POP1

POPULATION

Number	POP1
Indicator name	Population
Area	P
Indicator definition	Total number of permanent residents in the city/city district/municipality
Indicator unit	obyv.
Key words	Residents
Reason for tracking and usability	The indicator is monitored for the simple comparison of cities/city districts/municipalities based on the population. Other partial specific indicators are used for recalculation of the population.
Completeness, representativeness, validity	The population monitored by the Bureau of Statistics or on the basis of population records is not perfectly representative, because it does not take into account migration and temporary residence of the people in the city/city district/municipality. The indicator can be refined by other methods such as partial investigation, data analysis of mobile operators etc.
Description of data processing	The specific number is taken from the source.
Data source	Bureau of Statistics, own data
Tracking frequency	In urban and municipal statistics, it should be monitored annually. For KLIMASKEN, the periodicity is assumed to be 2–3 years.
Urban influence	City/city district/municipal policy may affect the population, but this factor is not foreseen in the context of KLIMASKEN.
Presentation method	Tabular value
Responsibility	Processor KLIMASKEN, city/city district/municipality

POP2

TOTAL AREA

Number	POP2
Indicator name	Total area
Area	P
Indicator definition	Total area of the administrative territory of the city/city district/municipality
Indicator unit	ha
Key words	Total area, territory
Reason for tracking and usability	The indicator is monitored for the simple comparison of cities/city districts/municipalities according to the size of the population. Other partial specific indicators are recalculated to the area.
Completeness, representativeness, validity	The area is precisely determined by the boundaries of cadastral municipalities. There may be some minor changes in the tracking that will be reflected in the statistics later. It is suitable to compare multiple geographic / territory data sources.
Description of data processing	The specific value is taken from the source.
Data source	Bureau of Statistics, own data
Tracking frequency	In statistics of the city/city district/municipality, it should be monitored annually. For KLIMASKEN, the periodicity is assumed to be 2–3 years.
Urban influence	City/city district/municipal policy may affect the population, but this factor is not foreseen in the context of KLIMASKEN.
Presentation method	Tabular value
Responsibility	Processor KLIMASKEN, city/city district/municipality

POP3

POPULATION DENSITY

Number	POP3
Indicator name	Population density
Area	P
Indicator definition	Number of permanent residents per unit area of the city/city district/minucipality (as of December 31 of the previous calendar year)
Indicator unit	pers./ha
Key words	Density, population
Reason for tracking and usability	Population density is the ratio of population to area. Different settlements can be compared according to population density. The population density itself is also partly an indicator of sensitivity.
Completeness, representativeness, validity	The representativeness and validity of the ratio indicator depends on both parts of the ratio. Population data in some parts of the city/city district/minucipality may be distorted, or the number and hence the density changes dynamically in daily / seasonal rhythm.
Description of data processing	The population shall be divided by the total administrative territory. If the already calculated value is included in the source, it shall also be verified by calculation.
Data source	Bureau of Statistics, own data
Tracking frequency	In urban and municipal statistics, it should be monitored annually. For KLIMASKEN, the periodicity is assumed to be 2-3 years.
Urban influence	City/municipal policy may affect the population, but this factor is not foreseen in the context of KLIMASKEN.
Presentation method	Tabular value
Responsibility	Processor KLIMASKEN, city/city district/municipality

POP4

AGRICULTURE LAND

Number	POP4
Indicator name	Agriculture land
Area	P
Indicator definition	Proportion of agricultural land in the total area of the administrative territory of the city/city district/municipality
Indicator unit	%
Key words	Agriculture, land, territory
Reason for tracking and usability	The proportion of agricultural land has an impact on the ecological stability of the area and based on it is possible to compare cities. The indicator is important for monitoring the development (decreasement or increasement).
Completeness, representativeness, validity	The indicator does not indicate the quality (creditworthiness) of agricultural land and the way it is managed and used. Therefore, the indicator is at least combined with the monitoring of cultivated agriculture land.
Description of data processing	The total land area of the agriculture land shall be divided by the total area of the administrative territory. If the already calculated value is included in the source, it shall also be verified by calculation.
Data source	Bureau of Statistics, own data
Tracking frequency	In urban and municipal statistics, it should be monitored annually. For KLIMASKEN, the periodicity is assumed to be 2-3 years.
Urban influence	The city/city district/municipality can influence the area of agricultural land through spatial planning.
Presentation method	Tabular value
Responsibility	Processor KLIMASKEN, city/city district/municipality

POP5

FOREST LAND

Number	POP5
Indicator name	Forest land
Area	P
Indicator definition	Proportion of forest land in the total area of the administrative territory of the city/city district/municipality
Indicator unit	%
Key words	Forestry, forest, territory
Reason for tracking and usability	The proportion of forest land has an impact on the ecological stability of the territory and can based on it, cities can be compared. The forest provides important ecosystem service. The indicator is important for monitoring the development (decreasement or increasement).
Completeness, representativeness, validity	The indicator does not indicate the composition and health of the forest vegetation, nor the composition of the forest according to the purpose of the forest.
Description of data processing	The area of the sum of the land plots intended for forest function shall be divided by the total area of the administrative territory. If the already calculated value is included in the source, it shall also be verified by calculation.
Data source	Bureau of Statistics, own data
Tracking frequency	In urban and municipal statistics, it should be monitored annually. For KLIMASKEN, the periodicity is assumed to be 2-3 years.
Urban influence	The area of land serving as a forest can be influenced by the city/city district/municipality through spatial planning.
Presentation method	Tabular value
Responsibility	Processor KLIMASKEN, city/city district/municipality

POP6

WATER SURFACE

Number	POP6
Indicator name	Water surface
Area	P
Indicator definition	Proportion of water surface in the total area of the administrative territory of the city/city district/municipality
Indicator unit	%
Key words	water, water body, territory
Reason for tracking and usability	The proportion of water bodies has an impact on the ecological stability of the area and based on it, cities/city districts/municipalities can be compared. Water bodies provide important ecosystem services and the maintenance of water within the city is important for the local climate. The indicator is important for monitoring the development (decreasement or increasement).
Completeness, representativeness, validity	The indicator does not the character and quality of water bodies. Nor can it be deduced whether there is one large water area or a number of small areas within the city/city district/municipality. The function of water bodies cannot be read from the simple area. . All these parameters should be monitored separately for example within the thematic chapters of local strategies, in addition to this headline indicator.
Description of data processing	The total land area of water bodies shall be divided by the total area of the administrative territory. If the already calculated value is included in the source, it shall also be verified by calculation.
Data source	Bureau of Statistics, own data
Tracking frequency	In urban and municipal statistics, it should be monitored annually. For KLIMASKEN, the periodicity is assumed to be 2-3 years.
Urban influence	The area of water bodies can be influenced by the city's management/management of city district/municipality and creation of new areas.
Presentation method	Tabular value

WATER SURFACE

Responsibility	Processor KLIMASKEN, city/city district/municipality

POP7

BUILT AREAS

Number	POP7
Indicator name	Built areas
Area	P
Indicator definition	Proportion of built-up areas from the total area of the administrative territory of the city/city district/municipality.
Indicator unit	%
Key words	development, built-up area, territory
Reason for tracking and usability	The proportion of the built-up area has an influence on the ecological stability of the area and it can be used to compare cities/city districts/municipalities. The share of the built-up area defines the possibilities of the city/city district/minicipality in adaptation to the impacts of the climate changes. The indicator is important for monitoring the development (decreasement or increasement).
Completeness, representativeness, validity	The indicator does not indicate the character, type, composition, age and other parameters of the built-up area. It can be used for comparison over time and recalculated to other specific indicators. It is advisable to monitor more detailed indicators additionally.
Description of data processing	The total area of built-up areas and courtyards shall be divided by the total area of the administrative territory. If the already calculated value is included in the source, it shall also be verified by calculation.
Data source	Bureau of Statistics, own data
Tracking frequency	In urban and municipal statistics, it should be monitored annually. For KLIMASKEN, the periodicity is assumed to be 2-3 years.
Urban influence	The city/city district/municipality can influence the built-up area through spatial planning.
Presentation method	Tabular value
Responsibility	Processor KLIMASKEN, city/city district/municipality

POP8

OTHER AREAS

Number	POP8
Indicator name	Other areas
Area	P
Indicator definition	Proportion of other surfaces of the total area of the administrative territory of the city/city district/municipality.
Indicator unit	%
Key words	other surfaces, territories
Reason for tracking and usability	The proportion of other areas is a recalculation in the structure of areas of the administrative territory and has an impact on ecological stability.
Completeness, representativeness, validity	Other surfaces are those areas that are not defined separately by the relevant land registry / land type legislation. It is a heterogeneous set of plots and the indicator is thus a calculation to 100% land use. Legislation may vary from country to country, so this group may include different types of land in different countries.
Description of data processing	The total area of built-up areas and courtyards shall be divided by the total area of the administrative territory. If the already calculated value is included in the source, it shall also be verified by calculation.
Data source	Bureau of Statistics, own data
Tracking frequency	In urban and municipal statistics, it should be monitored annually. For KLIMASKEN, the periodicity is assumed to be 2-3 years.
Urban influence	The city/city district/municipality can influence the area of other surfaces through spatial planning.
Presentation method	Tabular value
Responsibility	Processor KLIMASKEN, city/city district/municipality

POP9

PROTECTED AREAS

Number	POP9
Indicator name	Protected areas
Area	P
Indicator definition	Proportion of the area of areas with special territorial protection of nature (national parks, protected landscape areas, national nature reserve, national natural monument etc.) from the total area of the administrative territory of the city/city district/municipality.
Indicator unit	%
Key words	protected areas, nature protection, areas
Reason for tracking and usability	The size of protected areas (PA) can be a parameter for comparing individual cities, but also an indicator of sensitivity. The area of all types of PA is a measure of biodiversity. PAs provide significant ecosystem services.
Completeness, representativeness, validity	The indicator does not assess the type, nature, quality and type of protection in individual PAs. It is not clear whether there is a part of a large-scale protected area or more small-scale areas within the city. Biodiversity and conservation issues are not addressed either. These indicators need to be monitored additionally.
Description of data processing	It is best done by spatial analysis in GIS. Sum of area of all types of PAs in the city/city district/municipality territory, incl. those which affect only part of the territory (then the part is included) shall be divided by the total area of the administrative territory. If the already calculated value is included in the source, it shall also be verified by calculation.
Data source	Official statistics, GIS.
Tracking frequency	In urban and municipal statistics, it should be monitored annually. For KLIMASKEN, the periodicity is assumed to be 2-3 years.
Urban influence	The size of the PAs can be influenced by the city/city district/municipality depending on the competencies assigned to it in the area of nature and landscape protection (NaLP) and possibly by another initiative in the protection of nature and landscape.

POP9

PROTECTED AREAS

Presentation method	Tabular value
Responsibility	Processor KLIMASKEN, city/city district/municipality

POP10

PROPORTION OF INHABITANTS LIVING IN APARTMENT BUILDINGS

Number	POP10
Indicator name	Proportion of inhabitants living in apartment buildings
Area	P
Indicator definition	Proportion of population living in apartment buildings from the total population of the city/city district/municipality
Indicator unit	%
Key words	housing, apartment buildings
Reason for tracking and usability	The housing structure is an important sensitivity factor and is important for the size of the carbon footprint of the city/city district/municipality.
Completeness, representativeness, validity	The value of the indicator should come from a single source, which is possibly corrected by additional sources. Like the total population, this component may show a marked difference in statistics and reality. In addition, it can dynamically change in daily, weekly and seasonal rhythms.
Description of data processing	The number of inhabitants living in apartment buildings is divided by the number of all inhabitants of the city/city district/municipality.
Data source	Bureau of Statistics, own data
Tracking frequency	In urban and municipal statistics, it should be monitored annually. For KLIMASKEN, the periodicity is assumed to be 2–3 years.
Urban influence	The share of the population can be influenced by the own housing policy of the city/city district/municipality, or indirectly by another initiative affecting the character of development and spatial planning.
Presentation method	Tabular value
Responsibility	Processor KLIMASKEN, city/city district/municipality

POP11

PROPORTION OF INHABITANTS LIVING IN FAMILY HOUSES

Number	POP11
Indicator name	Proportion of inhabitants living in family houses
Area	P
Indicator definition	Proportion of the population living in family houses from the total population of the city/city district/municipality
Indicator unit	%
Key words	housing, family houses
Reason for tracking and usability	The housing structure is an important sensitivity factor and is important for the size of the carbon footprint of teh city/city district/municipality.
Completeness, representativeness, validity	The value of the indicator should come from a single source, which is possibly corrected by additional sources. Like the total population, this component may show a marked difference in statistics and reality. In addition, it can dynamically change in daily, weekly and seasonal rhythms.
Description of data processing	The number of inhabitants living in family houses is divided by the number of all inhabitants of the city/city district/municipality.
Data source	Official statistics.
Tracking frequency	In urban and municipal statistics, it should be monitored annually. For KLIMASKEN, the periodicity is assumed to be 2-3 years.
Urban influence	The share of the population can be influenced by the own housing policy of the city/city district/municipality, or indirectly by another initiative affecting the character of development and spatial planning.
Presentation method	Tabular value
Responsibility	Processor KLIMASKEN, city/city district/municipality

POP12

PROPORTION OF INHABITANTS CONNECTED TO THE WATER SUPPLY

Number	POP12
Indicator name	Proportion of inhabitants connected to the water supply
Area	P
Indicator definition	Proportion of population connected to public water supply from the total population of the city/city district/municipality
Indicator unit	%
Key words	water, water supply
Reason for tracking and usability	The proportion of inhabitants connected to the water supply system is an important factor for both sensitivity and adaptive capacity. It is one of the basic indicators of urban and municipal statistics and contributes to the image of the quality of life in the city/city district/municipality.
Completeness, representativeness, validity	Data coming from urban and municipal statistics should be representative. It is appropriate to verify it with data from the public water supply operator.
Description of data processing	The number of inhabitants living in households connected to the water main is divided by the number of all inhabitants of the city/city district/municipality.
Data source	Water supply operator
Tracking frequency	For KLIMASKEN, the periodicity is assumed to be 2–3 years.
Urban influence	The city/city district/municipality can influence the proportion by building public water supply and connections to the apartment buildings they own.
Presentation method	Tabular value
Responsibility	Processor KLIMASKEN, city/city district/municipality

POP13

CONNECTION TO THE PUBLIC SEWAGE SYSTEM

Number	POP13
Indicator name	Connection to the public sewage system
Area	P
Indicator definition	The proportion of the population connected to the public sewerage system with the WWTP (wastewater treatment plant) from the total population of the city/city district/municipality
Indicator unit	%
Key words	sewerage, WWTP
Reason for tracking and usability	The proportion of the population connected to the sewer system is an important factor for both sensitivity and adaptive capacity. It is one of the basic indicators of urban and municipal statistics and contributes to the image of the quality of life in the city/city district/municipality.
Completeness, representativeness, validity	Data coming from urban and municipal statistics should be representative. It is advisable to verify it with data from the public sewerage system.
Description of data processing	The number of inhabitants living in households connected to the sewer system is divided by the number of all inhabitants of the city/city district/municipality.
Data source	statistical office, sewer operator
Tracking frequency	For KLIMASKEN, the periodicity is assumed to be 2–3 years.
Urban influence	The city/city district/municipality can influence the share by building public sewerage and connections to apartment buildings they own.
Presentation method	Tabular value
Responsibility	Processor KLIMASKEN, city/city district/municipality

POP14

EXPENDITURES OF THE CITY

Number	POP14
Indicator name	Expenditures of the city
Area	P
Indicator definition	City budget in the expenditure part of the calendar year per capita
Indicator unit	EUR/obyv.
Key words	finance, budget, expenses
Reason for tracking and usability	The indicator allows to compare cities / to group them according to the volume of funds they manage. Climate protection expenditure and adaptation to climate change are also converted into total expenditure.
Completeness, representativeness, validity	This is an exact and complete figure.
Description of data processing	The data is taken from the budget of the city/city district/municipality.
Data source	Ministry of Finance, own data (municipal budget
Tracking frequency	For KLIMASKEN, the periodicity is assumed to be 2-3 years.
Urban influence	The budget of the city/city district/municipality is approved by the local authority.
Presentation method	Tabular value
Responsibility	Processor KLIMASKEN, city, city district, municipality

EXP1

THE DIFFERENCE BETWEEN THE AVERAGE ANNUAL AIR TEMPERATURE FOR THE LAST FIVE YEARS AND THE LONG-TERM AVERAGE

Number	EXP1
Indicator name	The difference between the average annual air temperature for the last five years and the long-term average
Area	E
Indicator definition	The indicator assesses the difference between the average annual air temperature for the last five years and the long-term average. The average annual air temperature recorded at the nearest weather station (professional or amateur) for the last five years. The long-term average annual air temperature is set for the period 1981–2010.
Indicator unit	°C
Key words	Temperature, climate, average temperature
Reason for tracking and usability	The indicator responds to the negative impact of expected climate change on elevated temperature. It is a key indicator describing climate change, average temperature. The indicator provides information on how much the average air temperature has changed from the long-term normal. The city and other municipalities cannot influence the value of the indicator too much.
Completeness, representativeness, validity	The indicator is representative of the area. It can be combined with additional indicators (average temperature in January or average temperature in July), but this is not necessary. Data for the creation of the indicator are standardized and monitored through the official network of weather stations. They adequately represent the entire indicator.
Description of data processing	The long-term average temperature is subtracted from the average annual air temperature for the last five years. The resulting difference value is calculated.
Data source	The data source is data from long-term functioning meteorological stations of official institutions.
Tracking frequency	Annual data are processed retroactively by official hydrometeorological institutions.
Urban influence	The indicator is not influenced by the city.

EXP1

THE DIFFERENCE BETWEEN THE AVERAGE ANNUAL AIR TEMPERATURE FOR THE LAST FIVE YEARS AND THE LONG-TERM AVERAGE

Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Processor KLIMASKEN, city, city district, municipality

EXP2

THE DIFFERENCE IN THE NUMBER OF TROPICAL DAYS FOR THE LAST FIVE YEARS COMPARED TO THE LONG-TERM AVERAGE

Number	EXP2
Indicator name	The difference in the number of tropical days for the last five years compared to the long-term average
Area	E
Indicator definition	The indicator assesses the difference between the number of tropical days for the last five years and the long-term average. A tropical day occurs when the maximum air temperature exceeds 30 °C. Measurements at the nearest weather station (professional or amateur) for the last five years are considered. The long-term average of the number of tropical days is set for the period 1981–2010. The long-term average value of tropical days is often given in the interval (e.g.: 11 °C – 15 °C), so we calculate the mean value of this interval in the calculation (13.5 °C in the example).
Indicator unit	day (days)
Key words	Temperature, climate, tropical day
Reason for tracking and usability	The indicator responds to the negative impact of expected climate change on elevated temperature. The number of tropical days (the day when the maximum temperature exceeds 30 °C) is a key indicator of the warming climate and makes it possible to assess regional temperature differences, especially in summer. Higher temperatures can also affect the health of the population, so it is necessary to monitor this indicator. A negative consequence of the temperature load is the health problems that may be faced by the chronically ill, who are less tolerant of high temperatures.

EXP2

THE DIFFERENCE IN THE NUMBER OF TROPICAL DAYS FOR THE LAST FIVE YEARS COMPARED TO THE LONG-TERM AVERAGE

Completeness, representativeness, validity	The indicator is representative of the area. Nevertheless, in the case of a series of settlements, the indicator may not include the specifics of the city/city districts/municipalities, because in different parts and due to local factors (thermal urban island, flow, absence of greenery) the maximum temperature may be different. It is therefore appropriate to create a temperature map for a detailed evaluation of the city/ city district/municipality in terms of temperature interpretation. The data for the creation of the indicator are standardized and monitored through the official network of meteorological stations. They sufficiently represent the whole indicator. The indicator results may not correspond to the temperature distribution within the city/city district/municipality, as the data is based on a station located in one location and may not cover the local specificities of the whole city/city district/minucipality.
Description of data processing	The number of tropical days recorded for the long-term average is subtracted from the number of tropical days for the last five years.
Data source	The data source is data from long-term functioning meteorological stations of official institutions.
Tracking frequency	Yearly
Urban influence	The indicator is not influenced by the city/city district/municipality.
Presentation method	The results will be presented in a single Klimasken framework on a five-step scale according to specified intervals
Responsibility	Klimasken processor, city/city district/municipality

EXP3

DIFFERENCE IN THE NUMBER OF TROPICAL NIGHTS IN THE LAST FIVE YEARS FROM THE LONG-TERM AVERAGE

Number	EXP3
Indicator name	Difference in the number of tropical nights in the last five years from the long-term average
Area	E
Indicator definition	The indicator assesses the difference between the average number of tropical nights in the last five years and the long-term average. Tropical night occurs when the minimum night air temperature has not fallen below 20 °C. Measurements at the nearest weather station (professional or amateur) are considered. The long-term average of the number of tropical nights is set for the period 1981–2010. The long-term average value of tropical nights is often given in the interval (e.g.: 11 °C – 15° C), so we calculate the mean value of this interval (in this example, 13.5° C).
Indicator unit	day (days)
Key words	Temperature, climate, tropical night
Reason for tracking and usability	The number of tropical nights (the day when the minimum daily temperature does not fall below 25 °C) is a key indicator of the warming climate and allows the assessment of regional temperature differences, especially in summer. Higher temperatures can also affect the health of the population; therefore, it is necessary to monitor this indicator. A negative consequence of the temperature loads are the health problems that may affect those chronically ill, who are less tolerant of high temperatures.

EXP3

DIFFERENCE IN THE NUMBER OF TROPICAL NIGHTS IN THE LAST FIVE YEARS FROM THE LONG-TERM AVERAGE

Completeness, representativeness, validity	The indicator responds to the negative impact of expected climate change on elevated temperature. The indicator is representative of the area. Nevertheless, in the case of a series of settlements, the indicator may not include the specifics of the city/city districts/municipalities, because in different parts and due to local factors (thermal urban island, flow, absence of greenery) the maximum temperature may be different. It is therefore appropriate to create a temperature map for a detailed evaluation of the city/ city district/municipality in terms of temperature interpretation. The data for the creation of the indicator are standardized and monitored through the official network of meteorological stations. They sufficiently represent the whole indicator. The indicator results may not correspond to the temperature distribution within the city/city district/municipality, as the data is based on a station located in one location and may not cover the local specificities of the whole city/city district/municipality.
Description of data processing	The avaregae number of tropical nights recorded for the long-term average is subtracted from the number of tropical nights in the last five years.
Data source	The data source is data from long-term functioning meteorological stations of official institutions.
Tracking frequency	Yearly
Urban influence	The indicator is not influenced by the city/city district/municipality.
Presentation method	The results will be presented in a single Klimasken framework on a five-step scale according to specified intervals:
Responsibility	Klimasken processor, city/city district/municipality

EXP4

DIFFERENCE IN THE HIGHEST NUMBER OF CONSECUTIVE CALENDAR DAYS WITHOUT PRECIPITATION COMPARED TO THE LONG-TERM AVERAGE

Number	EXP4
Indicator name	Difference in the highest number of consecutive calendar days without precipitation compared to the long-term average
Area	E
Indicator definition	The indicator assesses the difference between the largest number of consecutive calendar days without precipitation compared in the last five years to the long-term average. This is the number of consecutive days in a calendar year when no rain or snowfall (less than 0.2 mm) was recorded at the nearest weather station (professional or amateur). If there were several significant series of days without precipitation in a given year, the longest is always evaluated.
Indicator unit	day (days)
Key words	Temperature, climate, tropical day
Reason for tracking and usability	The indicator responds to the negative impact of expected climate change on the lack of precipitation and the associated drought. The indicator assesses the number of consecutive days without precipitation, which in many areas is the cause of lack of surface and subsurface water and thus, drought.
Completeness, representativeness, validity	The indicator evaluates the causes of the negative phenomenon, drought, i.e. lack of precipitation in a certain period. However, the indicator may not fully describe this, as it focuses only on the longest period and does not assess the situation in the amount of precipitation during the whole year, when the situation may be either the opposite or similar. It is therefore advisable to add this indicator to the total rainfall and total days without rainfall during the year. The indicator results may not correspond with rainfall distribution within the city/city district/municipality, as the data is based on a station located in one location and may not cover the local specificities of the whole city/city district/municipality.
Description of data processing	Data on daily precipitation totals at a given rainfall station are analysed. The highest number of consecutive days without precipitation is selected for the indicator in the last five years.

EXP4

DIFFERENCE IN THE HIGHEST NUMBER OF CONSECUTIVE CALENDAR DAYS WITHOUT PRECIPITATION COMPARED TO THE LONG-TERM AVERAGE

Data source	The data source is data from long-term functioning meteorological stations of official institutions. Amateur weather stations in the city/city district/municipality or data from measuring stations of other institutions can be used as well.
Tracking frequency	Yearly
Urban influence	The indicator is not influenced by the city/city district/municipality.
Presentation method	The results will be presented in a single Klimasken framework on a five-step scale according to specified intervals.
Responsibility	Klimasken processor, city/city district/municipality

EXP5

NUMBER OF FLASH FLOODS IN THE PAST 5 YEARS

Number	EXP5
Indicator name	Number of flash floods in the past 5 years
Area	E
Indicator definition	The indicator evaluates the number of recorded episodes of flash floods in the previous 5 years. A flood means a significant transient increase in the flow level, caused by a sudden increase in flow rate or a temporary reduction in the flow rate of a trough, with the possibility of outflow of water out of the trough. This type of flood occurs as a result of short-term and very intense torrential rainfall (hourly rainfall higher than 25 mm). In flash floods, both rapid increase and decrease of flow are typical.
Indicator unit	episode
Key words	Torrential rain, flood
Reason for tracking and usability	The indicator responds to another negative impact of expected climate change, namely torrential rainfall and a massive increase in the watercourse level, its spillage, or a large amount of water and other material (often soil) from the higher-lying area running down. The indicator shall be monitored to record the frequency of this phenomenon and to prevent event occurrence and follow-up.
Completeness, representativeness, validity	The indicator monitors only the frequency of the phenomenon of flesh floods. It does not monitor its intensity. Therefore, for a more objective presentation of the phenomenon, it is advisable to add an indicator of maximum flow rates, the amount of damage or the area affected by lightning floods. The indicator does not have limits
Description of data processing	Data are analysed either from water-meter stations, where the flow-through is recorded or is based on local experience and records.

EXP5

NUMBER OF FLASH FLOODS IN THE PAST 5 YEARS

Data source	Data sources are data from long-term functioning hydrological stations of official or records of the city/city district/municipality and local authorities (crisis council, city council, etc.)
Tracking frequency	Yearly
Urban influence	The indicator can affect the frequency of occurrence of the phenomenon by applying some flood or erosion control measures.
Presentation method	The results will be presented in a single Klimasken framework on a five-step scale according to specified intervals:
Responsibility	Klimasken processor, city/city district/municipality

EXP6

FREQUENCY OF RIVER FLOODS, WHEN THE RIVER HAS OVERFLOWED ITS BANKS IN THE LAST 5 YEARS.

Number	EXP6
Indicator name	Frequency of river floods, when the river has overflowed its banks in the last 5 years.
Area	E
Indicator definition	Number of episodes when river overflowed its banks over the past 5 years. In the case of the presence of more monitored flows in the city/city district/municipality territory, the indicator counts cases of overflowing of all rivers flows in the city/city district/municipality.
Indicator unit	number
Key words	Flood, river overflow
Reason for tracking and usability	The indicator responds to the further negative impact of expected climate change, namely increased rainfall or prolonged heavy rains higher in the basin and subsequent increase in the level of the river when it overflows its banks. The indicator shall be monitored to record the frequency of this phenomenon and to prevent event occurrence and follow-up.
Completeness, representativeness, validity	The indicator only monitors the frequency of the phenomenon when the main or secondary flow overflows its banks. However, it does not monitor the intensity of the phenomenon. Therefore, for a more objective presentation, it is advisable to supplement the indicator of maximum flow rates, the amount of damage or the area affected by the overflow. The indicator does not have limits.
Description of data processing	Data from water-meter stations where flow-through is recorded are analysed.
Data source	Data sources are data from long-term functioning hydrological stations of official institutions.
Tracking frequency	Yearly

EXP6

FREQUENCY OF RIVER FLOODS, WHEN THE RIVER HAS OVERFLOWED ITS BANKS IN THE LAST 5 YEARS.

Urban influence	The indicator is not influenced by the city/city district/municipality.
Presentation method	The results will be presented in a single Klimasken framework on a five-step scale according to specified intervals:
Responsibility	Klimasken processor, city/city district/municipality

EXP7

PROPORTION OF THE FLOODED AREA DEFINED BY LINE Q100 OF THE TOTAL AREA OF THE ADMINISTRATIVE TERRITORY OF THE CITY/CITY DISTRICT/MUNICIPALITY.

Number	EXP7
Indicator name	Proportion of the flooded area defined by line Q100 of the total area of the administrative territory of the city/city district/municipality.
Area	E
Indicator definition	The indicator assesses the proportion of flooded area defined by the Q100 line from the total area of the administrative territory of the city/city district/municipality.
Indicator unit	%
Key words	Floods, flooded area
Reason for tracking and usability	The indicator monitors the extent of possible overflow at a possible 100-year flow.
Completeness, representativeness, validity	The indicator only monitors the frequency of the phenomenon when the main or secondary flow overflows its banks. However, it does not monitor the intensity of the phenomenon. Therefore, for a more objective presentation, it is advisable to supplement the indicator of maximum flow rates, the amount of damage or the area affected by the overflow. The indicator does not have limits
Description of data processing	Data from water-meter stations where flow-through is recorded are analysed.
Data source	The data source is land-use planning documentation, flood protection plans or GIS layers.
Tracking frequency	Yearly
Urban influence	The indicator can be influenced by the city/city district/municipality to the extent where flooded area demarcated by the Q100 line correlates with the building of flood protection measures.

EXP7

PROPORTION OF THE FLOODED AREA DEFINED BY LINE Q100 OF THE TOTAL AREA OF THE ADMINISTRATIVE TERRITORY OF THE CITY/CITY DISTRICT/MUNICIPALITY.

Presentation method	The results will be presented in a single Klimasken framework on a five-step scale according to specified intervals:
Responsibility	Klimasken processor, city/city district/municipality

EXP8

NUMBER OF DAYS WITH THE OCCURRENCE OF EXTREME WEATHER EVENTS (STRONG WIND, HAIL, HEAVY THUNDERSTORMS, ICEBERG, ICING, HEAVY SNOW).

Number	EXP8
Indicator name	Number of days with the occurrence of extreme weather events (strong wind, hail, heavy thunderstorms, iceberg, icing, heavy snow).
Area	E
Indicator definition	The indicator assesses the average number of days with the occurrence of extreme weather events (strong wind, hail, heavy thunderstorms, frost) in the last five years. The average number of days in a year when a certain phenomenon was reached is evaluated. If several events have been achieved at the same time, it is counted only once. Evaluated: - tornado - torrential rainfall - hail (hail over 2 cm or whole layer of hail) - clear ice (existence) - lightning strike with destructive consequence - a wind impact exceeding 25 m / s or with a demonstrable destructive effect
Indicator unit	day (days)
Key words	Temperature, climate
Reason for tracking and usability	The indicator responds to another negative impact of expected climate change, to increased occurrence of extreme weather events. It will provide information on their occurrence and a closer look at the structure of extreme phenomena.
Completeness, representativeness, validity	As with other indicators, the indicator affects the frequency of phenomena, but does not affect their intensity. The limit is the presence of a meteorological measuring station and its location within the city/city district/municipality.
Description of data processing	The meteorological records in the last five years from the stations are analyzed and a value of 1 is assigned to each day on which the extreme event described above was recorded. Then they are summed.

EXP8

NUMBER OF DAYS WITH THE OCCURRENCE OF EXTREME WEATHER EVENTS (STRONG WIND, HAIL, HEAVY THUNDERSTORMS, ICEBERG, ICING, HEAVY SNOW).

Data source	Data sources are data from long-term functioning meteorological stations of official institutions or amateur measuring stations.
Tracking frequency	Yearly (or by Klimasken monitoring frequency)
Urban influence	The indicator is not influenced by the city/city district/municipality.
Presentation method	The results will be presented in a single Klimasken framework on a five-step scale according to specified intervals
Responsibility	Klimasken processor, city/city district/municipality

EXP9

NUMBER OF DAYS WITH OCCURRENCE OF HYDROLOGICAL DROUGHT IN THE LAST YEAR

Number	EXP9
Indicator name	Number of days with occurrence of hydrological drought in the last year
Area	E
Indicator definition	The indicator evaluates the number of recorded days in the previous 5 years, when there was a hydrological drought in the vicinity of the city/city district/municipality. In the case of water flows, a situation where the flow rate falls below the critical limit of 355-day flow Q355 is considered a drought.
Indicator unit	day (days)
Key words	Drought, river, climate, tropical day
Reason for tracking and usability	The indicator responds to the negative impact of expected climate change on the lack of precipitation associated with the drought. Hydrological drought is the result of lack of precipitation and manifests itself as a lack of sources of surface and ground water (flow rates in watercourses, lake and reservoir levels, water level in wells and spring yields).
Completeness, representativeness, validity	The indicator is one of the common drought indicators. It can be combined with others that evaluate other aspects of this phenomenon (soil). The data are objectively obtained. The lack of precipitation demonstrates itself in the underground part of the hydrological cycle with some delay. The occurrence of hydrological drought is also affected by the use of water; therefore, hydrological drought should be seen as a natural phenomenon, which may, however, be deepened by human action. The indicator is dependent on the existence of a water meter profile on the selected flow, while not each one monitors the long-term flow and evaluates this indicator.
Description of data processing	Data analysis is performed to find out how many calendar days of the year the flow rate was below the 355-day Q355 flow rate.

EXP9

NUMBER OF DAYS WITH OCCURRENCE OF HYDROLOGICAL DROUGHT IN THE LAST YEAR

Data source	Data sources are data from long-term functioning meteorological stations of official institutions or amateur measuring stations.
Tracking frequency	Yearly
Urban influence	The indicator is not too influenced by the city/city district/municipality.
Presentation method	The results will be presented in a single Klimasken framework on a five-step scale according to specified intervals:
Responsibility	Klimasken processor, city/city district/municipality

EXP10

CLIMATIC DROUGHT EXPRESSED BY THE STANDARDIZED RAINFALL EVAPOTRANSPIRATION INDEX (SREI)

Number	EXP10
Indicator name	Climatic drought expressed by the Standardized Rainfall Evapotranspiration Index (SREI)
Area	E
Indicator definition	The index is calculated using standardization of the difference in total rainfall and the potential evapotranspiration of grassland for the given period using the statistical probability distribution. SREI values as standard variables can be compared in different places and periods, therefore its calculation is recommended by the World Meteorological Organization (WMO) and the World Food and Agriculture Organization (WFAO). A rolling period of 12 months (from January to December of given year) shall be established for the purposes of this indicator. Categories of drought based on the index SPEI 0 – without drought 1 – weak drought 2 – moderate drought 3 – significant drought 4 – exceptional drought 5 – extreme drought
Indicator unit	index
Key words	Drought, precipitation
Reason for tracking and usability	The indicator is one of the common drought indicators. The Standardized Rainfall Evapotranspiration Index (SREI) is one of the drought indexes that make it possible to assess climatic drought using daily meteorological measurements.
Completeness, representativeness, validity	The indicator is one of the common drought indicators. It can be combined with others that evaluate other aspects of this phenomenon (soil). The data are objectively obtained. This indicator has no significant limits.

EXP10

CLIMATIC DROUGHT EXPRESSED BY THE STANDARDIZED RAINFALL EVAPOTRANSPIRATION INDEX (SREI)

Description of data processing	The index is calculated using the standardization of the difference in the total rainfall and the potential evapotranspiration of the grassland over the evaluated period using a statistical probability distribution. Potential evapotranspiration as opposed to actual evapotranspiration expresses the water output by soil and plant cover, assuming an optimal supply of water, so its calculation is not dependent on the real state of soil moisture. SREI calculation requires long-term (at least 30 years) quality and complete data series of all meteorological elements needed to calculate potential evapotranspiration, namely average daily air temperature, average daily water vapor pressure (humidity) sunshine duration per day, average daily wind speeds and daily total rainfall. The calculation is performed on average in the Czech Republic at 120 climatological stations.
Data source	Data sources are data from long-term functioning meteorological stations of official institutions.
Tracking frequency	Yearly (or by Klimasken monitoring frequency)
Urban influence	The indicator is partially influenced by the city/city district/municipality.
Presentation method	The results will be presented in a single Klimasken framework on a five-step scale according to specified intervals:
Responsibility	Klimasken processor, city/city district/municipality

Number	AD1
Indicator name	The area of green infrastructure
Area	A

Indicator definition

The indicator expresses the ratio of the area of green infrastructure to the total area of the administrative area. For the purposes of the Klimasken assessment, the term "green infrastructure (GI)" means natural greenery and greenery created by human activity (i.e. anthropogenic greenery). The determining condition is that these areas also provide a wide range of ecosystem services. This means that we include only healthy ecosystems with a rich diversity of species among the areas of GI. They do not count here e.g. low-mowed lawns of football pitches, areas managed in the form of intensive agriculture, etc.).

Examples:
Among the areas of anthropogenic (created by human activity) greenery we rank:
- Public greenery - which makes greenery accessible to all citizens without restrictions and is used for general use. It includes areas of all publicly accessible parks with unlimited and regulated accessibility, as well as smaller landscaped areas, greenery of residential complexes (e.g. greenery in inner blocks), historic greenery - parks connected with historic buildings, greenery with civic amenities, greenery of city squares and pedestrian zones, insulating green zones by type, e.g. line greenery at transport routes and streets (road greenery), accompanying greenery of railways, etc.
- Dedicated greenery - which makes the greenery accessible only to a certain defined group of people, such as the greenery of preschool and school buildings and areas, the greenery of industrial and production areas, cemeteries, etc.
- Private greenery - these are areas of greenery used on private land. These include front gardens, family gardens, farmsteads, cottages and cottages.

Furthermore, the included areas include natural and landscape greenery and various natural ecosystems valuable from the point of view of nature protection (e.g. forest and wetland communities, elements of Territorial System of Ecological Stability, protected areas, including the NATURA 2000 system). Linear elements, such as bio corridors, areas of tree lines and alleys, as well as areas of green roofs and elements of surface infiltration and areas of elements of sustainable rainwater management, such as e.g. seepage rain gardens are also part of the GI. Water bodies and streams themselves are not included in this indicator (only if they are part of the equipment of greenery such as a pond in the park).

Indicator unit	%
Key words	Green infrastructure, close to nature solutions, microclimate, biodiversity
Reason for tracking and usability	An ecologically balanced settlement is considered to be a settlement with a 40–60% share of green space (when planning "eco" neighborhoods in the UK, the general rule is that 40% of private and public land should be "green"). Monitoring the indicator provides the city/city district/municipality with information on whether the functional greenery that provides the necessary ecosystem services in the administrative territory of the municipality is increasing or decreasing (relatively). Green infrastructure is extremely important in the context of climate change. On the one hand, it can partially absorb greenhouse gas emissions, but its role in settlements is mainly in the area of adaptation to climate change. It is of great importance for the retention and precipitation of rainwater, cooling and maintaining a pleasant microclimate, reducing dust and the like. The information obtained will make it possible to respond to the deterioration of the situation and also to compare the situation in the given city/city district/municipality with other similar settlements, as well as with the recommended values. Negative developments can be responded not only by creating new areas and elements of GI (quantitative aspect), but also by changing the quality of care for greenery, which loses the ability to provide ecosystem services and perform adaptation and mitigation functions.

Completeness, representativeness, validity	The indicator is also closely related to the monitoring and protection of biodiversity in settlements. For this reason, part of the official set is the measurement of urban biodiversity City Biodiversity Index, where it is included under the indicator expressing what part of the settlement has a natural character. The spatial planning coefficient is used in spatial planning, as is the green coefficient. These coefficients are indicative because they determine the future development in a given area in terms of development and the amount of greenery. A prerequisite for completeness and representativeness is a detailed analysis of the entire administrative area and good knowledge of all areas and line elements (e.g. regularly updated pasport / general green). A prerequisite for sufficient validity is a good knowledge of the actual state of greenery and competent classification of individual areas according to the criteria / definition of GI. All data must be current, based on the actual state. Within Klimasken, the indicator is linked to descriptive indicators (area and share of different types of areas), exposure indicators (share of tropical days and nights, climatic drought), other indicators of sensitivity and adaptive capacity (availability of greenery, share of paved impermeable areas, retention capacity) and readiness indicators (area of areas converted to blue-green infrastructure). This indicator does not have significant limits.
Description of data processing	The area of greenery meeting the conditions of the criteria for GI calculated by a suitable method (spatial analysis) is divided by the total area of the administrative territory of the city/city district/municipality (the total area is also part of the descriptive indicators). The result is expressed as a percentage.
Data source	The source of data is the departments of the city/municipal office/local office of the city district (mainly the department of land usage plan, greenery or environment, general or pasport greenery, map GIS data, freely available data including satellite imaging (CORINE, LandCover, Copernicus Land Monitoring Service – Urban Atlas (land.copernicus.eu), The Landsat Program (landsat.gsfc.nasa.gov), ESRI basemaps (arcgis.com), Google maps (maps.google.com).
Tracking frequency	1 x 2 years (or according to the frequency of Klimasken monitoring)

Urban influence	The indicator applies to all greenery, regardless of owner. The city/city district/municipality can influence the extent, condition, quality and character of greenery only in its administration. The city/city district/municipality can affect the greenery managed by other owners by consistent application of Generally Binding Regulation on greenery, nature and landscape protection law (especially in the field of woody plants), rules in spatial planning, application of appropriate regulations of spatial development and construction as well as awareness-raising activities.
Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Processor KLIMASKEN, city, city district, municipality

AD2

AVAILABILITY OF AREAS OF PUBLIC GREENERY OF ADEQUATE QUALITY

Number	AD2
Indicator name	Availability of areas of public greenery of adequate quality
Area	A
Indicator definition	The indicator evaluates the spatial distribution of areas of quality public greenery with an area of at least 2000 m2 in terms of their accessibility for residents of the city/city district/municipality. Only areas of anthropogenic and natural greenery are evaluated, which provide suitable opportunities for refreshment during the summer heat with the help of shading and cooling by treetops. The share of tree canopy cover of a given area should be at least 40–60 %. These include parks, continuous areas of indoor greenery in low-rise buildings and residential greenery in high-rise buildings, historic greenery, greenery related to civic amenities and other greenery, if it is publicly accessible and fulfils, among other things, a recreational function. In practice, these are also urban forest lands with involved vegetation, alleys with tall trees and shrubs, etc. Accessibility for residents is reported (% of population living within 300 m of such areas).
Indicator unit	%
Key words	Green infrastructure, nature-based solutions, microclimate, biodiversity, summer heat, greenery, cooling
Reason for tracking and usability	One of the significant negative effects of climate change is the summer heat. Extremely high to tropical temperatures bring a number of health risks that cause significant negative health and social problems. This mainly concerns the most vulnerable groups of the population (seniors, mothers with small children, people with disabilities) who live in apartment buildings without the possibility of air conditioning. The tasks of local governments include ensuring a quality environment, which in the case of summer heat means providing for its inhabitants' areas where it is possible to cool down or overcome the hottest part of the day. One of the possibilities is public greenery with sufficient coverage of treetops or a water feature. Research has confirmed that in the case of parks with only a small proportion of trees, respectively, only with planted ornamental low plants, the temperature is the same as in their surroundings.

Completeness, representativeness, validity

The cooling effect of vegetation has been confirmed by several studies, but the extent of this effect depends not only on the area of public space, ratio and quality of vegetation, but also on the location of greenery within the city/city district/municipality, nature of surrounding buildings, terrain. Based on several sources in general, it can be said that the temperature difference e.g. between parks and built-up areas was on average from 0.94 °C to 2.26 °C.
A prerequisite for completeness and representativeness is a detailed analysis of the entire administrative area and a good knowledge of all areas and line elements (e.g. regularly updated pasport/general green).
A prerequisite for sufficient validity is a good knowledge of the actual condition of green areas, especially the evaluation of areas with sufficient shading and their classification into individual areas according to the criteria / definition of GI-green infrastructure (see indicatorAD1). All data must be current, based on the actual state. Within Klimasken, the indicator is linked to descriptive indicators (area and share of different types of areas), exposure indicators (share of tropical days and nights, climatic drought), other indicators of sensitivity and adaptive capacity (share of green infrastructure, share of paved impermeable areas, retention capacity) and readiness indicators (area converted to blue-green infrastructure).
This indicator does not have significant limits.

Description of data processing

Areas of anthropogenic and natural greenery will be set aside from the identified areas of GI (see indicator AD1), which provide suitable opportunities for refreshment during the summer heat with the help of tree canopy shading (more than 40-60 % shading). It is also advisable to make a map of shading by treetops. Subsequently, suitable areas with an area of at least 2000 m2 will be set aside. With the help of spatial analysis in GIS, a 300 m spatial zone (buffer) around such areas of anthropogenic and natural greenery is selected. Residential buildings will be set aside in the given spatial zone and the number of inhabitants will be determined with an assumed area of 3.5-4 inhabitants per 1 housing unit. Finally, the percentage of the obtained population living in the 300 m spatial zone of the total population is determined.
The result is expressed as a percentage.

AD2

AVAILABILITY OF AREAS OF PUBLIC GREENERY OF ADEQUATE QUALITY

Data source	The source of data is the departments of the city/municipal office/local office of the city district (mainly the department of land usage plan, greenery or environment, general or pasport greenery, map GIS data, freely available data including satellite imaging (CORINE, LandCover, Copernicus Land Monitoring Service – Urban Atlas (land.copernicus.eu), The Landsat Program (landsat.gsfc.nasa.gov), ESRI basemaps (arcgis.com), Google maps (maps.google.com).
Tracking frequency	1 x 2 years (or according to the frequency of Klimasken monitoring)
Urban influence	The indicator applies to all greenery, regardless of the owner, which is accessible to all citizens without restriction and is used for general use, possibly with a time-limited and regulated accessibility of availability. The city/city district/municipality can influence the extent, condition, quality and character of greenery only in its administration. The city/city district/municipality can influence the greenery managed by other owners by consistent application of VZN (Všeobecne záväzného nariadenia) on greenery, the law on nature and landscape protection (especially in the field of woody plants), rules in spatial planning, application of appropriate regulations of spatial development and construction as well as educational activities.
Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Processor KLIMASKEN, city, city district, municipality

AD3

BUILT-UP, PAVED IMPERMEABLE AREAS

Number	AD3
Indicator name	Built-up, paved impermeable areas
Area	A
Indicator definition	The indicator expresses the share of paved impermeable areas in the total area of the administrative territory of the city/city district/municipality. Paved, impermeable surfaces include, in particular, buildings, roads, courtyards, car parks and other paved surfaces that do not allow water to seep into the soil profile. If buildings have vegetation roofs, they are not included in the built-up area.
Indicator unit	%
Key words	Rainwater, sustainable rainwater management, microclimate, paved impermeable area
Reason for tracking and usability	Monitoring the indicator provides the city/city district/municipality with information on the total area of built-up and water-permeable areas. It is extremely important to monitor the ratio or whether these areas are increasing or decreasing (relatively or absolutely), as not only new development on the growing terrain but also the conversion of water-impermeable areas into permeable or construction of vegetation roofs on existing buildings is included. The ever-increasing share of built-up areas and sealing of land is a serious problem from several points of view. The European Commission has prepared a series of documents aimed at creating a soil protection directive. Soil is extremely important in the context of climate change. On the one hand, it is able to partially absorb greenhouse gas emissions, but its role in settlements is mainly in the area of adaptation to climate change, as it is of great importance especially for retention and rainwater. The information obtained will make it possible to respond to the deterioration of the situation and also to compare the situation in the given city/city district/municipality with other similar settlements. The negative development can be reacted not only by creating compensatory measures, especially in the form of vegetation roofs, vegetation walls, etc., or by legislative instruments (Generally Binding Regulation) to regulate and protect undeveloped land in the city/city district/municipality.

Completeness, representativeness, validity	The indicator is also closely related to the monitoring of the amount of greenery and green infrastructure, as well as the protection of biodiversity in settlements. The spatial planning coefficient is used in spatial planning, as is the green coefficient. These coefficients are indicative because they determine the future development in a given area from the point of view of development. A prerequisite for completeness and representativeness is a detailed analysis of the entire administrative territory and good knowledge of all areas. All data must be current, based on the actual state. Within Klimasken, the indicator is linked to descriptive indicators (area and share of different types of areas), exposure indicators (share of tropical days and nights, climatic drought), other indicators of sensitivity and adaptive capacity (retention capacity) and readiness indicators (area of areas converted to blue-green infrastructure). This indicator does not have significant limits.
Description of data processing	The area of paved and built impermeable areas calculated by a suitable method (spatial analysis) is divided by the total area of the administrative territory of the city/city district/municipality (the total area is also part of the descriptive indicators). The result is expressed as a percentage.
Data source	The source of data is the departments of the city/municipal office/local office of the city district (mainly the department of land usage plan, greenery or environment, general or pasport greenery, map GIS data, freely available data including satellite imaging (CORINE, LandCover, Copernicus Land Monitoring Service – Urban Atlas (land.copernicus.eu), The Landsat Program (landsat.gsfc.nasa.gov), ESRI basemaps (arcgis.com), Google maps (maps.google.com).
Tracking frequency	1 x 2 years (or according to the frequency of Klimasken monitoring)
Urban influence	The indicator applies to all built-up and impermeable areas, regardless of the owner. The city/city district/municipality can influence the extent, condition, quality and character of the development and paved areas only in its administration. Other built-up and impermeable areas under the administration of other owners may be affected by the city/city district/municipality through the consistent application of the rules in spatial planning, the application of appropriate regulations of spatial development and construction, as well as educational activities.

Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Processor KLIMASKEN, city, city district, municipality

AD4

PROPORTION OF THE NUMBER OF PERSONS VULNERABLE TO HEAT WAVES FROM THE TOTAL POPULATION

Number	AD4
Indicator name	Proportion of the number of persons vulnerable to heat waves from the total population
Area	A
Indicator definition	Proportion of the number of persons of the vulnerable population (ratio to the total population of the city/city district/municipality), sensitive to heat waves, from the total population of the city/city district/municipality. Vulnerable (or sensitive to this impact of climate change) populations are considered to be the elderly over 75 years of age, young children under 4 years of age and people with chronic diseases - cardiovascular diseases, chronic respiratory diseases, people with disabilities and socially disadvantaged groups living in unsatisfactory conditions. etc
Indicator unit	%
Key words	vulnerable inhabitants, vulnerable groups, the elderly, children
Reason for tracking and usability	For the elderly (over 75) living mainly in cities, high to tropical temperatures during heat waves pose serious health risks. Heat exposure can lead to overheating, headaches, dizziness and even vomiting in these vulnerable groups. Under certain conditions, it can lead to collapse leading to death. In the case of the elderly, people with chronic diseases, it is necessary to take into account other aspects increasing their sensitivity to fevers, such as reduced self-sufficiency, health problems, mobility problems, higher social insulation, quality of housing, etc. Young children are also vulnerable to the population due to their absolute dependence on the adult, their increased susceptibility to many paediatric diseases, including intestinal infections, respiratory problems, nutritional and metabolic diseases or diseases of the nervous system that can be caused by extreme weather events.

AD4

PROPORTION OF THE NUMBER OF PERSONS VULNERABLE TO HEAT WAVES FROM THE TOTAL POPULATION

Completeness, representativeness, validity	Selected age categories and citizens with disabilities, selected chronic diseases and socially disadvantaged groups are the most vulnerable part of the population and monitoring this indicator is a sufficiently concise analysis of the sensitivity of the population of the city/city district/municipality. In the case of a more detailed analysis, it would be appropriate to combine the data with the socio-economic status of selected groups of the population, which can significantly negatively or positively affect their vulnerability to the effects of climate change. In addition to the share of vulnerable groups in this consequence of climate change, it is also appropriate to monitor population density. he indicator consists of data from several sources. While obtaining demographic data (young children and the elderly) is usually not a problem, statistics that record people with chronic illnesses and other physical or mental disabilities within cities are absent.
Description of data processing	Proportion of the number of persons of the vulnerable population (ratio to the total population), sensitive to heat waves from the total population of the city. The result is expressed as a percentage.
Data source	This indicator consists of several data sources. Demographic data (small children, seniors) is available to each city through its population registers. The problem may arise with an insufficient or non-existent register of disabled and chronically ill citizens at the city/city district/municipality level. At least a partial solution may be to obtain information about capacities and their filling in specialized facilities in the city/city district/municipality, or on request from the National Centre for Health Information. Data on socially weaker groups of the population can be based on the records of social housing in the city/city district/municipality, or on other records of the city on low-income or excluded communities in the city/city district/municipality.
Tracking frequency	1 x 2 years (or according to the frequency of Klimasken monitoring)
Urban influence	The city/city district/municipality cannot directly influence the result of the indicator. Theoretically, it could affect the indicator indirectly through stronger long-term social policies.

AD4

PROPORTION OF THE NUMBER OF PERSONS VULNERABLE TO HEAT WAVES FROM THE TOTAL POPULATION

Presentation method	The results will be presented in a uniform Klimasken framework through a five-point scale:
Responsibility	Processor Klimasken, city/city district/municipality

AD5

THE SHARE OF THE TERRITORY IN THE CITY WITH THE RISK OF LANDSLIDES FROM THE TOTAL AREA OF THE ADMINISTRATIVE TERRITORY

Number	AD5
Indicator name	The share of the territory in the city with the risk of landslides from the total area of the administrative territory
Area	A
Indicator definition	The share of the territory in the city with the risk of landslides from the total area of the administrative territory of the city.
Indicator unit	%
Key words	Landslides, slope stability, slope deformations
Reason for tracking and usability	Potential risks associated with heavy rainfall include landslides in a built-up area or in an area that has any impact on the quality of life of the inhabitants of the analysed area. Landslide areas are becoming very dangerous, especially in extreme precipitation situations.
Completeness, representativeness, validity	The indicator sufficiently represents the given area. The data sufficiently represent the whole indicator. In the detailed vulnerability analysis, it is recommended to combine the extent of the landslide-threatened area with the assessment of possible landslide damage (e.g. whether the potential landslide area is in a built-up area, or whether there is critical infrastructure or significant traffic in the endangered area). This indicator has no major limits.
Description of data processing	Calculation of the ratio of the landslide-endangered area to the total area of the city/city district/municipality.
Data source	Geology statistics, local evidences, GIS, etc.
Tracking frequency	1 x 2 years (or according to the frequency of KLIMASKEN monitoring)

AD5

THE SHARE OF THE TERRITORY IN THE CITY WITH THE RISK OF LANDSLIDES FROM THE TOTAL AREA OF THE ADMINISTRATIVE TERRITORY

Urban influence	The city/city district/municipality has the opportunity to inform, initiate an interview, propose a solution, etc. with regard to problematic places, it also has an impact on the stabilization of disturbed slopes (slope shape adjustment, slope drainage, slope protection against weathering and erosion, rock strengthening, technical stabilization measures), if he is the owner of the problematic land.
Presentation method	The results will be presented in a uniform KLIMASKEN framework through a five-point scale.
Responsibility	Processor KLIMASKEN city/city district/municipality

AD6

PROPORTION OF THE NUMBER OF CRITICAL OBJECTS IN THE RISK AREA ENDANGERED BY TORRENTIAL RAINS FROM THE TOTAL NUMBER OF CRITICAL OBJECTS

Number	AD6
Indicator name	Proportion of the number of critical objects in the risk area endangered by torrential rains from the total number of critical objects
Area	A
Indicator definition	The share of the number of critical objects (energy, telecommunications, transport - bridges, underpasses -, public administration, cultural monuments, etc.) in the risk area endangered by torrential rains in the total number of these objects. The risk area is determined on the basis of rainfall runoff models with higher intensities in the area.
Indicator unit	%
Key words	critical infrastructure, flash floods
Reason for tracking and usability	Damage to any building indicates potential socio-economic damage, but also endangers human lives. However, some types of buildings are of special importance from the point of view of flood protection due to the nature of the construction or the function of the building or operation in it. Critical infrastructure facilities are those parts of the infrastructure whose disruption or destruction would, according to sectoral and cross-cutting criteria, have serious adverse consequences for the realization of the economic and social function of the city/city district/municipality, and thus for the quality of life of the inhabitants in terms of protection of their lives, health, safety, property and environment, while being particularly vulnerable to heavy rainfall and their impacts.

AD6

PROPORTION OF THE NUMBER OF CRITICAL OBJECTS IN THE RISK AREA ENDANGERED BY TORRENTIAL RAINS FROM THE TOTAL NUMBER OF CRITICAL OBJECTS

Completeness, representativeness, validity

From the point of view of the threat of the area by torrential precipitation, the data represent the whole indicator, but it depends on the availability and quality of the input data. If the area is also endangered by river floods, it is appropriate to supplement the indicator with the share of the number of critical infrastructure objects in the risk area (flood area Q100 or Q1000) endangered by torrential rainfall in the total number of these objects (see method sheet AD10).

The risk area, endangered by torrential rainfall, is obtained under ideal conditions by means of hydrological GIS modelling, the quality of which depends on the input data and on the accuracy of the model used. The limit may be the absence of a precipitation-runoff model. Then it is necessary to select the risk area by expert estimation, in which there is a risk that not all potentially endangered (flooded) places will be identified.

Description of data processing

Penetration of rainfall runoff maps and objects of critical infrastructure (CI) - it is necessary to create a map and analysis in GIS.

Data source

Critical infrastructure objects - Spatial plan of the city, map layers of the city/city district/municipality; rainfall runoff map - based on hydrological modelling.

Tracking frequency

Depending on changes in the physical structure of the area (new construction, etc.) - 1 x 2 years (or according to the frequency of monitoring Klimasken).

Urban influence

By its decisions, the city/city district/municipality can support, favour and apply adaptation measures to capture and slow down the outflow of extreme precipitation in its territory. The city/city district/municipality is able to restrict or prohibit the construction of critical objects in the area endangered by flash floods through a zoning plan or through its generally binding regulation (GBR). The city/city district/municipality can also implement flood protection measures outside the watercourse, which can help protect critical infrastructure from flash floods.

AD6

PROPORTION OF THE NUMBER OF CRITICAL OBJECTS IN THE RISK AREA ENDANGERED BY TORRENTIAL RAINS FROM THE TOTAL NUMBER OF CRITICAL OBJECTS

Presentation method	The results will be presented in a uniform Klimasken framework through a five-point scale:
Responsibility	Processor Klimasken, city/city district/municipality

AD7

PROPORTION OF INHABITANTS LIVING IN THE Q100 FLOODPLAIN OUT OF THE TOTAL POPULATION

Number	AD7
Indicator name	Proportion of inhabitants living in the Q100 floodplain out of the total population
Area	A
Indicator definition	The proportion of (technically unprotected) inhabitants living in the flood area Q100 of the total number of permanent residents.
Indicator unit	%
Key words	Flood line Q100, river flood
Reason for tracking and usability	Climate change, with its extreme weather events, has an impact on the occurrence and course of river floods. The number of potentially vulnerable inhabitants living in areas at risk of river flooding, which are defined by the flood line Q100, is one of the important factors of the city's vulnerability to river floods. A higher population represents not only a potential risk of health impacts for a larger population, but also increased problems with evacuation, increased demands on temporary accommodation capacity in case of damage to their homes, etc.
Completeness, representativeness, validity	The indicator completely represents given area. The indicator has no major limits.
Description of data processing	Proportion of population living in Q100 floodplains in the total number of permanent residents. The most accurate is the determination of the indicator through spatial analysis in GIS by a combination of the Q100 floodplain layer and the population registration layer at the address points. If records of the number of inhabitants at address points are not available, it is possible to use the layer of family and apartment houses, where the number of inhabitants is obtained by the average occupancy of flats in a given city. If the municipality does not have the data for the processing of spatial analysis, it is possible to use the data of the Slovak Economic Enterprise available at https://mpompr.svp.sk/.

AD7

PROPORTION OF INHABITANTS LIVING IN THE Q100 FLOODPLAIN OUT OF THE TOTAL POPULATION

Data source	Flood risk maps (part of the City Spatial Plan); layer of population registration at address points - based on data on population registration in the city (eg registry office); map of family and apartment buildings (for selected cities) Copernicus Land Monitoring Service UrbanAtlas https://land.copernicus.eu/local/urban-atlas Slovak Water Management Company - Flood hazard maps and flood risk maps of watercourses in Slovakia, https://mpompr.svp.sk/.
Tracking frequency	Depending on changes in the physical structure of the area (new flood control measures, etc.) and the expansion of the built-up area of the city - 1 x 2 years (or according to the frequency of monitoring CReLoCaF)
Urban influence	The city can not influence much the implementation of flood control measures on watercourses, but can initiate, support or call the administrator of the watercourse - Slovak Water Management Company, .. On the other hand, the city can through the zoning plan or through its generally binding regulation (VZN) restrict or prohibit development in areas at risk of river floods. The city can also implement flood protection measures outside the watercourse, which can help protect the lives and property of residents from river floods.
Presentation method	The results will be presented in a uniform Klimasken framework through a five-point scale:
Responsibility	Processor Klimasken, city, district

AD8

NUMBER OF OLD ECOLOGICAL BURDENS IN THE CITY

Number	AD8
Indicator name	Number of old ecological burdens in the city
Area	A
Indicator definition	Number of old ecological burdens in the administrative territory of the city/city district/municipality. We consider the old ecological burden to be serious contamination of the rock environment, groundwater or surface water, which occurred due to inappropriate handling of hazardous substances in the past (these are mainly oil, pesticides, PCBs, chlorinated and aromatic hydrocarbons, heavy metals, etc.).
Indicator unit	Number per 1000 ha
Key words	environmental burdens, contaminated area
Reason for tracking and usability	For the purposes of geological law, environmental load is defined as pollution of a territory caused by human activity, which poses a serious risk to human health or the rock environment, groundwater and soil, with the exception of environmental damage. It is a wide range of areas contaminated by industrial, military, mining, transport and agricultural activities, but also by improper waste management. In addition, if such areas are exposed to extreme weather events, e.g. torrential rainfall, pose a serious threat to the population and the environment.
Completeness, representativeness, validity	The indicator completely represents the given area. The indicator has no major limits. A possible limit may be the problem of identifying all relevant environmental burdens, as not all of them may be listed in the Enviroportal register (http://envirozataze.enviroportal.sk/) or known to the local government.
Description of data processing	The number of all known environmental burdens in the city/city district/municipality converted to 1000 ha
Data source	http://envirozataze.enviroportal.sk/, other databases according to own definition of loads (own database), GIS (spatial analysis), flood maps

AD8

NUMBER OF OLD ECOLOGICAL BURDENS IN THE CITY

Tracking frequency	1 x 2 years (or according to the frequency of Klimasken monitoring)
Urban influence	The municipality has theoretical possibilities to introduce preventive or restrictive measures to prevent the emergence of new environmental burdens on its territory. Given the already existing environmental burdens, it has the opportunity to take action towards the remediation of the areas in question through the relevant state authority.
Presentation method	The results will be presented in a uniform Klimasken framework through a five-point scale:
Responsibility	Processor Klimasken, city/city district/municipality

AD9

PROPORTION OF THE NUMBER OF INHABITANTS LIVING IN THE AREA AT RISK OF FLOODS FROM TORRENTIAL RAINS FROM THE TOTAL POPULATION

Number	AD9
Indicator name	Proportion of the number of inhabitants living in the area at risk of floods from torrential rains from the total population
Area	A
Indicator definition	Proportion of the number of inhabitants living in the risk area who are endangered by torrential rains from the total number of inhabitants of the administrative (cadastral) territory of the municipality. The risk area is determined on the basis of precipitation runoff models with higher intensities in the area, resp. expert estimation on the basis of previous damage in connection with pluvial floods, experience and morphology of the area (if a runoff model is not available).
Indicator unit	%
Key words	torrential rains, endangerment of the population
Reason for tracking and usability	Torrential rains present a risk to built-up areas, especially those parts of the area that remain flooded or damaged after extreme rainfall events. In addition, if people live in the affected area, they become particularly dangerous because of their speed. Most flash floods break out within six hours or less, which significantly shortens the time for residents to prepare for or leave such a place.

AD9

PROPORTION OF THE NUMBER OF INHABITANTS LIVING IN THE AREA AT RISK OF FLOODS FROM TORRENTIAL RAINS FROM THE TOTAL POPULATION

Completeness, representativeness, validity

The indicator partially represents the given area and the reason for monitoring. The problem arises in the accurate identification of vulnerable populations. Spatial analyses and modelling make it possible to locate the directions of concentrated runoff of extreme rainwater and its depth over the entire analysed area, but so far there is no key to the identification of really endangered inhabitants.
The risk area endangered by torrential rainfall is, under ideal conditions, obtained by means of hydrological GIS modelling, the quality of which depends on the input data and on the accuracy of the model used. The limit may be the absence of a runoff model. Then it is necessary to select the risk area by expert estimation, in which there is a risk that not all potentially endangered (flooded) places will be identified. Also, the population can be determined mostly only by a qualified estimate.

Description of data processing

Penetration of rainfall runoff maps and population records at address points. If the registration of the number of inhabitants at the address points is not available, it is possible to use the layer of family and apartment houses, when the number of inhabitants is obtained by the average occupancy of flats in the given city/city district/municipality.
Spatial analysis needs to be created in GIS.

Data source

Rainfall runoff map – based on hydrological modelling; layer of population registration at address points – based on data on population registration in the city/city district/municipality (e.g. registry office); layer of family and apartment houses (for example, for selected cities also from the Copernicus Land Monitoring Service).

Tracking frequency

Depending on changes in the physical structure of the area (new construction, etc.) – 1 x 2 years (or according to the frequency of monitoring Klimasken).

Urban influence

The city/city district/municipality has the opportunity to apply various measures in its territory, which both slow down the runoff and increase the retention capacity of the area. It also has tools to support such measures for private owners.

AD9

PROPORTION OF THE NUMBER OF INHABITANTS LIVING IN THE AREA AT RISK OF FLOODS FROM TORRENTIAL RAINS FROM THE TOTAL POPULATION

Presentation method	The results will be presented in a uniform Klimasken framework through a five-point scale:
Responsibility	Processor Klimasken, city/city district/municipality

AD10

PROPORTION OF THE NUMBER OF CRITICAL OBJECTS LOCATED IN THE FLOOD AREA OF RIVER FLOODS Q100 FROM THE TOTAL NUMBER OF CRITICAL OBJECTS

Number	AD10
Indicator name	Proportion of the number of critical objects located in the flood area of river floods Q100 from the total number of critical objects
Area	A
Indicator definition	Proportion of the number of critical infrastructure objects in the risk area located in the Q100 floodplain (flooded area during a flood with a probability of recurrence once every hundred years) of the total number of these objects. Critical objects include: - Energy facilities - power stations, substations, transformers, gas network facilities, heating plants - Telecommunication objects - Transport constructions - important transport communications and transport hubs (especially motorways, expressways and 1st and 2nd class roads) - Medical facilities - hospitals, clinics, medical centres - drinking water supply infrastructure - Public administration facilities: fire stations, police stations - Other: service stations, landfills, sewage treatment plants
Indicator unit	%
Key words	critical infrastructure facilities, technical infrastructure, Q100, river flood
Reason for tracking and usability	Damage to any building poses potential socio-economic damage, but also endangers human lives. However, some types of buildings are of special importance from the point of view of flood protection due to the nature of the construction or the function of the building or operation in it. Critical infrastructure facilities are those parts of the infrastructure the disruption or destruction of which, according to sectoral and cross-cutting criteria, would have serious adverse consequences for the implementation of the city's economic and social function and thus for the quality of life of the population. property as well as the environment, while being particularly vulnerable to river floods, heavy rainfall and their impacts.

AD10

PROPORTION OF THE NUMBER OF CRITICAL OBJECTS LOCATED IN THE FLOOD AREA OF RIVER FLOODS Q100 FROM THE TOTAL NUMBER OF CRITICAL OBJECTS

Completeness, representativeness, validity	The indicator completely represents the given area. The indicator has no major limits.
Description of data processing	Penetration of maps of flooded area Q100 and CI objects - suitable to create a map and analysis in GIS
Data source	Objects of Critical Infrastructure (CI) - Spatial plan of the city, map layers of the city; map of the flood area - Territorial plan of the city, resp. flood risk maps SVP, š.p. (Slovak Water Management Company - Flood risk maps and flood risk maps of watercourses in Slovakia, https://mpompr.svp.sk/).
Tracking frequency	Depending on changes in the physical structure of the area (new flood control measures, etc.) and the expansion of the built-up area of the city - 1 x 2 years (or according to the frequency of monitoring Klimasken).
Urban influence	The city/city district/municipality cannot do much about the implementation of flood control measures on watercourses, but can initiate, support or call the administrator of the watercourse - Slovak Water Management Company. On the other hand, the city/city district/municipality can through the zoning plan or through its generally binding regulation (GBR) restrict or prohibit the construction of critical facilities in areas at risk of river floods. The city/city district/municipality can also implement flood protection measures outside the watercourse, which can help protect critical infrastructure from river floods.
Presentation method	The results will be presented in a uniform Klimasken framework through a five-point scale:
Responsibility	Processor Klimasken, city/city district/municipality

AD11

THE SHARE OF DRINKING WATER IN THE TOTAL WATER CONSUMPTION FOR WATERING PUBLIC GREENERY

Number	AD11
Indicator name	The share of drinking water in the total water consumption for watering public greenery
Area	A
Indicator definition	The share of treated drinking water in the total water consumption determined by the city / city district / municipality for watering greenery, or sprinkling and cooling of public spaces (mainly paved areas) and streets.
Indicator unit	%
Key words	Drinking water, watering, sprinkling and cooling
Reason for tracking and usability	With the expected increase in the need for treated drinking water in cities / urban areas / municipalities and at the same time endangering drinking water sources due to drought or pollution, its correct and effective use is one of the basic requirements of the response to climate change. On the other hand, it is necessary to irrigate (especially in times of prolonged drought and heat waves) public greenery and, in addition, to sprinkle or cool paved areas. The way in which a given city / city district / municipality deals with this fact is one of the indicators of its adaptive capacity.
Completeness, representativeness, validity	The indicator only partially expresses the "correctness" of the decision drinking water vs. watering / sprinkling, because if the city / city / municipality does not have enough sources of water, sometimes it is a situation that it is necessary to use drinking water to save greenery (while maintaining sufficient capacity of drinking water to ensure the hygienic demands of the population). The limit of the indicator is the question of the availability (monitoring) of data on the total water consumption for this purpose and the distribution of the consumption of domestic and drinking water at the level of the city / city district / municipality.

AD11

THE SHARE OF DRINKING WATER IN THE TOTAL WATER CONSUMPTION FOR WATERING PUBLIC GREENERY

Description of data processing	Proportion of total water consumption for watering greenery, for sprinkling and cooling public spaces and drinking water used for this purpose.
Data source	City / municipal office, or administration of city / municipal greenery and administration of city / municipal roads
Tracking frequency	Once a year
Urban influence	The city / city district / municipality influences this indicator both by monitoring the data and emphasizing the use of domestic water for this purpose, but also by creating / maintaining sources of domestic water.
Presentation method	The results will be presented in a uniform Klimasken framework using a five-point scale (5 (E)) more than 90% drinking water, 1 (A) less than 25% drinking water).
Responsibility	Processor Klimasken, city/city district / municipality

AD12

CONSUMPTION OF DRINKING WATER IN THE CITY / CITY DISTRICT / MUNICIPALITY FROM PUBLIC SOURCES

Number	AD12
Indicator name	Consumption of drinking water in the city / city district / municipality from public sources
Area	A
Indicator definition	Total consumption of drinking water from public water resources recalculated in liters per capita and per day in a given reference year.
Indicator unit	l/inh./day
Key words	Drinking water, consumption, public resources
Reason for tracking and usability	The city / city district / municipality has to, in addition to the normal conditions, be able to ensure a sufficient capacity of drinking water sources for residents and other entities in the city / city district / municipality (either from sources in the city / city district / municipality or by connecting to sources outside) also at a time of increased frequency and intensity of dry periods and decreasing reservoir levels (for surface sources) and groundwater levels (for groundwater sources). One of the adaptation measures to climate change is to reduce the consumption of increasingly scarce drinking water. Consumption can be reduced by reduced consumption in households and other entities consuming drinking water, but also by new technologies, reducing leakages from the water system, or motivational tools to reduce consumption (eg pricing policy of water companies). Reducing consumption compensates for the need to find and maintain new resources.
Completeness, representativeness, validity	The indicator is sufficiently representative, although it is broadly defined and diverse in its details. The limit of the indicator is that water consumption is measured as average, although it is known that low-income (vulnerable) groups have lower consumption (up to the limit of the hygienic minimum) and, conversely, high-income groups have very high consumption. At the same time, households are included in this indicator, but also other public and business entities, which may cause ambiguity in interpretation.

AD12

CONSUMPTION OF DRINKING WATER IN THE CITY / CITY DISTRICT / MUNICIPALITY FROM PUBLIC SOURCES

Description of data processing	Data on the total consumption of drinking water in a given reference year are converted into the number of inhabitants of the town / city district / municipality and per day.
Data source	Local water and sewerage institutions, statistical data (eg Research Institute of Water Management).
Tracking frequency	Once a year
Urban influence	The city / city district / municipality influences this indicator on the one hand by a targeted information campaign, recommendations and regulation, as well as by the pricing policy, as a member of the water company.
Presentation method	The results will be presented in a single CReLoCaF framework through a five-point scale.
Responsibility	Klimasken processor /city/city district/municipality

AD13

AVERAGE USABLE CAPACITY OF DRINKING WATER SOURCES FOR THE NEEDS OF THE CITY / CITY DISTRICT / MUNICIPALITY PER CAPITA OF THE CITY/CITY DISTRICT/MUNICIPALITY

Number	AD13
Indicator name	Average usable capacity of drinking water sources for the needs of the city / city district / municipality per capita of the city/city district/municipality
Area	A
Indicator definition	The indicator reflects the capacity of drinking water sources for the needs of the city/city district/municipality (own resources, backup, contracted) per capita, i.e. the usable capacity of the water management system supplying the city/city district municipality. The indicator includes only sources for the mass supply of drinking water, the quality of which is regularly checked by the hygienic service (water from treatment plants of water management systems, general water supply).
Indicator unit	l.s-1 / 1000 inh.
Key words	Drinking water supply, drinking water sources
Reason for tracking and usability	Under most scenarios, climate change will reduce available water resources. In addition, the expected increase in temperature will create pressure to increase water consumption (increased consumption of drinking water and water for personal hygiene, increased evaporation, irrigation, cooling measures), which may cause an increase in tension in the water balance of the city. In order to ensure a problem-free water supply, from the point of view of the quantitative regime, it is necessary to determine the optimal amounts of water taken from WS (water sources) so that there is no excessive water abstraction, which would contribute to resource depletion and the need to shut it down. From this point of view, especially in the case of groundwater sources, it will be necessary to carefully monitor the trends of changes in water reserves in individual WS. In addition, the capture of rainwater in retention tanks and its subsequent use for irrigation or flushing saves drinking water resources, as well as has a positive effect on slowing down runoff in heavy rainfall.

AD13

AVERAGE USABLE CAPACITY OF DRINKING WATER SOURCES FOR THE NEEDS OF THE CITY / CITY DISTRICT / MUNICIPALITY PER CAPITA OF THE CITY/CITY DISTRICT/MUNICIPALITY

Completeness, representativeness, validity	The indicator quantifies the capacity of water resources through the mass supply of drinking water in the water supply system. It does not affect individual sources - wells on the land of the inhabitants. Limits and restrictions may be in setting the limits of consumption in case the water supply system serves several settlements at the same time. Private abstractions from groundwater are not included in the calculation. If the system serves more than one settlement, then the capacity should be converted to the population of all these settlements together - and take this per capita value as valid for any of these cities.
Description of data processing	Based on the determination of which water source supplies drinking water to the city/city district/municipality and on the basis of data on this identified water source, the capacity of the said water source(s) expressed in l.s-1 is divided by the population of the city/city district/municipality (in thousands). The result is expressed in l.s-1/1000 inhabitants.
Data source	Data come directly from water companies, department of the city/municipal office/local authority of the city district (mainly the department of spatial plan, environment), strategic development documents of the city/city district/municipality (PHaSR - Program of economic and social development), departmental documents and reports.
Tracking frequency	1 x 2 years (or according to the frequency of Klimasken monitoring)

AD13

AVERAGE USABLE CAPACITY OF DRINKING WATER SOURCES FOR THE NEEDS OF THE CITY / CITY DISTRICT / MUNICIPALITY PER CAPITA OF THE CITY/CITY DISTRICT/MUNICIPALITY

Urban influence

The city/city district/municipality can influence the protection of water resources through statements on possible investment activities that could endanger water resources (construction in protection zones, construction of golf courses, water works, etc.), but especially by the consistent incorporation of water resources protection conditions in elaboration of SPD (Spatial Planning Documentation) in all stages, as well as educational activities. Cities/city districts/municipalities should focus on monitoring trends in changes in public water supply reserves (for example by requesting and processing regular reports from water companies and discussing them in the city/city district/municipality) and at the same time preparing perspective scenarios for further development, rationalizing water consumption as natural resource and reduce the pressure on its removal from the natural environment, etc.

Presentation method

The results will be presented in a single Klimasken framework on a five-step scale according to specified intervals:

Responsibility

Klimasken processor, city/city district/municipality

AD14

FOREST VEGETATION PRONE TO DROUGHT

Number	AD14
Indicator name	Forest vegetation prone to drought
Area	A
Indicator definition	The indicator reflects the share of forest stands prone to drought threat as one of the consequences of the impacts of climate change on the total area of forest stands.
Indicator unit	%
Key words	Forestry, drought, fires
Reason for tracking and usability	Forests will be threatened mainly by drought due to the expected decrease in the total amount of precipitation activity depending on the location, as well as changes in precipitation activity during the year (changes in temporal and spatial distribution of precipitation), high evaporation and evapotranspiration, as well as accelerated runoff. Forest stands provide a full range of ecosystem services for cities/city districts/municipalities and their inhabitants. Other threats will be posed by more frequent possible fires (especially in pines). It is possible to expect a similar effect on non-forest woody vegetation with a transition to steppe to forest-steppe vegetation communities.
Completeness, representativeness, validity	The indicator does not take into account the vegetation type, health status, composition of trees. However, with the decrease of the groundwater level and the permanent decrease of the usable water capacity, the problem concerns most tree species. There are several perspectives on the issue, either data and map processing in relation to long-term drought stress, or the processing of this phenomenon in a particular year on the basis of moisture balance.
Description of data processing	On the basis of information from professional organizations and from publicly published reports, information is obtained on the acreage of forest stands endangered by drought, which relate to forest stands in the cadastral territory of the evaluated city/city district/municipality.

AD14

FOREST VEGETATION PRONE TO DROUGHT

Data source	Data sources directly from professional workplaces of environment and nature protection, State Nature Protection of the Slovak Republic, forest managers, department of the city/municipal office/local authority of the city district (mainly the department of spatial plan, environment) strategic development documents of the city/city district/municipality (PHaSR – Program of economic and social development), departmental documents and reports.
Tracking frequency	1 x 2 years (or according to the frequency of Klimasken monitoring)
Urban influence	The city/city district/municipality can influence the quality of forest stands, including the selection of suitable species, more adapted to changed climatic conditions through opinions on the FMP (Forest Management Program) as well as awareness-raising activities.
Presentation method	
Responsibility	Klimasken processor, city/city district/municipality

AD15

AMOUNT OF RAINWATER CAPTURED IN CADASTRAL AREA

Number	AD15
Indicator name	Amount of rainwater captured in cadastral area
Area	A
Indicator definition	The amount of rainwater captured in the area by the elements of sustainable rainwater management. It can be the capture of rainwater in retention tanks (surface, underground tanks) and its subsequent secondary use, or the capture of rainwater in the elements allowing seepage, (surface or subsurface). The volume of dry reservoirs (dry polders) and water bodies filling primarily for other purposes (ponds) is not included.
Indicator unit	m^3 /pers.
Key words	Rainwater, nature-based solutions, microclimate, biodiversity, summer heat, retention reservoirs, rain gardens
Reason for tracking and usability	Since the 1970s, close-to-nature drainage of cities has been promoted, which is based on the principle of preserving or imitating, as far as possible, the natural drainage features of the site before urbanization. The basis of this concept is the so-called a decentralized method of drainage that deals with precipitation runoff at the point of origin and returns it to the natural water cycle. In the narrowest sense, these are nature-friendly measures and devices that promote evaporation, infiltration and slow runoff into the local water cycle. In a broader sense, this also includes facilities that contribute at least in some way to the preservation of the natural water cycle and to the protection of watercourses, e.g. accumulation and use of rainwater or retention and regulated (delayed) runoff into surface waters or sewers. Thus, the support of precipitation runoff is the support of one of the components of the water cycle. In addition, the capture of rainwater in retention tanks and its subsequent use for irrigation or flushing saves drinking water resources, as well as has a positive effect on slowing down runoff in heavy rainfall.

Completeness, representativeness, validity

A prerequisite for completeness and representativeness is a detailed analysis of the entire administrative territory and good knowledge of all areas.
A prerequisite for sufficient validity is a good knowledge of the actual condition of built-up and impermeable areas and the method of their drainage. All data must be current, based on the actual state. Within Klimasken, the indicator is linked to descriptive indicators (area and share of different types of areas), exposure indicators (share of tropical days and nights, climatic drought), other indicators of sensitivity and adaptive capacity (drinking water consumption) and readiness indicators (area of areas converted to blue-green infrastructure).

The indicator counts the amount of rainwater that is captured and further solves either:
A. retention
or
B. infiltration
A) During retention, retention tanks with possible secondary use, both surface and underground, which have a protective, regulating and storage function are counted.
B) In case of infiltration, various surface and subsurface infiltration devices (infiltration blocks, shafts, rain gardens, infiltration gaps, etc.) are counted.
The first step is to determine the theoretical volume of rainwater (Vr), which will fall on the territory of the city/city district/municipality according to the formula:
Vr = (year*A1*C1) + (year*A2*C2) + (year*A3*C3) (l/year)
year = average annual total precipitation for the given locality, which is a freely available data (e.g. for Bratislava it is approximately 742.9 mm/year: http://www.bvsas.sk/sk/zakaznicka-zona/dalsie-sluzby/zrazkove-vody/).
C = rainwater runoff coefficient for a given area with a given surface type
A1 = area of impermeable and built-up areas (100-75 % built-up area) for the given city/city district/municipality in m2, C1 = 55 %
A2 = area of green areas with partially impermeable surfaces (55 % built-up area) for the given city/city district/municipality in m2, C2 = 30%
A3 = area of green areas with fully permeable surfaces (0-10 % built-up area) for the given city/city district/municipality in m2, C2 = 10 %
From the volume of rainwater (Vr) thus determined, which would flow out of the area, the volume of rainwater which is retained in the area and allowed to soak in and / or leads to the retention elements is deducted.

Description of data processing	
Data source	The source of data is the departments of the city/municipal office/local authority of the city district (mainly the department of spatial plan, greenery or the environment, map GIS data, open data including satellite imaging (CORINE, LandCover, Copernicus Land Monitoring Service – Urban Atlas (land.copernicus.eu), The Landsat Program (landsat.gsfc.nasa.gov), ESRI basemaps (arcgis.com), Google maps (maps.google.com). Identification of areas is also possible according to URBIs (http://urbis.gisat.cz/tool/) and OpenStreetMap (OSM). The average annual total precipitation for a given locality is available on the website of the water management company (for example https://www.stvps.sk/zrazkove-vody/SHMU (data on total precipitation).
Tracking frequency	1 x 2 years (or according to the frequency of Klimasken monitoring)
Urban influence	The indicator covers all elements of sustainable rainwater management, regardless of the owner. The city/city district/municipality can influence the amount and character of elements of sustainable rainwater management only in the areas and buildings under its administration. Buildings and drainage of open spaces on the areas of other owners, the city/city district/municipality can operate by consistent application of VZN (Generally binding regulations), rules in spatial planning, application of appropriate regulations of spatial development and construction through both financial instruments (grant programs) and awareness-raising activities.
Presentation method	The results will be presented in a single Klimasken framework on a five-step scale according to specified intervals:
Responsibility	Klimasken processor, city/city district/municipality

AD16

NUMBER OF EXTRAORDINARY CLIMATIC EVENTS

Number	AD16
Indicator name	Number of extraordinary climatic events
Area	A
Indicator definition	An extraordinary climatic event is considered to be the occurrence of weather when the event (eg the length of heat waves, or their frequency, rainfall intensity, number of days of soil drought, storm, etc.) causes significant health, material, environmental and other damage. The indicator assesses the average number of extraordinary climatic events over the last 5 years.
Indicator unit	počet
Key words	Extreme weather, damage, extraordinary climatic event
Reason for tracking and usability	Extreme weather events, the intensity and frequency of which worsen with climate change, cause minor or major problems, e.g. in transport, in water management, with the safety of citizens, in the local economy, in the provision of services, etc. In the event that the damage caused by these extraordinary events increases, it expresses both the sensitivity of the systems to such phenomena and at the same time the readiness of the city / city district / municipality to respond to it.
Completeness, representativeness, validity	The indicator is not sufficiently representative and only illustrates the situation in terms of the ability of the city / city district / municipality to adapt to the impacts of climate change. The limit of the indicator lies in its ambiguous nature, because neither the quantitative severity of the weather phenomenon nor the size of the damage it will cause is assessed. Another limit is the determination of the "significance" of the damage to the weather event to determine whether / not it meets the criterion of an exceptional climatic event. The degree of "significance" itself is determined by the individual city / city district / municipality on the basis of local conditions.

AD16

NUMBER OF EXTRAORDINARY CLIMATIC EVENTS

Description of data processing	The average number of extraordinary climatic events in a given area over the last 5 years that have caused significant damage. The average number is calculated as the ratio of the sum of all extraordinary climatic events in the city / city district / municipality and the sum of the years of the observed period
Data source	SHMÚ, Integrated Rescue System (IRS), Department of Civil Protection of the City, Crisis Staff of the City / City District / Municipality / District
Tracking frequency	Once a year
Urban influence	The city/city district/municipality cannot influence this indicator in any significant way, rather only in cooperation with the components of the integrated rescue system (IRS) and the district office influences this indicator on the one hand by a targeted information campaign, recommendations and regulation.
Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals
Responsibility	KLIMASKEN processor, city/city district/municipality, IRS

EMI1

CONSUMPTION OF DISTRICT HEAT

Number	EMI1
Indicator name	Consumption of district heat
Area	M
Indicator definition	The indicator monitors the total consumption of district heat within the administrative territory of the city/city district/municipality, regardless of the place and source of heat production. Heat consumption is then converted to the corresponding greenhouse gas emissions. It includes consumption in the households, public buildings, enterprises and services sectors (small customers, medium and large customers). It is necessary to identify heat sources; resp. use the national heat production factor. Heat sources should be divided according to the types of fossil fuels and non-fossil heat sources. Fossil heat sources included in the calculation tool: natural gas, coal (black and brown), fuel oil. Non-fossil sources: biofuels, biogas, biowaste, solar heat production, environmental energy (heat pumps), cogeneration, or combination of these resources.
Indicator unit	kg CO_2e/pers.
Key words	Energy, heat
Reason for tracking and usability	Heat consumption makes up a significant part of the total greenhouse gas emissions from the city/city district/municipality, about 50-60 % of the total emissions under current conditions in the Czech Republic and Slovakia. From the point of view of mitigation, it is a key indicator and it is necessary to determine the heat sources (share of individual heat sources) and the sectoral composition of heat consumption (households, the public sphere, companies).
Completeness, representativeness, validity	The indicator is sufficiently representative when the data on the predominant heat source (type of fuel, technology used) used within the central heat supply system can be obtained within the city/city district/municipality. Furthermore, it is necessary to collect data on the share of resources within individual heating points. The validity of the indicator decreases if the heat source is not known and the universal values of the emission factor for heat production in the given country are used.

CONSUMPTION OF DISTRICT HEAT

Description of data processing

In the first step, it is necessary to identify and address the sources and distributors of heat that is consumed in the city/city district/municipality and obtain data on the consumption of individual fossil and non-fossil heat sources for a given calendar year. It does not matter whether the heat source is located in the city/city district/municipality or outside them, the heat consumption in the city/city district/municipality is important. Subsequently, the data processing branches according to the success of this step:

1) It is possible to find the specific emission factor of district heat and consumption (MIT1_3)
In this case, check the box either "without cogeneration" or "with cogeneration", and enter the obtained emission factor in the first field, select its unit and then enter the heat consumption. Note: the district heat emission factor corresponds to values between 0 (biomass) and 135 kg CO2e / GJ (coal).

2) It is not possible to find a specific emission factor for district heating, but we know the predominant source of heating.
In this case, check the "I do not know" box, enter the consumption and, in addition to selecting the unit, also select the predominant heating source (natural gas, coal, biomass, fuel oil and mix).

3) It was only possible to obtain information that the source has or does not have cogeneration
In this case, check the box either "without cogeneration" or "with cogeneration" and enter the heat consumption in GJ in the second field (the unit converter is here: https://www.tzb-info.cz/tabulky-a-vypocty/49- converter-units). The average value 85 for normal heat production is taken into account in the calculation.

The consumption of fuels and energy for heat production is then converted within the instrument according to general emission factors into the corresponding greenhouse gas emissions and these are related to one inhabitant of the city/city district/municipality.

Data source

The primary source of data is the heat producers/distributors for the given city/district/municipality. Secondary sources are energy concepts of municipalities or regions, census data and other data on energy.

EMI1

CONSUMPTION OF DISTRICT HEAT

Tracking frequency	Once a year, or once every 2 years
Urban influence	The city/city district/municipality and the organizations managed by them can directly influence the heat consumption in their facilities. If they have a property or other connection to the heat producer, they can act to change the energy sources used and increase efficiency. In the case of other heat sources (e.g. individual heating points) they have only an indirect effect, e.g. the possibility of acting on citizens or offering a contribution/subsidy for the replacement of the boiler.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Processor KLIMASKEN, city, city district, municipality

EMI2

ELECTRICITY CONSUMPTION

Number	EMI2
Indicator name	Electricity consumption
Area	M
Indicator definition	Total electricity consumption within the administrative territory of the city/city district/municipality, regardless of the place of production. Consumption is then converted to the corresponding greenhouse gas emissions. Includes consumption in the household, public buildings, business and services sectors (retail, medium and large).
Indicator unit	kg CO_2e/pers.
Key words	Energy, electricity
Reason for tracking and usability	The production (and thus consumption) of electricity, especially from fossil fuels, is a significant source of greenhouse gas emissions. The share of total GHG emissions related to cities/city district/municipalities is around 20 %. The size of emissions will affect the way electricity is produced in a given country (energy mix). The reason for monitoring is the mentioned weight of the indicator on total emissions and the relatively simple possibility of obtaining data for the whole city/city district/municipality. It is also possible to obtain a sectoral structure of electricity consumption (households, the public sector, small and large enterprises).
Completeness, representativeness, validity	The indicator sufficiently represents the observed phenomenon. If it is possible to collect data for all sectors in the city/city district/municipality (households, public sphere, businesses), it is also complete. The validity is reduced by the fact that the national energy mix and the corresponding emission factor are used for the determined emissions from electricity consumption. Therefore, it does not reflect the share of individual sources of electricity that is consumed in the city/city district/municipality (marked-based emission factor for electricity). These data at the level of the city/city district/municipality cannot be obtained, they can only be found at the level of the building. The validity of the indicator is further reduced if it is not possible to obtain information directly from distributors, but other, more general data sources are used (energy concept, energy regulatory authority, regional level, etc.).

EMI2

ELECTRICITY CONSUMPTION

Description of data processing	The total electricity consumption in the city/city district/municipality is the sum of the consumption of small and large customers for a given calendar year. Data on electricity consumption per city/city district/municipality must be obtained centrally from the distribution company (see data sources). The values in MWh within the instrument are converted according to the relevant emission factor for electricity in the given state (location-based) to the corresponding greenhouse gas emissions and these are related to one inhabitant of the city/city district/municipality.
Data source	The only source of data for this indicator is the relevant distribution company. If it is not possible to obtain data on electricity consumption for a city/city district/municipality, it is possible to recalculate it to the number of inhabitants of the city/city district/municipality from regional data. These are published by the Energy Regulatory Office (ERO). However, this procedure significantly reduces the accuracy of the calculation and the specificity of the city/city district/municipality.
Tracking frequency	Once a year, or once every 2 years
Urban influence	The city/ district/municipality and the organizations managed by them can directly influence the consumption of electricity in their facilities and on their property. They can install their own low-carbon renewable energy sources on their assets and can implement cost-saving measures and support the development of electromobility infrastructure. In the case of other sectors (households, businesses), they have only an indirect impact on electricity consumption and sources.
Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Klimasken processor, city/city district/municipality, heat distributors

EMI3

CONSUMPTION OF NATURAL GAS

Number	EMI3
Indicator name	Consumption of natural gas
Area	M
Indicator definition	Total consumption of natural gas within the administrative territory of the city/city district/municipality. Consumption is then converted to the corresponding greenhouse gas emissions. Includes consumption in the household, public buildings, business and services sectors (retail, medium and large).
Indicator unit	kg CO_2e/pers.
Key words	Energy, natural gas
Reason for tracking and usability	Extraction, distribution and combustion of natural gas is a significant source of greenhouse gas emissions. Natural gas in cities/city districts/municipalities is used mainly for heat production (central heat production is included in the MIT1 indicator) and for other purposes in households. The reason for monitoring is the mentioned weight of the indicator on total emissions and the relatively simple possibility of obtaining data for the whole city/city district/municipality. It is also possible to obtain a sectoral composition of natural gas consumption (households, the public sphere, enterprises – small customers, medium consumption and large customers).
Completeness, representativeness, validity	he indicator is sufficiently representative when within the city/city district/municipality it is possible to obtain data on natural gas consumption for the city/city district/municipality from distributors. Validity and representativeness are affected by the fact that there may be double counting of natural gas consumption (for heat production and within a separate indicator). This must be prevented by thorough control of the input data. It reduces the validity of the indicator if it is not possible to obtain information directly from distributors, but other data sources are used (energy concept, Energy Regulatory Office, regional level, etc.).

CONSUMPTION OF NATURAL GAS

Description of data processing	In the first step, it is necessary to contact the distributors of natural gas (see data sources), which is consumed in the city/city district/municipality, and obtain data on the total consumption and consumption for individual sectors. The gas consumption values (in GJ, m3 or MWh) are converted within the instrument according to the relevant emission factor for natural gas in the given country to the corresponding greenhouse gas emissions and these are related to one inhabitant of the city/city district/municipality.
Data source	The primary source of data is regional natural gas distributors for a given city/city district/municipality (not to be confused with traders, of which there is a large quantity and only pre-sell natural gas). Secondary sources are energy concepts of cities/city districts/municipalities or regions, census data and other data on energy.
Tracking frequency	Once a year, or once every 2 years
Urban influence	The city/city district/municipality and the organizations managed by them can directly influence the consumption of natural gas in their facilities. They can implement austerity measures and support the development of natural gas (CNG) infrastructure. In the case of other sectors (households, businesses), they have only an indirect impact on natural gas consumption.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Processor KLIMASKEN, city, city district, municipality

Number	EMI4
Indicator name	Transport performance in individual car transport
Area	M
Indicator definition	Total performance of passenger cars used by residents of the city/city district/municipality and other entities (public sector) in passenger-kilometers (journeys of persons residing in the city/city district/municipality around the city / city district / municipality and outside the city/city district/municipality). Power is then converted to the corresponding greenhouse gas emissions from internal combustion engines. It is advisable to determine the amount of car sharing.
Indicator unit	kg CO_2e/pers.
Key words	Individual transport, cars
Reason for tracking and usability	The transport sector contributes to about a quarter of greenhouse gas emissions in cities in the Czech Republic and Slovakia. Reducing greenhouse gas emissions from transport will have a relatively significant impact in terms of overall mitigation policy. The reason for monitoring is the mentioned weight of the indicator on total emissions and the importance of passenger car transport for most citizens. In addition to mitigation, the indicator is also linked to transport policy, environmental protection policy (environment) and, indirectly, other aspects of the functioning of cities/city districts/municipalities (possibility of parking in cities /city districts/municipalities, link to adaptations, etc.).
Completeness, representativeness, validity	The limit of completeness and representativeness of the indicator is the possibility of data collection. The preferred method is a questionnaire survey of a representative sample of the population. This sample also includes children (age category 0-15). The indicator does not include business trips. Only regular trips to work, school, shopping, doctor and leisure time by car are recorded. Road freight transport is also not included in the indicator. The results therefore rather underestimate the total greenhouse gas emissions related to road transport.

Description of data processing	The most accurate data for the city/city district/municipality can be obtained by performing a standardized research "Mobility and local transport". Data are obtained directly from a survey of a statistically significant sample of the population living in a city/city district/municipality. A simple questionnaire can be used for this purpose. The sample size should be at least 4 % of the population of the town/city district/municipality, depending on its size. The obtained data on the number of journeys by car, their length and ride-in must be statistically evaluated and recalculated into the necessary units - "passenger-kilometres" per inhabitant of the city/city district/municipality and year.
Data source	The primary source of data is personal mobility surveys in the city/city district/ municipality. If it is not possible to determine the number of passenger-kilometres for individual modes of transport in this way, less accurate methods based on traffic data at the regional level may be used. However, the use of this data is less accurate and does not correspond to the specifics of the city/city district/municipality.
Tracking frequency	Once every 2 years
Urban influence	The city/city district/municipality and the organizations managed by them can only directly affect mobility within company vehicles (e.g. the possibility of replacing cars with internal combustion engines with hybrids or electric cars). In addition, they can promote car alternatives - public transport, bicycle and pedestrian transport and actively restrict individual car traffic in cities/city districts/municipalities through a mix of different measures. The overall values of the indicator are mainly influenced by citizens through their behaviour and choice of personal mobility.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Processor KLIMASKEN, city, city district, municipality

EMI5

CONSUMPTION OF COAL (BROWN, BLACK) WITHIN THE ADMINISTRATIVE TERRITORY OF THE CITY/CITY DISTRICT/MUNICIPALITY

Number	EMI5
Indicator name	Consumption of coal (brown, black) within the administrative territory of the city/city district/municipality
Area	M
Indicator definition	Total coal consumption (brown, black) within the administrative territory of the city/city district/municipality. Includes consumption in the household, public buildings, business and services sectors. The values of coal consumption under the instrument are converted according to the relevant emission factor for coal into corresponding greenhouse gas emissions and these are related to one inhabitant of the city/city district/municipality.
Indicator unit	kg CO_2e/pers.
Key words	Coal, energy, fossil fuels
Reason for tracking and usability	Direct coal combustion is not as important in the energy mix of most cities/city districts/municipalities as other fuels, yet it is an important source of greenhouse gas emissions. The goal of both EU and national climate policy is to gradually reduce coal mining and replace coal with non-fossil energy sources.
Completeness, representativeness, validity	The indicator includes only the direct consumption of coal in the city. Representativeness is limited by the fact that it is relatively difficult to obtain data on coal consumption because there are no central distributors at national level, as is the case for natural gas and electricity. In the case of a heating plant or boiler room supplying houses or their groups with heat that burns coal, we count this coal consumption in the MIT1 indicator (otherwise there will be double counting).
Description of data processing	In the first step, it is necessary to obtain data on the total consumption of hard coal and lignite (in mass or energy units). Subsequently, the coal consumption is converted according to the relevant emission factor into greenhouse gas emissions and these are related to one inhabitant of the city/city district/municipality.

EMI5

CONSUMPTION OF COAL (BROWN, BLACK) WITHIN THE ADMINISTRATIVE TERRITORY OF THE CITY/CITY DISTRICT/MUNICIPALITY

Data source	In the first step, it is necessary to contact local coal sellers. If it is not possible to determine the data on coal consumption at the local level, it is possible to perform a conversion per inhabitant of the city/city district/municipality from the last census of inhabitants, houses and flats, which includes data on the number of households burning solid fuels. Secondary sources are energy concepts of municipalities or regions and other data on energy. It is also possible to use tabular values of coal consumption for heating per apartment, but the validity of the calculation then decreases.
Tracking frequency	Once a year, or once every 2 years
Urban influence	The city/ districts/municipalities and the organizations managed by them can directly influence the consumption of coal in their facilities and in contributory organizations. This is rather exceptional nowadays, coal combustion in individual combustion plants predominates. Some cities/city districts/municipalities or higher territorial units support their citizens to replace solid fuel boilers through subsidies.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Processor KLIMASKEN, city, city district, municipality

EMI6

CONSUMPTION OF OTHER FOSSIL FUELS (PROPANE-BUTANE, HEATING OIL, OTHERS) WITHIN THE ADMINISTRATIVE TERRITORY OF THE CITY/CITY DISTRICT/MUNICIPALITY

Number	EMI6
Indicator name	Consumption of other fossil fuels (propane-butane, heating oil, others) within the administrative territory of the city/city district/municipality
Area	M
Indicator definition	Total consumption of other fossil fuels (propane-butane, heating oil, diesel, petrol, LPG) within the administrative territory of the city/city district/ municipality. Includes consumption in the household, public buildings, business and services sectors (retail, medium and large).
Indicator unit	kg CO_2e/pers.
Key words	Energy, fossil fuels
Reason for tracking and usability	Direct combustion of other fossil fuels (propane-butane, heating oil, diesel, petrol, LPG) is not as important in the energy mix of most cities/city district/municipalities as other fuels, yet it is an important source of greenhouse gas emissions. The aim of both EU and Member States' climate policy is to gradually replace these fuels with other energy sources.
Completeness, representativeness, validity	The indicator is sufficiently representative when data on the consumption of these fuels by individual consumers, distributors and energy sources can be obtained within the city/city district/municipality. The validity of the indicator decreases if general data are taken from statistics or a higher level (e.g. region) and recalculated per capita. This is not consumption in the transport sector, only in the energy and heat production sectors.
Description of data processing	In the first step, it is necessary to address the sources and distributors of fossil fuels (propane-butane, heating oil, diesel, gasoline, LPG) that are consumed in the city/city district/municipality and obtain data on their total consumption (in mass or energy units). Subsequently, their consumption is recalculated according to the relevant emission factor for greenhouse gas emissions and they are related to one inhabitant of the city/city district/municipality.

EMI6

CONSUMPTION OF OTHER FOSSIL FUELS (PROPANE-BUTANE, HEATING OIL, OTHERS) WITHIN THE ADMINISTRATIVE TERRITORY OF THE CITY/CITY DISTRICT/MUNICIPALITY

Data source	The primary source of data is producers/distributors of heat of the given fossil fuels (propane-butane, heating oil, diesel, petrol, LPG). Secondary sources are energy concepts of municipalities or regions, census data and other data on energy.
Tracking frequency	Once a year, or once every 2 years
Urban influence	The city/city district/municipality and the organizations managed by them can directly influence the consumption of the given fuels in their facilities. If they have a property or other connection to the heat producer, they can act to change the energy sources used and increase efficiency. In the case of other heat sources (e.g. individual heating points) they have only an indirect effect, e.g. the possibility of acting on citizens or a contribution to the replacement of the boiler.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Processor KLIMASKEN, city, city district, municipality

EMI8

TRANSPORT PERFORMANCE IN PASSENGER RAIL TRANSPORT

Number	EMI8
Indicator name	Transport performance in passenger rail transport
Area	M
Indicator definition	Total performance of rail transport used by residents of the city/city district /municipality and other entities (public sector - business trips) in passenger-kilometers (journeys of persons residing in the city/city district/municipality around the city/city district/municipality and outside the city/city district/village). These are public transport (trams) and passenger transport by rail. The output is then converted to the corresponding greenhouse gas emissions.
Indicator unit	kg CO_2e/pers.
Key words	Public transport, rail transport
Reason for tracking and usability	The transport sector contributes to about a quarter of greenhouse gas emissions in cities in the Czech Republic and Slovakia. Reducing greenhouse gas emissions from transport will have a relatively significant impact in terms of overall mitigation policy. The reason for monitoring is that the aim of mitigation policy should be, especially in cities, a growing share of public transport in total passenger transport performance. In the future, bus transport may also use low-emission fuels or zero-emission electricity for trolleybuses and produce zero direct emissions. In addition to mitigation, the indicator is also linked to transport policy, environmental protection policy and, indirectly, other aspects (possibility of parking in cities, link to adaptations, etc.).
Completeness, representativeness, validity	The limit of completeness and representativeness of the indicator is the possibility of data collection. The preferred method is a questionnaire survey of a representative sample of the population. This sample also includes children (age category 0-15).

Description of data processing	We obtain the most accurate data for the municipality by conducting a standardized research "Mobility and local transport". The data are obtained directly from a survey of a statistically significant sample of the population living in the city. A simple questionnaire can be used for this purpose. The sample size should be at least 4% of the municipality's population, depending on its size. The obtained data on the number of trips by bus and trolleybus transport and their length need to be statistically evaluated and recalculated into the necessary units - "passenger-kilometers" per inhabitant of the municipality and year.
Data source	The primary source of data is personal mobility surveys in the city. If it is not possible to determine the number of passenger-kilometers for individual modes of transport in this way, less precise methods based on transport data at the regional level can be used. These mobility data are regularly published by the Ministry of Transport within the Transport Yearbook, Official Statistics or other surveys of passenger transport in urban public transport. However, the use of this data is less accurate and does not correspond to the specifics of the city / district / municipality.
Tracking frequency	Once every 2 years
Urban influence	The city/city district /municipality and the organizations managed by it can support public transport, bicycle transport and pedestrian transport and actively restrict individual car transport in cities/city districts/municipalities through a mix of different measures. Both the state and private companies can invest in the growing quality of bus transport between cities. The overall values of the indicator are mainly influenced by the citizens by their behavior.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Processor KLIMASKEN, city, city district, municipality

EMI9

TRANSPORT PERFORMANCE IN PASSENGER BUS AND TROLLEYBUS TRANSPORT

Number	EMI9
Indicator name	Transport performance in passenger bus and trolleybus transport
Area	M
Indicator definition	Total performance of bus and trolleybus transport used by residents of the city/city district/municipality and other entities (public sector – business trips) in passenger-kilometers (journeys of persons residing in the city/ city district/municipality around the city/city district/municipality and outside the city/city district/municipality. These are public transport (buses and trolleybuses) and intercity bus transport. It can be supplemented by business trips of public sector representatives. The output is then converted to the corresponding greenhouse gas emissions.
Indicator unit	kg CO_2e/pers.
Key words	Public transport, bus transport
Reason for tracking and usability	The transport sector contributes to about a quarter of greenhouse gas emissions in cities in the Czech Republic and Slovakia. Reducing greenhouse gas emissions from transport will have a relatively significant impact in terms of overall mitigation policy. The reason for monitoring is that the aim of mitigation policy should be, especially in cities, a growing share of public transport in total passenger transport performance. Bus transport can also use low-emission fuels in the future, or zero-emission electricity for trolleybuses, and produce zero direct emissions. In addition to mitigation, the indicator is also linked to transport policy, environmental protection policy (ENP) and, indirectly, other aspects (possibility of parking in cities / boroughs / municipalities, link to adaptations, etc.).
Completeness, representativeness, validity	The limit of completeness and representativeness of the indicator is the possibility of data collection. The preferred method is a questionnaire survey of a representative sample of the population. This sample usually also includes children (age category 0–15).

EMI9

TRANSPORT PERFORMANCE IN PASSENGER BUS AND TROLLEYBUS TRANSPORT

Description of data processing	The most accurate data for the city/city district/municipality can be obtained by carrying out a standardized research "Mobility and local transport". Data are obtained directly from a survey of a statistically significant sample of the population living in a city/city district/municipality. A simple questionnaire can be used for this purpose. The sample size should be at least 4% of the population of the town / district / municipality, depending on its size. The obtained data on the number of bus and trolleybus journeys and their length must be statistically evaluated and recalculated into the necessary units - "passenger-kilometers" per inhabitant of the city / city / municipality and year.
Data source	The primary source of data is personal mobility surveys in the city/city district/municipality. If it is not possible to determine the number of passenger-kilometres for individual modes of transport in this way, less accurate methods based on transport data at the regional level may be used. However, the use of this data is less accurate and does not correspond to the specifics of the city/city district/municipality.
Tracking frequency	Once every 2 years
Urban influence	The city/city district/municipality and the organizations managed by them can support public transport, bicycle transport and pedestrian transport and actively limit individual car transport in cities/city districts/municipalities through a mix of different measures. Both the state and private companies can invest in the growing quality of bus transport between cities. The overall values of the indicator are mainly influenced by citizens through their behavior.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Processor KLIMASKEN, city, city district, municipality

EMI10

TRANSPORT PERFORMANCE IN AIR TRANSPORT

Number	EMI10
Indicator name	Transport performance in air transport
Area	M
Indicator definition	Total length of air journeys in passenger-kilometres (private and business journeys of persons residing in a city/city district/municipality. It is possible to supplement the business trips of public sector representatives. Air transport performance is then converted to the corresponding greenhouse gas emissions.
Indicator unit	kg CO_2e/pers.
Key words	Air transport
Reason for tracking and usability	Emissions from aviation have an impact of about 3% on total global greenhouse gas emissions. A large part of these emissions are personal holiday travel (or business trips), which are related to the inhabitants of the city. In addition to mitigation, the indicator is also linked to transport policy, environmental protection policy and, indirectly, other aspects such as noise, pollution, land use, etc.
Completeness, representativeness, validity	The limit of completeness and representativeness of the indicator is the possibility of data collection. The preferred method is a questionnaire survey of a representative sample of the population. This sample also includes children (age category 0–15). Air freight is not included in the indicator. The results therefore rather underestimate the total greenhouse gas emissions related to aviation.
Description of data processing	The most accurate data for the city/city district/municipality can be obtained by conducting a standardized research "Mobility and local transport". The data are obtained directly from a survey of a statistically significant sample of the population living in the city. A simple questionnaire can be used for this purpose. The sample size should be at least 4% of the municipality's population, depending on its size. The obtained data on the number of air travel and their length need to be statistically evaluated and recalculated to the necessary units – "passenger-kilometers" per inhabitant of the village and year.

Data source	The primary source of data is personal mobility surveys in the city/city district/municipality. If it is not possible to determine the number of passenger-kilometres for individual modes of transport in this way, less accurate methods based on transport data at the regional level may be used. However, the use of this data is less accurate and does not correspond to the specifics of the city/city district/municipality.
Tracking frequency	Once every 2 years
Urban influence	City/city district/municipality will have very little effect on this indicator. Cities with airports have a certain decision-making power (permitting the construction of new runways and expanding airports). The overall values of the indicator are mainly influenced by citizens through their behaviour.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Processor KLIMASKEN, city, city district, municipality

EMI13

AMOUNT OF MIXED MUNICIPAL WASTE DISPOSED OF IN LANDFILLS

Number	EMI13
Indicator name	Amount of mixed municipal waste disposed of in landfills
Area	M
Indicator definition	The total amount of municipal waste produced, generated in the city/city district/municipality (after removal of sorted components) per year, which was disposed of at a municipal waste landfill. The amount of waste is then converted to the corresponding greenhouse gas emissions.
Indicator unit	kg CO_2e/pers.
Key words	Waste, waste management, landfilling
Reason for tracking and usability	In total, waste production represents 3 – 10 % of greenhouse gas emissions in the cities of the Czech Republic and the Slovak Republic. Reducing the production of municipal waste through the prevention of waste generation or better utilization of waste and the introduction of the principles of circular economy therefore has a significant mitigation potential. The area of municipal waste management is in the competence of cities and this is the reason for including the indicator in Klimasken.
Completeness, representativeness, validity	The indicator is sufficiently representative if data on municipal waste management can be obtained. These are compulsorily reported for cities/city districts/municipalities, either by the statistical office or as part of environmental reporting. Validity can be reduced by the fact that the classification of waste according to the waste catalog and disposal methods is in some cases inaccurate and misleading.

EMI13

AMOUNT OF MIXED MUNICIPAL WASTE DISPOSED OF IN LANDFILLS

Description of data processing	It is necessary to obtain data on the generated municipal waste from the statistics of waste production from the city. Municipal waste is all waste generated on the territory of the municipality during the activities of natural persons, which is listed as municipal waste in the law, with the exception of waste from entrepreneurs included in other categories. Municipal waste is also considered to be all waste generated in the municipality from trades, offices and the like, which is practically identical in composition to municipal waste. This is referred to as "municipal waste". Separately collected components are part of municipal waste. The input data of the indicator is the weight of municipal waste produced in the municipality per year without components of separate collection (plastics, paper, glass, metals, biodegradable waste) and without hazardous waste. Only unsorted municipal waste, which is disposed of at landfills, is included in the calculation of the indicator. The production of municipal waste disposed of in landfills is then recalculated within the instrument according to general emission factors into the corresponding greenhouse gas emissions, and these are related to one city inhabitant.
Data source	The primary source of data is the city/city district/municipality - environmental department, which keeps waste statistics. Furthermore, it is possible to correct the data by using the records of the operator of the local waste management system, which ensures the removal and disposal of waste (e.g. technical services).
Tracking frequency	Once every year
Urban influence	The city/city district/municipality and the organizations managed by them can directly influence the production and sorting of municipal waste in their facilities. They can also improve the sorting system (reachability, amount of sorted waste components) and raise awareness of citizens for better waste management.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Processor KLIMASKEN, city, city district, municipality

EMI14

AMOUNT OF MIXED MUNICIPAL WASTE DISPOSED OF BY INCINERATION

Number	EMI14
Indicator name	Amount of mixed municipal waste disposed of by incineration
Area	M
Indicator definition	The total amount of municipal waste generated generated in the city/city district/municipality (after removal of sorted components) per year that was incinerated in the waste incinerator. The amount of waste is then converted to the corresponding greenhouse gas emissions.
Indicator unit	kg CO_2e/pers.
Key words	Waste, waste management, incineration
Reason for tracking and usability	In total, waste production represents 3 – 10 % of greenhouse gas emissions in the cities of the Czech Republic and the Slovak Republic. Reducing the production of municipal waste through the prevention of waste generation or better use of waste and the implementation of waste management principles therefore has a significant mitigation potential. The area of municipal waste management is in the competence of cities and this is the reason for including the indicator in Klimasken. Waste incineration means lower greenhouse gas emissions (in the case of waste heat recovery) than landfilling.
Completeness, representativeness, validity	The indicator is sufficiently representative if data on municipal waste management can be obtained. These are compulsorily reported for cities / city districts / municipalities, either by the statistical office or as part of environmental reporting. Validity can be reduced by the fact that the classification of waste according to the waste catalog and disposal methods is in some cases inaccurate and misleading. It is necessary to determine the proportion of incinerated waste.

EMI14

AMOUNT OF MIXED MUNICIPAL WASTE DISPOSED OF BY INCINERATION

Description of data processing	From the statistics of waste production from the city/city district/municipality, it is necessary to obtain data on the generated municipal waste. Municipal waste is all waste generated on the territory of the municipality during the activities of natural persons, which is listed as municipal waste in the law, with the exception of waste from entrepreneurs included in other categories. Municipal waste is also considered to be all waste generated in the municipality from trades, offices and the like, which is practically identical in composition to municipal waste. This is referred to as "municipal waste". Separately collected components are part of municipal waste. The input data of the indicator is the weight of municipal waste produced in the municipality per year without components of separate collection (plastics, paper, glass, metals, biodegradable waste) and without hazardous waste. Only unsorted municipal waste that is disposed of in waste incinerators (regardless of the location of the incinerators) is included in the calculation of the indicator. The production of municipal waste disposed of by incineration is then recalculated within the instrument according to general emission factors into the corresponding greenhouse gas emissions and these are related to one inhabitant of the city.
Data source	The primary source of data is the city/city district/municipality - environmental department, which keeps impact statistics. Furthermore, it is possible to correct the data by using the records of the operator of the local waste management system, which ensures the removal and disposal of waste (e.g. technical services).
Tracking frequency	Once every year
Urban influence	The city/city district/municipality and the organizations managed by them can directly influence the hazardous waste collection system in their facilities. They can also raise awareness for citizens and businesses about better waste management. They have a co-decision role in deciding on the construction of hazardous waste incinerators.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Processor KLIMASKEN, city, city district, municipality

EMI15

TOTAL HAZARDOUS WASTE PRODUCTION

Number	EMI15
Indicator name	Total hazardous waste production
Area	M
Indicator definition	Total amount of hazardous waste produced per year. This is then converted into corresponding greenhouse gas emissions.
Indicator unit	kg CO_2e/pers.
Key words	Hazardous waste, waste management
Reason for tracking and usability	The production of waste (including wastewater) in total represents 3 – 10 % of greenhouse gas emissions in the cities of the Czech Republic and the Slovak Republic. Reducing the production of hazardous waste by preventing the generation of waste or better recovery of waste and introducing the principles of waste management therefore has considerable mitigation potential. The area of hazardous waste management is in the competence of cities/city districts/municipalities and this is the reason for including the indicator in Klimasken.
Completeness, representativeness, validity	The indicator is sufficiently representative if data on the production of hazardous waste can be obtained. These are compulsorily reported for cities/city districts/municipalities, either by the statistical office or as part of environmental reporting. Validity may be diminished by the fact that the classification of waste according to the waste catalogue and disposal methods is in some cases inaccurate and misleading.

EMI15

TOTAL HAZARDOUS WASTE PRODUCTION

Description of data processing	From the statistics of waste production from the city/city part/municipality, it is necessary to obtain data on the generated hazardous waste. Hazardous wastes include wastes that exhibit at least one hazardous property listed in the Annex to Commission Regulation (EU) No. 1907/2006. 1357/2014 of 18 December 2014. These are e.g. on toxicity, carcinogenicity, mutagenicity, infectivity and ecotoxicity. Examples of hazardous wastes include wastes of polychlorinated biphenyls (PCBs), persistent organic pollutants (POPs), infectious medical wastes or wastes containing mercury or wastes from plants which predominantly use hazardous chemicals in the production process. The input data for the calculation of the indicator is the weight of all hazardous waste collected from the generators in accordance with the law by separate collection of hazardous components of municipal waste. The production of hazardous waste is then recalculated under the instrument according to general emission factors into the corresponding greenhouse gas emissions and these are related to one city inhabitant.
Data source	The primary source of data is the city/city district/municipality - environmental department, which keeps waste statistics. Furthermore, it is possible to correct the data by using the records of the operator of the local waste management system, which ensures the removal and disposal of waste (e.g. technical services).
Tracking frequency	Once every year
Urban influence	The city/city district/municipality and the organizations managed by them can directly influence the hazardous waste collection system in their facilities. They can also raise awareness for citizens and businesses about better waste management. They have a co-decision role in deciding on the constru
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Processor KLIMASKEN, city, city district, municipality

EMI16

WASTEWATER PRODUCTION

Number	EMI16
Indicator name	Wastewater production
Area	M
Indicator definition	The total amount of wastewater generated in the administrative territory of the city/city district/municipality. It is wastewater from households, the public sphere and companies. Can be stated by volume or by means of a pollution indicator (BSK5). This is then converted into corresponding greenhouse gas emissions.
Indicator unit	kg CO_2e/pers.
Key words	Waste water, wastewater treatment, waste
Reason for tracking and usability	The production of waste (including wastewater) in total represents 3 – 10 % of greenhouse gas emissions in the cities of the Czech Republic and the Slovak Republic. Connecting the population to sewage with a final wastewater treatment plant (WWTP) and better wastewater treatment using modern technologies will reduce greenhouse gas (GHG) emissions compared to individual solutions (reservoirs, septic tanks, anaerobic lagoons, etc.). Technologies and equipment enabling anaerobic decomposition of sewage sludge have a significant mitigation potential. The area of wastewater management is in the competence of cities/city districts/municipalities and operators of the relevant water management infrastructure.
Completeness, representativeness, validity	The indicator is sufficiently representative if it is possible to obtain data on the production of waste water and the method of management of this waste water. Validity may be reduced by the fact that general calculation coefficients (e.g. the number of inhabitants connected to the WWTP) are used to calculate the indicator and not specific data on the production of wastewater and sludge. Completeness is further reduced if there is a larger number of non-sewered residents in the given city/city district/municipality and they use individual treatment plants.

WASTEWATER PRODUCTION

Description of data processing	From the sewerage and wastewater treatment plant operator, it is necessary to obtain data on the total production of wastewater in the town/city district/municipality in cubic meters (m3). These are then converted to greenhouse gas emissions according to the relevant emission factor. A more accurate method is provided by more specific data on total pollution at the WWTP inflow, expressed in tonnes of biochemical oxygen demand per calendar year. These are again converted to greenhouse gas emissions according to the corresponding emission factor. Furthermore, it is appropriate to estimate the number of inhabitants living in households not connected to the sewerage system with a final waste treatment plant and to determine the corresponding greenhouse gas emissions according to the relevant coefficient. When calculating the indicator, it does not matter whether the WWTP is located in the territory of the city/city part/municipality or not.
Data source	The primary source of data is the operator of water management infrastructure (sewerage and WWTP). The secondary is a city/city district/municipality – department of the environment, or a statistical office.
Tracking frequency	Once every year
Urban influence	The city/city district/municipality and the organizations managed by it may partially influence the production of wastewater in their facilities, e.g. by introducing technologies to save water consumption or by separate collection of rainwater and sewage. They also have an important say in connecting households to sewers with final WWTPs in areas where they have not yet been built. The overall impact of the city/city district/municipality on the value of the indicator is only indirect, in this case the technologies used in wastewater treatment and the method of sludge management have the greatest role.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Processor KLIMASKEN, city, city district, municipality

EMI17

AMOUNT OF BIODEGRADABLE MUNICIPAL WASTE (BDMW)

Number	EMI17
Indicator name	Amount of biodegradable municipal waste (BDMW)
Area	M
Indicator definition	The total amount of biodegradable municipal waste (BDMW) produced per year. This is then converted into corresponding greenhouse gas emissions. BDMW, generally called biowaste, is any waste that is capable of anaerobic or aerobic degradation (e.g. food, green waste, paper, garden waste, park waste or urban forest waste).
Indicator unit	kg CO_2e/pers.
Key words	Waste, waste management, biowaste
Reason for tracking and usability	In total, waste production represents 3 – 10 % of greenhouse gas emissions in the cities of the Czech Republic and the Slovak Republic. BDMW accounts for about 40 % of mixed municipal waste. Better use of BDMW through its sorting and composting or disposal in a biogas plant has a significant mitigation potential. The area of disposal of BDMW is in the competence of cities/city districts/municipalities and this is the reason for including the indicator in Klimasken.
Completeness, representativeness, validity	The indicator is sufficiently representative if it is possible to obtain data on municipal waste management and the amount of sorted BDMW. These are compulsorily reported for cities/city districts/municipalities, either by the statistical office or as part of environmental reporting. Validity may be diminished by the fact that the classification of waste according to the waste catalogue and disposal methods is in some cases inaccurate and misleading. The indicator also does not include bio-waste generated from industrial processes, food industry, etc., so it rather underestimates the total amount of emissions associated with waste generation.

Description of data processing	From the statistics of waste production from the city/city part/municipality, it is necessary to obtain data on all generated biodegradable municipal waste (BDMW). BDMW is any waste that is capable of anaerobic or aerobic decomposition (e.g. food, green waste, paper, garden waste, park waste or public green waste). It is part of a wider category of municipal waste. It is all waste generated on the territory of the city/city part/municipality in the activity of natural persons, which is listed as municipal waste in the law, with the exception of waste from entrepreneurs classified into other categories. Municipal waste is also considered to be all waste generated in the city/city part/municipality from trades, offices and the like, which is practically identical in composition to municipal waste. The input data of the indicator is the total weight of BDMW generated in the city/city part/municipality. The method and place of liquidation of BDMW are not solved within the determination of the indicator. The production of municipal waste disposed of in landfills is then recalculated within the instrument according to general emission factors into the corresponding greenhouse gas emissions and these are related to one inhabitant of the city/city district/municipality.
Data source	The primary source of data is the city/city district/municipality - department of the environment, which keeps waste statistics. Furthermore, it is possible to correct the data by using the records of the operator of the local waste management system, which ensures the removal and disposal of BRKO waste (e.g. technical services).
Tracking frequency	Once every year
Urban influence	The city/city district/municipalities and the organizations managed by them can directly influence the production and sorting of municipal waste in their facilities. They can also improve the BDMW sorting system, i.e. accessibility for citizens and the way of handling BDMW (e.g. construction of a composting plant or provision of composters to citizens. The city/city district/municipality can also raise awareness for citizens to better sort the BDMW.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)

Responsibility	Processor KLIMASKEN, city, city district, municipality

GOV1

STRATEGIC-INSTITUTIONAL SITUATION OF THE CITY IN THE FIELD OF ADAPTATION TO THE IMPACTS OF CLIMATE CHANGE

Number	GOV1
Indicator name	Strategic-institutional situation of the city in the field of adaptation to the impacts of climate change
Area	G
Indicator definition	The indicator evaluates how the city/city district/municipality is prepared in the strategic-institutional area for the implementation of system adaptation measures. It is based on the confirmed premise that the city/city district/ municipality without the creation of a comprehensive adaptation strategy/plan, which is reflected both in all relevant planning and decision-making processes and in the institutional structure of the public entity, does not respond, resp. responds unsystematically and often incorrectly to the effects of climate change.
Indicator unit	%
Key words	Adaptation strategy / plan, climate vulnerability, planning and decision-making processes in the city/city district/municipality, institutional readiness
Reason for tracking and usability	A well-prepared city/city district/municipality for the implementation of adaptation measures is considered to be a city/city district/municipality that has a quality, based on the latest knowledge-based adaptation strategy / plan (climatological assessment, vulnerability assessment, goal setting, activity setting, action plan, approval by the local government) and this is reflected in all relevant development planning processes / documents, its implementation is explicitly reflected in the organizational structure and organizational rules of the city/city district/municipality, a city-wide professional capacity related to the need to respond to climate change and a system for monitoring, evaluating and updating the adaptation strategy is in place.

Completeness, representativeness, validity

Meeting this indicator is a necessary but not sufficient condition for assessing the readiness of a city/city district/municipality to respond to the impacts of climate change. Part of the readiness is also an awareness of the need to adapt to climate change, both in the decision-making sphere and in the population itself in the city/city district/municipality, mainly through the transformation of planning, permitting and decision-making processes, as well as infrastructure creation and maintenance processes.
The indicator has its limits in the subjective assessment of the quality of the strategic and institutional environment of self-government, as there are no norms / standards yet, and the indicator is set up as framework and does not have to describe the specifics of individual cities/city districts/municipalities (e.g. by size or type of administration).

GOV1

STRATEGIC-INSTITUTIONAL SITUATION OF THE CITY IN THE FIELD OF ADAPTATION TO THE IMPACTS OF CLIMATE CHANGE

Description of data processing

Data are obtained either directly (from the description of strategic development documents, organizational structure and organizational rules) or indirectly from the review of individual decisions or permits, or from a survey among executive and elected representatives of local government, respectively public.

5 (E) - 0 points:
The city / town / municipality in the area of adaptation to adverse effects of climate change does not implement any systematic activities and / or the city / city / municipality has the topic of adaptation to adverse effects of climate change (or selected objectives or specific measures) without detailed analysis developed / included / mentioned as part of the Economic Development and Social Development Program (PHSR) and / or the Spatial Plan (ÚPN)
4 (D) -1 points
The city / city district / municipality has developed a comprehensive adaptation strategy / plan, resp. SECAP (if the city / district / municipality is involved in the Covenant of Mayors).
3 (C) - 2 points
The comprehensive adaptation strategy is reflected in the key development documents of the city / city district / municipality of PHSR and / or ÚPN.

2 (B) - 3 points
In addition to the projection of the adaptation strategy into the documents, it is also reflected in the organizational structure and organizational rules of the municipality (the city / city district / municipality has created a position for coordination / implementation, or this role is included in the job description (s) of other relevant positions).
1 (A)
In addition to points 4 (D), 3 (C) and 2 (B), the city / municipality has a developed and implemented implementation mechanism for monitoring, evaluating and updating the adaptation strategy of the city / municipality (including systematic data collection).

Data source

The data source is the city/city district/municipality itself

Tracking frequency

1 x 2 years

GOV1

STRATEGIC-INSTITUTIONAL SITUATION OF THE CITY IN THE FIELD OF ADAPTATION TO THE IMPACTS OF CLIMATE CHANGE

Urban influence	City/city district/municipality directly influences this indicator
Presentation method	The results will be presented in a single Klimasken framework on a five-step scale according to specified intervals:
Responsibility	Klimasken processor, city/city district/municipality

GOV2

FUNDS SPENT ON THE IMPLEMENTATION OF ADAPTATION MEASURES

Number	GOV2
Indicator name	Funds spent on the implementation of adaptation measures
Area	G
Indicator definition	The indicator evaluates the ratio of funds spent on the implementation of all adaptation measures / activities in the reference year (planned in the relevant adaptation strategy) from the total expenditures of the city/city district/municipality in the given year. This indicator includes all finances (own, obtained from external European or other sources) that have passed through the budget of the city/city district/municipality.
Indicator unit	%
Key words	Financial expenditures on adaptation measures in the city / borough / municipality, budget
Reason for tracking and usability	The city/city district/municipality that is purposefully adapted, resp. considers as a priority to adapt to the impacts of the climate change, is considered such a city/city district/municipality that plans (allocates) and implements adequate financial resources to reduce the vulnerability of the city/city district/municipality to the impacts of climate change. It is assumed that these financial resources are both allocated on the basis of the existing adaptation strategy / plan and at the same time are competently selected in terms of their effectiveness and efficiency. Expenditures on adaptation measures include the so-called soft adaptation measures (e.g. preparation or updating of adaptation strategy itself, necessary related studies and analyses, creation of job (s) within the municipality in order to improve the adaptation process, targeted information campaigns, conferences, seminars, exhibitions, creation of better conditions for population protection etc.). Expenditure includes only those funds that are targeted at reducing vulnerability to climate change and not those that are made for other purposes, and coincidentally (without being explicitly included in the adaptation plan / strategy) may have also the adaptive effect.

GOV2

FUNDS SPENT ON THE IMPLEMENTATION OF ADAPTATION MEASURES

Completeness, representativeness, validity	The percentage of funds spent on reducing climate vulnerability in relation to all local public municipality's expenditures in a given year reflects quite representatively the priority given by the municipality to adapt to climate change, but also its efforts to reduce the vulnerability of the city. The indicator has some limits, in sense that, even if the municipality proceeds systematically and intensively in the process of adaptation, e.g. has a clear adaptation policy and plan and at the same time applies this policy / plan in a large number of adaptation measures, which are useful and necessary, but low-cost, so it can then be rated lower than a municipality that makes only one, but high - cost adaptation measure.
Description of data processing	Data are obtained from the final account of the given municipality for the previous (reference year).
Data source	The data source is the city/city district/municipality itself
Tracking frequency	1 x every year
Urban influence	City/city district/municipality directly influences this indicator
Presentation method	The results will be presented in a single Klimasken framework on a five-step scale according to specified intervals:
Responsibility	Klimasken processor, city/city district/municipality

GOV3

EXISTENCE OF A LOW CARBON STRATEGY / POLICY / ACTION PLAN

Number	GOV3
Indicator name	Existence of a low carbon strategy / policy / action plan
Area	G
Indicator definition	The indicator includes 5 sub-components that assess the existence of a strategic document (climate protection policy, low-carbon strategy, climate strategy, etc.) in the city, the SECAP process, the professional capacity of the office, management and implementation and collection of relevant data. If the Office is involved in the Covenant of Mayors and processes SECAP, this will also be reflected in the evaluation of sub-indicators. Sub-indicators: a) Existence of a low-carbon plan / strategy, b) Translating a low-carbon plan into a strategic plan / Economic and Social Development Program (PHSR), c) Translating mitigations into the organizational structure of self-government (position for coordination / implementation), d) Professional capacity (expert working group, agreements with external experts, memoranda and agreements with professional institutions, demonstrable cooperation with experts) for mitigations, e) Systematic data collection (impact / status / response) and their updating - relevance for reducing emissions.
Indicator unit	%
Key words	Low carbon strategy, mitigation, planning and decision-making processes in the city / district / municipality, institutional readiness.
Reason for tracking and usability	Cities / towns / municipalities and their municipalities have a major role to play in reducing greenhouse gas emissions. The implementation of mitigation measures must be well planned, institutionally protected and evaluated. Mitigation principles should also be reflected in the Office's other strategies. The purpose of the indicator is to evaluate the above aspects from the point of view of an independent evaluator.

EXISTENCE OF A LOW CARBON STRATEGY / POLICY / ACTION PLAN

Completeness, representativeness, validity

Compliance with this indicator is a necessary but not a sufficient condition for assessing the status and extent of mitigation measures of the city / city district / municipality. Part of the area of reducing greenhouse gas emissions (mitigation) is the reflection of these measures in decision-making processes, including planning, permitting and decision-making processes, as well as processes of infrastructure creation and maintenance. The indicator well represents the area of the institutional framework of mitigation measures in the city / city district / municipality, but does not cover the mitigation measures of other stakeholders (eg private sector, households).
The indicator has its limits in the subjective assessment of the quality of the strategic and institutional environment of self-government, because there are no norms / standards for similar strategies and their evaluation.

GOV3

EXISTENCE OF A LOW CARBON STRATEGY / POLICY / ACTION PLAN

Description of data processing

Data are obtained either directly (from the description of strategic development documents, organizational structure and organizational rules) or indirectly from the review of individual decisions or permits, or from a survey among executive and elected representatives of local government, or by the public.
5 (E) - 0 points
The city / city district / municipality does not carry out any systematic activities in the area of reducing greenhouse gas emissions (mitigation) or solves them only in a partial and unsystematic way (e.g. gradual insulation of schools / kindergartens).
4 (D) -1 point
The city / city district / municipality has developed a comprehensive low-carbon strategy / plan or SECAP (if the city is party to the Covenant of Mayors).
3 (C) - 2 points
The comprehensive low-carbon strategy is reflected in the key development documents of the city (Slovak Republic - Economic Development and Social Development Plan (PHSR) and / or Spatial Plan (ÚPN), Czech Republic: City Development Program / Strategy, Spatial Plan (ÚP), etc.).
2 (B) -3 points
In addition to the reflection of the low-carbon strategy in the documents of the city / city district / municipality, it is also reflected in the organizational structure and organizational rules of self-government (city / city district / municipality has a position for coordination / implementation, or relevant positions).
1 (A)
In addition to points 4 (D), 3 (C) and 2 (B), the city / city district /municipality has developed and implemented an implementation mechanism to monitor, evaluate and update the adaptation strategy of the city / city district / municipality (including systematic data collection).

Data source

The source of data are cities/ city districts / municipalities.

Tracking frequency

1x in 2 years

Urban influence

The city / city district / municipality directly influences this indicator.

GOV3

EXISTENCE OF A LOW CARBON STRATEGY / POLICY / ACTION PLAN

Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Processor KLIMASKEN, city, city district, municipality

GOV4

FUNDS FOR THE IMPLEMENTATION OF MITIGATION MEASURES FROM THE TOTAL BUDGET OF THE CITY / CITY DISTRICT / MUNICIPALITY

Number	GOV4
Indicator name	Funds for the implementation of mitigation measures from the total budget of the city / city district / municipality
Area	G
Indicator definition	The indicator evaluates the total financial resources for the implementation of mitigation measures (planned in the relevant mitigation / climate strategy) from the total budget of the city / city district / municipality (expenditure page) for the calendar year. This indicator includes all finances (own, obtained from external European or other sources) that have passed through the budget of the city / city district / municipality.
Indicator unit	%
Key words	Mitigation, finances, budget of the city / city district / municipality
Reason for tracking and usability	For a city / city district / municipality that purposefully reduces its greenhouse gas emissions - implements mitigation measures in order to reduce greenhouse gas (GHG) emissions, it is considered such a city / city district / municipality that plans (allocates) and implements adequate financial resources to reduce emissions. It is assumed that these financial resources are both allocated on the basis of the existing low-carbon (mitigation) strategy / plan and at the same time are competently selected in terms of their effectiveness and efficiency. These are primarily investment measures of the city / city district / municipality, which demonstrably lead to a reduction in emissions. For example, thermal insulation of buildings, energy saving projects, promotion of sustainable modes of transport, electromobility, reduction of waste production and increasing sorting, etc. It also includes non-investment costs (so-called soft measures) - e.g. educational or supportive studies and analyzes. Expenditure includes only those funds that are specifically aimed at reducing greenhouse gas emissions. It does not include expenditure that is made for another purpose and, coincidentally (without being explicitly mentioned and planned), it may also have a mitigating effect.

FUNDS FOR THE IMPLEMENTATION OF MITIGATION MEASURES FROM THE TOTAL BUDGET OF THE CITY / CITY DISTRICT / MUNICIPALITY

Completeness, representativeness, validity	The indicator is complete and valid if it is possible to correctly quantify the expenditures that fall there and there is no double counting (see point 8 of the methodological sheet). It reflects relatively representatively the importance that the municipality gives to reducing greenhouse gas emissions in the context of its overall activities and care for public finances. The indicator does not include investments in measures by the private sector or households (residents of the city / city district / municipality), which may be in the order of magnitude higher than investments of the public sector. The limit is that it can be difficult to quantify whether the funds provided for a given measure belong to the indicator or not. The indicator has its limits in that even if the municipality proceeds systematically and intensively in the process of reducing emissions, but implements low-cost small measures, then it can be evaluated with a lower mark than the municipality, which will take only one, but very expensive mitigation measure.
Description of data processing	Data are obtained from the final account of the given municipality for the previous calendar (reference) year. The numerator of the indicator is the total expenditure on mitigation measures (in CZK or EUR), the denominator of the indicator is the total expenditure of the city / city district / municipality in the given calendar year (in CZK or EUR).
Data source	The source of data is data of the city / city district / municipality on the final account for the given year, or information on other expenditures of the city / city district / municipality.
Tracking frequency	once a year
Urban influence	The city / city district / municipality directly influences this indicator within its decision-making process.
Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Processor KLIMASKEN, city, city district, municipality

GOV5

THE SHARE OF RESIDENTIAL BUILDINGS IN A GIVEN ENERGY STANDARD ACCORDING TO THE HEAT DEMAND FOR HEATING

Number	GOV5
Indicator name	The share of residential buildings in a given energy standard according to the heat demand for heating
Area	G
Indicator definition	The proportion of buildings meeting the defined standards in category 0 and 1 (see description of building category) of the total number of buildings
Indicator unit	%
Key words	Renovation of buildings, need for heat for heating, residential buildings

Reason for tracking and usability

The quality of buildings and their energy intensity are key for our society, as the construction sector is responsible for 30-40% of total energy consumption and more than 55% of final electricity consumption.
Buildings are classified into 4 categories (renovated, partially and minimally renovated and not renovated) based on the need for heat for heating
Category 0: renovated building with heat demand for heating around 50 kWh / m2a
Category 1: partially renovated building with heat demand for heating approx. 70 kWh / m2a
Category 2: minimally renovated building with heat demand for heating approx. 90 kWh / m2a
Category 3: non-renovated building with heat demand for heating approx. 120 kWh / m2a
Detailed description of building categories: -
Category 0: renovated building with heat demand for heating around 50 kWh / m2a
The restored building has the entire thermal protection of the perimeter cladding with
insulation thickness of at least 10 cm. The roof has completed insulation in thicknesses of at least 20 cm. The balcony boards are insulated. The building has windows replaced with windows with a plastic frame (possibly other) and with insulating double glazing or triple glazing in the range of about 90%.

Category 1: partially renovated building with heat demand for heating around 70 kWh /m2a
The partially renovated building has been renovated to the extent required legislative requirements. The facade of the perimeter cladding has added insulation in thicknesses of 4 -8 cm. The roof has completed insulation in a thickness of about 20 cm. Balcony boards are usually not insulated. The building has exchanged windows for windows with a plastic frame (or other) and
insulating double glazing in the range of 50 - 90%.

Category 2: minimally renovated building with heat demand for heating around 90 kWh /m2a.
The minimally renovated building is in a condition e.g. with repaired roof resp. with addition thermal insulation thickness of approx. 20 cm, or with an insulated facade from the north side, resp. so insulation of gable walls. The building has windows replaced with windows with a plastic frame (possibly other) and with insulating double glazing in the range of less than 50%.
Category 3: non-renovated building with heat demand for heating around 120 kWh / m2a

	The non-renovated building is in its original condition, without insulation of the outer perimeter walls, insulation of the roof, or it has replaced the windows with plastic (or other) with insulation double glazing to the extent of less than 30 %. This also includes buildings on which repairs have been carried out system failures, repairing cracks in the facade of the building, removal of leaks roofs without additional insulation.
Completeness, representativeness, validity	A prerequisite for completeness and representativeness is a detailed analysis of the condition of all residential buildings in the entire administrative area. A prerequisite for sufficient validity is a good knowledge of the actual state of the building stock. All data must be current, based on the actual state, respectively on the relevant energy performance certificates of buildings. This indicator has limitations, especially problematic data acquisition, which can be replaced by field research and subsequent data retrieval.
Description of data processing	Data acquisition and processing is based on the evaluation of the state of renovation of apartment buildings and their classification into categories 0-3.
Data source	The data sources are the departments of municipalities (mainly the spatial planning departments), the Building Authority.
Tracking frequency	1 x 2 years (or according to the frequency of Klimasken monitoring)
Urban influence	The indicator applies to all residential buildings. The city / city district / municipality can influence the area of building renovation by applying appropriate regulations of spatial development and construction, both with the help of financial instruments (grant programs) and awareness-raising or consulting activities.
Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Processor KLIMASKEN, city, city district, municipality

GOV6

PROPORTION OF PUBLIC LIGHTING SPOTS REPLACED BY A MORE EFFICIENT SOURCE

Number	GOV6
Indicator name	Proportion of public lighting spots replaced by a more efficient source
Area	G
Indicator definition	Proportion of individual street lighting luminaires replaced in a given year with more efficient ones (e.g. installation of LED lighting instead of sodium lamps). Public lighting (PL) is a public service that is provided to citizens free of charge and includes lighting of public roads and spaces. Public lighting serves primarily to increase safety and comfort in public places. Public lighting also includes festive lighting (e.g. at Christmas) and architectural lighting. The indicator focuses on reducing the electricity consumption of public lighting. It is expressed as a percentage of the replaced lighting sources.
Indicator unit	%
Key words	Public lighting, mitigation, electricity
Reason for tracking and usability	Energy inefficient sources of public lighting are relatively important consumers of electricity in the city/city district/municipality. In the past (end of 2007), i.e. before their gradual renewal for more economical ones, in the Czech Republic the consumption of public lighting was about 50 – 70/kWh per capita, i.e. approximately 1 % of total electricity consumption. In terms of electricity consumption, for which the city/city district/municipality is responsible, it is a much higher share – about 10–20 %. Greenhouse gas emissions from energy consumption also correspond to this. A significant aspect is financial – the total expenditure on public lighting electricity in the Czech Republic is 2 billion CZK (approx. 80 million euros) per year. The reason for monitoring the indicator is the possibility of reducing emissions and saving funds by up to 2/3 and capturing these phenomena using an indirect ratio indicator.

GOV6

PROPORTION OF PUBLIC LIGHTING SPOTS REPLACED BY A MORE EFFICIENT SOURCE

Completeness, representativeness, validity	Data on replacement of light points – light sources should be sufficiently complete and representative. The situation in larger cities is more problematic, where thousands or tens of thousands of light places are in operation and the registration of restoration can be more difficult. The indicator describes the monitored issue well. It does not include other types of lighting in public spaces – private and corporate.
Description of data processing	The owner of individual elements of public lighting is almost always the city/city district/municipality, which also has data on the operation and renewal of public lighting. The administration of public lighting is arranged either directly by the city/city district/municipality (usually in larger settlements within the department of administration, technical, maintenance, etc.) or the administration is outsourced to an external company. These organizations are providers of data on the refurbishment of public lighting sites for more economical lighting sources. The numerator of the indicator is the total number of replaced/renewed public lighting places (lamps) in a given year, the denominator is the total number of these places within the administrative territory of the city/city district/municipality.
Data source	City/city district/municipality or external company managing public lighting.
Tracking frequency	Once a year
Urban influence	The city/city district/ municipality directly influences this indicator within its decision-making process, or through an external organization that manages public lighting.
Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Processor KLIMASKEN, city, city district, municipality

GOV7

INSTALOVANÝ VÝKON NOVĚ NAINSTALOVANÝCH FOTOVOLTAICKÝCH PANELŮ NA OBYVATELE

Number	GOV7
Indicator name	Instalovaný výkon nově nainstalovaných fotovoltaických panelů na obyvatele
Area	G
Indicator definition	The total installed capacity of newly installed PV panels in a given year in the city (regardless of the operator)
Indicator unit	kWp/1000 obyv./rok
Key words	renewable energy sources (RES), photovoltaics, photothermics, solar energy, photovoltaic panels, photothermal panels, solar energy
Reason for tracking and usability	Each megawatt-hour of electricity saved means (depending on the national emission factor) a saving of more than 1 tonne of CO2. Photovoltaic (PV) panels obtain electricity from the energy of solar radiation. Photothermal panels (PT) use the energy obtained from solar radiation to heat water (which can be accumulated). With the optimal way of using the panels, it is possible to replace a significant part of the supplied electricity (in the case of heating water and other fuels), and thus reduce CO2 emissions. This saving can be calculated for the building, the city district and the city.

Completeness, representativeness, validity

The indicator is designed to include all installations of PV and PT panels in the city/city district/municipality. The methodology assumes a complete description of existing installations, including the distinction between PV and PT panels (they have different efficiencies). Ideally (occurring using a combination of multiple detection methods), the data are complete and representative. The validity of the data depends on the method of use and the condition of individual installations (which cannot be verified by observation).
The value of the indicator applies to the optimal operating mode of all installations.
If the orthophoto map analysis method is used to determine the indicator (see below), then there is a risk that for some areas aerial maps will not be up-to-date or not available at all.
It is difficult to distinguish between photovoltaic and photothermal panels. Only some photothermal panels differ markedly, others are similar in size to photovoltaic ones.
Windows can also resemble panels. By analysing the map, we cannot determine the inclination of the panels to the roof (on flat roofs it is about 45 degrees).
The position of the panels on taller buildings must therefore be determined by visual interpolation of the various positions so that they correspond as closely as possible to the vertical reality.
After 20 years, the output of the PV panel drops to approx. 80%. In the future, it will be necessary to adjust the methodology by the efficiency factors of the panels depending on their age.

Description of data processing

To determine the value of the indicator, it is necessary to obtain data on the number, total power calculated from the area and possibly the type of photovoltaic panels. This data can be obtained in one of 4 ways, or a combination of them: (1) obtaining data from the regulator of the RES market, (2) obtaining data from the building authority, (3) analysis of orthophoto maps and (4) local survey and targeted survey of solar panels operators.
In the case of procedure (1), we obtain accurate and up-to-date data for individual operators in a given administrative territory and only add up the individual values of the installed peak power. In the case of procedure (2), we obtain similar data, but probably only about part of the installations. In the case of procedure (3), we obtain the data on the area of the panels, which we convert to peak performance by conversion using a simple consensus factor. In the case of procedure (4), we obtain data from the technical documentation and again add up the peak performances.
Description of data processing by the method of orthophoto map analysis with additional field investigation:

In the first step, it is necessary to choose the best possible freely available map base with orthophoto map (it will vary in different countries, or you can use products containing maps of the world, such as Google Maps). The Google background layer (orthophoto) can be loaded into the GIS environment (ArcGIS, QGIS, etc.). It is appropriate to supplement and correct the primary orthophoto map with other map sources (ESRI, ZBGIS (SR) and others).
In the second step, it is necessary to perform a map analysis in a GIS environment and identify all objects that are probably photovoltaic panels.
The standardized size of the PV module will help with orientation. Photovoltaic panels in the power range from 270 Wp to 300 Wp have a height of 1650 mm and a width of 995 mm. We can simply say that solar panels for electricity production have a size of 1.65 x 1 meter.

In the third step, it is necessary to create polygon objects and create an attribute table in which structured data about each object will be inserted:
• Panel number
• Roof inclination
• Panel inclination
• Panel type
• Panel area
• Standardised panel performance
• Total panel performance
The analysis is complicated by uncertainty as to whether it is a PV panel. Photothermal panels (see limits and restrictions) and possibly some other elements will appear very similar on the map. Therefore, we introduce an item into the attribute table
• Certainty (0/1)
After field verification, doubts should be dispelled as to whether it is a photovoltaic panel and the variable should be set to 1. In some cases, Google StreetView can also be used for verification. The on-site investigation may be carried out by a volunteer or other representative of the processor. Individual installations can also be geodetically surveyed (find out exactly the actual area) and the parameters on the map correct retrospectively. The on-site investigation should be combined with the summoning of building owners with installations with an explanation and a request to send information about the installed capacity.
1 standard panel produces approx. 250 kWh per year, i.e. 1 m2 produces approx. 156 kWh per year.
The specific annual profit of one photovoltaic panel is 160 kWh. m-2 and the photothermal panel 370 kWh. m-2. The number of panels is multiplied by the specific annual profit according to

	the respective type. All panels that are not identified with certainty as photothermal will be considered photovoltaic.
Data source	Data of the national coordinating body for RES, building authorities, energy agencies, own analysis of map materials, GIS analysis, field investigation, questionnaire survey, technical documentation.
Tracking frequency	once in 3 years
Urban influence	The city/city district/municipality can directly influence the number of installations on its own buildings and on the buildings of budgetary and contributory organizations (e.g. primary schools). Larger installations on private buildings are hindered by several factors, especially legislative ones, which the city/city district/municipality does not affect. Hypothetically, the city/city district/municipality can financially support installations on selected buildings outside its property, ensure common services of an energy agency to citizens, more advantageous purchases of panels and achieve further economies of scale.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to the set intervals
Responsibility	Processor Klimasken, city/city district/municipality

GOV8

TOTAL POWER OF SPARE SOURCES FOR ELECTRICITY GENERATION

Number	GOV8
Indicator name	Total power of spare sources for electricity generation
Area	G
Indicator definition	The indicator assesses the degree of preparedness of the system for a possible power outage by quantifying the total capacity of alternative sources for electricity production. These are public spare sources, such as diesel generators, uninterruptible power supplies (UPS), portable (mobile) power generators or backup batteries. They can be operated by the city/city district/municipality components of the Integrated Rescue System, hospitals, schools, etc. The unit is VA (volt-amperes) and evaluates the apparent electrical power.
Indicator unit	kVA/1000 inhabitants
Key words	electricity generation, backup sources
Reason for tracking and usability	Emergencies, including those related to climate change, may cause a malfunction of one or more elements of the electricity system. Such disruption can lead to crisis situations and accidents, which affect important entities and elements on which the very function of the territorial unit depends. Large-scale accidents can exceed the capabilities of certain facilities and their ability to resume operations immediately, the absence of which could lead to secondary crisis situations. Even a relatively short shutdown can lead to some chaos, economic losses and possible loss of life. Power outages are currently a real threat to the proper functioning of society. Depending on the events of recent decades, the need for preparedness for situations where electricity is not available from the public grid is still increasing in our country and in the world. It is very important that the objects necessary for the proper functioning of the territorial unit are prepared for a situation of power failure.

Completeness, representativeness, validity	However, the backup power supply is not only used for situations of complete loss of power supply. Backup power sources are also designed to eliminate other network failures, such as short-term voltage drops, voltage spikes or frequency changes. The weather is responsible for many power outages. Outages are caused by natural phenomena such as high temperatures, heavy rain, wind, snow and ice. Outside of the weather, a power outage can be caused human error or other disruption to the electrical system. The indicator evaluates only a part of the total capacity of alternative sources of electricity. These are mainly public ones affected by crisis management. However, there are also sources that are owned by private entities, companies or the public and they are not registered.
Description of data processing	It is necessary to create a list of all backup sources in the city/city district/municipality, where the owner and the capacity of the source in kVA is described. It is necessary to divide this by the number of inhabitants and multiply by 1000.
Data source	The source of data is the crisis management of the city/city district/municipality and its components. Furthermore, it may be the operator of the distribution system or the operators of backup sources themselves.
Tracking frequency	Once a year
Urban influence	The city/city district/municipality directly influences this indicator.
Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Processor KLIMASKEN, city, city district, municipality

GOV9

PUBLIC BUILDINGS IN THE ADMINISTRATION OF THE CITY/CITY DISTRICT/MUNICIPALITY RENOVATED IN ORDER TO INCREASE THEIR ADAPTABILITY TO THE IMPACTS OF CLIMATE CHANGE.

Number	GOV9
Indicator name	Public buildings in the administration of the city/city district/municipality renovated in order to increase their adaptability to the impacts of climate change.
Area	G
Indicator definition	The indicator evaluates the share of public buildings in the administration of the city/city district/municipality that have been renovated in order to adapt to the total number of public buildings in the administration of the city / city district / municipality. These are buildings on which some of the following measures have been implemented: increased thermal insulation of facades and roofs, shading of transparent openings, installation of air conditioning with recuperation, creation of a green roof or vertical garden (vertical facade), creation of rainwater retention capacity at the building and its subsequent use in the management of the building (e.g. for watering the surrounding greenery, green roof, cooling the building's surroundings, etc.), the use of "grey" water, planting trees to shade facades, land modification, respectively. installation of technical elements in order to prevent flooding of the building during torrential rains, installation of air conditioning equipment (or other interior cooling system), etc.
Indicator unit	%
Key words	Adaptations of buildings
Reason for tracking and usability	Buildings (and therefore their users) are vulnerable to the effects of climate change. In the future, this vulnerability may increase and may lead to a deterioration in the quality and efficiency of work, reduced housing comfort, loss of market value, shortened life cycle and internal microclimate, and even increased health problems for those living there. Existing buildings must be assessed for their resilience to the current impacts of climate change and, at the same time, prepared for prevented future impacts by preventive measures.

GOV9

PUBLIC BUILDINGS IN THE ADMINISTRATION OF THE CITY/CITY DISTRICT/MUNICIPALITY RENOVATED IN ORDER TO INCREASE THEIR ADAPTABILITY TO THE IMPACTS OF CLIMATE CHANGE.

Completeness, representativeness, validity	The indicator is representative in terms of the readiness of the /city district/municipality for climate change in the building sector. Its validity depends on the quality of the assessment of the current state and the implemented measures. Like any indicator, this one has its limits in the case of qualitative evaluation. Despite the fact that the building will be included among those that have elements of adaptation, it is not clear from the indicator how comprehensively it was built by the given investments.
Description of data processing	Number of buildings that have been renovated (enhanced) by at least one measure to increase their adaptability to the effects of climate change. It is necessary to proceed from building permits as well as from the own sources of information of the city/city part/municipality.
Data source	The data are obtained from the relevant departments of the city/municipal office / district office.
Tracking frequency	Once a year
Urban influence	The city/city district/municipality directly influences this indicator.
Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Processor KLIMASKEN, city, city district, municipality

GOV10

AREA OF THE TERRITORY CHANGED TO GREEN INFRASTRUCTURE

Number	GOV10
Indicator name	Area of the territory changed to green infrastructure
Area	G
Indicator definition	The share of the area of the newly created green infrastructure (GI) from the total area of the administrative territory of the city/city district/municipality is calculated. The definition of the Green infrastructure is a network of natural and semi-natural features, in particular green areas and aquatic ecosystems, designed and managed to provide a wide range of ecosystem services, with particular regard to ensuring biodiversity, ecological stability and environmental friendliness and interconnecting the urban environment. with the surrounding landscape ". It is calculated as the share of the area of the newly created green infrastructure per 1000 inhabitants of the administrative territory of the town / city district / municipality. These are only areas in settlements created by human activity, e.g. public parks, green squares, street, road, alley or insulating greenery, greenery of residential complexes, green roofs, reserved areas of greenery, elements with sustainable rainwater management such as rain gardens, infiltration rugs, artificially created water areas and ponds, etc.). The included areas within this indicator do not include natural elements and various natural ecosystems, although valuable from the point of view of nature protection (e.g. forest and wetland communities, elements of the so-called Territorial systems of the ecological stability, protected areas including the NATURA 2000 system, etc.), but not created by human activity. However, linear elements such as bio corridors, tree lines, alleys, green boulevards, greenways and greenbelts of anthropogenic origin are included in the GI.
Indicator unit	m^2 / 1000 pers.
Key words	Green infrastructure, sustainable rainwater management, nature-friendly solutions

GOV10

AREA OF THE TERRITORY CHANGED TO GREEN INFRASTRUCTURE

Reason for tracking and usability	Green infrastructure serves to improve air quality and microclimate in the urban environment, is positively influencing the hydrological cycle and runoff conditions, supporting biodiversity, life cycles and processes, controlling soil erosion and other slope processes, supporting soil formation processes, help to decompose harmful substances and others
Completeness, representativeness, validity	Increasing the area of green infrastructure directly contributes to the adaptation to the impacts of climate change, resp. to absorb CO2 as one of the main greenhouse gases causing climate change. This data can be ascertained relatively accurately and directly reflects the activity of the city/city district/municipality in this area. The indicator has limits in that if the increase of areas in a given reference year is determined and the process of conversion of a particular area itself can be multi-year (project preparation, preparatory work and implementation / completion) it may not be clear for which year the change of area to GI ascribed.
Description of data processing	The data reflect the area that was converted to green infrastructure in a given reference year. This data could be obtained from the department / municipal enterprise / final account of the given self-government for the previous (reference year).
Data source	The data source is the municipal departments / municipal enterprises / external contractors in charge of the green infrastructure.
Tracking frequency	1 x every year
Urban influence	City/city district/municipality directly influences this indicator
Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Processor KLIMASKEN, city, city district, municipality

GOV11

SHARE OF WATER LOSSES IN THE DISTRIBUTION SYSTEM IN TOTAL PRODUCTION

Number	GOV11
Indicator name	Share of water losses in the distribution system in total production
Area	G
Indicator definition	The indicator evaluates the amount of drinking water losses in the distribution system. Water losses include losses due to leaks due to leaks in joints or fittings, water leaks in accidents and pumping of reservoirs, water losses caused by inaccuracy of water meters, higher water abstractions than the corresponding invoices according to annual reference numbers and losses caused by water theft.
Indicator unit	%
Key words	drinking water, losses
Reason for tracking and usability	Water losses cannot be completely eliminated, but their amount must be reduced. The reason is both the economical use of water resources and climate change, because water losses put pressure on water resources and increase the amount of total water abstracted, what reduces the adaptive capacity of the entire system.
Completeness, representativeness, validity	The indicator in many cities affects the vast majority of losses of drinking water supplied for the needs of households and other entities. Part of the water is obtained from private wells or boreholes and is not evaluated here. The indicator has no limitations because it clearly affects and expresses the source being monitored.
Description of data processing	The data is provided by the water infrastructure operator, who knows the amount of drinking water produced and the amount of drinking water sold. The difference is made up of losses, which are expressed here by the share of both values – i.e. percentages.
Data source	Water infrastructure operators.
Tracking frequency	1 x every year

GOV11

SHARE OF WATER LOSSES IN THE DISTRIBUTION SYSTEM IN TOTAL PRODUCTION

Urban influence	The city/city district /municipality often directly influences this indicator, as it is the owner of the infrastructure and can, in the form of investments, influence its repair and renewal.
Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Processor KLIMASKEN, city, city district, municipality

GOV12

NUMBER OF AWARENESS-RAISING EVENTS FOR CITIZENS AND LOCAL ACTORS FOCUSED ON EDUCATION AND INCREASING COMPETENCIES (COMPETENCES) IN THE FIELD OF CLIMATE CHANGE

Number	GOV12
Indicator name	Number of awareness-raising events for citizens and local actors focused on education and increasing competencies (competences) in the field of climate change
Area	G
Indicator definition	The indicator evaluates the number of all activities (conferences, seminars, workshops, exhibitions, lectures, campaigns, information events, leaflets, etc.) implemented or co-organized and / or funded by the city/city district/municipality focused on information, education and competencies in change climate change (adaptation and mitigation) in the observed year.
Indicator unit	events / 10 ths. residents
Key words	Education, awareness raising, information, competence development
Reason for tracking and usability	Part of the city's ability to adapt to climate change is the support of the city government by residents and other entities living or operating in the city in the planning and implementation of adaptation measures. Such support is conditioned not only by allowing these actors to participate in the adaptation or mitigation process, but also by the level of their knowledge and understanding. The city/city district/ municipality, which systematically prepares, cooperates in the preparation and implements, resp. co-implements activities that contribute to such awareness raising can be considered as more resilient, respectively less vulnerable to climate change

GOV12

NUMBER OF AWARENESS-RAISING EVENTS FOR CITIZENS AND LOCAL ACTORS FOCUSED ON EDUCATION AND INCREASING COMPETENCIES (COMPETENCES) IN THE FIELD OF CLIMATE CHANGE

Completeness, representativeness, validity	Only those activities / events could be included where there is direct or co-organization by the city/city district/ municipality. Events organized by other organizers without the active co-organization are not included. The number of activities / events does not always reflect the actual number of participants, so it may happen that in one event covers (in absolute terms) there is more participants than in more events. However, more events provide greater variability of target groups and different approaches, which ultimately emphasizes more the quality than quantity.
Description of data processing	Data are obtained from records / entries and documentation
Data source	The data source is the city/city district/ municipality.
Tracking frequency	1 x every year
Urban influence	City/city district/municipality directly influences this indicator
Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Processor KLIMASKEN, city, city district, municipality

GOV13

PROPORTION OF POPULATION WITH PERMANENT ACCESS TO ONE OF THE SOURCES OF INFORMATION

Number	GOV13
Indicator name	Proportion of population with permanent access to one of the sources of information
Area	G
Indicator definition	The ratio of the registered persons number, resp. number of registered in the information systems of citizens, operated by the city / local government / municipal self-government, resp. integrated rescue system (IRS) to the total number of inhabitants over 15 years of age.
Indicator unit	%
Key words	Awareness, information systems
Reason for tracking and usability	Timely and targeted information of citizens can significantly reduce damage to health and property caused by emergencies resulting from climate change (heat waves, floods, storms, etc.). The more inhabitants are directly (SMS, e-mail, mobile application, etc.) warned before and during the occurrence of an emergency, respectively. directly informed of how to behave during the event, thus reducing vulnerability to its effects. All communication channels that serve also to other purposes can be used for this purpose.
Completeness, representativeness, validity	The total number of inhabitants with permanent access to one of the sources of information includes unique telephone numbers, e-mail addresses, resp. downloaded mobile applications. The total number of contacts to sources of information can be distorted by multiple registrations in different information channels, and at the same time the condition of registration of citizens over the age of 15 may not always be met.
Description of data processing	The data are obtained from the registration data of the city, resp. IRS. records / entries and documentation
Data source	The data source is the municipal departments / municipal enterprises / external contractors in charge of the green infrastructure.

GOV13

PROPORTION OF POPULATION WITH PERMANENT ACCESS TO ONE OF THE SOURCES OF INFORMATION

Tracking frequency	1 x every year
Urban influence	City/city district/municipality could only directly influencing this indicator
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to set intervals, reflecting the percentage of applicants, resp. registered in citizens&#8217 information systems for the total population over 15 years of age in the reference year.
Responsibility	Processor KLIMASKEN, city, city district, municipality

GOV14

AGRICULTURAL LAND FUND LAND FORECLOSURE

Number	GOV14
Indicator name	Agricultural land fund land foreclosure
Area	G
Indicator definition	Reduction of the agricultural land surface (AL) in relation to the total area of the administrative territory of the city/city district/municipality and its change to built-up area (sealed) during the monitored year compared to the previous year (e.g. in 2019 compared to 2020).
Indicator unit	%
Key words	agriculture, land, territory, self - sufficiency, urban agriculture
Reason for tracking and usability	This indicator monitors the "build up" and soil sealing of agricultural land by construction of buildings but also linear structures. Agricultural land represents not only the typical arable land, but within the cities / urban areas / municipalities mainly gardens, vineyards, orchards, permanent grasslands. This indicator is important from the reason of monitoring of the limitation of suburbanization processes and the growth of the city/city district/municipality into the countryside, as well as due to the deterioration of the microclimate, permeability of the territory, etc. From the point of view of the sustainability of settlements, the currently unused areas of the so-called brownfields shall be use preferentially. The protection of agricultural land is gaining in importance in the application of the concepts of circular economy, self-sufficiency, short food chains, support of the local community and social inclusion, etc. At present, the importance of "urban agriculture" is also growing, which, with its environmentally friendly practices, often a permaculture approach without the use of pesticides, is also very favourable from the point of view of protecting and promoting biodiversity.

Completeness, representativeness, validity	The indicator shows the changes in the urban structure of the settlement and should indicate how much agricultural land has been built up in a given year. The indicator is also directly related to the exclusion from the land fund, as the application is supported by a valid zoning decision, which means that the construction is in accordance with the zoning plan. This indicator has limits, as it is not possible to monitor this indicator on the basis of an allowed set-aside from agricultural land for the purpose to be build up. The actual set-aside from the land fund according to Act. no. 220/2004 Coll. (Act on the Protection and Use of Agricultural Land in Slovakia) does not mean a suspension, as it is valid only for 3 years from the decision&#8217s validity, and if the land was not used for the purpose stated in the withdrawal decision, it ceases to be valid, which could lead to distorted or false results.
Description of data processing	The difference in the surface of agricultural land that has been built-up area during the monitored calendar year compared to the previous year is divided by the total area of the administrative territory.
Data source	National statistical office.
Tracking frequency	In statistics of the city/city district/municipality, it should be monitored at an annual frequency. For the purposes of the Klimasken tool, a periodicity of 2-3 years is assumed.
Urban influence	The size of the AL can be influenced by the city/city district/municipality through spatial planning, application of appropriate regulations of spatial development and construction and awareness raising activities.
Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Processor KLIMASKEN, city, city district, municipality

GOV15

PROPORTION OF ENERGY FROM RES (RENEWABLE ELECTRICITY, HEAT AND COLD FROM RENEWABLE SOURCES) IN PUBLIC BUILDINGS MANAGED BY THE MUNICIPALITY

Number	GOV15
Indicator name	Proportion of energy from RES (renewable electricity, heat and cold from renewable sources) in public buildings managed by the municipality
Area	G
Indicator definition	The indicator addresses the final energy consumption in public buildings in the city/city district/municipality administration. It monitors the share of used low-carbon resources in the total final consumption of public buildings in the administration of the city/city district/municipality for the year. These are used renewable energy sources - electricity produced from renewable sources (hydro, photovoltaic), heat / cold from renewable sources and the use of renewable sources in final consumption (biomass, solar collectors and heat pumps).
Indicator unit	%
Key words	Energy, renewable sources, mitigation
Reason for tracking and usability	Reducing greenhouse gas emissions is one of the key goals of cities and municipalities in the field of sustainable development and climate protection. The Europe-wide (later global) Covenant of Mayors initiative is also working towards this goal. The signatories - local authorities of the pact - declare the goal of reducing CO2 emissions by at least 40% by 2030, mainly due to energy savings and the use of local renewable resources. The signatories are also committed to increasing their resilience to the effects of climate change. Local government has an important role to play in decarbonising the territory it manages. It is directly involved in only a small part of greenhouse gas emissions (most of which are the responsibility of households and companies), but can be a model for other sectors. In addition, it has the resources, buildings and land where renewable resources can be used. The reason for monitoring is to determine the share of renewable sources in total final consumption and its trend. The indicator can be used with regard to the stated mitigation goals of local governments.

GOV15

PROPORTION OF ENERGY FROM RES (RENEWABLE ELECTRICITY, HEAT AND COLD FROM RENEWABLE SOURCES) IN PUBLIC BUILDINGS MANAGED BY THE MUNICIPALITY

Completeness, representativeness, validity	If the final energy consumption in buildings managed by the city administration can be mapped in terms of energy sources, the indicator is complete. The calculation should include both buildings under the direct administration of the local government (e.g. municipal office buildings) and other public buildings where it has direct financial control (e.g. contributory organizations of the city, schools, etc.). The indicator is sufficiently valid for the monitored phenomenon. The indicator does not provide an overall picture of energy consumption in the city/city district/municipality. To do this, it is necessary to process a comprehensive analysis - the energy balance of the city/city district/municipality.
Description of data processing	The numerator of the indicator consists of the total consumption of energy from renewable sources of buildings in the city administration - electricity produced from renewable sources (hydro, photovoltaic), heat / cold from renewable sources and the use of renewable sources in final consumption (biomass, solar collectors and heat pumps). The denominator of the indicator is the total final energy consumption of buildings in the administration of the city/city district/municipality - regardless of its origin (renewable and non-renewable).
Data source	The source of data is the records of the municipal office. If the city has the position of energy engineer of the city, the source of data is this entity. Another possible source is data from energy suppliers.
Tracking frequency	In urban / municipal statistics, it should be monitored at an annual frequency. For the purposes of the Klimasken tool, a periodicity of 2-3 years is possible to capture a longer-term trend.
Urban influence	The city/city district/minicipality has a direct influence on the choice of energy suppliers, so it can influence the share of renewables in the energy mix it consumes. It can also buy so-called "green electricity" – i.e. certificates of origin of electricity from renewable sources. It can also invest in the use of RES within its assets (e.g. the use of biomass or biofuels).
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to the set intervals
Responsibility	Processor Klimasken, city/city district/municipality

GOV16

PRODUCTION OF ENERGY FROM RENEWABLE SOURCES WITHIN THE ADMINISTRATIVE TERRITORY OF THE CITY / CITY-DISTRICT / MUNICIPALITY.

Number	GOV16
Indicator name	Production of energy from renewable sources within the administrative territory of the city / city-district / municipality.
Area	G
Indicator definition	The indicator addresses the energy production within the administrative territory of the city/city district/municipality. It monitors the share of renewable sources in the total energy production within the administrative territory of the city / city district / municipality. These are the following renewable energy sources - solar energy, hydropower, wind energy, ambient energy (geothermal energy) and biofuels. The indicator includes all energy production in the city/city district/municipality, regardless of the source operator (public and private energy sources).
Indicator unit	MWh/obyvatele
Key words	Energy, renewable sources, mitigation
Reason for tracking and usability	Reducing greenhouse gas emissions is one of the key goals of cities and municipalities in the field of sustainable development and climate protection. The Europe-wide (later global) Covenant of Mayors initiative is also working towards this goal. The signatories - local authorities of the pact - declare the goal of reducing CO2 emissions by at least 40% by 2030, mainly due to energy savings and the use of local renewable resources. The signatories are also committed to increasing their resilience to the effects of climate change. The indicator provides an overall picture of energy production in the city/city district/municipality in terms of energy production from renewable, i.e. low carbon resources. These sources are: solar energy, hydropower, wind energy, environmental energy (geothermal energy) and biofuels. The increasing share of energy production from these sources will lead to a decreasing carbon intensity of the economy and a mitigation effect on climate change.

GOV16

PRODUCTION OF ENERGY FROM RENEWABLE SOURCES WITHIN THE ADMINISTRATIVE TERRITORY OF THE CITY / CITY-DISTRICT / MUNICIPALITY.

Completeness, representativeness, validity	The indicator includes all sources in the territory of the city / city district / municipality, it is therefore sufficiently representative. It does not include the energy consumption side (e.g. consumption of electricity produced from RES-renewable energy sources). It also does not address where the energy that was produced from RES in the territory of the city/city district/municipality (either within the city / city district / municipality, or beyond their borders) is consumed. The validity of the indicator may be reduced by the fact that it is not possible to obtain relevant data from all, especially small energy producers (e.g. households operating a biomass boiler). Then it is necessary to obtain data indirectly - for example, from statistical data or a sample survey of residents and companies. The indicator does not provide an overall picture of energy consumption in the city/city district/municipality. To do this, it is necessary to process a comprehensive analysis - the energy balance of the city/city district/municipality.
Description of data processing	The numerator of the indicator is the total production of energy from renewable sources within the administrative territory of the city/city district/municipality. These are the following renewable energy sources - solar energy, hydropower, wind energy, environmental energy (geothermal energy) and biofuels. The denominator of the indicator is the total energy produced within the administrative territory of the city/city district/municipality, regardless of its origin (renewable and non-renewable). The indicator can be additionally used to determine greenhouse gas emissions from the territory of the city /city district/municipality (MIT part - Production of greenhouse gases and its reduction - emissions).
Data source	Energy source operators, distributors, statistical office data.
Tracking frequency	For the purposes of the Klimasken tool, a periodicity of 2-3 years is possible to capture the longer-term trend of the indicator.
Urban influence	The city/city district/municipality influences the indicator only to a small extent - in terms of its own production of renewable energy (e.g. PV panels on its office buildings, heating the office with a biomass boiler or operation of a biogas plant). The further impact is only indirect and depends on the specific investments of private investors (or the state) in renewable energy sources.
Presentation method	Table value, graph of indicator development over time.

GOV16

PRODUCTION OF ENERGY FROM RENEWABLE SOURCES WITHIN THE ADMINISTRATIVE TERRITORY OF THE CITY / CITY-DISTRICT / MUNICIPALITY.

Responsibility

The results will be presented in a uniform Klimasken framework on a five-point scale according to the set intervals.

B-POP1

YEAR OF CONSTRUCTION

Number	B-POP1
Indicator name	Year of construction
Area	P
Indicator definition	Year of completion of the construction of the building
Indicator unit	year
Key words	Age of the building, year of construction
Reason for tracking and usability	Changes in construction and technical procedures, standards, regulations and other parameters of buildings in individual historical stages were reflected in the execution of building structures and their technical support. Key elements of structures and TEB (technical equipment of the building) affect the sensitivity and adaptive capacity of buildings.
Completeness, representativeness, validity	This is an exact figure, but for a more detailed analysis it is necessary to know the details of the construction and technical design.
Description of data processing	The indicator will be used for an indicative assessment of the initial state – classification of the building into a category.
Data source	Building documentation, building approval decision, building office (authority)
Tracking frequency	Once
Urban influence	Not relevant
Presentation method	As a separate data or category
Responsibility	Processor KLIMASKEN, owner, administrator

B-POP2

YEAR OF SIGNIFICANT RENOVATION OF THE BUILDING

Number	B-POP2
Indicator name	Year of significant renovation of the building
Area	P
Indicator definition	Year of significant renovation of the building. Renovation of a building means changes to the building structures and technical security of the building, which, before the end of their service life, will meet the basic requirements for construction and extend the service life. These are, in particular, adjustments to meet the new energy and hygiene requirements. Significant renovation means construction modifications of the existing building, which intervene in its envelope in the range of more than 25% of its area, especially by insulating the perimeter and roof cladding and replacing the original fillings of building openings. If it is a new building, state the year of construction.
Indicator unit	
Key words	Renovation of the building, year of renovation, reconstruction of the building
Reason for tracking and usability	Significant renovation (reconstruction) of the building fundamentally changes its parameters related to sensitivity and adaptive capacity.
Completeness, representativeness, validity	This is an exact figure, but for a more detailed analysis it is necessary to know the details of the construction and technical design of the reconstruction.
Description of data processing	The indicator will be used for an indicative assessment of the initial state - classification of the building into a category.
Data source	Building documentation, building approval decision, building office (authority)
Tracking frequency	Once
Urban influence	Not relevant
Presentation method	As a separate data or category
Responsibility	Processor KLIMASKEN, owner, administrator

B-POP3

NUMBER OF FLOORS

Number	B-POP3
Indicator name	Number of floors
Area	P
Indicator definition	Number of floors above ground of the building
Indicator unit	number
Key words	Floor, height of the building
Reason for tracking and usability	The level of exposure and sensitivity to the effects of climate change is related to the number of floors above ground in the building. The number of floors brings information about the height, character and in combination with the data on the built-up area also the data on the total mass of the building.
Completeness, representativeness, validity	This is an exact and unambiguous figure.
Description of data processing	The indicator will be used to classify the building in the relevant category and also as a starting point for further calculations.
Data source	Building documentation, building approval decision, building office (authority)
Tracking frequency	Once
Urban influence	Not relevant
Presentation method	As a separate data or category
Responsibility	Processor KLIMASKEN, owner, administrator

B-POP4

POPULATION

Number	B-POP4
Indicator name	Population
Area	P
Indicator definition	The number of residents permanently living in the building
Indicator unit	number
Key words	Residents of the building, users of the building
Reason for tracking and usability	The population data is included in further calculations. The number of inhabitants affects the sensitivity of the building and is also related to the adaptive capacity (communication, cooperation). Residents affect greenhouse gas emissions from the building.

Completeness, representativeness, validity	Permanent occupants of the building are counted. For non-residential buildings, a recalculation is made (see below). In some cases, there will be significant fluctuations and inaccuracies - inconsistencies between the records and the actual situation. The KLIMASKEN tool is designed primarily for the evaluation of residential buildings. However, it can also be used appropriately for the assessment of other building types that are similar to residential buildings and serve a similar purpose. In the case of the assessment of such buildings, it is necessary to convert the building users number to effective occupants (EfO) so that the result is roughly comparable to an residential (apartment) building. Case-by-case procedure: Children, pupils and students in nursery, primary, secondary and higher education are counted as 0.3 EfO, teachers and other staff as 0.5 EfO. In the case of hospitals, bed capacity multiplied by average daily occupancy is counted as 1.0 EfO, staff as 0.5 EfO. For polyclinics and ambulances, i.e. health establishments without an inpatient part, only staff shall be counted as 0,5 EfO. In offices and similar administrative buildings or office buildings, staff shall be counted as 0,5 EfO. In accommodation establishments, the bed capacity multiplied by the average daily use of this capacity shall be counted as 0,5 EfO and the number of staff in the operation as 1,0 EfO. In old people's homes, children's homes, hospitals, etc., the average number of clients and staff shall be counted as 1,0 EfO. This is only a non-binding guide. Full comparability for different buildings entered in the evaluation by different authors cannot be ensured. For buildings whose type is not indicated above, discretion should be exercised.
Description of data processing	The indicator will be used to classify the building in the relevant category and also as a starting point for further calculations.
Data source	Own data of the owner/administrator, population register
Tracking frequency	2-3 years, always when updating the KLIMASKEN rating
Urban influence	The city/city district/municipality can indirectly affect the occupancy of buildings, e.g. acting to change the predominant use of the sites concerned, their development, maintenance, etc.
Presentation method	As a separate data or category

Responsibility	Processor KLIMASKEN, owner, administrator

B-POP5

BUILT-UP AREA

Number	B-POP5
Indicator name	Built-up area
Area	P
Indicator definition	Built-up area means the area bounded by the rectangular projections of the outer face of the peripheral structures of all above-ground and underground floors into a horizontal plane. The built-up area is delimited by envelope lines guided by the outer faces of vertical structures to the horizontal plane.
Indicator unit	m2
Key words	Built-up area of the building, floor plan
Reason for tracking and usability	The level of exposure and sensitivity to the effects of climate change is related to the built-up area. The data, in combination with the data on the height of the building, provides information on its total mass. The floor plan of the roof affects the potential for rainwater management. Other indicators can be converted to a unit of built-up area.
Completeness, representativeness, validity	This is an unambiguous data resulting from the construction and project documentation. Can be measured exactly.
Description of data processing	The indicator will be used to classify the building in the relevant category and also as a starting point for further calculations.
Data source	Project and construction documentation, approval decision, building office, owner's/administrator's own data
Tracking frequency	One-time, update in case of change
Urban influence	Not relevant
Presentation method	As a separate data or category
Responsibility	Processor KLIMASKEN, owner, administrator

B-POP6

LIVING SPACE (OF APARTMENTS)

Number	B-POP6
Indicator name	Living space (of apartments)
Area	P
Indicator definition	Living space means the sum of all areas of living rooms in a property. These are rooms suitable for permanent living with a minimum area of 8 m2. The living area does not include a cellar, balcony, staircase, hallway, terrace and cleaning or technical rooms.
Indicator unit	m2
Key words	Living area of the building, living rooms
Reason for tracking and usability	The level of exposure and sensitivity to the effects of climate change is related to the living space. In comparison with other parameters, the data provides information on the degree of use of the building for housing. Other indicators can be converted to a unit of living space.
Completeness, representativeness, validity	This is an unambiguous data resulting from the construction and project documentation. It is possible to measure exactly, resp. calculated.
Description of data processing	The indicator will be used to classify the building in the relevant category and also as a starting point for further calculations.
Data source	Project and construction documentation, approval decision, building office, owner's/administrator's own data
Tracking frequency	2-3 years, always when updating the KLIMASKEN rating
Urban influence	Not relevant
Presentation method	As a separate data or category
Responsibility	Processor KLIMASKEN, owner, administrator

B-EX1

FLOOD RISK

Number	B-EX1
Indicator name	Flood risk
Area	E
Indicator definition	The indicator shows the degree of flood risk resulting from the location of the building.
Indicator unit	number
Key words	Rainfall, floods, inundation, flood risk
Reason for tracking and usability	The location of the building in the flood zone of the relevant category is directly related to the risk of the building being endangered by fluvial floods as one of the consequences of climate change.
Completeness, representativeness, validity	The indicator does not evaluate specific local conditions or the condition of the building. It tells about the statistical degree of risk of exposure of the building to floods according to hydrological data.
Description of data processing	To determine the value, it is necessary to determine in which zone in terms of flood risk the building is located. For the purpose of determining the flood risk, four zones are distinguished according to the degree of danger, the definition of which is based on previous measurements and the degree of risk of flooding by water: 1 – zone with negligible flood risk (position outside Q100) 2 – zone with low flood risk (so-called century-old water area, Q100) 3 – zone with a medium risk of flooding (the area of the so-called fifty-year-old water, Q50) 4 – zone with a high risk of floods (the area of so-called twenty-year-old water, Q20) According to this zoning, the amount of flood insurance is determined. In zone 4, insurance companies usually do not insure housing. For the purposes of the indicator, the worst category is added: 5 – location in the territory of five-year-old water Q5

B-EX1

FLOOD RISK

Data source	The indicator is based on flood maps / flood hazard maps / flood zone maps. A freely usable (for non-commercial purposes) application is offered in the Czech Republic by the Czech Insurance Association: http://www.cap.cz/kalkulacky-a-aplikace/povodnove-mapy. Flood zones are defined in territorial-analytical documents. In the Czech Republic, the map of floodplains is a map application offered by VÚV TGM at: http://www.dibavod.cz/70/prohlizecka-zaplavovych-uzemi.html.
Tracking frequency	2 – 3 years
Urban influence	The location of residential buildings can be influenced by the city/city district/municipality within the policy and practice of territorial development.
Presentation method	The results will be presented in a single KLIMASKEN framework on a five-step scale according to specified intervals.
Responsibility	Owner, administrator, employee of spatial planning of the municipal office

B-EX2

THREAT TO TECHNICAL INFRASTRUCTURE FROM FLOODS

Number	B-EX2
Indicator name	Threat to technical infrastructure from floods
Area	E
Indicator definition	The indicator expresses the degree of threat to the technical infrastructure and networks of the building by floods during floods or torrential rains.
Indicator unit	Body
Key words	Floods, flood threats, flood risk, technical infrastructure, threats to property
Reason for tracking and usability	The indicator uses a checklist to indicate the indicative degree of threat to parts of the building important for the performance of its function and to ensure the quality of life and safety of residents.
Completeness, representativeness, validity	The indicator includes only selected technical aspects of the threat to the building and assigns them an arbitrary severity rating for the safe operation of the building. From this point of view, the indicator provides a subjective and orientational view.

Description of data processing

For the relevant object, a point evaluation according to the checklist will be performed as follows (only one option always applies), while the sensitivity and risk factors are evaluated:
Sensitivity (X):
- The building is located in the area of flood risk 1 (= Q100), the runoff model for torrential rain did not identify the building as a potential endangered and in the last 5 years (or since approval) there was no flooding and damage due to floods or torrential rainfall = 40 points
- The building is located in the area of flood risk 2, the runoff model for torrential rains did not identify the building as potentially endangered and in the last 5 years (resp. from building approval) there was no flooding and damage due to floods or torrential rains = 30 points
- The building is located in the area of flood risk 3 and worse and / or in the last 5 years (for new buildings in the period since approval) flooding and damage due to floods or torrential rains occurred and / or the runoff model for torrential rains identified the building as potentially at risk = 20 points
Risk factors (Y):
- The building has a part below ground level (basement, cellar) without a functional device for pumping water after flooding (pumping cesspool) = -3 points
- The technology room / main technological equipment is in the basement = -3 points
- Near the border of the building (up to 5 m) there are street drains above the basement level =-2 points
- Rain sewer pipes and sewage pipes do not meet all the parameters of the applicable technical standard (clearance, slope) = -2 points
= Roof gutters and gutter drains are not provided with a grating = -1 point
- The building is connected to the rain sewer and the connection is not equipped with an anti-swelling device = -2 points
- The sewage connection is not equipped with a non-return valve = -1 point
- The location of the main electrical equipment (main circuit breaker, house circuit breakers, fuse box, switchboards, main switch, HDO switch, etc.) are located in the basement, resp. less than 2.5 m above the definitively landscaped terrain = -3 points
- The main gas valve and gas meter are located in the basement = -1 point
Total score Z = X+Y

Data source	Own data, project, construction, technical, operational documentation, local investigation
Tracking frequency	One time, at a change
Urban influence	The city/city district/municipality can ensure that the implementation of all monitored technical solutions and equipment is in accordance with construction, technical, operational and safety requirements. For other buildings, it can support the protection of buildings methodically, through control activities within its powers or in another way.
Presentation method	The results will be presented in a uniform KLIMASKEN framework on a five-point scale after including the resulting Z value in the appropriate interval.
Responsibility	Owner, administrator

B-EX3

THREAT TO THE BUILDING BY EXTREME METEOROLOGICAL PHENOMENA

Number	B-EX3
Indicator name	Threat to the building by extreme meteorological phenomena
Area	E
Indicator definition	The indicator shows the degree to which the building is endangered by strong winds, storms, hail and possibly ice.
Indicator unit	Body
Key words	Extreme weather, wind, storms, hail, ice, icing
Reason for tracking and usability	As a result of climate change, there is an increase in episodes of extreme meteorological phenomena, which threaten, among other things, buildings and related assets. The building is also threatened by the fall of trees or branches standing in its vicinity.
Completeness, representativeness, validity	The indicator takes into account technical standards (STN 83 710 Tree maintenance). The indicator sets a few technical security parameters and it assigns them arbitrary values of the severity rate for threat prevention. The indicator is indicative.
Description of data processing	For the relevant object, a point evaluation according to the checklist will be performed as follows: Rating X: - The building is equipped with a functional and regularly inspected lightning conductor = 3 point - The passage of the access road to the building is maintained throughout the year by the technical services of the municipality ≥ the access road to the building is passable all year round = 2 points - There are no tree crowns in the vicinity of the building (the crowns do not reach closer than 10 m to the boundary of the building) with dry skeletal branches or disturbed statics; the trees are regularly maintained and inspected = 2 points - The electrical connection to the building is realized by an underground line = 1 point - All network connections are located in the non-freezing depth and the main water shut-off is protected from frost all year round = 1 point - There is a regular inspection of the security of sensitive technological equipment related to the building against gusts of wind, hail, storm (e.g. photovoltaic panels, solar collectors, awnings) = 1 point After completing the checklist, all points are counted.

B-EX3

THREAT TO THE BUILDING BY EXTREME METEOROLOGICAL PHENOMENA

Data source	Own data, project, construction, technical, operational documentation, local investigation
Tracking frequency	One time, at a change
Urban influence	The city/city district/municipality can ensure that the implementation of all monitored technical solutions and equipment is in accordance with construction, technical, operational and safety requirements. For other buildings, it can support the protection of buildings methodically, through control activities within its powers or in another way.
Presentation method	The results will be presented in a uniform KLIMASKEN frame on a five-point scale after including the resulting value of X in the appropriate interval..
Responsibility	Owner, administrator

B-EX4

THE DIFFERENCE BETWEEN THE AVERAGE ANNUAL AIR TEMPERATURE IN THE OBSERVED YEAR AND THE LONG-TERM AVERAGE

Number	B-EX4
Indicator name	The difference between the average annual air temperature in the observed year and the long-term average
Area	E
Indicator definition	The indicator evaluates the difference in the average annual air temperature around the building compared to the value of the long-term average. Two values are compared: - The average annual air temperature recorded at the nearest meteorological station (professional or amateur) for a given year. - The long - term average annual air temperature is set for the period 1981 - 2010.
Indicator unit	°C
Key words	Temperature, climate
Reason for tracking and usability	The indicator responds to the negative impact of expected climate change on elevated temperature. It is a key indicator describing climate change, average temperature. The indicator provides information on how the average air temperature has changed from the long-term normal. The city/city district/municipality or other self-government cannot influence the value much.
Completeness, representativeness, validity	The indicator is representative of the area. It can be combined with additional indicators (average temperature in January or average temperature in July), but it is not necessary. The data for the creation of the indicator are standardized and monitored through the official network of meteorological stations to create an indicator. They sufficiently represent the whole indicator. Temperatures from the nearest meteorological stations are taken into the indicator, therefore its value may not fully correspond to the specifics of the locality where the building is located. Nevertheless, the indicator indicates the phenomenon.
Description of data processing	The temperature of the long-term average - normal (TN) is deducted from the average annual air temperature (TR) in the observed year. The result is the value of the difference (T). T = TR - TN

B-EX4

THE DIFFERENCE BETWEEN THE AVERAGE ANNUAL AIR TEMPERATURE IN THE OBSERVED YEAR AND THE LONG-TERM AVERAGE

Data source	The source of data is data from long-term functioning meteorological stations of official institutions.
Tracking frequency	Annual, data are processed retrospectively and disposed of by official institutions.
Urban influence	The indicator cannot be influenced by the city/city district/municipality.
Presentation method	Spôsob prezentácie The results will be presented in a uniform KLIMASKEN framework on a five-point scale according to the set intervals.
Responsibility	Owner of the building

B-AD1

THERMAL PROTECTION OF PERIMETER WALLS

Number	B-AD1
Indicator name	Thermal protection of perimeter walls
Area	A
Indicator definition	The predominant thickness of the thermal insulation material used to insulate the building
Indicator unit	mm
Key words	Insulation, insulation, thermal insulation

Reason for tracking and usability

The method, extent and efficiency of insulation has an impact on greenhouse gas emissions from the energy consumed for heating and cooling.
The indicator mainly takes into account the structural composition of the perimeter cladding, the thickness of the thermal insulation material, the type of facade: ventilated facade, the facade with a contact thermal insulation system, the scope of application of the thermal insulation material with regard to the cardinal directions. The starting point is the current legislation and standard requirements, in particular the European Directive on the Energy Performance of Buildings (EPBD and its latest revision 2018/844/EU), which is together with the Energy Efficiency Directive the main legislative instrument for promoting the energy performance of buildings and speeding up the renovation of buildings in the EU.
The thermal resistance of a material represents the ability of the material to retain heat. It depends on the thickness of the material and the thermal conductivity. It is denoted by the letter "R" and the unit of measure is m2K/W, i.e. how big area is needed to transfer unit heat at a temperature difference of 1 Kelvin/degree. The transfer of heat from the air to the structure creates a thermal resistance, which can be characterized as a resistance to heat transfer. The total thermal resistance of the structure is then the sum of the thermal resistances of the individual layers and the heat transfer resistances.
The heat transfer coefficient "U" is the inverse value of thermal resistance. The unit of measure is W/m2K, i.e. how much heat passes through a structure with an area of 1 m2 at a temperature difference of 1 Kelvin/degree. The lower the U-value, the better thermal insulator is the material.
The heat conductivity coefficient "λ" (lambda) can be defined as the ability of a material to conduct heat. The unit of measure is W/mK, i.e. how much heat passes through the 1 m thick material with a temperature difference of 1 Kelvin (difference 1 K = difference 1 °C). The lower the value of λ, the better thermal insulator is the material.
The phase shift of temperatures is closely related to the storage capacity of building materials and represents a time shift of extreme temperatures. An example is the situation where the highest outdoor afternoon temperatures are shifted to a later time and at the same time their value is dampened.

Completeness, representativeness, validity	The indicator is based on the assumption that the basic evaluation can be performed only on the basis of determining the predominant thickness of insulation, regardless of the material used. When scaling, we do not distinguish between renovated buildings and new buildings. Most of the newly built buildings have packaging structures designed with an insulation system. Nevertheless, this methodology allows for newly built buildings, where the required thermal insulation properties are provided by the construction material itself without insulation, to classify the building according to the approximate value of the average heat transfer coefficient corresponding to wall insulation with thermal insulation material. In the further specification of scaling, it would be possible to state the thermal resistance of the structure, resp. U value, that is, for the overall composition of the wall, this information is usually given in the project documentation, respectively in the energy certificate.
Description of data processing	Thermal insulation materials that are most often used for thermal protection of non-transparent vertical perimeter structures are extruded polystyrene (EPS) and mineral wool (MW). Due to very similar values of the thermal conductivity coefficient (λ) for EPS (0.036 W / mK) for MW we use the term thermal insulation material. To calculate the indicator, we determine the predominant thickness of the thermal insulation material used on the building structures. According to the detected value, the building is included in the appropriate interval in the scale. The walls and the roof are evaluated separately. For (new) buildings, where the thermal insulation properties are not provided by contact insulation, it is possible to classify the building according to the heat transfer coefficient for the perimeter wall on the basis of the following table: Insulation layer thickness (PS/wool) 0 (without insulation) - 180 mm - 0,15 Un (W/m2K)
Data source	Project and construction documentation, approval decision, building office, owner's / administrator's own data
Tracking frequency	One-time, update on change

B-AD1

THERMAL PROTECTION OF PERIMETER WALLS

Urban influence	The city/city district/municipality can directly invest in the renovation of buildings owned by it, possibly support the renovation of buildings financially or otherwise.
Presentation method	The results will be presented in a uniform KLIMASKEN framework on a five-point scale according to the set intervals: 5(E): 0 mm; 4(D): < 80 mm; 3(C): 80–120 mm; 2(B): 121–180 mm; 1(A): > 180 mm
Responsibility	Owner, building manager

B-AD2

THERMAL ROOF PROTECTION

Number	B-AD2
Indicator name	Thermal roof protection
Area	A
Indicator definition	The predominant thickness of the thermal insulation material used to insulate the roof of the building
Indicator unit	mm
Key words	Insulation, thermal insulation
Reason for tracking and usability	The method, extent and efficiency of insulation has an impact on greenhouse gas emissions from the energy consumed for heating and cooling. The indicator takes into account in particular the structural composition of the roof cladding, the thickness of the thermal insulation material, the type of roof - flat, sloping with a slope of ≤ 45 ° (for slopes ≥ 45 ° it is considered as for vertical perimeter structures). The thermal resistance of a material represents the ability of the material to retain heat. It depends on the thickness of the material and the thermal conductivity. It is denoted by the letter "R" and the unit of measurement is m2K / W, - how large an area is needed to transfer unit heat at a temperature difference of 1 Kelvin / degree. The transfer of heat from the air to the structure creates a thermal resistance, which can be characterized as a resistance to heat transfer. The total thermal resistance of the structure is then the sum of the thermal resistances of the individual layers and the heat transfer resistances. The heat transfer coefficient "U" is the inverse value of thermal resistance. The unit of measure is W / m2K, ie how much heat passes through a structure with an area of 1 m2 at a temperature difference of 1 Kelvin / degree. The heat conductivity coefficient "λ" (lambda) can be defined as the ability of a material to conduct heat. The unit of measure is W / mK, ie. how much heat passes through the 1 m thick material with a temperature difference of 1 Kelvin (difference 1 K = difference 1 ° C). The lower the value of λ, the better the thermal insulator is the material. The phase shift of temperatures is closely related to the storage capacity of building materials and represents a time shift of extreme temperatures. An example is the situation where the highest outdoor outside temperatures are shifted to a later time and at the same time their value is dampened. The method, extent and efficiency of insulation has an impact

on greenhouse gas emissions from the energy consumed for heating and cooling.
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Completeness, representativeness, validity

The indicator is based on the assumption that the basic evaluation can be performed only on the basis of determining the predominant thickness of insulation, regardless of the material used.
When scaling, we do not distinguish between renovated buildings and new buildings. Most of the newly built buildings have packaging structures designed with an insulation system. In the further specification of scaling, it would be possible to state the thermal resistance of the structure, resp. U value, that is, for the overall composition of the roof, this figure is usually given in the project documentation.

B-AD2

THERMAL ROOF PROTECTION

Description of data processing	Thermal insulation materials that are most often used for thermal protection of roof structures are extruded polystyrene EPS and mineral wool MW. Due to very similar values of the thermal conductivity coefficient (λ) for EPS (0.036 W / mK) for MW, we use the term thermal insulation material. To calculate the indicator, we determine the predominant thickness of the thermal insulation material used on the roof of the building. According to the detected value, the building is included in the appropriate interval in the scale. The walls (previous indicator) and the roof are evaluated separately.
Data source	Project and construction documentation, approval decision, building office, owner's / administrator's own data
Tracking frequency	One-time, update on change
Urban influence	The city can directly invest in the renovation of buildings owned by it, support the renovation of buildings financially or otherwise.
Presentation method	The results will be presented in a uniform KLIMASKEN framework on a five-point scale according to the set intervals
Responsibility	Owner, building manager

Number	B-AD3
Indicator name	Transparent constructions
Area	A
Indicator definition	The indicator is determined on the basis of a combination of qualitative and quantitative parameters of windows, glass doors and glazed walls. The indicator expresses the influence of transparent constructions on the overheating of interiors with regard to the sides of the world.
Indicator unit	Point score
Key words	Windows, doors, glass walls, transparent structures, glass, overheating
Reason for tracking and usability	Hole constructions have the greatest influence on the overheating of the interior. The amount of heat load (as well as heat loss in winter) is mainly affected by the following parameters: The heat transfer coefficient "U" is the inverse value of thermal resistance. The unit of measure is W / m2K, ie how much heat passes through a structure with an area of 1 m2 at a temperature difference of 1 Kelvin / degree. The lower the U value, the better the thermal insulation is the material. It is considered separately for the frame and for the glazing. The technical standard specifies values for windows, glazed parts of glazed walls, roof windows and doors. The windows are characterized by the value of the heat transfer coefficient for glazing Ug (g - glass), for the frame Uf (f-frame) and as a whole element the value is called Uw (w-window / o window) Solar transmittance "g": solar transmittance, given in%, or up to 0 -1. The value of "g" is a coefficient commonly used in Europe to measure the solar transmittance of windows. A g value of 1.0 represents the full transmittance of all solar radiation, while 0.0 represents a window without the transmission of solar energy. In practice, however, most g values are between 0.2 and 0.7, with solar control glazing having a g value of less than 0.5. The current requirement in Slovakia according to STN EN 73 0540-2 for external opening structures is Uw min. 1 W / m2.K from 1.1.2021 is Uw min. 0.85 W / m2K. The limit for window evaluation should therefore be the parameter Uw = 1 W / m2K

Completeness, representativeness, validity

The indicator offers a simplified evaluation combining several parameters, so it should have a relatively high explanatory power. However, it cannot replace accurate measurements in the conditions of a specific site and building and does not replace accurate calculation methods.

Description of data processing

The calculation is based on a combination of qualitative and quantitative parameters:
Qualitative parameters are based on determining the ratio of windows, with different values of Uw, and their orientation to the sides of the world. They express the influence of the window on the overheating of the interior with regard to the world, the quality of the window as a whole element. The quantitative parameter determines the percentage of windows on individual structures - perimeter walls, roof.
One predominant type of window is selected for the whole house.
The value of the indicator (point score) is calculated as a multiple of the points obtained by evaluating the quality of the windows and estimating the share of the area of these windows oriented to the individual sides of the world. E.g. the worst variant is when 100% of the original windows are oriented to the south, then the resulting value will be calculated as: 5 x 1 = 5.
The best variant is when 100% of the windows with triple insulating glazing are oriented to the north, then the resulting value will be calculated as: 1 x 1 = 1.
X-score calculation table (with an example for double-glazed windows, where approximately one third of the double-glazed windows are oriented to the north and two thirds to the west):East: Original windows (Uw ≥ 2) 4; Double glazed windows (Uw ≤ 2) 3; Windows with triple insulating glazing (Uw ≤ 1 W/m2.K) 2; Share of window area (percentage estimate in whole %) 0 %; x = 0West: Original windows (Uw ≥ 2) 5; Double glazed windows (Uw ≤ 2) 4; Windows with triple insulating glazing (Uw ≤ 1 W/m2.K) 3; Share of window area (percentage estimate in whole %) 66 %; x = 2,64North: Original windows (Uw ≥ 2) 2; Double glazed windows (Uw ≤ 2) 2; Okna s trojitým izolačnímWindows with triple insulating glazing (Uw ≤ 1 W/m2.K) 1; Share of window area (percentage estimate in whole %) 33 %; x = 0,66South: Original windows (Uw ≥ 2) 5; Double glazed windows (Uw ≤ 2) 4; Windows with triple insulating glazing (Uw ≤ 1 W/m2.K) 3; Share of window area (percentage estimate in whole %) 0 %; x = 0Total 100%; x = 3,3

B-AD3

TRANSPARENT CONSTRUCTIONS

Data source	Project and construction documentation, approval decision, building office, owner's / administrator's own data
Tracking frequency	One-time, update on change
Urban influence	The city/city district/municipality can directly invest in the renovation of transparent parts of the construction of buildings owned by it, or support the renovation of buildings financially or otherwise.
Presentation method	The results will be presented in a uniform KLIMASKEN framework on a five-point scale according to the specified intervals for the X score
Responsibility	Owner, building manager

B-AD4

SHIELDING STRUCTURES AND SHIELDING BY STRUCTURES

Number	B-AD4
Indicator name	Shielding structures and shielding by structures
Area	A
Indicator definition	The indicator is determined on the basis of a combination of qualitative and quantitative shading parameters for windows, glazed doors and glazed walls. The indicator expresses the influence of transparent constructions on the overheating of interiors with regard to the sides of the world.
Indicator unit	Point score
Key words	Windows, doors, glass walls, transparent structures, glass, overheating, shading
Reason for tracking and usability	Shading of windows and possibly external entrances is a basic measure for adaptation to heat waves, which is applicable with immediate results even in the reconstruction of older buildings. Interior shading is several times less effective in reducing solar gains than exterior shading of a building. Exterior shading is an effective means of reducing overheating of the interior. Shading can be solved with blinds, shutters, shades and awnings. Due to the low efficiency and practical impossibility to specify the interior shading more technically, it is proposed not to take it into account in the evaluation. By shading the external entrances, we mean an awning or other means ensuring that the entrance areas of the building are permanently protected from sunlight, or this protection can be easily installed manually or automatically as required.
Completeness, representativeness, validity	The indicator offers a simplified evaluation combining several parameters, so it should have a relatively high explanatory power. However, it cannot replace accurate measurements in the conditions of a specific site and building and does not replace accurate calculation methods.

Description of data processing	The calculation is based on a combination of the same qualitative and quantitative parameters as in the case of the B-AD2 indicator, but is further extended by the effect of window shading. The calculation is performed as for the indicator B-AD2. The value of X is determined on the basis of a table according to the predominant type of windows and their approximate distribution according to the sides of the world (with an example for double glazed windows, where approximately one third of double-glazed windows are oriented north and two thirds west). East: Original windows (Uw ≥ 2) 4; Double glazed windows (Uw ≤ 2) 3; Windows with triple insulating glazing (Uw ≤ 1 W/m2.K) 2; Share of window area (percentage estimate in whole %) 0 %; X= 0West: Original windows (Uw ≥ 2) 5; Double glazed windows (Uw ≤ 2) 4; Windows with triple insulating glazing (Uw ≤ 1 W/m2.K) 3; Share of window area (percentage estimate in whole %) 67 %; X=2,64North: Original windows (Uw ≥ 2) 2; Double glazed windows (Uw ≤ 2) 2; Windows with triple insulating glazing (Uw ≤ 1 W/m2.K) 1; Share of window area (percentage estimate in whole %) 33%; X=0,66South: Original windows (Uw ≥ 2) 5; Double glazed windows (Uw ≤ 2) 4; Windows with triple insulating glazing (Uw ≤ 1 W/m2.K) 3; Share of window area (percentage estimate in whole %) 0 %; X=0Total 100% x = 3,3The X score obtained is multiplied for each side of the world by the proportion of the area of the windows that are not shaded by exterior blinds or other types of effective exterior shading. For north-facing windows, the shading factor is not taken into account. The resulting values are added to the Y score according to the following table.East: X=0; Podíl plochy nestíněných oken (%) 0 %, Y=0,0West: X=0; Proportion of area of unshielded windows (%) 0 %, Y=1,98North: X=0,66; Does not coun, Y=0,0South: X=0; Proportion of area of unshielded windows (%) 0 %; Y=0,00Y=1,98
Data source	Project and construction documentation, approval decision, building office, owner's / administrator's own data
Tracking frequency	One-time, updates on change
Urban influence	The city can directly invest in the installation or reconstruction of the shading of transparent parts of the construction of buildings owned by it, support these measures on the buildings of other owners financially or otherwise.
Presentation method	The results will be presented in a uniform KLIMASKEN framework on a five-point scale according to the specified intervals for the Y score.

Responsibility	Owner, building manager

B-AD5

SHADING BY STRUCTURES AND GREENERY

Number	B-AD5
Indicator name	Shading by structures and greenery
Area	A
Indicator definition	The indicator expresses in % the share of the surface of the building shaded by the exterior structure, respectively vegetation
Indicator unit	%
Key words	Overheating, shading, greenery
Reason for tracking and usability	Shading, especially of all-glass buildings, can be realized by means of perforated façade systems (reminiscent of external blinds above the entire facade). A solitary tall tree, protecting the building from the wind, could save about 1.3 % of energy costs. According to the generally accepted rule used in the United Kingdom, 3 to 9 % energy savings are proposed with the trees involved. Approximately 80 % of the cooling effect of the tree shade is due to transpiration. However, since coniferous and evergreen trees prevent sunlight in the winter, it is necessary to give preference to deciduous trees, respectively. their combination with conifers. An unshaded façade can also heat up to 40 °C during a hot summer day, while the wall temperature under the green cladding is also 15 °C lower (Perez et al. 2011), which has a positive effect on the interior temperature. Thanks to the façade of climbing plants, only a fraction of solar energy penetrates the building's own façade. Therefore, if the uncovered wall is heated to 42 °C in the sun, for example, the same wall under the green façade is only about 22 °C. Climbing plants significantly reduce the temperature of the wall not only depending on the climate zone, but mainly on the area they cover. The temperature reduction thus ranges from 10 to 30 °C. It has been calculated that reducing the wall temperature by 5.5 °C will save 50 % of the energy spent on air conditioning. Considering that 1/3 of the energy for heating in winter is spent on wind-cooled walls, climbing plants (especially evergreen ones such as ivy) bring energy gains.

Completeness, representativeness, validity	The indicator offers a simplified assessment and cannot replace an accurate measurement in the conditions of a specific location and building. The indicator does not replace exact calculation methods. The determination of the shaded area itself is subjective and the result may vary according to the chosen method.
Description of data processing	The data are obtained as an estimate of the percentage of the area of the building protected from direct sunlight during the summer day by a separate green façade, green wall, shading of the façade with deciduous trees, or mixed (deciduous-coniferous) vegetation, or a separate shading structure.
Data source	Own owner / administrator data
Tracking frequency	2 – 3 years
Urban influence	The city/city district/municipality can directly invest in the installation or reconstruction of shading of the structure of buildings owned by it, or support these measures on the buildings of other owners financially or otherwise.
Presentation method	The results will be presented in a uniform KLIMASKEN framework on a five-point scale according to the set intervals
Responsibility	Owner, building manager

B-AD6

VEGETATION AND GRAVEL ROOFS

Number	B-AD6
Indicator name	Vegetation and gravel roofs
Area	A
Indicator definition	The indicator is determined as a point score depending on the proportion of the roof area covered by a given type of surface.
Indicator unit	Body
Key words	Vegetated roof, green roof, gravel roof, roof
Reason for tracking and usability	Based on some research, it is assumed that vegetation roofs can dissipate thermal energy by 150 W/m2. The heat transfer through the roof from the outside to the inside can be reduced to more than 90 % through the green vegetation roof. Measurements on summer days in recent years in Germany, for example, have shown that if the outside temperature is between 25-30 °C, the reduction in the indoor room temperature under the vegetation roof is 3-4 °C. If it is assumed as a rough estimate that all the heat accumulated and obtained through the roof structure must be eliminated by means of an air conditioning unit with a capacity of 10 Btu/h (3 W) per watt (including fan energy and loss distribution), "Of the non-vegetated roof of 307 m2 , the additional heat obtained from the roof structure during the monitored summer period was approximately 700 Watt-hours per day. Experimental determination of the reflectivity of gravel roofs (pdf): https://lnk.sk/imr0 Experiment with 4 fractions of natural light gravel used for roofs of houses in the Mediterranean of different thickness (8-22.4 mm, 4-12.5 mm, 2-5.6 mm, 0-4 mm) and one fraction of the same thickness of 4-12.5 mm of different colour / material. Average albedo of materials 29-44 %. Measures proposed to be included in the indicator: o Extensive green roof (usually covers most of the area, can be built on roofs with less load-bearing capacity, requires durable and special types) o Intensive green roof (can cover only partial parts, requires higher load-bearing capacity of the roof, retains more water due to the height of the substrate, requires irrigation) o Gravel cover (retains water, increases reflectivity)

B-AD6

VEGETATION AND GRAVEL ROOFS

Completeness, representativeness, validity	The influence of vegetation and gravel roofs on the cooling of buildings is the subject of expert research. The indicator is based on general conclusions about the estimated effectiveness of each of the main types of roofs. This is an indicative categorization regardless of the specific conditions of the building. The indicator does not take into account the specific composition of a particular roof, only the general type.
Description of data processing	The value of the indicator is evaluated as a point score corresponding to the share of the roof area covered by the given surface type. Area type:Extensive roof: 0 – 10 %: 0 points10 – 25 %: 1 point26– 50 %: 2 points51 – 70 %: 3 points76 – 100 %: 4 pointsInxtensive roof: 0 – 5 %: 0 points5 – 20 %: 1 point21 – 40 %: 2 points40 – 60 %: 3 points61 – 80 %: 4 points81 – 100 %: 5 pointsGravel surface: Under 25 %: 0 pointsOver 25 %: 1 point
Data source	Own owner/administrator data
Tracking frequency	One time, at change
Urban influence	The city/city district/municipality can directly invest in the installation or reconstruction of vegetation or gravel roofs owned by it, or support these measures on the buildings of other owners financially or otherwise.
Presentation method	The results will be presented in a uniform KLIMASKEN framework on a five-point scale according to the point score
Responsibility	Owner, building manager

B-AD7

COLOUR VERSION

Number	B-AD7
Indicator name	Colour version
Area	A
Indicator definition	The indicator is determined as a point score depending on the proportion of the area of the roof and the facade covered with a material with a reflectance index HBW in a given interval. If the roof of the building is vegetative (green), the indicator value is empty.
Indicator unit	Point score
Key words	Roof, facade, colour, reflectivity, albedo, reflectance index, overheating

Reason for tracking and usability

The influence of the used material and colour design of vertical perimeter and roof constructions on the interior comfort in well-insulated houses is small - in the case of ventilated tiles or double-skin roofs it is minimal. However, dark facade plasters (which are no longer suitable due to their thermal expansion and thermal stress of the substrate) and dark single-skin roofs (unsuitable for other reasons) lead to about twice the heat gain through the wall or roof and should not be used. However, compared to the total heat gains, this is still a relatively small impact that will not affect the achievement of summer thermal comfort. Black bodies have a reflectance of 0.05 and an emittance of 0.9 - SRI index 0; standard white bodies have a reflectivity of 0.8 and an emittance of 0.9 - SRI index 100. The higher the SRI index, the better the roof parameters in terms of the so-called cooling effect of roofs. The colour of the glare surface has a significantly more significant effect on the interior comfort in poorly insulated buildings - in these cases, the first step should be to improve the insulation. The SRI is defined as the ability of a material to reject light expressed by an increase in temperature. Albedo's reflectivity - the amount of reflected light regardless of the material.

- Colour of the roof surface (affects the reflectivity) - light reflectance index (HBW), cooling coverings (aluminium with PES varnish) have a reflectance of up to 67 %
- The colour of the facade affects its heating. Insulated facades should not have an albedo lower than 30%, otherwise there is a risk of overheating and damage.
- HBW index given e.g. in various colour swatches: https://lnk.sk/bnd3
- Examples of surface reflectance values:

Surface Albedo Corrugated iron roofs 0,1-0,15
Colourful facades 0,15-0,35
Trees 0,15-0,18
Asphalt 0,05-0,2
Concrete 0,25-0,7
Grass 0,25-0,3
Red-brown tiles 0,1-0,35 Brick, stone 0,2-0,4
White facade 0,5-0,9

Completeness, representativeness, validity	The indicator does not take into account the real extent and manner of glare of buildings and their shading (i.e. the importance of reflectivity in a particular case). The scale is constructed only on the basis of reflectivity. This can only be estimated by comparison with typical examples or a colour swatch. Similarly, an emissivity scale could be constructed. Albedo and SRI cannot simply be measured as a guide.
Description of data processing	The indicator evaluates the proportion of roof and facade areas with a reflectance index in a given interval. From the evaluation table, the sum is determined according to the proportion of the roof with the given type of reflectivity and the facade with the given type of reflectivity. Rating tableIndex HBW roofs greater than or equal to 35: Less than 25 %: 0 points25 to 75 %: 1 pointOver 75 %: 2 pointsIndex HBW facade greater than or equal to 35: Less than 25 %: 0 points25 to 75 %: 1 pointOver 75 %: 2 pointsOverall rating:The sum of the point scores of the roof and the facade.
Data source	Owner/administrator data
Tracking frequency	One time, at change
Urban influence	The city can directly invest in the surface treatment of roofs and facades of buildings owned by it, or support these measures on the buildings of other owners financially or otherwise.
Presentation method	The results will be presented in a uniform KLIMASKEN framework on a five-point scale according to the sum of points from the evaluation table: 5 (E) 4 (D) 3 (C) 2 (B) 1 (A) 0 1 2 3 4
Responsibility	Owner, building manager

B-AD8

COOLING EQUIPMENT

Number	B-AD8
Indicator name	Cooling equipment
Area	A
Indicator definition	The indicator is set as a point score depending on the type of building cooling installed. The score is constructed on the basis of a combination of the efficiency of a given type of equipment and its energy intensity (impact on the production of CO2 emissions).
Indicator unit	Point score
Key words	Cooling, overheating, indoor environment, microclimate
Reason for tracking and usability	The indicator monitors which methods are used in the building for active cooling. Active cooling is most often solved by air-to-air conditioning units. Only fixed units are included, not mobile air conditioners. Other cooling methods are included. When cooling based on the principle of heat exchange during the change of state, it is necessary to keep in mind that the production of cold produces heat outside the building and consumes electricity. From this point of view (mitigation synergy) there are more favourable technologies and some of them are inherently on the verge of passive and active cooling. As it is not possible to calculate the exact physical and energy parameters of the evaluated buildings for the indicative evaluation, values (weighing) are assigned to individual types of cooling with regard to efficiency and mitigation impacts.
Completeness, representativeness, validity	The indicator provides only a highly indicative assessment of the technology used in the building. The specific technology, product, parameters are not taken into account. The indicator does not take into account the energy source of the cooling. If cooling is provided exclusively from renewable energy sources, the assessment is not appropriate.

B-AD8

COOLING EQUIPMENT

Description of data processing	Qualitative parameters specify the most frequently used refrigeration equipment and the average adaptation and mitigation contribution. Quantitative parameters determine the coefficients that indicate the effect of the refrigeration equipment used. The value of the indicator is calculated as a multiple of the coefficient of the scoring table and the scale. E.g. the worst variant is when an air-conditioning system is used, which has a negative impact on CO2 emissions due to high production, as well as no refrigeration equipment, without which a stay in some areas is problematic in summer due to high interior overheating. Rating table: Technology (Adaptation and Mitigation points) Total rating - No cooling system (5; 1): 3 points - Passive cooling (via low temperature circuits in the structure) (1; 1): 1 point- Ventilation system with heat recovery (with bypass) (2; 1) 1,5 points - Ventilation system with integrated cooler (1; 3) 2 points - Ventilation system with ground heat exchanger (2; 1): 1,5 points - Air conditioning (split air conditioning) (1; 5): 3 points
Data source	Own data of the owner/administrator, project documentation of TSB (technical security of the building)
Tracking frequency	One time, at change
Urban influence	The city/city district/municipality can directly invest in the technical security of buildings owned by it, or support these measures on the buildings of other owners financially or otherwise.
Presentation method	The results will be presented in a uniform KLIMASKEN framework on a five-point scale according to the sum of points from the evaluation table: 5 (E) 4 (D) 3 (C) 2 (B) 1 (A) 3 2,5 2 1,5 1
Responsibility	Owner, building manager

B-AD9

VENTILATION EQUIPMENT

Number	B-AD9
Indicator name	Ventilation equipment
Area	A
Indicator definition	The indicator is determined as a point score depending on the installed type of ventilation (ventilation equipment) of the building. The score is constructed on the basis of a combination of the efficiency of a given type of equipment and its energy intensity (impact on the production of CO2 emissions).
Indicator unit	Point score
Key words	Ventilation, overheating, indoor environment, microclimate
Reason for tracking and usability	The ventilation system with recuperation ensures a constant exchange of air in the living rooms in the building, it sucks out degraded air from the kitchen, sanitary facilities, wardrobe, etc. and at the same time saves energy all year round. There is no need to open windows in summer, as it provides a permanent supply of fresh air. In the case of existing buildings, the additional installation is relatively complicated, due to the extensive intervention in the building as long as it is inhabited. For new buildings, it is ideal if it also has pre-cooling of the supply air in the summer (we know the solution for the new building Petržalské Dvory). During the significant renovation of apartment buildings in Slovakia in Bratislava, e.g. apartment house of Pavel Horov to the A0 standard, where the so-called inverters, it is a ventilation unit installed in the facade, which solves one space-room). The ventilation system has the benefit of reducing interior overheating.
Completeness, representativeness, validity	The indicator provides only a highly indicative assessment of the technology used in the building. Determining the predominant type is subjective. The specific technology, product, parameters are not taken into account. The indicator does not take into account the energy source of the ventilation. If cooling is provided exclusively from renewable energy sources, the assessment is not appropriate.

VENTILATION EQUIPMENT

Description of data processing	The first step specifies the prevailing ventilation technologies: 1) Without ventilation system, i.e. it is a natural ventilation through windows and infiltration. 2) Without ventilation system, only with extraction of the kitchen and hygienic areas (bathroom, toilet). 3) Ventilation system with recuperation: supply of fresh air to living rooms, extraction of degraded air from the kitchen and hygienic areas (bathroom, toilet). 4) Ventilation system with recuperation and summer bypass. This bypass allows the house to be cooled by cooler outside air at night during the summer months. If the bypass is activated, the exhaust hot air does not pass through the heat exchanger and the heat is not transferred to the fresh cold air coming from outside. The cold air can therefore be used to cool the house. The bypass is activated mostly automatically, depending on the indoor and outdoor temperature. 5) Ventilation system with recuperation and with the use of passive cooling: supply of fresh air to living rooms, extraction of degraded air from the kitchen and hygienic areas (bathroom, toilet). Passive cooling is based on the use of the cooling medium in natural temperatures - groundwater, ground heat / ground cold, air intake through the ground heat exchanger, without additional reduction of the cooling medium temperature. 6) Ventilation system with recuperation and with the use of active cooling: supply of fresh air to the living rooms, extraction of degraded air from the kitchen and hygienic areas (bathroom, toilet). Active cooling is based on the use of a cooling medium, the temperature of which is additionally reduced by the cooling system. In the second step, the score of the respective type is deducted from the evaluation table. Rating table: Technology; (Adaptation-Mitigation Points), Total result - No cooling system (1; 5): 3 points- Ventilation system with recuperation (3; 1): 2 points - Ventilation system with recuperation and using passive cooling (2; 3): 2,5 points - Passive cooling (via low-temperature circuits in the design (2; 1): 1,5 points - Ventilation system with recuperation and using active cooling (5; 1): 1 point
Data source	Own owner/administrator data, project documentation TSB (technical security of the building)
Tracking frequency	One time, at a change
Urban influence	The city/city district/municipality can directly invest in the technical security of buildings owned by it, or support these measures on the buildings of other owners financially or otherwise.

B-AD9

VENTILATION EQUIPMENT

Presentation method	The results will be presented in a uniform KLIMASKEN framework on a five-point scale according to the sum of points from the evaluation table
Responsibility	Owner, building manager

B-AD10

CAPACITY OF THE BUILDING TO ACCUMULATE RAINWATER

Number	B-AD10
Indicator name	Capacity of the building to accumulate rainwater
Area	A
Indicator definition	The indicator expresses the accumulation (detention, storage) capacity related to the building, enabling the storage of filtered rainwater from the roof of the building into the supply for further use in the building and on land in above-ground and underground storage tanks. However, rainwater on the plot is not included in the indicator. If the installation of the tank is not possible or is excluded, the capacity calculation does not have to be done and the building is marked in the worst category in this indicator.
Indicator unit	%
Key words	Water accumulation, water detection, retention tank, accumulation tank, rainwater
Reason for tracking and usability	Creating a supply of filtered rainwater in storage tanks ensures higher self-sufficiency of building users, whether the water is used e.g. for flushing toilets or watering the garden. To determine the indicator, it is necessary to calculate the optimal volume of storage capacity for a given property according to the input parameters, while it is assumed that these are mainly family / apartment houses. Optimally, the capacity is such that all water consumption in the building, which may be saturated with rainwater, is covered by this water - taking into account the total precipitation in the area and the size and type of roof. The calculation can be used to optimize the rainwater accumulation system, see here.
Completeness, representativeness, validity	The indicator is based on the exact technical calculation of the optimal volume of accumulation in terms of the amount of precipitation and the needs of the building. If the "gray" water from the building operation and rainwater is mixed in the storage tanks, a larger storage capacity must be reserved than just when rainwater is stored. The indicator is not sensitive to this situation.

Description of data processing	Indicator is calculated in 4 steps: (according to the technical security of the building TSB-info): 1. Determination of the amount of rainwater collected per year (Q) at a given location. The amount of trapped rainwater Q depends on the amount of precipitation in the area, the size of the roof area, the roof drain coefficient and the efficiency coefficient of the mechanical dirt filter. Q=j*P*fs*ff/1000j - amount of precipitation (mm / year) - determined according to the precipitation map P - usable roof area (m2) - calculated according to the floor plan projection of the roof fs - roof drain coefficient (-) - calculated according to the roofing material ff - mechanical impurity filter efficiency coefficient (-) - calculated according to the manufacturer's data, or a coefficient of 0.9 (90%) is used 2. Required storage volume according to building consumption The volume of the reservoir Vv depends on the number of inhabitants in the household, water consumption per capita and the coefficient of rainwater utilization. The calculation takes into account the necessary water supply for the period of rain break in the form of a coefficient z. Vv=n*Sd*R*z/1000n - number of inhabitants in the household Sd - total consumption of all water per capita and day (l) - usually 140 R - rainwater utilization factor (-) - usually 0.5 (i.e. rainwater utilization to replace 50 % of total consumption) z - coefficient of optimal size (-) - usually 20 3. Required storage volume according to the amount of usable rainwater The volume of the tank VP depends on the amount of collected rainwater. The calculation takes into account the necessary water supply for the period of rain break in the form of a coefficient of. Vp=z*Q/365VP - tank volume according to the amount of usable rainwater (m3) Q - amount of captured rainwater (m3/year) z - coefficient of optimal size (-) - usually 20 4. Calculation of the required storage tank volume For the design of the storage tank size, the smaller of the calculated volumes shall be selected as the minimum required volume VN: VN=min(Vv;Vp)VN - required tank volume (m3) Vv - tank volume according to consumption (m3) Vp - tank volume according to the amount of usable rainwater (m3) The indicator is evaluated as a proportion of the actual volume of the retention tank (tanks) associated with the building (VA) and (VN): X=VA/VN *100 %
Data source	Precipitation map, the processor's own data on the inhabitants of the building and their water consumption, technical and project documentation
Tracking frequency	One time, at a change

B-AD10

CAPACITY OF THE BUILDING TO ACCUMULATE RAINWATER

Urban influence	The city/city district/municipality can support the construction of rainwater accumulation systems in its own buildings, support the construction of accumulation tanks on the city's/city district's land supplemented from other owners' buildings, join joint accumulation systems from several buildings and support the creation of these systems in other buildings financially or otherwise.
Presentation method	The results will be presented in a uniform KLIMASKEN frame on a five-point scale after including the resulting value of X in the appropriate interval.
Responsibility	Owner, building manager

B-EMI12

HEAT CONSUMPTION IN BUILDING

Number	B-EMI12
Indicator name	Heat consumption in building
Area	M
Indicator definition	The indicator is evaluating the total consumption for heating, which is produced from local energy source. Heat consumption is then converted to the corresponding greenhouse gas emissions, that includes the energy consumption for heating in the building. It is necessary to determine the heat source, resp. to use the national heat production factor (if known). Heat sources should be divided according to the types of fossil fuels and non-fossil energy sources for heating. Fossil heat sources, which are included in the calculation tool are as follow: • natural gas, • electricity (normal mix) • coal (black and brown), • fuel oil, fuel oil. Non-fossil sources: • biofuels, biogas, bio waste, solar heat production, environmental energy (heat pumps), cogeneration, event. a combination of these resources, • electricity ("green" electricity from RES=renewable energy sources) Combination of these resources: • mix of fossil and non-fossil district heat sources
Indicator unit	kg CO2e/obyv.
Key words	Energy, heat, heating
Reason for tracking and usability	Heat consumption belongs to the most significant part of the total greenhouse gas emissions in relation to the buildings. From the point of view of mitigation, this is a key indicator. In the case of individually heated dwellings within an apartment building, it is necessary to determine the heat sources and estimate or measure the total heat consumption for the entire apartment building. The usability and influence of the indicator are high because each operator or owner of the building has an impact on the local heat source in the building.

B-EMI12

HEAT CONSUMPTION IN BUILDING

Completeness, representativeness, validity	This indicator is sufficiently representative in the case, that is possible to obtain data within the building on the predominant heat source (type of fuel, technology used), which are used for heat supply of the relevant building. It is also appropriate to collect data about the total energy consumption for heating for the whole resitendial building.
Description of data processing	In the first step, it is necessary to obtain the relevant invoice for heat billing or another source of information on heat consumption in the building. There is a need to collect data on annual energy consumption in MWh or other units that might be obtained from the invoice or a similar source. The next step is to determine the heat source or its combination. The consumption of fuels and energy for heat production is then recalculated according to the corresponding emission factors for greenhouse gas emissions and these are further expressed per capita – it means in relation to one inhabitant of the building.
Data source	The primary source of data is the manager/operator, owner, or administrator of the building. Another source of data is represented by the heat producers/distributors for a given building.
Tracking frequency	Once a year, or once every 2 years.
Urban influence	The city/city district/municipality and the organizations managed by it can directly influence the heat consumption only in their buildings and the buildings of the contributory organizations. In the case of other heat sources (e.g. individual heating points) they have only an indirect effect, e.g. the possibility of acting on citizens or offering a contribution/subsidy for the replacement of the boiler.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e/inhabitant). A: 0–600; B: 301–1 200; C:1 201–1 800; D:1 801–2 400; E: 2 401 and more
Responsibility	Owner, building manager

B-EMI3

ELECTRICITY CONSUMPTION IN THE BUILDING

Number	B-EMI3
Indicator name	Electricity consumption in the building
Area	M
Indicator definition	The indicator includes the total electricity consumption within the building, regardless of the place of electricity production. Electricity consumption is then converted to the corresponding greenhouse gas emissions. It includes the total annual electricity consumption in the building (high and low tariff).
Indicator unit	kg CO2e/obyv.
Key words	Energy, electricity
Reason for tracking and usability	Electricity production (and therefore the electricity consumption as well), especially from fossil fuels, is a significant source of greenhouse gas (GHG) emissions. The electricity production share of GHG total emissions related to the building is around 20% (excluding emissions embodied in the construction of a new building). The size of emissions will affect the method of electricity production in a given country (energy mix), but also the specific electricity supplier and the method of electricity production it offers. The reason for monitoring the electricity production is the mentioned weight of the indicator in comparison to the total emissions and the relatively easy possibility of obtaining accurate data of the electricity production in relation to the building, based on invoicing.
Completeness, representativeness, validity	The indicator sufficiently represents the observed phenomenon. If it is possible to collect comprehensive and accurate data about the electricity consumption and its production, this indicator is fully valid. Validity is reduced by the fact that the contracting authority does not know whether it is buying electricity from renewable sources and then it is necessary to use the national energy mix for electricity production and the corresponding emission factor. The indicator also does not reflect the share of individual electricity sources that are consumed in the building (the so-called marked-based emission factor for electricity), especially when the mix of renewable and non-renewable sources is applied.

B-EMI3

ELECTRICITY CONSUMPTION IN THE BUILDING

Description of data processing	It is necessary to obtain data on the annual energy consumption in relation to the supplied electricity in the evaluated building. Data sources could be represented by annual electricity bills. The values in kWh are converted according to the relevant emission factor for electricity in the given state (location-based) to the corresponding greenhouse gas emissions and these are re-calculated per capita (to one inhabitant of the building).
Data source	The data source relevant for this indicator is the relevant electricity producer and its annual billing, or other annual consumption records.
Tracking frequency	Once a year, or once in two years.
Urban influence	The city and their sub-ordinary organizations can directly influence heat consumption, even only in its owned buildings and in the buildings that are under its management. They can install their own low-carbon renewable energy sources on their assets and can implement cost-saving measures and support the development of electromobility infrastructure. In the case of other buildings (households, businesses) in private ownership, the cities and municipalities have only an indirect effect on electricity consumption and relevant electricity sources.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Owner, building manager

B-EMI4

ELECTRICITY GENERATION/PRODUCTION IN THE BUILDING

Number	B-EMI4
Indicator name	Electricity generation/production in the building
Area	M
Indicator definition	The indicator includes the total production of electricity from renewable energy sources (RES) within the building (eg PV panels on the roof) or in its immediate vicinity (turbines/windmill on the land belonging to the building), which is both used/consumed within the building and distributed to the grid.
Indicator unit	kg CO2e/obyv.
Key words	Energy, electricity from renewable energy sources
Reason for tracking and usability	The electricity production (and therefore the electricity consumption as well), especially from fossil fuels, is a significant source of greenhouse gas (GHG) emissions. The production of electricity from renewable energy sources is thus one of the ways to directly reduce the carbon footprint of the building's operation and increase the share of renewable sources in the energy mix. The potential of buildings for their own electricity production is quite high. It is necessary to distinguish between the direct consumption of electricity produced in the building and the amount of electricity that flows into the distribution grid/network. While the first option reduces dependence on electricity consumed, the second increases the share of renewables in the country's total electricity production (national energy mix).
Completeness, representativeness, validity	The indicator sufficiently represents the observed phenomenon. If it is possible to collect comprehensive and accurate data about the electricity production within the building, this indicator is complete and fully valid.
Description of data processing	To determine the indicator, it is necessary to take into account the total electricity production in the building, from all sources, regardless of whether it is used in the building (the so-called island system) or supplied to the grid. The energy sources are in the most cases e.g. the photovoltaic panels, wind turbines on a building or on its land, etc.

B-EMI4

ELECTRICITY GENERATION/PRODUCTION IN THE BUILDING

Data source	The source of data for the calculation of this indicator is the production of a given energy source, or the billing of the seller and buyer of electricity in the case, when 100% of electricity produced is saled This data are available by the operator of this RES or the owner / administrator of the building.
Tracking frequency	Once a year, or once every 2 years.
Urban influence	The city and its sub-ordinary organizations can directly influence heat consumption, even only in its owned buildings and in the buildings that are under its management. They can install their own low-carbon renewable energy sources on their assets and can implement cost-saving measures and support the development of electromobility infrastructure. In the case of other buildings (households, businesses) in private ownership, the cities and municipalities have only an indirect effect on electricity consumption and relevant electricity sources.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Owner, building manager

B-EMI5

MIXED MUNICIPAL WASTE PRODUCTION IN THE BUILDING

Number	B-EMI5
Indicator name	Mixed municipal waste production in the building
Area	M
Indicator definition	The total amount of mixed municipal waste generated within the building (after removal of all components, that were separated), which was disposed at a municipal waste landfill, incinerated, or otherwise disposed of per year. The amount of waste is then converted to the corresponding greenhouse gas emissions.
Indicator unit	kg CO2e/obyv.
Key words	Waste, waste management
Reason for tracking and usability	The production of waste, including wastewater, represents a considerable source of GHG emissions (e.g. in average 3 – 10% of the GHG total emissions in the cities of the Czech Republic and Slovakia). Reducing the amount of municipal waste through the prevention of waste production or better utilization of waste and the introduction of the principles of the circular economy therefore has a significant mitigation potential. The amount of separate and solid municipal waste is significantly affected by the tenants/owners of the building (households, companies or authorities) due to their consumption habits. In the case of building operators/managers, the possibility to influence this indicator is therefore very limited.
Completeness, representativeness, validity	The indicator is sufficiently representative if it is possible to collect data about the municipal waste management in relation to the evaluated building. Validity may be reduced in the case, that the amount of waste derives from the volume of the municipal waste container and the number of collection, however this may not well represent the weight of the waste. The most accurate data are obtained in the so-called smart waste collection mode, where the exact weight of waste from each container is expressed.

B-EMI5

MIXED MUNICIPAL WASTE PRODUCTION IN THE BUILDING

Description of data processing	With the aim to obtain data about the produced municipal solid waste for the year, the data on the waste removal/ from the building could serve as the relevant source. Municipal solid waste is all the waste produced on the territory of the municipality during the activities of natural persons (the exact definition of the solid municipal waste is listed in the National municipal Waste law), with the exception of waste from entrepreneurs classified into other categories. The input data of the indicator is the weight of municipal waste produced in the building per year without components of separate collection (plastics, paper, glass, metals, biodegradable waste) and without hazardous waste. Only unseparated solid municipal waste is included in the calculation of the indicator, which is regularly collected. The production of municipal waste is then recalculated according to general emission factors to the corresponding greenhouse gas emissions, and these are expressed per capita (to one inhabitant of the building). One 120 l container of mixed waste has a weight of about 20 kg according to the composition of the waste.
Data source	The primary source of data is the building operator or waste removal company.
Tracking frequency	Once per year
Urban influence	The city and its sub-ordinary organizations can directly influence the production and separation of municipal waste in their facilities. They can also improve the separation system (accessibility, amount of separated waste components) and raise awareness of citizens for better waste management.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Owner, building manager

B-EMI6

WASTEWATER PRODUCTION IN THE BUILDING

Number	B-EMI6
Indicator name	Wastewater production in the building
Area	M
Indicator definition	The total amount of wastewater produced in the building. If the building is connected to a sewerage system, the wastewater is discharged to a central wastewater treatment plant. The second option is a local wastewater solution treatment (septic tank, domestic wastewater treatment plant, root waste treatment plant, etc.) for those buildings that are not connected to the centralized sewage system. The volume of wastewater is then converted to the corresponding greenhouse gas emissions.
Indicator unit	kg CO2e/obyv.
Key words	Wastewater, wastewater treatment
Reason for tracking and usability	The production of waste, including wastewater, represents a considerable source of GHG emissions (e.g. in average 3 – 10% of the GHG total emissions in the cities of the Czech Republic and Slovakia). The production of wastewater is a significant source of greenhouse gas emissions due to the content of organic substances and the need for their subsequent disposal From the point of view of environmental protection, a better solution for the wastewater treatment is the construction of a central sewerage system (where the wastewater is separated from the rainwater) and wastewater treatment in the WWTP. Another option is to build a root treatment plant. The least suitable solution is a drain to a septic tank or the home treatment plant).
Completeness, representativeness, validity	The indicator is sufficiently representative if data about wastewater produced in the building are available. The source of data can be billing for sewerage. Validity may be reduced if such bill is not available. Further complication is, if the building is not connected to the sewer and an individual treatment plant or septic tank is used. The exact data on the annual production of wastewater must then be derived from the volume of the septic tank or water consumption.

B-EMI6

WASTEWATER PRODUCTION IN THE BUILDING

Description of data processing	In the case of buildings connected to the sewerage system with the final WWTP, it is necessary to obtain an annual bill of water and waste water. The amount of waste water in m3 / year is needed for the evaluation through this indicator. This amount is then converted to greenhouse gas emissions according to the relevant emission factor. In the case of buildings not connected to the sewerage system, the number of inhabitants in the building is used to calculate emissions. The standardized value of emissions from wastewater production per inhabitant of the building is used.
Data source	The primary source of data is the building operator or the company responsible for water supply and sewerage in the city.
Tracking frequency	Once a year
Urban influence	The city and the organizations it manages can partially influence the production of wastewater in their facilities, e.g. by introducing technologies to save water consumption or by separate collection of rainwater and waste water. They also have an important role in connecting households to sewers with a final wastewater plant WWTP, in areas where wastewater plants have not yet been built. The overall influence of the city on the value of the indicator is only indirect, the biggest role is played by the technologies used in wastewater treatment and the method of sludge management.
Presentation method	The results will be presented in a uniform Klimasken framework on a five-point scale according to specified intervals (kg CO2e / inhabitant)
Responsibility	Owner, building manager

B-GOV1

TECHNICAL SECURITY OF THE BUILDINGS AGAINST FLOODS AND TORRENTIAL RAINS

Number	B-GOV1
Indicator name	Technical security of the buildings against floods and torrential rains
Area	G
Indicator definition	The indicator describes the scope and nature of technical measures and the fulfilment of construction and technical conditions for the protection of the building against water penetration.
Indicator unit	Points
Key words	Floods, torrential rains, inundations, flood protection, building security
Reason for tracking and usability	The degree of security of a building against water intrusion determines the adaptive capacity and resistance of the building to the effects of climate change in the form of more numerous episodes of fluvial and pluvial floods. The buildings are protected against groundwater intrusion by waterproofing. A properly constructed roof protects buildings from atmospheric precipitation with separate waterproofing. It can protect against further penetration of atmospheric precipitation by further covering the building and especially building openings with roofs. During floods, the height of the water column acting with a hydrostatic force on the structures increases and water penetrates the building through all the "weak points". For such cases, the buildings can be secured with special elements of technical protection. Examples: - Means of technical security of buildings against floods: https://lnk.sk/fjkh - Construction-technical conditions (principles) for protection of the building against floods: https://lnk.sk/hkw4 - Drainage sidewalks: https://lnk.sk/tvkw
Completeness, representativeness, validity	The indicator takes into account 15 partial measures that generally serve as protection against water penetration into the building. It does not evaluate specific local conditions, cannot replace technical tests and does not evaluate the specific implementation (quality and scope) of individual measures.

Description of data processing	It is evaluated according to the checklist of building parameters. The point value given in the table is taken into account for meeting the relevant parameter. Table / checklist: 1 – building with a regular floor plan without risalits and shaping: 1 point 2 – waterproofing on the entire roof surface (flat or sloping): 1 point 3 – roof waterproofing without defects: 1 point 4 – functional and sufficient capacity drainage of rainwater from the entire roof area: 1 point 5 – covering the building or courtyard with another roof with rainwater drainage: 1 point 6 – covering the predominant number of entrances and entrances with a roof (including entrances to cellars and basements): 1 point 7 – predominant share of the area of building openings (doors, windows) above ground level: 1 point 8 – horizontal waterproofing of foundations in the whole floor plan: 1 point 9 – vertical waterproofing of foundations around the entire perimeter: 1 point 10 – special waterproofing of foundations against pressurized water: 2 points 11 – surrounding terrain (land) mostly considering the direction from the house: 2 points 12 – predominant slope of sidewalks and adjacent paved areas at least 2% in the direction from the building: 1 point 13 – adjacent gutters with drainage on the predominant part of the perimeter: 1 point 14 – secured entrances to cellars and basements, for example by raising the terrain to prevent direct leakage by a sufficient gutter, etc. mobile flood barrier: 2 points 15 – fixed flood gates and shutters: 3 points Maximum: 20 points If the building is built on piles (with a flow zone), uses a lifting device or is otherwise systematically secured against flooding, all points from parameter 6 onwards are automatically counted.
Data source	Own owner/administrator data, project, construction and technical documentation of the building, operational documentation
Tracking frequency	2 – 3 years

B-GOV1

TECHNICAL SECURITY OF THE BUILDINGS AGAINST FLOODS AND TORRENTIAL RAINS

Urban influence	The city/city district/municipality can directly invest in the flood protection of buildings owned by it, or support these measures on the buildings of other owners financially or otherwise.
Presentation method	The results will be presented in a uniform KLIMASKEN framework on a five-point scale according to the sum of points from the evaluation table: 5(E): < = 3; 4(D): 4–7; 3(C): 8–11; 2(B): 11–15; 1(A): > = 16
Responsibility	Owner, building manager

B-GOV2

RETENTION OF RAINWATER AROUND THE BUILDING

Number	B-GOV2
Indicator name	Retention of rainwater around the building
Area	G
Indicator definition	The indicator (qualitative and quantitative) describes the elements, especially surfaces, around the building (within 20 meters of the building) that have an impact on water retention. The indicator is expressed by the coefficient of blue-green infrastructure, which expresses the scope and quality of the elements of BGI (blue-green infrastructure) around the building.
Indicator unit	coefficient
Key words	Water, rainwater management, water retention, blue-green infrastructure
Reason for tracking and usability	Water retention in the soil through permeable surfaces, greenery and ideally rainwater management (RWM) facilities to some extent reduces the risk of flooding the building in the event of precipitation. When creating the indicator, a modified and modified "index of blue-green infrastructure" according to J. Vitek (JV PROJEKT VH s.r.o.) and other processed studies and documents in the given area is used. The blue-green infrastructure (BGI) index expresses the permeability of the surfaces of the selected area by means of the functional coefficient BGI of the respective surface type / object and the total area of the given surface type / covered by the given object type in this area. The area of individual surfaces / areas in the vicinity up to 20 m from the sides of the building is first weighted by the coefficient BGI and then after consideration calculated. The weighted BGI coefficient is then obtained by dividing the area of areas with the BGI function by the total area of areas.
Completeness, representativeness, validity	The size of the area around the building is determined by a vertical line with a length of 20 m from the sides of the building. This limit is decisive and may not correspond to the nature of the development / land in various cases. Due to the fact that the weighted coefficient is expressed by a ratio, the considered area may not always be the same for different buildings (for example it is possible to use land plots).

Description of data processing

The indicator includes both qualitative (type of surfaces) and quantitative parameters (area). Table of qualitative parameters: Code; Surface / object description Definition; - A: impermeable paved surfaces; areas without plant cover and the possibility of rainwater infiltration - B: paved area with paving, threshing surface; paving on a gravel bed with a joint of less than 15 mm, threshing surfaces with a permeability of less than 10 mm / hour - C: paved surface with permeable cover, unpaved surfaces without plant cover; permeable paved surfaces and paving with permeable joint over 15 mm, area with gravel and sand surface with permeability over 10 mm / hour - G. a small area with a continuous plant cover and the possibility of infiltration into deeper layers strongly compacted; areas up to 10 m2 and green strips width less than 3.5 m without the possibility of inflow of rainwater from the surrounding areas, areas heavily compacted - H: grassy area with intensive maintenance with the possibility of free infiltration into deeper layers; grassed intensively mowed areas (more than 3 mowings per year) exceeding the dimensions of 10 m2 - CH: extensively maintained grassy area, area with mixed vegetation cover of herb and wood floor vegetation; areas with an increased value in terms of biodiversity or infiltration capacity - J: massive trees; mixed (coniferous and deciduous), existing involved tree growth massive trees capture 80% of precipitation, coniferous trees are more effective in capturing precipitation, as deciduous trees in the leafless state capture only 10 to 30% (Xiao, McPherson, 2002, Calder et al. 2008) - K: trees with small growth, mostly deciduous trees; young trees capture only 15%, coniferous trees are more effective in capturing rainfall, as deciduous trees in the leafless state capture only 10 to 30% (Xiao, McPherson, 2002, Calder et al. 2008) - L. areas of shrubs over 1 m high - P: underground overwhelming space for trees; root cells, structural substrate, root bridges and pathways with water regime optimization - Q: areas where treatment has been made to support rainwater infiltration; H-shaped areas, the topography and degree of compaction of which has been adjusted for the possibility of water infiltration from the surrounding areas, other areas where rainwater infiltration has been supported by a technical or technological measure - R: RWM objects regulating water runoff; infiltration swales and grooves with regulated outflow - S: flat RWM objects allowing water infiltration; infiltration swales and grooves with regulated outflow Calculation table with quantitative parameter (area) including example: Example: house approx. 10 x 10 m on a plot of 570 m2 with predominant permeable areas and greenery: Code; Coefficient (k); Area (S) [m2]; Function BGI (fBGI) = k*S A: 0 * 36 = 0 B: 0,2 * 48 = 9,6 C: 0,4 * 0 = 0 G: 0,4 * 27 = 10,8 H: 0,7 * 450 = 315 CH: 1 * 30 = 30 J: 1 * 45 = 45 K: 0,4 * 0 = 0 L:

	0,4 * 34 = 13,6 P: 0,6 * 0 = 0 Q: 0,4 * 0 = 0 R: 0,8 * 0 = 0 S: 1 * 670 = 670 TOTAL: area TOTAL: 1340; area BGI: 1094 Calculation: Weighted coefficient= area BGI/area TOTAL = 0,816
Data source	The dimensions of individual types of surfaces adjacent to the building/objects of rainwater management must be determined by direct field measurements and, if necessary, by comparison with project or construction documentation.
Tracking frequency	2 – 3 years
Urban influence	The city/city district/municipality can directly invest in increasing the permeability of surfaces around buildings owned by it, in RWM facilities and other elements of BGI, or support these measures on land and buildings of other owners financially or otherwise. RWM and BGI elements related to buildings and related to public space should be proposed in the strategic planning of urban development and in the framework of urban spatial development policy.
Presentation method	The results will be presented in a uniform KLIMASKEN framework on a five-point scale after including the final value of the weighted BGI in the appropriate interval. 5(E): < = 0,2; 4(D): > 0,2 < = 0,3; 3(C): > 0,3 < = 0,6; 2(B): > 0,6 < = 0,8; 1 (A): > 0,8
Responsibility	Vlastník, správce budovy

B-GOV3

RAINWATER CAPTURE ON THE BUILDING

Number	B-GOV3
Indicator name	Rainwater capture on the building
Area	G
Indicator definition	The indicator (qualitative and quantitative) describes the elements on the roof of the building and on its vertical structures that have an impact on water retention. The indicator is expressed by the coefficient of blue-green infrastructure, which expresses the scope and quality of the elements of BGI (blue-green infrastructure) around the building.
Indicator unit	coefficient
Key words	Water, rainwater management, water retention, blue-green infrastructure
Reason for tracking and usability	Green roofs and green facades help keep surfaces cooler by evaporation and shading. Greenery and related substrates retain rainwater, intensive roofs about 80%, extensive about 35-70%. Green roofs and facades also have an anti-noise function. The greenery on the building improves the microclimate in its immediate vicinity. Intensive roofs also have a recreational function and both types of roofs increase biodiversity. Green roofs and facades help to connect the building organically with the greenery in the public space. When creating the indicator, a modified "index of blue-green infrastructure" according to J. Vitek (JV PROJEKT VH s.r.o.) and other processed studies and documents in the given area is used. This index expresses the ability of a given type of surface to perform the function of a blue-green infrastructure through the ratio of the functional part of the surface to its total area. For roofs with gravel backfill, which are not considered in the concept of the MZI index, a value of a coefficient of 0.4 is set for the purposes of this indicator. Their ability to retain rainwater is lower than that of vegetation roofs, especially in the case of medium and heavy rainfall (see eg :
Completeness, representativeness, validity	The indicator uses a method that has proven itself in practice to calculate the permeability of surfaces in the city and applies it to the building, respectively uses those parts of the BGI that are related to building construction. The indicator is always more representative only in combination with the KLIMASKEN B-GOV2 indicator.

Description of data processing	The indicator includes both qualitative (type of surfaces) and quantitative parameters (area). Table of qualitative parameters: (Code; Surface/object description; Definition). - XX; Roof and facade surface without modifications surfaces of roofs and facades without vegetation cover and backfill - D; green wall, climbing plants; climbing plants on facades and structures - E1; extensive roof gardens - flat roof; roof gardens and greenery on underground structures with a height of vegetation substrate up to 200 mm - E2; extensive roof gardens - inclination from 35°; roof gardens and greenery on underground structures with the height of the vegetation substrate up to 200 mm - inclination from 35° - F; intensive roof gardens; roof gardens and greenery on underground structures with the height of the vegetation substrate over 200 mm - Y; so-called blue resp. blue-green roofs; roofs with 100% rainwater retention technology - Z; roofs with gravel backfill roofs; usually covered with gravel fraction 16/32 with a layer thickness of 4 - 6 cm Calculation table with quantitative parameter (area) including example: Example: A building with a floor plan of 10x10 m, a height of 7 m, with a flat roof, covered with an intensive vegetation layer and one wall covered with climbing greenery: Code; Coefficient (k); Area (S) [m2]; Function BGI (fBGI)=k*S - XX: 0; 210; 0 - D: 0,6; 70; 42 - E1: 0,6 0; 0 - E2: 0,3; 0; 0 - F: 0,8; 100; 80 - Y: 1; 0; 0 - Z 0,4; 0; 0 TOTAL: Area TOTAL: 380; Area BGI: 122
Data source	The dimensions of individual types of roof surfaces must be determined by direct field measurements and, if necessary, by comparison with project or construction (execution, technical) documentation.
Tracking frequency	One time, at a change
Urban influence	The city/city district/municipality can directly invest in the modifications of roofs, RWM buildings and other elements of BGI on its own buildings, or support these measures on the buildings of other owners financially or otherwise.

RAINWATER CAPTURE ON THE BUILDING

Presentation method	The results will be presented in a uniform KLIMASKEN framework on a five-point scale after including the final value of the weighted BGI in the appropriate interval. 5(E): 0; 4(D): > 0 < = 0,1; 3(C): > 0,1 < = 0,3; 2(B): > 0,3 < = 0,5; 1(A): > 0,5
Responsibility	Owner, building manager

B-GOV4

ENSURING PREVENTION AGAINST NATURAL EVENTS

Number	B-GOV4
Indicator name	Ensuring prevention against natural events
Area	G
Indicator definition	The indicator evaluates the level of prevention in buildings in the event of natural disasters, resp. the impact of extreme weather events related to climate change.
Indicator unit	Points
Key words	Natural events, fire, disaster, blackout, extreme weather
Reason for tracking and usability	As a result of climate change, there is an increasing risk of natural disasters, which threaten, among other things, buildings and related assets.
Completeness, representativeness, validity	The indicator identifies several options for preventive action and it assigns them arbitrary values of the severity rate for threat prevention. The indicator is indicative.

Description of data processing	The indicator is determined by adding the points in the ten-point checklist. For each completed list item, 1 point is always included in the resulting value of X. - 1. The building is equipped with fire sensors (in common areas and / or in apartments) and flood sensors in buildings at risk of flooding. - 2. All common areas of the building are freely passable without barriers and obstacles in accordance with fire regulations. All main switches and caps are marked and accessible. The building is equipped with fire-fighting equipment in accordance with regulations. - 3. Users are instructed on the principles of behaviour in the event of natural disasters (securing property, disconnecting equipment, ensuring access to information, closing windows, etc.) - 4. Users are actively informed about the principles of securing a building against floods, inundations and the effects of extreme weather, know the location of key technological elements of the building, have access to them and are willing to cooperate. - 5. The building is equipped with a backup power supply / device for the production of electricity in case of blackout. - 6. The building has two independent sources of (at least utility) water. - 7. If the building does not have a backup power supply and is heated by solid fuel heaters connected to the heating system, this system is equipped with a cooling loop (prevention of damage when the pumps are disconnected). - 8. The building has common areas where it is possible to cool down in case of heat and gather in case of emergency. - 9. The building has an administrator who performs regular maintenance and inspections. - 10. At least 3/4 of the residents (households, effective occupants) of the building are registered in a system enabling quick information in case of emergency or emergency (SMS, e-mail). After completing the checklist, all points are counted.
Data source	Own data, project, construction, technical, operational documentation, local investigation
Tracking frequency	2 – 3 years

Urban influence	The city/city district/munilipality can ensure compliance with prevention requirements in its own buildings. For other buildings, it can support prevention methodically, through control activities within its powers or in another way.
Presentation method	The results will be presented in a uniform KLIMASKEN frame on a five-point scale after including the resulting value of X in the appropriate interval. 5(E): 0-2, 4(D): 3-4, 3(C): 5-6, 2(B): 7-8, 1(A): 9-10
Responsibility	Owner, administrator