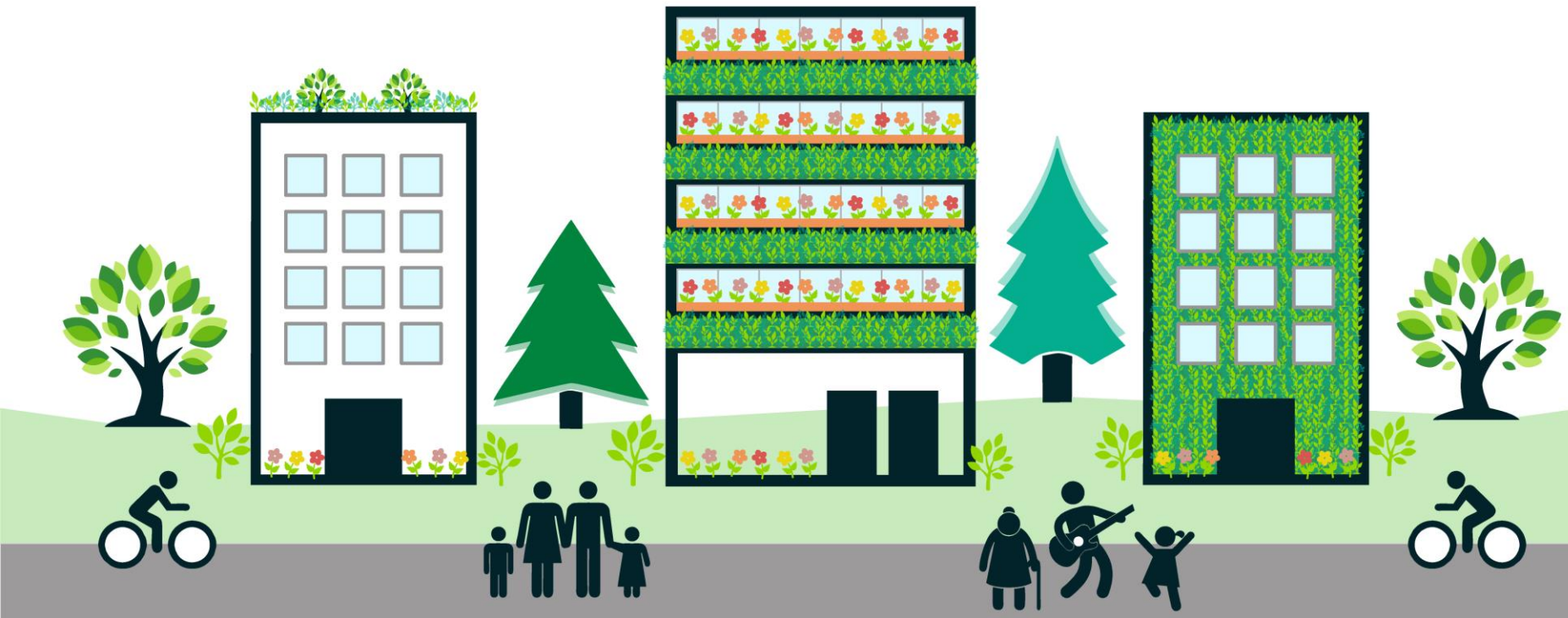
STUDY

Public attitude to air quality and urban greenery, Willingness of citizens to change behaviour in favour of improved air quality



CLAIRO
INOVATIVNÍ VÝSADBA STROMŮ V OSTRAVĚ
EUROPEAN UNION
European Regional Development Fund
UIA URBAN INNOVATIV ACTIONS

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SUBJECT, AIMS AND CONTENTS OF THE STUDY

Is the topic of air quality important for the inhabitants of the Moravian-Silesian Region? How do people rate the air quality in their surroundings? Are the people of the region willing to change their behaviour (lifestyle) in favour of better air quality?

Would they use ecological heating, travel more often by public transport, or participate in planting trees? How important is the greenery around them to the inhabitants? Would they welcome new solutions in the future such as vertical gardens, green facades, or green roofs, and if yes, would they be willing to participate financially or in the planting by themselves?

The answers to these and other questions were sought during two public surveys that took place in the Moravian - Silesian Region in 2019 and 2020 (for more details see *Survey methodology* at the end of the study). The most important outputs are summarized in the Study of Behaviour of the Population in the area of air quality protection (hereinafter referred to as the "Study") and commented on by experts in the individual areas surveyed.

The aim of the study is to provide municipalities and cities (especially in the Moravian-Silesian Region) with the feedback from residents regarding topics that they themselves consider important, and at the same time make recommendations on what can be done next in this area, as well as how to use the potential of the population to get involved in these policies.

This study is divided into 4 parts:

1. Air quality
2. Urban greenery
3. The willingness of the population to change behaviour in favour of improving air quality
4. Recommendations to municipalities

MAIN FINDINGS OF THE STUDY

- **The topic of air quality is important for four-fifths of the conurbation's population** (compared to other problems, even in the time of covid).
- Almost half of the population are rather dissatisfied, or very much **dissatisfied** with air quality. The more the respondent was interested in air quality, the lower was their satisfaction with the state of air quality. The age group that was the least satisfied with the state of air quality was **people aged 30-39, i.e., the generation that are now starting families** .
- One of the strongest influences on responses (both in the areas of air quality and greenery) was **the level of education attained by the respondents** . With increasing education, interest in the issue and the belief that it concerns an important topic is growing rapidly. There was also a strong interest from **women** and **inhabitants of larger cities** .
- **More than a third of the population suffers from their own health problems** (impaired breathing, asthma, allergies, eczema, etc.), **or their children have health problems.** The proportion of the population who perceive the problem of air pollution as a **moral** one is increasing (more than a fifth).
- In Ostrava conurbation, **8-10% of residents are seriously considering relocation** due to the state of air quality, and another 17% thought of moving though they are not sure about taking this step. **The youngest generation is considering moving due to air quality the most, which is a warning in itself**.
- **The theme of greenery** in the city is perceived positively by the vast majority of respondents. More than three quarters of them would also welcome new solutions in their surroundings such as green facades, roofs, etc. **It can be very interesting feedback for cities that green locations are especially attractive for young and educated members of the population.**
- Almost half of the residents would be willing to help their municipality with the planting of greenery or another form of support for improving air quality **by contributing financially** .
- **The vast majority of respondents declared their willingness to contribute in person** to improve air quality and the environment in their region.
- Most often there was support for **planting greenery (90%),** not burning household **waste** (including leaves, grass, paper, wood etc.) and to a limited extent **ecological heating.**

- Besides, less than half of the population (but with a growing trend) is more likely to favour the **use sustainable forms of transport.**
- Achievements in the improvement of air quality are not communicated enough, many residents are not aware of any significant positive shift in recent years. Less than **one third of respondents think that the current state of air quality is better than it was 10 years ago** although surveys show the opposite.
- Information about air quality is requested but is not always considered reliable. **Interest in information in the area of air quality protection** which may show the real willingness of the public to get involved in the issue, was expressed by more than half of respondents.
- Only 15% of respondents confirm full confidence in media reports concerning air quality, **for 37% of respondents, however, reports in this area are untrustworthy**, which is the most evenly matched of all the questions regarding agreement among respondent groups.
- There is a relatively good **knowledge of sources of pollution**. However, this information is not up to date. In particular, information on sources of pollution from transport and local heating plants (which account for a significant part of pollution in the region) can support the willingness of residents to adjust their heating and lifestyle in general.

Recommendations for cities and municipalities on how to communicate with the population and which areas of participation to focus on are given in the comments of the experts involved and in the final part of the study.

AIR QUALITY

It is always better to choose a “win-win” strategy

Any activity aimed at improving the quality of the air, and therefore the environment, can only be welcomed. However, immediate solutions cannot be expected. From my point of view, two related problems are essential - **lack of motivation of the population and the influence of media messages on their decision-making.** Especially in larger cities people may be less willing to engage in activities which overlap into their property or their immediate surroundings. In small settlements, safety (pavements, crossings, bypasses) remains in the first place in the ranking of municipal priorities, with civic amenities in second place. There is usually not enough willingness left for the environment. From this point of view, the inhabitants of industrial centres in the Moravian-Silesian Region are somewhat exceptional.

The significant influence of media messages as well as the historical experience of a heavily industrial area on the opinions of the inhabitants of the Moravian-Silesian Region are underlined by the graphs on the following pages. **Nearly 30% of respondents to the CLAIRO research project said that the air quality in their home is deteriorating, although measurements show the opposite.** Almost half of the respondents are not satisfied with the state of air quality and consider industrial companies from the Czech Republic and Poland to be the main culprits responsible for this. It could be expected that in other areas the issue of air quality would be perceived as more problem-free and that in cities such as Prague or Brno, transport would be identified as the biggest polluter.

In terms of air quality, the Moravian - Silesian Region is among **the most congested areas in the Czech Republic** and industry still plays a significant role in the situation but in addition to this, **transport and local heating plants** are also important. Focusing only on large enterprises negatively affects the willingness of the population to participate in improving the situation according to the principle of “it won't help anyway."

When looking for recommendations for the management of municipalities on how to deal with this issue, it is appropriate to return in time to two projects. The first is a project of the Ministry of the Environment called "Small Settlements" (2001-2005), which focused on air quality in often neglected municipalities with less than 5,000 inhabitants. Although its results can no longer be generalized,

based on this **the importance of awareness of residents can be seen.**

Respondents involved in the project did not have a general awareness of the dangers of burning certain types of fuels and waste, the lay person lacked a simple and well-arranged comparison of the properties of individual fuels and existing heating options. It is the level of awareness of air quality issues, whether low or on the contrary excessive, which had a negative impact on their decisions and the ministry therefore focused on awareness-raising events before the heating season began.

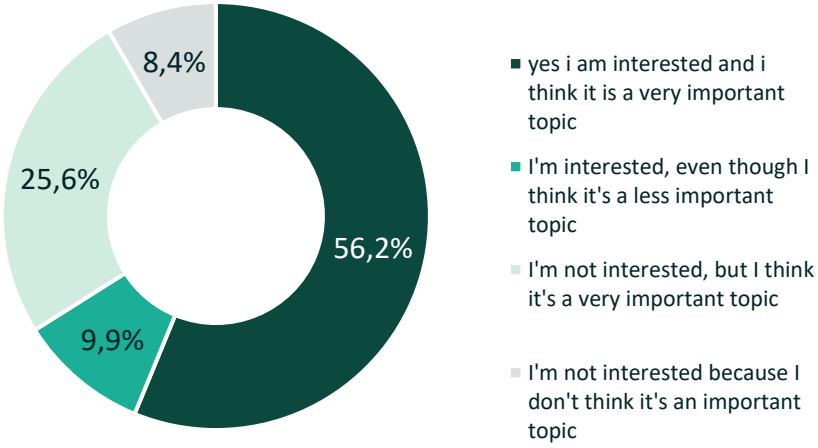
The second example is the "Stop Dust" project (2009-2016), a joint initiative of municipalities and towns around the Bílina quarry and North Bohemian mines, which aimed to reduce the impact of all local sources of pollution, including small combustion sources in both households and transport. Professionally handled PR activity proved that **people's willingness to get involved is always higher if everyone involved participates**, i.e. residents, local government and polluters. It is always better to choose a **win-win strategy** and a discussion rather than a dispute, whether it be professional, non-expert or educational. The project showed that common practices can be found, albeit step by step.

It works similarly, or at least it worked in 1990, in France. Any environmental decision in the area of interest has always been discussed by the so-called tripartite, i.e. representatives of citizens, local

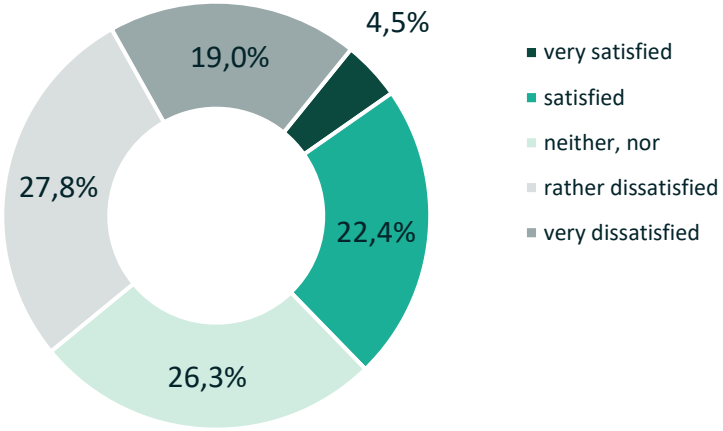
government and businesses. If they did not agree, the state representative made a decision. It shows us that direct management is not the way to go. **The way forward is through communication, suitable motivation, a good project** and its explanation or defence, setting up cooperation and fulfilling promises. And above all, patience.

RNDr. Bohumil Kotlik, Ph.D.
Head of the Department of Air Pollution and Waste of the Public Health Institute.

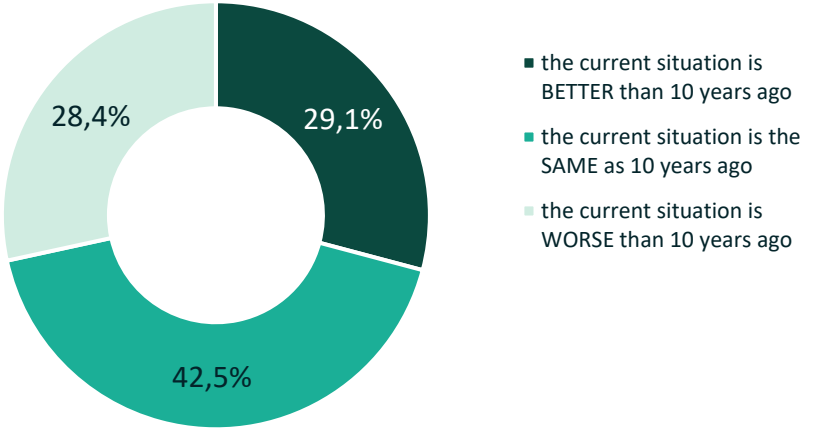
Are you interested in issues concerning air quality and is it an important topic to you?



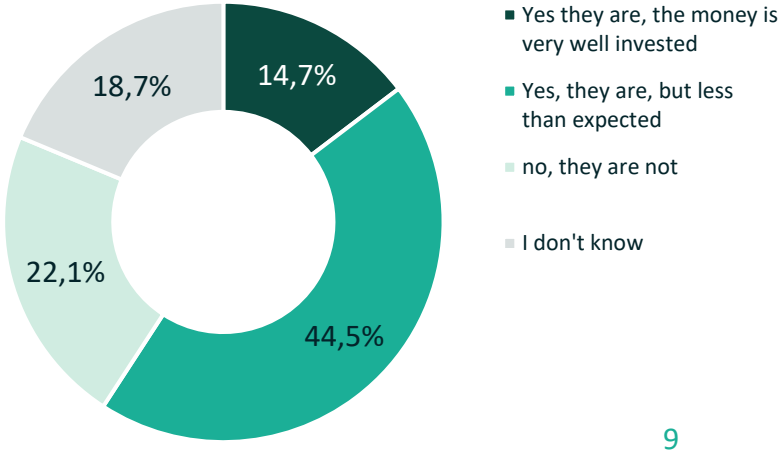
How satisfied are you with the air quality in your residence?



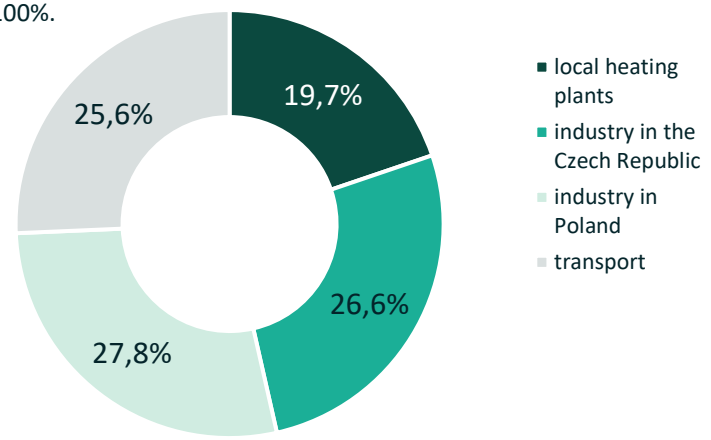
How do you perceive the current state of the air quality in your residence compared to 10 years ago?



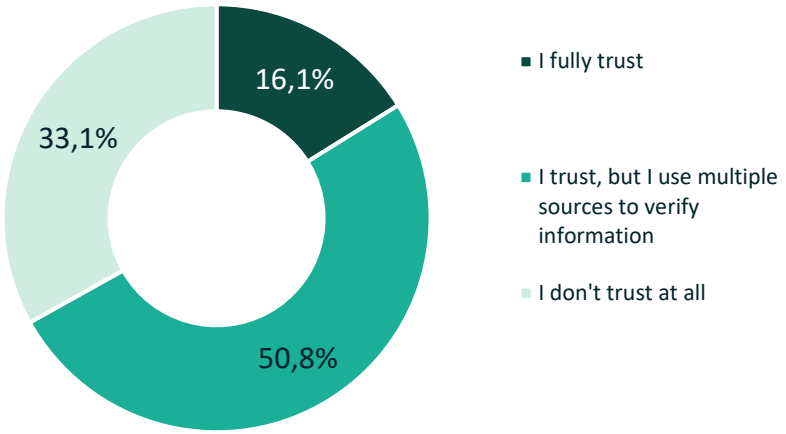
Do you think that the state's investments in protection of air quality are helpful (e.g. boiler subsidies, cleaning of industrial enterprises, lower tax burden on environmentally friendly resources)?



In your opinion, which form of air pollution has the greatest impact on air quality in the Moravian-Silesian Region? Please estimate the percentage of each individual resource, together they should amount to 100%.

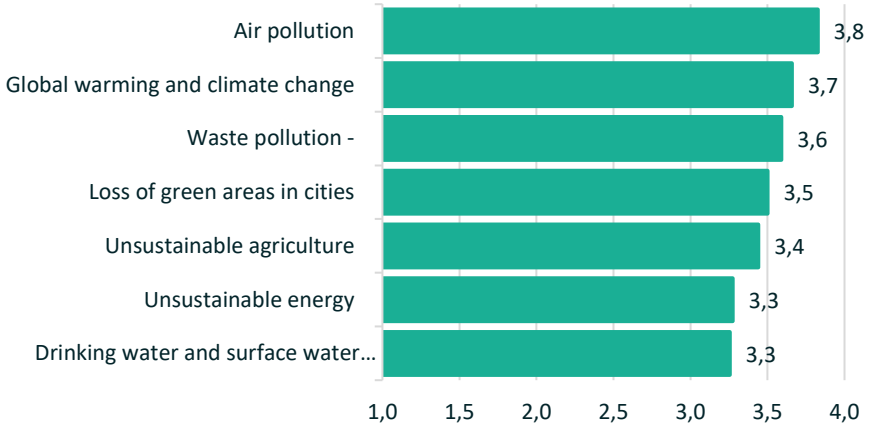


Media reports on air quality and the environment

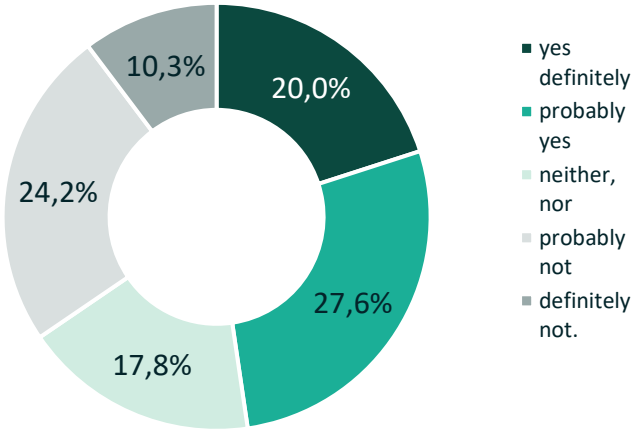


Evaluate which problems you currently consider to be the most serious

(rank 1 = least serious, 5 = most serious)



Are you interested in regular information in the area of air quality protection in the Moravian-Silesian Region?



AIR QUALITY: FINDINGS FROM THE SURVEY

- More than 80% of the population of the conurbation consider the topic to be **important**.
- On the issue of air quality protection **more than half of the population of the Ostrava conurbation are definitely interested** (57.3%). Compared to the results from 2019, this is a small increase in the number of people with this view. (In 2020, the issue of the Covid-19 pandemic prevails in the public and in the media. From this point of view, on the contrary, it is positive that even so, people are still interested in the topic of air quality and consider it an important issue in society.)
- A higher number is evident in **women**, who consider protection of air quality to be an important topic and at the same time are actually interested in it. Men are more passive in this area - they agree that it is an important topic but they are interested in it to a lesser extent.
- One of the strongest influences on responses (both in the areas of air quality and greenery) was **the level of education attained by the respondents** . With increasing education, interest in the issue and the belief that it concerns an important topic seems to grow rapidly.
- Interest in protection of air quality and its importance also depends on residence - with a growing **population in a city there is also a growing interest** in seeing an importance in protection of air quality.
- **Satisfaction with the state of air quality is relatively low.** Only 6.3% of respondents are very satisfied with the state of air quality. 23.3% of respondents are fairly satisfied. Almost half of the population are rather, or very much , dissatisfied with air quality. In 2020, there were more than 5% more satisfied respondents compared to the year 2019. In addition to the feeling, this result may be due to the real situation in the field of air quality - there is a rapid decrease in air quality problems due to several factors - from favourable climatic conditions to a significant reduction in traffic or a reduction in the performance of industrial enterprises.
- Differences in answers to the question how satisfied are you with the air quality in your place of residence? **brings new perspectives on satisfaction with the state of air quality.**

- It is interesting, for example, that men are slightly more satisfied than women with the state of air quality. The age group that was the least satisfied with the state of air quality was **people aged 30-39, i.e., the generation that are now starting families**. It is worth noting the analysis of satisfaction with air quality according to the interest of the respondents about issues of air quality protection. The more the respondent was interested in air quality, the lower was their satisfaction with the state of the air quality.
- People who rate the current level of air quality as better (compared to 10 years ago) are far more satisfied with the situation. It is interesting that low satisfaction with the state of air quality is shown by people who are not interested in this issue.
- **Less than a third** of respondents think that the current state of air quality is better than it was 10 years ago, more than 40% think that there is no significant difference and about a quarter of the population even think that the current state of air quality is worse than it was 10 years ago. That says something about **insufficient successes in communication** in this area (see role played by MS Region).
- Most respondents think **that state investment in protection of air quality is evident** (59.5%, 58.8% in 2019), but as many as 46.5% of respondents are convinced that **it is in evidence less than expected**.
- Only 13% of respondents think that these measures are effective and that the money has been well invested. As the level of education grows, so does the number of people with the view that these investments are beneficial.
- According to the respondents in the MS Region, **industry** has the greatest influence on air quality. According to the respondents, this contributes about 54% to air pollution. At the same time, they blame Czech sources in the territory of the MS Region, as well as Polish companies beyond the borders of the region. An interesting finding is the very balanced average results for all groups of respondents, and in both years of the survey - which indicates a relatively good awareness of the effects of individual sources (see SZÚ applications and summary in the media).
- Out of the 7 global environmental issues put forward, residents rated air pollution itself as the most serious, which **confirms the importance attached to this topic**. Another issue was global warming and related climate change, as well as waste pollution. The least important problems were considered to be unsustainable energy and - somewhat surprisingly - pollution of drinking water and surface water.

- Full confidence in media reports about air quality and the environment were recorded in 2020 in only about 15% of respondents and, in addition, it is still slightly lower than in 2019 (17%). Almost half of the respondents trust the information but they like to verify the news with other sources. **For 37% of respondents, reports from this area are untrustworthy.** There was an increase of 7% in these respondents when comparing the two years. The issue of trust in media reports on air quality and the environment is surprisingly one of the most balanced in terms of the opinions of individual groups of respondents.
- Interest in regular information in the field of protection of air quality can often show real public involvement in the issue.
- Specific interest in regular information is definitely declared by one fifth of respondents and probably yes by 30% of respondents. Overall **more than half of the respondents are interested in information in the field of air quality protection,** which is an interesting increase of over 5% compared to 2019 (44.5%).

URBAN GREENERY

You can't just plant trees, a long-term strategy is crucial

Of the five solutions for improving air quality - from rigorous measurement and enforcement of fines for exceeding emission limits and an absolute ban on solid fuel heating to significant traffic restrictions in the centres of large cities and the closure of industrial enterprises in cities - respondents to the CLAIRO survey reacted **most positively to the planting of greenery in cities**. It is a form of air quality protection which, as the only one offered, **does not have a negative impact on their comfort**. On the other hand, the least popular was the closure of industrial enterprises, a seemingly logical step, which, however, leads to economic disadvantages.

Due to global climate change, amongst other reasons, the topic of **blue-green infrastructure** is being discussed more and more in both foreign and Czech cities. A comprehensive analysis of the state of greenery was undertaken in the summer of 2019, by the Prague Institute of Planning and Development. The analysis included a set of exact data from a survey of two thousand trees in Prague's tree plantations and a proposal for an assortment of hardy trees resistant against the effects of climate change. The working group, experts in the fields of arboriculture, dendrology, surveying, traffic engineering, landscape architecture and water management under the leadership of David Hora proposed city-wide principles for establishment and care of tree plantations in city streets.

It also took into account the ability of **individuals of different species and ages to fulfil ecosystem services. The survey showed that the greatest influence to improve the climate in city streets is possessed by trees with a large, naturally branching crown and larger leaves**.

According to the current vegetation survey and the CLAIRO survey, so far it can be seen, among other things, that a larger leaf surface usually has a greater ability to trap dust particles. Thus **mature trees** have a significant effect on improving the climate. They help the most in reducing heat islands, increasing the comfort of the inhabitants, improving the microclimate and cleaning the air. Whether trees become full carriers of ecosystem services depends on how they are planted, the quality of the substrate and their resistance to

negative urban influences (compaction, chemical pollution, salinization, etc.). In the urban environment, therefore **post-planting and aftercare of planted trees** is crucial, which is still not a matter of course in many places. Currently, a relatively high percentage of planted individuals do not survive to maturity.

This trend can be prevented by a long-term strategy, but also by the currently supported **integrated blue-green infrastructure systems** , which are intensively promoted in European countries such as Denmark, Sweden, Norway, Germany and Austria.

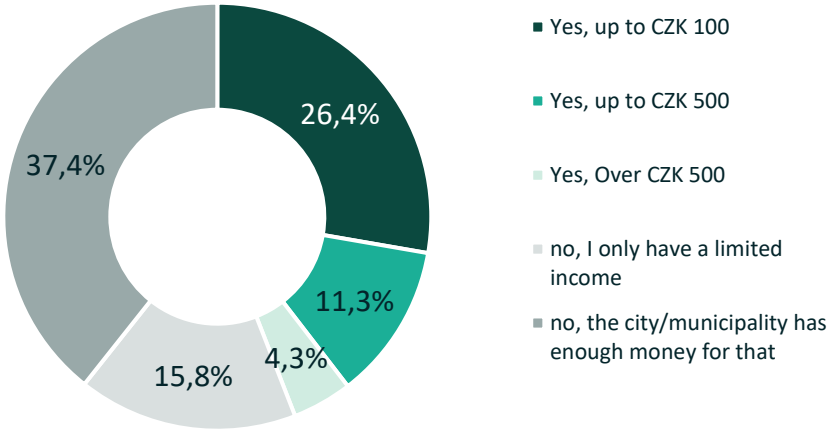
The systems integrate several functions simultaneously - rainwater management, planting of quality tree species and a variable approach to dealing with the surface, which is linked to the site, the intended use and surface load. In these countries, the overall negative carbon footprint of a project is determined, in which the **materials used** plays a significant role. A modern material in the field of caring for greenery is biochar, which can be processed from biowaste (wood processing industry, biowaste from caring for greenery, etc.), and thus supports the circular economy.

Planting trees and other vegetation is **poor compensation for the amount of areas built on each year**, which change hydrological conditions not only in cities, but also in the suburbs, where satellite settlements with a large share of built-up area per capita are often created. Therefore **raising awareness and public participation** plays an important role. In terms of planting and caring for greenery not only landowners can be involved, but also the inhabitants of blocks of flats or apartment buildings who can contribute to the environment with carefully chosen vegetation placed in window boxes or on balconies.

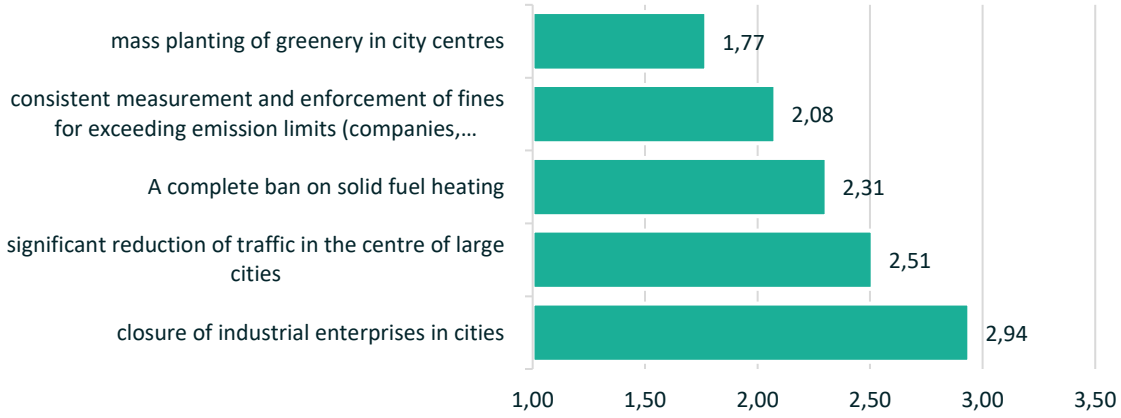
Further details are provided in the final recommendations, including the annexes.

Ing. Kateřina Stará
atelier K2N LANDSCAPE

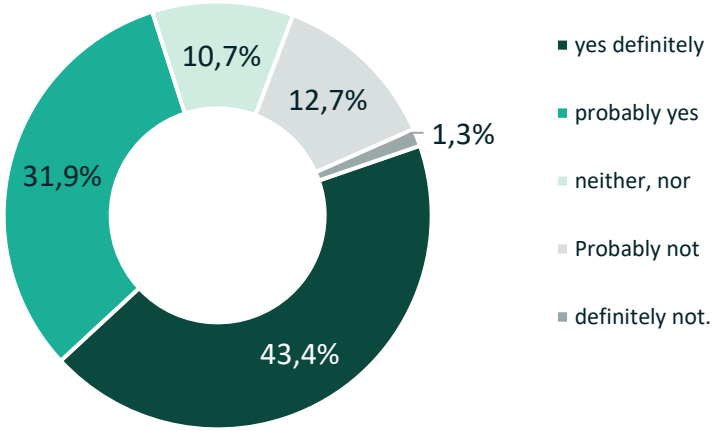
Would you be willing to contribute financially (e.g. once a year) to the municipality for the planting of greenery, or another form of support for protection of air quality?

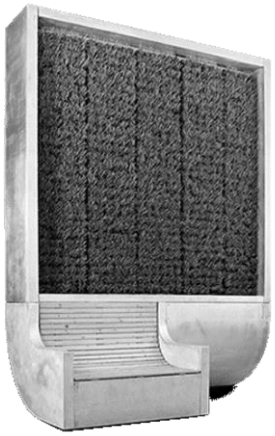


Which of these solutions would you personally support?
(1 = definitely yes, 5 = definitely not)



Do you like these ideas? Would you support the construction of such natural solutions in your surrounding area? (See below)





URBAN GREENERY: FINDINGS FROM THE SURVEY

- The presented examples (see previous page) were appreciated by the vast majority of respondents. **Similar planting solutions would be supported by more than three quarters of respondents**. Women like these solutions slightly more often than men. The dependence on age is evident, when with increasing age the support for these methods of planting greenery decreases. Even more pronounced is the link to educational attainment when **with an increasing level of education, support for these new forms of planting greenery grows rapidly**.
- The presented new planting methods are more often preferred by people from larger cities. For cities it can be very interesting feedback that **such locations are especially attractive for young and educated members of the population.**
- In total, **44.7% of respondents would be willing to contribute financially to the municipality for planting greenery**, or another form of support for protection of air quality.
- It is possible to see **interesting trends in the answers of individual groups of respondents:** With increasing age, the willingness to contribute to planting of greenery decreases. As the level of education grows, so does the willingness to contribute to the planting of greenery. Women are more willing to pay than men. Of course, those who consider the topic of protection of air quality itself to be important are more willing to contribute.
- One question in the survey *(Do you think the composition and structure of planted greenery - what and where you plant - can affect air quality?)* aimed at promoting the project's outputs, with the aim of briefly informing 1,200 inhabitants of the region about the CLAIRO project. More than 80% of respondents answered that the composition and structure of planted greenery can have an effect on air quality.
- Respondents were offered a total of **five different solutions** on how to improve air quality - from quick, extreme solutions - closure of industrial enterprises in cities), a significant reduction in traffic in the centres of large cities and an absolute ban on heating with solid fuels, up to mass planting of greenery in city centres and rigorous measurement and imposition of fines for exceeding emission limits for companies, households and individuals.

- The highest absolute support with more than half of the respondents (answering definitely yes) is somewhat as expected, the backing for **planting greenery in city centres, which is supported by 78% of respondents.** Less than 5% of respondents do not consider the planting of greenery to be important.
- **Consistent measurement and enforcement of fines** for those who exceed emission limits - mainly companies, but households and individuals too, also has a high level of support. A total of two thirds of respondents support this type of solution. Over 35% of respondents definitely support this form, another 32% would probably support it. In comparing the two years, however, there is a shift in the number of answers from the category definitely yes to the category probably yes.
- The third most supported solution is an **absolute ban on heating with solid fuels**. This seemingly unpopular solution is in some way supported by an absolute majority of respondents, and almost 35% of them definitely support this solution. However, about 15% of respondents are completely against this solution (as in 2019).
- The second smallest support is for **traffic restrictions in large city centres**. Approximately 14% of respondents oppose this solution, and a third remain neutral. However, even this unpopular solution is supported by a sufficient number of more than half of the respondents in both surveys.
- The least popular is the very surprising idea on the **closure of industrial enterprises** in city centres. This seemingly logical step points to the very obvious economic disadvantage of this solution, which the respondents are probably very well aware of. Regarding the closure of these companies, respondents are simply divided into three categories of equal size (one-third for, one-third neutral, one-third against).

WILLINGNESS
TO CHANGE BEHAVIOUR

It is essential to recognize what exactly the inhabitants need

Although there are still many things that municipalities should find out from their citizens, in order to support them in their efforts not to contribute to air pollution, the results of the CLAIRO survey seem to state **three key messages** for municipalities in the Moravian-Silesian Region.

Firstly, the public perceive air pollution as **a serious and personal problem**. Previous research shows that this topic resonates throughout the country and the citizens of the Moravian-Silesian region are no exception. For most of them, air pollution is a very important topic and at the same time more than half are interested in it. A quarter are not actively interested in the problem, but still consider it to be important. In addition, almost half of the participants have personal experience with air pollution - **impacts on their own health, the health of their children restricting their movement outside**. In addition, the number of citizens who would respond positively to these options is likely to be higher. In fact, in the study they could choose only one option, of how to most reduce air pollution (see the comments in the appendix). The personal dimension of the problem is also evidenced by the fact that most respondents due to this problem **consider or do not rule out a change of residence**.

At the same time, a large number of these inhabitants are willing to contribute to the improvement of air quality. So here it concerns citizens who can be reached and helped to get involved with a joint effort. Psychological research shows that when we perceive a threat as distant, when it does not concern us, we are less likely to do something about it. **It is the personal perception of air pollution that helps to mitigate the problem through behaviour.**

Secondly, **most citizens of the Moravian-Silesian Region (59%) are willing to contribute to the improvement of air quality and the environment** . However, from a general willingness to get involved there is a long way to go to real action. Therefore it is crucial to find out what specific activities people are undertaking. The CLAIRO survey showed that citizens are in favour of planting greenery, **municipalities can therefore count on their support** when landscaping and motivate them to do some planting themselves.

The vast majority of citizens also declared that they do not incinerate household waste.

If municipalities solve the problem of incineration, they could find out **why some people burn waste**, what benefits it brings them and then focus on balancing them or providing compensation. They can also present to their citizens the fact that the majority of the public supports this measure, which will increase motivation for “the right behaviour".

Thirdly, **municipalities can support citizens in more environmentally friendly travel and heating**. According to the survey, 43% of the population regularly use public or shared transport already, and another 29% use it occasionally and plan to do so more often. So there is about a third of citizens that we can encourage in their plan to travel in a more environmentally friendly way , and another large part, which we can support in maintaining their current behaviour.

The second behaviour that municipalities can focus on **is ecological heating.** The majority of the population (68%) do not have influence over the way they heat their homes. Here it is necessary to **look towards the companies** that provide it, rather than to individuals. On the other hand, the roughly 14% of citizens who are still able to change their type of heating, could have a big impact on local air quality. The local heating plants are one of the biggest pollutants of the air we breathe. **In the Moravian-Silesian Region, for example, they are responsible for one third to one half of benzo(a)pyrene emissions (depending on the specific location)**. Thus, although it is a relatively small number of households, it could make sense for some municipalities to try to motivate them to change.

Municipalities should take into account the general trend where the Czech public particularly engages in the types of activities, which are financially beneficial and are not very demanding. So it's always good **try to make theses activities as accessible as possible, facilitate and actively offer possible alternatives**.

The more municipalities know about the preferences of their inhabitants, the better they can help them change their behaviour and the more efficiently they can invest their time and money. **The basic thing is to be able to recognize exactly what the inhabitants need.**

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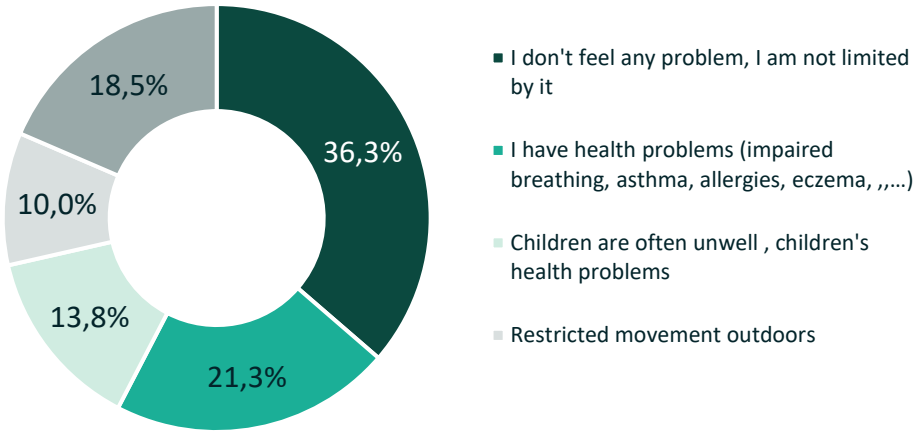
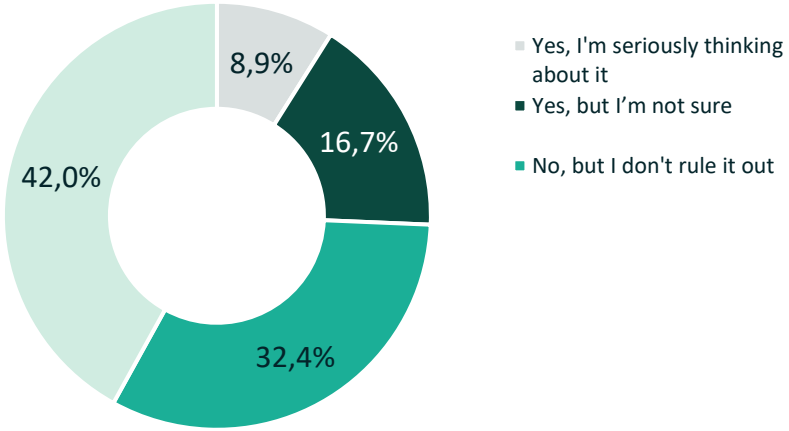
Faculty of Social Studies, Masaryk University in Brno

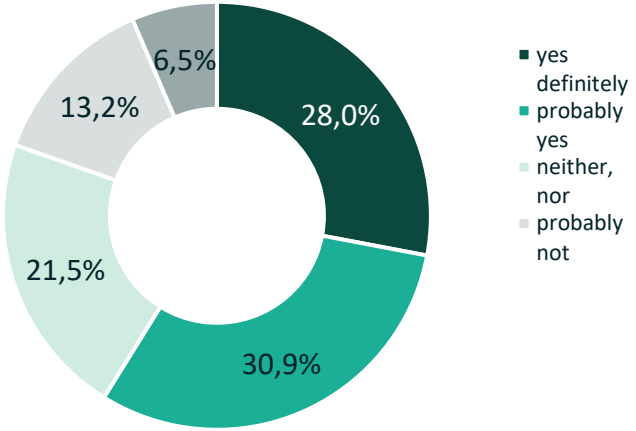
How does air pollution limit or bother you the most?



Have you ever considered changing your place of residence due to air pollution?



Are you willing to contribute to the improvement of air quality and the environment in your region?



WILLINGNESS TO CHANGE BEHAVIOUR: FINDINGS FROM THE SURVEY

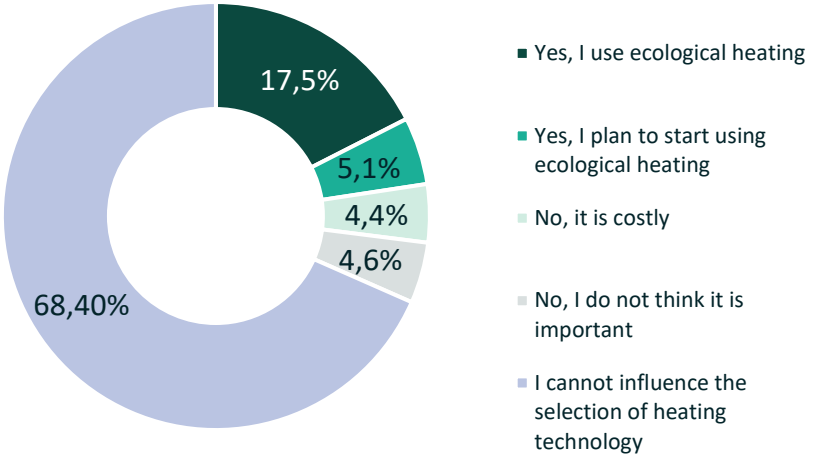
- **Almost 60% of respondents declared their willingness to contribute to improving the air quality and environment in their region.** 29.4% of respondents are definitely willing to contribute, 29.9% are probably willing. less than a fifth of respondents are probably or definitely unwilling to contribute to improving the environment.
- It is evident that there is a higher degree of willingness to contribute to the improvement of the state of air quality and the environment among **women** rather than men. **The willingness to contribute to improvement is highest in the 30-39 age group**, then this willingness decreases relatively with increasing age. On the contrary, with increasing education, this willingness grows significantly and **people with a university degree belong to the target group with the highest potential**.
- Though about a quarter of respondents consider the topic of protection of air quality to be very important, despite this fact, they are not very interested in this area. **From the perspective of the project objectives and marketing of protection of air quality it is the most interesting group of respondents featuring great internal contradiction**.
- There is a high degree of willingness to contribute to the improvement of the state of air quality and the environment by those people who are very interested in this issue and consider it to be important. On the contrary, with declining satisfaction regarding the state of air quality, the willingness to contribute to improvement also decreases. **Somewhat paradoxically, the most satisfied, but also the most dissatisfied respondents are willing to contribute the most**.
- There is a much higher willingness to contribute to the improvement of those who support natural solutions (tree planting); **People who are thinking about relocating because of the state of the air quality are also more willing to contribute.**
- Each region strives, among other things, to ensure that its inhabitants do not move away. If it is natural relocation, the reasons are understandable. **The problem is when it is the dissatisfaction with the state of air quality behind the desire to move.**
- In the Ostrava conurbation **8-10% of the population are seriously considering relocating** due to the state of air quality (it is a positive that there is a slight decrease in people with this intention).

Roughly another 17% thought of moving, but they are not sure about this step. In total, a quarter of the population are considering moving due to air quality. 30.2% of residents do not consider moving, but on the other hand do not exclude it. 42% of respondents do not think about moving in connection with air quality.

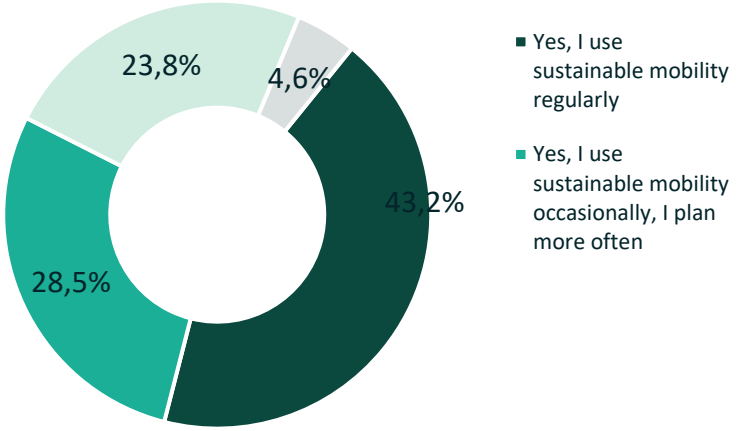
- Women are much more likely to think about moving than men. With increasing age, the willingness to move (or think about it) decreases. It's obvious that **considering moving due to air quality is most prevalent among the youngest generation**. It is interesting to note the gradual growing trend of willingness to move due to air quality dependent on rising age that illustrates better the dissatisfaction with the state of air quality (the same trend). **Those who are interested in the issue think most often about moving due to air quality, and also logically those who are less satisfied with the state of air quality.** It seems a bit paradoxical that the people who most often consider moving due to air quality are those who declare their willingness to make a personal contribution to improving air quality and the environment, i.e. active people. **On the other hand, it is logical but at the same time dangerous for the region.**
- Only a third of respondents state that they are not in any way limited or bothered by air pollution. A fifth of respondents cite as personal problems with air quality being mainly **their own health problems** (impaired breathing, asthma, allergies, eczema, etc.), while another 14% of respondents are concerned about **their children's health problems related to poor air quality.** The largest number of personal health problems then, as expected, are seen in the oldest generation of respondents.
- More health problems in relation to air quality are recorded in people who are **more willing to improve the situation in this area**. People more prone to relocation are found particularly among those who report more problems with air quality in the survey. The group of respondents **aged 30-39** report the most problems related to air quality.
- It is interesting to note the increase in the number of respondents who **perceive this as a moral problem**. At present, almost 22% of respondents think this way (in 2019 almost 7% less). It is evident that men do not have a hard time with the issue - almost half of them do not feel limited or bothered by anything in connection with it.

In particular, how would you personally contribute to better air quality?

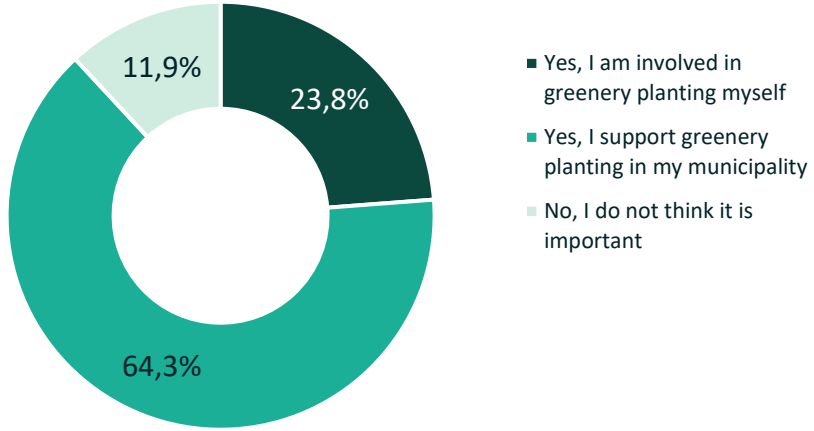
Ecological heating (sustainable heating technology and sources, energy efficiency, etc.)



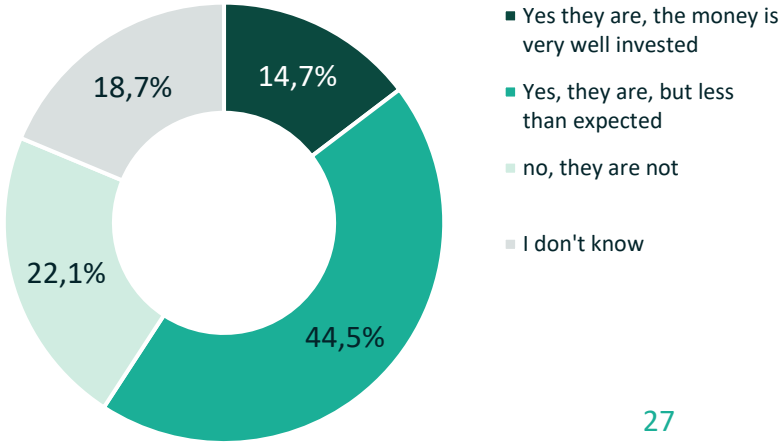
Sustainable mobility use (public transport, bikes, car-sharing etc.



Support to greenery planting



Avoiding household waste incineration



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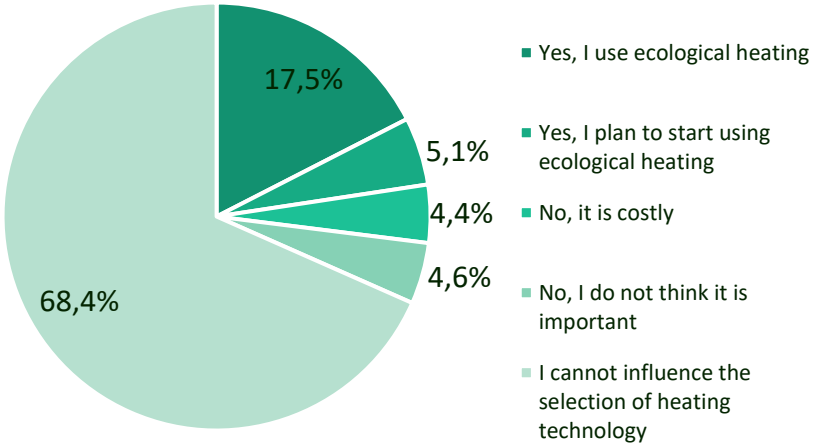

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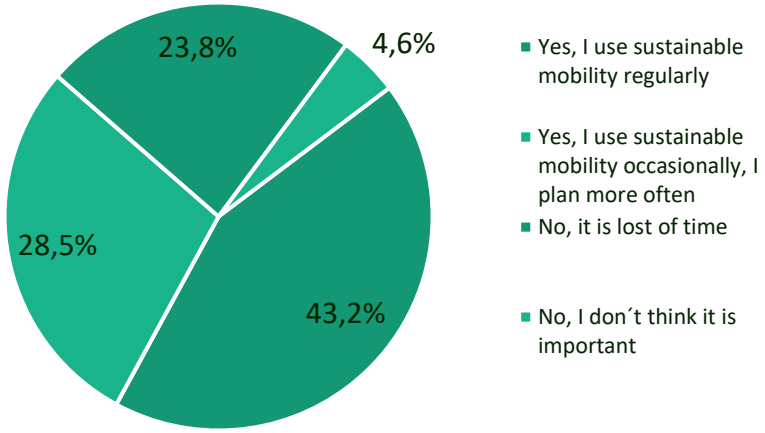

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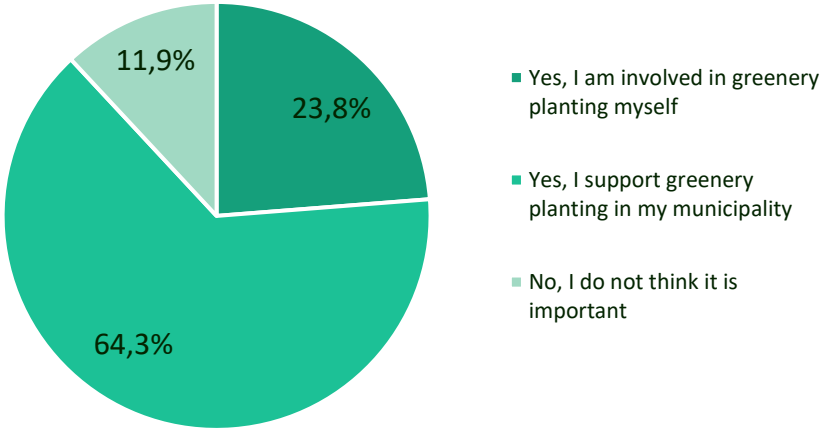
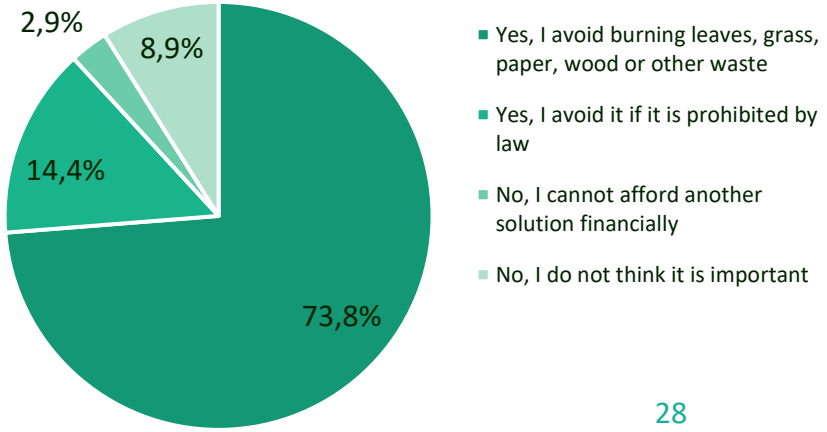


Avoiding household waste incineration



WILLINGNESS TO CHANGE BEHAVIOUR: FINDINGS FROM THE SURVEY

- **Ecological heating**

  According to the surveys, 70% of the MS Region's population have no influence over the way they heat their homes. On the other hand, around 17-18% of respondents are convinced that they are already heating their homes in an ecological way, and another 5% of respondents state that they are planning to make an ecological change in their type of heating. For about 4% of respondents, a change in their type of heating seems to be beyond their economic means. 4.5% of respondents consider the type of heating to be irrelevant. Evidently, younger people and people with a higher level of education are more likely to change their type of heating.

- **Sustainable forms of transport**

  Approximately 43% of respondents regularly use public or shared transport. The comparison between the two surveys has increased the number of people who plan to use public transport more often. A further 4% more people are considering about this, making a total of 30% of respondents. About a fifth of respondents see a loss of time in the use of public transport.

- **Planting of greenery**

  90% of respondents support active planting of greenery, while almost a quarter of respondents even declare interest in their own planting. The remaining 65.5% talk about supporting planting in their city/municipality. The number of respondents who do not consider planting to be important fell by 4% between the two surveys, and now only 10% of the population think this. Planting is more important for women than for men and as with the interest in air quality and greenery, it grows with education. On the contrary, it decreases with increasing age. The target group for this activity is therefore mainly younger people, more often women and people with a higher level of education.

- **Omitting household waste incineration**

  More than three quarters of respondents do not burn leaves, grass, paper, wood or other waste. A quarter of respondents admit to burning one of the above mentioned items. 14% of respondents are willing to stop this burning if it is prohibited by law. About 10% of respondents do not consider it to be important. Less than 3% of respondents cannot afford a solution other than incineration (they state economic reasons for this).

Conclusions

Recommendations to municipalities

With regard to the main conclusions of the analysis, in cooperation with experts, the following recommendations were made for cities and municipalities on how to improve communication in the area of air quality, and examples of how to involve all stakeholders in issues of air quality and greenery:

- **Inform residents regularly and in a balanced manner** on the long-term evolution of air quality, sources of pollution and **projects to improve it**; to use verified sources including resources on health effects in connection with air quality.
- Actively address **motivate and involve the population**, offer alternative involvement, cooperate with local initiatives, schools, non-profit organizations, etc. in the form of competitions, discussions, but also small grants and other activities (Appendix No. 1).
- In particular, motivate to **change the method of heating** and **use of sustainable forms of transport, including adequate support.**
- **Dealing with companies** (polluters, developers, partners within the framework of corporate social responsibility).
- To use **green public procurement** and give priority to long-term, sustainable solutions when choosing contractors.

Referring to the greenery planting in cities and municipalities:

- **Target** places with the most stress factors; always think carefully about **structure, composition and planting efficiency** . Take into account all factors and design greenery in relation to its demands (Appendix No. 2).
- Preserve and support **greenery on transit routes** - in pedestrian zones, around cycles paths, but also transport hubs.
- Don't underestimate maintenance and invest in **mature growths**. **Ensure professional supervision during both planting and aftercare** .
- **Integrate projects to green and blue infrastructure** (to support efficient rainwater management and subsequently use it, among other things, to use modified floodplains, river catchments and watercourses around the city, etc.).

- **Use existing buildings and brownfield sites** in development plans, so that natural green spaces do not decrease.
- Think conceptually and **plan public space** with regard to sustainability, needs, mobility, health and the free time of its users. In this sense, public space can be the symbol of a city's sustainable policy.

Annexes

1. Jan Krajhanzl and team: Recommendations for cities and municipalities in the area of information, communication and participation
2. Kateřina Stará: Recommendations for cities and municipalities in the area of greenery

USEFUL LINKS AND RESOURCES USED

The study identified resources that may serve to further supplement information on individual topics.

- Czech Hydrometeorological Institute / Air; Atlas of the Moravian-Silesian Region (Air quality)
- A guide for investors in brownfield revitalization to apply the principles of energy efficiency and sustainability - Czech Green Building Council (CZGBC)
- Health consequences and risks of air pollution - State Institute of Public Health
- Europe towards zero pollution - European Environment Agency (EEA)
- Principles for cooperation with investors - City of Jihlava
- Buy green! Handbook on Green Public Procurement - Europa.eu/DG Environment
- **Plant database** - CLAIRO project (Statutory City of Ostrava and project partners)
- Methodology for the implementation of planting woody plants absorbing dust particles along roads and at so-called areal sources of dust - Ecological model studio / TAČR
- Methodology for evaluating the influence of environmental factors on the health of the child population, with the main focus to eliminate the identified adverse effects (use of greenery in reducing PM10 concentrations and O3), TA02020944, Ecotoxa Heating options - Arnika
- Ten principles for sustainable mobility - Dobramesta.cz
- Public space and the green future of cities - Transformation Foundation
- Subsidy program to support projects in public space - Statutory city of Ostrava
- The forms and functions of green (and blue) infrastructure - Europa.eu/DG Environment

METHODOLOGY OF PUBLIC SURVEYS

- The research was carried out using exclusive quantitative research using the technique of **face to face** standardized in-home interviews. Data were processed by standard statistical methods using professional software.
- Data collection was undertaken between: **15.10.2019 – 10.11.2019 and between 5.10.2020–31.10.2020.**
- The basic source of research subjects were inhabitants of the Ostrava conurbation aged over 18.
- The sample was formed of **1,207 respondents** (605 in 2020+ 602 in 2019) from selected cities and municipalities in the Ostrava conurbation, specifically from the following cities (and surrounding small villages):

  Bohumín (64), Český Těšín (75), Frýdek - Místek (112), Havířov (141), Hlučín (20), Jablunkov (15), Karviná (112), Opava (80), Orlová (20), Ostrava (476), Trinec (93)
- In the **structure of respondents** is it possible to determine between gender (men / women), age (categories 1 / -29, 30-39, 40-49, 50-59, 60+ years), education (basic, apprentices / without high school graduation, secondary/vocational education, university educated) and other parameters.
- The differences in responses during the two surveys were generally not significant.
- Responses in which there was a more noticeable shift of opinion are presented in the comments.
- The study includes a **detailed annex** to the responses of individual groups and questions:

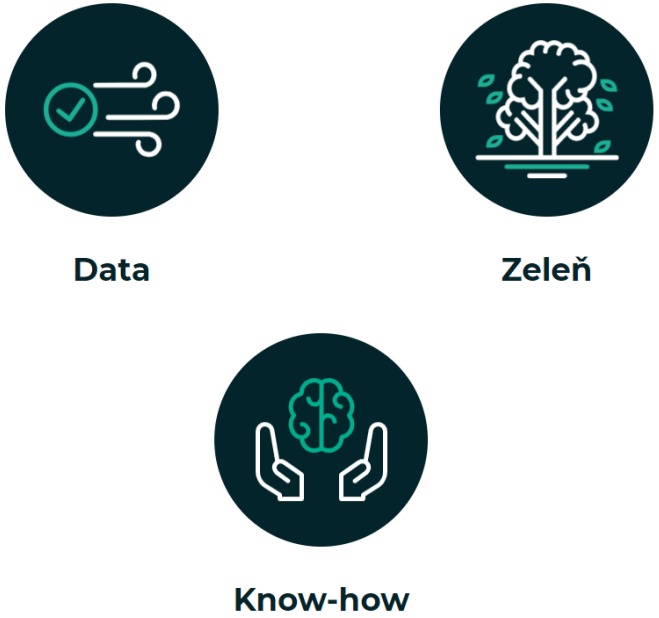
  Public surveys 2019 - 2020 (Opinions and behaviour of the inhabitants of the Moravian-Silesian Region in the field of protection of air quality and greenery

PROJECT CLAIRO

The project is called CLAIRO (from the English name: CLear AIR and CLimate Adaptation in Ostrava and Other cities) and aims for the **systematic reduction of air pollution by planting suitable greenery with a proven ability to absorb impurities from various sources**. It uses advanced and innovative calculations to capture impurities based on spatial data of local pollution and meteorological conditions. Another innovative element of the CLAIRO project is **increasing the resistance of planted greenery by its special treatment** .

The City of Ostrava implements the project in cooperation with the following project partners: Moravian-Silesian Region, Vysoká škola báňská - Technical University of Ostrava, Silesian University in Opava, Palacký University in Olomouc, SOBIC: Smart & Open Base for Innovations in European Cities and Regions and the Regional Association of Territorial Cooperation of Těšín Silesia. The results will be used not only in the city of Ostrava, but also on a transnational scale at the European level.

More Information: clairo.ostrava.cz



Prepared by: SOBIC - Smart & Open Base for Innovations in European Cities and Regions and the Regional Association of Territorial Cooperation of Těšín Silesia.

This project is co-financed by the European Regional Development Fund (ERDF) through the Urban Innovative Actions initiative, the Statutory City of Ostrava and the Moravian-Silesian Region.

2021