Interreg
Danube Region

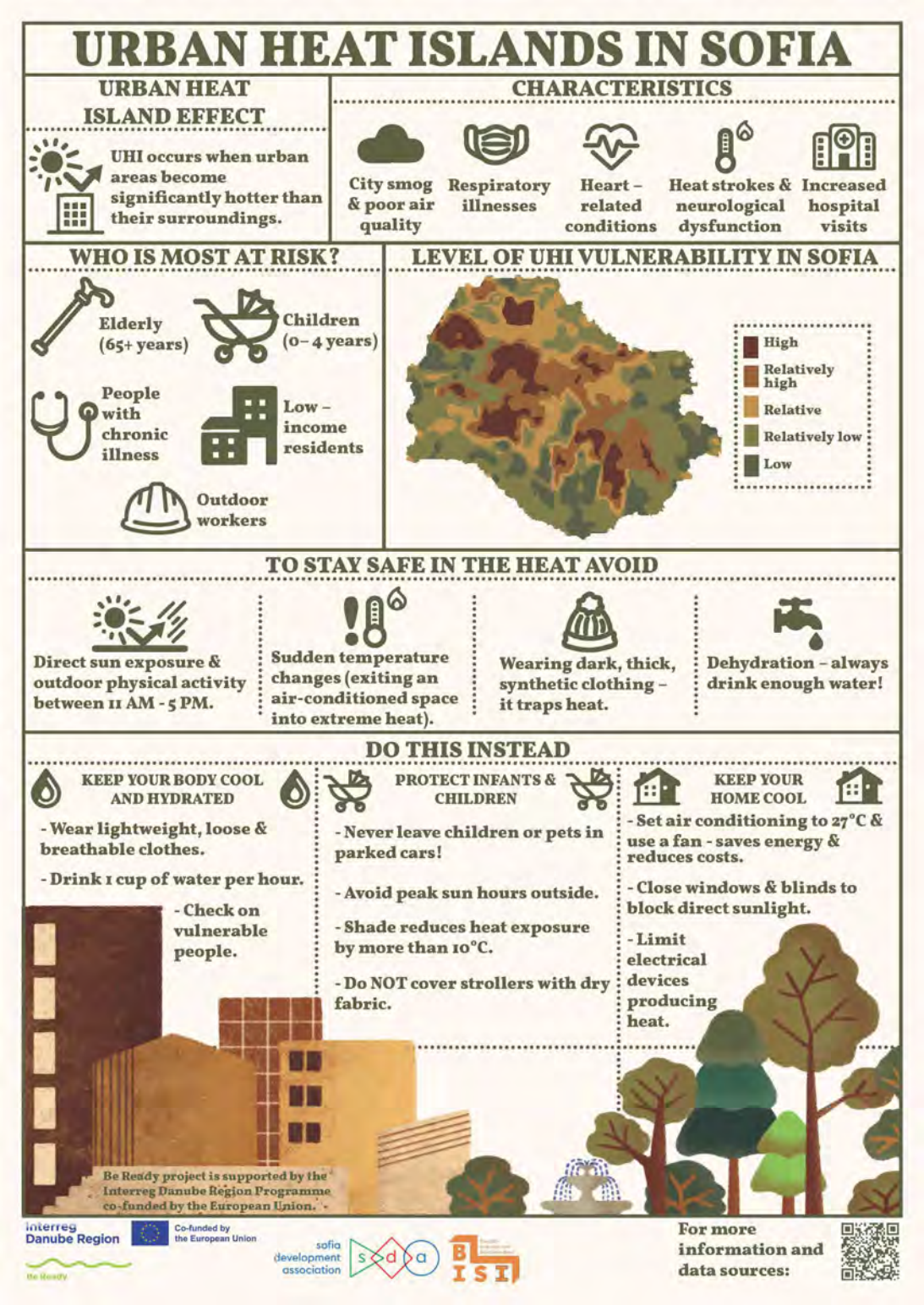
Co-funded by
the European Union

Be Ready

D1.4.1 INFOGRAPHICS AND INFORMATION MATERIALS

D1.4.1 Infographics and information materials

1. Sofia



ГРАДСКИ ТОПЛИННИ ОСТРОВИ

ЕФЕКТ НА ГРАДСКИЯ ТОПЛИНЕН ОСТРОВ

Появява се, когато градските райони станат значително по-горещи от заобикалящата ги среда.

ХАРАКТЕРИСТИКИ

- Смог в града и лошо качество на въздуха
- Респираторни болести
- Сърдечно - съдови заболявания
- Топлинни удари и неврологична дисфункция
- Увеличаване на посещенията в болница

КОЙ Е ИЗЛОЖЕН НА НАЙ-ГОЛЯМ РИСК?

- Възрастни хора (над 65 години)
- Деца (0-4 години)
- Хора с хронични болести
- Хора с ниски доходи
- Работещи на открито хора

НИВО НА ГТО УЯЗВИМОСТ В СОФИЯ

- Високо
- Средно високо
- Средно
- Средно ниско
- Ниско

ЗА ДА СЕ ПРЕДПАЗИТЕ ОТ ЖЕГИТЕ ИЗБЯГВАЙТЕ

- Пряко излагане на слънце и физическа активност на открито между 11:00 и 17:00 часа.
- Внезапни температурни промени (излизане от климатизирано помещение в екстремна жега).
- Носене на тъмни, дебели и синтетични дрехи - те задържат топлината.
- Обезводняване - винаги пийте достатъчно вода!

СЪВЕТИ

ПОДДЪРЖАЙТЕ ТЯЛОТО СИ ОХЛАДЕНО И ХИДРАТИРАНО:

- Носете леки, свободни дрехи и дишащи материи
- Пийте по 1 чаша вода на час (поне 2-3 литра дневно).
- Погрижете се за по-уязвимите хора - възрастни хора, хора с увреждания и такива с хронични заболявания.

ЗАЩИТА НА БЕБЕТА И ДЕЦА:

- Никога не оставяйте деца или домашни любимци в паркирани автомобили!
- Избягвайте пиковите часове на слънцето.
- Сянката намалява излагането на топлина с повече от 10°C!
- НЕ покривайте детските колички с изкуствена материя.

ПОДДЪРЖАЙТЕ ДОМА СИ ХЛАДЕН:

- Затворете прозорците и щорите през деня, за да блокирате пряката слънчева светлина.
- Настройте климатика на 27°C и използвайте вентилатор - спестява енергия и намалява разходите за охлаждане.
- Ограничете електрическите уреди, които произвеждат топлина.

Be Ready project is supported by the Interreg Danube Region Programme co-funded by the European Union.

SOFIA UHI VULNERABILITY ASSESSMENT

Urban heat island = urban areas become hotter than the surroundings.

Infrastructure absorbs and retains heat, increasing city temperatures.

Poor urban design adds heat stress.

UHI EFFECTS

- Economic loss
- More energy for cooling
- Health risks
- Worse air and water quality
- Loss of biodiversity

The Be Ready project tackles UHIs as a shared challenge. 19 partners, 9 associate partners from 12 countries aim to enhance societal preparedness, adaptive capacity, and foster urban resilience in response to climate change.

CITY: SOFIA, BULGARIA

- Population: 1,224,175
- Area: 1,344.9 sq. km
- GDP per capita: €27,480

TRENDS & PROJECTIONS

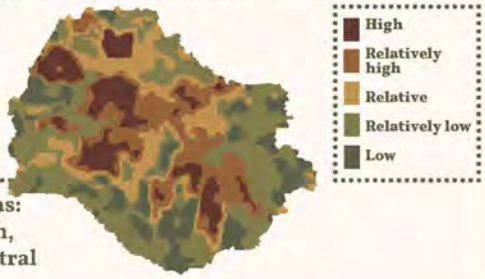
Temperature trends

Summer

Heat Wave Average Duration: 9 days, 3 times a year

LEVEL OF UHI VULNERABILITY IN SOFIA

Temperature difference between hottest and coolest areas: 26°C



High-Risk Areas: Mladost, Lyulin, Nadezhda, Central Sofia

SENSITIVITY OF EQUIPMENT & MATERIALS

Average City Albedo Coefficient (surface reflectivity): 0,75

Surface temperature at noon in August: from 20,2 to 46,5 C

EXPOSURE OF BUILDINGS & SURROUNDINGS

62%

City green coverage: 62%, but unevenly distributed.

16%

City sealed surfaces: 16%

28 Water bodies, 7 in bad ecological condition

VULNERABLE GROUPS IN SOFIA

CHILDREN

Aged 0-4: 61,940
Aged 5-14: 123,167

INCREASED VULNERABILITY TO URBAN HEAT

- Serious health risks: dehydration, heat exhaustion, heat stroke and more.
- Sleep disruptions, affecting growth and well-being.
- Reduced outdoor activity.

SOLUTION FOCUS

- Ensure shaded and cool outdoor spaces for children.
- Improve urban planning to reduce heat effects in child-dense areas.
- Promote hydration awareness & heat protection in schools and kindergatens.

PEOPLE WITH DISABILITIES

Population 16+ with a disability level of over 50%: 9.2%

INCREASED VULNERABILITY TO URBAN HEAT

- More prone to heat-related issues due to physical, sensory, or cognitive impairments.
- Wheelchairs and other devices generate extra heat.
- Lower incomes make cooling less affordable.

SOLUTION FOCUS

- Improve accessible cooling spaces & public transport options.
- Support for energy-efficient housing & financial aid for cooling needs.

ELDERLY PEOPLE

Aged 65-74: 124,631
Aged 75+: 88,427

INCREASED VULNERABILITY TO URBAN HEAT

- Dehydration risks:
  - weakness
  - dizziness
  - headaches
- Heat can cause a drop in blood pressure, heat stroke.
- Severe health complications.

SOLUTION FOCUS

- Ensure easy access to cooling shelters & hydration points.
- Promote community support to prevent isolation.
- Improve public awareness & emergency response for heat risks.

Interreg Danube Region
Co-funded by the European Union
Be Ready

sofia development association

For more information and data sources:

ОЦЕНКА НА УЯЗВИМОСТТА КЪМ ГТО В ГРАД СОФИЯ

Градски топлинен остров = градските райони стават значително по-горещи от заобикалящата ги среда.

Инфраструктурата поглъща и задържа топлина, като повишава температурата в градовете.

Лошият градски дизайн увеличава топлинния стрес.

ЕФЕКТИ НА ГРАДСКИЯ ТОПЛИНЕН ОСТРОВ

- Икономически загуби
- Повече енергия за охлаждане
- Рискове за здравето
- По-лошо качество на въздуха и водата
- Намаляване на биоразнообразие

Проектът "Be Ready" цели да подобри възможностите на градовете да се справят с общото предизвикателство – градските топлинни острови (ГТО). 19 партньори, 9 асоциирани партньори от 12 държави имат за цел да повишат обществената готовност, капацитета за адаптиране и да насърчат устойчивостта на градовете в отговор на изменението на климата.

ГРАД: СОФИЯ, БЪЛГАРИЯ

- Население: 1,224,175
- Район: 1,344,9 кв. км
- БВП на глава от населението: 27,480 €

НИВО НА ГТО УЯЗВИМОСТ В СОФИЯ

Температурна разлика между най-горещите и най-хладните зони: 25 °C

- Високо
- Средно високо
- Средно
- Средно ниско
- Ниско

Високорискови зони: Младост, Люлин, Надежда, Централна София

ТЕНДЕНЦИИ И ПРОГНОЗИ

- Температурни тенденции
- Лято

Средна продължителност на горещата вълна: 9 дни, 3 пъти годишно

ИЗЛАГАНЕ НА СГРАДИ И ЗАОБИКАЛЯЩА СРЕДА

62%

Зелено покритие: 62%, но с неравномерно разпределение.

16%

Запечатани повърхности в града: 16%.

28 Водни обекта, 7 в лошо екологично състояние

ЧУВСТВИТЕЛНОСТ НА ОБОРУДВАНЕТО И МАТЕРИАЛИТЕ

Среден коефициент на албедо на града (отразяваща способност на повърхността): 0,75

Температура на повърхността по обяд през август: от 20,2 до 46,5°C

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For more information and data sources:

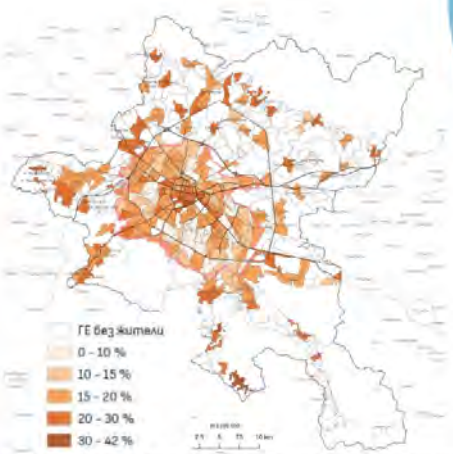
VULNERABLE COMMUNITIES AND URBAN HEAT ISLANDS EFFECTS MITIGATION: ELDERLY PEOPLE

1 * POPULATION AGED 65 AND OVER

Population aged 65-74: **124 631**

Population aged - 75: **88 427**

*2020, National Statistical Institute



Concentration of population over 65 years of age by GE by 2020 in the city of Sofia, source: GRAO, Sofiaplan.

2 HOW DO URBAN HEAT ISLANDS AFFECT THE ELDERLY?

- Dehydration, dizziness, weakness, severe thirst and headache.
- For people with cardiovascular diseases - drop in blood pressure.
- In case of an increase in internal body temperature (heat stroke) - organ failure.
- Possible complications and life-threatening conditions related to kidney diseases, stroke, heart attack, migraine, mental illness.

3 THE DEGREE OF DANGER IS DETERMINED BY:

AGE: the ability to regulate body temperature decreases with age.

PHYSICAL AND MENTAL HEALTH: chronic problems often occur, and especially in cardiovascular, respiratory and endocrine diseases.

ECONOMIC AND SOCIAL CONDITIONS: if they cannot afford to have air conditioning at home or to use it in the summer, they do not have the option of temperature comfort and cooling; or if they have to go outside because of commitments or a feeling of social isolation.

RISK-INDUCING BEHAVIORS: direct sun exposure or physical activity at peak heat hours; switching abruptly from cool indoor conditions to hot outdoor environments, with a temperature difference of over 10 degrees and no time to adapt; wearing dark, thick clothing made of artificial fabrics and not wearing a hat; insufficient water intake.

4 HOW THE ELDERLY PREFER TO COPE WITH EXTREME HEAT:

- If their homes have cooling - air conditioning or ventilation - older people prefer to stay at home during heatwaves.
- If their homes lack cooling, the elderly prefer to go to a park with tree cover for shade and water facilities; with drinking water, toilets, benches and places to rest, but without factors causing social stress: too much noise and crowds.
- Going outside is often about having company–those living in social isolation may not consider seeking a cool place outdoors as an option.
- Many elderly people still do not recognize the harmful effects of heat, as for most of their lives, the problem has been the opposite: staying warm.

Sources: NSI; CRAS; Sofiaplan; own research

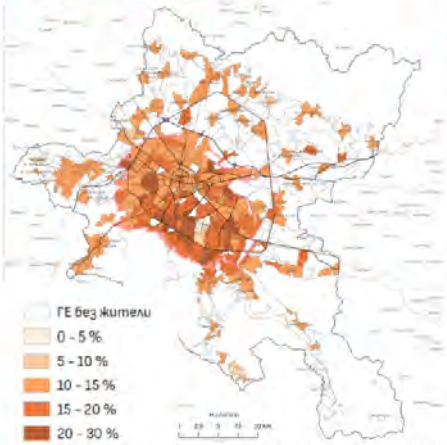
VULNERABLE COMMUNITIES AND URBAN HEAT ISLANDS EFFECTS MITIGATION: CHILDREN

1 * POPULATION AGED 0 TO 14 YEARS

Children aged 0-4 years: **61 940**

Children aged 5-14 years: **123 167**

* 2020, National Statistical Institute



Concentration of population aged 0 - 14 years. by GE by 2020 in Sofia, source: GRAO, Sofiaplan.

2 HOW DO URBAN HEAT ISLANDS AFFECT CHILDREN?

- Children have physical and physiological differences compared to adults: a higher surface-to-mass ratio, a less developed body and immune system, a lower sweating rate due to smaller sweat glands, and a different ability to perceive the thermal environment.
- Young children exposed to high temperatures are more likely to develop jaundice and neurological dysfunction, and dehydration can affect their nutritional status. They may experience heat exhaustion and muscle cramps, and heat strokes can damage their brain, heart, kidneys, and muscles.
- Extreme heat causes sleep problems during the day and night.
- Many children become lethargic, lose the desire to play (fundamental for their development), and do not have the opportunity to spend time outside, which can lead to nutritional problems and depression.
- Their concentration and focus deteriorate, and their school performance declines.

3 THE DEGREE OF DANGER IS DETERMINED BY:

AGE: particularly dangerous is extreme heat for infants from 0 to 4 years.

ADAPTABILITY: children may not notice signs of heat stress, they adapt more slowly to changes in temperature.

FLUID INTAKE: if not carefully monitored, children may not take in enough fluids.

SOCIAL AND ECONOMIC CONDITIONS: if they live in a home without cooling and ventilation or spend a lot of time outside directly exposed to the sun.

4 HOW TO PROTECT CHILDREN FROM THE INFLUENCE OF HEAT ISLANDS:

- Children cannot cope or decide for themselves, as adults do. That's why adults should be extra attentive.
- Outdoor public spaces intended to be used or visited by children such as playgrounds, spaces between residential buildings, public transportation stops, etc., shall be screened and adapted to protect from heat with appropriate landscaping, access to potable water, and shade.
- Going outdoors should be done during suitable hours when temperatures are lower, and with appropriate clothing.
- Places visited by children - schools, kindergartens and nurseries, health centers, child care centers, etc. should also be equipped to deal with the heat, with adequate cooling, shade in courtyards, and potable water, especially in neighborhoods with low-income families.

Sources: National Statistical Institute, GRAO, Sofiaplan, own research

VULNERABLE COMMUNITIES AND URBAN HEAT ISLANDS EFFECTS MITIGATION: PEOPLE WITH DISABILITIES

1 PEOPLE WITH DISABILITIES

The City of Sofia does not have accurate statistics on the number of people with disabilities. Available data is from the 2021 census self-reported health status.

The proportion of people aged **16** and over with a disability level of over **50%** is **9.2%**, which is lower than the national average.

2 HOW DO URBAN HEAT ISLANDS AFFECT THE DISABLED AND CHRONICALLY ILL (E.G. DIABETES, CARDIOVASCULAR DISEASES, SENSORY IMPAIRMENTS, MENTAL ILLNESS, ETC.)?

- In addition to the problems caused by heat that affect everyone, such as insomnia, dehydration, brain fog, etc., people with disabilities may experience additional difficulties (depending on the type of disability. For some disabilities, there are physical limitations in coping with heat, such as the inability to sweat (which helps minimize overheating). If people with mental illnesses are left to cope with the heat on their own, it can worsen their condition. Some of the medications taken by people with disabilities also interfere with the body's cooling mechanisms. Prolonged exposure to extreme heat, due to some people's limited mobility, also increases discomfort and sensitivity to pain.
- Particularly vulnerable are people with spinal injuries and people with mental illness.
- For those who rely on assistive devices or equipment, such as wheelchairs or orthotics, the heat generated by these devices increases discomfort in hot weather.
- Social aspects - people with disabilities have more difficulty accessing transportation and public parks suitable for cooling; limited to stay at home, they are more likely to experience social isolation, especially during heatwaves.
- Economic aspects: people with disabilities and chronic illnesses often have lower incomes, and have a harder time maintaining a comfortable living environment.

3 HOW TO PROTECT PEOPLE WITH DISABILITIES FROM THE IMPACT OF HEAT ISLANDS:

- Check their homes for medication storage conditions and create a "cool place" with temperatures below 26 C in the summer.
- A plan for personal assistants, social and health workers, and volunteers (when appropriate) on how to care for people with disabilities during heat waves.
- Create accessible channels for climate and heat emergency information for people with disabilities.
- Fostering networks of acquaintances, relatives, neighbors, and friends to maintain contact with people with disabilities during heatwaves.

Sources: Institute for Market Economy, own research

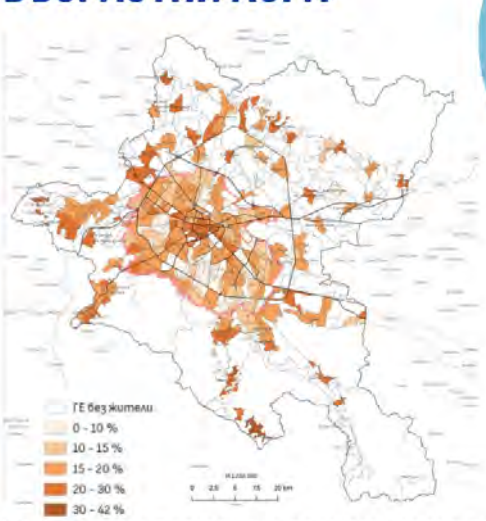
СМЕКЧАВАНЕ НА ЕФЕКТИТЕ ОТ ГРАДСКИТЕ ТОПЛИННИ ОСТРОВИ ВЪРХУ УЯЗВИМИ ОБЩНОСТИ: ВЪЗРАСТНИ ХОРА

1 НАСЕЛЕНИЕ НА ВЪЗРАСТ НАД 65 Г.*

Население на възраст между **65-74** години:
124 631

Население на възраст над **74** години:
88 427

*2020 НСИ



Концентрация на население на възраст над 65 г. по ГЕ към 2020 в гр. София, източник: ГРАО, Софияплан.

2 КАК ВЛИЯЯТ ГРАДСКИТЕ ТОПЛИННИ ОСТРОВИ НА ВЪЗРАСТНИТЕ ХОРА?

- Обезводняване, замаяност, отслабналост, силна жажда и главоболие.
- При хора със сърдечно-съдови заболявания - спадане на кръвното налягане.
- При повишаване на вътрешната телесна температура (топлинен удар) - отказ на органи.
- Възможни усложнения и животозастрашаващи състояния, свързани с бъбречни заболявания, инсулт, инфаркт, мигрена, психични заболявания.

3 СТЕПЕНТА НА ОПАСНОСТ СЕ ОПРЕДЕЛЯ ОТ:

ВЪЗРАСТТА: с годините намалява способността за регулиране на телесната температура

ФИЗИЧЕСКОТО И ПСИХИЧЕСКОТО ЗДРАВЕ: често се появяват хронични проблеми и най-вече сърдечно-съдови, респираторни и ендокринни заболявания.

СОЦИАЛНИТЕ И ИКОНОМИЧЕСКИ УСЛОВИЯ: ако не могат да си позволят да имат климатик у дома или да го ползват през лятото, нямат възможност за температурен комфорт и охлаждане; ако се налага излизане навън заради ангажименти поради социална изолация.

РИСКОВО ПОВЕДЕНИЕ: пряко излагане на слънце или физическа активност в пикови часове; рязко преминаване от хладно на закрито към горещина навън с повече от 10 градуса разлика, без възможност за адаптация; носене на тъмни, плътни дрехи от изкуствени материи и липса на шапка; недостатъчен прием на вода.

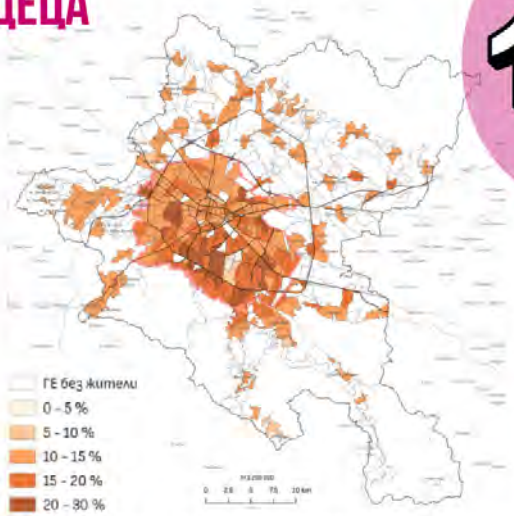
4 КАК ВЪЗРАСТНИТЕ ХОРА ПРЕДПОЧИТАТ ДА СЕ СПРАВЯТ С ГОРЕЩИНИ:

- Ако в домовете им има охлаждане - климатици или вентилация - възрастните хора предпочитат да прекарат горещините у дома.
- Ако домът е без охлаждане, възрастните хора предпочитат да отидат в парк с дървета, предпазващи от слънцето, и водни елементи, с наличие на питейна вода, тоалетни, пейки и места за почивка, но без фактори, причиняващи социален стрес: твърде много шум и тълпи.
- Излизането навън е свързано с това да имаш компания - за живеещите в социална изолация търсенето на хладно място на открито не е решение.
- Голяма част от възрастните хора все още не осъзнават вредното влияние на горещините, тъй като през по-голямата част от живота си проблемът е бил отоплението.

Източници: НСИ, ГРАО, Софияплан, собствено проучване

СМЕКЧАВАНЕ НА ЕФЕКТИТЕ ОТ ГРАДСКИТЕ ТОПЛИННИ ОСТРОВИ ВЪРХУ УЯЗВИМИ ОБЩНОСТИ:

ДЕЦА



Концентрация на население на възраст 0 - 14 г. по ГЕ към 2020 в гр. София, източник: ГРАО, Софияплан.

1 * НАСЕЛЕНИЕ НА ВЪЗРАСТ ОТ 0 ДО 14 Г.

Население на възраст между 0 - 4 години:
61 940

Население на възраст между 5 - 14 години:
123 167

*2020 НСИ

2 КАК ВЛИЯЯТ ГРАДСКИТЕ ТОПЛИННИ ОСТРОВИ НА ДЕЦАТА?

- Децата имат физически и физиологични различия в сравнение с възрастните: те имат по-високо съотношение повърхност към маса, по-малко развити тяло и имунна система, по-ниска скорост на изпотяване поради по-малките потни жлези и различна способност за възприемане на топлинната среда.
- Малките деца, изложени на високи температури, са по-склонни да развият жълтеница и неврологична дисфункция, а дехидратацията може да повлияе на хранителния им статус. Те могат да изпитат топлинно изтощение и мускулни крампи, а топлинните удари могат да увредят мозъка, сърцето, бъбреците и мускулите им.
- Горещините причиняват проблеми със съня през деня и нощта.
- Много деца са летаргични, губят желание за игра, фундаментално за развитието им,нямат възможност да прекарват време навън, което може да доведе до хранителни проблеми и депресия.
- Влошава се концентрацията и фокуса им, академичното представяне е по-ниско.

Източници: НСИ, ГРАО, Софияплан, собствено проучване

3 СТЕПЕНТА НА ОПАСНОСТ СЕ ОПРЕДЕЛЯ ОТ:

ВЪЗРАСТТА: особено опасни са горещините при бебета от 0 до 4 г.

СПОСОБНОСТ ЗА АДАПТАЦИЯ: децата може да не забележат признаци на топлинен стрес, те се адаптират по-бавно към промените в температурата.

ПРИЕМ НА ТЕЧНОСТИ: ако не са внимателно наблюдавани, децата имат тенденция да не приемат достатъчно течности.

СОЦИАЛНИТЕ И ИКОНОМИЧЕСКИ УСЛОВИЯ: ако живеят в дом без охлаждане и вентилация или прекарват много време навън директно изложени на слънце.

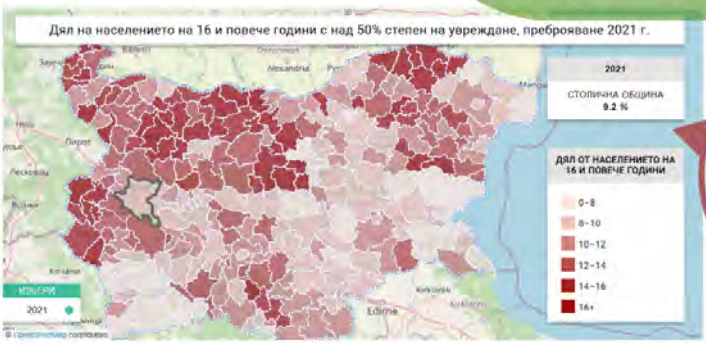
4 КАК ДА ПРЕДПАЗИМ ДЕЦАТА ОТ ВЛИЯНИЕТО НА ТОПЛИННИТЕ ОСТРОВИ:

- Децата не са малки възрастни и не могат да се справят или решат сами.
- Обществените пространства на открито, предназначени да се ползват или посещават от деца като детски площадки, междублокови пространства, спирки на градския транспорт и др., трябва да бъдат проверени и адаптирани да предпазват от горещина с подходящо озеленяване, питейна вода, засенчване.
- Излизането навън трябва да става в подходящи часове с по-ниски температури и с подходящо облекло..
- Местата, посещавани от деца - училища, детски градини и ясли, ДКЦ, центрове за деца и др. също трябва да са оборудвани за справяне с топлината, с подходящо охлаждане, сянка в дворовете, питейна вода, особено в кварталите с ниски доходи.

СМЕКЧАВАНЕ НА ЕФЕКТИТЕ ОТ ГРАДСКИТЕ ТОПЛИННИ ОСТРОВИ ВЪРХУ УЯЗВИМИ ОБЩНОСТИ: ХОРА С УВРЕЖДАНИЯ

1 ХОРА С УВРЕЖДАНИЯ

София не разполага с точна статистика за броя на хората с увреждания. Наличните данни са от самоопределението на здравното състояние на гражданите от преброяването на населението 2021 г.



Дял на хората с увреждания на **16** и повече години **над 50%** е **9,2%**, по-малък от средния за страната.

2 КАК ВЛИЯЯТ ГРАДСКИТЕ ТОПЛИННИ ОСТРОВИ НА ХОРАТА С УВРЕЖДАНИЯ И ХРОНИЧНО БОЛНИТЕ (НАПР. ДИАБЕТ, СЪРДЕЧНОСЪДОВИ ЗАБОЛЯВАНИЯ, СЕНЗОРНИ УВРЕЖДАНИЯ, ПСИХИЧНИ ЗАБОЛЯВАНИЯ И ДР.)?

В допълнение към проблемите, причинявани от горещината на всички хора като безсъние, обезводняване, замъгляване на съзнанието и др., в зависимост от уврежданията хората с увреждания е възможно да изпитват допълнителни трудности. При някои увреждания има физически ограничения за справяне с горещината - невъзможност за потене за минимизиране на прегряването. Хората с психични заболявания, оставени да се справят сами с горещините, влошават състоянието си. Някои от лекарствата, приемани от хора с увреждания, също пречат на механизмите на тялото за охлаждане. Продължителното излагане на екстремна топлина поради ограничената им способност да се движат или сменят позициите им също засилва дискомфорта и засилва чувствителността към болка.

Особено уязвими са хора с наранявания на гръбнака и хора с психични заболявания.

За онези, които разчитат на помощни устройства или оборудване като инвалидни колички или ортези, топлината, генерирана от тези помощни средства, увеличава дискомфорта при горещо време.

Социални аспекти: хората с увреждания имат по-затруднен достъп до транспорт и до обществени паркове, подходящи за охлаждане; по-вероятно е да изпитват социална изолация, особено по време на горещи вълни.

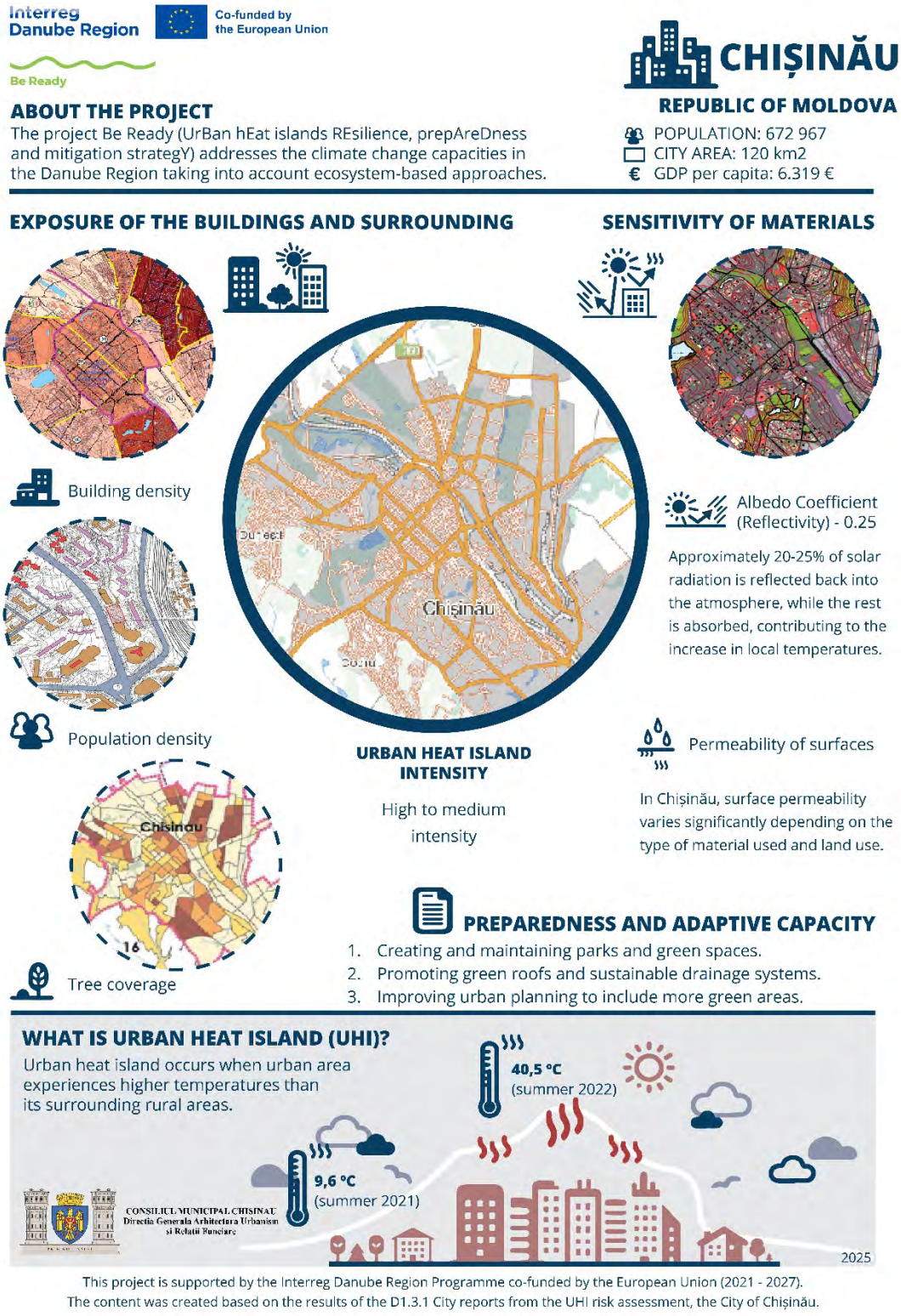
Икономически аспекти: хората с увреждания и хронични заболявания често имат по-ниски доходи, по-трудно поддържат комфортна среда за живеене.

Източници: Институт за пазарна икономика, собствено проучване

3 КАК ДА ПРЕДПАЗИМ ХОРАТА С УВРЕЖДАНИЯ ОТ ВЛИЯНИЕТО НА ТОПЛИННИТЕ ОСТРОВИ:

- Проверка на домовете за условията на съхранение на лекарства и създаване на „хладно място" през лятото с температура под 26° през лятото.
- План за лични асистенти, социални и здравни работници, когато е подходящо - и доброволци, как да се грижат за хора с увреждания при горещи вълни.
- Създаване на канали за достъпна за хората с увреждания информация, свързана с климата и горещините спешна информация.
- Насърчаване на мрежи от познати, роднини, съседи, приятели, които да поддържат контакт с хората с увреждания в условията на горещи вълни.

2. Chisinau


Interreg Danube Region
Co-funded by the European Union
Be Ready
CHIȘINĂU
REPUBLIC OF MOLDOVA
ABOUT THE PROJECT
The project Be Ready (UrBan hEat islands REsilience, prepAreDness and mitigation strategY) addresses the climate change capacities in the Danube Region taking into account ecosystem-based approaches.
POPULATION: 672 967
CITY AREA: 120 km2
GDP per capita: 6.319 €
EXPOSURE OF THE BUILDINGS AND SURROUNDING
SENSITIVITY OF MATERIALS
Building density
Chișinău
Albedo Coefficient (Reflectivity) - 0.25
Approximately 20-25% of solar radiation is reflected back into the atmosphere, while the rest is absorbed, contributing to the increase in local temperatures.
Population density
URBAN HEAT ISLAND INTENSITY
High to medium intensity
Permeability of surfaces
In Chișinău, surface permeability varies significantly depending on the type of material used and land use.
Chisinau
Tree coverage
PREPAREDNESS AND ADAPTIVE CAPACITY
1. Creating and maintaining parks and green spaces.
2. Promoting green roofs and sustainable drainage systems.
3. Improving urban planning to include more green areas.
WHAT IS URBAN HEAT ISLAND (UHI)?
Urban heat island occurs when urban area experiences higher temperatures than its surrounding rural areas.
40,5 °C (summer 2022)
9,6 °C (summer 2021)
CONSILIUL MUNICIPAL CHIȘINĂU
Direcția Generală Arhitectură Urbanism și Relații Funciare
2025
This project is supported by the Interreg Danube Region Programme co-funded by the European Union (2021 - 2027).
The content was created based on the results of the D1.3.1 City reports from the UHI risk assessment, the City of Chișinău.

Interreg Danube Region
Co-funded by the European Union
Be Ready

CHIȘINĂU

REPUBLICA MOLDOVA

POPULAȚIE: 672 967
SUPRAFAȚA: 123 km2
€ PIB pe locuitor: 6.319 €

DESPRE PROIECT

Proiectul Be Ready (Strategie de reziliență, pregătire și atenuare a efectelor Insulei de Căldură Urbană) abordează capacitățile de adaptare la schimbările climatice în regiunea Dunării, luând în considerare abordările bazate pe ecosistem.

EXPUNEREA CLĂDIRILOR ȘI ÎMPREJURIMILOR

Densitatea clădirilor

Densitatea populației

Zone și spații verzi

INTENSITATEA INSULEI DE CĂLDURĂ URBANĂ

Intensitate medie spre mare

SENSITIVITATEA MATERIALELOR

Aproximativ 20-25% din radiația solară este reflectată înapoi în atmosferă, în timp ce restul este absorbit, contribuind la creșterea temperaturilor locale.

Coeficient Albedo (Reflectivitate) - 0.25

Permeabilitatea suprafețelor

În Chișinău, permeabilitatea suprafeței variază semnificativ în funcție de tipul de materiale și de utilizarea terenurilor.

PREGĂTIRE ȘI CAPACITATE ADAPTIVĂ

1. Crearea și întreținerea parcurilor și spațiilor verzi.
2. Promovarea acoperișurilor verzi și a sistemelor de drenaj durabile.
3. Îmbunătățirea planificării urbane pentru a include mai multe zone verzi.

CE ESTE INSULA DE CĂLDURĂ URBANĂ (ICU)?

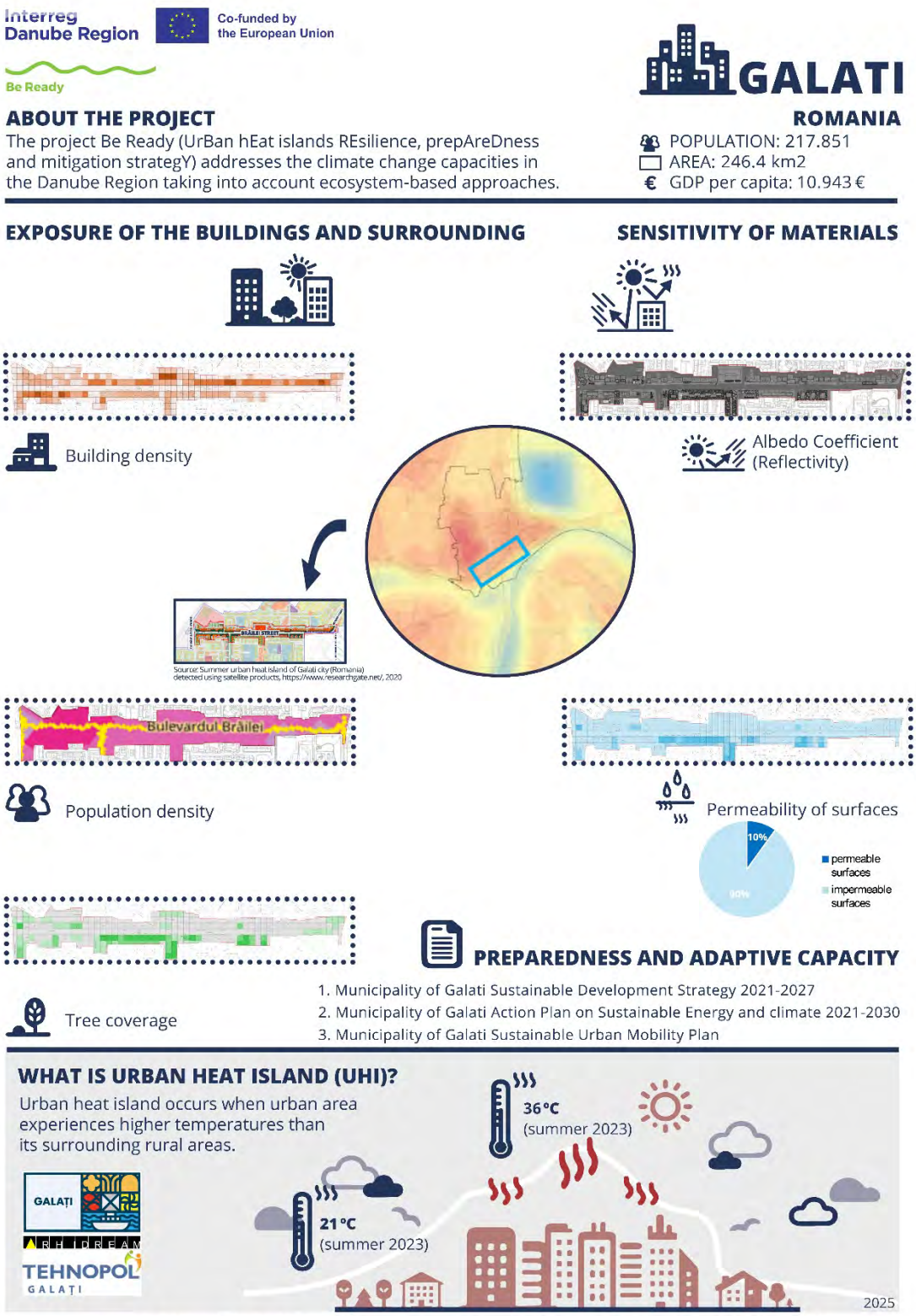
Insula de Căldură Urbană (ICU) apare atunci când zona urbană experimentează temperaturi mai ridicate decât zonele rurale înconjurătoare.

CONSILIUL MUNICIPAL CHISINAU
Direcția Generală Arhitectura Urbanism și Relații Funciare

2025

Acest proiect este susținut de Programul Interreg Regiunea Dunării, cofinanțat de Uniunea Europeană (2021 - 2027).
Conținutul a fost creat pe baza rezultatelor rapoartelor D1.3.1 ale orașului din evaluarea riscurilor ICU, orașul Chișinău.

3. Galati



This project is supported by the Interreg Danube Region Programme co-funded by the European Union (2021 - 2027).
The content was created based on the results of the D1.3.1 City reports from the UHI risk assessment, Galați.

Interreg Danube Region
Co-funded by the European Union
Be Ready

DESPRE PROIECT

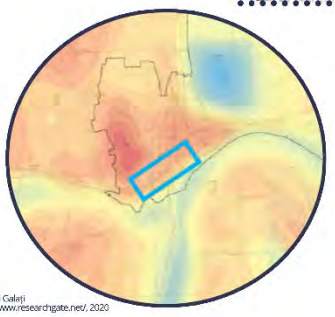
Proiectul BE READY (Strategia de reziliență, pregătire și atenuare a efectului insulelor de căldură urbană) abordează capacitățile de adaptare la schimbările climatice în regiunea Dunării, luând în considerare abordările bazate pe ecosisteme.

GALATI
ROMANIA

POPULATIE: 217.851
SUPRAFATA: 246.4 km2
€ PIB PE CAP DE LOCUITOR: 10.943€

EXPUNEREA CLĂDIRILOR ȘI A ZONEI ÎNCONJURĂTOARE

Densitatea clădirilor



Sursa: Insula de căldură urbană din timpul verii a orașului Galați (România) detectată utilizând produse satelitare, https://www.researchgate.net/, 2020

Densitatea populației

Acoperire cu arbori

SENSITIVITATEA MATERIALELOR

Coeficient Albedo (reflectivitate)

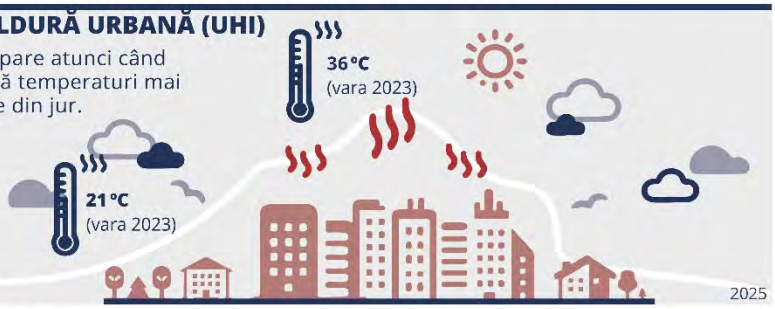
Permeabilitatea suprafețelor

CAPACITATE DE PREGĂTIRE ȘI ADAPTARE

1. Strategia de Dezvoltare Durabilă a Municipiului Galați 2021–2027
2. Planul de Acțiune privind Energia Durabilă și Clima al Municipiului Galați 2021–2030
3. Planul de Mobilitate Urbană Durabilă al Municipiului Galați

CE ESTE INSULA DE CĂLDURĂ URBANĂ (UHI)

Insula de căldură urbană apare atunci când o zonă urbană înregistrează temperaturi mai ridicate decât zonele rurale din jur.



GALAȚI
ARHIDREAM
TEHNOPOL GALAȚI

Acest proiect este susținut de Programul Interegional Regiunea Dunării, cofinanțat de Uniunea Europeană (2021–2027).
Conținutul a fost realizat pe baza rezultatelor rapoartelor urbane D1.3.1 din evaluarea riscului UHI, Galați.

URBAN HEAT ISLAND IN GALAȚI

URBAN HEAT ISLAND EFFECT

The urban heat island (UHI) occurs when urban areas become significantly warmer than the surrounding areas.

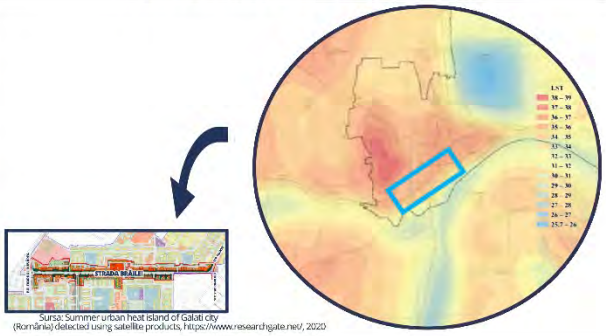
CARACTERISTICS

- Urban smog and low air quality
- Respiratory diseases
- Cardiovascular diseases
- Heatstroke and neurological dysfunctions
- Increased number of hospital visits

WHO IS MOST AT RISK?

- Elderly (+65 yrs)
- Childrens (0-4 yrs)
- People with chronic diseases
- People with low incomes
- Outdoor workers

THE IMPACT OF UHI IN GALAȚI



Sursa: Summer urban heat island of Galati city (Romania) detected using satellite products, https://www.researchgate.net/, 2020

TO STAY SAFE DURING THE HEAT, AVOID:

- Direct exposure to the sun and physical activities outdoor between 11:00 am-5:00 pm
- Sudden changes in temperature (leaving an air-conditioned space in extreme heat)
- Wearing dark, thick, synthetic clothing - it retains heat
- Dehydration - always drink enough water!

TO STAY SAFE DURING HEAT, IT IS RECOMMENDED:

KEEP YOUR BODY COOL AND HYDRATE

- Wear light, loose-fitting, breathable clothing
- Drink 1 glass of water per hour
- Check for vulnerable people

PROTECT INFANTS AND CHILDREN

- Never leave children or pets in parked cars!
- Avoid peak sun hours outdoors!
- Shading reduces heat exposure by over 10 °C
- Do not cover the stroller with dry fabrics - it may overheat.

KEEP YOUR HOME COOL

- Set the air conditioning to 27°C and use a fan - save energy and reduce costs
- Close windows and blinds to block direct sunlight.
- Limit the use of electrical appliances that produce heat.

INSULA DE CĂLDURĂ URBANĂ ÎN GALAȚI

EFECTUL INSULEI DE CĂLDURĂ URBANĂ

Insula de căldură urbană (UHI) apare atunci când zonele urbane devin semnificativ mai calde decât zonele înconjurătoare.

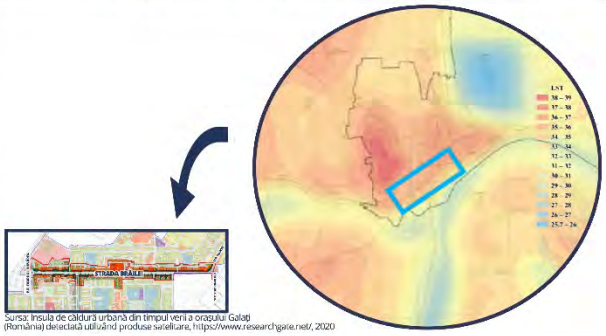
CARACTERISTICI

- Smog urban și calitate slabă a aerului
- Afecțiuni respiratorii
- Afecțiuni cardiovasculare
- Insolații și disfuncții neurologice
- Număr crescut de vizite la spital

CINE ESTE CEL MAI EXPUS RISCULUI?

- Vârstnici (+65 ani)
- Copii (0-4 ani)
- Persoane cu boli cronice
- Persoane cu venituri reduse
- Lucrători în aer liber

IMPACTUL UHI ASUPRA GALAȚIULUI



Sursa: Insula de căldură urbană din timpul verii a orașului Galați (România) detectată utilizând produse satelitare, https://www.researchgate.net/, 2020

PENTRU A RĂMÂNE ÎN SIGURANȚĂ PE TIMPUL CĂLDURII, EVITĂ:

- Expunerea directă la soare și activitățile fizice în aer liber între orele 11:00–17:00
- Schimbările bruște de temperatură (ieșirea dintr-un spațiu cu aer condiționat în căldură extremă)
- Purtarea hainelor închise la culoare, groase și sintetice – rețin căldura.
- Deshidratarea – bea întotdeauna suficientă apă!

PENTRU A RĂMÂNE ÎN SIGURANȚĂ PE TIMPUL CĂLDURII, SE RECOMANDĂ:

MENȚINE-ȚI CORPUL RĂCORIT ȘI HIDRATAT

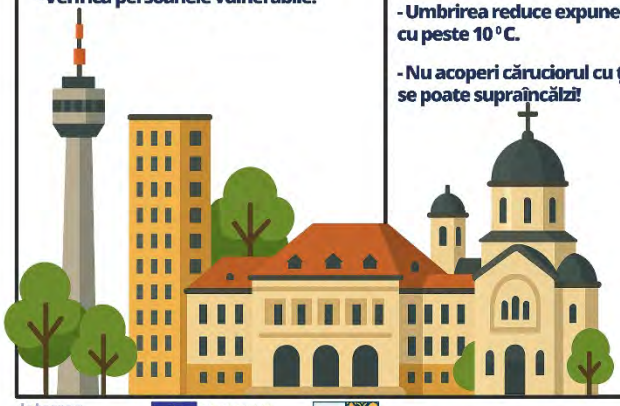
- Poartă haine ușoare, largi și din materiale respirabile.
- Bea 1 pahar de apă pe oră.
- Verifică persoanele vulnerabile.

PROTEJEAZĂ SUGARII ȘI COPIII

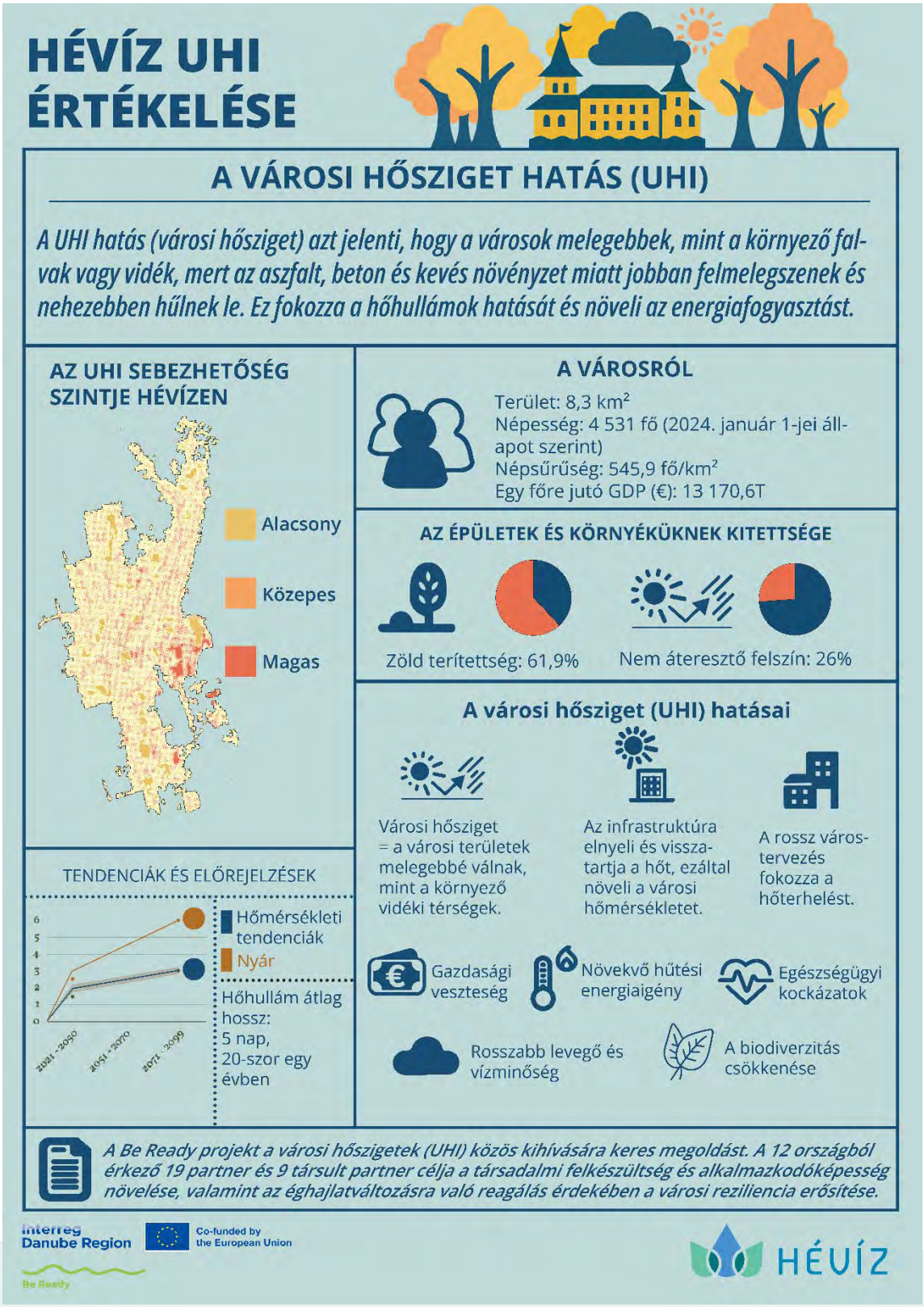
- Nu lăsa niciodată copiii sau animalele de companie în mașini parcate!
- Evită orele de vârf ale soarelui în aer liber!
- Umbrirea reduce expunerea la căldură cu peste 10 °C.
- Nu acoperi căruciorul cu țesături uscate - se poate supraîncălzi!

MENȚINE-ȚI LOCUINȚA RĂCOROASĂ

- Setează aerul condiționat la 27°C și folosește un ventilator – economisești energie și reduci costurile.
- Închide ferestrele și jaluzelele pentru a bloca lumina directă a soarelui
- Limitează utilizarea aparatelor electrice care produc căldură



4. Hévíz


HÉVÍZ UHI ÉRTÉKELÉSE
A VÁROSI HŐSZIGET HATÁS (UHI)
A UHI hatás (városi hősziget) azt jelenti, hogy a városok melegebbek, mint a környező falvak vagy vidék, mert az aszfalt, beton és kevés növényzet miatt jobban felmelegszenek és nehezebben hűlnek le. Ez fokozza a hőhullámok hatását és növeli az energiafogyasztást.
AZ UHI SEBEZHETŐSÉG SZINTJE HÉVÍZEN
Alacsony
Közepes
Magas
A VÁROSRÓL
Terület: 8,3 km²
Népesség: 4 531 fő (2024. január 1-jei állapot szerint)
Népsűrűség: 545,9 fő/km²
Egy főre jutó GDP (€): 13 170,6T
AZ ÉPÜLETEK ÉS KÖRNYÉKÜKNEK KITETTSÉGE
Zöld terítettség: 61,9%
Nem áteresztő felszín: 26%
A városi hősziget (UHI) hatásai
Városi hősziget = a városi területek melegebbé válnak, mint a környező vidéki térségek.
Az infrastruktúra elnyeli és visszatartja a hőt, ezáltal növeli a városi hőmérsékletet.
A rossz városterezés fokozza a hőterhelést.
Gazdasági veszteség
Növekvő hűtési energiaigény
Egészségügyi kockázatok
Rosszabb levegő és vízminőség
A biodiverzitás csökkenése
TENDENCIÁK ÉS ELŐREJELZÉSEK
Hőmérsékleti tendenciák
Nyár
Hőhullám átlag hossz: 5 nap, 20-szor egy évben
2021 - 2050
2051 - 2070
2071 - 2099
A Be Ready projekt a városi hőszigetek (UHI) közös kihívására keres megoldást. A 12 országból érkező 19 partner és 9 társult partner célja a társadalmi felkészültség és alkalmazkodóképesség növelése, valamint az éghajlatváltozásra való reagálás érdekében a városi reziliencia erősítése.
Interreg Danube Region
Co-funded by the European Union
Be Ready
HÉVÍZ

Interreg Danube Region
Co-funded by the European Union
Be Ready

CITY OF HÉVÍZ
HUNGARY

ABOUT THE PROJECT

The project Be Ready (UrBan hEat islands REsilience, prepAreDness and mitigation strategY) addresses the climate change capacities in the Danube Region taking into account ecosystem-based approaches.

POPULATION: 4531
AREA: 8,3 km2
GDP per capita: 13170.6 €

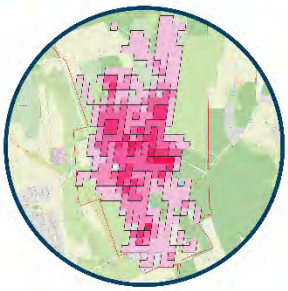
EXPOSURE OF THE BUILDINGS AND SURROUNDING

SENSITIVITY OF MATERIALS

Tree coverage

Permeability of surfaces

Population density



Albedo Coefficient (Reflectivity)

Material	Albedo (Reflectivity)	Thermal Conductivity (W/m·K)	Heat Capacity (J/kg·K)	Emissivity	Condition
Asphalt Shingles	0.04 - 0.12	1.0 - 1.5	800 - 1,200	0.9	Good
Metal Roofing	0.5 - 0.7	50 - 200	500 - 600	0.2 - 0.4	Good
Natural Stone Pavement	0.2 - 0.4	1.2 - 2.0	1,000 - 1,500	0.9	Fair
Paving Stones (Sandstone)	0.2 - 0.3	1.5 - 3.0	800 - 1,300	0.9	Fair
Concrete	0.3 - 0.6	1.4 - 2.4	800 - 1,200	0.9	Fair
Ceramic Tiles	0.2 - 0.3	1.0 - 2.0	800 - 1,200	0.8	Good

URBAN HEAT ISLAND INTENSITY

high intensity
medium intensity
low intensity

PREPAREDNESS AND ADAPTIVE CAPACITY

1. Hévíz Lake Protection Program
2. Bicycle path development project

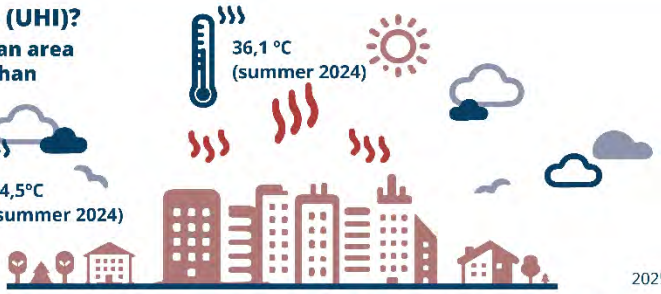
WHAT IS URBAN HEAT ISLAND (UHI)?

Urban heat island occurs when urban area experiences higher temperatures than its surrounding rural areas.

HÉVÍZ

24,5°C (summer 2024)

36,1 °C (summer 2024)



2025

This project is supported by the Interreg Danube Region Programme co-funded by the European Union (2021 - 2027).
The content was created based on the results of the D1.3.1 City reports from the UHI risk assessment, the City of Hévíz.

Interreg Danube Region
Co-funded by the European Union
Be Ready

HÉVÍZ VÁROSA
MAGYARORSZÁG

A PROJEKTRŐL

„A Be Ready projekt (UrBan hEat islands REsilience, prepAreDness and mitigation strategY) az éghajlatváltozással kapcsolatos kapacitásokat célozza meg a Duna régióban, figyelembe véve az ökoszisztéma-alapú megközelítéseket.

NÉPESSÉG: 4531
TERÜLET: 8,3 km²
EGY FŐRE GDP: 13 170,6 €

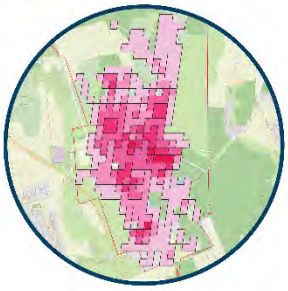
AZ ÉPÜLETEK ÉS KÖRNYEZETÜK KITETTSÉGE

AZ ANYAGOK ÉRZÉKENYSÉGE

Fákkal borítottság

A felületek áteresztőképessége

Népsűrűség



Albedó együttható (visszaverőképesség)

Material	Albedo (Reflectivity)	Thermal Conductivity (W/m·K)	Heat Capacity (J/kg·K)	Permeability	Condition
Asphalt (Roads)	0.04 - 0.12	1.0 - 1.5	800 - 1,200	0.0	Good
Metal Roofing	0.8 - 0.7	40 - 200	900 - 500	0.2 - 0.6	Good
Natural Stone Pavement	0.2 - 0.4	1.5 - 3.0	1,000 - 1,300	0.9	Fair
Paving Stones (Concrete)	0.3 - 0.5	1.5 - 3.0	800 - 1,300	0.9	Fair
Concrete	0.3 - 0.6	1.4 - 2.1	800 - 1,200	0.9	Fair
Ceramic Tiles	0.3 - 0.5	1.0 - 2.0	800 - 1,200	0.5	Good

A VÁROSI HŐSZIGET INTENZITÁSA

magas intenzitás
közepes intenzitás
alacsony intenzitás

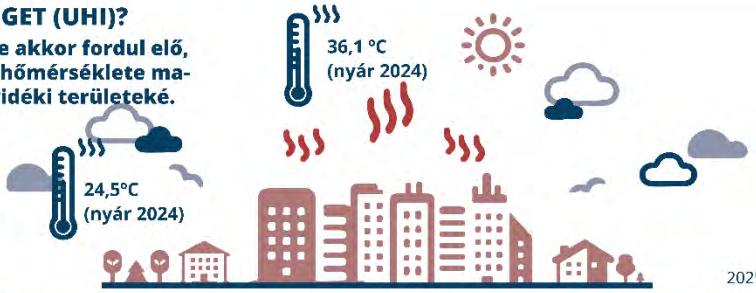
FELKÉSZÜLTSÉG ÉS ALKALMAZKODÓKÉPESSÉG

1. Hévízi-tó Védelmi Program
2. Kerékpárút-fejlesztési projekt

MI AZ A VÁROSI HŐSZIGET (UHI)?

A városi hősziget jelensége akkor fordul elő, amikor a városi területek hőmérséklete magasabb, mint a környező vidéki területeké.

HÉVÍZ



2025

Ezt a projektet az Interreg Duna Régió Program támogatja, az Európai Unió társfinanszírozásával (2021–2027). A tartalom a városi hősziget (UHI) kockázatértékelés D1.3.1-es városi jelentései alapján készült, Hévíz városára vonatkozóan.

VULNERABLE GROUPS IN HÉVÍZ

CHILDREN

Under the age of 6
149 people
3.3% of residents

INCREASED VULNERABILITY TO URBAN HEAT

- Serious health risks: dehydration, heat exhaustion, heat stroke and
- Sleep disruptions, affecting growth and well-being.
- Reduced outdoor activity.

SOLUTION FOCUS

- Ensure shaded and cool outdoor spaces
- Improve urban planning to reduce heat effects in child-dense areas.
- Promote hydration awareness & heat protection in schools

PEOPLE WITH DISABILITIES

At County Level (Zala)
14 329 people
5.57% of the residents

INCREASED VULNERABILITY TO URBAN HEAT

- More prone to heat-related issues due to physical, sensory, or cognitive impairments.
- Wheelchairs and other devices generate extra heat.
- Lower incomes make cooling less affordable.

SOLUTION FOCUS

- Improve accessible cooling spaces & public transport options.
- Support for energy-efficient housing & financial aid for cooling needs.

ELDERLY PEOPLE

Over the age of 65
1499 people
33.4% of residents

INCREASED VULNERABILITY TO URBAN HEAT

- Dehydration risks:
  - weakness
  - dizziness
  - headaches
- Heat can cause a drop in blood pressure, heat stroke.
- Severe health complications.

SOLUTION FOCUS

- Ensure easy access to cooling shelters & hydration points.
- Promote community support to prevent isolation.
- Improve public awareness & emergency response for heat risks.

VESZÉLYEZTETETT CSOPORTOK HÉVÍZEN

FIATALOK

6 év alattiak
149 fő
A lakosság 3,3%-a

NAGYOBB KITETTSÉG A VÁROSI HŐHATÁSOKNAK

- Súlyos egészségügyi kockázatok: kiszáradás, hőkimerülés, hőguta és egyéb problémák.
- Alvási nehézségek, amik lassíthatják a növekedést és ronthatják a közérzetet.
- Kevesebb idő a szabadban.

MEGOLDÁSI JAVASLATOK

- Biztosítani kell árnyékos és hűvös szabadtéri területeket.
- A várostervezés fejlesztése a hőhatások csökkentésére a gyermekekben gazdag területeken.
- A folyadékfogyasztás és hőség elleni védekezés tudatosítása az iskolákban.

FOGYATÉKOSSÁGGAL ÉLŐK

Megyei szinten (Zala)
14 329 fő
A lakosság 5,57%-a

NAGYOBB KITETTSÉG A VÁROSI HŐHATÁSOKNAK

- A fizikai, érzékszervi vagy kognitív fogyatékosságok miatt jobban ki vannak téve a hőséggel kapcsolatos problémáknak.
- A kerekesszékek és más eszközök további hőt termelnek.
- Az alacsony jövedelmek megnehezítik a hűtés megfizethetőségét.

MEGOLDÁSI JAVASLATOK

- A hűvös, könnyen megközelíthető helyek és a tömegközlekedés lehetőségeinek fejlesztése
- Támogatás az energiahatékony lakhatáshoz és anyagi segítség a hűtési igények fedezésére.

IDŐSEK

65 év felettiek
1499 fő
A lakosság 33,4%-a

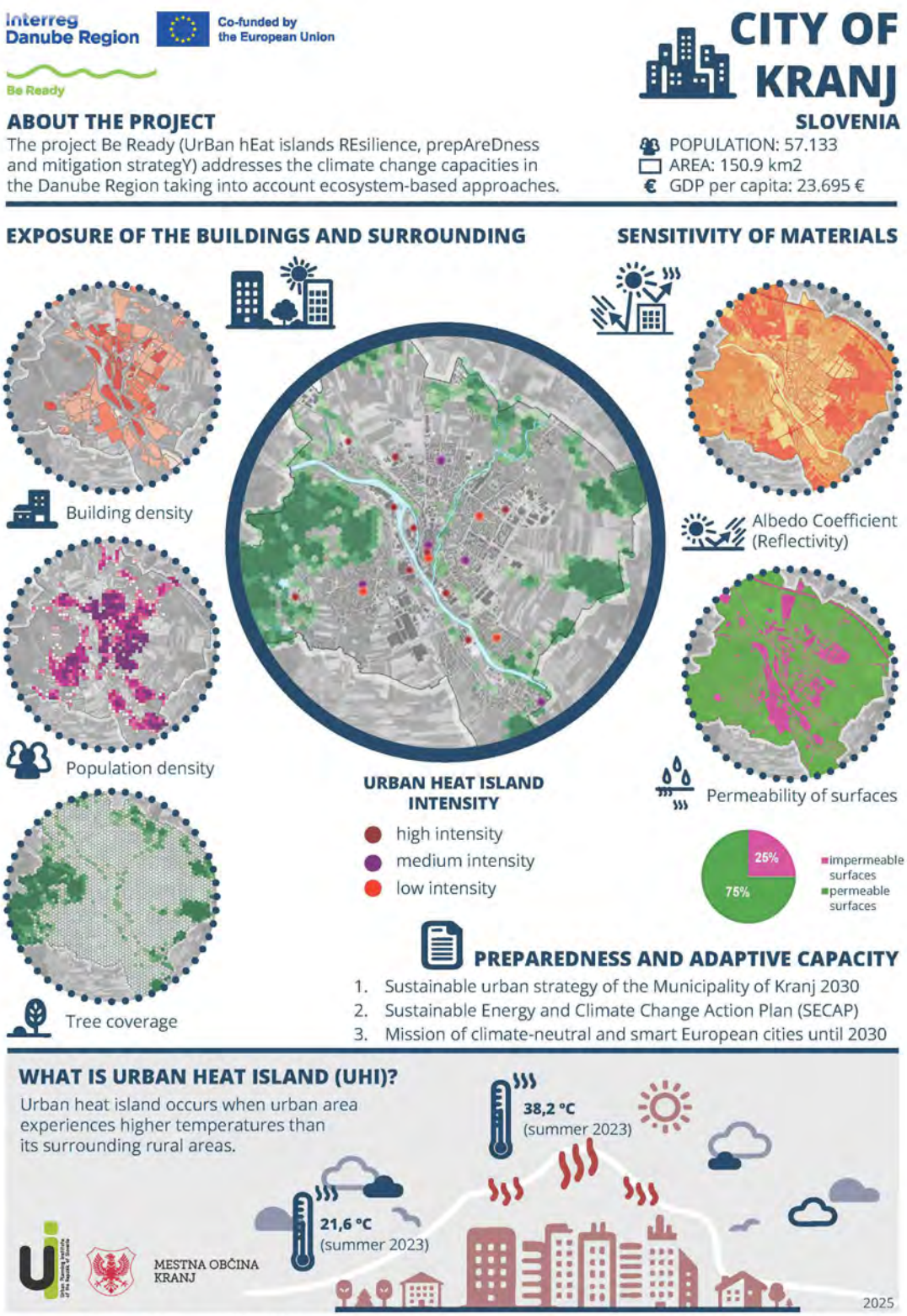
NAGYOBB KITETTSÉG A VÁROSI HŐHATÁSOKNAK

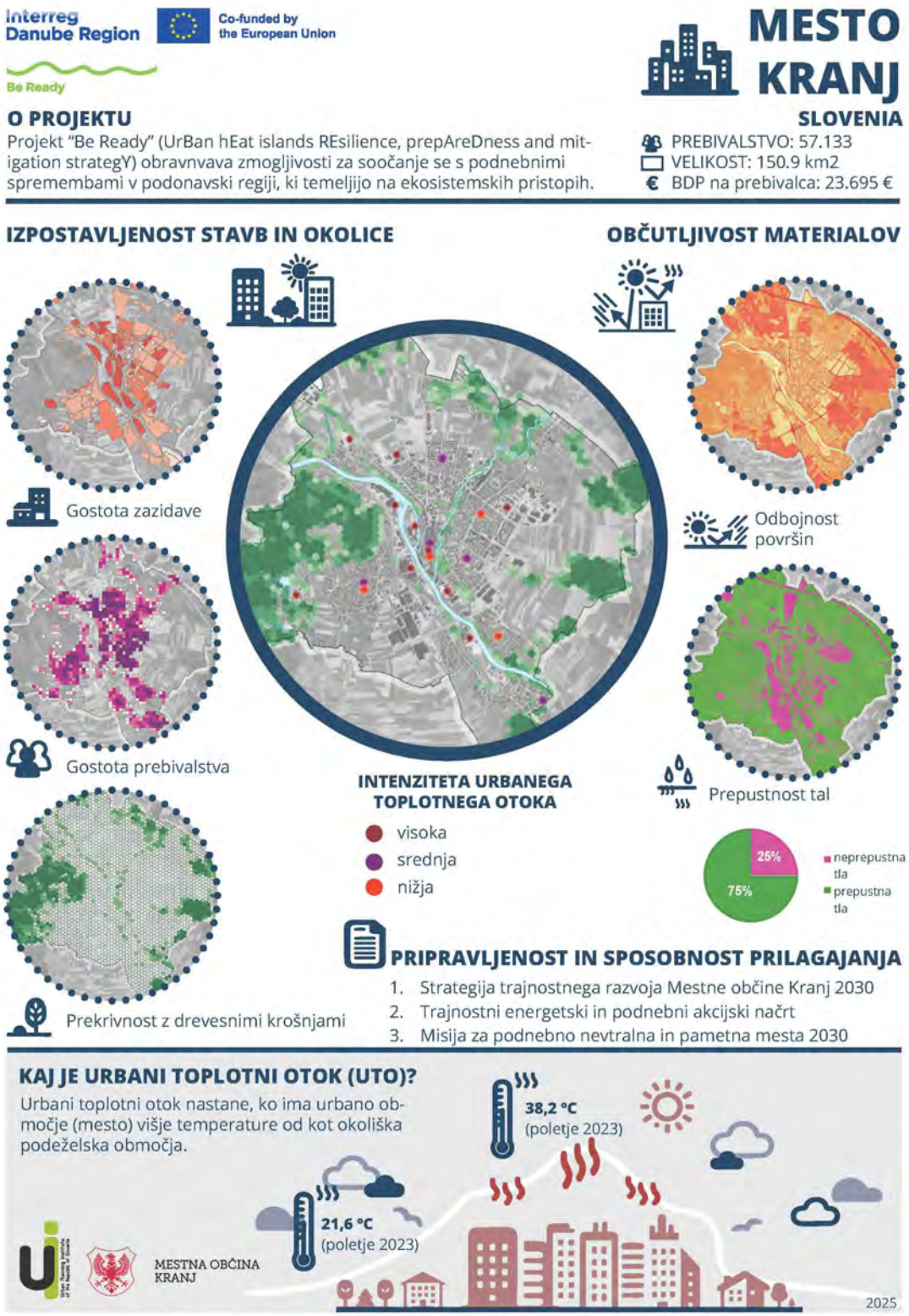
- A kiszáradás kockázata:
  - gyengeség
  - szédülés
  - fejfájás
- A hőség vérnyomáscsökkenést és hőgutát okozhat.
- Súlyos egészségügyi következmények

MEGOLDÁSI JAVASLATOK

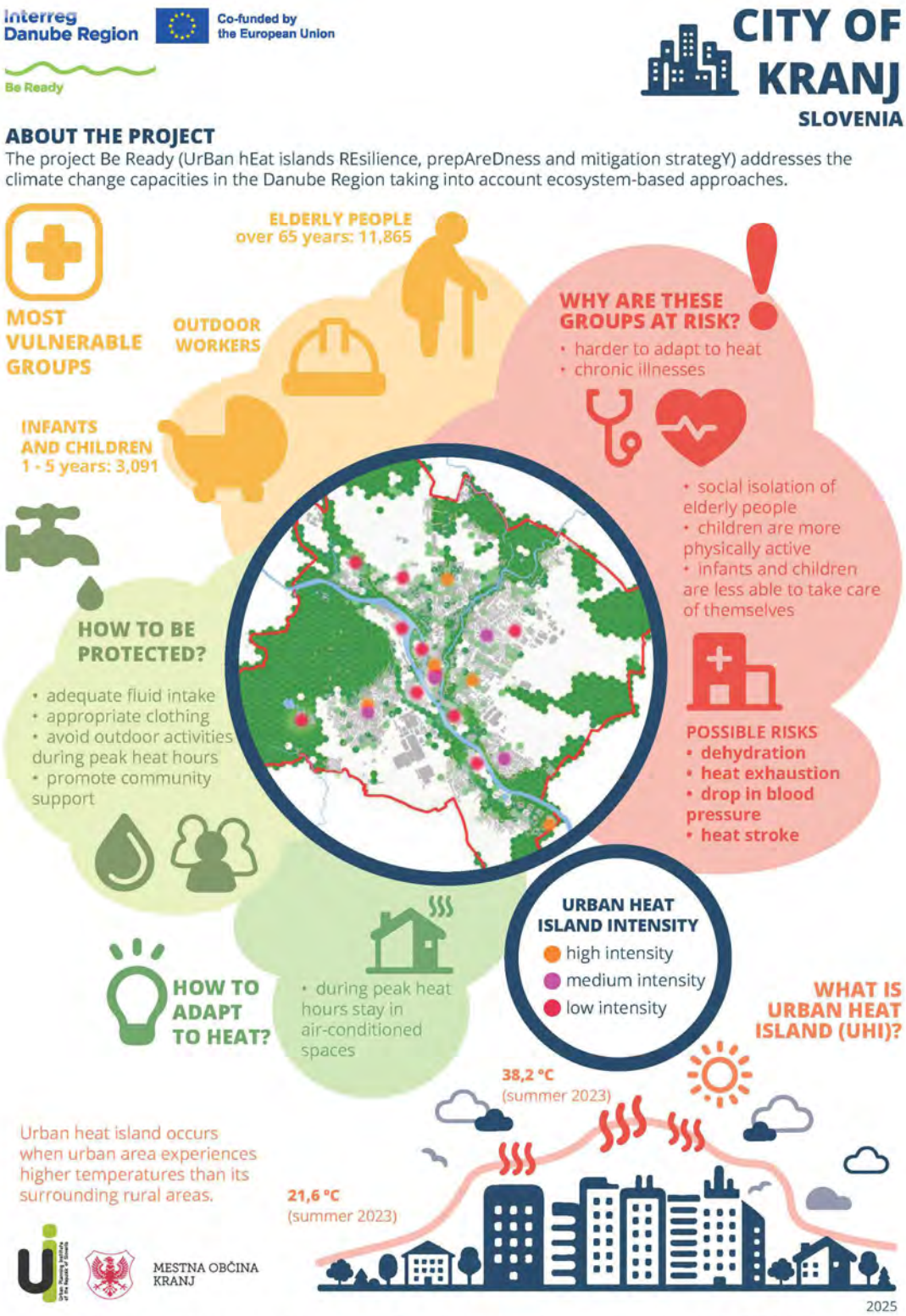
- Biztosítani kell a hűsölőhelyekhez és ivóvízvételi pontokhoz való könnyű hozzáférést.
- A közösségi támogatás elősegítése az elszigetelődés megelőzése érdekében.
- A hőséggel kapcsolatos kockázatokkal kapcsolatos lakossági tájékoztatás és vészhelyzeti reagálás fejlesztése.

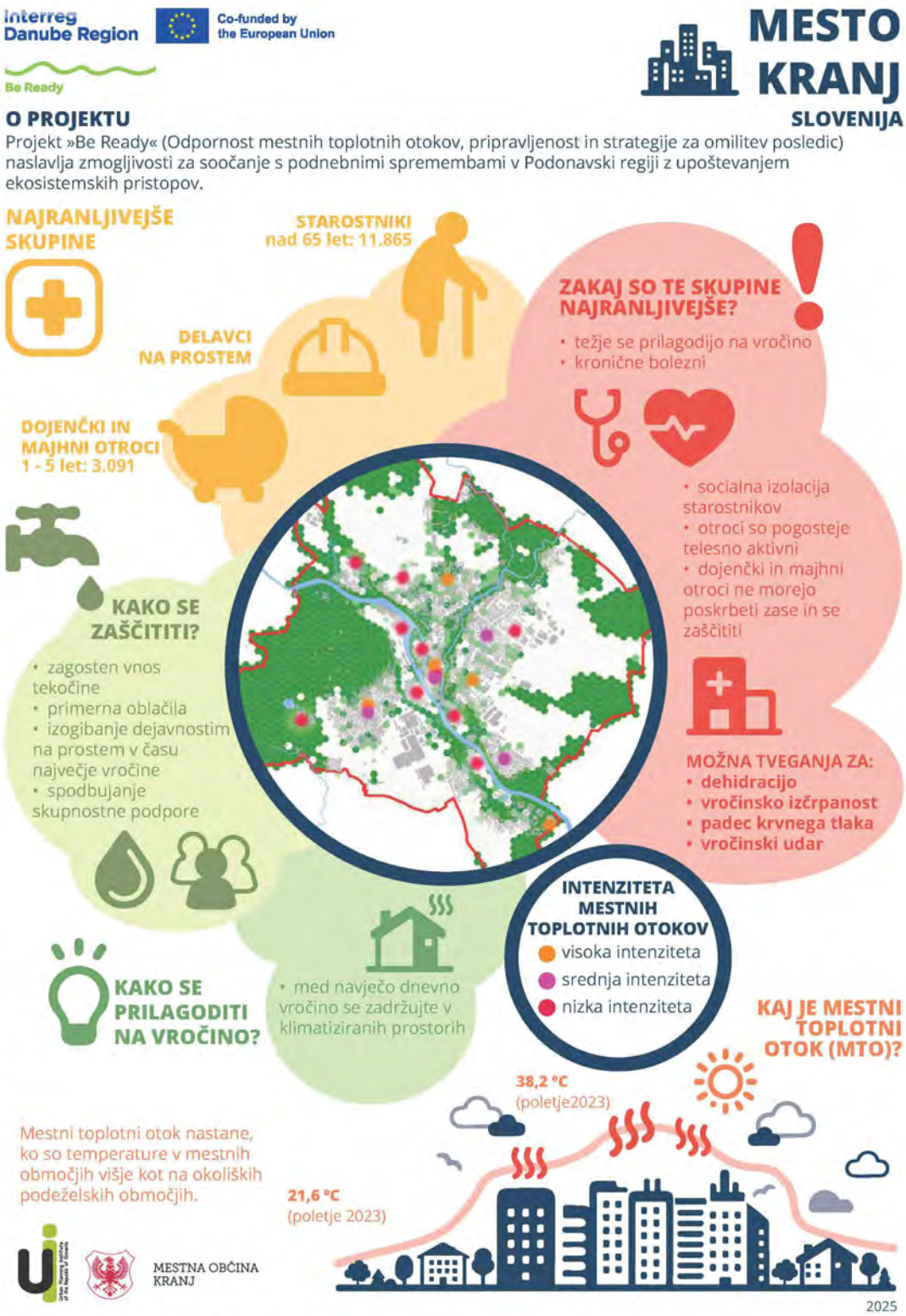
5. Kranj


Interreg Danube Region
Co-funded by the European Union
Be Ready
CITY OF KRANJ
SLOVENIA
ABOUT THE PROJECT
The project Be Ready (UrBan hEat islands REsilience, prepAreDness and mitigation strategY) addresses the climate change capacities in the Danube Region taking into account ecosystem-based approaches.
POPULATION: 57.133
AREA: 150.9 km2
GDP per capita: 23.695 €
EXPOSURE OF THE BUILDINGS AND SURROUNDING
SENSITIVITY OF MATERIALS
Building density
Population density
Tree coverage
Albedo Coefficient (Reflectivity)
Permeability of surfaces
URBAN HEAT ISLAND INTENSITY
high intensity
medium intensity
low intensity
25%
75%
impermeable surfaces
permeable surfaces
PREPAREDNESS AND ADAPTIVE CAPACITY
1. Sustainable urban strategy of the Municipality of Kranj 2030
2. Sustainable Energy and Climate Change Action Plan (SECAP)
3. Mission of climate-neutral and smart European cities until 2030
WHAT IS URBAN HEAT ISLAND (UHI)?
Urban heat island occurs when urban area experiences higher temperatures than its surrounding rural areas.
38,2 °C (summer 2023)
21,6 °C (summer 2023)
MESTNA OBČINA KRANJ
2025
This project is supported by the Interreg Danube Region Programme co-funded by the European Union (2021 - 2027).
The content was created based on the results of the D1.3.1 City reports from the UHI risk assessment, the City of Kranj.

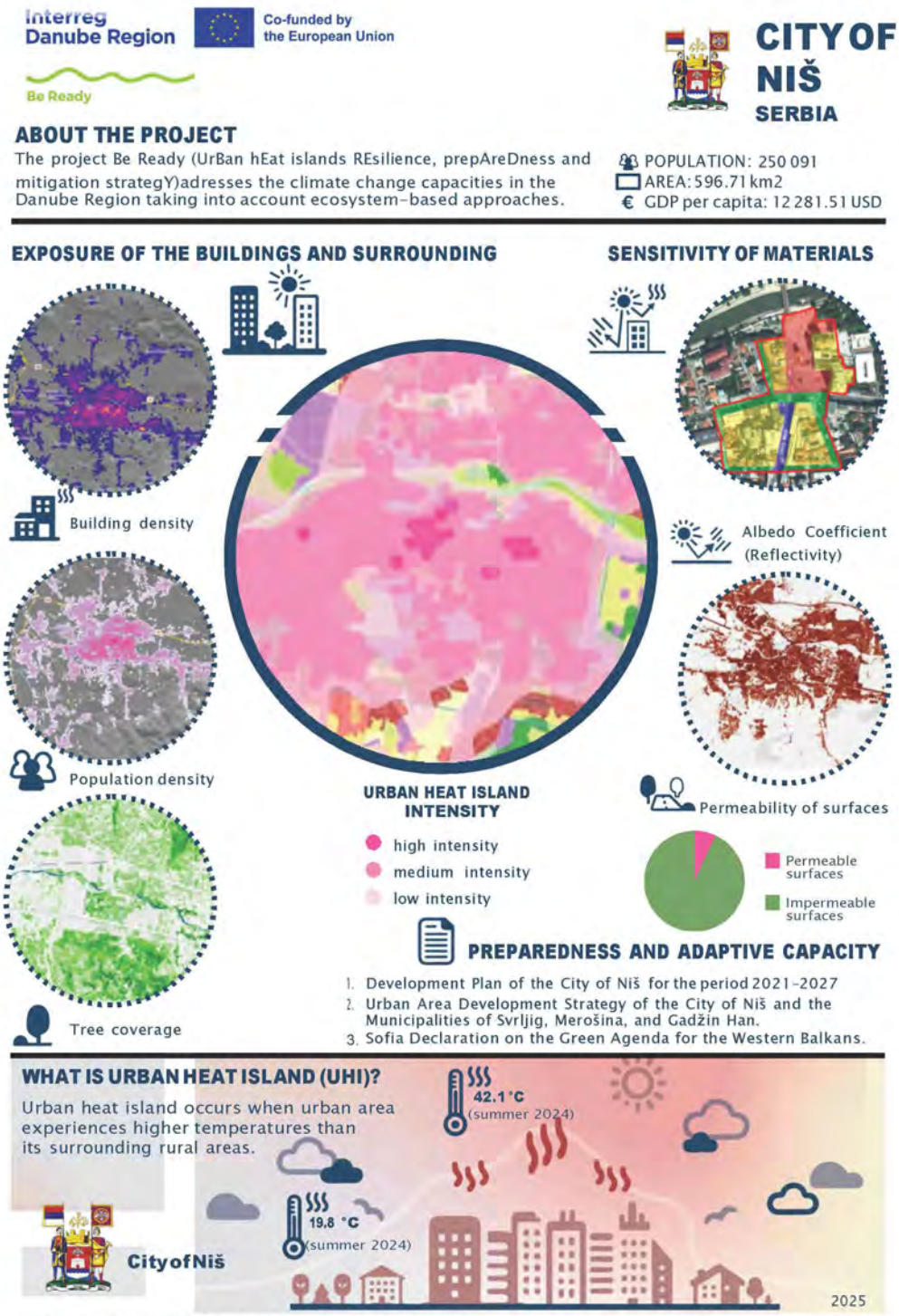


Projekt podpira program Interreg Podonavje, ki ga sofinancira Evropska Unija (2021 - 2027).
Vsebina temelji na poročilu D1.3.1 Ocena tveganja UTO mesta Kranj.

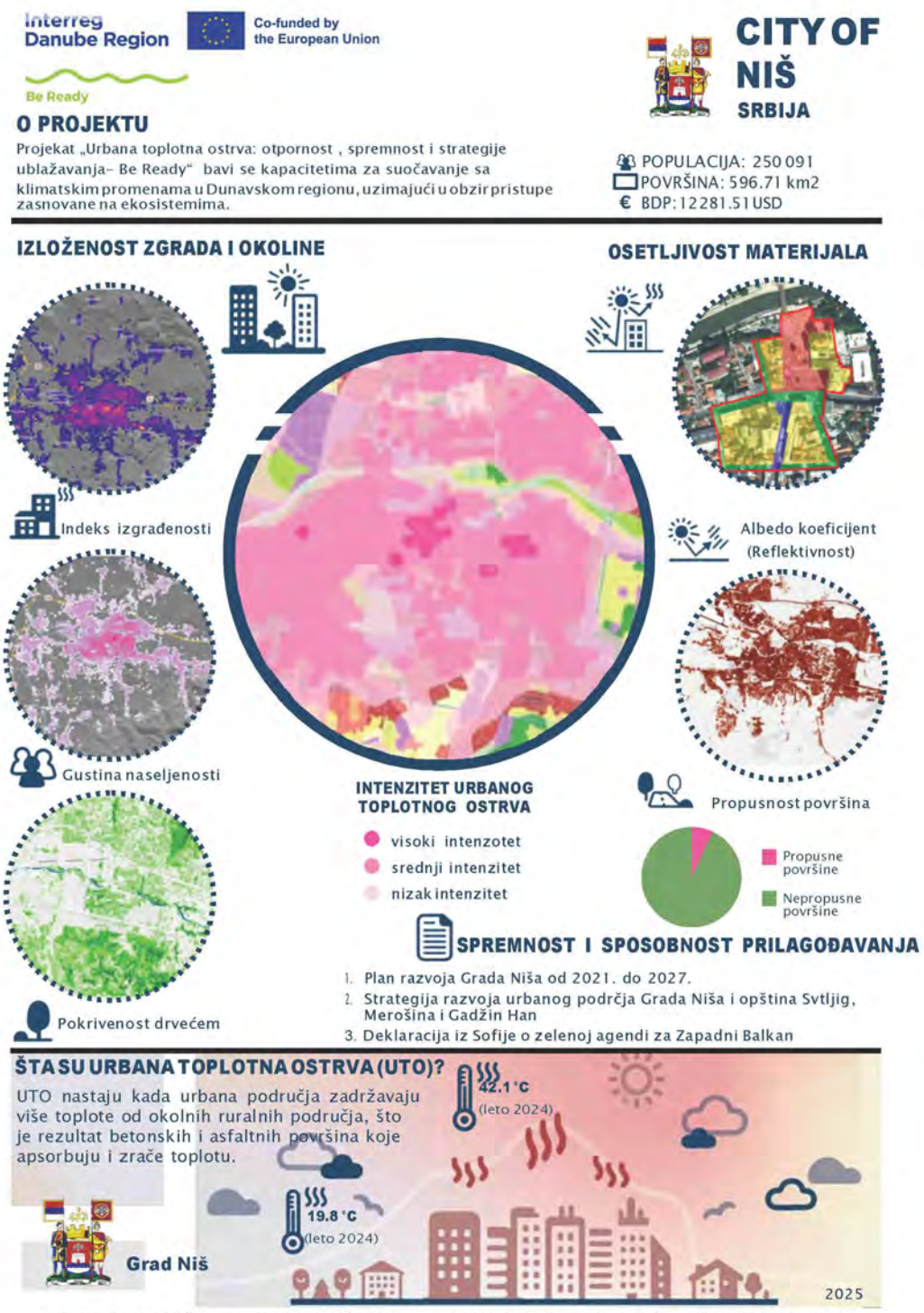

Interreg Danube Region
Co-funded by the European Union
Be Ready
CITY OF KRANJ
SLOVENIA
ABOUT THE PROJECT
The project Be Ready (UrBan hEat islands REsilience, prepAreDness and mitigation strategY) addresses the climate change capacities in the Danube Region taking into account ecosystem-based approaches.
MOST VULNERABLE GROUPS
ELDERLY PEOPLE over 65 years: 11,865
OUTDOOR WORKERS
INFANTS AND CHILDREN 1 - 5 years: 3,091
WHY ARE THESE GROUPS AT RISK?
• harder to adapt to heat
• chronic illnesses
• social isolation of elderly people
• children are more physically active
• infants and children are less able to take care of themselves
POSSIBLE RISKS
• dehydration
• heat exhaustion
• drop in blood pressure
• heat stroke
HOW TO BE PROTECTED?
• adequate fluid intake
• appropriate clothing
• avoid outdoor activities during peak heat hours
• promote community support
HOW TO ADAPT TO HEAT?
• during peak heat hours stay in air-conditioned spaces
URBAN HEAT ISLAND INTENSITY
high intensity
medium intensity
low intensity
WHAT IS URBAN HEAT ISLAND (UHI)?
38,2 °C (summer 2023)
21,6 °C (summer 2023)
Urban heat island occurs when urban area experiences higher temperatures than its surrounding rural areas.
MESTNA OBČINA KRANJ
2025
This project is supported by the Interreg Danube Region Programme co-funded by the European Union (2021 - 2027).
The content was created based on the results of the D1.3.1 City reports from the UHI risk assessment, the City of Kranj.


Interreg Danube Region
Co-funded by the European Union
Be Ready
MESTO KRANJ
SLOVENIJA
O PROJEKTU
Projekt »Be Ready« (Odpornost mestnih toplotnih otokov, pripravljenost in strategije za omilitev posledic) naslavlja zmogljivosti za soočanje s podnebnimi spremembami v Podonavski regiji z upoštevanjem ekosistemskih pristopov.
NAJRANLJIVEJŠE SKUPINE
STAROSTNIKI nad 65 let: 11.865
DELAVCI NA PROSTEM
DOJENČKI IN MAJHNI OTROCI 1 - 5 let: 3.091
ZAKAJ SO TE SKUPINE NAJRANLJIVEJŠE?
• težje se prilagodijo na vročino
• kronične bolezni
• socialna izolacija starostnikov
• otroci so pogosteje telesno aktivni
• dojenčki in majhni otroci ne morejo poskrbeti zase in se zaščititi
MOŽNA TVEGANJA ZA:
• dehidracijo
• vročinsko izčrpanost
• padec krvnega tlaka
• vročinski udar
KAKO SE ZAŠČITITI?
• zagosten vnos tekočine
• primerna oblačila
• izogibanje dejavnostim na prostem v času največje vročine
• spodbujanje skupnostne podpore
INTENZITETA MESTNIH TOPLOTNIH OTOKOV
visoka intenziteta
srednja intenziteta
nizka intenziteta
KAKO SE PRILAGODITI NA VROČINO?
• med največjo dnevno vročino se zadržujte v klimatiziranih prostorih
KAJ JE MESTNI TOPLOTNI OTOK (MTO)?
38,2 °C (poletje2023)
21,6 °C (poletje 2023)
Mestni toplotni otok nastane, ko so temperature v mestnih območjih višje kot na okoliških podeželskih območjih.
MESTNA OBČINA KRANJ
2025
Projekt podpira program Interreg Podonavje, sofinanciran s strani Evropske unije (2021–2027).
Vsebina temelji na rezultatih poročila D1.3.1 o oceni tveganja za MTO za mesto Kranj.

6. Nis



This project is supported by the Interreg Danube Region Programme co-funded by the European Union (2021 – 2027).
The content was created based on the results of the D1.3.1 City reports from the UHI risk assessment, the City of Niš.



Ovaj projekat je podržan od strane Interreg Programa za Dunavski region, koji sufinansira Evropska unija (2021–2027). Sadržaj je nastao na osnovu rezultata iz izveštaja D1.3.1 o proceni rizika od urbanih toplotnih ostrva, Grad Niš.

URBAN HEAT ISLANDS IN NIŠ

URBAN HEAT ISLAND EFFECT

UHI occurs when urban areas become significantly hotter than their surroundings.

CHARACTERISTICS

- City smog & poor air quality
- Respiratory illnesses
- Heart – related conditions
- Heat strokes & neurological dysfunction
- Increased hospital visits

WHO IS MOST AT RISK?

- Elderly (65+ years)
- Children (0– 4 years)
- People with chronic illness
- Low – income residents
- Outdoor workers

LEVEL OF UHI VULNERABILITY IN NIŠ

TO STAY SAFE IN THE HEAT AVOID:

- Direct sun exposure & outdoor physical activity between 11 AM - 5 PM.
- Sudden temperature changes (exiting an air-conditioned space into extreme heat).
- Wearing dark, thick, synthetic clothing – it traps heat.
- Dehydration – always drink enough water!

DO THIS INSTEAD:

KEEP YOUR BODY COOL AND HYDRATED

- Wear lightweight, loose & breathable clothes.
- Drink 1 cup of water per hour.
- Check on vulnerable people.

PROTECT INFANTS & CHILDREN

- Never leave children or pets in parked cars!
- Avoid peak sun hours outside.
- Shade reduces heat exposure by more than 10°C.
- Do NOT cover strollers with dry fabric.

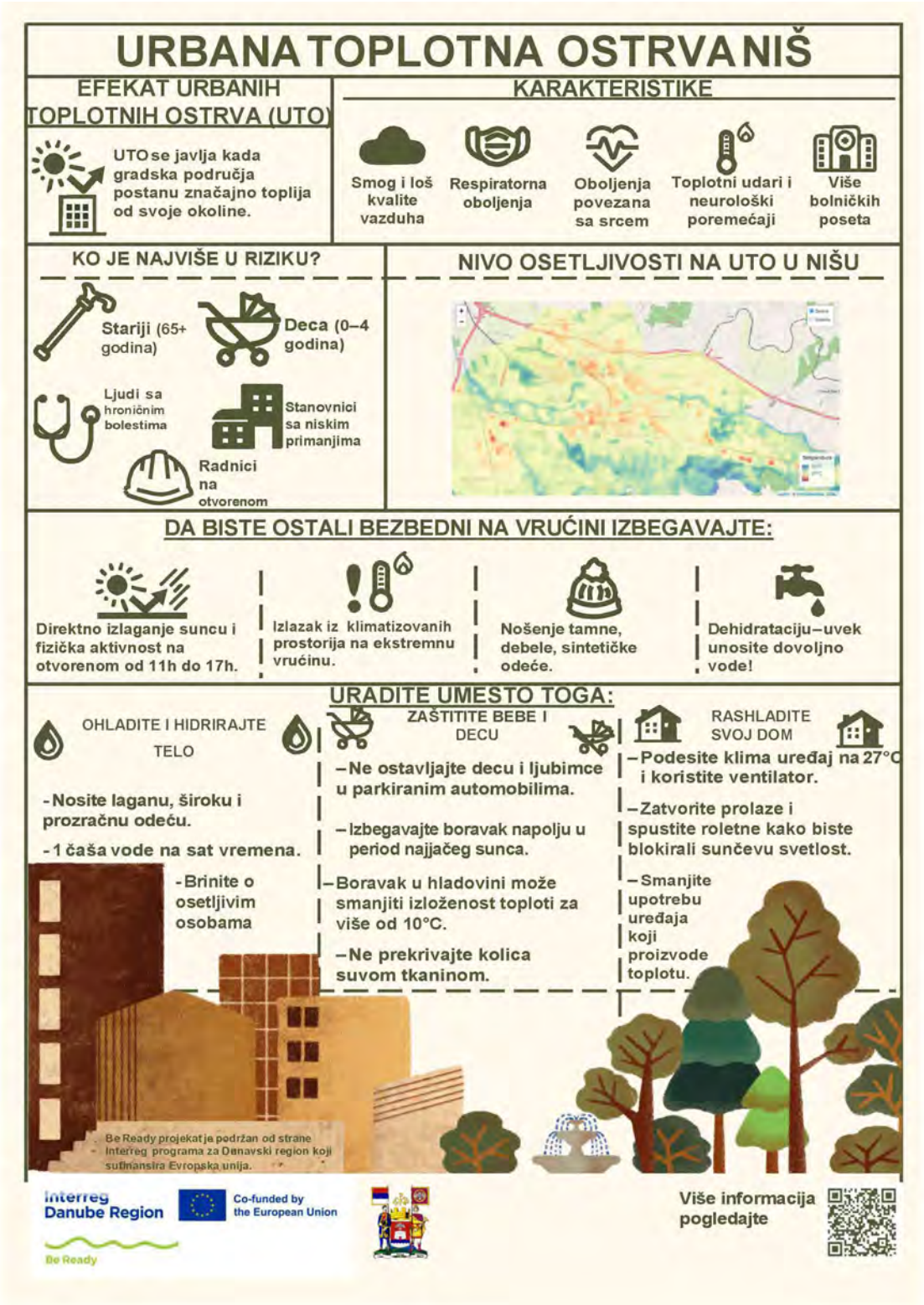
KEEP YOUR HOME COOL

- Set air conditioning to 27°C & use a fan – saves energy & reduces costs.
- Close windows & blinds to block direct sunlight.
- Limit electrical devices producing heat.

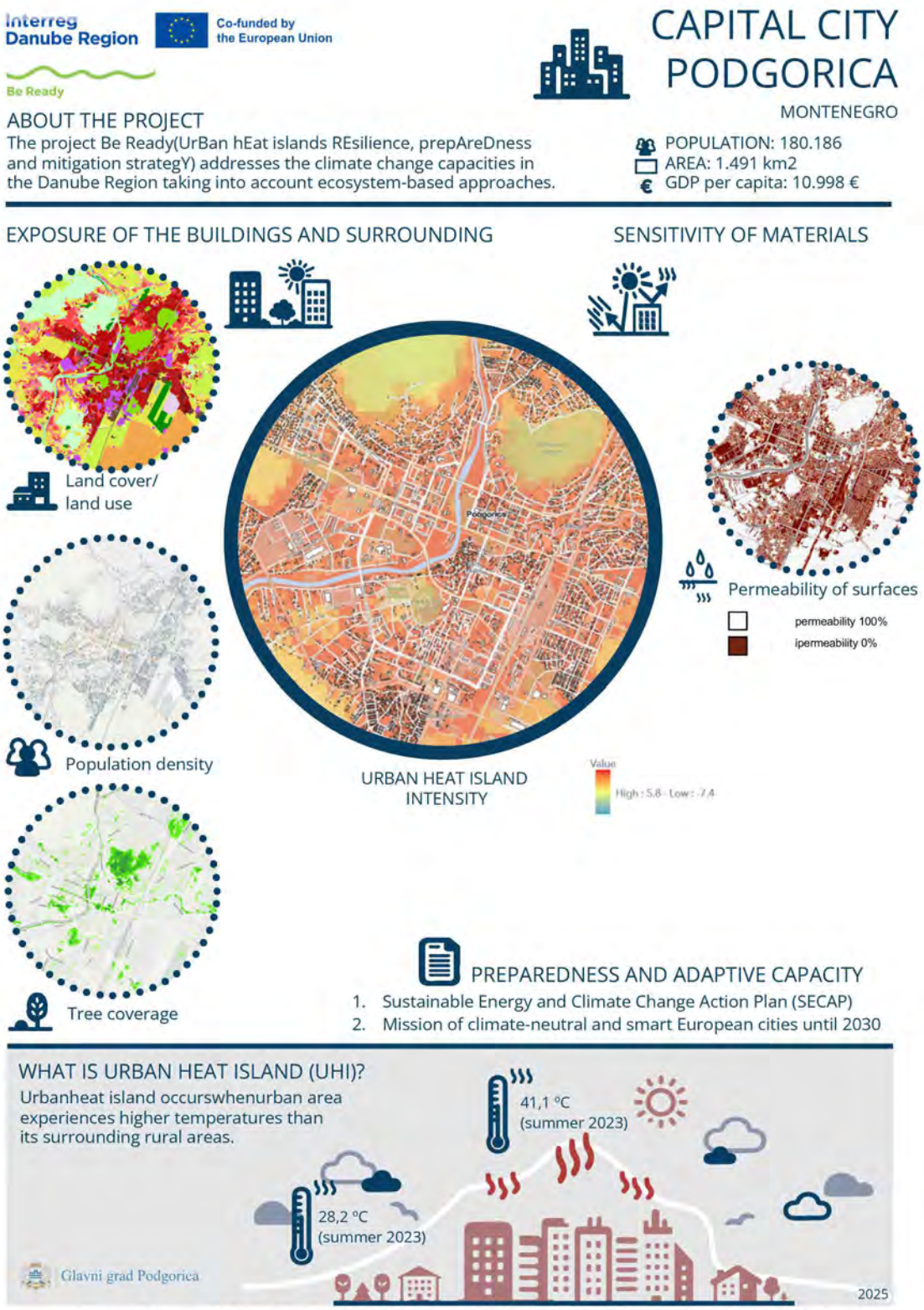
Be Ready project is supported by the Interreg Danube Region Programme co-funded by the European Union.

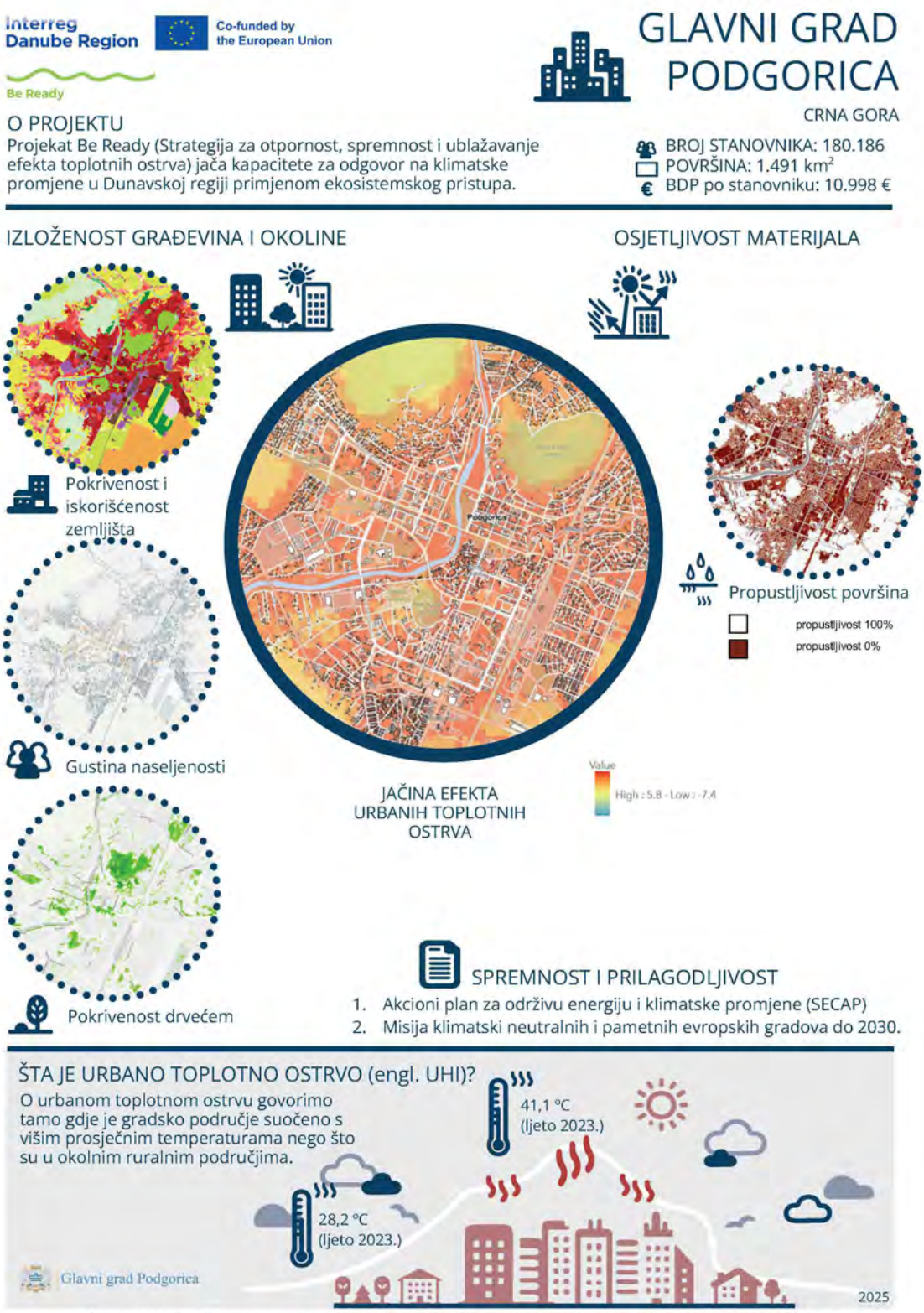
Interreg Danube Region
Co-funded by the European Union
Be Ready

For more information and data sources


URBANA TOPLOTNA OSTRVA NIŠ
EFEKAT URBANIH TOPLOTNIH OSTRVA (UTO)
UTO se javlja kada gradska područja postanu značajno toplija od svoje okoline.
KARAKTERISTIKE
Smog i loš kvalite vazduha
Respiratorna oboljenja
Oboljenja povezana sa srcem
Toplotni udari i neurološki poremećaji
Više bolničkih poseta
KO JE NAJVIŠE U RIZIKU?
Stariji (65+ godina)
Deca (0–4 godina)
Ljudi sa hroničnim bolestima
Stanovnici sa niskim primanjima
Radnici na otvorenom
NIVO OSETLJIVOSTI NA UTO U NIŠU
DA BISTE OSTALI BEZBEDNI NA VRUĆINI IZBEGAVAJTE:
Direktno izlaganje suncu i fizička aktivnost na otvorenom od 11h do 17h.
Izlazak iz klimatizovanih prostorija na ekstremnu vrućinu.
Nošenje tamne, debele, sintetičke odeće.
Dehidrataciju–uvek unosite dovoljno vode!
URADITE UMESTO TOGA:
OHLADITE I HIDRIRAJTE TELO
-Nosite laganu, široku i prozračnu odeću.
-1 čaša vode na sat vremena.
-Brinite o osetljivim osobama
ZAŠTITITE BEBE I DECU
–Ne ostavljajte decu i ljubimce u parkiranim automobilima.
–Izbegavajte boravak napolju u period najjačeg sunca.
–Boravak u hladovini može smanjiti izloženost toploti za više od 10°C.
–Ne prekrivajte kolica suvom tkaninom.
RASHLADITE SVOJ DOM
–Podesite klima uređaj na 27°C i koristite ventilator.
–Zatvorite prolaze i spustite roletne kako biste blokirali sunčevu svetlost.
–Smanjite upotrebu uređaja koji proizvode toplotu.
Be Ready projekat je podržan od strane Interreg programa za Dunavski region koji sufinansira Evropska unija.
Interreg Danube Region
Co-funded by the European Union
Be Ready
Više informacija pogledajte

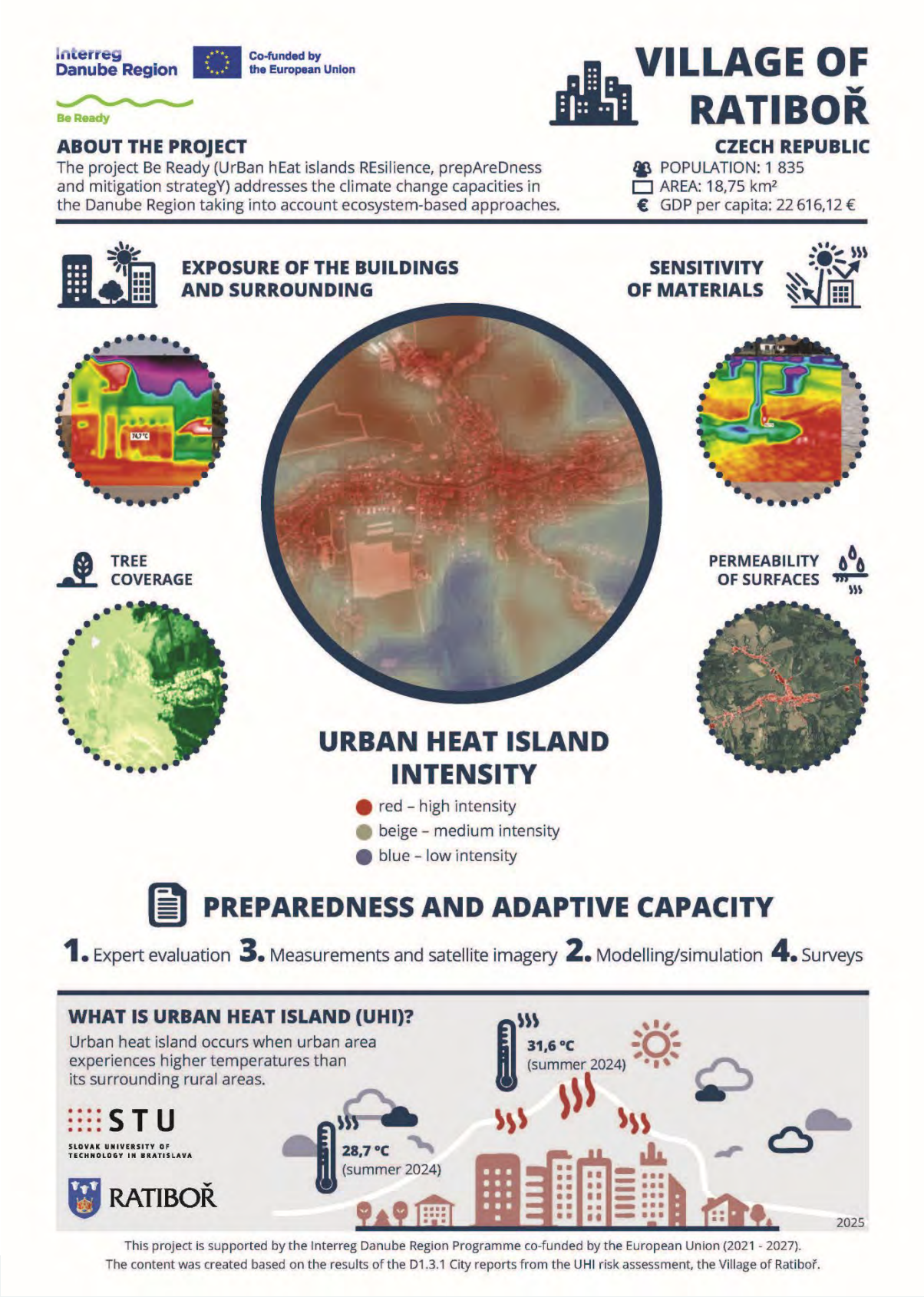
7. Podgorica


Interreg Danube Region
Co-funded by the European Union
Be Ready
CAPITAL CITY PODGORICA
MONTENEGRO
ABOUT THE PROJECT
The project Be Ready(UrBan hEat islands REsilience, prepAreDness and mitigation strategY) addresses the climate change capacities in the Danube Region taking into account ecosystem-based approaches.
POPULATION: 180.186
AREA: 1.491 km2
GDP per capita: 10.998 €
EXPOSURE OF THE BUILDINGS AND SURROUNDING
SENSITIVITY OF MATERIALS
Land cover/ land use
Population density
Tree coverage
URBAN HEAT ISLAND INTENSITY
Value
High : 5.8 - Low : -7.4
Permeability of surfaces
permeability 100%
ipermeability 0%
PREPAREDNESS AND ADAPTIVE CAPACITY
1. Sustainable Energy and Climate Change Action Plan (SECAP)
2. Mission of climate-neutral and smart European cities until 2030
WHAT IS URBAN HEAT ISLAND (UHI)?
Urbanheat island occurswhenurban area experiences higher temperatures than its surrounding rural areas.
41,1 °C (summer 2023)
28,2 °C (summer 2023)
Glavni grad Podgorica
2025
This project is supported by the Interreg Danube Region Programme co-funded by the European Union (2021 - 2027). The content was created based on the data available on: https://portal.discomap.eea.europa.eu/



Projekat podržava Program saradnje u Dunavskoj regiji koji kofinansira Evropska unija (2021-2027). Ova infografika sadrži podatke koji se mogu naći na: https://portal.discomap.eea.europa.eu/

8. Ratiboř


Interreg Danube Region
Co-funded by the European Union
Be Ready
VILLAGE OF RATIBOŘ
CZECH REPUBLIC
ABOUT THE PROJECT
The project Be Ready (UrBan hEat islands REsilience, prepAreDness and mitigation strategY) addresses the climate change capacities in the Danube Region taking into account ecosystem-based approaches.
POPULATION: 1 835
AREA: 18,75 km²
GDP per capita: 22 616,12 €
EXPOSURE OF THE BUILDINGS AND SURROUNDING
SENSITIVITY OF MATERIALS
TREE COVERAGE
PERMEABILITY OF SURFACES
URBAN HEAT ISLAND INTENSITY
red – high intensity
beige – medium intensity
blue – low intensity
PREPAREDNESS AND ADAPTIVE CAPACITY
1. Expert evaluation
3. Measurements and satellite imagery
2. Modelling/simulation
4. Surveys
WHAT IS URBAN HEAT ISLAND (UHI)?
Urban heat island occurs when urban area experiences higher temperatures than its surrounding rural areas.
31,6 °C (summer 2024)
28,7 °C (summer 2024)
STU
SLOVAK UNIVERSITY OF TECHNOLOGY IN BRATISLAVA
RATIBOŘ
2025
This project is supported by the Interreg Danube Region Programme co-funded by the European Union (2021 - 2027).
The content was created based on the results of the D1.3.1 City reports from the UHI risk assessment, the Village of Ratiboř.

Interreg Danube Region
Co-funded by the European Union
Be Ready

VESNICE RATIBOŘ

ČESKÁ REPUBLIKA

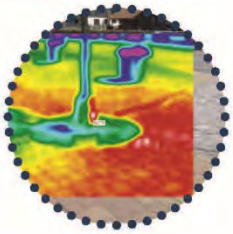
POČET OBYVATEL: 1 835
ROZLOHA: 18,75 km²
HDP na obyvatele: 22 616,12 €

O PROJEKTU

Projekt Be Ready (Odolnost městských tepelných ostrovů, připravenost a strategie zmírňování) se zabývá schopnostmi regionu Dunaje reagovat na změnu klimatu s přihlédnutím k ekosystémovým přístupům.

EXPOZICE BUDOV A JEJICH OKOLÍ

CITLIVOST MATERIÁLŮ



ZALESNĚNÍ

PROPUSTNOST POVRCHŮ

INTENZITA MĚSTSKÉHO TEPELNÉHO OSTROVA

- červená – vysoká intenzita
- béžová – střední intenzita
- modrá – nízká intenzita

PŘIPRAVENOST A ADAPTAČNÍ SCHOPNOSTI

1. Expertní hodnocení **3.** Měření a satelitní snímání **2.** Modelování/simulace **4.** Průzkumy

CO JE MĚSTSKÝ TEPELNÝ OSTROV (UHI)?

Městský tepelný ostrov vzniká, když je v městské oblasti vyšší teplota než v okolních venkovských oblastech.

STU
SLOVAK UNIVERSITY OF TECHNOLOGY IN BRATISLAVA

RATIBOŘ

Tento projekt je podporován programem Interreg Dunajský region, spolufinancovaným Evropskou unií (2021–2027).
Obsah byl vytvořen na základě výsledků zpráv D1.3.1 z hodnocení rizik UHI, obec Ratiboř.

POCITOVÁ MAPA

RATIBOŘ

VĚNUJÍCÍ SE TÉMATU TEPELNÉHO OSTROVA A TEPELNÉ POHODY OBČANŮ OBCE RATIBOŘ.

KDO SE POCITOVÉ MAPY ÚČASTNIL?

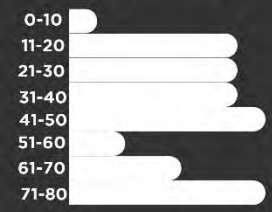
100 respondentů

ZAPOJENO...

DLE POHLAVÍ

54% zapojených žen

DLE VĚKU

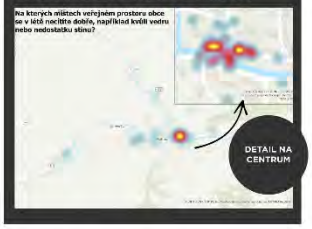


DLE ZAMĚSTNÁNÍ

A CO Z TOHO VYŠLO?

JAKÁ MÍSTA VE VEŘEJNÉM PROSTORU OBCE VÁM BĚHEM HORKÝCH LETNÍCH DNŮ PŘIPADAJÍ PŘÍJEMNÁ A OSVĚŽUJÍCÍ?

NA KTERÝCH MÍSTECH VEŘEJNÉM PROSTORU OBCE SE V LÉTĚ NECÍTÍTE DOBŘE, NAPŘÍKLAD KVŮLI VEDRU NEBO NEDOSTATKU STÍNU?



KDE BY PODLE VÁS OBEC MOHLA ZLEPŠIT PODMÍNKY PRO POBYT BĚHEM TEPLÝCH DNÍ?

NA JAKÉM MÍSTĚ VE VEŘEJNÉM PROSTORU OBCE NEJRADĚJI TRÁVÍTE SVŮJ VOLNÝ ČAS?

COOL REGION Data

RATIBOŘ

Interreg Danube Region
Co-funded by the European Union
Be Ready

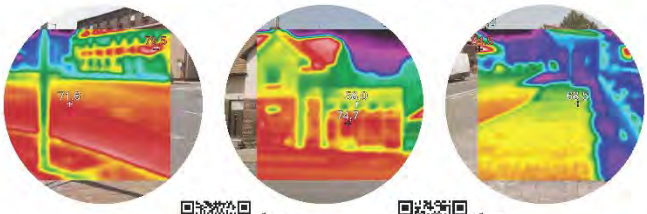
Interreg Danube Region
Co-funded by the European Union
Be Ready
RATIBOŘ

URBAN HEAT ISLAND IN RATIBOŘ

The **Be Ready project** will develop, test and implement effective measures to help tackle heat islands (UHI).

UHI occurs when urban areas become significantly warmer than their surroundings. Buildings, roads and infrastructure absorb and retain heat, which increases the temperature in the city. **Heat waves pose health risks**, especially for vulnerable groups. **Increased heat degrades air and water quality.**

TEMPERATURE MEASUREMENTS IN THE VILLAGE CENTRE DURING THE SUMMER



Please fill out the Feeling Map of our community...

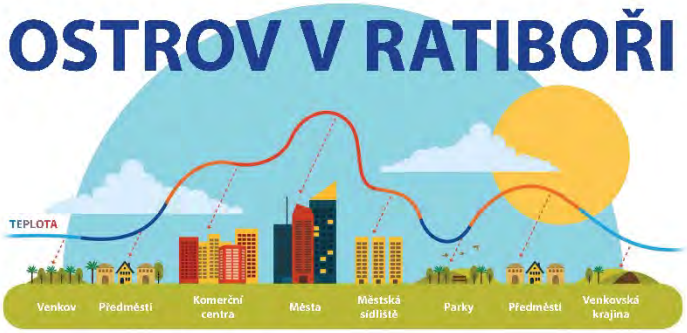
More information under the QR code on the municipal website **www.ratibor.cz**

PROJECT PARTNERS

This project is supported by the Interreg Danube Region Programme, co-funded by the European Union (2021-2027).

Interreg Danube Region
Co-funded by the European Union
Be Ready
RATIBOŘ

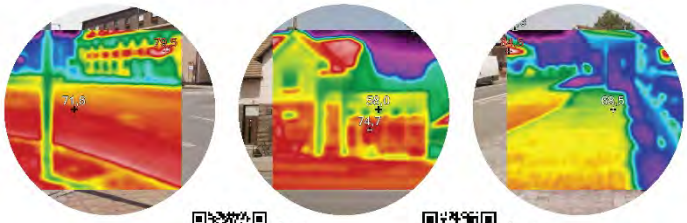
MĚSTSKÝ TEPELNÝ OSTROV V RATIBOŘI



V rámci projektu **Be Ready** budou vyvíjena, testována a zaváděna účinná opatření, která pomohou řešit problematiku tepelných ostrovů (UHI).

UHI vzniká, když se městské oblasti výrazně oteplí oproti svému okolí. Budovy, silnice a infrastruktura pohlcují a zadržují teplo, což zvyšuje teplotu ve městě. **Vlny veder představují zdravotní rizika**, zejména pro zranitelné skupiny. **Zvýšené teplo zhoršuje kvalitu ovzduší a vody.**

MĚŘENÍ TEPLOTY V CENTRU OBCE V PRŮBĚHU LÉTA



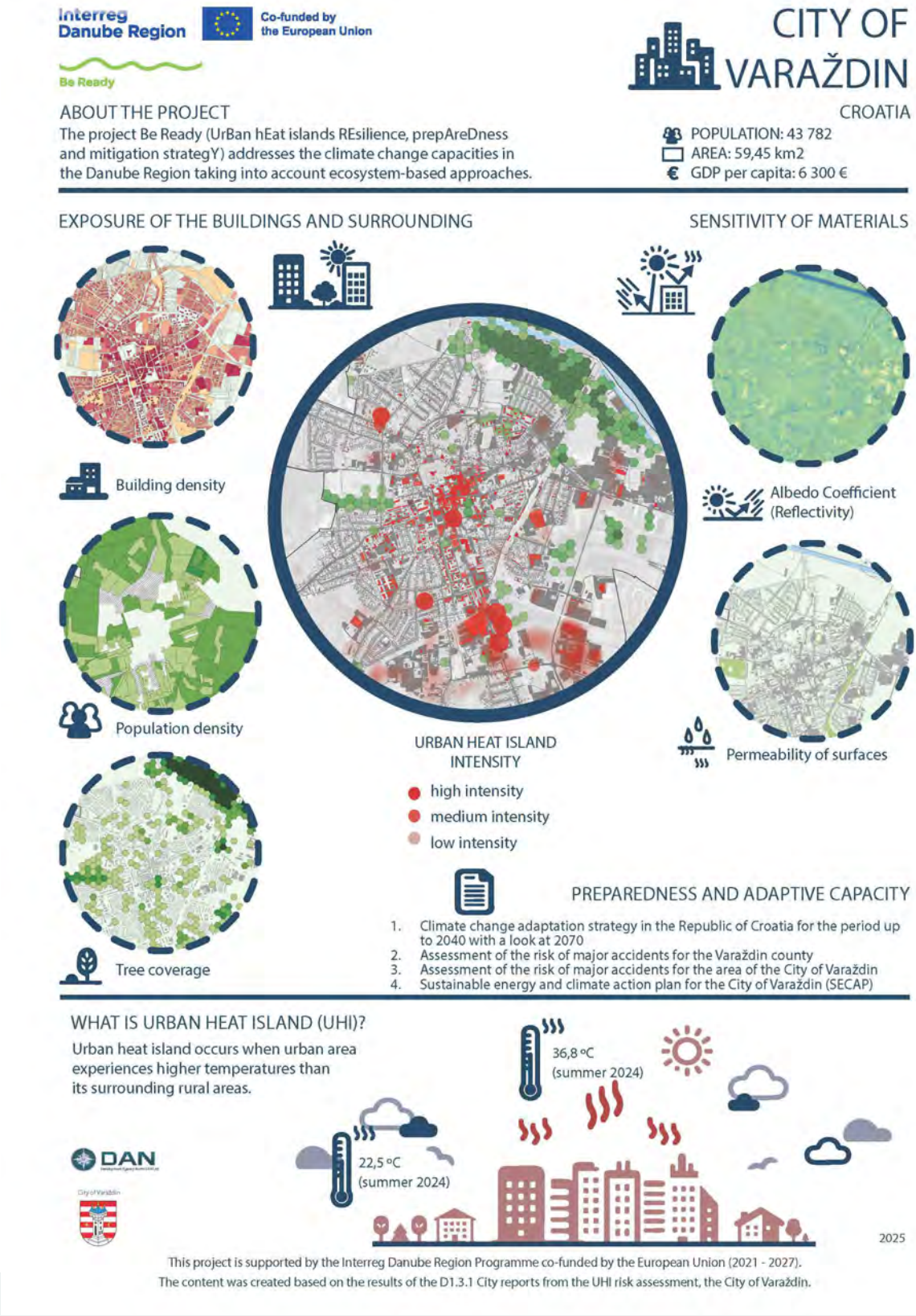
Vyplňte prosím Pocitovou mapu naší obce...

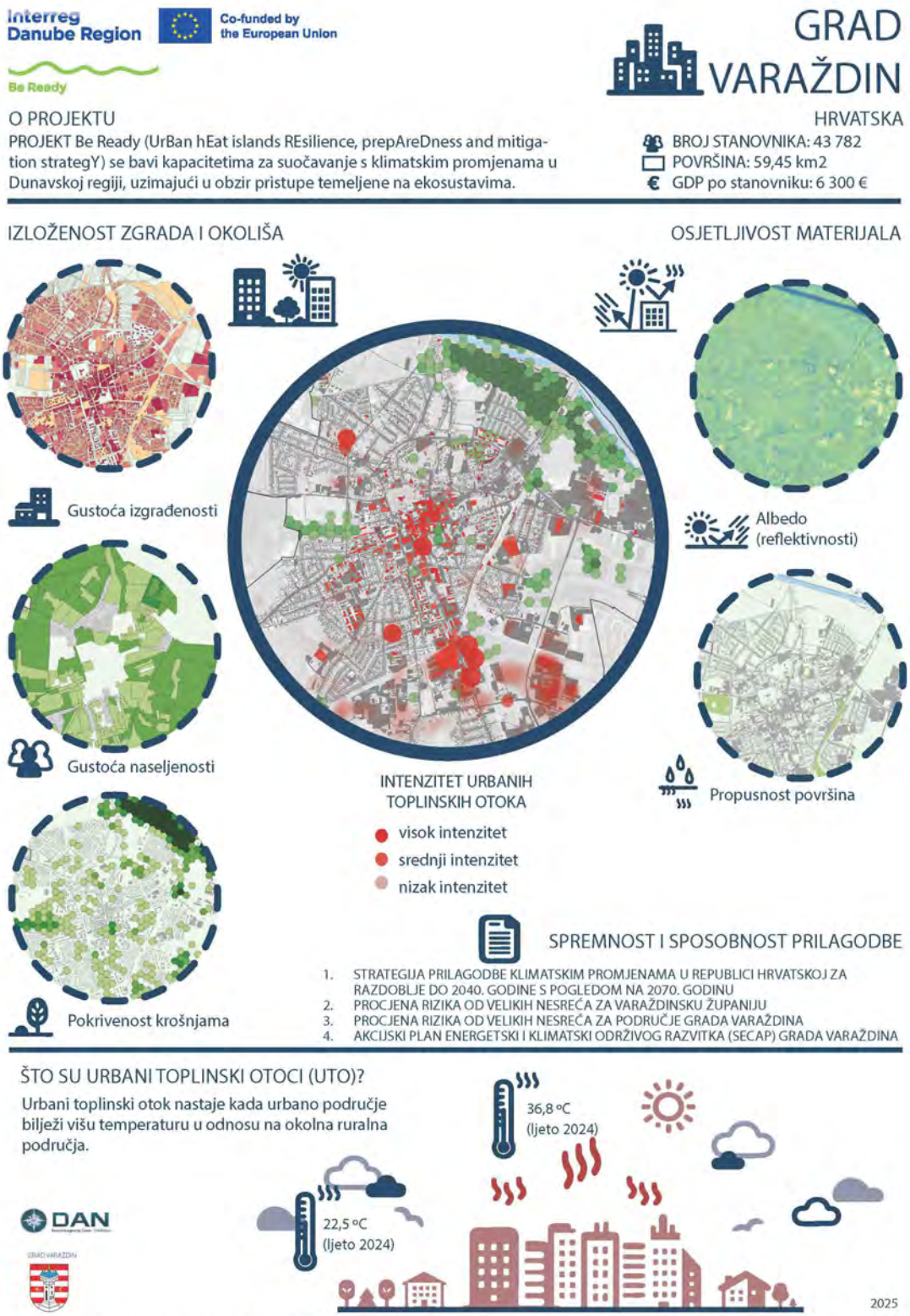
Více informací pod QR kódem na obecním webu **www.ratibor.cz**

PARTNEŘI PROJEKTU

Tento projekt je podporován programem Interreg Dunajský region, spolufinancovaným Evropskou unií (2021–2027).

9. Varazdin


Interreg Danube Region
Co-funded by the European Union
Be Ready
CITY OF VARAŽDIN
CROATIA
ABOUT THE PROJECT
The project Be Ready (UrBan hEat islands REsilience, prepAreDness and mitigation strategY) addresses the climate change capacities in the Danube Region taking into account ecosystem-based approaches.
POPULATION: 43 782
AREA: 59,45 km2
GDP per capita: 6 300 €
EXPOSURE OF THE BUILDINGS AND SURROUNDING
SENSITIVITY OF MATERIALS
Building density
Population density
Tree coverage
Albedo Coefficient (Reflectivity)
Permeability of surfaces
URBAN HEAT ISLAND INTENSITY
high intensity
medium intensity
low intensity
PREPAREDNESS AND ADAPTIVE CAPACITY
1. Climate change adaptation strategy in the Republic of Croatia for the period up to 2040 with a look at 2070
2. Assessment of the risk of major accidents for the Varaždin county
3. Assessment of the risk of major accidents for the area of the City of Varaždin
4. Sustainable energy and climate action plan for the City of Varaždin (SECAP)
WHAT IS URBAN HEAT ISLAND (UHI)?
Urban heat island occurs when urban area experiences higher temperatures than its surrounding rural areas.
36,8 °C (summer 2024)
22,5 °C (summer 2024)
DAN
2025
This project is supported by the Interreg Danube Region Programme co-funded by the European Union (2021 - 2027).
The content was created based on the results of the D1.3.1 City reports from the UHI risk assessment, the City of Varaždin.


Interreg Danube Region
Co-funded by the European Union
Be Ready
GRAD VARAŽDIN
HRVATSKA
O PROJEKTU
PROJEKT Be Ready (UrBan hEat islands REsilience, prepAreDness and mitigation strategY) se bavi kapacitetima za suočavanje s klimatskim promjenama u Dunavskoj regiji, uzimajući u obzir pristupe temeljene na ekosustavima.
BROJ STANOVNIKA: 43 782
POVRŠINA: 59,45 km2
GDP po stanovniku: 6 300 €
IZLOŽENOST ZGRADA I OKOLIŠA
OSJETLJIVOST MATERIJALA
Gustoća izgrađenosti
Albedo (reflektivnosti)
Gustoća naseljenosti
Propusnost površina
INTENZITET URBANIH TOPLINSKIH OTOKA
visok intenzitet
srednji intenzitet
nizak intenzitet
Pokrivenost krošnjama
SPREMNOST I SPOSOBNOST PRILAGODBE
1. STRATEGIJA PRILAGODBE KLIMATSKIM PROMJENAMA U REPUBLICI HRVATSKOJ ZA RAZDOBLJE DO 2040. GODINE S POGLEDOM NA 2070. GODINU
2. PROCJENA RIZIKA OD VELIKIH NESREĆA ZA VARAŽDINSKU ŽUPANIJU
3. PROCJENA RIZIKA OD VELIKIH NESREĆA ZA PODRUČJE GRADA VARAŽDINA
4. AKCIJSKI PLAN ENERGETSKI I KLIMATSKI ODRŽIVOG RAZVITKA (SECAP) GRADA VARAŽDINA
ŠTO SU URBANI TOPLINSKI OTOCI (UTO)?
Urbani toplinski otok nastaje kada urbano područje bilježi višu temperaturu u odnosu na okolna ruralna područja.
36,8 °C (ljeto 2024)
22,5 °C (ljeto 2024)
DAN
2025
Ovaj projekt je podržan od strane INTERREG programa Dunavske regije sufinanciranog od strane Europske unije (2021. – 2027.).
Sadržaj je izrađen na temelju rezultata izvješća D1.3.1 o Procjeni rizika urbanih toplinskih otoka (UHI) za Grad Varaždin.

URBAN HEAT ISLANDS IN VARAŽDIN

URBAN HEAT ISLAND EFFECT

UHI occurs when urban areas become significantly hotter than their surroundings.

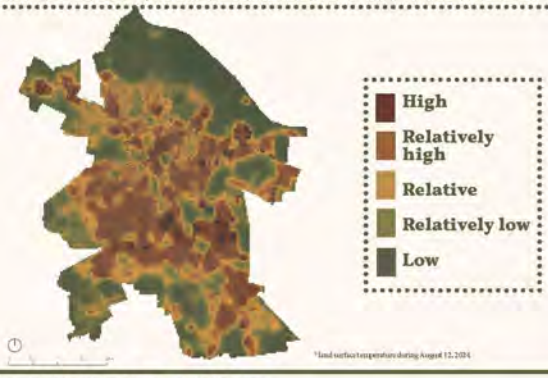
CHARACTERISTICS

- City smog & poor air quality
- Respiratory illnesses
- Heart – related conditions
- Heat strokes & neurological dysfunction
- Increased hospital visits

WHO IS MOST AT RISK?

- Elderly (65+ years)
- Children (0– 4 years)
- People with chronic illness
- Low – income residents
- Outdoor workers

LEVEL OF UHI VULNERABILITY IN VARAŽDIN



TO STAY SAFE IN THE HEAT AVOID

- Direct sun exposure & outdoor physical activity between 11 AM - 5 PM.
- Sudden temperature changes (exiting an air-conditioned space into extreme heat).
- Wearing dark, thick, synthetic clothing – it traps heat.
- Dehydration – always drink enough water!

DO THIS INSTEAD

KEEP YOUR BODY COOL AND HYDRATED

- Wear lightweight, loose & breathable clothes.
- Drink 1 cup of water per hour.
- Check on vulnerable people.

PROTECT INFANTS & CHILDREN

- Never leave children or pets in parked cars!
- Avoid peak sun hours outside.
- Shade reduces heat exposure by more than 10°C.
- Do NOT cover strollers with dry fabric.

KEEP YOUR HOME COOL

- Set air conditioning to 27°C & use a fan - saves energy & reduces costs.
- Close windows & blinds to block direct sunlight.
- Limit electrical devices producing heat.

Be Ready project is supported by the Interreg Danube Region Programme co-funded by the European Union.

Interreg Danube Region
Co-funded by the European Union
Be Ready
DAN Development Agency North
City of Varaždin

For more information and data sources:

URBANI TOPLINSKI OTOCI (UTO) U VARAŽDINU

EFEKT TOPLINSKIH OTOKA

UTO se pojavljuje kada urbana područja postanu znatno toplija od svoje okolice.

KARAKTERISTIKE

- smog i loša kvaliteta zraka
- Respiratorne bolesti
- Srčane bolesti
- Toplotni udari i neurološki poremećaji
- Povećan broj posjeta bolnicama

TKO JE NAJUGROŽENIJI ?

- Stariji (65+ godina)
- Djeca (0-4 godine)
- ljudi s kroničnim bolestima
- Stanovnici slabijeg imovinskog statusa
- Radnici na otvorenom

RAZINA RANJIVOSTI NA UHI U VARAŽDINU

- Visoka
- Relativno visoka
- Srednja
- Relativno niska
- Niska

DA BISTE OSTALI SIGURNI NA VRUĆINI, IZBJEGAVAJTE SLJEDEĆE

- Izlaganje izravnoj sunčevoj svjetlosti i tjelesne aktivnosti na otvorenom između 11 i 17 sati.
- Naglu promjenu temperature (izlazak iz klimatiziranog prostora u ekstremnu vrućinu).
- Nošenje tamne, guste, sintetičke odjeće – ona zadržava toplinu.
- Dehidraciju – uvijek pijte dovoljno vode!

UMJESTO TOGA UČINITE SLJEDEĆE

ODRŽAVAJTE TIJELO HLADNIM I HIDRATIZIRANIM

- Nosite laganu, široku i prozračnu odjeću.
- Pijte jednu čašu vode na sat.
- Provjeravajte ranjive skupine ljudi.

ŠTITITE DOJENČAD I DJECU

- Nikada ne ostavljajte djecu ili kućne ljubimce u parkiranim automobilima!
- Izbjegavajte boravak vani tijekom najjačeg sunca.
- Sjena smanjuje izlaganje toplini za više od 10°C.
- Nemojte pokrivati dječja kolica suhom tkaninom.

ODRŽAVAJTE DOM HLADNIM

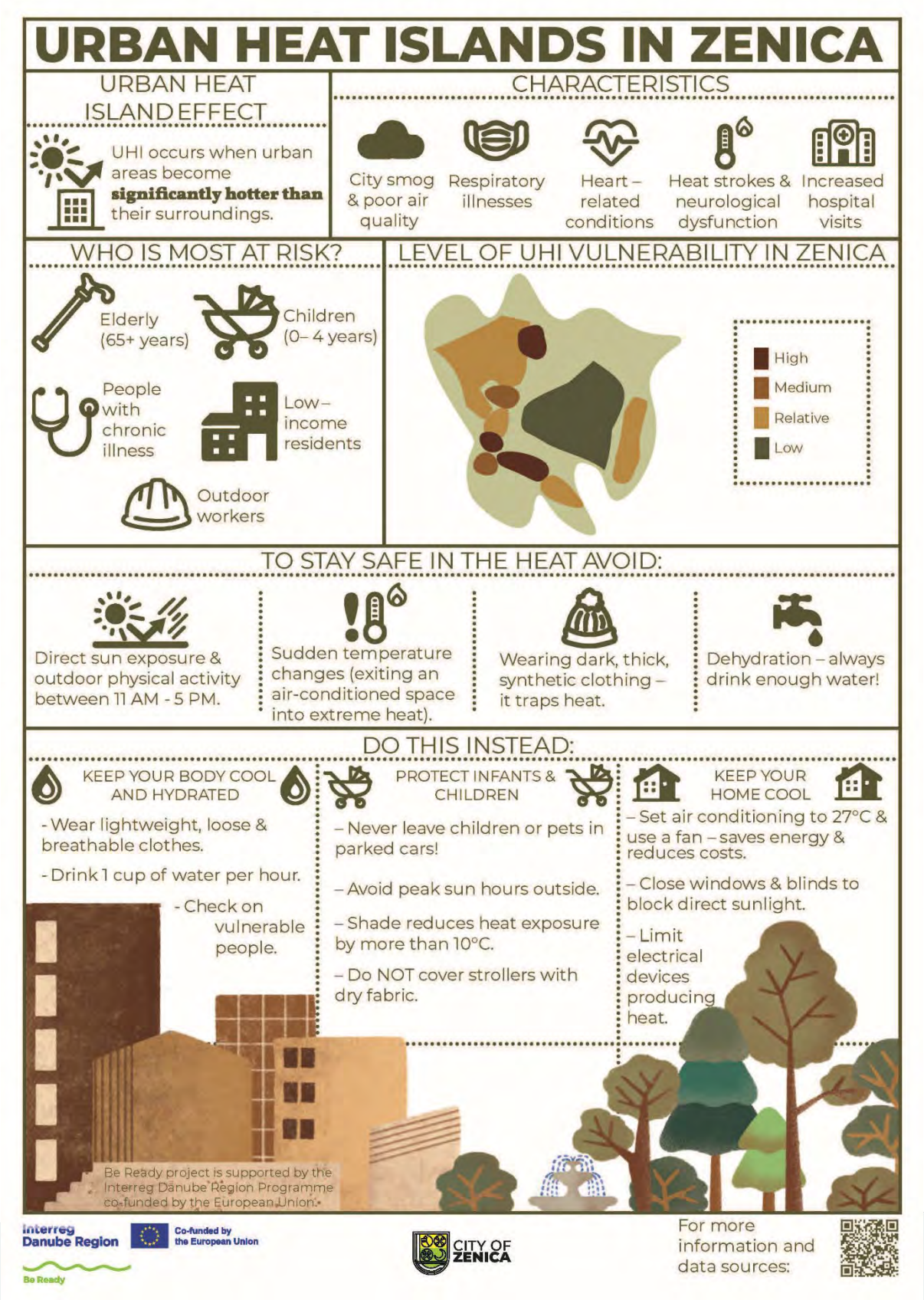
- Postavite klima uređaj na 27 °C i koristite ventilator – štedi energiju i smanjuje troškove.
- Zatvarajte prozore i rolete kako biste blokirali izravnu sunčevu svjetlost.
- Ograničite upotrebu električnih uređaja koji proizvode toplinu.

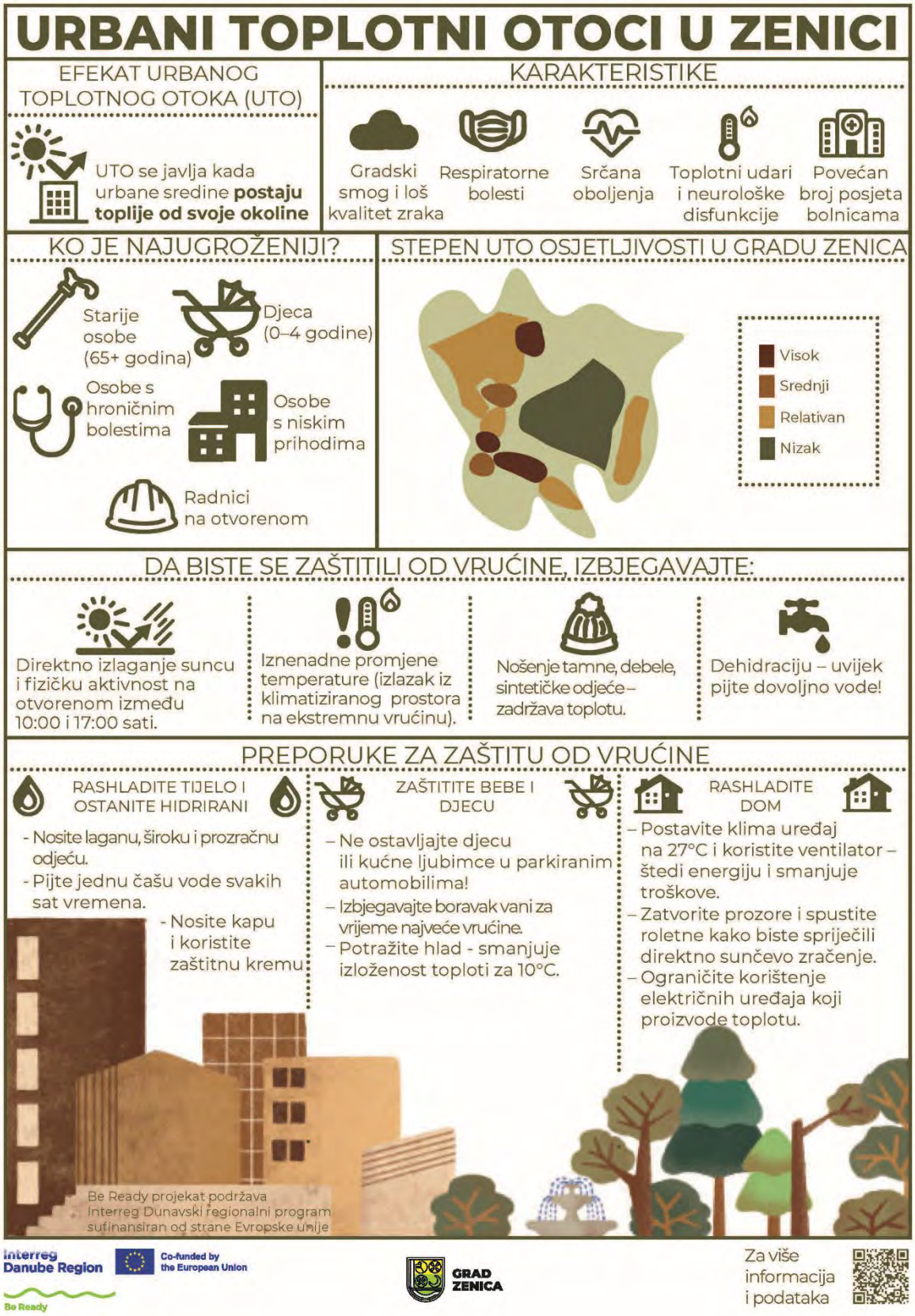
Projekt Be Ready podržava Program Interreg Dunavska regija sufinanciran od strane Europske unije.

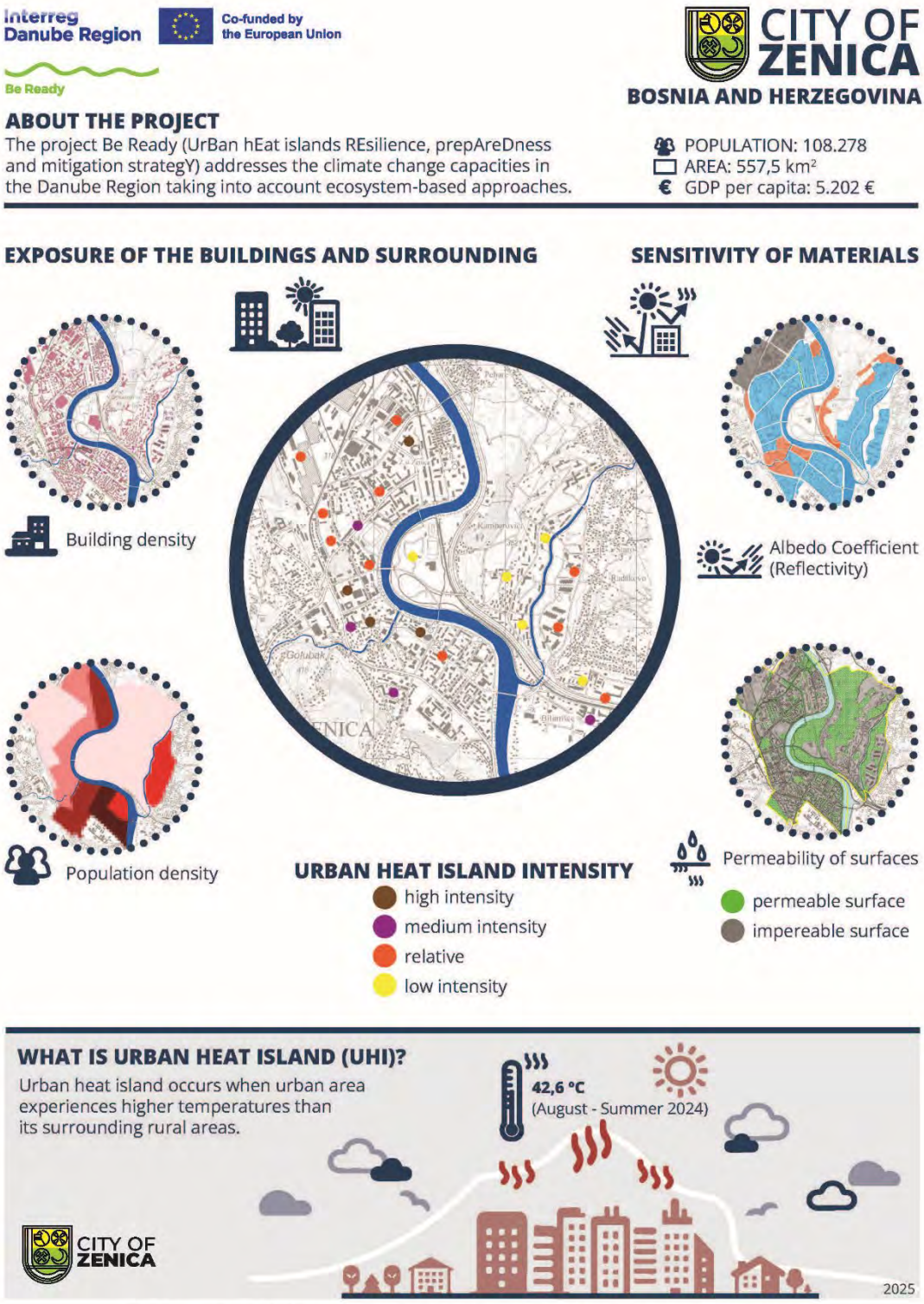
Interreg Danube Region
Co-funded by the European Union
Be Ready
DAN
Razvojna agencija Sjever - DAN d.o.o.
Grad Varaždin

Za više informacija i izvore podataka:

10. Zenica


URBAN HEAT ISLANDS IN ZENICA
URBAN HEAT ISLAND EFFECT
UHI occurs when urban areas become significantly hotter than their surroundings.
CHARACTERISTICS
City smog & poor air quality
Respiratory illnesses
Heart – related conditions
Heat strokes & neurological dysfunction
Increased hospital visits
WHO IS MOST AT RISK?
Elderly (65+ years)
Children (0– 4 years)
People with chronic illness
Low – income residents
Outdoor workers
LEVEL OF UHI VULNERABILITY IN ZENICA
High
Medium
Relative
Low
TO STAY SAFE IN THE HEAT AVOID:
Direct sun exposure & outdoor physical activity between 11 AM - 5 PM.
Sudden temperature changes (exiting an air-conditioned space into extreme heat).
Wearing dark, thick, synthetic clothing – it traps heat.
Dehydration – always drink enough water!
DO THIS INSTEAD:
KEEP YOUR BODY COOL AND HYDRATED
- Wear lightweight, loose & breathable clothes.
- Drink 1 cup of water per hour.
- Check on vulnerable people.
PROTECT INFANTS & CHILDREN
– Never leave children or pets in parked cars!
– Avoid peak sun hours outside.
– Shade reduces heat exposure by more than 10°C.
– Do NOT cover strollers with dry fabric.
KEEP YOUR HOME COOL
– Set air conditioning to 27°C & use a fan – saves energy & reduces costs.
– Close windows & blinds to block direct sunlight.
– Limit electrical devices producing heat.
Be Ready project is supported by the Interreg Danube Region Programme co-funded by the European Union.
Interreg Danube Region
Co-funded by the European Union
Be Ready
CITY OF ZENICA
For more information and data sources:

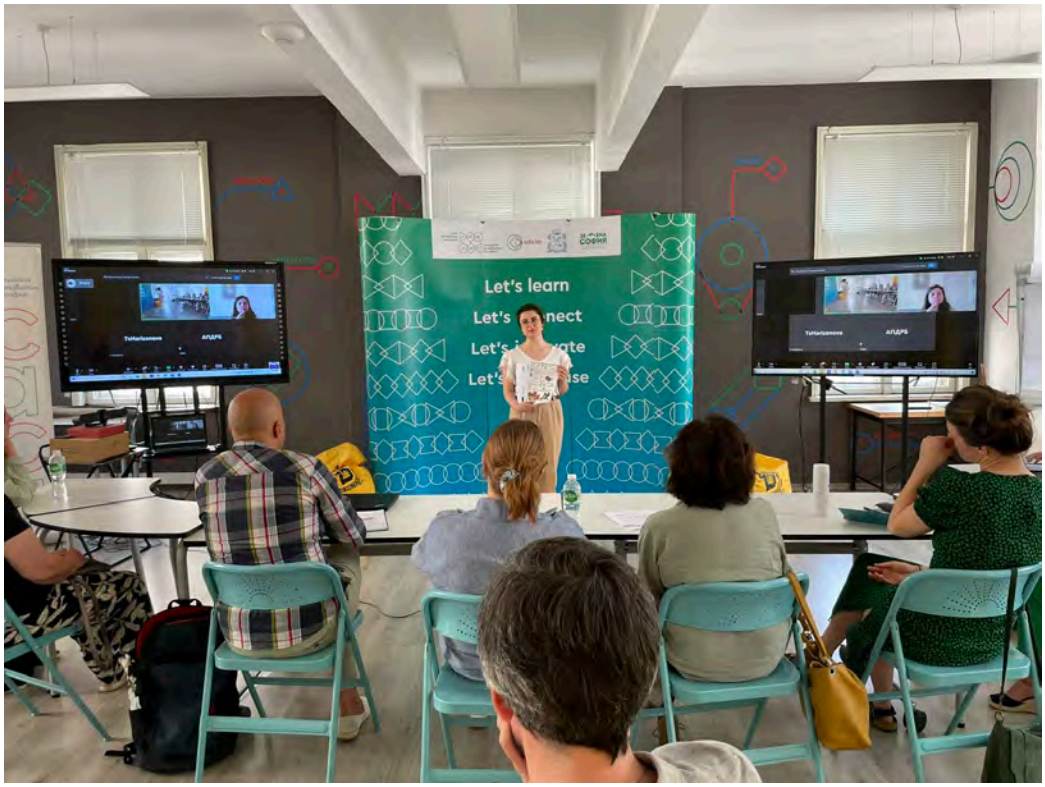

URBANI TOPLOTNI OTOCI U ZENICI
EFEKAT URBANOG TOPLOTNOG OTOKA (UTO)
UTO se javlja kada urbane sredine postaju toplije od svoje okoline
KARAKTERISTIKE
Gradski smog i loš kvalitet zraka
Respiratorne bolesti
Srčana oboljenja
Toplotni udari i neurološke disfunkcije
Povećan broj posjeta bolnicama
KO JE NAJUGROŽENIJI?
Starije osobe (65+ godina)
Djeca (0–4 godine)
Osobe s hroničnim bolestima
Osobe s niskim prihodima
Radnici na otvorenom
STEPEN UTO OSJETLJIVOSTI U GRADU ZENICA
Visok
Srednji
Relativan
Nizak
DA BISTE SE ZAŠTITILI OD VRUĆINE, IZBJEGAVAJTE:
Direktno izlaganje suncu i fizičku aktivnost na otvorenom između 10:00 i 17:00 sati.
Iznenadne promjene temperature (izlazak iz klimatiziranog prostora na ekstremnu vrućinu).
Nošenje tamne, debele, sintetičke odjeće – zadržava toplotu.
Dehidraciju – uvijek pijte dovoljno vode!
PREPORUKE ZA ZAŠTITU OD VRUĆINE
RASHLADITE TIJELO I OSTANITE HIDRIRANI
- Nosite laganu, široku i prozračnu odjeću.
- Pijte jednu čašu vode svakih sat vremena.
- Nosite kapu i koristite zaštitnu kremu.
ZAŠTITITE BEBE I DJECU
– Ne ostavljajte djecu ili kućne ljubimce u parkiranim automobilima!
– Izbjegavajte boravak vani za vrijeme najveće vrućine.
– Potražite hlad - smanjuje izloženost toploti za 10°C.
RASHLADITE DOM
– Postavite klima uređaj na 27°C i koristite ventilator – štedi energiju i smanjuje troškove.
– Zatvorite prozore i spustite roletne kako biste spriječili direktno sunčevo zračenje.
– Ograničite korištenje električnih uređaja koji proizvode toplotu.
Be Ready projekat podržava Interreg Dunavski regionalni program sufinansiran od strane Evropske unije
Interreg Danube Region
Co-funded by the European Union
Be Ready
GRAD ZENICA
Za više informacija i podataka



This project is supported by the Interreg Danube Region Programme co-funded by the European Union (2021 - 2027).
The content was created based on the results of the D1.3.1 City reports from the UHI risk assessment, the City of Zenica (Bosnia and Herzegovina)

Sadržaj je izrađen na osnovu rezultata iz izvještaja D1.3.1 UHI procjena rizika za Grad Zenicu (Bosna i Hercegovina
Ovaj projekat podržava Interreg Dunavski regionalni program sufinansiran od strane Evropske unije (2021–2027).

Dissemination


Let's learn

ELDERLY PEOPLE
PEOPLE WITH DISABILITIES

Střední Vsetínsko
POCITOVÁ MAPA
MĚSTSKÝ TEPELNÝ OSTROV V RATIBOŘI
Be Ready
Urban hEat islands REsilience, prepAreDness and mitigation strategy
19 project partners
12 countries
12 pilots
30 months
2,4 million euro
1,9 million euro Interreg funds