Deutsche Umwelthilfe

NO_2 Report

Hotspots in Germany, Czech Republic, Slovenia, Bulgaria and Serbia and Poland

#no2airpollution

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Deutsche Umwelthilfe

Introduction

Nitrogen Dioxide (NO_2) in the ambient air presents a direct threat to human health. The major source is road traffic – diesel engines and namely diesel passenger cars. The new Handbook Emission Factors for Road Transport (HBEFA) version 4.1 was published on 11th September 2019 and confirms that NOx-emissions for almost all diesel vehicles, light commercial vehicles and heavy-duty vehicles as well as passenger cars significantly exceed legal emission limits.

Ensuring better air quality is of high relevance. In order to monitor the European air quality an official network of measuring stations has been set up. Nevertheless, it only covers a fraction of potentially polluted areas. The vast majority of municipalities in the EU does not have enough air quality data. With support from local activists using reliable, yet easy-to-handle measuring devices, we want to close these gaps. Since 2018 Deutsche Umwelthilfe (DUH) has gained experience and initiated three cycles of measurements at more than 1500 locations in Germany. The results show the urgent need for effective action and therefore improving air quality can be a major driver for the transition in the transport sector to sustainable modes.

We used diffusion tubes to measure NO_2 pollution – a method that is also used by authorities in Germany and other EU member states. The measurement accuracy is proven and fulfills EU regulation. The tubes are usually fixed at a height of two meters or more to street lamps, signs or similar structures. They do not need electricity to operate. They simply need to be installed and taken down again after a certain period of time. We want to support NGO´s and local activists from different countries to gain more information about the air quality on site and at the same time, raise public awareness of the topic. For this reason we initiate NO_2 measurements with this easy to handle method across Europe.

The EU-wide annual mean limit value for NO_2 defined in the Ambient Air Quality Directive is 40 micrograms per cubic meter (µg /m³). With the diffusion tubes we measure the average exposure per month. The diffusion tubes indicate the average load of NO_2 at the time they are installed. The one-month exposure allows conclusions about the annual exposure at the site and whether the site is potentially heavily polluted or not. However, in order to be able to make more precise statements, it is worth measuring at the same spot over a longer period of time. For this purpose, the diffusion tubes must be replaced monthly. From Serbia and Bulgaria we already have obtained results from measurements taken over several months. Tables with these measurement results are provided in the annex.

Throughout the last year we have networked with NGOs from different countries and shared our insights gained through the data collected to date. In addition, we continued with our German measurements.

In this report we present which hotspots have been discovered so far in the Czech Republic, Slovenia, Bulgaria and Serbia and Poland. We also present an overview of our results from Germany.

Various studies have shown that even NO_2 loads under 40 µg /m³ are harmful to health. That is why we demand an EU-wide annual mean limit value for NO_2 of 30 µg /m³ or less. Hence all values above 30 have been classified as hotspots.

Some measurements are still ongoing and in the upcoming months more results from other countries will be available. All hotspots can be found in our interactive map on our website:

www.duh.de/no2airpollution/

Germany

In Germany, we carried out three nationwide Citizen Science measurement campaigns. They took place throughout July and August 2018 and March 2019.

We asked citizens to name us the places where they expect a high NO_2 concentration. Due to a huge demand to participate in our measuring campaign, we had to make a selection. We looked at each of these spots and rated them. On this basis, we selected around 500 participants for each run.

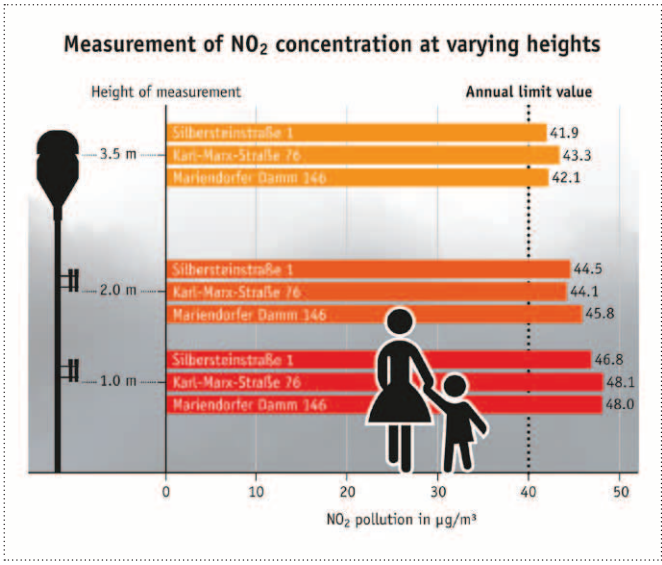
Map showing clustered hotspots in Germany

The number in the coloured circles represents the amount of hotspots.

In the first two runs we focused on minor towns, which don't have any official monitoring stations and therefore no data about their air quality. In the third run, we focused on vulnerable groups and particularly measured in the vicinity of schools, kindergartens, hospitals and retirement homes. Since children are particularly affected by the toxic exhaust gas. In the third run the measuring tubes were suspended at heights of one and two meters to emulate the breathing height of children.

The results of all measurement runs have confirmed that NO_2 is a nationwide problem in Germany. Alarmingly high NO_2 values above the legal limit have been determined in cities that don´t have any official monitoring data. For example in July 2018 a value of 54.6 µg/m³ was measured in the small Bavarian towns of Starnberg, in Fürth 50.7 µg/m³ and Trostberg 50.3 µg/m³.

The assumption that the air at a child's breathing height is more polluted than higher up was confirmed as illustrated by the graphic below. Diesel exhaust gases, which are particularly toxic for small children, are often concentrated near the ground.



In March 2019 the highest NO_2 value within the four-week measurement period was recorded at Heilbronner Strasse in Stuttgart, measured directly next to a day-care centre. At a height of one metre, the NO_2 value was 59.7 µg/m³ and at two metres 46.9 µg NO_2/m³. At some points, the value at two meters was not above the limit value of 40 µg/m³. , and at a height of one meter, it was. For example, at a school in Dortmund, in two meters a NO_2 value of 36.3 µg/m³ was measured. At a height of one meter, however, the children were exposed to an NO_2 load of 43.3 µg/m³.

In Germany there is a nation-wide problem with NO_2. It consists of hundreds of individual hotspots, many of which we have identified with our citizen science measurements. A table of all the hotspots would be exceedingly long and therefore was not included in this report. However, all hotspots can be found on our homepage (www.duh.de/no2airpollution/) in the interactive map. They can also be downloaded as xls file.

Czech Republic

In the Czech Republic the Measurements were carried out in cooperation with Centrum pro ZP a zdravi. From mid-March until mid-April 2019, 200 diffusion tubes where installed across the country. The tubes were hung in 9 different regions, of which Prague, Brno, Ostrava, Usti where priority regions.

Map showing clustered hotspots in 9 different regions in Czech Republic

The number in the coloured circles represents the amount of hotspots.

Of the 192 available results, 58 are above the European NO_2 limit value of 40 µg/m³. 74 measurement results are between 30 µg/m³ and 40 µg/m³. The highest pollution levels were found in Prague and Brno. In Prague 32 out of 46 results were above 40 µg/m³.

Map of Prague with hotspots

Nitrogen dioxide exposure in µg/m³ 30 -< 40 > 40

© Ingo Bartussek/Fotolia

The highest value was captured in Sokolská-Ječná next to the National Medical Library with a NO_2 concentration of 78.4 µg/m³. Not far from one of the arms of the Blanka tunnel complex in Dejvice another high value of 73.4 µg/m³ was measured. All hotspots discovered in the Czech Republic are listed in annex.

In July 2019, a two-week intensive media campaign was launched to present our findings, featuring five press conferences . This has successfully fuelled public debate on the issue.

Further measurement results will be available before the end of this year.

The measurements provide an overview of the situation in the Czech Republic and prove that there exist hazardous NO_2 concentrations in different traffic frequented spots in urban areas across the whole country.

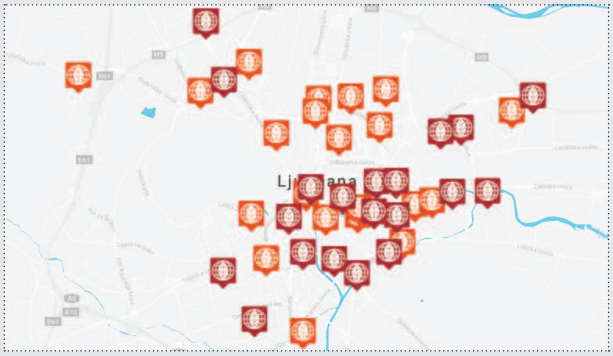
Miroslav Suta from Centrum pro ZP a zdravi szazes states:

»The results of our measurements indicate that the problem of air pollution by nitrogen dioxide in the Czech Republic can be much more serious than the public believes. Probably more cities are facing the problem than just Prague and Brno, where exceeded limits are confirmed by official monitoring stations. In many cities, stations are not located in locations with heavy traffic. Moreover, the Czech authorities de facto ignore the problem of cars from the dieselgate affair.«

Slovenia

The measurements in Slovenia were carried out in cooperation with Focus, Association for Sustainable Development. From mid-March to mid-April 2019, 50 spots were measured in Ljubljana.

Map of Ljubljana with hotspots



The measurement results consist almost exclusively of hotspots. Almost half of the measurements exceeded 40 µg/m³. The highest value of 74.4 µg NO_2/m³ was recorded in Šmartinska. The second highest in Križišče med Kolodvorsko in Slovensko which had a value of 63,9 µg/m³. The other half of the measurements have been between 30-40 µg NO_2/m³. Only six values were between 20-30 µg/m³ and not a single value below 20 µg/m³. The rest of the hotspots above 30 µg NO_2/m³ are in a table in the annex.

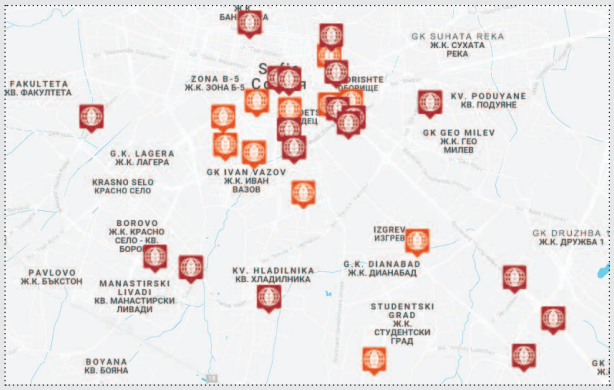
These measurements indicate that Ljubljana has a serious problem with air pollution from diesel cars which puts the health of its citizens is at risk. Katjuša Šavc Focus calls for a traffic transition for better air quality:

»Slovenes sure love our cars, on average we use them to make 83 % of all the journeys we take. Poor air quality along busy roads is a logical result of this. The biggest culprit is the lack of alternatives, since public transport infrastructure has been neglected for the past decades and car use is still the most convenient way of travel. A modern, comfortable and affordable public transport is a no-brainer, as well as a more in-depth reflection of what do we want our cities to look like and what leveI or life quality we wish for its inhabitants. This should result in making our cities difficult to use a car in generally through limiting parking, narrowing roads, speed limits as well as prohibiting entrance for the most polluting vehicles.«

Bulgaria

The measurements in Bulgaria were carried out in cooperation with AirBG.Info. Measurements in Sofia started at the beginning of June 2019 and since then have been measured continuously. New measuring locations were added and some have changed. If the same spot was measured over several consecutive months, an average value was calculated.

Map of Sofia with hotspots



Nitrogen dioxide exposure in µg/m³ 30 -< 40 > 40

The measurements in October were particularly bad. Of 29 measurement results, only one is below the limit value. In Evlogi i Hristo Georgiev the highest value was recorded in October with 82.4 µg NO_2/m³. The highest average value across five months was recorded in Tsar Osvoboditel Boulevard with 63.8 µg/m³. The second highest five-month average value was recorded in Rakovski Street at 62.5 µg/m³.

The measurements over several months show that Sofia clearly has to fight with diesel exhaust gases and air pollution. Stefan Dimitrov calls for banning old Diesel cars:

»AirBG.Info has partnered with DUH to measure the levels of NO_2 in Sofia. This was done during the summer period in order to exclude other possible factors of the pollution. Results show people are safe in residential areas, but the busy streets and crossroads of the city are very much polluted. The citizen-volunteers from AirBG.Info are expecting the next mayor of Sofia and the new municipal council to take complex and urgent measures in order to guarantee the health and the lives of the people of Sofia. The old diesel must be banned from the busy streets of Bulgaria as well as prohibited as an import from Europe.«

© Kara/Fotolia

Serbia

In Serbia, measurements were carried out in cooperation with the local NGO Oasis. The monitoring of NO_2 has been implemented in several cities around the country which cover Belgrade including Obrenovac, Novi Sad, Subotica, Pancevo, Uzice, Valjevo, Nis and Leskovac.

Map showing clustered hotspots in Serbia

The number in the coloured circles represents the amount of hotspots.

In the period May-August 2019, two test runs were carried out in the city of Belgrade. In the first test run, four out of nine measured values exceeded 40 µg NO_2/m³, with a maximum value of 80,8 µg/m³ on Takovska Street.

The second test run yielded the highest value measured by DUH so far at 106,8 µg/m³ in Brankova, Belgrade. At this spot as well as many others, measurements are continuing. The second time Brankova has reached a similarly high level of 104,2 µg/m³. The average of two months is therefore 105,5 µg NO_2/m³! In Uzice, Novi Sad, Valjevo and Subotica hotspots were also recorded which can be found it the table in the annex.

In Serbia, in particular in Belgrade, very high NO_2 values were found which are a serious threat to the health of the citizens. Also the published results from the state and local monitoring network show that the trend of air quality in the period 2010-2018 in Serbia is constantly worsening. The main cause of the pollution is high concentration of nitrogen dioxide (particularly in 2017) and PM particles.

Map of Belgrade with hotspots

Nitrogen dioxide exposure in µg/m³ 30 -< 40 > 40

In 2018 49 % of the NO_2 Emission combustion process stems from the energy sector (thermal power plants, district heating plants) while 23 % of emissions are from air and road transport (old vehicle mostly with diesel engines as well as increasing road traffic in large cities (Belgrade, Novi Sad, Nis) , 11 % from the industrial sector (oil refineries and petro-chemical industry complex primarily in Novi Sad and Pancevo, and several mining and metal processing complexes across Serbia) , 4 % from individual household heating and cooking in rural and remote places that also use solid fuels (coal, crude oil, wood), 7 % from agriculture and 6 % from other sources, states Gordana Grujic from Oasis.

Gordana Grujic explains what actions need to be taken to improve the situation:

»Actions to be undertaken towards reduction of air pollution should tackle change of energy policies to be safer for human health, decreasing the use of fuels for household heating and cooking, reducing emissions from industrial sites, increased use of low-emission fuels and renewable combustion-free power sources, improving the development of the monitoring network with more measuring sites, improving the communication and awareness of the public in terms of decreasing the frequency of the vehicles in the center of the cities and to be replaced with bicycling lanes; and to turn off the cars at the long traffic lights, capacity building for public health professionals in the field of health impact assessment and improving the inter-sectoral cooperation.«

Poland

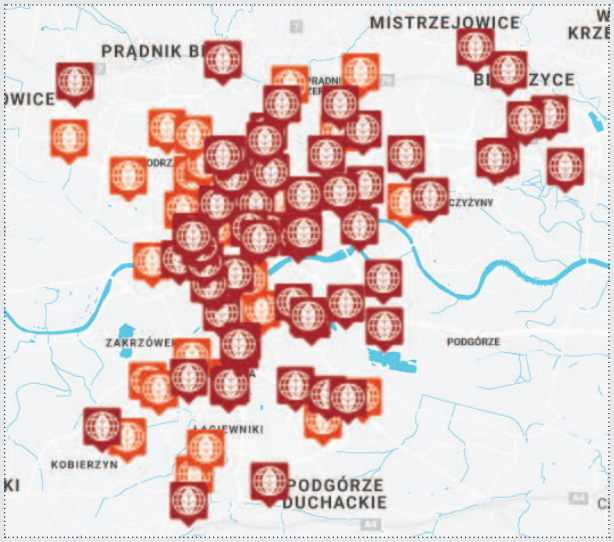
The measurements in Poland were carried out in cooperation with Krakow smog alert (Stowarzyszenie Krakowski Alarm Smogowy) . In October, 100 spots were measured in Krakow.

Map showing clustered hotspots in Poland

The number in the coloured circles represents the amount of hotspots.

The measurement results consist almost exclusively of hotspots. The majority of the results, 64 out of 99, exceeded 40 µg/m³. The highest value of 72.9 µg NO_2/m³ was recorded on Dietla. The second highest on Zakopianka which had a value of 72,3 µg/m³. Another 28 of the measurements have been between 30-40 µg NO2/m³. Only six values were between 20-30 µg/m³ and not a single value below 20 µg/m³. The rest of the hotspots above 30 µg NO_2/m³ are in a table in the annex.

Map of Krakow with hotspots



Nitrogen dioxide exposure in µg/m³ 30 -< 40 > 40

The values from Krakow are alarmingly high. The city has an overall problem with too high values of the toxic diesel exhaust gas nitrogen dioxide. For the safety of the citizens, the EU limit value of 40 micrograms per cubic meter must be adhered to as quickly as possible.

© elcovalana/Fotolia

Conclusion

In this first year of the project, we have discovered many new NO_2 hotspots. The results make clear that the diesel exhaust gas NO_2 is a problem in highly frequented urban areas regardless of the country. The results have also shown there are not enough official measuring stations and that those already in place are often not located in the most polluted areas. This outcome is important since the focus of the air quality debate today, especially in Central and Eastern Europe, is on particulate matter, mainly from industry and residential heating. When talking about NO_2 in a policy and regulation context there is a wide range of options with concrete measures concerning road transport. Especially in Central and Eastern Europe, there is a growing concern about the import of diesel vehicles banned from German cities due to illegal defeat devices and high nitrogen oxide emissions. These cars flood the cities in Central and Eastern Europe with toxic diesel exhaust gases. Therefore, DUH demands a mandatory hardware retrofit for all particularly dirty Euro 5 and 6 diesel cars to ensure diesel car exports from Germany fulfil the binding emission standards on the road.

With our measurement results, we strengthen our partners' position to approach city officials and politicians and demand additional, official measurements and modelling of NO_2 pollution along the main road networks. Measurement results are also a very strong argument for more effective air quality action plans and should lead cities to introduce low-emission zones. A transition in the transport sector to sustainable modes is of the essence.

Air pollution is one of the biggest threats to human health. According to studies by the European Environment Agency (EEA), approximately 79,000 people died prematurely from the consequences of high NO_2 emissions. A study published by the Federal Environment Agency (UBA) in March 2018, pointed out that concentrations well below the legal limit value of 40 µg / m³ are still harmful to human health. For this reason, we have classified all exposures over 30 µg /m³ as hotspots. Bearing this in mind, we demand a reduction of the annual mean limit value to 30 µg /m³ or less.

Annex

Table with hotspots from Czech Republic

Nitrogen dioxide pollution in Czech cities – DUH in cooperation with Center for environment and health (životní prostředí a zdraví)

● > 40 ● 30 - < 40

Street	City	Result of measurement [µg NO_2/m^3]	Begin of measurement	End of measurement
Sokolská/Ječná	Prague	78,4	09.03.2019	06.04.2019
Dejvice	Prague	73,4	09.03.2019	06.04.2019
Vychovatelna	Prague	67,0	13.03.2019	24.04.2019
Rokoska	Prague	63,6	13.03.2019	24.04.2019
Ječná/Štěpánská	Prague	63,6	09.03.2019	06.04.2019
V Botanice	Prague	55,8	19.03.2019	24.04.2019
Chodov / Dálnice	Prague	54,7	13.03.2019	24.04.2019
Bratislavská/Koliště	Brno	54,7	16.03.2019	20.04.2019
Rumunská/Sokolská	Prague	53,4	09.03.2019	06.04.2019
Karlovarská	Pilsen	52,1	18.03.2019	18.04.2019
Na Veselí	Prague	52,0	09.03.2019	06.04.2019
Bělocerkevská	Prague	51,4	09.03.2019	06.04.2019
Koliště	Brno	50,8	16.03.2019	20.04.2019
V Holešovičkách	Prague	50,7	13.03.2019	24.04.2019
Veletržní/Sochařská	Prague	50,5	09.03.2019	06.04.2019
Bus	Olomouc	50,4	11.03.2019	11.04.2019
Zvonařka	Brno	50,4	16.03.2019	20.04.2019
úvoz	Brno	49,4	16.03.2019	20.04.2019
Na poříčí	Brno	49,4	16.03.2019	20.04.2019
Plzeňská	Prague	49,2	19.03.2019	24.04.2019
Na Veselí	Prague	48,7	09.03.2019	06.04.2019
FUTURUM	Brno	48,3	17.03.2019	20.04.2019
Zborovská	Prague	48,2	19.03.2019	24.04.2019
Svornosti	Prague	48,2	19.03.2019	24.04.2019
Radlická 14/Anděl	Prague	47,9	19.03.2019	24.04.2019
Nám. Republiky	Prague	47,2	19.03.2019	21.04.2019
U Prazdroje	Pilsen	47,0	08.03.2019	05.04.2019
Florenc	Prague	46,4	19.03.2019	21.04.2019
Sukova	Pilsen	46,4	18.03.2019	18.04.2019
Kafkova/Svatovítská podchod	Prague	46,1	09.03.2019	06.04.2019

Street	City	Result of measurement [µg NO_2/m^3]	Begin of measurement	End of measurement
Severni Spořilov	Prague	45,4	13.03.2019	24.04.2019
Svatoplukova	Brno	45,4	16.03.2019	20.04.2019
Plaza mall	Pilsen	45,3	08.03.2019	05.04.2019
Na Ořechovce	Prague	45,3	09.03.2019	06.04.2019
Důl Jeremenko	Ostrava	44,4	12.03.2019	12.04.2019
Pobřežní	Prague	43,5	19.03.2019	24.04.2019
V Botanice	Prague	43,3	19.03.2019	24.04.2019
Všebořice/Rondel/Bukov	Ústí nad Labem	43,3	14.03.2019	13.04.2019
Ostrovského	Prague	43,2	19.03.2019	24.04.2019
třída května	Prague	42,9	09.03.2019	06.04.2019
Flora-mall	Prague	42,6	09.03.2019	06.04.2019
Skála	Ústí nad Labem	42,5	14.03.2019	13.04.2019
Rudná/MOL	Ostrava	42,5	12.03.2019	12.04.2019
Přívoz	Ostrava	42,4	12.03.2019	12.04.2019
Boženy Němckové	Pilsen	42,0	18.03.2019	18.04.2019
main	Prague	41,9	13.03.2019	24.04.2019
Zvonařka	Brno	41,7	16.03.2019	20.04.2019
Synagoga	Carlsbad	41,5	15.03.2019	14.04.2019
Bohatice	Carlsbad	41,4	15.03.2019	14.04.2019
Bukov	Ústí nad Labem	41,4	14.03.2019	13.04.2019
Havlíčkova/Klatovská	Pilsen	41,4	18.03.2019	18.04.2019
Strakonická	Prague	40,9	19.03.2019	24.04.2019
tunel	Brno	40,8	17.03.2019	20.04.2019
Vaňkovka	Brno	40,6	17.03.2019	20.04.2019
Janovského/Veletržní	Prague	40,5	09.03.2019	06.04.2019
Hotel Pawllovia	Prague	40,4	13.03.2019	24.04.2019
Křížovnická	Prague	40,1	09.03.2019	06.04.2019
Zenklova/Na Korábě	Prague	39,4	13.03.2019	24.04.2019
Štítného /albertova	Olomouc	39,3	11.03.2019	11.04.2019
Koliště Malinovskeho nam.	Brno	39,1	16.03.2019	20.04.2019
Geislerova	Olomouc	39,1	11.03.2019	11.04.2019

Street	City	Result of measurement [µg NO_2/m^3]	Begin of measurement	End of measurement
Klatovská	Pilsen	39,1	18.03.2019	18.04.2019
Hrnčířská	Ústí nad Labem	39,0	14.03.2019	13.04.2019
Bukov silnice	Ústí nad Labem	38,8	14.03.2019	13.04.2019
Západní	Carlsbad	38,7	15.03.2019	14.04.2019
sady 5. května	Pilsen	38,6	08.03.2019	05.04.2019
Pobřežní	Prague	38,3	19.03.2019	24.04.2019
trainstation	Olomouc	38,1	11.03.2019	11.04.2019
Českobratrská ČHMÚ	Ostrava	38,1	12.03.2019	12.04.2019
Husova	Brno	37,9	16.03.2019	20.04.2019
Bus station	Olomouc	37,9	11.03.2019	11.04.2019
Pavlovická	Olomouc	37,7	11.03.2019	11.04.2019
ETZ Doudlevce	Pilsen	37,1	08.03.2019	05.04.2019
Havni / most	Prague	36,7	13.03.2019	24.04.2019
Rudná/JEEP	Ostrava	36,3	12.03.2019	12.04.2019
Modřice	Brno	36,1	17.03.2019	20.04.2019
Rudolfovská/Nádražní	České	35,5	07.03.2019	04.04.2019
Nové sady	Brno	35,4	17.03.2019	20.04.2019
Bridge	Carlsbad	35,1	15.03.2019	14.04.2019
Škoda III. brána	Pilsen	35,1	08.03.2019	05.04.2019
Hodolanská/Přáslavská	Olomouc	35,0	11.03.2019	11.04.2019
křižovatka	Brno	34,9	16.03.2019	20.04.2019
Husova	Brno	34,6	16.03.2019	20.04.2019
J µgoslávských partyzánů	Prague	34,6	09.03.2019	06.04.2019
úvoz /Trýbova	Brno	34,6	16.03.2019	20.04.2019
Masarykova	Ústí nad Labem	34,2	14.03.2019	13.04.2019
Hradčanská	Prague	34,2	09.03.2019	06.04.2019
Vinohradská/Flora	Prague	34,2	09.03.2019	06.04.2019
Na dlouhé/Husova školské	České	34,1	07.03.2019	04.04.2019
Lidická/Matice	České	34,1	07.03.2019	04.04.2019
Milíčova	Ostrava	34,1	12.03.2019	12.04.2019
Mánesova/Dukelská	České Budejovice	33,9	07.03.2019	04.04.2019
mall	Ústí nad Labem	33,8	14.03.2019	13.04.2019
Masarykova	Ústí nad Labem	33,8	14.03.2019	13.04.2019
Klatovská	Pilsen	33,6	18.03.2019	18.04.2019
Budějovická	Prague	33,6	09.03.2019	06.04.2019
Komín Svratecká	Brno	33,4	17.03.2019	20.04.2019

Street	City	Result of measurement [µg NO_2/m^3]	Begin of measurement	End of measurement
Vítězná	Carlsbad	33,4	15.03.2019	14.04.2019
Negreliho viadukt	Prague	33,3	19.03.2019	24.04.2019
Bohatice	Carlsbad	33,2	15.03.2019	14.04.2019
viadukt	Olomouc	33,1	11.03.2019	11.04.2019
Sokolovská	Carlsbad	33,0	15.03.2019	14.04.2019
Vršovická	Prague	32,9	09.03.2019	06.04.2019
Domažlická	Pilsen	32,9	08.03.2019	05.04.2019
Těšínská	Ostrava	32,9	12.03.2019	12.04.2019
Pražská	České	32,8	07.03.2019	04.04.2019
Husova	České	32,7	07.03.2019	04.04.2019
tř. Svobody/SŽDC	Olomouc	32,7	11.03.2019	11.04.2019
Dolní/kamenná	Carlsbad	32,6	15.03.2019	14.04.2019
Sokolovská	Pilsen	32,5	18.03.2019	18.04.2019
Billa Karlin	Prague	32,2	19.03.2019	24.04.2019
Kotevní	Prague	32,2	19.03.2019	24.04.2019
Karla IV./Jahnova	Pardubice	32,0	06.03.2019	03.04.2019
Procházkův ústav	Pilsen	32,0	18.03.2019	18.04.2019
Albertova	Olomouc	31,7	11.03.2019	11.04.2019
Wolkerova	Olomouc	31,6	11.03.2019	11.04.2019
Constitution court	Brno	31,5	16.03.2019	20.04.2019
Českobratrská nádražní	Ostrava	31,5	12.03.2019	12.04.2019
Královo Pole	Brno	31,4	17.03.2019	20.04.2019
Plchova/Teplého/Jana Palacha	Pardubice	31,3	06.03.2019	03.04.2019
Svatovítská /tunel	Prague	31,0	09.03.2019	06.04.2019
Mattoniho nábřeží	Carlsbad	30,9	15.03.2019	14.04.2019
Rokycanska Letná	Pilsen	30,8	08.03.2019	05.04.2019
stadiom ZM	Carlsbad	30,8	15.03.2019	14.04.2019
Berkova/Palackého	Brno	30,6	17.03.2019	20.04.2019
tř. Svobody/SŽDC	Olomouc	30,6	11.03.2019	11.04.2019
Sokolská	Ostrava	30,6	12.03.2019	12.04.2019
Nádražní	Ústí nad Labem	30,5	14.03.2019	13.04.2019
Novomětská	Brno	30,4	17.03.2019	20.04.2019
Otýlie Beníškové	Pilsen	30,3	18.03.2019	18.04.2019
Futurum Tesco	Brno	30,0	17.03.2019	20.04.2019

Nitrogen dioxide exposure in µg/m³ ● > 40 ● 30 - < 40

Table with hotspots from Slovenia

Nitrogen dioxide pollution in Slovenia, Ljubljana. DUH in cooperation with Focus, corporation for sustainable development (Focus, društvo za sonaraven razvoj)

● > 40 ● 30 - < 40

Street	City	Result of measurement [µg NO_2/m^3]	Begin of measurement	End of measurement
Šmartinska	Ljubljana	74,4	09.03.2019	06.04.2019
Križišče med Kolodvorsko in Slovensko	Ljubljana	63,9	09.03.2019	06.04.2019
Vošnjakova ulica	Ljubljana	60,1	09.03.2019	06.04.2019
Celovška cesta	Ljubljana	51,6	09.03.2019	06.04.2019
Karlovška cesta	Ljubljana	51,2	09.03.2019	06.04.2019
Metelkova ulica	Ljubljana	50,8	09.03.2019	06.04.2019
Roška	Ljubljana	50,1	09.03.2019	06.04.2019
Bleiweisova cesta	Ljubljana	49,5	09.03.2019	06.04.2019
Šmartinska cesta	Ljubljana	49,4	09.03.2019	06.04.2019
Tržaška cesta	Ljubljana	48,0	09.03.2019	06.04.2019
Križišče Šmartinska/Šmartinska	Ljubljana	47,3	09.03.2019	06.04.2019
Aškerčeva cesta	Ljubljana	47,2	09.03.2019	06.04.2019
Kolodvorska	Ljubljana	46,1	09.03.2019	06.04.2019
Levstikov trg	Ljubljana	45,6	09.03.2019	06.04.2019
Križišče Kajuhova/Zaloška	Ljubljana	44,9	09.03.2019	06.04.2019
Šišenska	Ljubljana	44,2	09.03.2019	06.04.2019
Celovška cesta	Ljubljana	43,4	09.03.2019	06.04.2019
Kajuhova	Ljubljana	42,5	09.03.2019	06.04.2019
Križišče Šmartinske ceste in Ulice Gradnikove brigade	Ljubljana	42,0	09.03.2019	06.04.2019
Zaloška	Ljubljana	41,1	09.03.2019	06.04.2019
Ilirska	Ljubljana	40,8	09.03.2019	06.04.2019
Zaloška	Ljubljana	40,5	09.03.2019	06.04.2019
Šmartinska cesta	Ljubljana	39,3	09.03.2019	06.04.2019
Prešernova ulica	Ljubljana	38,6	09.03.2019	06.04.2019
Dunajska	Ljubljana	38,5	09.03.2019	06.04.2019
Celovška cesta	Ljubljana	38,5	09.03.2019	06.04.2019
Bleiweisova cesta	Ljubljana	38,2	09.03.2019	06.04.2019
Dunajska cesta	Ljubljana	37,5	09.03.2019	06.04.2019
Cesta 27. aprila	Ljubljana	37,2	09.03.2019	06.04.2019
Poljanska cesta	Ljubljana	36,5	09.03.2019	06.04.2019
Podmilščakova	Ljubljana	35,8	09.03.2019	06.04.2019

Street	City	Result of measurement [µg NO_2/m^3]	Begin of measurement	End of measurement
Komenskega ulica	Ljubljana	35,1	09.03.2019	06.04.2019
Založka	Ljubljana	34,8	09.03.2019	06.04.2019
Barjanska cesta	Ljubljana	34,6	09.03.2019	06.04.2019
Litostrojska	Ljubljana	34,6	09.03.2019	06.04.2019
Šlajmerjeva ulica	Ljubljana	33,9	09.03.2019	06.04.2019
Podutiška cesta	Ljubljana	33,4	09.03.2019	06.04.2019
Vodnikova cesta	Ljubljana	32,7	09.03.2019	06.04.2019
Trubarjeva	Ljubljana	31,8	09.03.2019	06.04.2019
Langusova	Ljubljana	31,2	09.03.2019	06.04.2019
Vojkova cesta	Ljubljana	30,7	09.03.2019	06.04.2019
Topniška	Ljubljana	30,6	09.03.2019	06.04.2019
Podmilščakova	Ljubljana	30,5	09.03.2019	06.04.2019

Nitrogen dioxide exposure in µg/m³ ● > 40 ● 30 - < 40

Table with hotspots from Bulgaria

Nitrogen dioxide pollution in Bulgaria. DUH in cooperation with AirBG.Info

● > 40 ● 30 - < 40

Street	City	Result of measurement [µg NO_2/m^3]	Begin of measurement	End of measurement
bul. "Tsar Osvoboditel"	Sofia	63,8*	03.06.19	31.10.19
str. „Rakovski“	Sofia	62,5*	03.06.19	31.10.19
bul. „Cherni Vrah"	Sofia	61,8	27.09.19	31.10.19
ul. „Kostenski vodopad“	Sofia	59,4	27.09.19	31.10.19
str. ,,Angel Kanchev"	Sofia	57,3*	03.06.19	31.10.19
str. „Kostenski vodopad“	Sofia	57,1*	04.06.19	29.08.19
Bstr. "Evlogi i Hristo Georgiev"	Sofia	56,3*	28.08.19	31.10.19
bul. „Aleksandar Malinov“	Sofia	55,6	26.09.19	31.10.19
bul. „Cherni Vrah"	Sofia	54,1*	04.06.19	29.08.19
bul. „Tsarigradsko shose“	Sofia	50,7	26.09.19	31.10.19
Spirka na bstr. "Tsarigradsko shose"	Sofia	50,4*	28.08.19	31.10.19
str. „Maragidik“	Sofia	50,2*	03.06.19	31.10.19
bstr. "Todor Alexandrov"	Sofia	48,7*	28.08.19	31.10.19
str. "Kozloduy"	Sofia	47,9*	03.06.19	31.10.19
zhk. „Krasna polyana“	Sofia	47,3*	03.06.19	31.10.19
pl. "Lavov most"	Sofia	47,1*	28.08.19	31.10.19
str. ,,Aksakov“	Sofia	46,6*	30.06.19	31.10.19
bstr. Evl.Georgiev	Sofia	45,8*	28.08.19	31.10.19
bstr."Knyaginya Maria Luiza"	Sofia	45,4*	28.08.19	31.10.19
bul. „Tsarigradsko shose“	Sofia	44,7*	04.06.19	01.08.19
str. „Tsar Asen"	Sofia	44,2*	28.08.19	31.10.19
str. "Solunska"	Sofia	43,8*	28.08.19	31.10.19
bul. „Makedonia"	Sofia	43,7*	03.06.19	31.10.19
str. ,,Dunav“	Sofia	43,7*	03.06.19	31.10.19
str. „Viktor Grigorovich“	Sofia	43,3*	01.08.19	31.10.19
str. "Shipka"	Sofia	43,2	03.06.19	30.06.19
str.. "Shipka"	Sofia	43,2*	01.08.19	31.10.19
str. „sv. Teodosiy Tarnovski“	Sofia	43,1*	28.08.19	31.10.19
str. „sv. Teodosiy Tarnovski“	Sofia	42,2*	03.06.19	28.08.19
Vinarovo Kolelo	Sofia	42,1*	28.08.19	31.10.19
str. „Tsar Asen"	Sofia	41,9*	03.06.19	01.08.19
bul „Dragan Tsankov"	Sofia	41,8*	04.06.19	01.08.19

Street	City	Result of measurement [µg NO_2/m^3]	Begin of measurement	End of measurement
zhk. „Hipodruma"	Sofia	41,7*	28.08.19	31.10.19
str. „Viktor Grigorovich“	Sofia	41,4	03.06.19	30.06.19
str. „Atanas Manchev“	Sofia	40,4	04.06.19	01.07.19
str. „Trepetlika“	Sofia	39,6+	04.06.19	30.06.19
bul „Dragan Tsankov"	Sofia	39,6*	28.08.19	31.10.19
bstr. „Tsar Boris III“	Sofia	39,5*	28.08.19	31.10.19
bstr. "Bulgaria"	Sofia	37,6	28.08.19	26.09.19
str. „Republika“	Sofia	36,7*	28.08.19	31.10.19
bstr. „Slivnitsa“	Sofia	34,1	28.08.19	26.09.19

*mean value over several months

Nitrogen dioxide exposure in µg/m^3 > 40 30 - < 40

Table with hotspots from Serbia

Nitrogen dioxide pollution in Serbian cities. DUH in cooperation with Oasis

● > 40 ● 30 - < 40

Street	City	Result of measurement [µg NO_2/m^3]	Begin of measurement	End of measurement
Brankova	Belgrade	105,5*	10.07.2019	31.08.2019
Takovska	Belgrade	85,4	07.08.2019	05.09.2019
Takovska	Belgrade	80,8	21.05.2019	20.06.2019
Gospodarska Mehana / B. Vojvode Misica	Belgrade	69,9	06.08.2019	31.08.2019
Glavna	Zemun/Belgrade	66,4	11.07.2019	06.08.2019
Beogradska	Belgrade	63,8*	10.07.2019	02.09.2019
Borska	Belgrade	60,7	12.08.2019	06.09.2019
Nikole Pasica	Uzice	55,5	16.08.2019	11.09.2019
Dimitrija Tucovica	Uzice	54,6	16.08.2019	11.09.2019
Kraljice Natalije	Belgrade	54,55	12.07.2019	31.08.2019
Dr. Milutina Ivkovica	Belgrade	53,15*	11.07.2019	02.09.2019
Pilota Mihajla Petrovica	Belgrade	51,6	10.08.2019	06.09.2019
Boul. J. Tomic / S. Kovacevic corner	Novi Sad	50,1	21.08.2019	12.09.2019
Turgenjeva	Belgrade	49,8	18.05.2019	17.06.2019
Cara Dusana	Belgrade	49	21.05.2019	18.06.2019
Vladike Nikolaja	Valjevo	47	16.08.2019	11.09.2019
Kirovljeva	Belgrade	46,9	03.08.2019	30.08.2019
Terazija	Belgrade	46,9	18.05.2019	18.06.2019
Milana Rakica	Belgrade	40,2	10.07.2019	07.08.2019
Djure Djakovica	Subotica	36,5	14.08.2019	10.09.2019
Radnicka	Valjevo	36,5	16.08.2019	11.09.2019
Bulevar Kralja Aleksandra	Belgrade	36,4*	12.07.2019	02.09.2019
Matka Vukovic / M.Gubac corner	Subotica	36	14.08.2019	10.09.2019
Hajduk Veljko	Valjevo	35,1	16.08.2019	11.09.2019
Rackog	Novi Sad/ Petrovaradin	34,4	17.08.2019	12.09.2019
Molerova	Belgrade	32	17.05.2019	17.06.2019
Gospodar Jevremova	Belgrade	31,9	16.05.2019	18.06.2019
Milosa Obrenovica	Uzice	30,5	16.08.2019	11.09.2019

*mean value over several months

Table with hotspots from Poland

Nitrogen dioxide pollution in Krakow. DUH in cooperation with Stowarzyszenie Krakowski Alarm Smogowy

● > 40 ● 30 - < 40

Street	City	Result of measurement [µg NO_2/m^3]	Begin of measurement	End of measurement
50.05744439 /19.94605819	Krakow	72,9	03.10.2019	30.10.2019
50.00672514 /19.92466667	Krakow	72,3	02.10.2019	30.10.2019
50.07350137 /19.93502593	Krakow	69,4	01.10.2019	29.10.2019
50.05776045 /19.92617643	Krakow	62,2	03.10.2019	30.10.2019
50.04245891 /19.96069146	Krakow	61,6	02.10.2019	30.10.2019
50.07281242 /20.01705593	Krakow	59,5	02.10.2019	30.10.2019
50.07125811 /20.03850908	Krakow	57,9	02.10.2019	29.10.2019
50.05842877 /19.95927895	Krakow	57,6	01.10.2019	30.10.2019
50.03689918 /19.93986838	Krakow	56,9	01.10.2019	30.10.2019
50.05577605 /19.92831688	Krakow	56,4	01.10.2019	29.10.2019
50.05755473 /19.95766087	Krakow	56,4	01.10.2019	30.10.2019
50.08033739 /20.026522	Krakow	55,6	02.10.2019	29.10.2019
50.09190689 /19.93494808	Krakow	55,3	02.10.2019	29.10.2019
50.09445187 /20.01126022	Krakow	54,4	02.10.2019	29.10.2019
50.04475392 /19.9719586	Krakow	52,7	02.10.2019	30.10.2019
50.07357712 /19.93641885	Krakow	52,1	01.10.2019	29.10.2019
50.06649247 /19.97046069	Krakow	51,9	01.10.2019	29.10.2019
50.03569163 /19.94012793	Krakow	51,6	01.10.2019	30.10.2019
50.06780766 /19.97799616	Krakow	51,4	02.10.2019	29.10.2019
50.08330998 /19.95275961	Krakow	51,2	01.10.2019	29.10.2019
50.04851588 /19.9309953	Krakow	50,3	01.10.2019	29.10.2019
50.05776167 /19.92616104	Krakow	50,2	03.10.2019	30.10.2019
50.05274137 /19.92962508	Krakow	50,1	01.10.2019	29.10.2019
50.06946117 /19.93763762	Krakow	50,0	01.10.2019	29.10.2019
50.05776428 /19.92616836	Krakow	48,9	03.10.2019	30.10.2019
50.02639761 /19.97297225	Krakow	48,6	01.10.2019	30.10.2019
50.05876814 /19.92540172	Krakow	48,3	01.10.2019	29.10.2019
50.07622109 /19.94774513	Krakow	48,1	01.10.2019	29.10.2019
50.03740934 /19.94075888	Krakow	48,0	01.10.2019	30.10.2019
50.04173952 /19.96175456	Krakow	47,8	02.10.2019	30.10.2019
50.04955107 /19.98333474	Krakow	47,5	02.10.2019	30.10.2019
50.07011207 /19.94945577	Krakow	47,4	01.10.2019	29.10.2019

Street	City	Result of measurement [µg NO_2/m^3]	Begin of measurement	End of measurement
50.05883122 /19.94914116	Krakow	47,1	01.10.2019	30.10.2019
50.08331262 /19.9704814	Krakow	47,0	01.10.2019	29.10.2019
50.04493161 /19.95635682	Krakow	46,9	02.10.2019	30.10.2019
50.01047788 /19.94918137	Krakow	46,9	03.10.2019	30.10.2019
50.05924162 /19.94282336	Krakow	46,7	01.10.2019	29.10.2019
50.05748492 /19.9459931	Krakow	46,5	03.10.2019	30.10.2019
50.02910748 /19.93748027	Krakow	46,4	02.10.2019	30.10.2019
50.05053056 /19.93879375	Krakow	45,4	01.10.2019	29.10.2019
50.06403765 /19.94513955	Krakow	45,2	01.10.2019	29.10.2019
50.06577092 /19.95928197	Krakow	45,1	01.10.2019	29.10.2019
50.06398256 /19.93327912	Krakow	45,1	01.10.2019	29.10.2019
50.02858958 /19.93663378	Krakow	44,7	02.10.2019	30.10.2019
50.03050412 /19.92467831	Krakow	44,6	02.10.2019	30.10.2019
50.07358125 /19.99044694	Krakow	44,6	01.10.2019	29.10.2019
50.0662961 /19.93833851	Krakow	44,2	01.10.2019	29.10.2019
50.07330259 /20.01894208	Krakow	43,8	02.10.2019	30.10.2019
50.02089146 /19.89879058	Krakow	43,7	02.10.2019	30.10.2019
50.07816191 /19.94876427	Krakow	43,7	01.10.2019	29.10.2019
50.04047701 /19.98395633	Krakow	43,6	02.10.2019	30.10.2019
50.04826245 /19.9333262	Krakow	43,4	01.10.2019	29.10.2019
50.0877444 /19.8904062	Krakow	43,3	02.10.2019	29.10.2019
50.05752844 /19.94603632	Krakow	43,0	03.10.2019	30.10.2019
50.0596928 /19.97629318	Krakow	42,9	01.10.2019	30.10.2019
50.09001676 /20.02131215	Krakow	42,8	02.10.2019	29.10.2019
50.02882573 /19.95703769	Krakow	42,7	01.10.2019	30.10.2019
50.02708285 /19.96660225	Krakow	42,6	01.10.2019	30.10.2019
50.07374709 /19.96635637	Krakow	42,3	01.10.2019	29.10.2019
50.05338546 /19.92193531	Krakow	41,7	01.10.2019	29.10.2019
50.07857001 /19.97711969	Krakow	41,7	01.10.2019	29.10.2019
50.06561477 /19.99745251	Krakow	41,1	01.10.2019	30.10.2019
50.04298442 /19.93473786	Krakow	40,5	01.10.2019	30.10.2019
50.08130247 /20.03340152	Krakow	40,2	02.10.2019	29.10.2019
50.02666328 /19.97725876	Krakow	39,9	02.10.2019	30.10.2019
50.06503073 /19.95116437	Krakow	39,6	01.10.2019	29.10.2019
50.0629114 /19.92309891	Krakow	39,2	01.10.2019	29.10.2019
50.0779255 /19.97008196	Krakow	39,1	01.10.2019	29.10.2019
50.03054358 /19.93705656	Krakow	39,1	02.10.2019	30.10.2019

Street	City	Result of measurement [µg NO_2/m^3]	Begin of measurement	End of measurement
50.05954302 /19.93286279	Krakow	39,1	01.10.2019	29.10.2019
50.08953612 /19.97674457	Krakow	38,7	02.10.2019	29.10.2019
50.05481779 /19.92686154	Krakow	38,6	01.10.2019	29.10.2019
50.06958836 /19.90645523	Krakow	38,3	01.10.2019	29.10.2019
50.07184464 /19.92927969	Krakow	38,3	01.10.2019	29.10.2019
50.04948783 /19.94287548	Krakow	37,9	01.10.2019	29.10.2019
50.07737276 /19.92598572	Krakow	37,8	01.10.2019	29.10.2019
50.08709499 /19.95533707	Krakow	37,0	01.10.2019	29.10.2019
50.06971468 /19.92576052	Krakow	36,2	01.10.2019	29.10.2019
50.0626265 /19.93696337	Krakow	35,9	01.10.2019	29.10.2019
50.03437738 /19.92585022	Krakow	35,9	02.10.2019	30.10.2019
50.02224075 /19.96534363	Krakow	35,9	01.10.2019	30.10.2019
50.0104775 /19.94918064	Krakow	35,6	03.10.2019	30.10.2019
50.04360327 /19.94658614	Krakow	34,9	02.10.2019	30.10.2019
50.05287156 /19.9135913	Krakow	34,7	01.10.2019	29.10.2019
50.01681924 /19.92987779	Krakow	34,6	02.10.2019	30.10.2019
50.06448913 /19.99014354	Krakow	34,5	01.10.2019	30.10.2019
50.0786766 /19.9182087	Krakow	33,0	01.10.2019	29.10.2019
50.01898443 /19.90626949	Krakow	33,0	02.10.2019	30.10.2019
50.07669977 /19.8886161	Krakow	32,5	01.10.2019	29.10.2019
50.02831155 /19.91565572	Krakow	31,8	02.10.2019	30.10.2019
50.01169366 /19.92643546	Krakow	30,3	02.10.2019	30.10.2019
50.02990025 /19.91232629	Krakow	30,0	02.10.2019	30.10.2019

Nitrogen dioxide exposure in µg/m³ ● > 40 ● 30 - < 40

As of 25.11.2019

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