

SMART PRAGUE INDEX 2021



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SMART PRAGUE

Yearbook 2021

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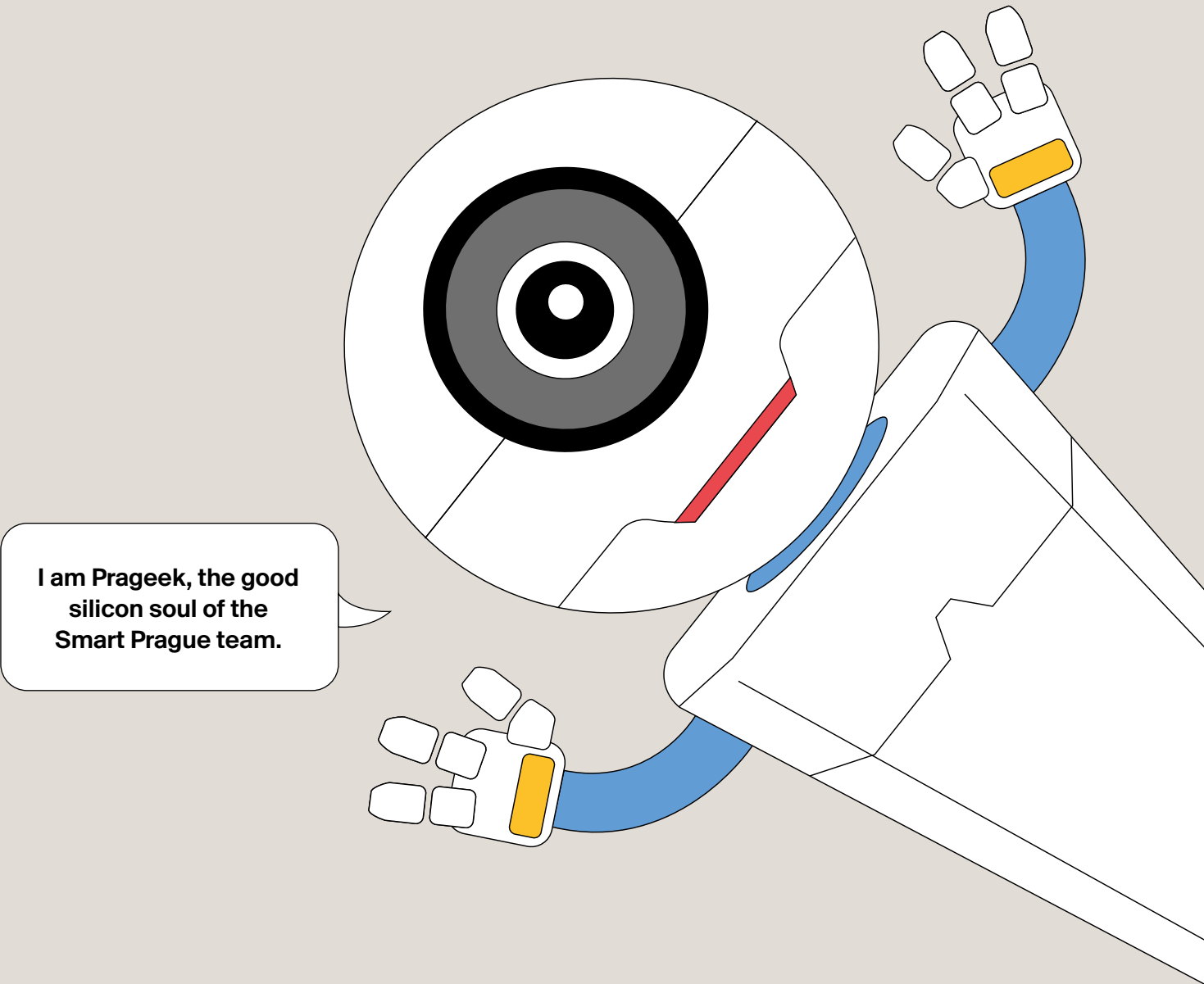
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Opening speech of the mayor of the capital city of Prague

Dear readers,

I am very happy that you got your hands on the new edition of the Smart Prague Index for the year 2021. This is already the fifth edition of this analytical document, created by a team of experts from the municipal company Operátor ICT, a. s. The document maps in detail the fulfilment of the goals of the Smart Prague 2030 strategy, using a precise methodology enabling the measurement of specific indicators of individual innovation projects.

The concept of Smart Cities and urban innovation, in general, is about streamlining and simplifying processes, which was not missed by the Smart Prague Index itself. This year, it is much more airy and clear and communicates mainly using infographics.

In this year's Smart Prague Index yearbook, you will also find out what the development of projects was in the six priority areas on which the Smart Prague 2030 concept focuses. The areas are: Mobility of the future, a Waste-free city, Smart buildings and energy, Attractive tourism, People and urban environment, and Data area.

Looking back at the year 2021, it too was greatly affected by the covid pandemic. However, if I had to choose one thing that really succeeded, it would be the launch of the web portals covid.praha.eu and ockovani.praha.eu. In a very short time, we were able to transform our data and know-how into a system that served the benefit of all the people of Prague and helped clarify the chaotic situation.

I wish you an inspiring read, and I hope you enjoy the new form of the yearbook as much as I do.



MD Zdeněk Hřib
The mayor of the capital city of Prague

Opening speech of the OICT Board Member

Dear readers,

2021 was a turning point in many ways. The ongoing covid-19 pandemic brought with it additional challenges, but the work of developing urban innovation projects continued unabated.

In the past year, we worked on approximately thirty projects related to various thematic areas of Prague. The Smart Prague project office launched, for example, the Healthy Classroom project, which aimed to monitor the level of CO₂ in classrooms and help improve the air quality in enclosed rooms in Prague schools.

The Remote Traffic Signage project was a great success, winning first prize in the Smart Cities competition in the project for the region category. As for the Smart Waste Collection project, at the end of the year, its expansion throughout Prague was approved to approximately 6,000 containers. The PID Lítačka application was also successful, which recorded both a large increase in users and the number of searches for connections and subsequent public transport journeys.

The Golemio data platform has also seen great development, approximately 40 unique dashboards from various areas have been created. Our data experts have managed, for example, to make information on the location and delays of all Prague Integrated Transport vehicles available to the entire public. And since the Smart Prague Index is being created with a certain time lag, we can already reveal that in 2022, Google has also started using our data. This is a confirmation that we are moving in the right direction and our work for the city makes sense.

I wish you a pleasant reading.



Petr Suška, MSc.
OICT Board Member and Director of the Smart City,
Innovation and Project Management Department

Smart City concept

The term Smart City began to appear around the mid-1990s. Since then, the number of cities implementing the Smart City concept has been increasing. The basic idea of this concept is as follows: Smart cities are those in which information and communication technologies serve as a tool for solving complicated issues related to the sustainable development of the city.

Smart and resilient city

The concept of smart and resilient cities tries to make appropriate use of modern technologies to achieve synergistic effects between different sectors based on reliable data, information, and knowledge, concerning the resilience and sustainable development of urban units and the quality of life (QoL - Quality of Life) of their citizens.

The area of smart and resilient cities is an integral part of the ongoing fourth industrial revolution. It is truly a revolution, and not just an evolution because the impact of connected systems via the Internet of Things, services, and people will affect all known socio-economic processes. That is why we talk about Society 4.0 or Thinking 4.0. It is a challenge that we should all use to transform a smarter and more resilient society than it was before the covid-19 pandemic.

Smart solutions in this area offer not only better prevention based on a better understanding of partial processes, but also better optimization of interventions in the event of extraordinary events. In crises, it is necessary to guarantee the functionality of the selected critical infrastructure, to ensure its constant monitoring and control of traffic on it. This enables the deployment of modern technologies for the simulation of various scenarios along with the recommendation of the best possible responses to the situation.

City management

The management of smart cities uses a whole range of sensors, starting with physical detectors and ending with the processing of space images (weather predictions, temperature maps of cities, and emission maps). It should be noted that even your vehicle or mobile phone becomes an intelligent sensor providing important data in this concept. Using the public lighting infrastructure, it is possible, for example, to implement a sensory network, and at the same time ensure the availability of telecommunication services throughout the city.

From a technical point of view, the infrastructure of the Internet of Things (IoT), Internet of People (IoP), Internet of Energy (IoE), or Internet of Services (IoS) will be increasingly used. From a theoretical point of view, a prime example of a Cyber-Physical System (CPS) or, in the case of a smart city, better said a Social-Cyber-Physical-System

(S-CPS-Social-Cyber-Physical-System) emerges.

Thanks to current data, city management is moving from original predefined dynamic plans to adaptive control algorithms ensuring the coordination of entire territorial units.

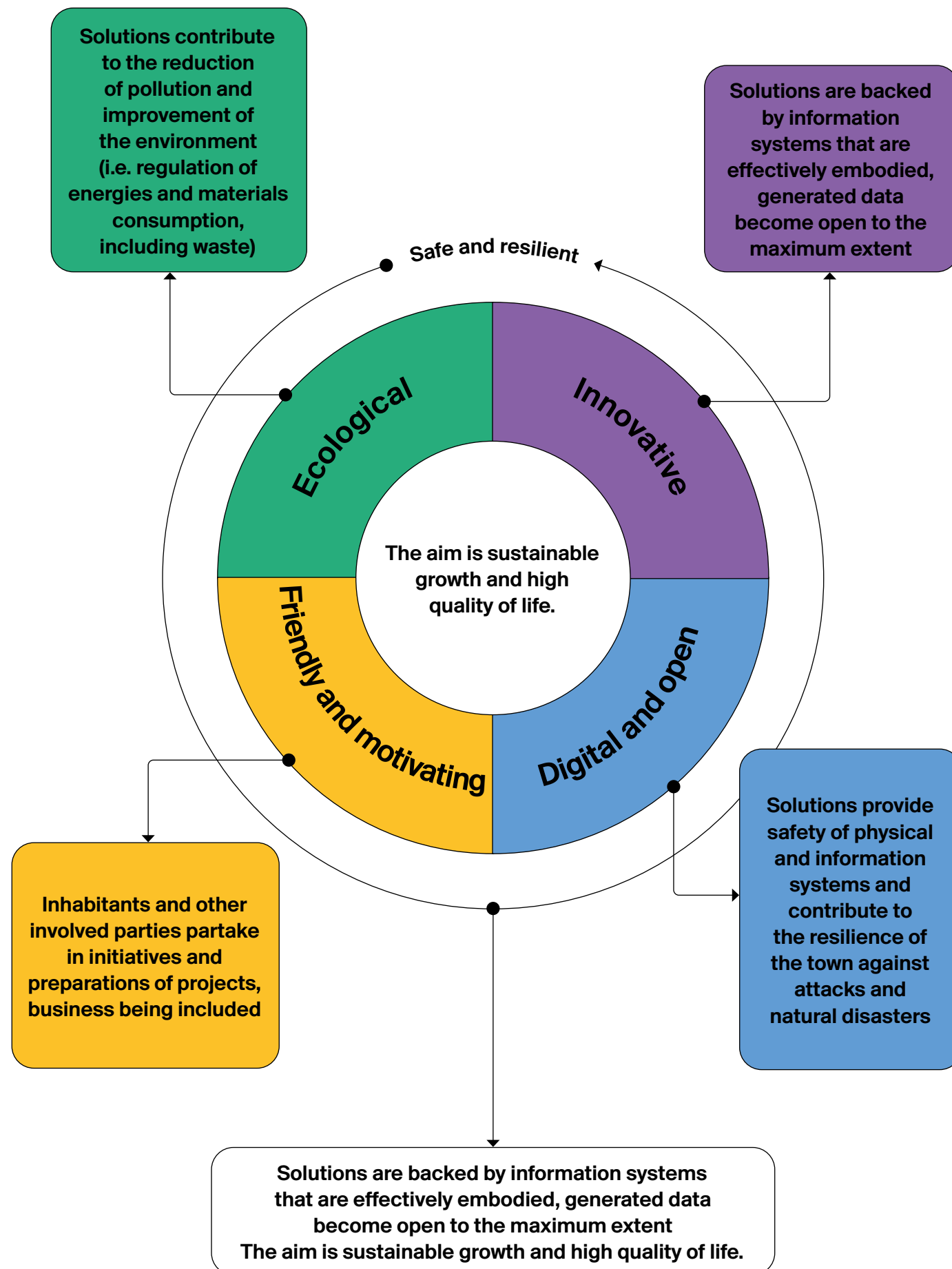
Measuring Smart City

Creating a uniform measurement system between cities is almost impossible, as some criteria of the index may change when the borders of the country or region are crossed, so the proposed solution will never be fully transferable. To ensure a relevant comparison, these indices are applied to cities that have similar characteristics to a certain extent and are often very general (geographical location, size, population, etc.).

Currently, many methodologies are used to evaluate the smartness of cities - the Smart City Index. It is an assessment of the digitization of various city processes, an assessment of partial functional areas such as mobility, energy, and security, or an assessment of information links between operators of smart services and their users. Based on various methodologies, an annual ranking of the best smart cities in the world takes place at the global level.

The manager for the implementation of the Smart Cities concept in the territory of the Czech Republic is the Ministry of Regional Development (MRD), which participates in issuing methodologies related to the Smart Cities concept. The national concept of SMART Czechia - Sustainable Czech Republic was also created, in which 2019 the Association of Cities and Municipalities in the Smart City Area continued to work on the "Strategic Framework of the Association of Cities and Municipalities in the Smart City Area". This document defines the addressed areas within the concept and issues documents related to the Smart City issue. In 2020, the MRD prepared the Smart Cities Concept - resilience through Smart solutions for municipalities, cities, and regions. The concept fulfills the Innovation Strategy of the Czech Republic 2030 from the point of view of municipalities, cities, and regions. The concept also brings suggestions of areas for new solutions to ensure not only a quality life for people but also to see the Czech Republic as an attractive country and a good partner in both the European and global context.

Smart cities are



Smart Prague

The implementation of the Smart City concept dates back to 2014 (you can read about the history, organization, and management of projects in previous SPIs). Currently, it fulfills the goals of the Smart Prague Concept until 2030, which was created in connection with the existing priorities of the city given by the Strategic Plan of the Capital City of Prague and sectoral concepts, which were then examined concerning the possibilities of applying technological trends. The concept defines six areas: Mobility of the future, Smart buildings and energy, Waste-free city, Attractive tourism, People and urban environment, and Data area. Each of these key areas is further elaborated into the visions of 2030 based on the best available practice and subsequently into thematic areas for each key area. These are not stand-alone solutions for individual key areas, but a system linked to the city-wide data Golemio, enabling citizens and companies to evaluate and interpret the obtained data. The data platform manages and evaluates city data as a whole, thus providing city officials with a classified overview of its operation.

As part of the Smart Prague Concept, Operátor ICT, a. s. (OICT) acts as a project manager, using innovative technologies to solve Prague's challenges and proceeding to the maximum extent possible while respecting competence neutrality in the context of other development projects connected with the digitization of the office. After completion of the pilot phase, the OICT hands over the projects to the relevant body of the capital city of Prague for the operational phase.

Smart Prague Index

The entire SPI concept was based on the Cities in Motion Index (CIMI) developed by Ernst & Young. CIMI evaluates cities based on mutual comparison in 471 indicators and subsequently aggregated within each thematic area. To ensure consistency and at the same time simplicity, the use of key indicators of the CIMI index was proposed for SPI.

The starting point in creating the methodology for SPI was the 5 + 1 strategic areas of the Smart Prague Concept, the appropriate development of which is described through specific, qualitatively set strategic goals. Each of the defined strategic goals is described within the SPI through specific quantifiable indicators and grouped into thematic areas.

Smart City Competitions and Rankings

With the development of the Smart City concept, the need to compare individual cities or sub-projects and to share applied solutions is also increasing - Smart City competitions and rankings evaluating the smartness of cities make it possible to compare cities with each other. Nowadays, many events honour the most interesting and innovative ideas and projects that have been implemented in the past within the Smart City area. The purpose of these competitions is also to find out what the practice is in implementing smart solutions and to provide lessons and inspiration for the management of other cities.

Smart cities 2021

The competition is announced by the Smart City Innovations Institute in cooperation with the Ministry for Regional Development, the Union of Cities and Towns of the Czech Republic, and the Association of Regions of the Czech Republic. As part of the fifth annual Smart Cities 2021 national competition, the capital city of Prague won in the Project for the Region category with the Remote Traffic Signage project.

Quality of Life Index 2021

The Quality of Life Index compares 206 municipalities with extended scope, including Prague, based on a total of 29 indicators expressing, among other things, the level of health, environment, and availability of health care, optimal material conditions, sufficiency of services, but also relationships between people. In the Quality of Life Index, Prague has repeatedly ranked second behind the city of Říčany.

The most beautiful city on the planet - poll by Time Out magazine

A poll by the British magazine Time Out recognized Prague as the most beautiful city on the planet in 2021. Prague in the ranking overtook cities such as Chicago and Paris, which occupied other ranks. Cities were rated by their residents, and a total of 27,000 residents from around the world participated.

Time Out magazine also published a ranking of the cities it considers the best in the world. Previously, the magazine mostly evaluated the cultural aspects of the cities in question, but in 2021 it also focused on the amount and sustainability of greenery or the support of social events, where Prague was ranked seventh.

Golden Coat of arms 2021

In 2021, the twenty-third year of the Golden Coat of Arms (Zlatý erb) competition for the best websites of cities and municipalities, electronic services and Smart City took place. In the Smart City and electronic service category, the City District of Prague 2 took first place with the project Encyklopedie Prahy 2 (Encyclopaedia of Prague 2). In the category of the best website of the municipality, the City District of Prague-Zbraslav took second place.

Parking lot of the year competition

The fifth year of the Parking of the Year competition awarded projects related to parking. In the category of Parking lots and garages, Prague took third place for the Automatic parking system under the ČVUT CIIRC building and fourth place for Connecting public and subscription parking lots - BB Centrum south. In the Innovation category, Prague took the first three places for the projects: Citymove by ŠKODA AUTO DigiLab, MPLA Off-street and Supervision, and the Intelligent Navigation System on the roof of the Westfield Chodov shopping centre.

Smart Cities Index 2021

The research focused on four areas: the digital life of the city's inhabitants, innovation in the field of mobility, business technical infrastructure (innovation in business, the prevalence of electronic payments and internet connectivity), and the ecological footprint of each analysed city. Prague ranked 43rd in the Metropolis category with a population of 600,000 to 3 million.

IMD Smart City Index 2021

The IMD Smart City Index is an index evaluating a city's performance compared to others based on its residents' perception, with 120 residents of each city being interviewed. Individual cities were included in one of four groups based on the HDI value. Within each HDI group, cities are assigned a "rating scale" (AAA to D) based on the city's perception score compared to the scores of all other cities within the same group. There are two pillars of the assessment: "Structural", relating to the existing infrastructure of cities, and "Technological", describing the technological measures and services available. Each pillar is assessed in five key areas: health and safety, mobility, activities, opportunities, and governance. Out of 118 evaluated cities, Prague fell from 44th place to 78th. For comparison, Singapore took 1st place, Berlin took 50th place, Paris 61st, and Bratislava took 96th place.

Only 120 respondents decided on the location of Prague. The reason for the decline is primarily the very poor availability of housing in Prague, housing prices in the capital city are still rising, and because of this, Prague lost the most of all the evaluated cities. The second worst-rated category, which had a significant effect on the drop, is traffic jams, which the residents who were contacted very often had to deal with. Prague also received a negative rating in the area of corruption

Mobility of the future

The Mobility of the Future chapter responds to the identified challenges of the capital city of Prague from the point of view of transport. One of the leading identified challenges is the growth of the population of Prague and its hinterland. It is precise because of population growth that the demands on transport performance, including the transport of people and goods, are increasing.

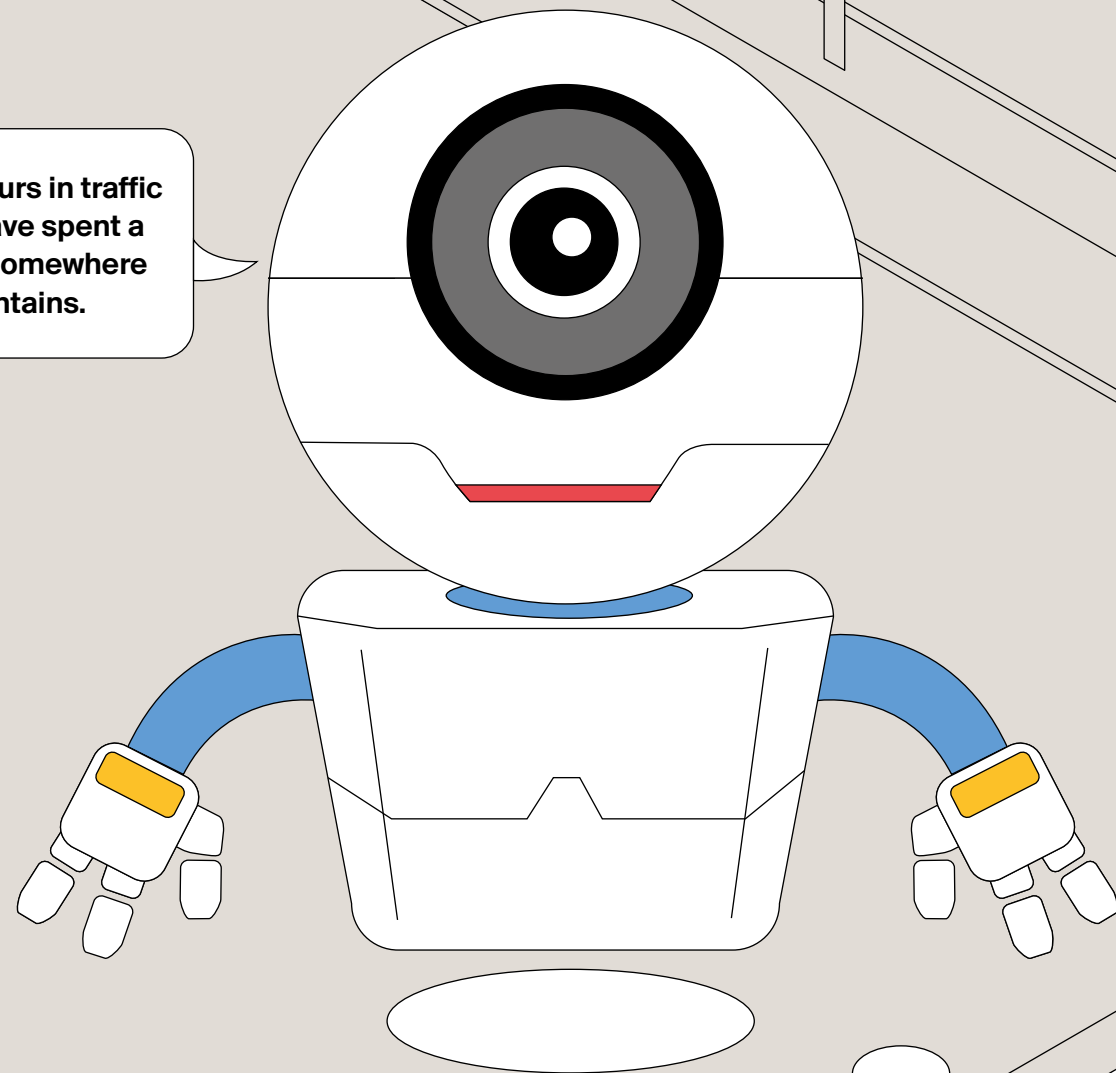
As the demand for mobility increases, so does the level of car ownership, which increases the pressure to ensure sustainable measures (e.g. a sufficient number of parking lots or greater use and comfort of public transport). Such measures can contribute to changes in the division of transport performance (the so-called modal split), which are supported by changes in society (for example, economic growth, a healthy lifestyle, and technological development), which will also help in solving the unsatisfactory state of the transport infrastructure.

The strategic document, which also includes a comprehensive list of necessary measures in the field of transport, is the Sustainable Mobility Plan for Prague and its surroundings (SUMP), which was approved by the City Council of Prague in 2018. SUMP defines the direction of mobility in the territory of the capital and the Prague agglomeration until 2030 using strategic goals (e.g.: reducing the spatial demand of transport, reducing the carbon footprint, and increasing performance and reliability).

Following on from SUMP, the Smart Prague Concept brings a vision of Prague mobility that is modern, technologically advanced, cleaner, safer, and more efficient. It includes a modern check-in system in public transport providing a wide range of services for passengers, from payment channels for purchasing fares in the PID Lítačka mobile application to searching for connections including their delays. In the next few years, the introduction of mobility services (MaaS), including alternative modes of transport (e.g. bike-sharing or carsharing), is expected. As part of the PID Lítačka or MojePraha mobile applications, there is also the option to pay for parking in P+R parking lots and paid parking zones.

Another part of the Smart Prague Concept is the support of autonomous mobility, shared mobility and electromobility, which is supported by the conceptual construction of a network of charging stations within the framework of the Smart Prague Concept. Prague also plans to make more use of real-time data for adaptive control of traffic lights at intersections, enabling better use of road capacity and active control of traffic flows.

Instead of 114 hours in traffic jams, I could have spent a long weekend somewhere in the mountains.



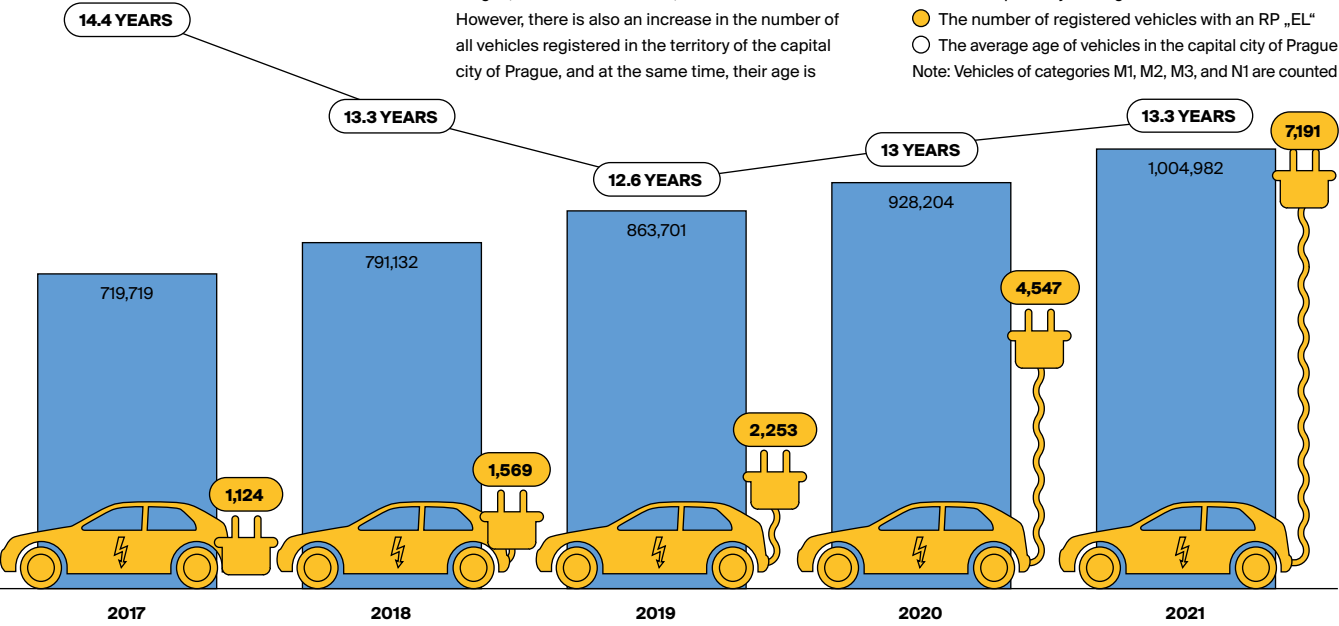
Electromobility

Electromobility should be seen as a different style of vehicle use compared to internal combustion engines. At the same time, this is a current trend that is supported by various cities and states, primarily for reasons of reducing local emissions, not only exhaust fumes, but also noise. For this publication,

all vehicles meeting the condition for being marked with the abbreviation „EL“ on the registration plate (RP) were selected. This means that these are also hybrid vehicles meeting the specified emission limit. In the graphic below, you can see the gradual increase of these vehicles in the territory of the capital city of Prague, of which there were 7,191 at the end of 2021. However, there is also an increase in the number of all vehicles registered in the territory of the capital city of Prague, and at the same time, their age is

increasing since 2019. In this context, this means that the number of vehicles in Prague continues to increase and they are getting older, even though new vehicles with low emissions are also increasing.

● Number of vehicles in the territory of the capital city of Prague
● The number of registered vehicles with an RP „EL“
○ The average age of vehicles in the capital city of Prague
Note: Vehicles of categories M1, M2, M3, and N1 are counted

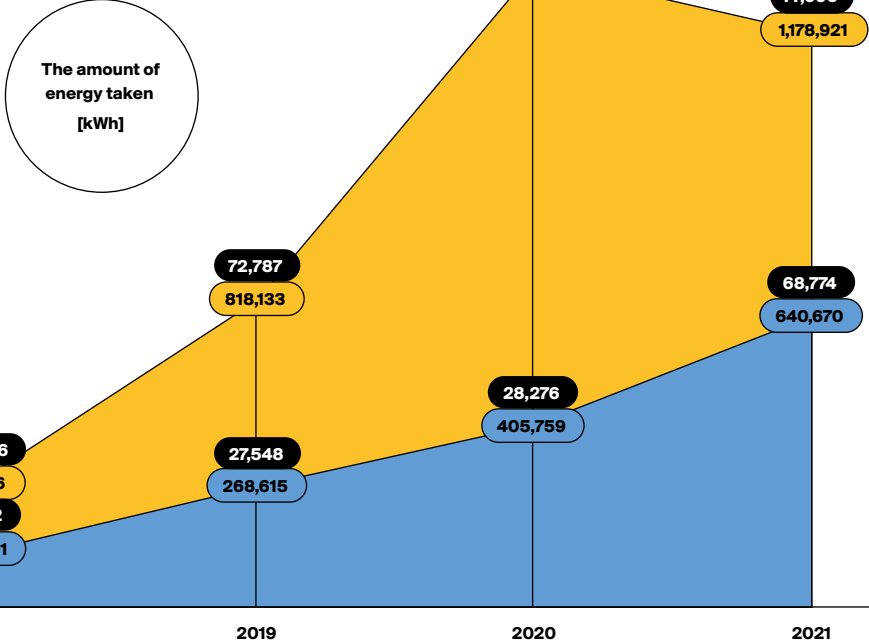
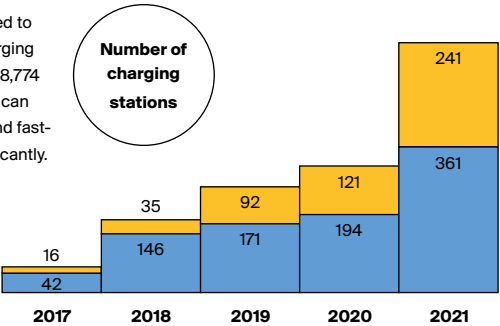


Charging infrastructure

Hand in hand with electromobility goes the charging infrastructure. Therefore, not only the number of vehicles requiring such infrastructure is monitored in Prague, but the infrastructure itself is monitored as well. The infrastructure is based on charging stations, which are divided into two basic types: fast-charging stations (DC) and slow-charging stations (AC). Each type of charging station has its advantages and disadvantages. Fast charging is especially required in places with a high traffic load, which is mainly transit. This means that people park, recharge, and then continue driving, aiming to stop for as short a time as possible. Slow-charging has its uses, for example, when charging at residential parking spaces, where the driver spends a long time and in the meantime, the vehicle can be slowly recharged (typically it can also be at home or work). The infographic shows the growth in the number of recharging points, which was significant in 2021. The number of slow-charging points is still predominant. However, the growth of fast-charging points also makes sense because when charging is faster, more power is transferred in less time and then the charging station can be used by the next customer as opposed to slow-charging. At the same time, it shows that people in this situation recharge the amount of energy that is sufficient for them at that moment to continue their journey. The difference in the number

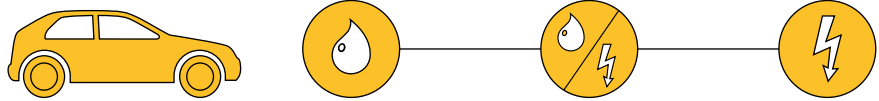
of recharges for both types of stations compared to previous years is more substantial for slow charging (an increase of more than 40,000 to a total of 68,774 individual recharges). Considering the above, it can be said that in Prague, when comparing slow and fast-charging, slow-charging is growing more significantly.

● Fast-charging
● Slow-charging
● Number of recharges



Shared Mobility

Shared mobility represents a new way of using vehicles when users rent them among themselves and the vehicle is not always parked and waiting to be used by only one owner. Since these vehicles are still in circulation, they do not need a permanent parking space. Metropolises support the trend of shared mobility by, for example, free parking when the vehicle is not rented. Support from the cities is mainly due to the monitoring of the vehicle fleet and the determination of its parameters. The city thus supports the development of low-emission vehicles, while at the same time reducing the need for parking spaces, which are in shortage in historic cities. Data from shared mobility providers show an increase in the number of shared vehicles. However, the growth trend has slowed down and it may be a matter of gradual saturation of demand. However, the data also shows that more than a third of shared vehicles are electric vehicles or hybrids. This confirms the trend of cities that want new and low-emission vehicles.

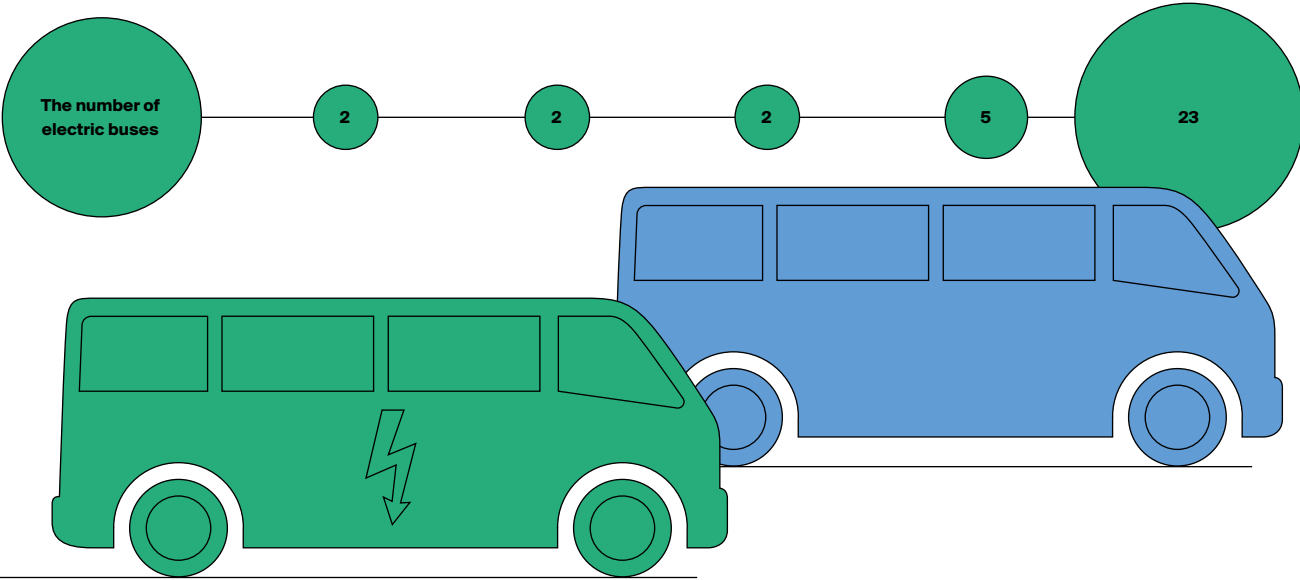


Year	2017	2018	2019	2020	2021
Number of shared electro-vehicles	17	61	69	242	221
Number of shared hybrid cars	0	0	100	278	441
Total number of shared cars	265	650	919	1,466	1,554
Number of vehicles in the territory of the capital city of Prague	719,719	791,132	863,701	928,204	1,004,982

Electric buses

Electromobility is also a topic in public transport. Not only trains but also trams and the metro have been using this drive for a long time, for buses, this trend is still in the phase of development. In Prague, buses with electric drive units are being tested in a lower number of units. We can see in the data that the total number of electric buses has increased significantly. Due to the decline

in demand for transport from private contractors, the number of kilometers driven by e-buses has decreased.



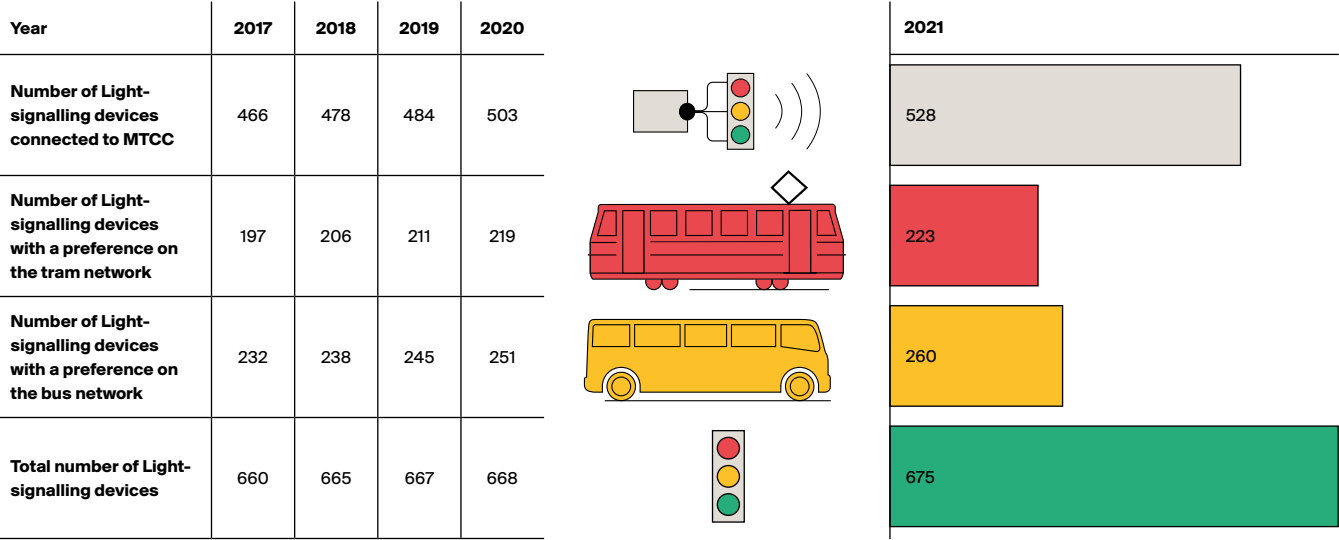
Year	2017	2018	2019	2020	2021
Total number of buses in the DPP fleet	1,170	1,162	1,144	1,166	1,203
Total number of buses of other PID carriers	934	1,022	1,350	1,516	1,889
The number of km driven by e-buses	60,755	45,940	116,660	168,930	55,377
Total number of bus vehicle-kilometers	72,450,000	75,632,100	75,577,309	70,349,690	70,266,509
Number of vehicle-kilometers travelled by DPP buses in the territory of the capital city of Prague	64,683,000	67,900,000	67,540,000	61,100,000	60,770,788
Vehicle kilometres of city bus lines outside the DPP in the territory of the capital city of Prague	7,767,000	7,732,100	8,037,309	9,249,690	9,495,721

Light-signalling devices

Light-signalling devices, or traffic lights, represent one of the most important ways in which traffic is managed and influenced today. Light-signalling devices can have a static signal plan, that is, the length of the GO (i.e. green) signal is repeated at the same interval. Another option is a dynamic Light-signalling device equipped with sensors that can adjust the

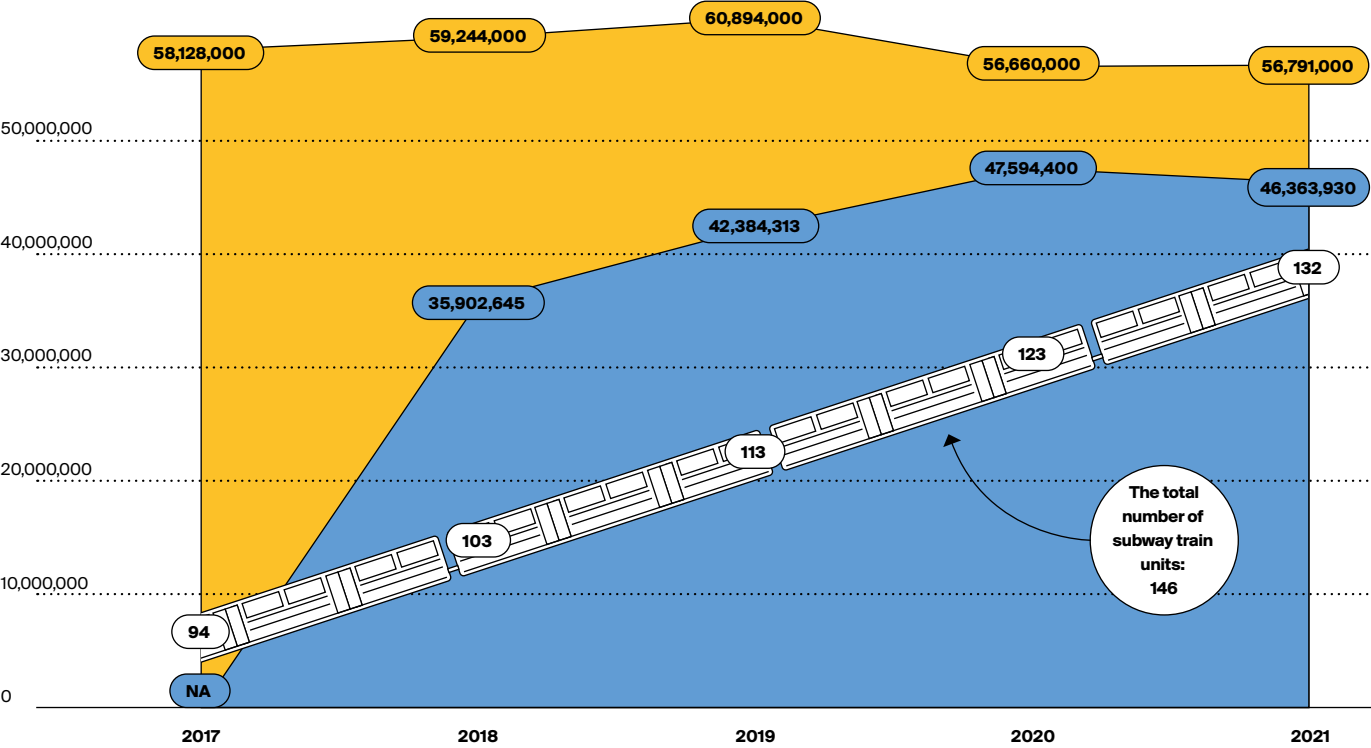
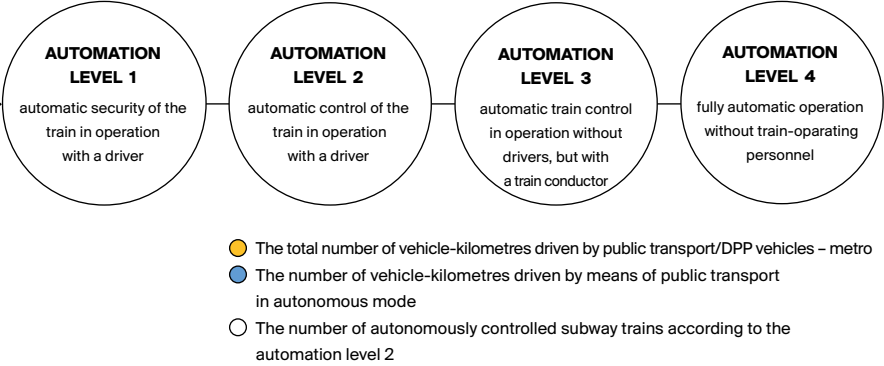
signal plan in favour of a certain direction according to pre-set rules (for example, a busier direction or the arrival of a delayed public transport vehicle). The data below shows the total number of Light-signalling devices in the territory of Prague and the number of them connected to the Main Traffic Control Centre (MTCC). Both of these numbers

are growing together with the construction and renovation of old Light-signalling devices. The number of Light-signalling devices on the tram network is also listed here. These Light-signalling devices are usually dynamic and can adjust their signal plan according to arriving public transport vehicles, thus preferring their direction.



Autonomous driving in the subway

We meet autonomous vehicles not only on the road but to a much greater extent they can be seen on the railway, mainly due to the lower freedom of traffic participants. For a train, the autonomous mode has the following levels of automation: In the Prague Metro, automation level 2 has already been implemented, specifically on lines A and C. On line B, there is a continuous transfer to this level of automation, which is why the number of train units is also increasing. The data also shows a decrease in vehicle-kilometres driven, mainly caused by lower traffic performance during the covid-19 pandemic.

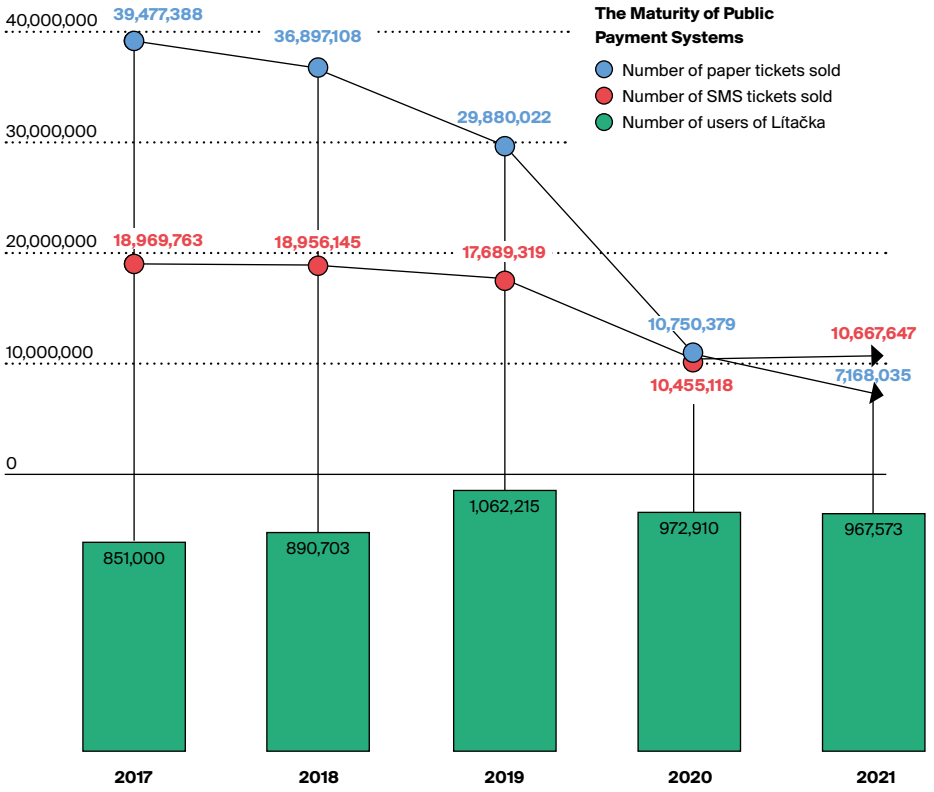


Mobility as a Service (MaaS)

The availability of public transport in Prague is at a very high level. The infographic shows that users are gradually abandoning paper tickets, of which significantly fewer were sold, and more people are registering for the PID Lítačka mobile application. The number of users of the card itself is already at its peak, but registration in the city's mobile application has increased significantly (see the following graph).

To explain the display of the number of individual users, here is the following:

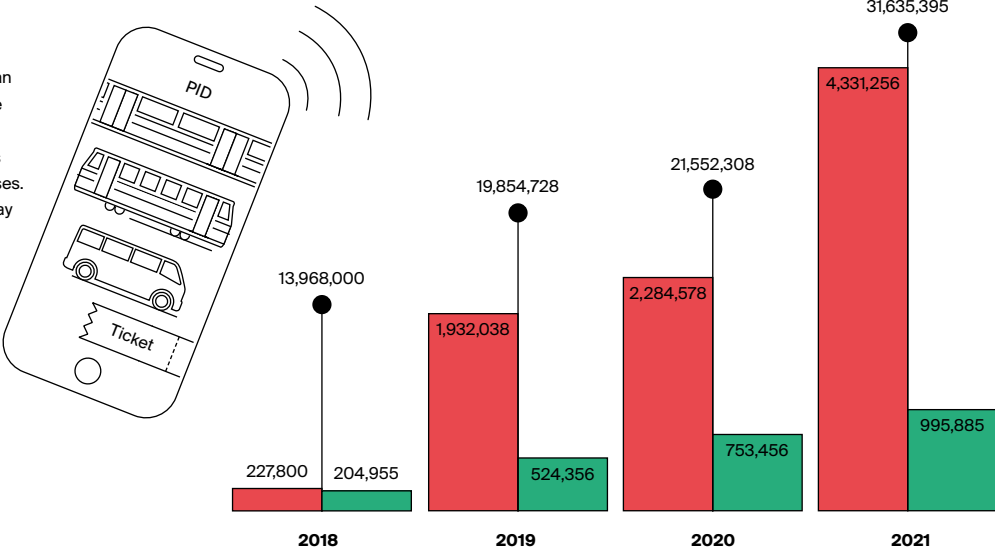
- **Lítačka users:** those who have an active coupon on any carrier (Lítačka card, InKarta, digital coupon in the PID Lítačka mobile application, etc.)
- **Registered users of Lítačka:** those who have registered in the digital version (web/mobile application) - have a user account, which may not be consistent with the fact that they also have an active coupon.



Use of the city's application for transportation around the city

The success of the city transport application can also be seen in the following infographic, where there is a significant increase in the number of searches for connections (almost by a third), as well as almost double number of ticket purchases. There is a noticeable trend in users moving away from classic paper tickets to digital ones.

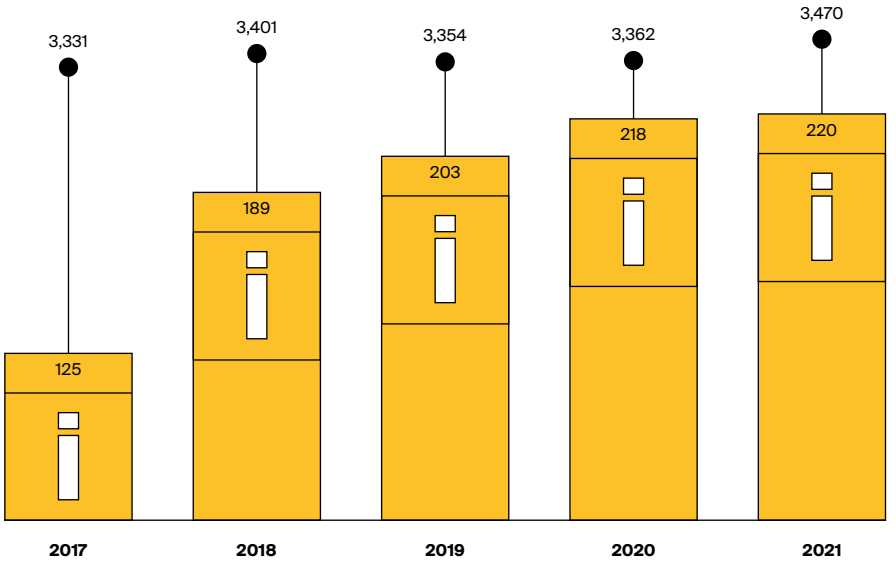
- The number of connection search requests
- Number of ticket purchases
- Number of registered PID Lítačka users [created accounts in the e-shop]



Information panels at bus stops

Information panels at stops are also increasing, but at a slower pace, which is due to the gradual repairs of stops and the consideration of the need to place such a panel at a stop. The number of markers providing information in real-time has increased by two, which are at the Zahradní Město stop. The significant increase in the number of all stops is caused by a minor expansion of the public transport network, but mainly by completed repairs to roads, stops, etc.

- The total number of stops within the PID in the territory of the capital city of Prague
- Number of stop markers providing real-time information including information panels providing departure information outside the markers



Waste-free city

Increasing the rate of sorting and subsequent recycling of sorted waste is one of the fundamental challenges and goals for municipal governments, which is defined by the new waste legislation. Until 2035, the municipality is obliged to ensure that a maximum of 30% of the total amount of municipal waste generated by the municipality in a given calendar year is landfilled.

Waste is created in all human activities - in industry, construction, agriculture, and transport, but above all in the everyday life of a person in society. In particular, municipal waste is a product of all residents. Due to its specific characteristics and different risk of endangering the environment, each waste stream requires specific handling.

The first law on waste was established in the Czech Republic in 1991. On January 1, 2021, Act No. 541/2020 Coll., on waste (Act) regulating waste management came into force. The Act establishes the rights and obligations of persons in the field of waste management and promotes the basic principles of circular economy, environmental protection, and human health in waste management.

The new law on waste brought several changes. One of the biggest changes is the postponement of the end of landfilling usable waste by six years, i.e. from 2024 to 2030. There will be a gradual increase in fees for landfilling waste, from the current 500 CZK/ton to 1,850 CZK/ton in 2029. With the adoption of the new law, municipalities also experience an increase in the costs associated with the disposal of mixed municipal waste (MMW) at landfills, however, at the same time, there is a reduction in the fee for the disposal of hazardous waste at landfills. With the entry into force of the new law on waste, there was a restriction on the types of waste accepted at landfills. Among other things, there has also been an increased emphasis on the recycling and reuse of construction waste.

Similar to the year 2020, the year 2021 was also greatly affected by the measures related to the covid-19 pandemic, which had an impact on a whole range of daily activities, including waste production in households. Over time, we can observe the deviations of sorting in the individual quarters of the pandemic years 2020 and 2021 from long-term trends. In particular, the first and second quarters of both years saw a significant change in consumer behavior, and a related change in the production of wastepaper, glass, and metals.



Classification of municipal waste and its use

Collection of sorted waste in the Prague metropolis is carried out based on set collection frequencies, which continuously change depending on the requirements of the city and City Districts (CD). In 2021, the total annual costs for the collection of usable components amounted to approximately CZK 550 million. It is therefore important to coordinate all activities in a joint strategy of responsible waste management, which will effectively collect the produced waste and use it for material and energy purposes.

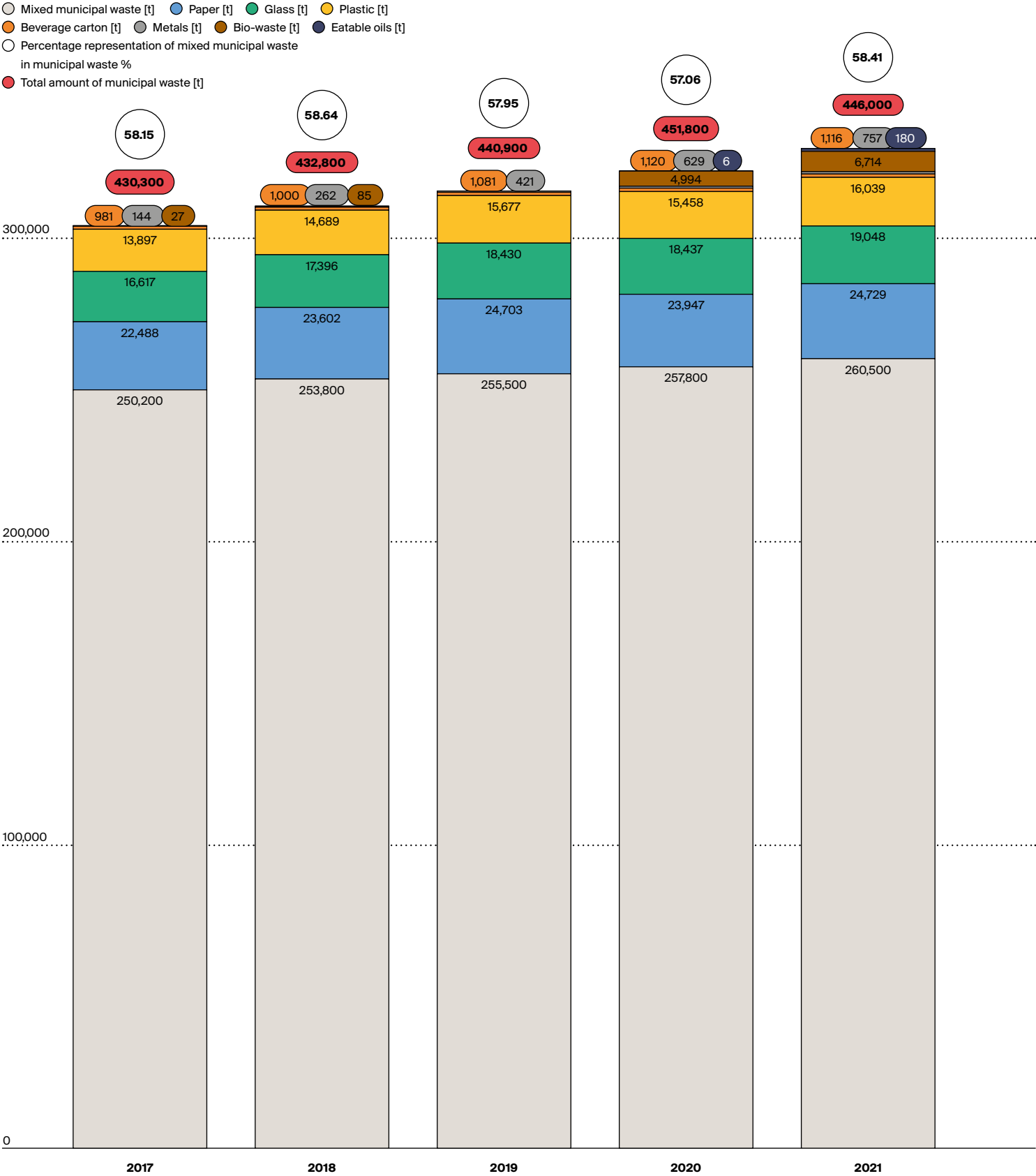
The capital city together with the municipal company

Pražské Služby (Prague Services) plans to launch a sorting line for the commodities plastic, metals, and beverage cartons in 2022. Thanks to this sorting line, it will be possible to introduce a multi-commodity collection – which means that plastics, metals, and beverage cartons can be put into one container. The value of MMW shows the production of waste from the citizens of the capital city from household containers or public places of sorted waste. In the course of 2021, there were a total of 6,105 sorted waste sites in the city, including so-called „home“

sites - of which approx. 3,453 sites are located directly on the streets of the city. Converted to the number of Prague residents as of December 31, 2021, one collection point served 369 residents.

Each resident of Prague sorted a total of 48.5 kg of paper, glass, plastics, and beverage cartons in 2021.

From the total amount of 446.0 thousand tons of waste generated in Prague households, mixed waste is still the most represented, accounting for approximately 58.4%. Since April 2020, edible oils and fats have been collected through collection containers placed at selected public locations for sorted waste, by the end of 2021, 485 locations were equipped with oil containers.



Use of MMW and its components

Prague's maximum effort is to reduce landfill as much as possible. For this reason, most of the produced waste is used to obtain energy in the Waste to Energy Utilization Facility in Malešice (ZEVO), where the energy released during the MMW burning process is converted into heat and electricity in a cogeneration unit. The capital city of Prague set the maximum share of landfilling for the energy use of MMW at 10%. In 2021, the waste-to-energy facility processed a total of 228,000 t of waste deposited by citizens to MMW

containers, i.e. 87.5% of this waste. Due to the fire at ZEVO in the second half of 2021, operations were limited and some of the mixed municipal waste that would have been used for energy recovery here had to be landfilled. This led to an increase in the amount of landfilled waste and, conversely, to a decrease in the amount of waste used for energy recovery. Part of bulky waste and street litter is also used for energy. The share of material utilization of all waste produced by the city reached a total of 29% in 2021. Its amount in 2021 increased

from 125.5 thousand tons to 127.9 thousand tons. In addition to composting, bio-waste can also be processed in biogas stations. The resulting product is BioCNG biofuel suitable for vehicles in city traffic or biogas for the city network. Heat and electricity are produced in cogeneration units from waste received in wastewater treatment plants. Residual stabilized sludge is modified by technological measures for reuse in agriculture.

Energy utilization of MMW

- Energy use of mixed municipal waste
- Landfilling of mixed municipal waste
- Sorting efficiency (material use only)
- Share of used waste (material and energy use)

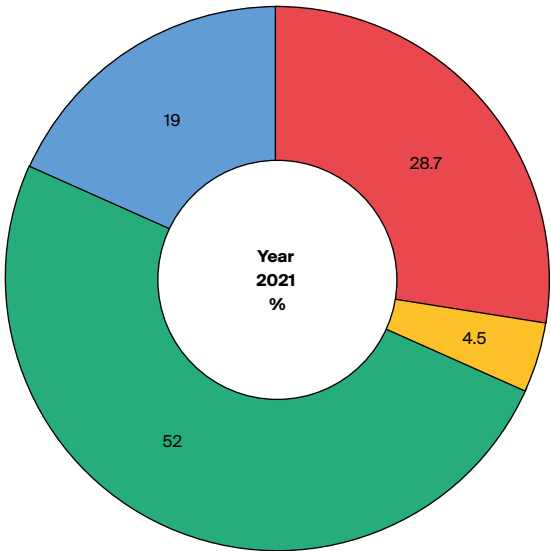


Ways of dealing with Municipal Waste in Prague

* The numbers given for individual years do not add up to 100%, as there were percentage adjustments to the biological utilization of waste according to internal communication with Environmental Protection Department (EPD). It can be assumed that biological utilization is a part of material utilization.

- Materially used
- Biologically used
- Combusted (used for energy)
- Landfilled

Year	2017	2018	2019	2020
Materially used	27 %	28 %	27.1 %	27.8 %
Biologically used	2.9 %	2.7 %	2.8 %	3.8 %
Combusted (used for energy)	56 %	57 %	56.5 %	55.6 %
Landfilled	13 %	14 %	14.5 %	14.2 %

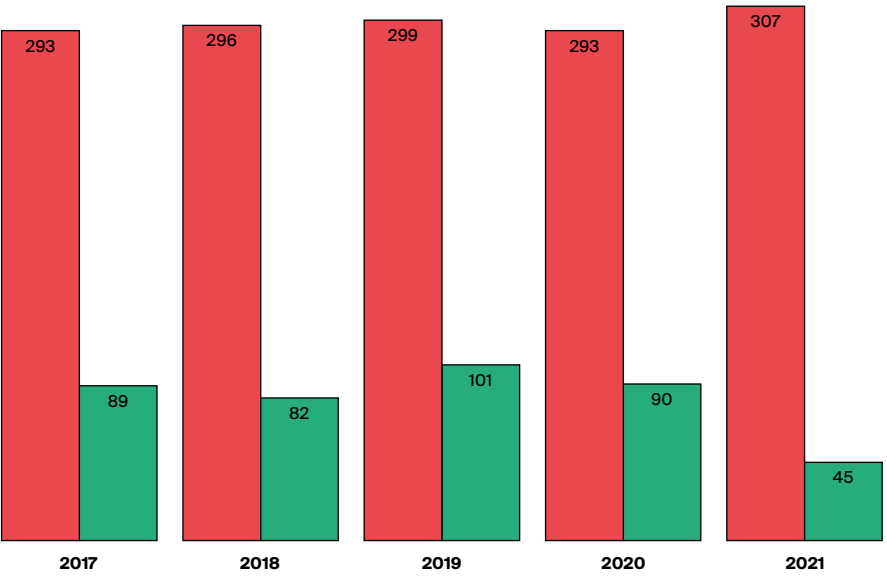


Material utilization of waste

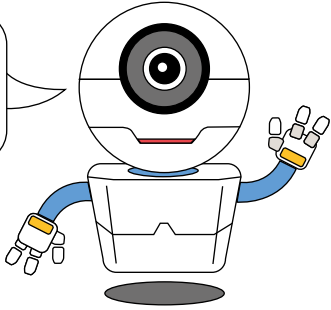
Material utilization of waste is in third place in the hierarchy of waste management after waste prevention and reuse. The waste material is returned to circulation as a secondary raw material, which often does not differ in quality from the primary raw materials. The indicator shows the extent of pervasion of the capital city of Prague territory by points of take-back (PoTB) of electrical equipment and the density of coverage by collection yards for further material use of the recovered waste. It thus indicates the degree of availability of electrical equipment points of take-back (PoTB). Discarded electrical equipment represents a valuable source of raw materials, especially rare metals, which would otherwise be disposed of inefficiently. The product take-back system significantly increases the amount of electrical waste that is recovered from consumers for further material use. The value of the number of collection yards includes 19 permanent Prague collection yards and the implementation of mobile collection yards in the respective year. Due to the low interest of citizens, the service of organizing mobile collection yards was terminated in June 2021, which was reflected in a decrease in the value of the number of collection yards. In 2021, 39,805 tons of bulk waste were collected at collection yards, which translates to 31 kg per inhabitant.

Year	2017	2018	2019	2020	2021
Number of km² per PoTB place	1.69	1.68	1.66	1.69	1.62
The number of inhabitants using one PoTB place	4,418	4,421	4,429	4,557	4,152
Number of km² per collection yard	5.57	6.05	4.91	5.51	11.02
Area of the capital of Prague	496 km²				
Population of the capital city of Prague	1,294,513	1,308,632	1,324,277	1,335,084	1,274,562

- Number of PoTB places for electrical equipment - red containers
- Number of collection yards



In 2021, there is one collection yard for every 28,324 inhabitants.

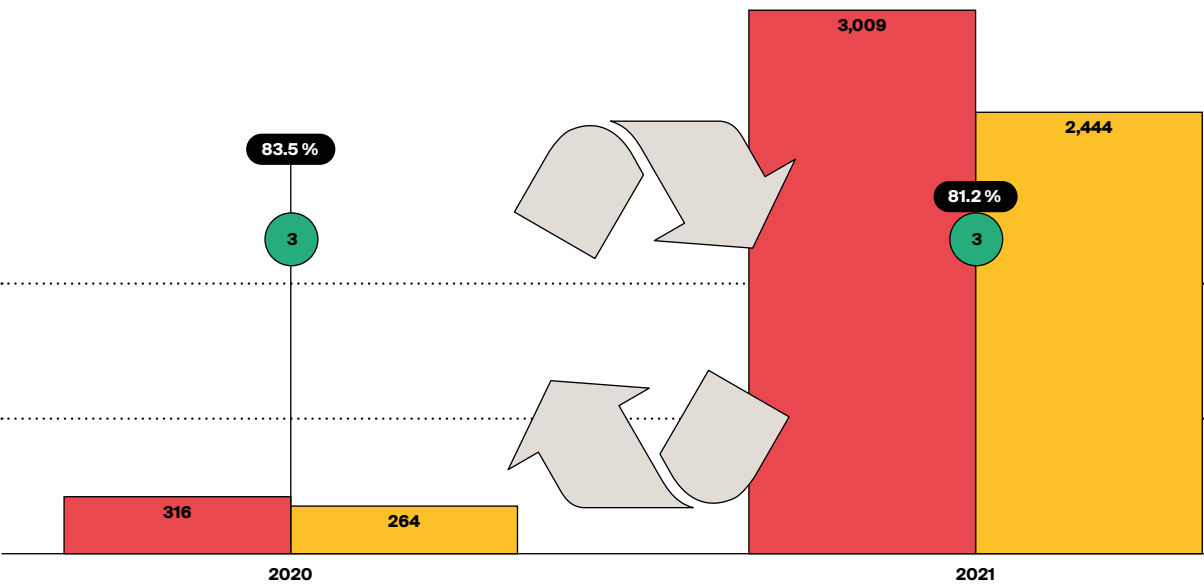


Utilization of re-use centres and points of take-back

- Obtained material [pcs]
- Issued material [pcs]
- Total number of re-use centres in the territory of the capital city of Prague
- Resulting indicator value

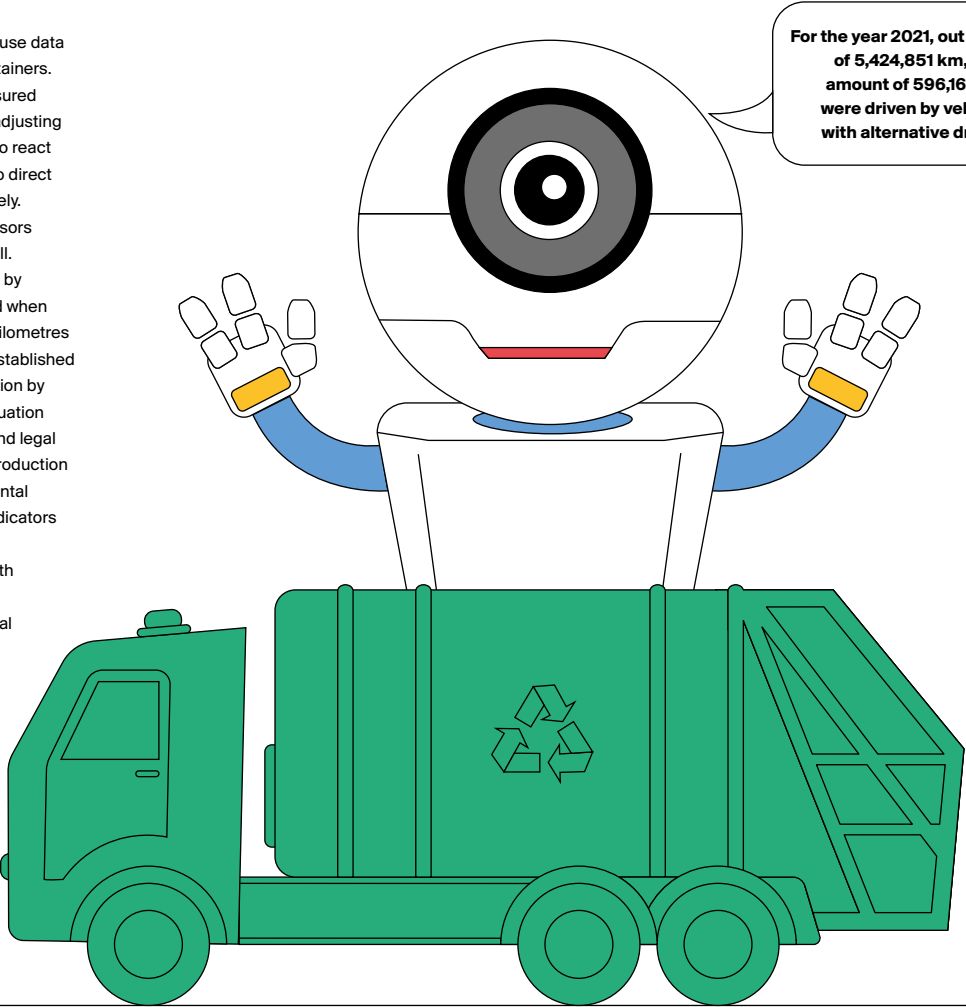
The goal of re-use is not to throw away when it can be repaired or can serve others. According to the hierarchy of waste management, this is the second strategic goal after waste prevention. Reusing things is more fundamental to reducing waste than reducing or recycling it. Even in 2021, it was possible to deposit items such as furniture, books, or sports equipment in 3 permanent collection yards – that is, items that could be reused for the needy residents of Prague. As part of the waste prevention, SWAP events were also organized, one of which collected approximately 1 ton of

items in 7 hours, and 80% of the total amount brought in was dismantled during the event, the remaining 20% was taken care of by the participating organizations. In 2021, there was an increase in take-backs only for some commodities. More and more batteries were taken, on the contrary, the number of TVs and monitors is lower. Products that have already reached their end of life can thus be further recycled, which is especially important in the case of batteries and small electrical devices, the presence of which in landfills is harmful to the environment.



Ecological collection vehicles and their use

In 2021, the capital city of Prague continued to use data from sensors located in 460 underground containers. Due to the covid-19 pandemic, the use of measured data from sensors was an important basis for adjusting the frequency of collection, as it was possible to react flexibly based on the data obtained, and thus to direct expenses in waste management more effectively. For this reason, it is planned to expand the sensors to other containers in the following years as well. The indicators listed in this area are influenced by many different factors that must be considered when evaluating them. For example, the number of kilometres travelled is affected by traffic closures, newly established or relocated sites, and the expansion of collection by a new commodity or service. The economic situation in society, the behaviour of users (individuals and legal entities, City Districts, Prague City Hall), the introduction of new technologies, etc., also have a fundamental impact. Therefore, the telling ability of these indicators can only be evaluated over a longer period. The number of pieces of pick-up equipment with an alternative (ecological) drive is constantly changing concerning the purchase and disposal of end-of-life equipment. The indicator monitoring the use of collection vehicles on alternative fuels shows their practical use in waste collection. Compared to the absolute number of vehicles on alternative fuels, this indicator is focused on the real rate of use of collection vehicles on alternative fuels. The goal is to increase the value of the indicator implying a reduction in the use of vehicles on conventional fuels that burden the environment in the city.

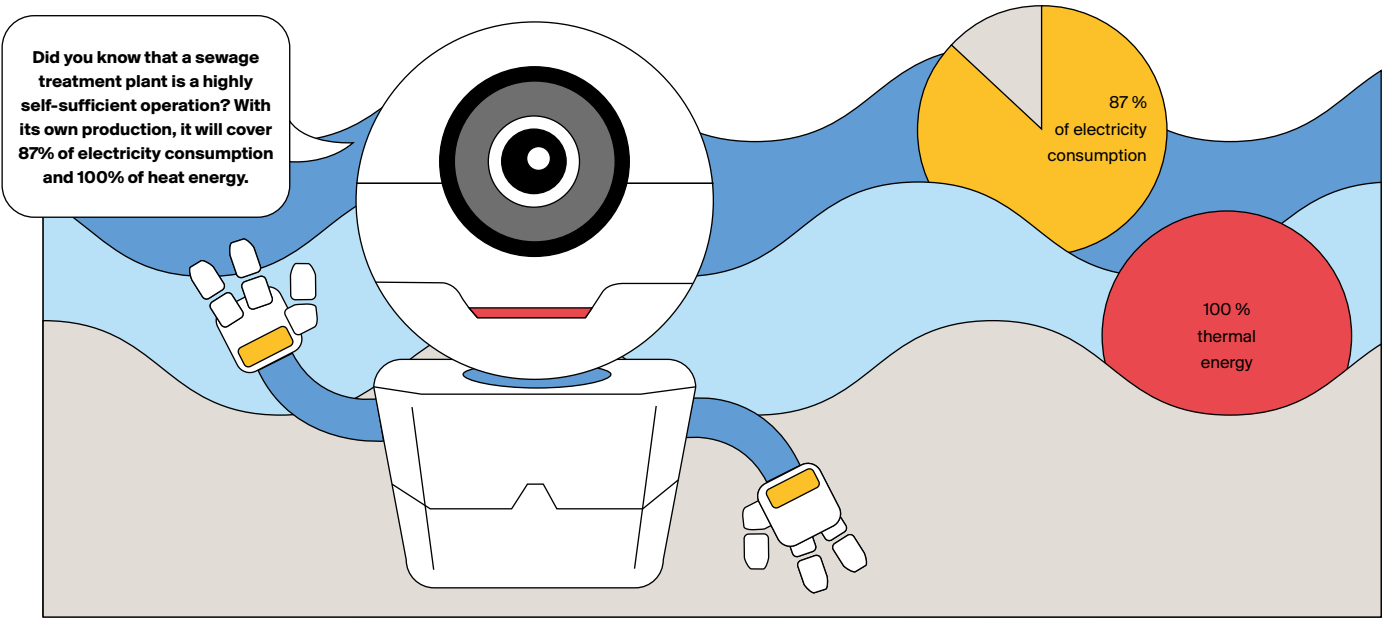


Conversion of sewage sludge into raw materials and the amount of energy produced

Sewage sludge utilization
Stabilized sludge is considered to be sludge that does not cause any damage to the environment and does not cause problems (e.g. unpleasant smell) when working with it. Sanitized sludge is generally considered to be sludge in which the indicators of pathological organisms have been reduced to the required values. Only sanitized sludge can be further used. Untreated sludge must first go through a sanitization process to significantly reduce the content of pathogenic

organisms in the sludge and thereby health risks. The application of sludge is one of the alternative options for supplying a certain amount of organic matter and nutrients to the soil, thereby ensuring protection against erosion. The amount of de-watered sludge is related to water consumption, or the amount of treated wastewater. The lower the water consumption, the less dewatered sewage sludge is produced. In 2021, there was a reduction in the amount of sanitized dewatered sludge, mainly due to restrictions on tourism, closing

or limiting the operation of hotels, restaurants, shops and service establishments, and others. A large number of company employees used home offices or took care of children, which reduced their commute to work in Prague. A trend can be traced in which many companies, where it is possible due to the nature of the job, are switching to a combination of office work with work from home permanently. This has already reduced the consumption of drinking water in Prague this year and will probably continue to do so in the future.



Smart buildings and energy

Energy as one of the key areas of Smart Prague Concept is on the threshold of change. The entire field of energy is moving in the direction of ensuring a safe and reliable supply of energy obtained ecologically so that the capital city of Prague lives up to its obligations and reduces its carbon footprint following the approved Climate Commitment.

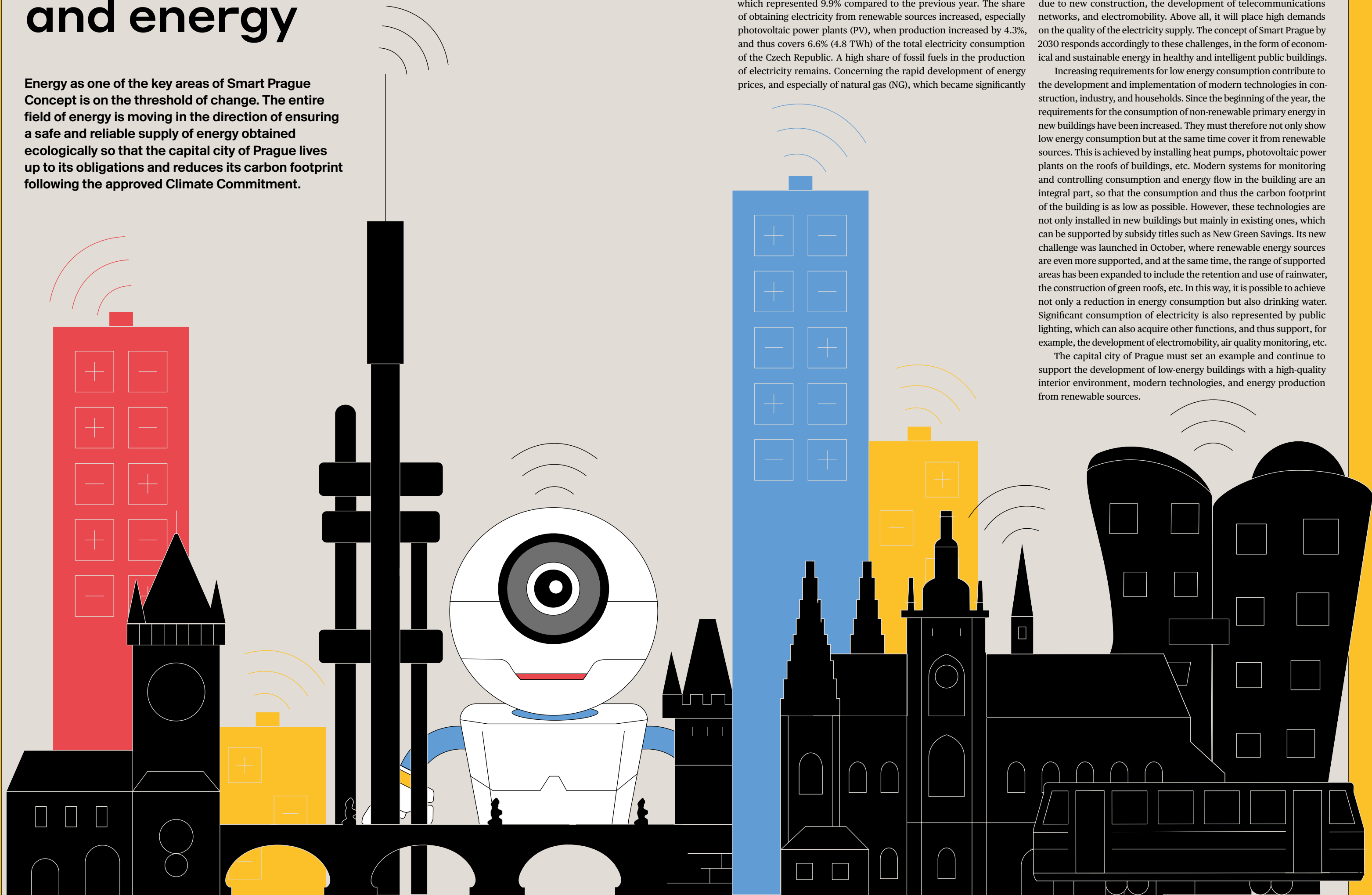
The year 2021 was still affected by the covid situation and other problems with supply chains in industry and construction. Electricity consumption in the Czech Republic increased by 4% compared to 2020. The main influence was the growth of household consumption, which represented 9.9% compared to the previous year. The share of obtaining electricity from renewable sources increased, especially photovoltaic power plants (PV), when production increased by 4.3%, and thus covers 6.6% (4.8 TWh) of the total electricity consumption of the Czech Republic. A high share of fossil fuels in the production of electricity remains. Concerning the rapid development of energy prices, and especially of natural gas (NG), which became significantly

more expensive in the second half of 2021, we can expect an increased demand for electricity, especially from renewable sources, with which households and companies would cover their consumption.

In Prague, growth in electricity consumption can still be expected due to new construction, the development of telecommunications networks, and electromobility. Above all, it will place high demands on the quality of the electricity supply. The concept of Smart Prague by 2030 responds accordingly to these challenges, in the form of economical and sustainable energy in healthy and intelligent public buildings.

Increasing requirements for low energy consumption contribute to the development and implementation of modern technologies in construction, industry, and households. Since the beginning of the year, the requirements for the consumption of non-renewable primary energy in new buildings have been increased. They must therefore not only show low energy consumption but at the same time cover it from renewable sources. This is achieved by installing heat pumps, photovoltaic power plants on the roofs of buildings, etc. Modern systems for monitoring and controlling consumption and energy flow in the building are an integral part, so that the consumption and thus the carbon footprint of the building is as low as possible. However, these technologies are not only installed in new buildings but mainly in existing ones, which can be supported by subsidy titles such as New Green Savings. Its new challenge was launched in October, where renewable energy sources are even more supported, and at the same time, the range of supported areas has been expanded to include the retention and use of rainwater, the construction of green roofs, etc. In this way, it is possible to achieve not only a reduction in energy consumption but also drinking water. Significant consumption of electricity is also represented by public lighting, which can also acquire other functions, and thus support, for example, the development of electromobility, air quality monitoring, etc.

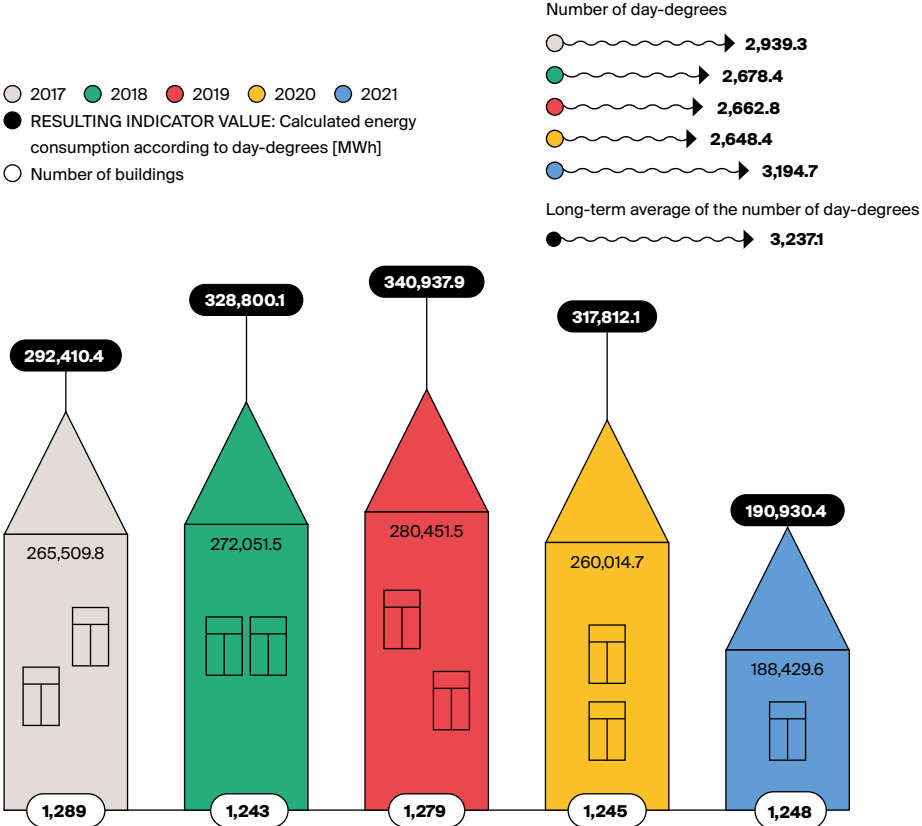
The capital city of Prague must set an example and continue to support the development of low-energy buildings with a high-quality interior environment, modern technologies, and energy production from renewable sources.



Energy consumption in public buildings (energy performance)

It monitors the energy efficiency of public buildings in terms of energy consumption. The indicator now applies to buildings and consumption points registered in the energy management system of the capital city of Prague. The number of public buildings owned by the capital city of Prague registered in the information system at the end of 2021 is 1,248. However, the data provided for individual collection points are not complete and was not monitored for the entire period. These are primarily data on heat consumption, which are not complete and comparable to the previous year.

The average number of degree-days in the long term is 3,237 (Prague - Karlov, 1961-1990). The year 2021 almost corresponded to the long-term average and is the coldest year for the observed period. The basis of the degree-day method is knowledge of the course of outdoor temperatures from meteorological data. The calculation of degree-days is used to determine the characteristics of the heating period - the number of degree-days and the number of heating-days. It is one of the procedures used for the design, evaluation, and comparison of heat sources and consumers. The calculation is performed over a database of daily average outdoor air temperatures.



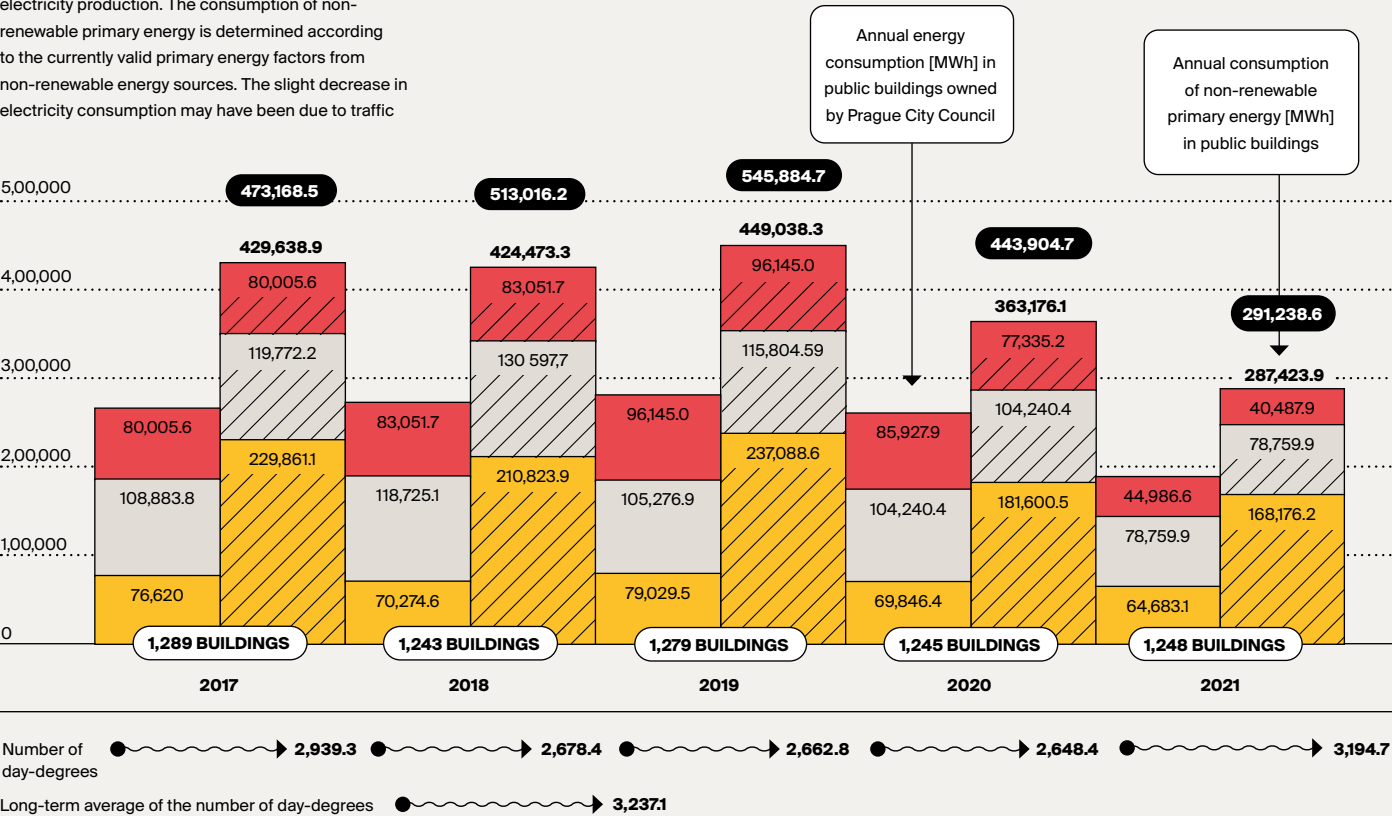
Consumption of non-renewable primary energy in public buildings

In September 2020, the new Decree No. 264/2020 Coll. on the energy performance of buildings entered into force, replacing Decree 78/2013 Coll. One of the essential changes is the adjustment of primary energy factors from non-renewable energy sources for most energy carriers. The most significant drop in the factor from 3.0 to 2.6 occurred in electricity. This decrease is caused by a higher share of the use of renewable sources for the production of electricity (PV, biogas, etc.) and an increase in the efficiency of electricity production. The consumption of non-renewable primary energy is determined according to the currently valid primary energy factors from non-renewable energy sources. The slight decrease in electricity consumption may have been due to traffic

restrictions during the anti-coronavirus measures. The resulting value of natural gas (NG) consumption and heat from central heat source (CZT) is not directly comparable with previous years, as they were not monitored in the database for all buildings and the entire period. Above all, for buildings using heat supply from CZT, data is available for only 33 consumption points compared to 142 in the previous year.

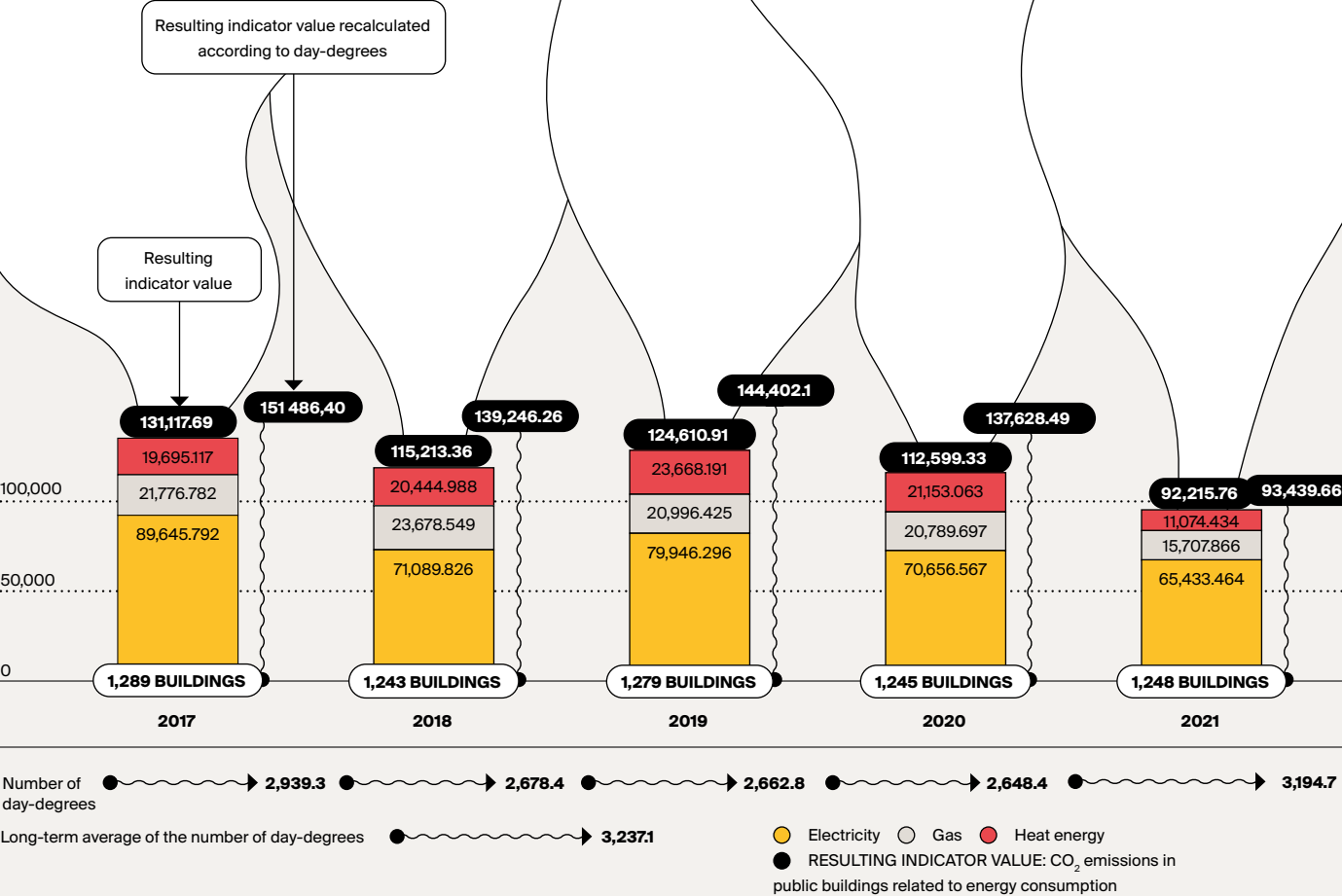
Electricity Gas Heat energy

● RESULTING INDICATOR VALUE: Total annual consumption of non-renewable primary energy [MWh] in public buildings after conversion according to day-degrees

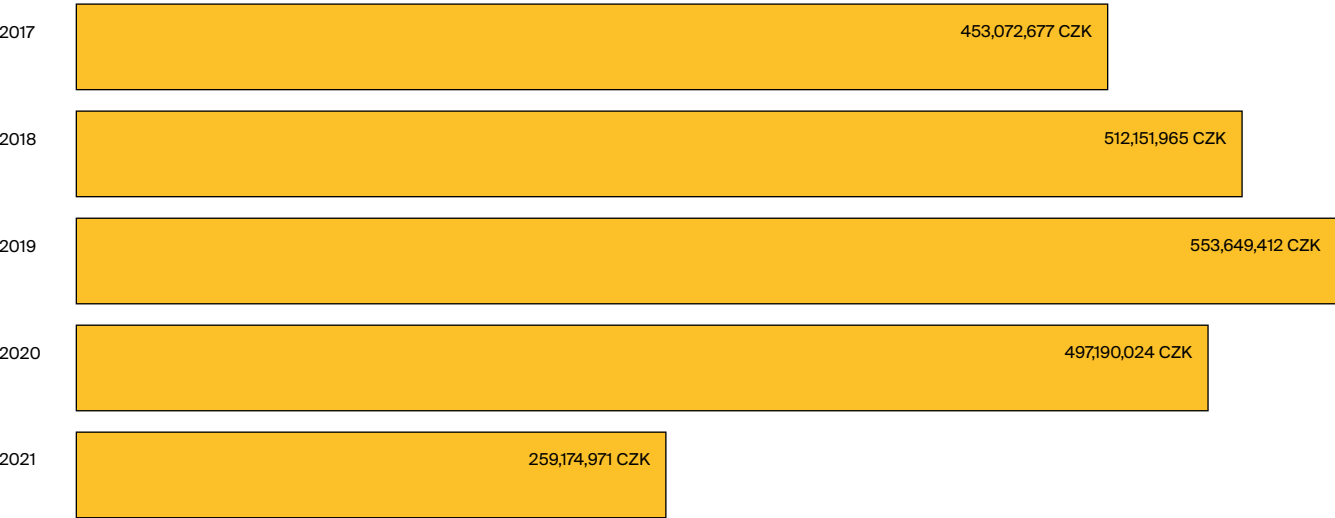


Carbon footprint of public buildings

The data refer to the collection points registered in the information system of the capital city of Prague. The carbon footprint is based on energy consumption. We obtain its value based on knowledge of the energy consumption of individual energy carriers and subsequent recalculation according to the following table based on Decree No. 309/2016 Coll., on energy audit and energy assessment. The comparison with previous years is distorted by missing data, especially for heat consumption from CHS.



Energy costs (in CZK)



Class of energy performance of public buildings

Energy costs are based on invoicing the energy consumption of public buildings. They, therefore, correspond to the energy consumption according to the indicator Energy consumption in public buildings [MWh].

The energy efficiency class is indicated by the written designations A to G, where the A designation is given to extremely economical objects and the G designation is given to extremely wasteful objects. The value indicates the energy-obsolete building fund owned by Prague City Hall. The buildings owned by Prague City Hall are gradually being replaced with energy sources, the building envelope is being reconstructed, and the Energy Performance Certificate (EPC) is also being updated. For this reason, the indicator has and will have an improving trend.

Public buildings with almost zero consumption

Year	2017	2020	2021
Total number of public buildings with almost zero consumption		0	1
Total number of public buildings owned by the capital of Prague		7,819	7,819

A building with almost zero energy consumption is, simply put, a building that has qualitatively stricter requirements for the building envelope. It has well-regulated heating, ventilation, and lighting. Its technical systems cover energy consumption with high efficiency, and the building will be partially supplied from renewable energy sources, or produce energy (electricity, heat).

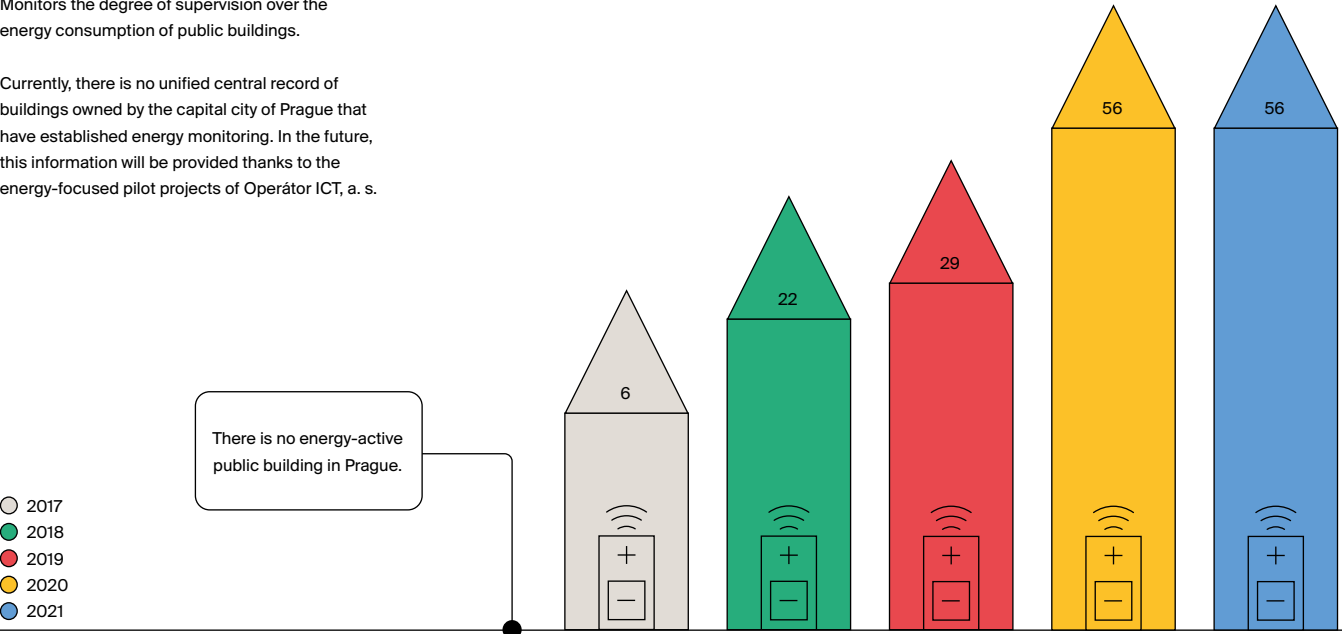
At the end of the year 2021, the reconstruction of the Českobrodská Secondary School was completed, which will significantly exceed the requirements for a building with almost zero consumption. The building will be energy-active, producing more energy than it consumes.

PUBLIC BUILDINGS WITH A GREEN BUILDING CERTIFICATE
Certification systems are used to assess and evaluate buildings in the field of sustainable construction. A number of these tools have already been developed in various countries around the world. Their importance continues to increase from an ecological and marketing point of view, as well as from the point of view of operating costs and life cycle costs in general. Certification results in the creation of a comprehensive evaluation of the building, which can provide potential investors or tenants with an idea of possible operational savings and marketing advantages, and at the same time can serve as a motivational factor. A certification is also a suitable tool for the public sector enabling the fulfillment of efficiency requirements, not only for newly built buildings but also for existing buildings.

The total number of public buildings with energy monitoring and intelligent control at a high level of automation

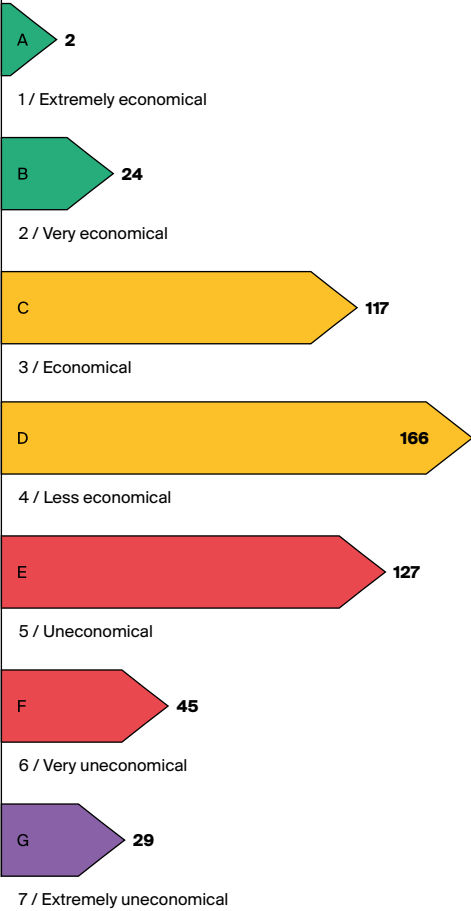
Monitors the degree of supervision over the energy consumption of public buildings.

Currently, there is no unified central record of buildings owned by the capital city of Prague that have established energy monitoring. In the future, this information will be provided thanks to the energy-focused pilot projects of Operátor ICT, a. s.



- 2017
- 2018
- 2019
- 2020
- 2021

Number of buildings



Degree of digitization of the electrical distribution system

It monitors the degree of readiness of the Prague electric distribution network – distribution network PREdistribuce, a.s. (PREdi) – for the use of services connected with the possibilities of smart networks.

The total number of meters on the distribution network means the number of consumption points. A smart meter is one that, at least, features a remote value-reading function.

Year	2017	2018	2019	2020	2021
Number of smart meters	< 1%	< 1%	< 2%	< 2%	< 1%
Total number of all meters within the PREdi distribution network	791,000	791,000	810,000	817,000	818,000

Rate of digitization of distribution systems

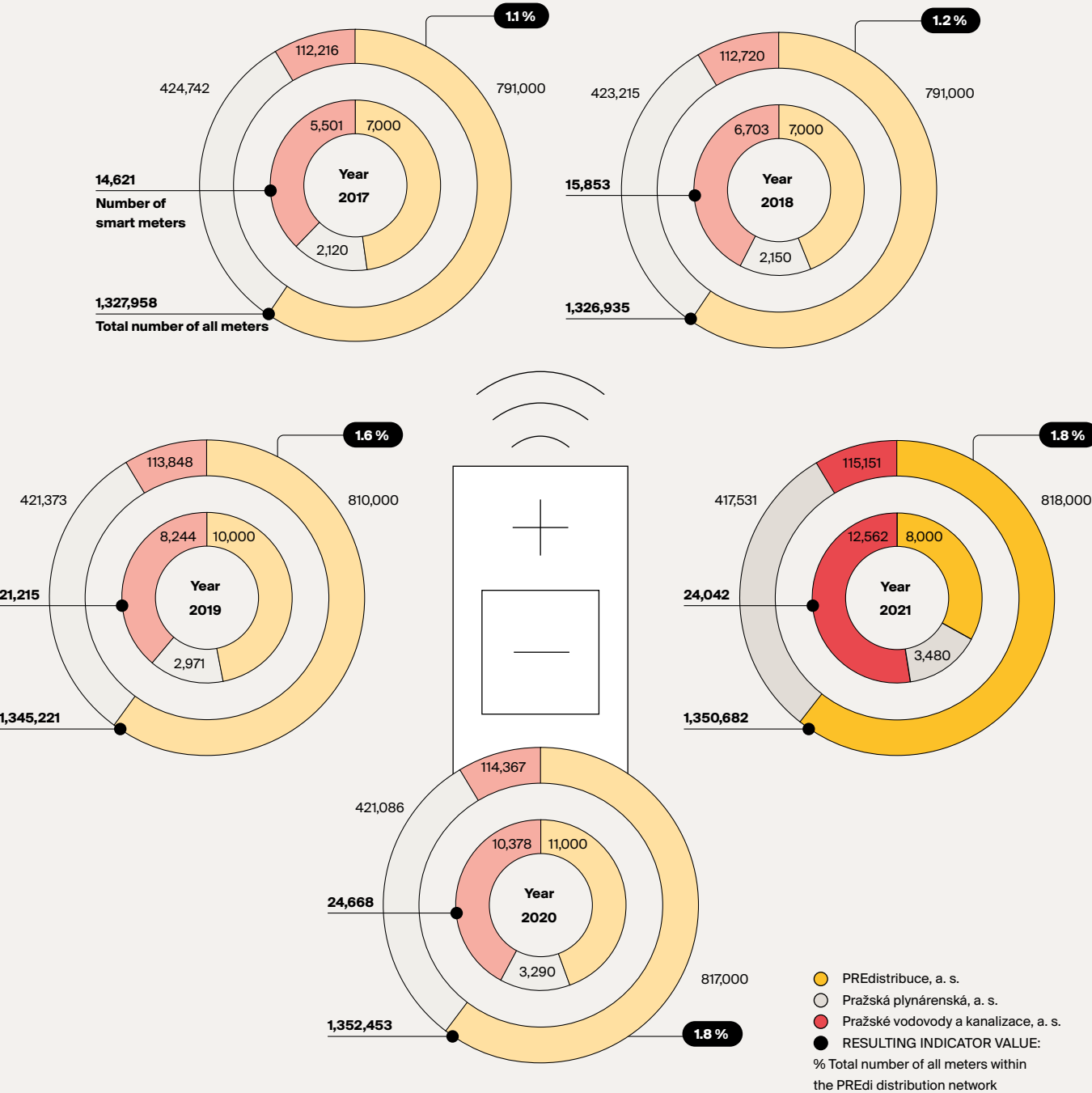
The indicator expands the previous category to capture the degree of digitization of all distribution networks in Prague.

In 2021, the number of smart meters at Pražská plynárenská, a. s., saw an increase in the

category Medium consumption, but especially in the category Small consumption, where several projects were implemented.

The total number of meters at Pražská plynárenská, a. s., recorded a decrease, which mainly concerns customers in the Household category, most often

customers who stopped using gas stoves and do not have another gas appliance at home. The share of water meters with remote status readings increases every year. In 2021, the total number of water meters with remote reading was 12,562, which is 17.4% more than the previous year.

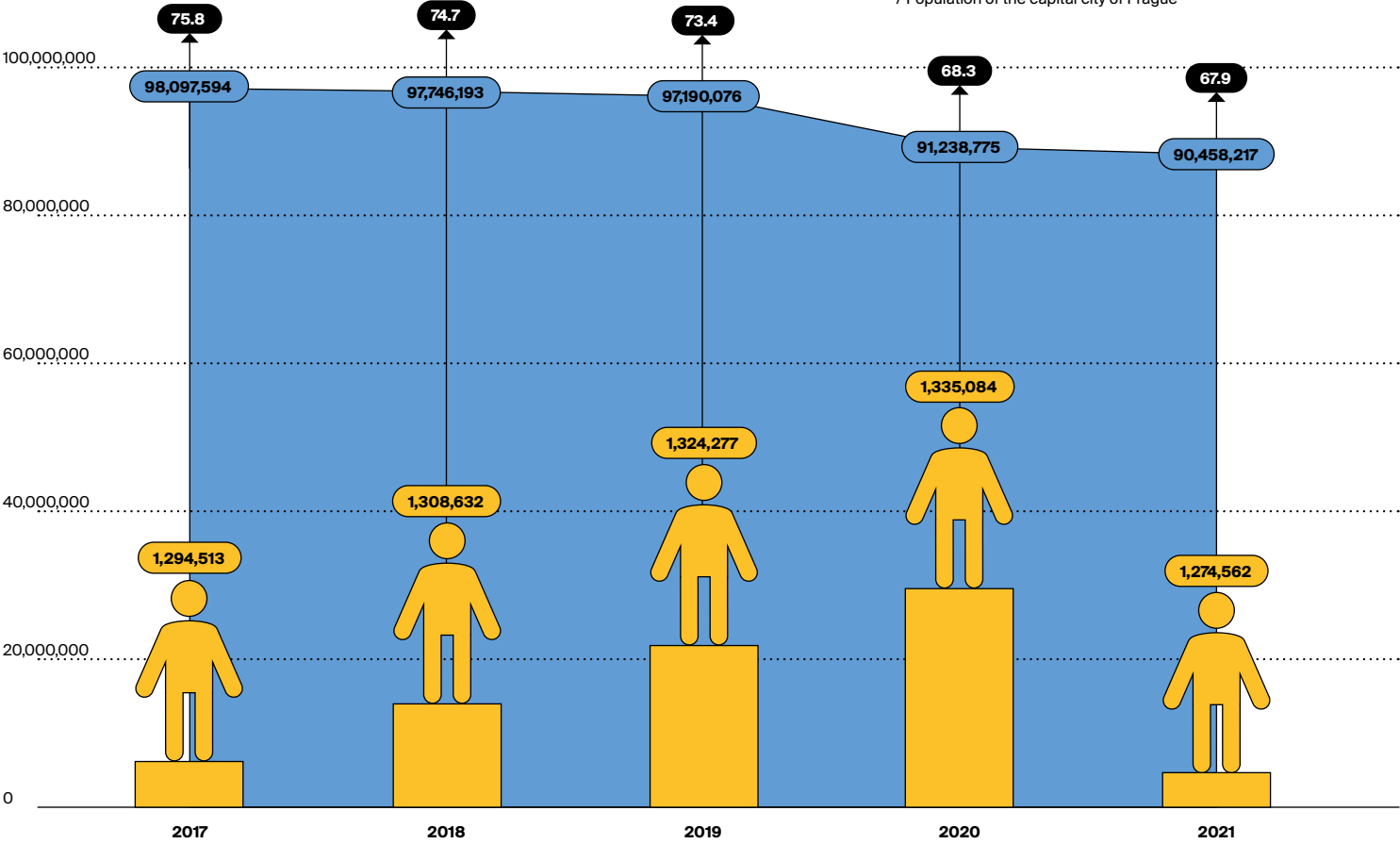


Water consumption

Water consumed in the territory of the capital city of Prague includes both drinking water and industrial water. The data provides the total amount of water supplied to the network together with technical losses – malfunctions, leaks, etc.

In 2021, PVK (Prague waterline and sewerage system) delivered 90,458 thousand m³ of water to the water supply network, which is a comparable consumption with the previous year.

- The amount of water supplied to the network for implementation in the territory of the capital city of Prague m³
- Population of the capital city of Prague
- RESULTING INDICATOR VALUE: Amount of water supplied to the network for implementation in the territory of the capital city of Prague m³ / Population of the capital city of Prague

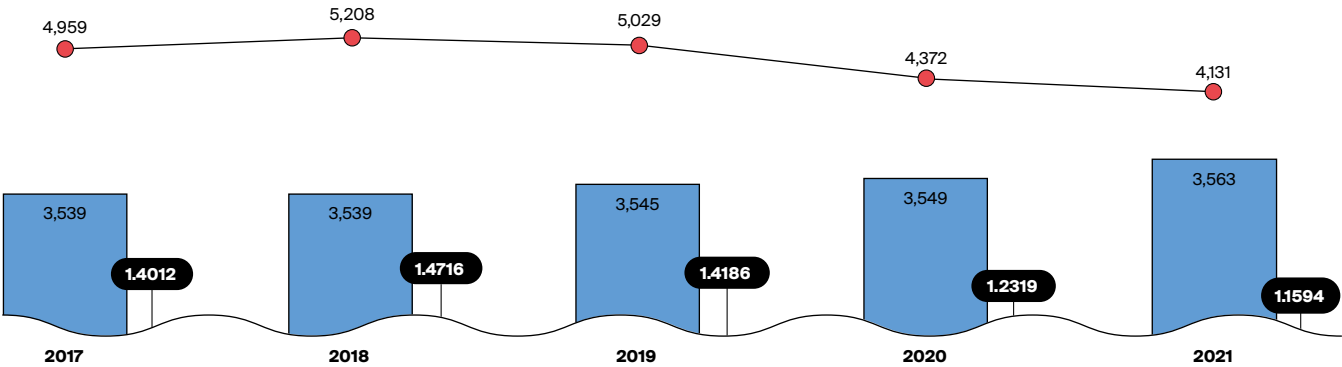


Use of grey water for energy needs - public sector

Year	2017	2018	2019	2020	2021
Amount of water preheated by grey water energy [m³]	NA	NA	NA	8,712	7,895
Total water consumption in public sector buildings (hot service water and cold water in m³)	1,506,823.820	1,187,699.670	1,385,154.701	1,141,642.5	251,838.780

Unscheduled water shut-offs

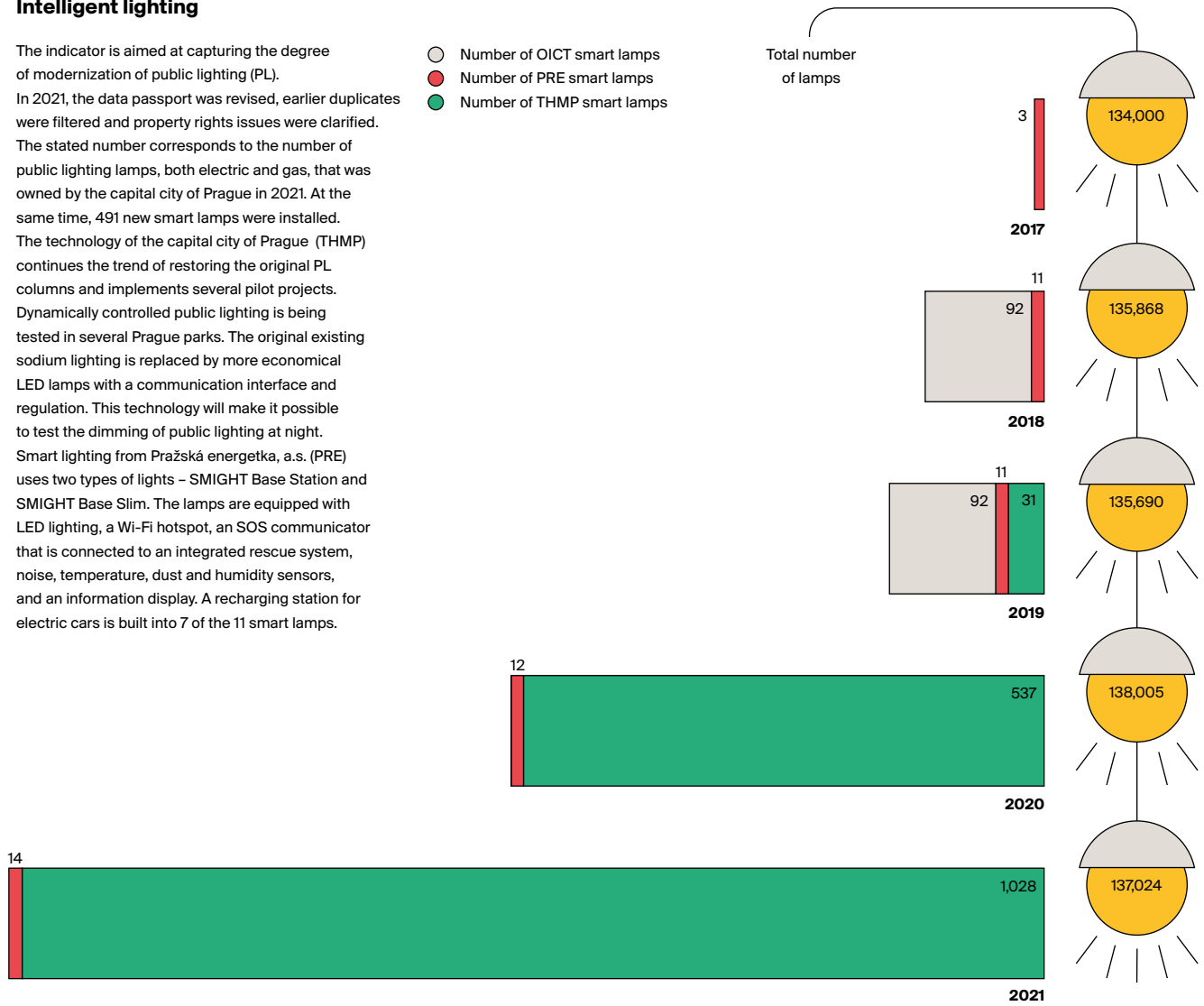
- Length of the water supply network [km]
- Number of accidents on the water supply network
- RESULTING INDICATOR VALUE: Number of accidents on the water supply network / Length of the water supply network [km]



Intelligent lighting

The indicator is aimed at capturing the degree of modernization of public lighting (PL). In 2021, the data passport was revised, earlier duplicates were filtered and property rights issues were clarified. The stated number corresponds to the number of public lighting lamps, both electric and gas, that was owned by the capital city of Prague in 2021. At the same time, 491 new smart lamps were installed. The technology of the capital city of Prague (THMP) continues the trend of restoring the original PL columns and implements several pilot projects. Dynamically controlled public lighting is being tested in several Prague parks. The original existing sodium lighting is replaced by more economical LED lamps with a communication interface and regulation. This technology will make it possible to test the dimming of public lighting at night. Smart lighting from Pražská energetka, a.s. (PRE) uses two types of lights – SMIGHT Base Station and SMIGHT Base Slim. The lamps are equipped with LED lighting, a Wi-Fi hotspot, an SOS communicator that is connected to an integrated rescue system, noise, temperature, dust and humidity sensors, and an information display. A recharging station for electric cars is built into 7 of the 11 smart lamps.

- Number of OICT smart lamps
- Number of PRE smart lamps
- Number of THMP smart lamps

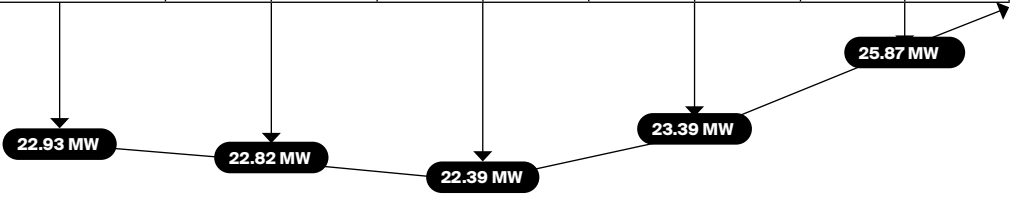


Decentralized production of electricity from the sun

Year	2017	2018	2019	2020	2021
Number of electrical energy sources installed in the territory of the capital city of Prague	1,223	1,242	1,481	1,724	2,052
Average installed solar power	0.019 MW	0.018 MW	0.015 MW	0.014 MW	0.013 MW
Total power and number of other micro sources of electrical energy	NA	23.040 MW 32 sources	23.129 MW 12 sources	23.129 MW 12 sources	17.479 MW 10 sources
Landfill gas	NA	5.552 MW 7 sources	5.650 MW 2 sources	5.650 MW 2 sources	5.402 MW 1 source
Sludge gas	NA	5.402 MW 5 sources	5.402 MW 1 source	5.402 MW 1 source	12.075 MW 8 sources
Water energy	NA	12.084 MW 19 sources	12.075 MW 8 sources	12.075 MW 8 sources	0.002 MW 1 source
Wind energy	NA	0.002 MW 1 source	0.002 MW 1 source	0.002 MW 1 source	0 MW 0 sources

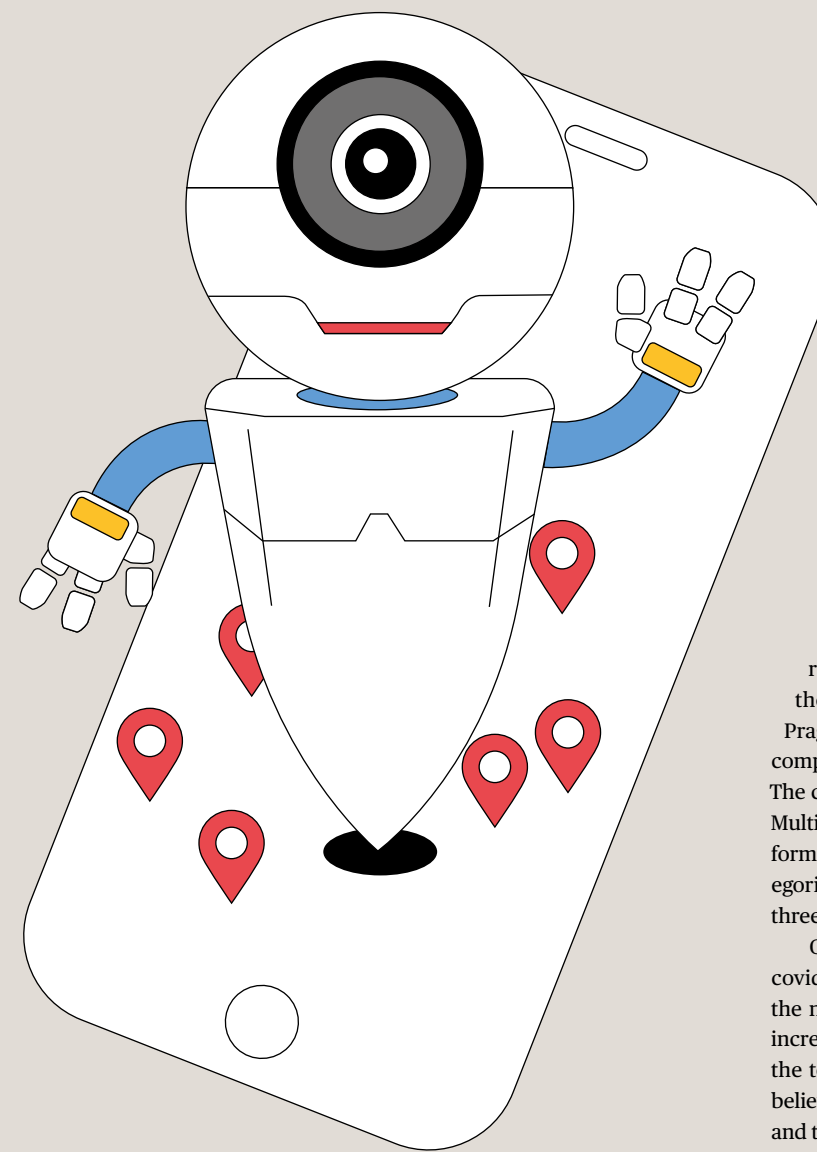
Resulting indicator value

Amount of installed capacity of solar power plants in the territory of the capital city of Prague [MW]



Attractive tourism

In the areas of modern tourism, the city of Prague is constantly developing and offering people a wide range of services, countless events, and innovations that increase its attractiveness even more. Whether it is the availability of services or various activities such as geocaching, guided tours, festivals, thematic events, or video mapping on various occasions.

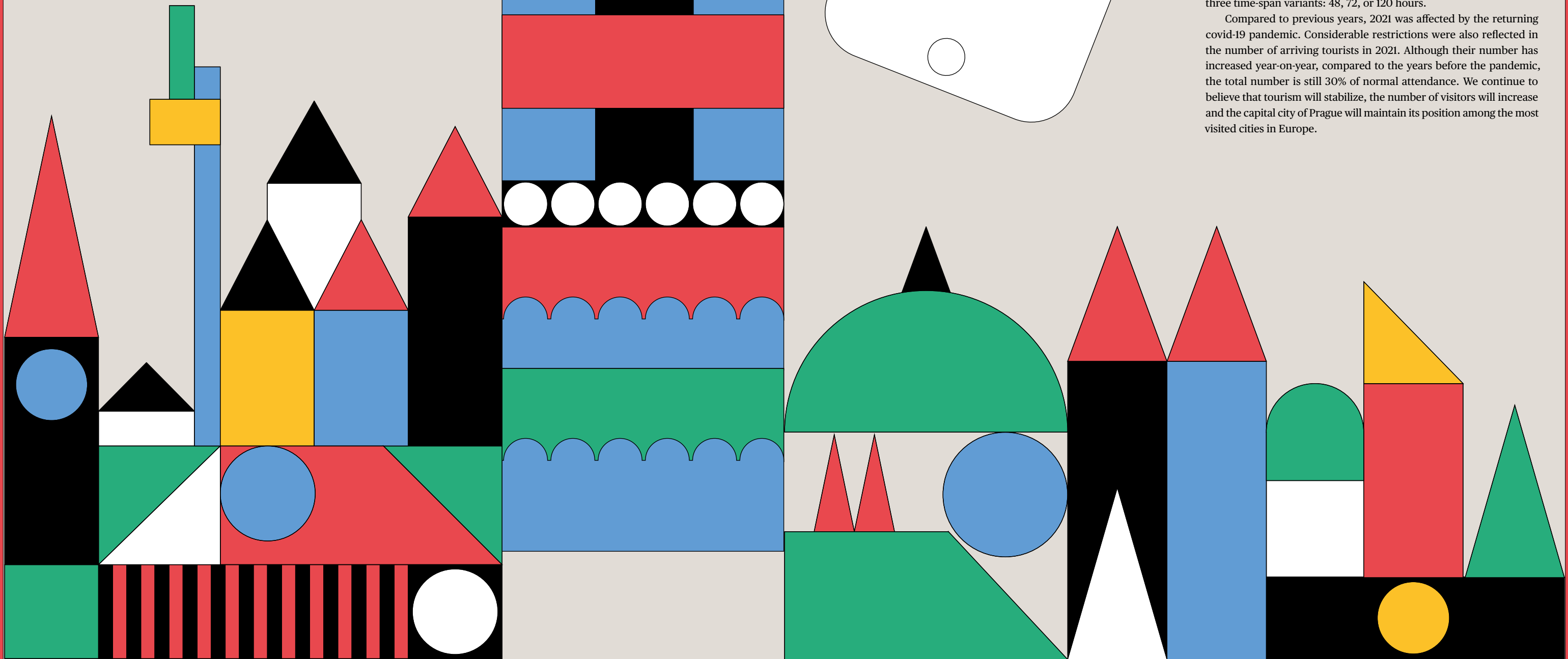


The capital city of Prague also takes a responsible approach to national celebrations responding to modern trends and the needs not only of residents but also of tourists. The city itself offers a very diverse range of local celebrations and cultural events that are available to the general public. Another area with great tourism potential is the use of

augmented reality during tours of monuments or the involvement of robots equipped with artificial intelligence, the aim of which is to increase the attractiveness of the places visited and thus promote learning about the historic city even for younger generations.

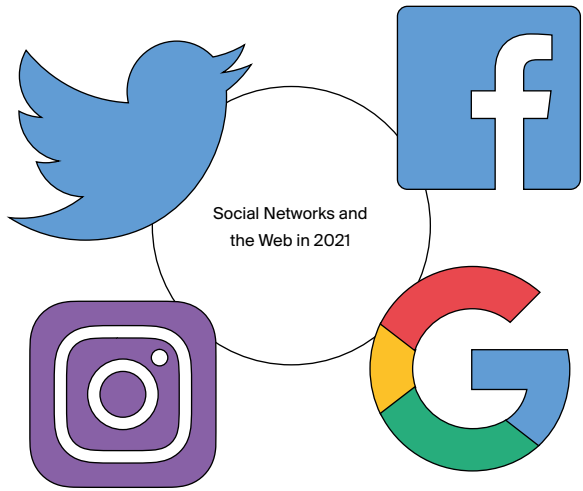
Despite the unfavourable situation in recent years, it is assumed that tourism will return to normal in the future, and therefore there is a need to further develop it in a coordinated manner with the use of innovative technologies, both based on reliable movement data and visitor preferences. This is also why the Prague Visitor Pass (PVP) was created, a new multi-purpose Prague tourist card with which the capital city of Prague will offer comprehensive services to tourists on its territory from 30 May 2022. The card will also be connected to public transport services using the Multi-Channel Check-in System. PVP will be available both in physical form and as a mobile application and will be available in several categories (children, students, and adults). The card will be available in three time-span variants: 48, 72, or 120 hours.

Compared to previous years, 2021 was affected by the returning covid-19 pandemic. Considerable restrictions were also reflected in the number of arriving tourists in 2021. Although their number has increased year-on-year, compared to the years before the pandemic, the total number is still 30% of normal attendance. We continue to believe that tourism will stabilize, the number of visitors will increase and the capital city of Prague will maintain its position among the most visited cities in Europe.



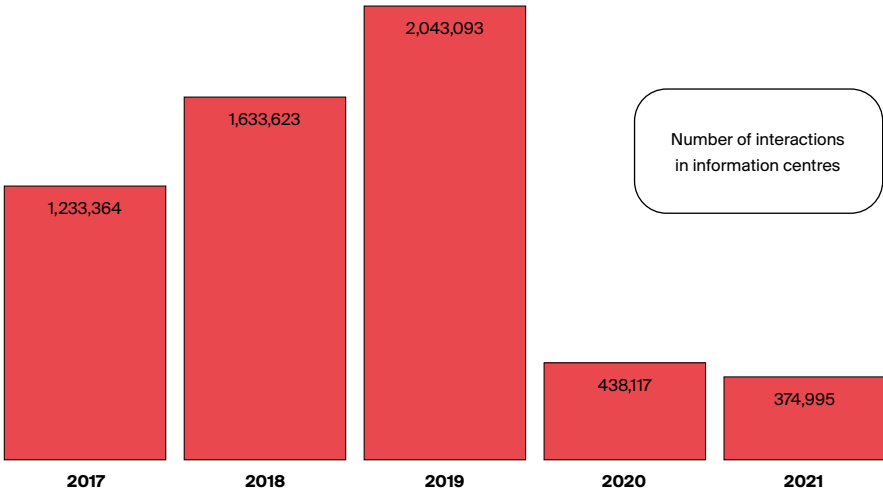
Exploiting Big data in tourism

This indicator expresses the level of collection and analysis of available data for the controlled development of tourism in Prague. Administrators and operators of mobile networks have information on the approximate location, quantity, and country of origin of SIM cards in switched-on mobile devices at a given time. In combination with other sources of Big data, such as GPS data, data on the use of payment cards, accommodation statistics, etc., this is a valuable basis for obtaining an overview of the concentration and other socio-economic characteristics of residents or visitors in specific locations. This is how you can target the promotion of the capital city of Prague according to specific groups of visitors, plan the development of tourism, including related infrastructure, and improve the quality of tourist services.



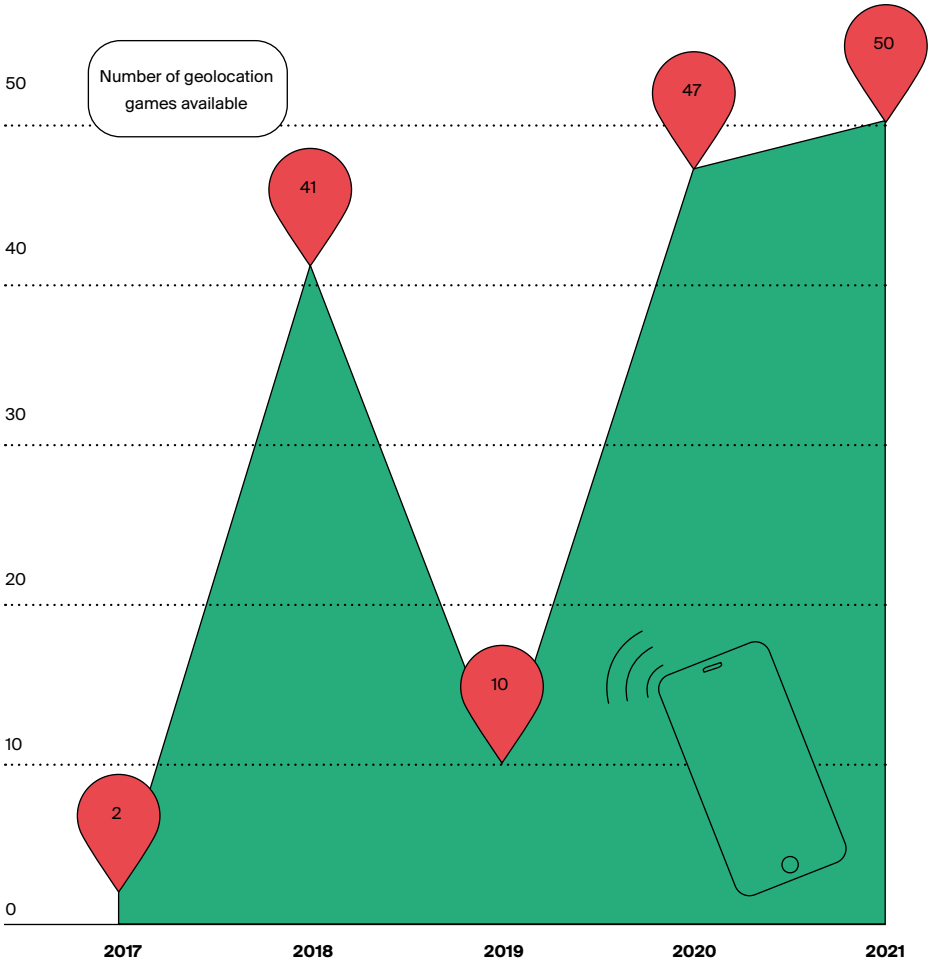
Feedback from tourists

The indicator focuses on the number of interactions with visitors to the capital. city of Prague through individual communication channels and monitors the number of feedbacks. From the data provided, it follows that Prague City Tourism, a. s. monitors feedback from visitors to Prague and records interactions within Prague information centres, from records on social networks, and from e-mail communication.

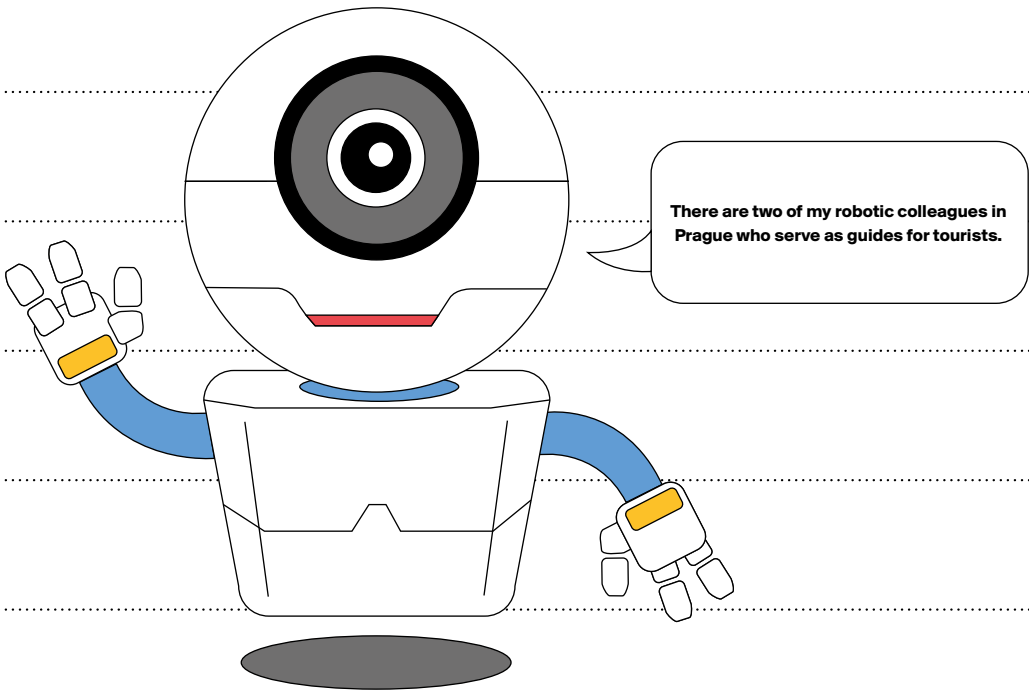


Geolocation Games

The goal of the development of this area is to make the tour of Prague's monuments more attractive to visitors in an entertaining way, as well as to draw attention to interesting locations in Prague even outside the main tourist routes. Geolocation games are based on popular geocaching, a game on the border between sports and tourism, in which tourists search for hidden boxes or collect points using geographical coordinates. This principle can also be used for comfortable, interesting, and playful planning of sightseeing tours and trips in and around Prague. In Prague, the GeoFun geolocation game with 17 routes, the Hidden Stories game with 31 routes, the S-technique game around with a route focused on interesting places in Prague 6 and a search game from Puzzle Tours Prague/YMCA located in the streets of Prague 1 are currently freely available in Prague. Companies also offer private or corporate games with individual settings. The principle of the game consists not only in finding a place but also in fulfilling the tasks that await the player after reaching the place. Another relatively new way of making locations more attractive, ensuring routine interpretation and interactive provision of information is provided by robotic guides.

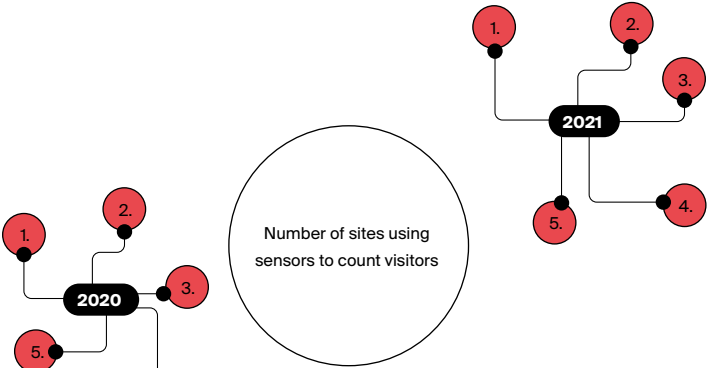


Guide - robot



Sensory count of visits

Sensory people counters can automatically detect the presence of a person using a variety of technologies. Based on these systems, we can add and subtract arrivals and departures, thereby monitoring the number of visitors in a given space. In the second half of 2021, the Intensity of Pedestrian Traffic project aimed at monitoring the intensity of pedestrian traffic, especially taking into account the concentration of crowds and public space, was launched into routine operation. As part of its pilot operation, three technologies were tested: Wi-Fi sensors, pyroelectric sensors, and advanced video analysis on existing urban CCTV cameras. After a successful pilot operation, the following locations were put into operation: Rašínovo nábreží (embankment), Karlův most, Na Můstku x Rytířská, Stromovka, and U Výstaviště street - under the railway viaduct.

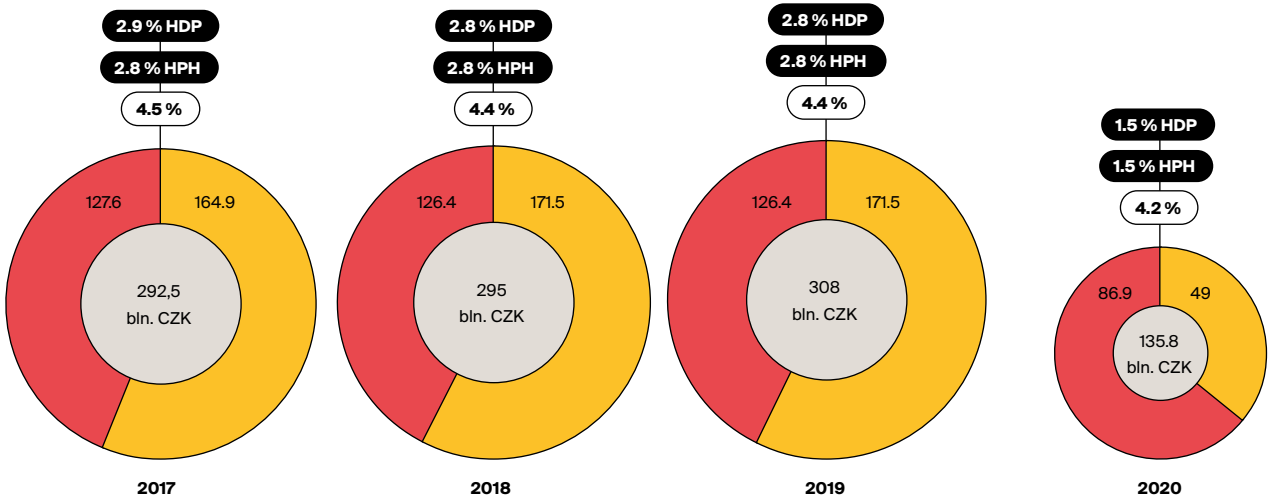


Tourism productivity

The indicator aims to approximate the productivity of the tourism industry and uses indicators related to tourism expenditure with a breakdown into the expenditure of foreign visitors (foreign inbound tourism) and the expenditure of domestic visitors (tourists from the Czech Republic). It then puts these indicators in

a mutual ratio, which results in the productivity ratio of both groups of tourists on the overall result. For further illustration, the year-on-year percentage share of tourism in gross value added (GVA) and gross domestic product (GDP) is shown.

- Expenses of foreign visitors
 - Expenses of domestic visitors
 - Total visitor spending on tourism
 - Share of tourism in employment
- *data one year back, values for 2021 will be published in SPI 2022



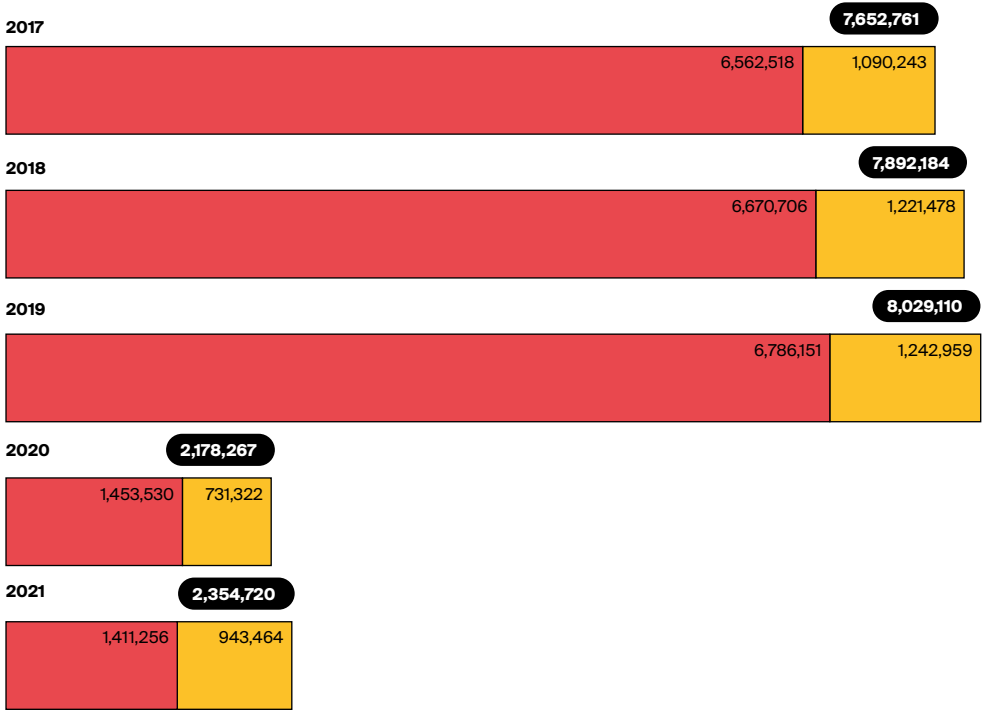
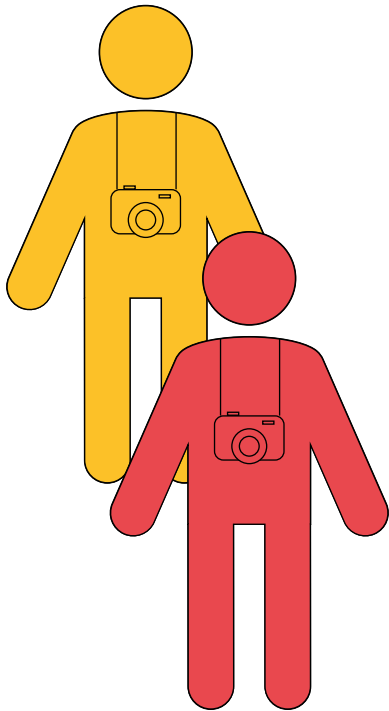
Number of visitors

The occupancy rate of the capital is continuously monitored, both in terms of the total number of visitors and their overnight stays in mass accommodation facilities. In 2020, the number of visitors decreased by 73% due to the covid-19 pandemic, and approximately 5.8 million fewer tourists visited Prague. In 2021, a slight increase in the number of visitors, by 8%, is already visible. The largest number of visitors from abroad came from Europe,

especially from Germany, Slovakia, and Poland. According to the Czech Statistical Office, the duration of an overnight stay in Prague has been around 2.3 nights in the long term. Increasing this value, in addition to increasing the attractiveness of tourism with the help of modern technologies, generally requires the provision of services that motivate tourists to stay longer, such as important cultural and sports events, conferences, opportunities for sports, relaxation, and

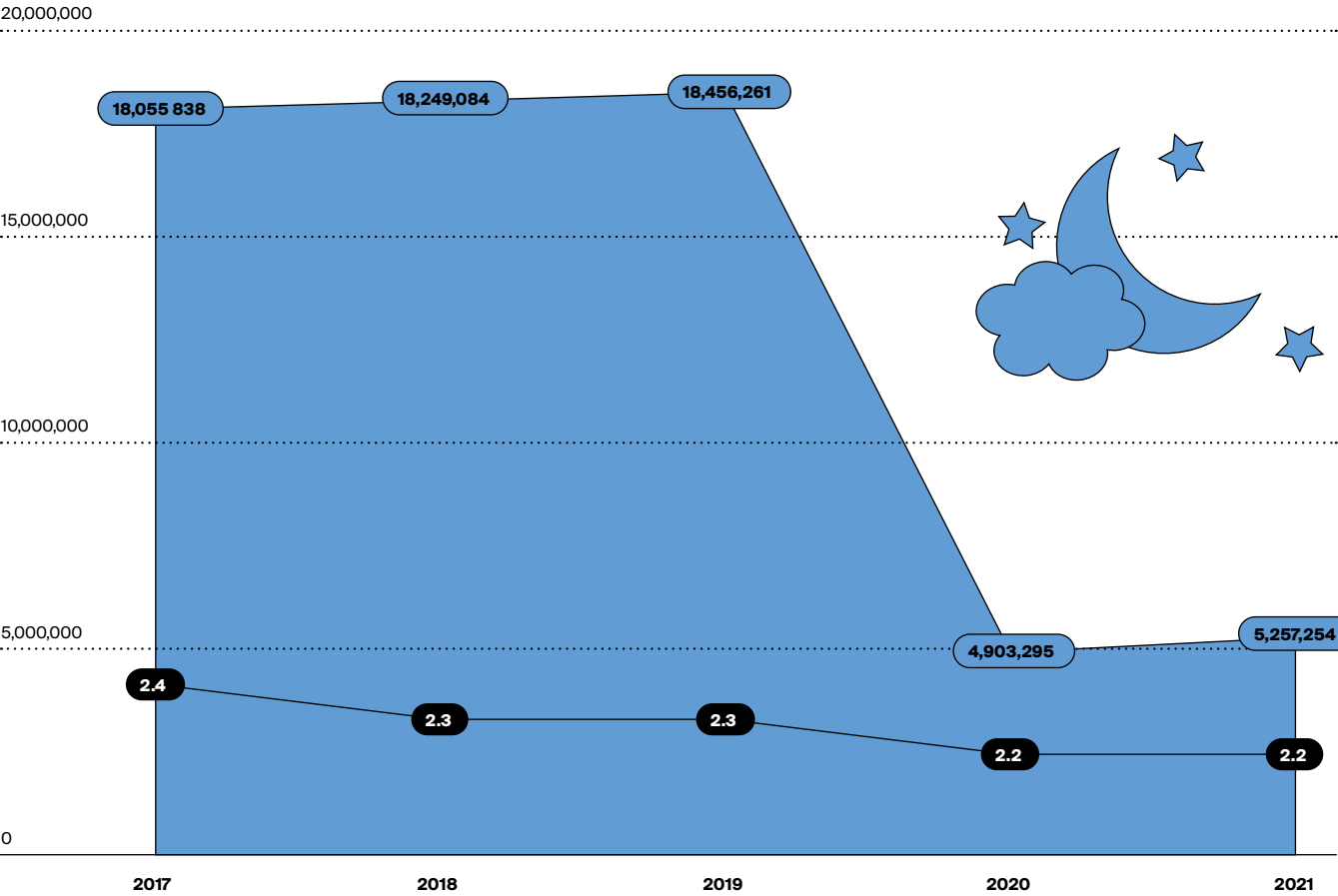
recreation. The number of overnight stays in 2021 increased slightly year-on-year by roughly 7.2%, and the average length of stay remains at 2.2 nights.

- Number of foreign visitors
- Number of domestic visitors
- Total number of visitors



Number of nights

- Total number of overnight stays
- Average length of stay (number of nights)

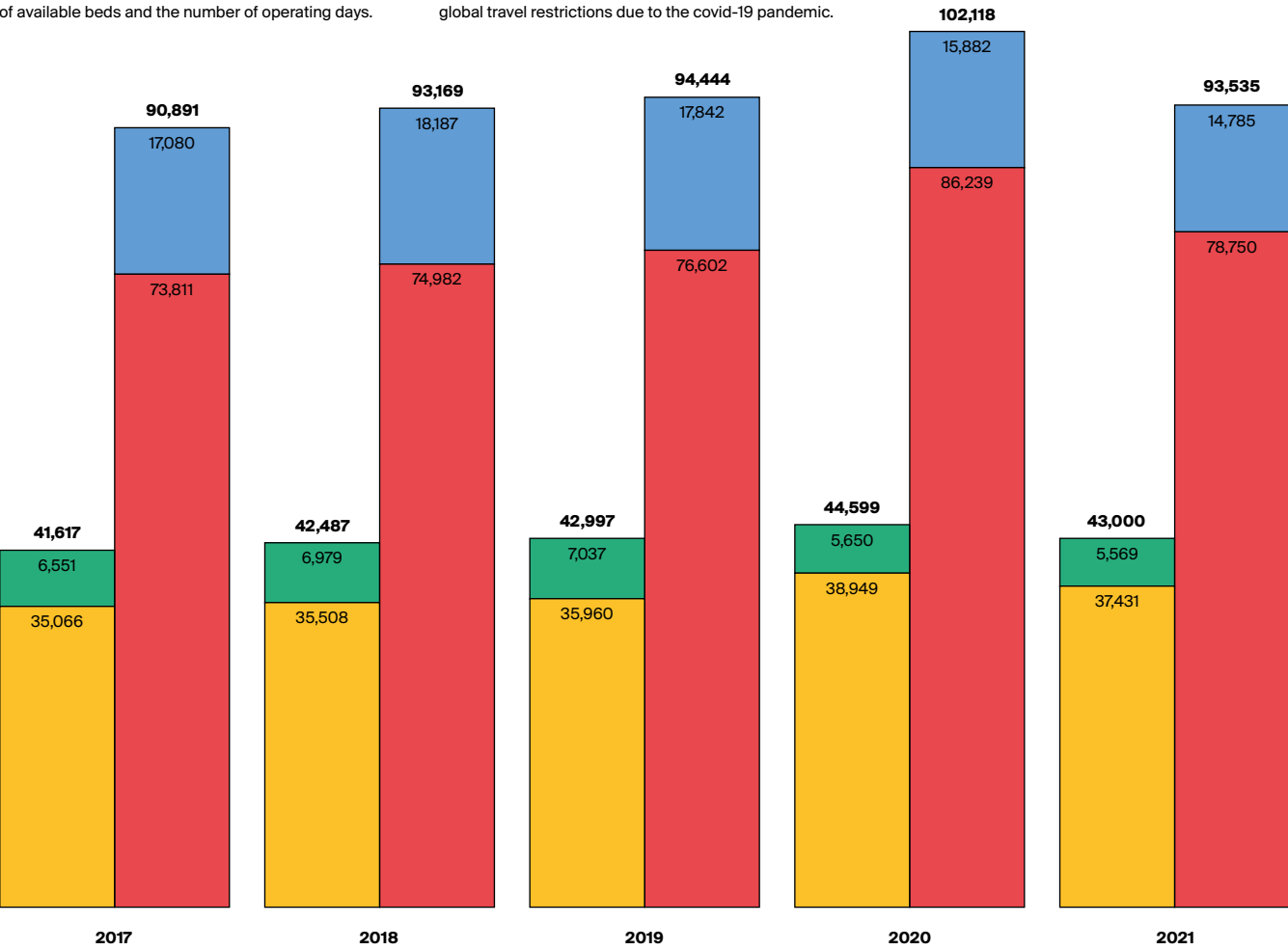


Occupancy of rooms

The indicator monitors the net use of beds and room use in hotels and other mass accommodation facilities in the capital city of Prague. The Czech Statistical Office states that the net utilization of beds is determined as a proportion of the number of overnight stays for the monitored period and the product of the average number of available beds and the number of operating days.

Room utilization is determined as a proportion of the number of realized "room days" (i.e. the number of occupied rooms for individual days of the monitored period) and the product of the average number of available rooms and the number of operating days. In 2021, a slight decrease is again noticeable due to global travel restrictions due to the covid-19 pandemic.

- Number of hotel-type rooms
- Number of non-hotel rooms
- Number of beds in hotels
- Number of beds in other accommodation facilities

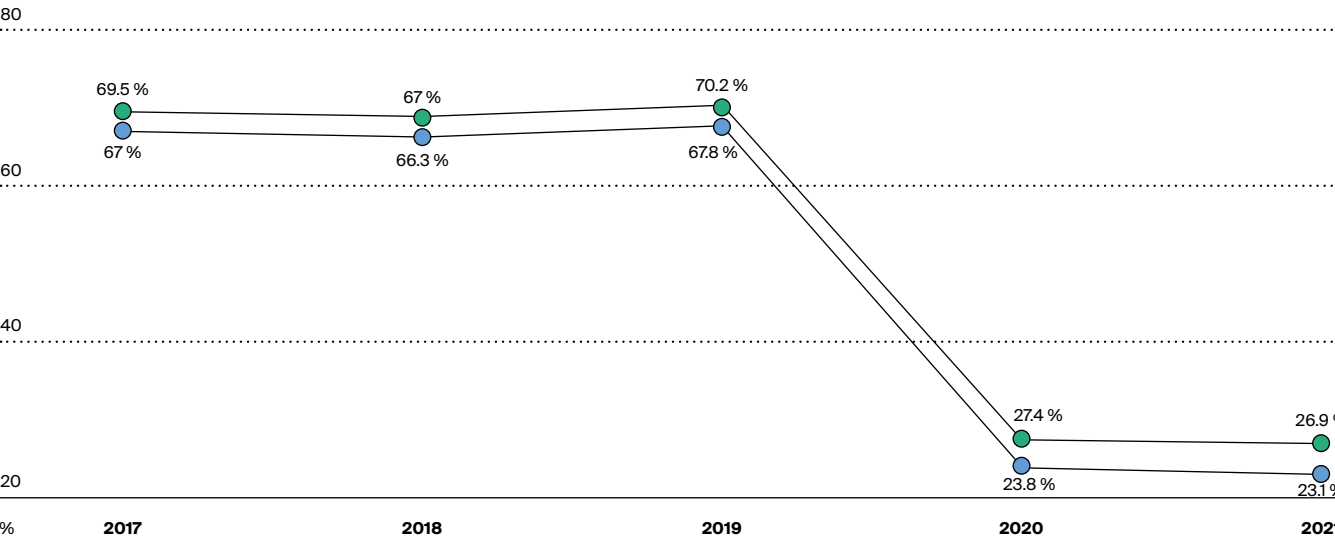


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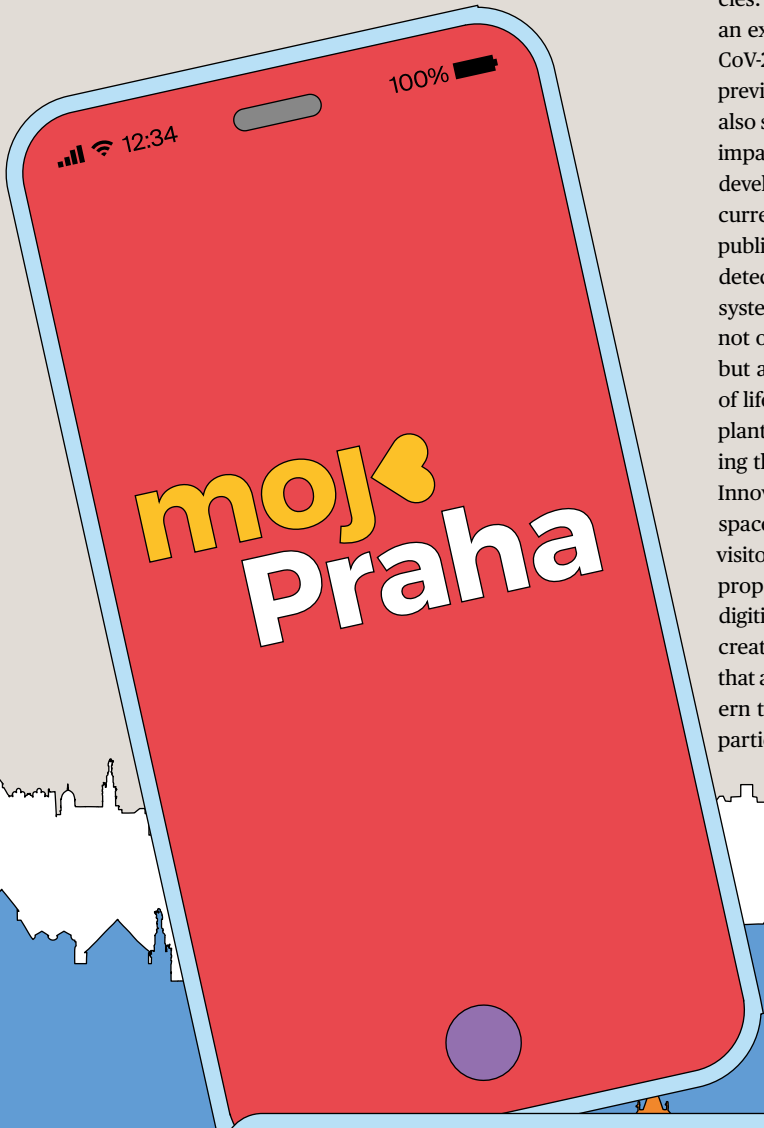
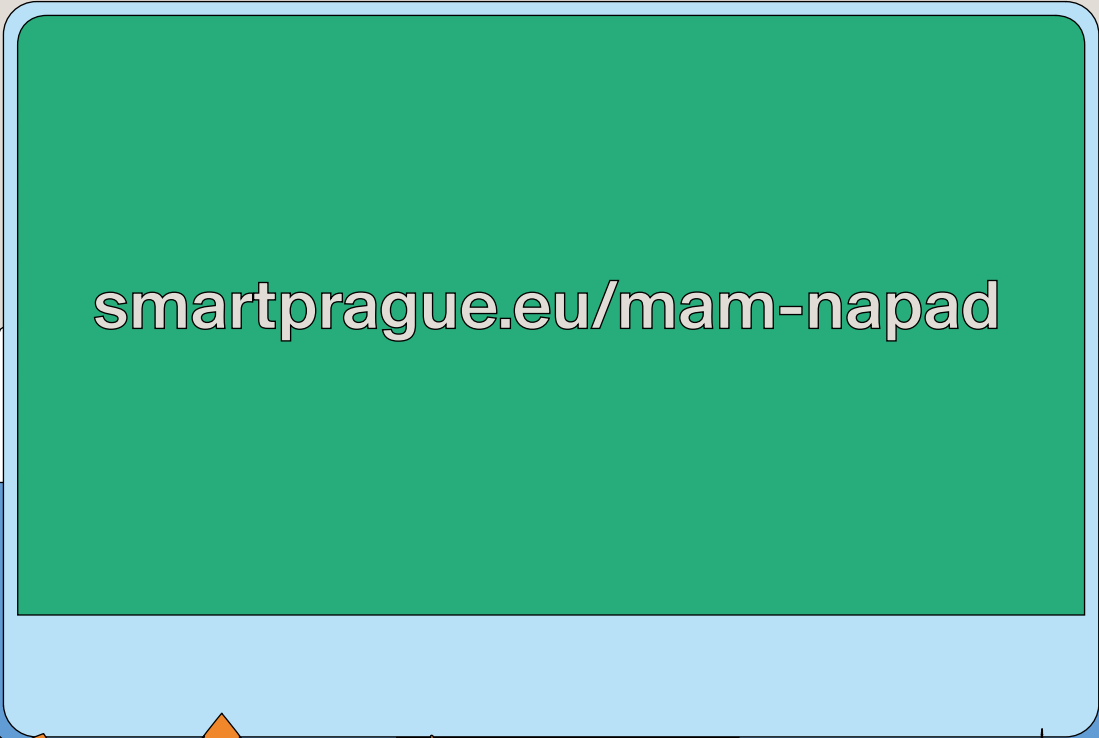
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- Net occupancy of beds
- Net occupancy of rooms

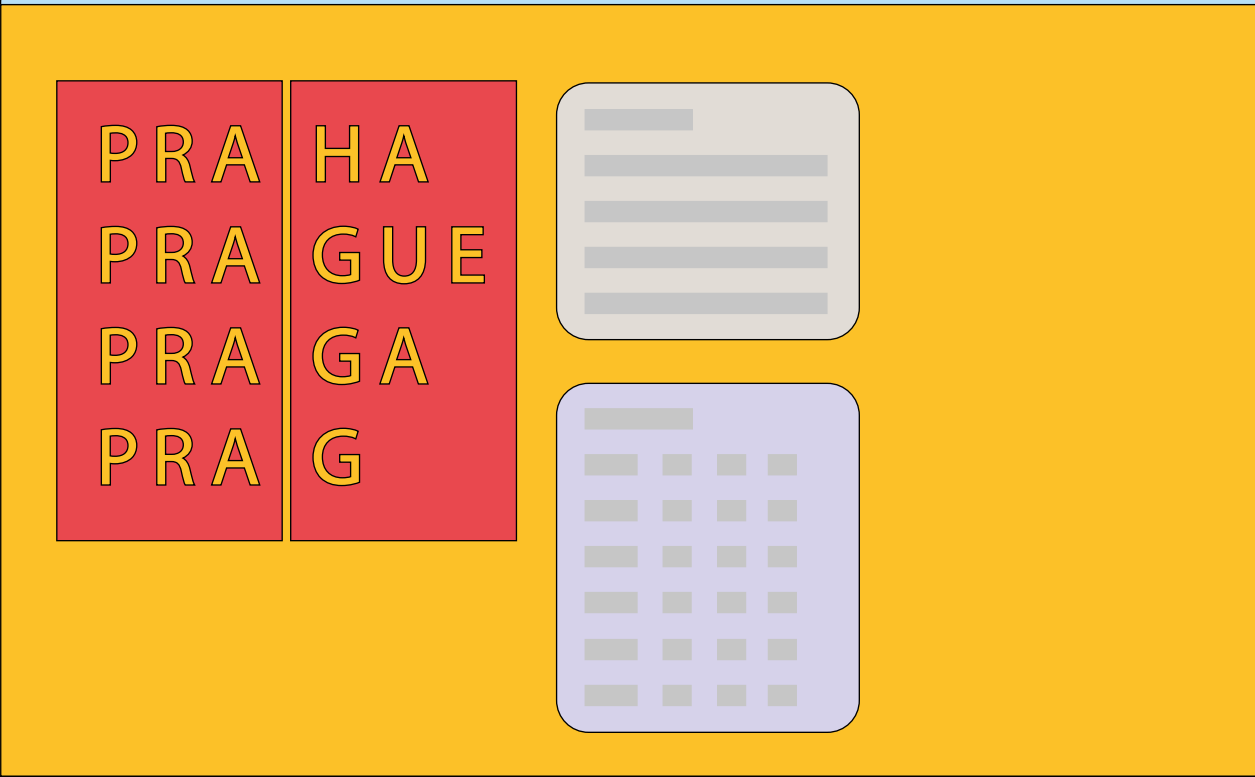


People and urban environment

Cities are created by people, they are their essence. Creating cities for and in harmony with people is important for the usability and sustainability of the effort to create a smart city.



People in Prague (1.3 million as of the last day of 2021) live in the area of the largest heritage-protected reserve in the Czech Republic, which makes the city a unique space combining historical and modern tendencies. In 2021, residents and cities themselves continued to experience an exceptional state of functioning, the cause of which was the SARS-CoV-2 virus causing the disease covid-19. Based on the experience of the previous "covid" year, solutions improving not only safety and health but also social and community life were supported to reduce the negative impact of isolation. Communication and interaction with residents are developed using mobile applications with functions corresponding to the current needs of life and movement in the city. The safety of citizens in public spaces will be increasingly strengthened thanks to the automated detection and prediction of risk phenomena using intelligent camera systems and a dense sensor network. In cities, demands will increase not only for the support of an active life and the availability of sports but also for care using the latest technologies to improve the quality of life of city residents. An equally important aspect is the support of planting greenery and urban agriculture, which contribute to improving the capital city's environment and food self-sufficiency in Prague. Innovative technologies also bring non-traditional ways of using public spaces and equipment. Municipal furniture can offer the citizens and visitors of Prague their accessibility by combining the traditional useful properties of the furniture with added functions. With the support of digitization and public participation in the development of the city, the creative potential of the inhabitants is used, trust is built and projects that are lacking in the given urban environment are implemented. Modern technologies allow the city to use appropriate methods of public participation and improve the quality of life of citizens.



City mobile applications

MOJE PRAHA (MY PRAGUE)

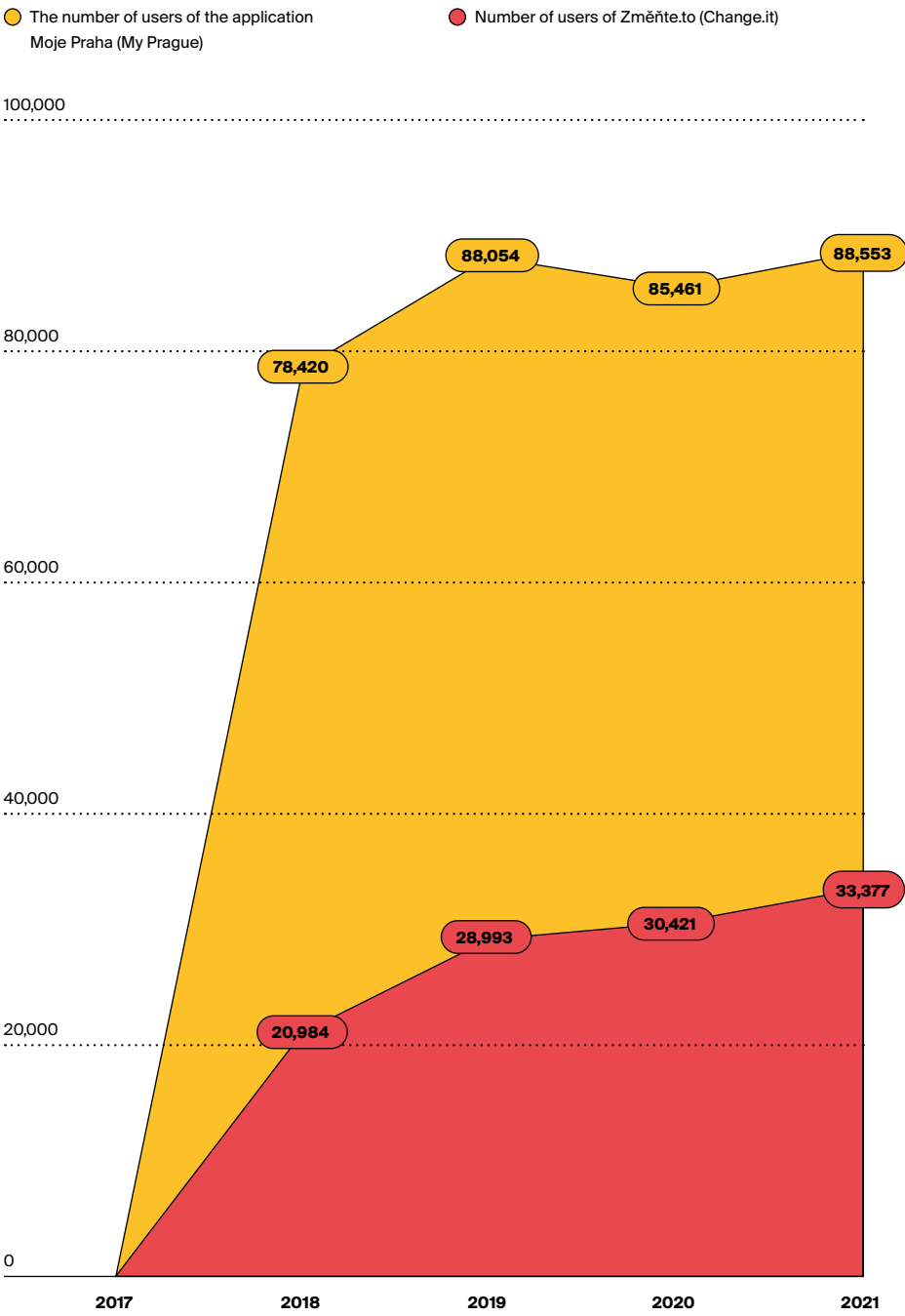
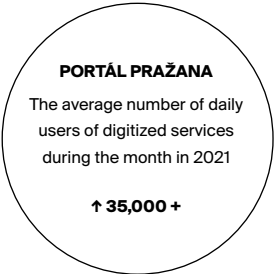
Mobile applications help to connect cities with people and to further use the data obtained from people from the urban environment. In 2021, there was an increase in users of the Moje Praha application. The application is developed in such a way as to offer as much relevant and up-to-date information as possible, which will make life in Prague as easy as possible for users. That's why the application offers essential information from the public space about parking zones and the possibility of paying for parking, traffic information, cultural news, of course also contacts and opening hours at offices and other practical information.

ZMĚŇTE.TO (CHANGE.IT)

The mobile application Změňte.to was taken over by the OICT in July 2019. The number of users also increased in 2021. The Změňte.to the application also grew in 2021, however, due to the lockdown period, the number of complaints filed decreased. The application is a single place that offers users the opportunity to send proposals and initiatives to the employees of the Prague City Hall and its subordinate organizations or to evaluate the authorities.

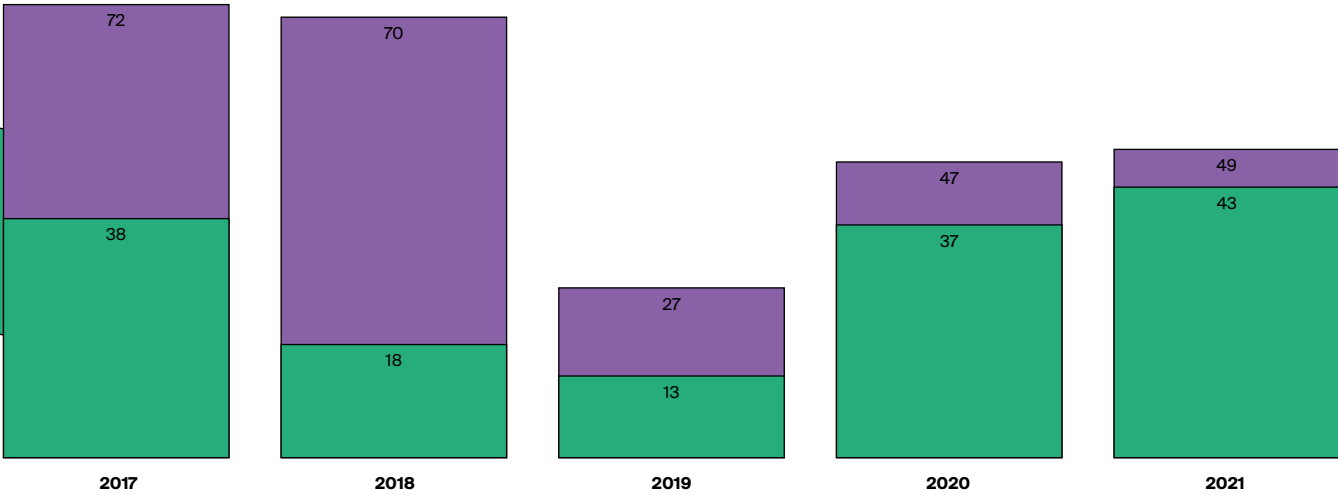
PORTÁL PRAŽANA (PRAGUER PORTAL)

The new Portál Pražana has the ambition to become the centre of the city's digital services. The portal is gradually digitizing the agendas and thus enabling them to be processed online (e.g. trash fee, etc.). Since 2020, when the pilot operation took place, the number of agendas has increased significantly, due to which there has also been an increase in the number of users and processed requests. The same trend is expected in the future, as the implementation of other agendas is expected.



City website Mám nápad

- Number of all ideas received
- Number of approved ideas



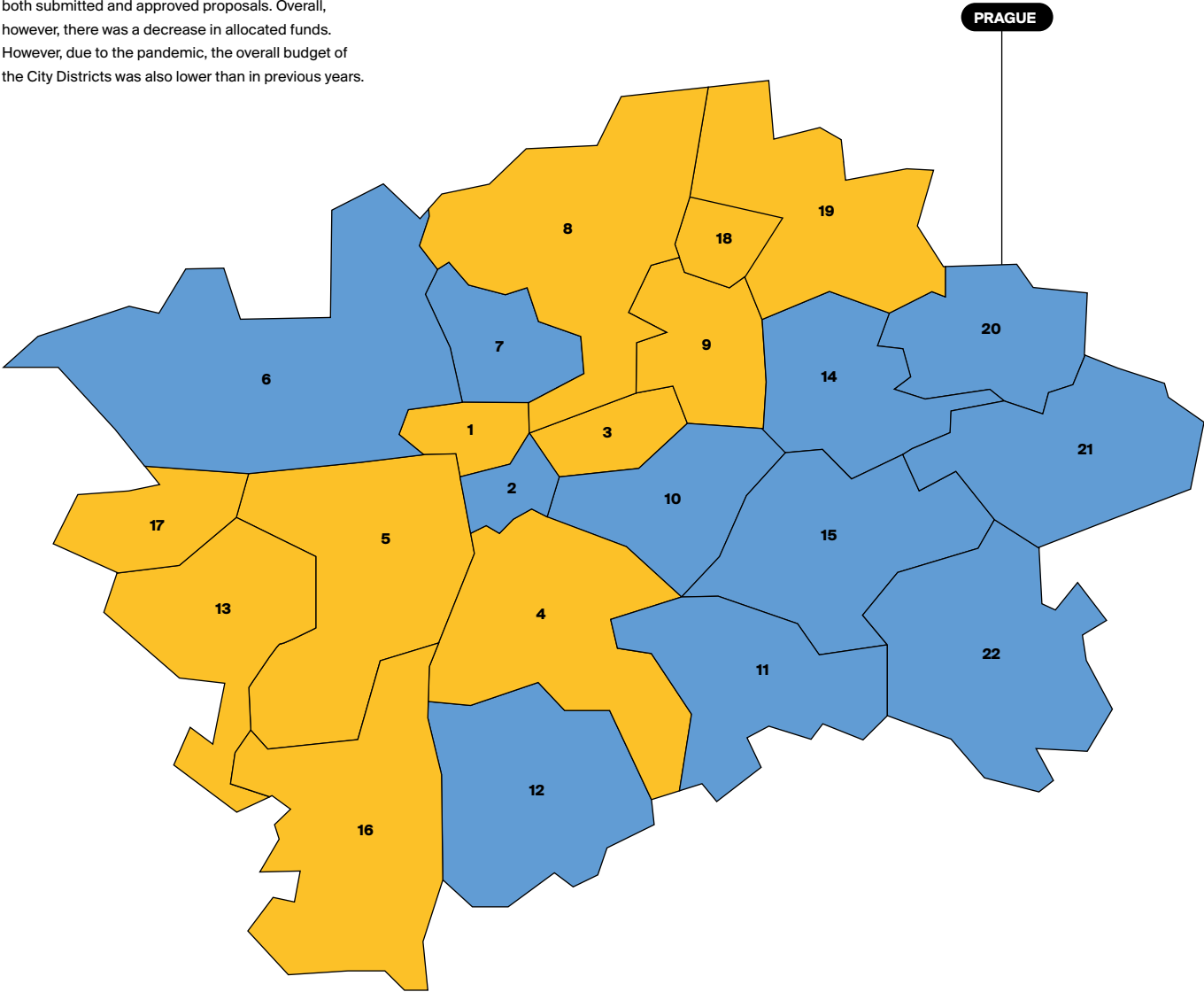
The Mám nápad (I Have an Idea) website has seen an increase in both received and approved proposals. The most submitted proposals were for the area of People and Urban Environment and Future Mobility. Mám nápad (I Have an Idea) is a long-term project thanks to which

OICT collects ideas for new projects from citizens and visitors to Prague. The aim of the OICT is to achieve the highest possible success rate of relevant projects, i.e. that as many accepted ideas as possible are approved with a view to subsequent implementation.

Participatory budget of City Districts

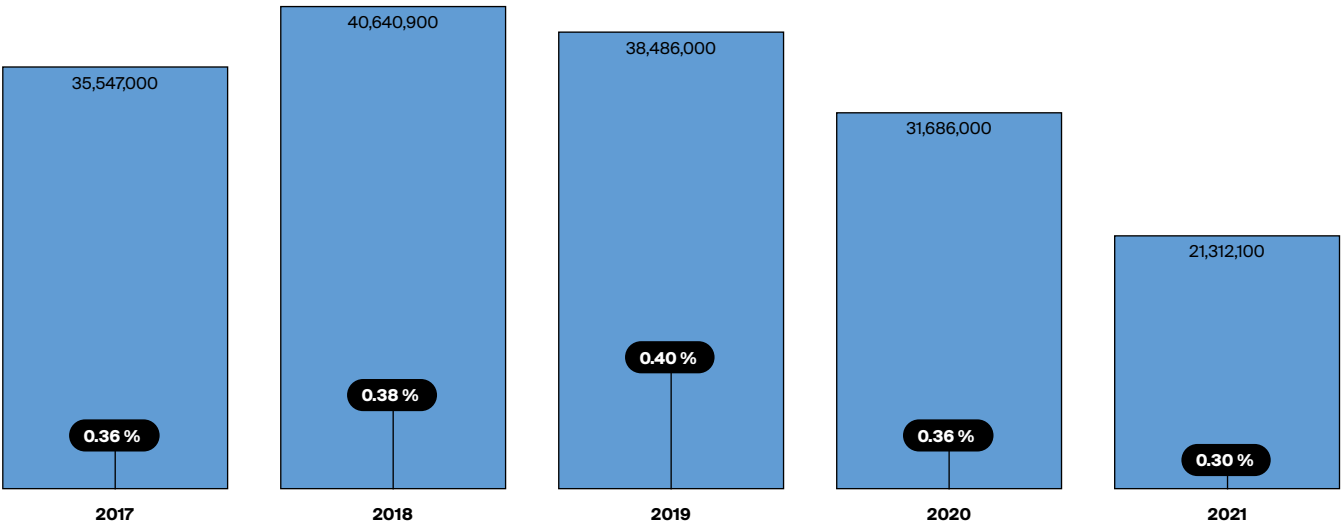
The participatory budget tool allows city residents to actively participate in the development of their district. In 2021, there were 6 City Districts introduced participatory budgeting, which led to an increase in both submitted and approved proposals. Overall, however, there was a decrease in allocated funds. However, due to the pandemic, the overall budget of the City Districts was also lower than in previous years.

- City Districts with a participatory budget: 2, 6, 7, 10, 11, 12, 14, 15, 20, 21, 22, Běchovice, Čakovice, Dolní Měcholupy, Ďáblice, Libuš, Suchdol, Štěrboholy, Zbraslav
- City Districts without a participatory budget



Financial means of participation

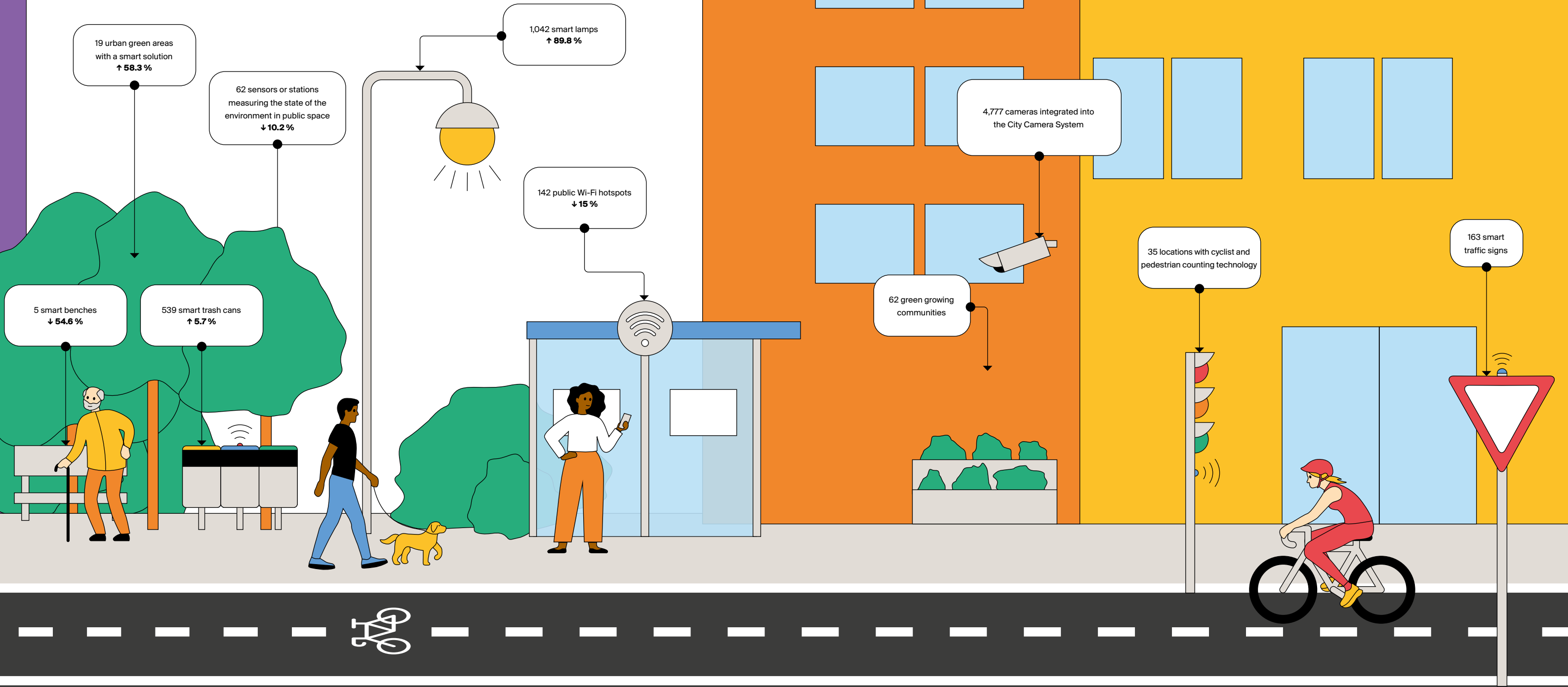
- CD funds allocated to the participatory budget
- RESULTING INDICATOR VALUE: Share of the CD budget allocated to participation in the total budget of the CD



Smart city

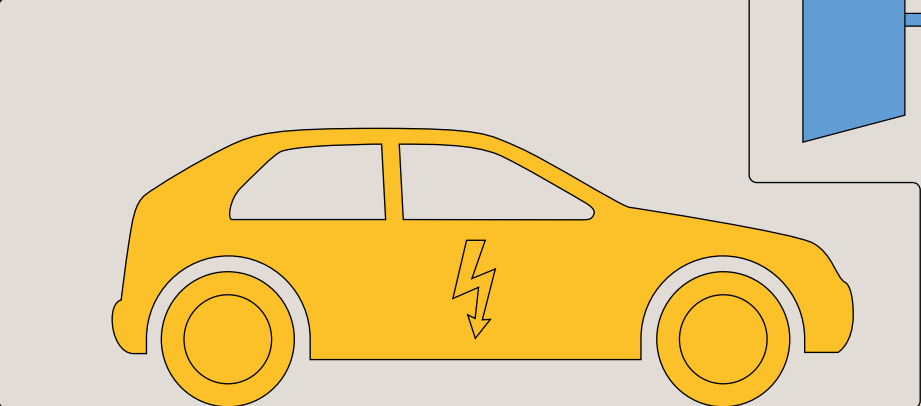
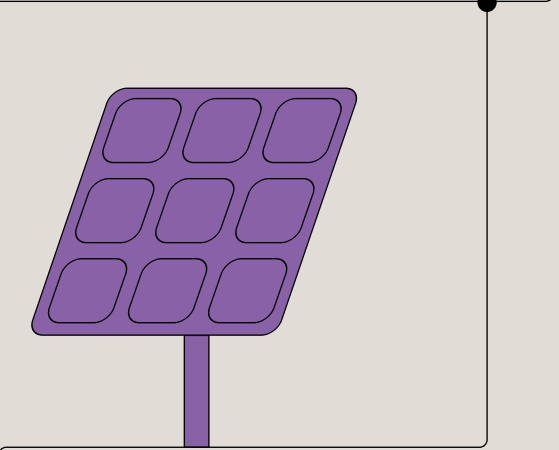
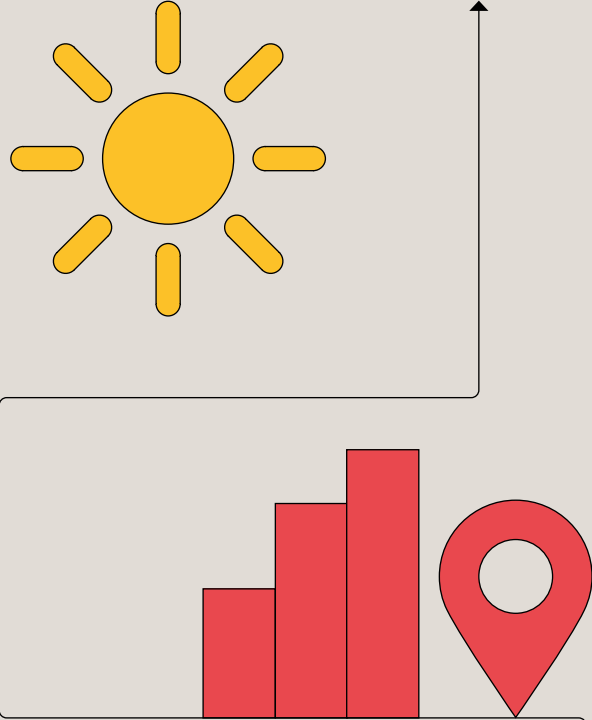
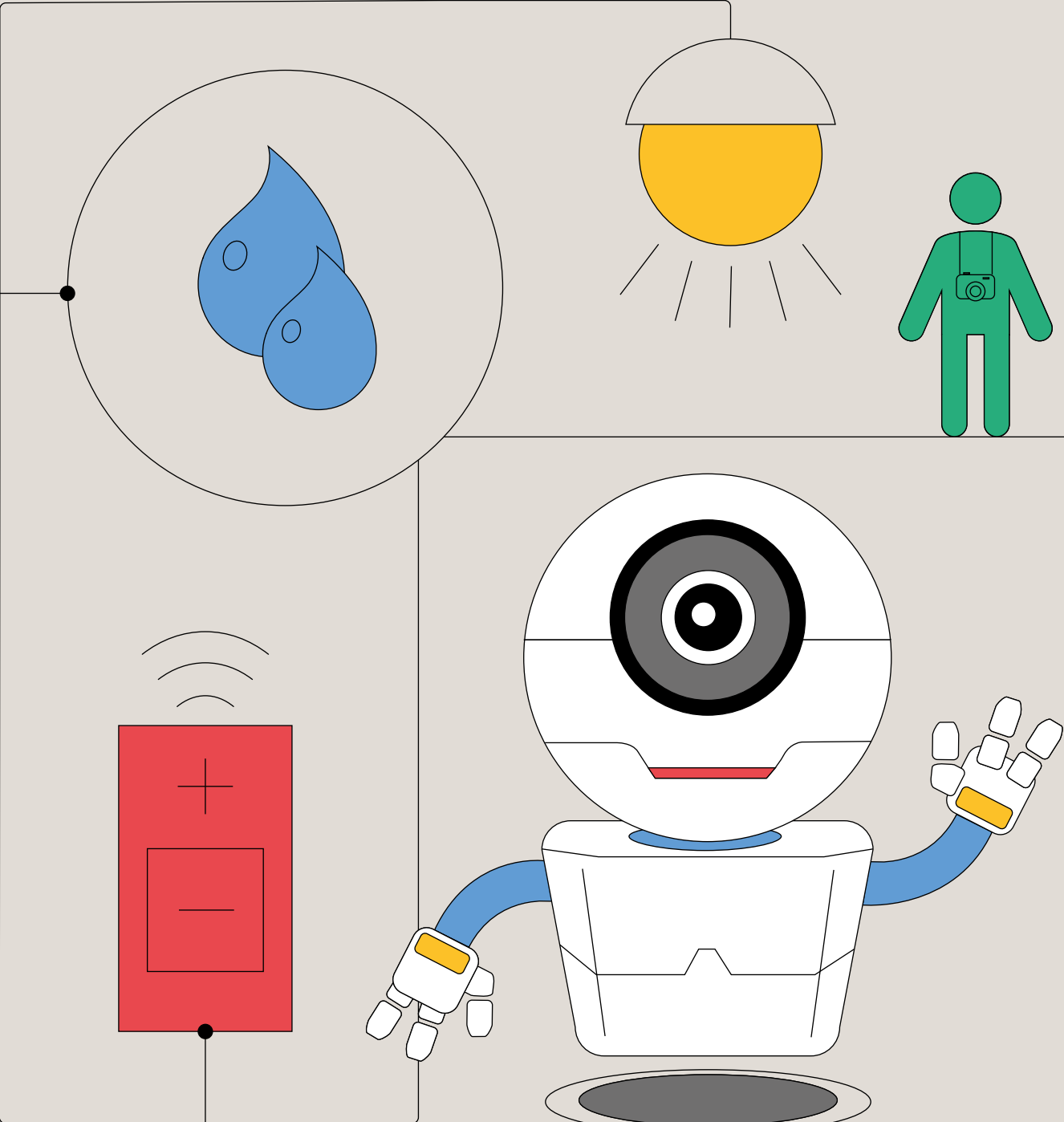
One of the components of building a smart city is the implementation of so-called smart elements (e.g. sensor systems or "improved" existing elements). These elements then help either people within the urban environment to have higher security, information, or new data, which are subsequently the basis for further development and effective management of the city. In the past year, Prague has seen an increase in these elements and has thus become a bit smarter. More and more green areas are controlled by a smart solution. These are mainly irrigation systems that take care of greenery according to actual needs. Their number increased by almost 60% year-on-year. Significant changes include the inclusion of pedestrian and cyclist counters in normal traffic. The data from

these sensors help the city monitor the trends of individual transport modes in different locations in the city. The active mobility database is also part of the Sustainable Mobility Plan of the Capital City of Prague. In 2021, 163 traffic signs equipped with IoT technology that will provide status information (location, position relative to the Earth's geomagnetic field or tilt) for permanent or portable traffic signs have been included in the pilot. The technology will help with the detection of changes in the state of the sign, which will be quickly resolved and thus help to eliminate any negative impact on the safety of road traffic in the city. The most significant increase was recorded in the past year for smart lighting. The number increased by 89% with the installation of 493 lamps.



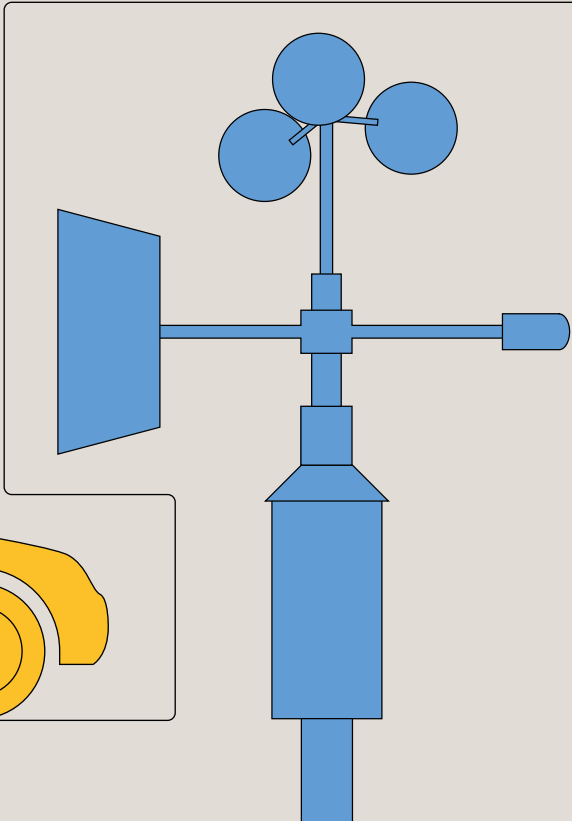
Golemio data platform

We know that data helps in making important decisions. And where else can they have a greater impact than in Prague, which affects the quality of life of hundreds of thousands of people?



The data platform of the capital city of Prague – Golemio – is a service which is provided by OICT, especially for the Prague City Hall, and also to Prague companies, organizations, and City Districts. The purpose of the Golemio Data Platform is to receive data from a wide range of sources (primarily via API), process it, and further, publish it for the needs of data users within Prague. In practice, these are various types of data and tasks, for example, data on transport (mass, motorized, bicycle, pedestrian), health care, public contracts of the Prague City Hall, and others, which are provided to users via dashboards in the Golemio BI service, data exports or API. The data is then made available to the general public through Open data on the Prague portal opendata.praha.eu, through the website [Golemio.cz](https://golemio.cz), and last but not least, also on the website [Pragozor.cz](https://pragozor.cz), which makes a range of interesting and useful information about Prague available to the public. Illustrated by a golem, Pragozor guides website visitors through various areas of urban life, from transport and the environment through housing, tourism, or security to health. Through the Golemio data platform, the team of experienced experts also provides technical consultations in all relevant areas, is able to advise on the creation of assignments and tender documentation, design metrics, and KPI, as well as provide analysis and other data-related services.

The Golemio Data Platform team is a fixed part of the Smart Prague projects, which processes, analyses and makes data from these projects available (including the most extensive Prague Smart City project, Smart Waste Collection). However, the sources and range of processed data are significantly wider. For example, as part of the covid-19 pandemic, current data from the ÚZIS (Institute of Health Information and Statistics) on the number of infected or vaccinated people was processed, including the creation of a simulation of the occupancy of hospital beds. At the same time, a unique Prague website covid.praha.eu was created, which provides an overview of free capacities for testing for covid-19 in one place in Prague and the Central Bohemian Region. In close cooperation with ROPID, which operates the public transport system in Prague and the Central Bohemia region, a unique system was created that aggregates data on the current location of public transport vehicles from all operators, whether they are trams, buses, trains or ferries, in one place. This data is made available to the general public through the mapa.pid.cz website and in the form of an API for use in any application. Other interesting projects related to the processing of traffic flow data from WAZE mobile navigation, analyses of the capacity utilization of P+R parking lots from TSK (Technical administration of communications), analysis of data on housing in Prague using data from Seznam's Sreality server and Airbnb server, and others.

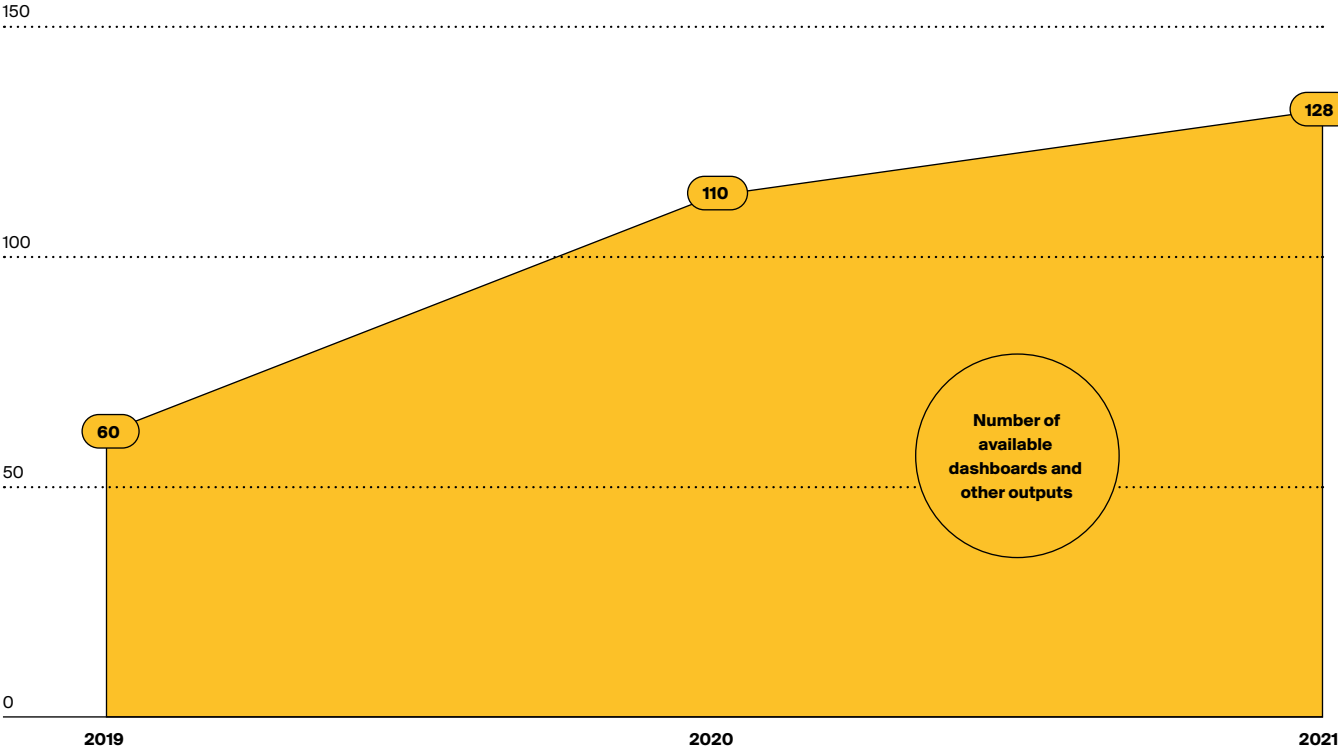


Golemio BI Web Application

The Golemio BI web application is the primary interface for making data outputs available for clients of the Golemio Data Platform, i.e. primarily for the Prague City Hall, city organizations, and city companies. The number of users is thus one of the key indicators because every single output that is included in Golemio BI has its own specific users for whom it was prepared. Over the course

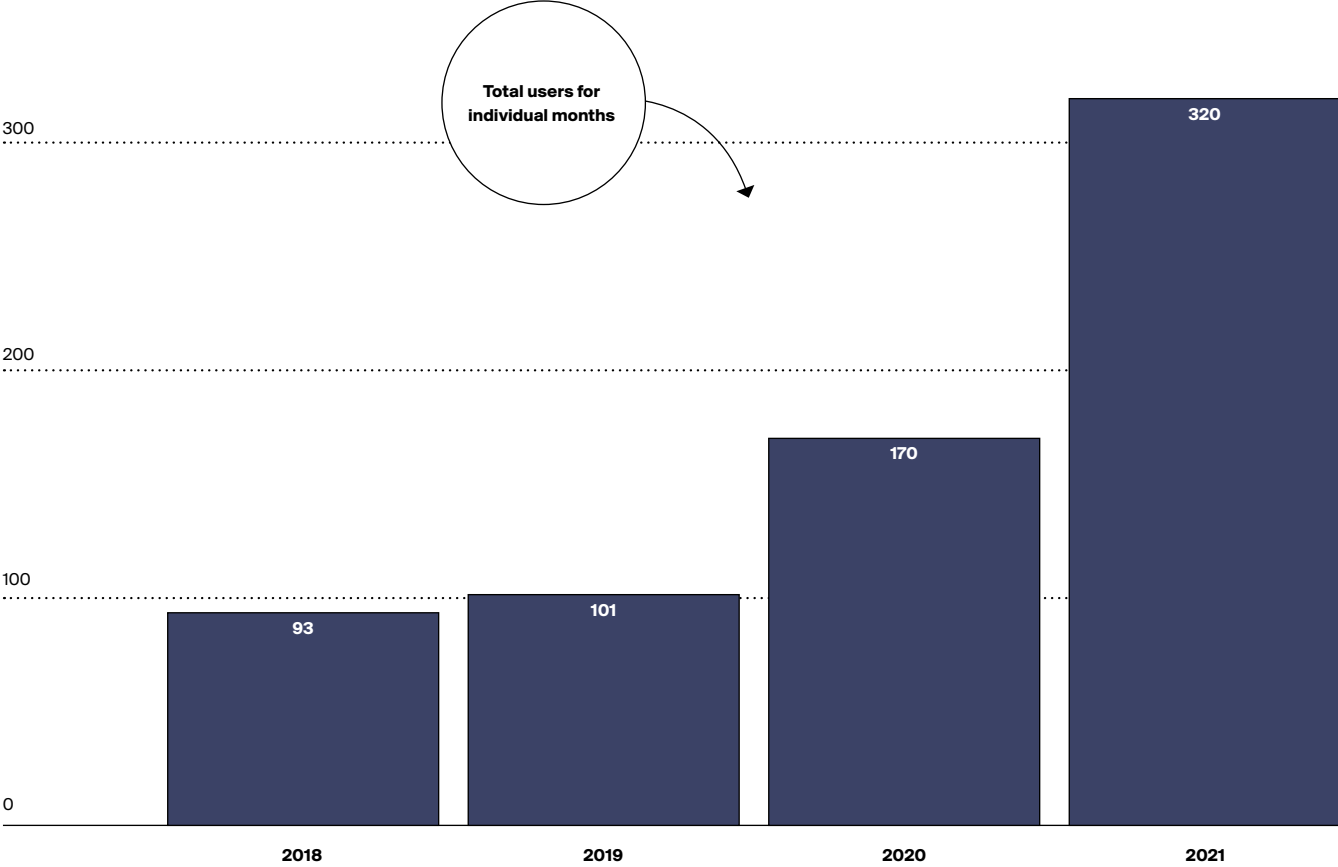
of several years of existence, Golemio BI has become a tool routinely used across the city: within the Prague City Hall, it is used both by political representation and by officials across many departments, as well as by a wide range of city organizations and companies, for example, ROPID, to access data from several projects, TSK (Technical administration of communications),

social service operators and many others. Through the Golemio BI web application, users are provided with access to data outputs, primarily to dashboards, i.e. de facto to simple applications providing a view of the analyzed data in numerical or graphic form, but also to map applications displaying selected data and to export modules for subsequent data analysis, for example in Excel.



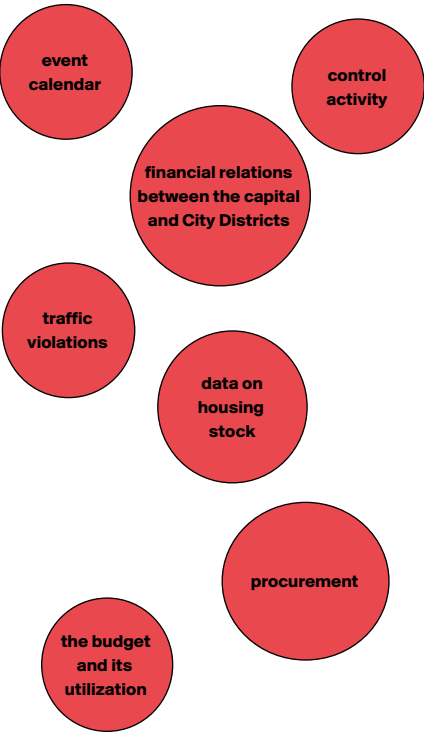
Golemio Open API

Some of the data sources are also available in the form of a REST API via the Golemio portal. The public API launched in the Fall 2019.



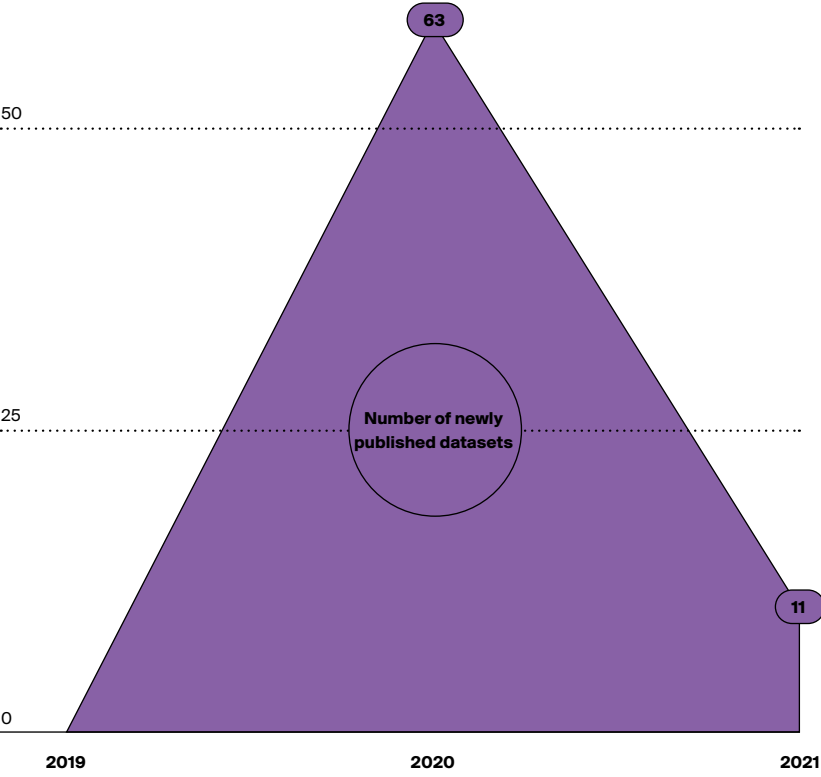
Opening data on the Prague City Hall

The Golemio data platform provides, based on a contractual relationship, the role of data opening coordinator for the Prague City Hall. In 2021, the Portal of the capital city of Prague managed to publish a total of 11 datasets from 7 areas:



In 2021, the Golemio data platform also participated in the creation and processing of the Prague City Hall Open Data Strategy for the period 2021-2025, setting out the strategic framework and goals for improving data quality and setting up

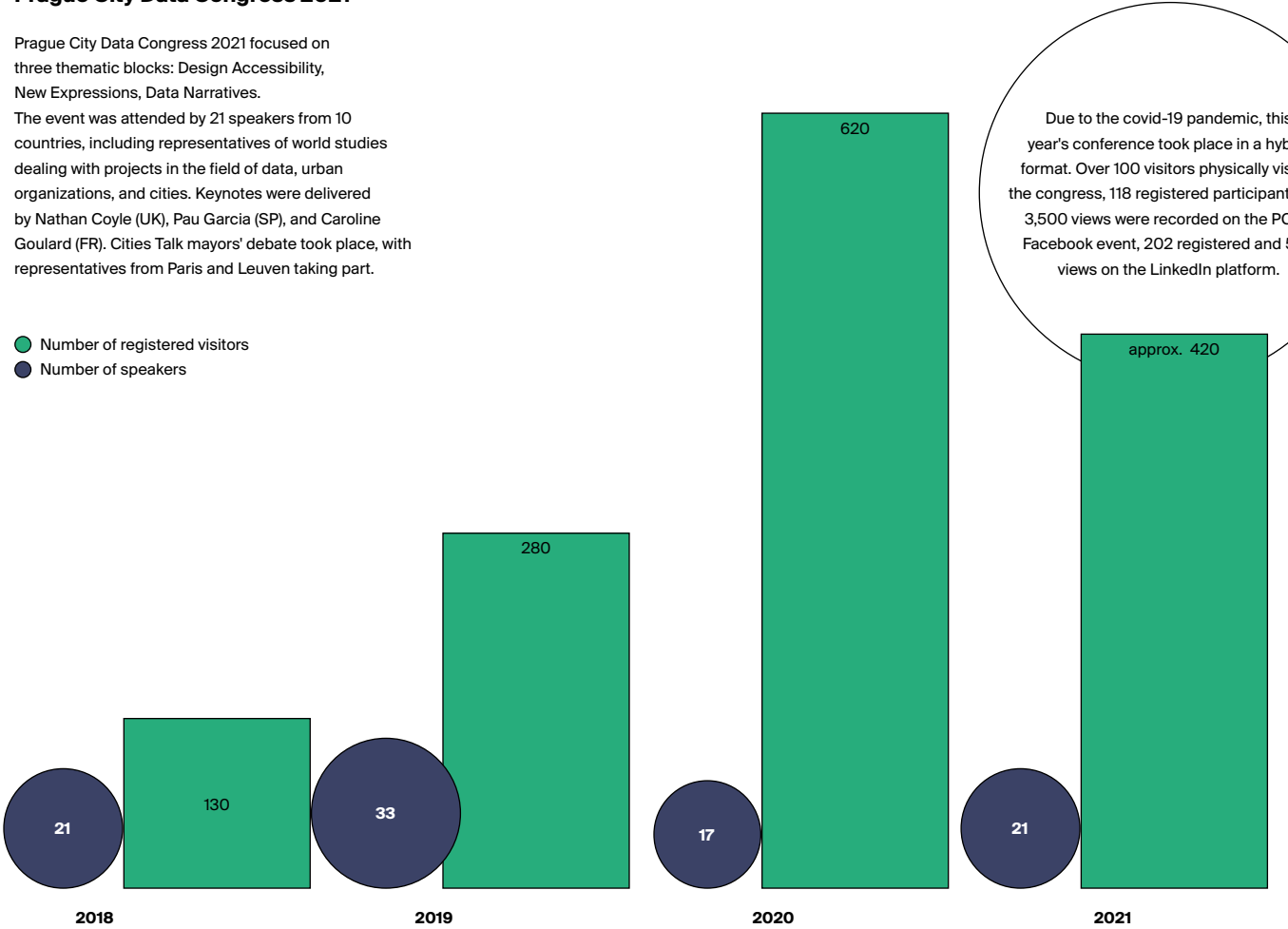
the right processes and a functional environment for opening data. In 2022, the Strategy will be presented to the Prague City Council for approval.



Prague City Data Congress 2021

Prague City Data Congress 2021 focused on three thematic blocks: Design Accessibility, New Expressions, Data Narratives. The event was attended by 21 speakers from 10 countries, including representatives of world studies dealing with projects in the field of data, urban organizations, and cities. Keynotes were delivered by Nathan Coyle (UK), Pau Garcia (SP), and Caroline Goulard (FR). Cities Talk mayors' debate took place, with representatives from Paris and Leuven taking part.

- Number of registered visitors
- Number of speakers

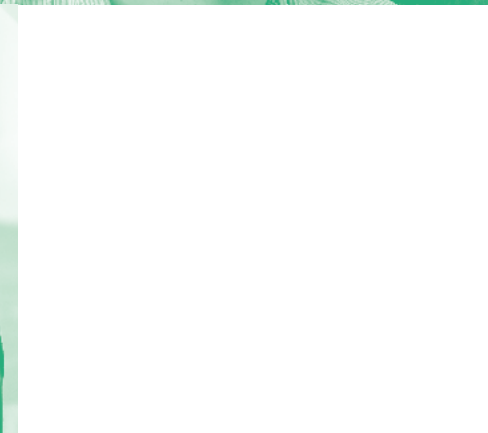


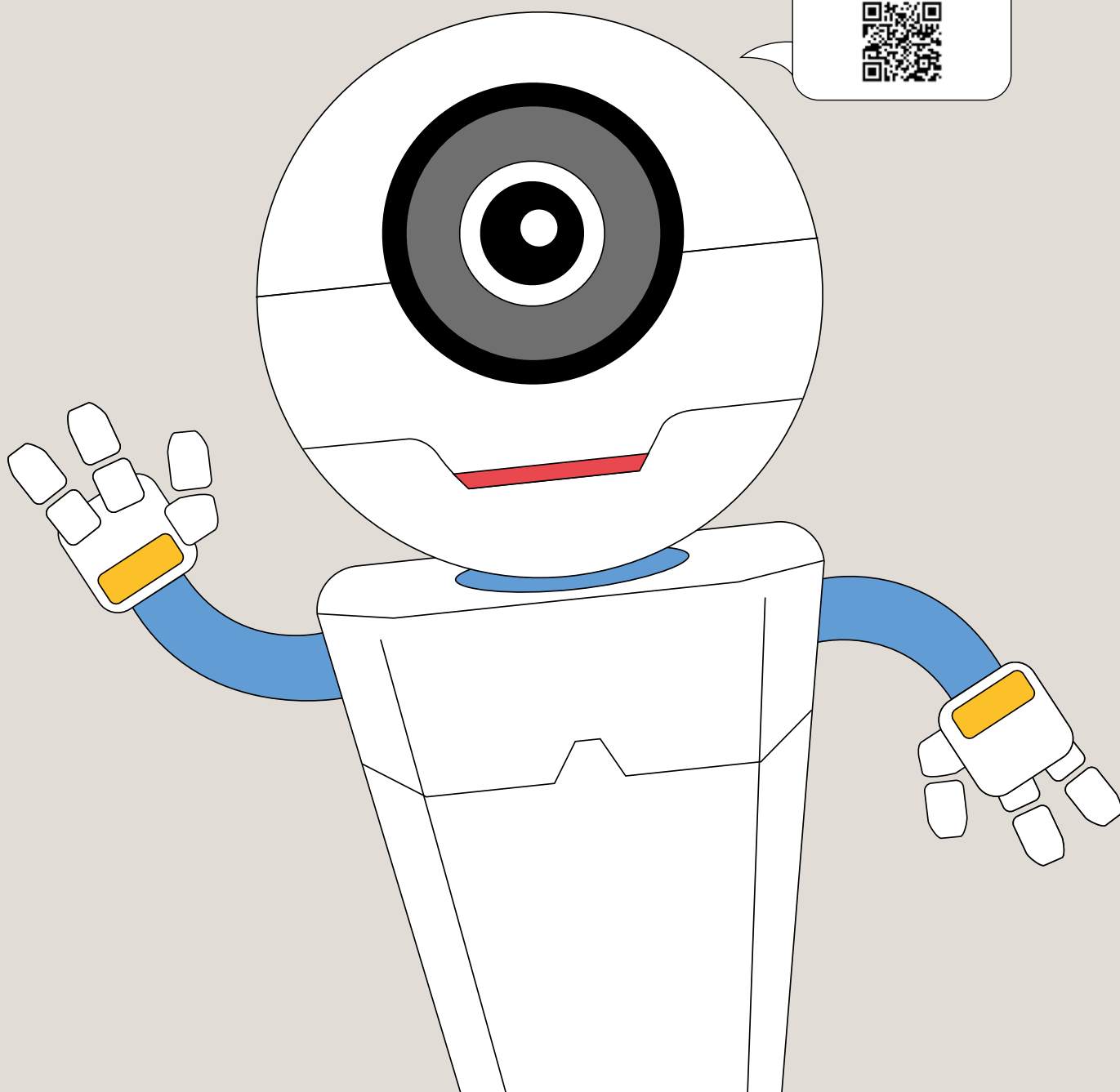
About the Smart Prague OICT team

The Smart Prague Project Office is a team of people who care about what the Prague of the future will look like. It consists of both internal and external specialists and experts, especially in the fields of project management, data analysis and innovation in the city. Smart Prague projects help to respond appropriately to the challenges of climate change, the transition to new trends in mobility, the ever-increasing demands on the quality of housing and life in the metropolis or addressing the cost-effectiveness of city buildings and operations.

In the six years of its existence, Smart Prague has been approved by the Prague City Council's Commission for the Development of the Smart Cities Concept in the capital city of Prague. Forty-seven project plans have been approved in the past six years and nearly thirty projects are currently in various stages of implementation and cooperation on international projects has been initiated. Since the beginning, the office has monitored the implementation of the Smart Prague 2030 Concept and carefully recorded year-on-year changes using the Smart Prague Index publication, organized a large number of working groups and various meetings with representatives of municipal organizations, cities, and municipalities both in the Czech Republic and abroad.

The fifth publication of the Smart Prague Index shows that the two years marked by the covid-19 epidemic have produced different effects for different indicators. From stagnation to significant growth. In particular, the Attractive Tourism area is marked by a slowdown in growth or even a halt in development. Significant changes are taking place in the Future Mobility and Data area, thanks to the Prague data platform - Golemio. The year 2022 is marked by projects supporting flexible modes of transport, at the same time there is a significant shift to alternative fuels. Last but not least, investments in projects focusing not only on the efficiency of buildings or the renewal of public lighting but also on data-driven decision-making have increased significantly.





List of abbreviations
used and all
indicators monitored can
be found at
www.smartprague.eu



