration limits for nitrogen dioxide have not been exceeded for many years.

At the communication monitoring station at al. Krasieńskiego, measurements exceeding the limits are gradually decreasing. These high measurements are due to the station being located in an extreme environment – among dense and high buildings of a “street canyon”, between six road lanes, where there is poor ventilation. These levels do not reflect the air quality citywide, only in communication routes of similarly high road traffic.

ANNUAL AVERAGE CONCENTRATION OF NITROGEN DIOXIDE 2006–2022



Legend:

Sign	Explanation
K	Communication monitoring station
P	Industry monitoring station
T	Urban-background monitoring station
—	Annual average standard for nitrogen dioxide – 40 µg/m ³

Currently, almost every building in Krakow is heated ecologically. Between 1995 and 2022, more than 45,000 solid fuel furnaces were removed and replaced by ecological heating sources and almost 4,000 renewable energy source installations were installed.

Still in 2020, only every sixteenth residential building in Krakow had a **photovoltaic** system installed.



In 2021, it was every eighth residential building in Krakow,



and in 2022, every fifth residential building was equipped with this kind of installation.

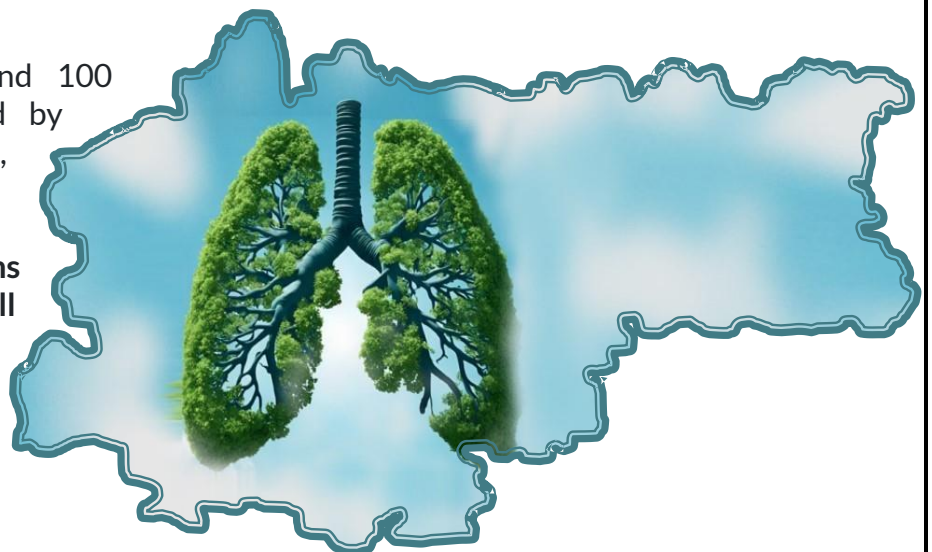


All the micro-installations connected to the grid in the Municipality of Krakow in 2020–2022 have a combined power of **69.7 MW**.

Thanks to this, carbon dioxide emissions are reduced by **47,000 tonnes a year** – the amount absorbed by nearly **8 million trees**.

It is estimated that only around 100 buildings in Krakow are heated by installations powered by solid fuel, as their only source of heating.

As a result of the actions undertaken, almost 100% of all buildings in Krakow are heated ecologically.



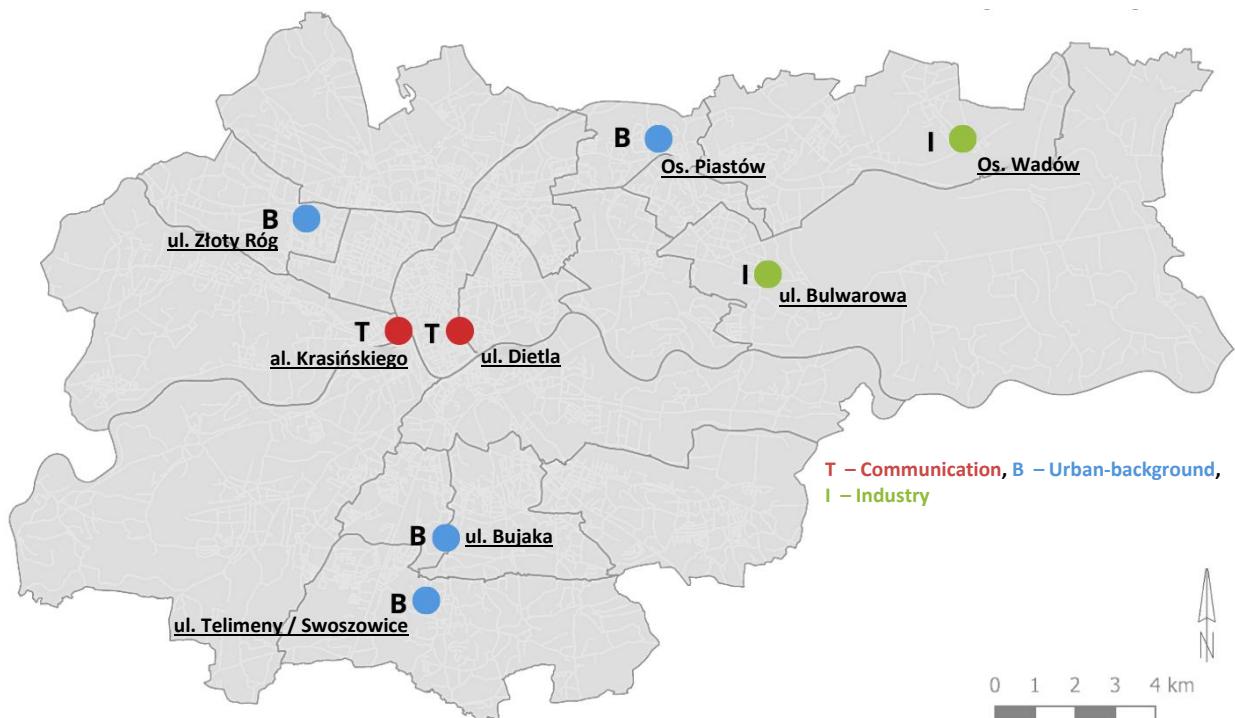
MONITORING AND REPORTING ON THE AIR QUALITY CONDITION

There are currently **8 reference air quality monitoring stations** in Krakow.



Using funds from the city budget, the mayor of Krakow **has bought five** out of the eight monitoring stations in order to strengthen the monitoring network and to provide residents with more accurate information.

Station	Owner
al. Krasieńskiego (K)	Inspectorate General for Environment Protection
ul. Bujaka (T)	
ul. Bulwarowa (P)	
ul. Dietla (K)	Municipality of Krakow
ul. Złoty Róg (T)	
os. Piastów (T)	
os. Swoszowice (T)	
os. Wadów (P)	

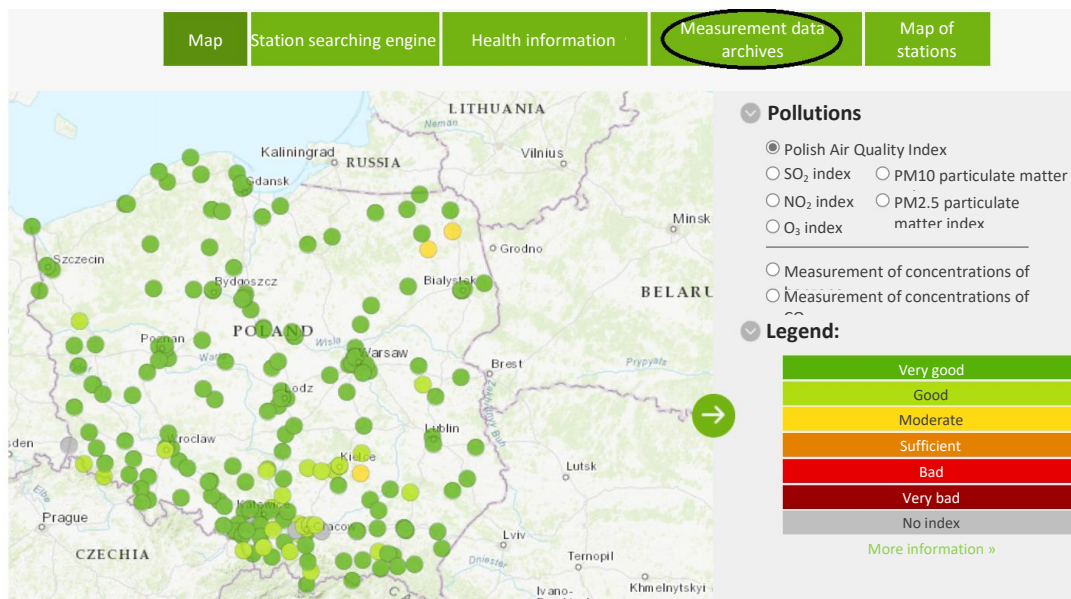


Krakow has sufficient monitoring stations to make air quality assessments in the city (by law, cities like Krakow require at least three monitoring stations).

Statement on air quality condition

Air quality assessments and observations of changes in the air quality are carried out by the **Inspectorate General for Environment Protection** as part of national monitoring.

The results of current and past measurements from stations are published on the website <http://powietrze.gios.gov.pl/pjp/current>. The website also has downloadable data on air quality conditions (in the tab "Measurement data archives"):



In addition, information on the condition of air quality is widely shared on the city's platforms, such as the **Magical Krakow** website: https://www.krakow.pl/krakow_open_city

or available via the “Powietrze Kraków” mobile app. This application is free and available for download for everyone at the website: www.krakow.pl/206595,artykul,powietrze_krakow.html.



In addition, information about air quality condition is very often displayed on screens at city transport stops, as well as in information bars on the screens in city transport vehicles and several information boards located around the City of Krakow.

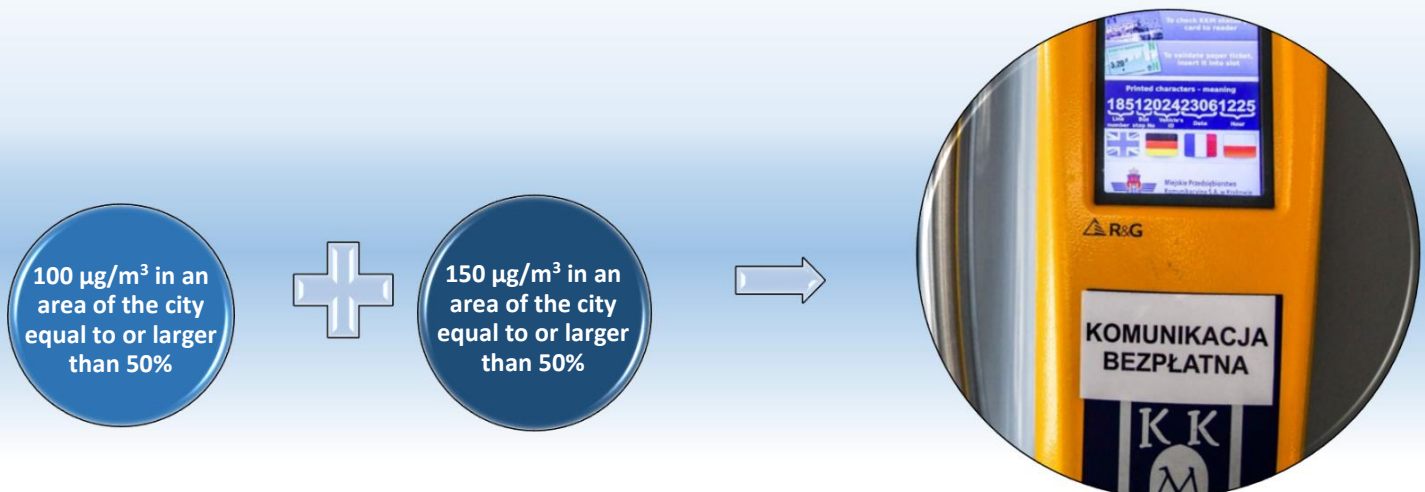


Free city transport

The City has a **Crisis Management Team for the City of Krakow** whose tasks include: assessing the ongoing and potential risks that may influence public safety in Krakow, informing the public about crisis risks, including information about the probability of exceeding certain concentration limits.

The city transport functions for free for a period of 24 hours, starting from midnight. The periods of free city transport are introduced based on the everyday air quality forecast for the next day. The forecast is divided into three 8-hour timeslots (0:00 AM–8:00 AM, 8:00 AM–4:00 PM, 4:00 PM–12:00 AM of the next day).

Only two conditions must be met – in any two 8-hour timeslots, the concentration of PM10 particulate matter must exceed:



Summary



For several years, the City of Krakow has been fighting hard to improve air quality, which is fully supported by society: both non-governmental organisations and residents themselves. Thanks to responsible management, including the implementation of Near-Ground Emissions Restriction Programme, Krakow is the only city in Poland to have eliminated almost 100% of near-ground emissions in the city area. This would not have been possible without the significant involvement of the residents of Krakow and their participation in the process of replacing furnaces. As a result of the actions implemented, over 45,000 furnaces and boiler rooms have been removed and nearly 4,000 renewable energy source installations have been installed. This includes the estimate of 20,000 furnaces replaced by residents from their own financial means, which is a clear sign of the scale of involvement. As a result of these actions, the share of local sources of pollution in the city, and their influence on concentrations at measuring stations, has decreased considerably. Almost 100% of buildings in Krakow are now heated ecologically.

The City's next course of action includes the transition to renewable sources of energy, improving the energy efficiency of buildings, developing low-emission transport and electromobility, and limiting incoming emissions by actively influencing the metropolitan area in order to accelerate the implementation of anti-smog resolutions in the Małopolskie Province. This involves the ambition to replace all unrated boilers from all over the region with low-emission heating systems.

We are aware that, despite a visibly decreasing trend in the concentration of pollutants, there is a long way to go, particularly with restricting pollution coming from transportation or incoming emissions from the neighbouring municipalities, which currently have the biggest impact on the air quality condition in the city. Our goal is to intensively influence the neighbouring municipalities by sharing our experience and creating a low-emissions policy.

