



Sofia's Challenges and Solutions in Urban Mobility, Air Pollution and Urban Green Areas

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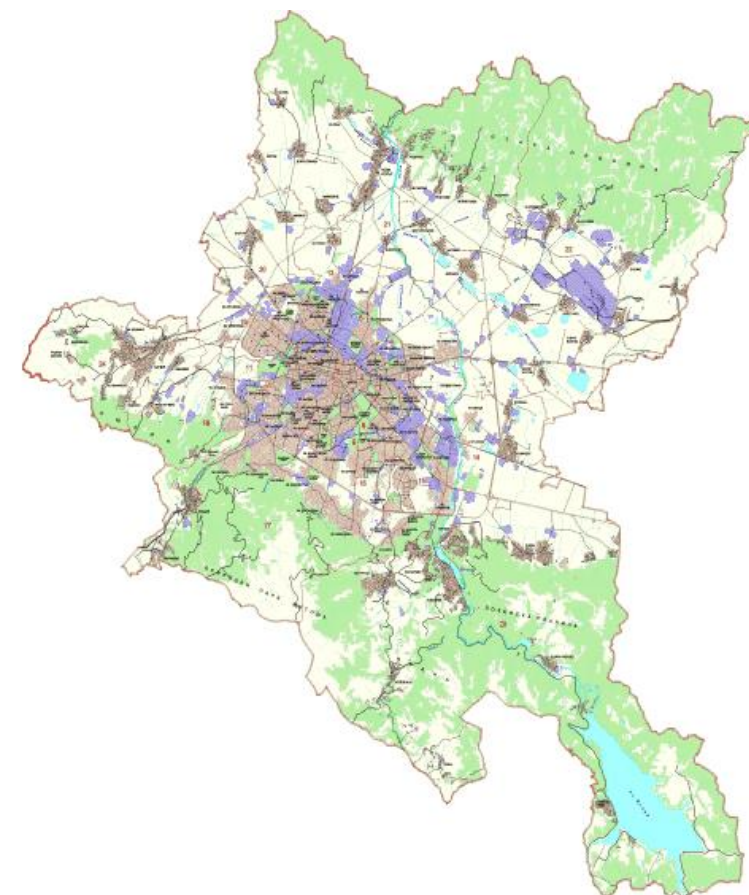
Bulgaria

- **Area: 110,993.6 sq.km**
(world rank 103rd)
- **Population: 6,520,314** ()
- **Language: Bulgarian**
- **Religion: 61,1% Christians**
(mostly Bulgarian Orthodoxy)
- **Capital: Sofia**



Sofia - the capital of Bulgaria

- **Area – 1 311 sq.km.**
- **Population – 1,6 m inhabitants ()**
- **24 administrative districts**
- **Educational center - 24/54 universities**
- **40% students in stem**



Sofia at a glance

- Sofia accounts for 40% of Bulgaria's GDP
- Administrative center of Bulgaria
- 20% of Bulgaria's workforce
- Sofia is a digital hub in Bulgaria, the Balkans and Eastern Europe
- Sofia is a startup and tech hub
- #19 in the ranking of the fDi x TNW Tech Cities of the Future 2021

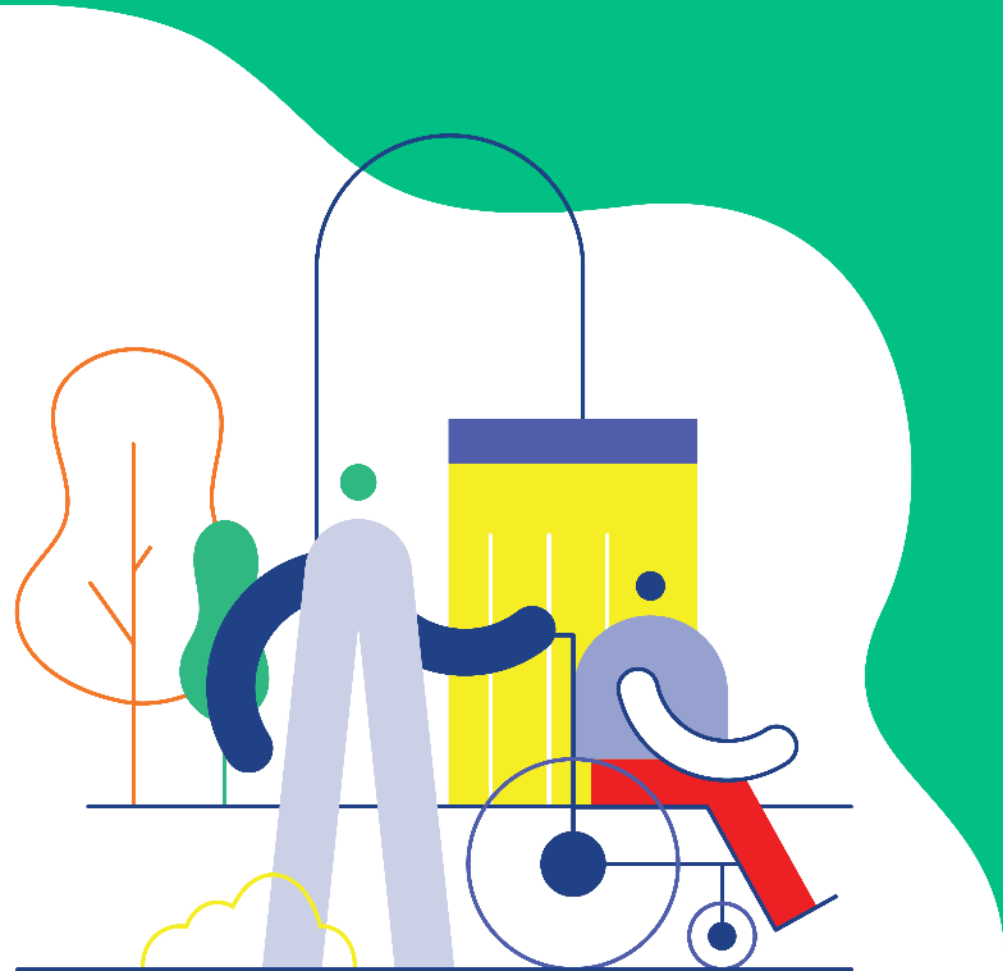
TOP 25 TECH CITIES OF THE FUTURE 2021 – OVERALL

RANK	CITY	COUNTRY
1	London	UK
2	Paris	France
3	Dublin	Ireland
4	Berlin	Germany
5	Amsterdam	Netherlands
6	Madrid	Spain
7	Barcelona	Spain
8	Munich	Germany
9	Stockholm	Sweden
10	Bucharest	Romania
11	Belfast	UK
12	Helsinki	Finland
13	Zurich	Switzerland
14	Moscow	Russia
15	Frankfurt am Main	Germany
16	Warsaw	Poland
17	Vilnius	Lithuania
18	Milan	Italy
19	Sofiya	Bulgaria
20	Cambridge	UK
21	Eindhoven	Netherlands
22	Tallinn	Estonia
23	Edinburgh	UK
24	Prague	Czech Republic
25	Copenhagen	Denmark



Urban mobility - current situation

- Public transport trips (2019): 588 mil, (2020): 435 mil (-26%)
- Motorisation rate (2020): 663 cars/1000 inhabitants
- Short-term paid parking spaces – 32 000 (on-street)



Modal split (October 2020)

Устойчива градска мобилност Модален сплит (Октомври, 2020 г.)



36.8%



35.3%



20.9%



1.1%



0.4%



4.6%



+



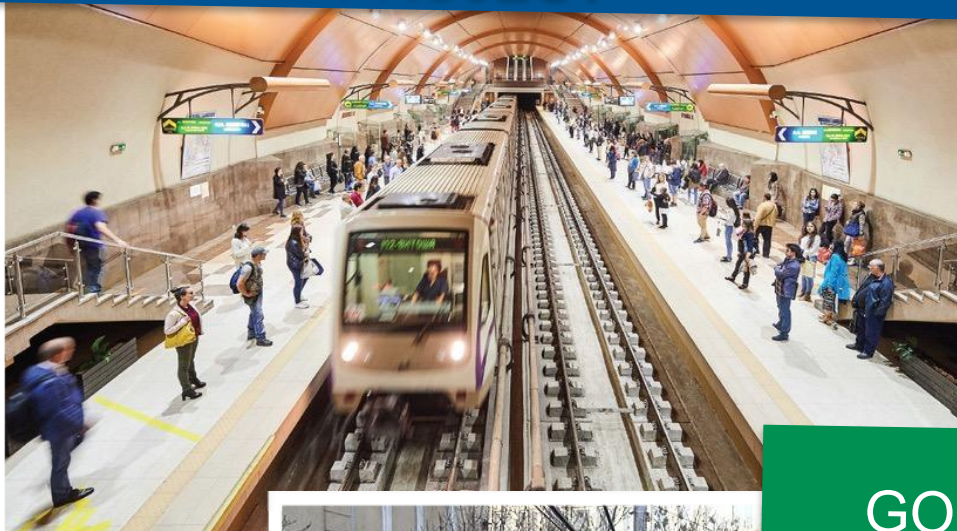
0.9%



Други

MOBILITY FRAMEWORK - SOFIA

THE METRO = SOFIA'S BIGGEST PROJECT



RENEWED BUS FLEET WITH >90% EURO 6 STANDARD BUSES



GOOD PUBLIC E-MOBILITY



Metro system

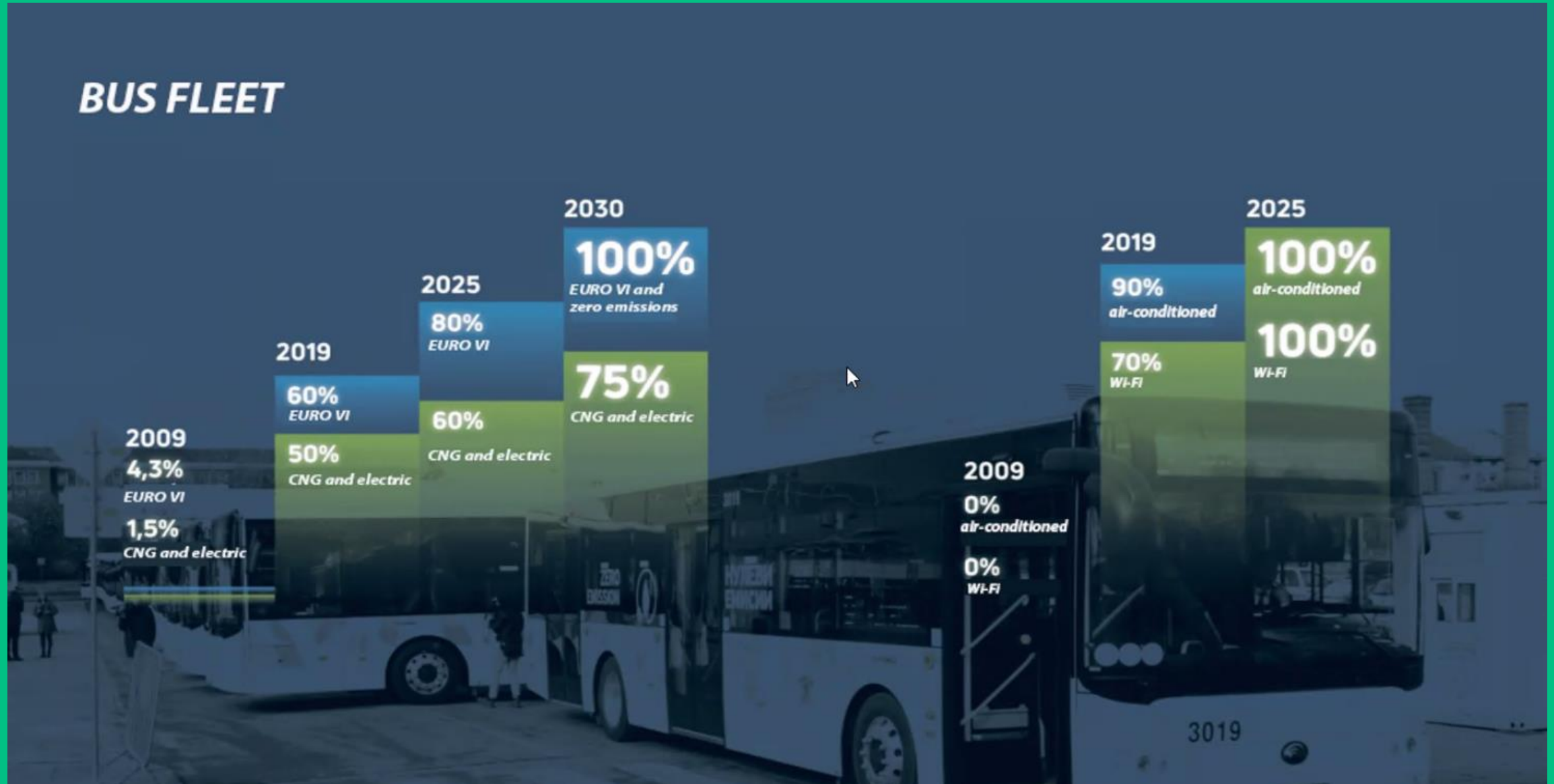
- 4 current metro lines
- 47 stations
- 52 km long
- the backbone of the public transport in Sofia
- 350 000 daily riderships

Future plans (2025):

- 65 km
- 650 000 passengers/day
- 25 % reduction of car traffic



Bus fleet



New Technologies

- 15 Ultra capacitor electric buses
- trolleybuses with hydrogen technology



Making the public transport more attractive

- **New Automated Ticketing System integrated in:**
 - 1200 trams, trolleybuses and buses
 - 52 metro stations
 - 60 ticket offices
 - Centre for video surveillance
- **Web portal and Sofia mobile pass - sofia.mpass.bg**
- **Payment with a bank card, smart device**



Shared mobility services

E-BIKE SHARING SYSTEM



SHARED E-SCOOTERS



3
PROVIDERS

ELECTRIC CAR SHARING



450+
CARS

Air pollution - current situation and challenges

- A big topic of concern in most of the big cities in Bulgaria, especially in Sofia
- The location of Sofia - between high mountains, causes problems with the emissions inventory
- High motorization of the citizens, old vehicles (avr. 16 years old)



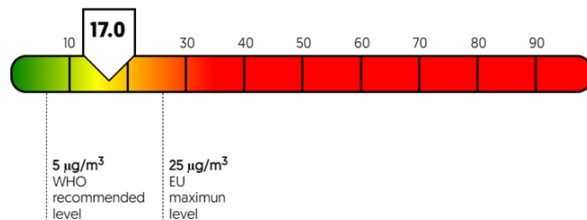
➤ Bulgaria has the highest rate of premature deaths due to air pollution in Europe

➤ Sofia is ranked #81 (out of 858 EU cities) and has a high mortality related to PM_{2.5}

ISGlobal — RankingOfCities
Urban health study in 1,000 European cities

EN

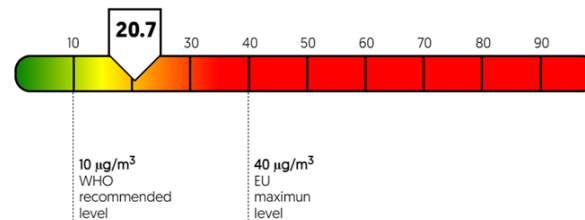
PM_{2.5}
(ANNUAL MEAN)



RANKING POSITION

81/858

NO₂
(ANNUAL MEAN)

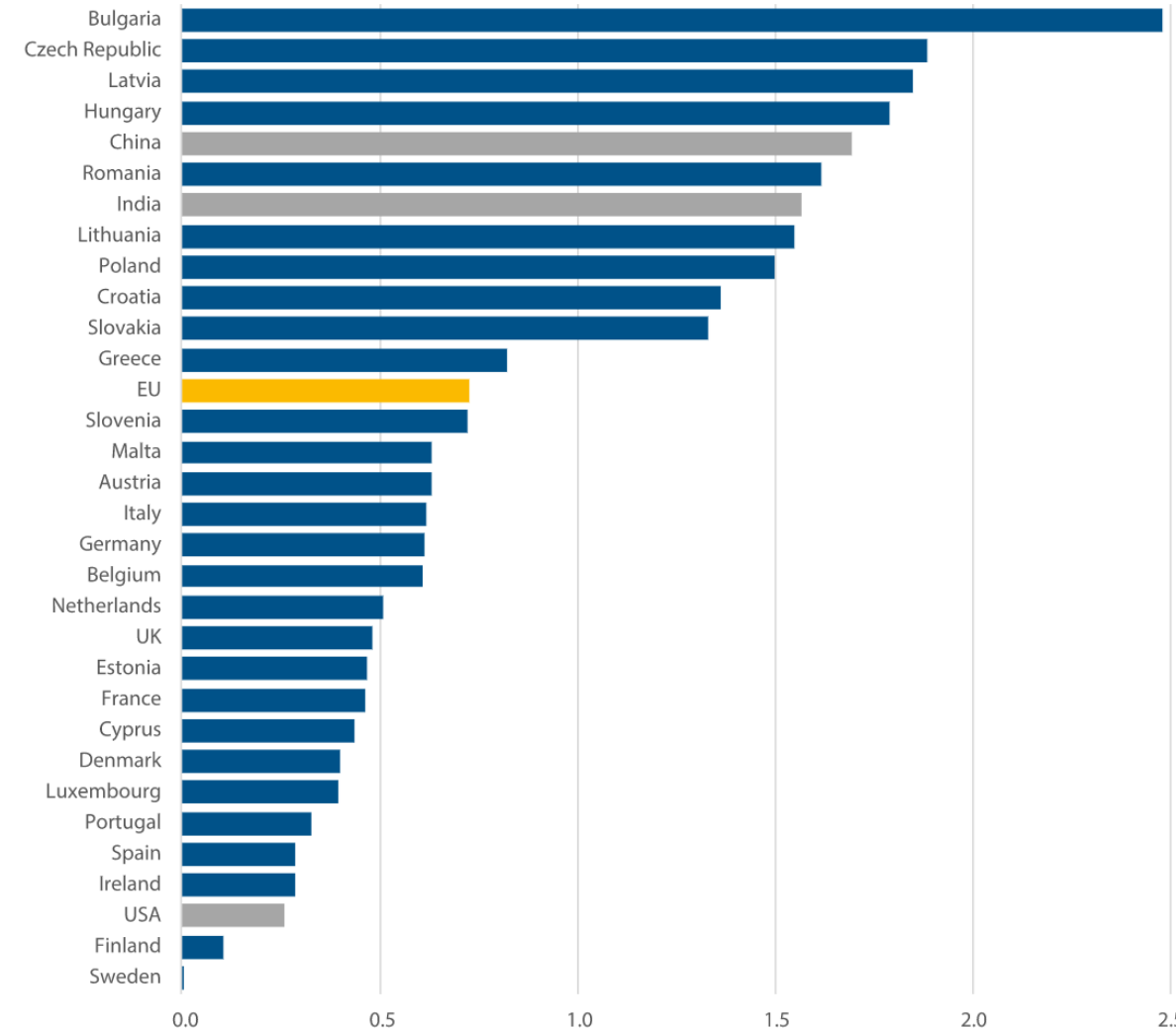


RANKING POSITION

309/858

Figure 1

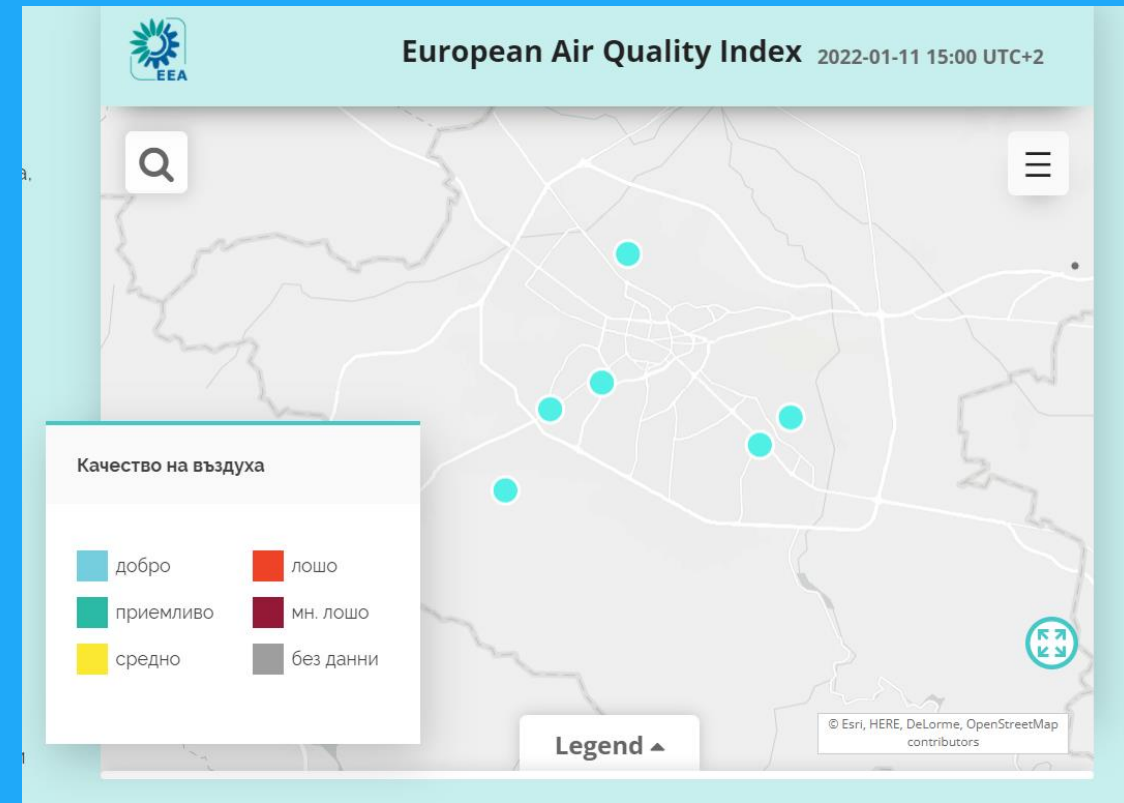
Lost years of healthy life from ambient air pollution per hundred inhabitants



Sofia is making steps to a clearer air:

Gathering data:

- 6 national stations for measuring PM10
- 22 additional measuring sensors operated by the Sofia Municipality (<https://platform.airthings-project.com/>)
- a civil network of over 350 low cost sensors AirBG stations (citizen science - <https://www.airbg.info/en/>)
- a Municipal mobile measurement station
- identifying the main sources of air pollution



Sources of air pollution PM 2.5 (2020):

- dust from the streets - 25 %
- burning of biomass, including wood - 23 %
- coal burning - 19%
- transfer from external sources - 26%
- transport - only 9%
- industry - only 4%



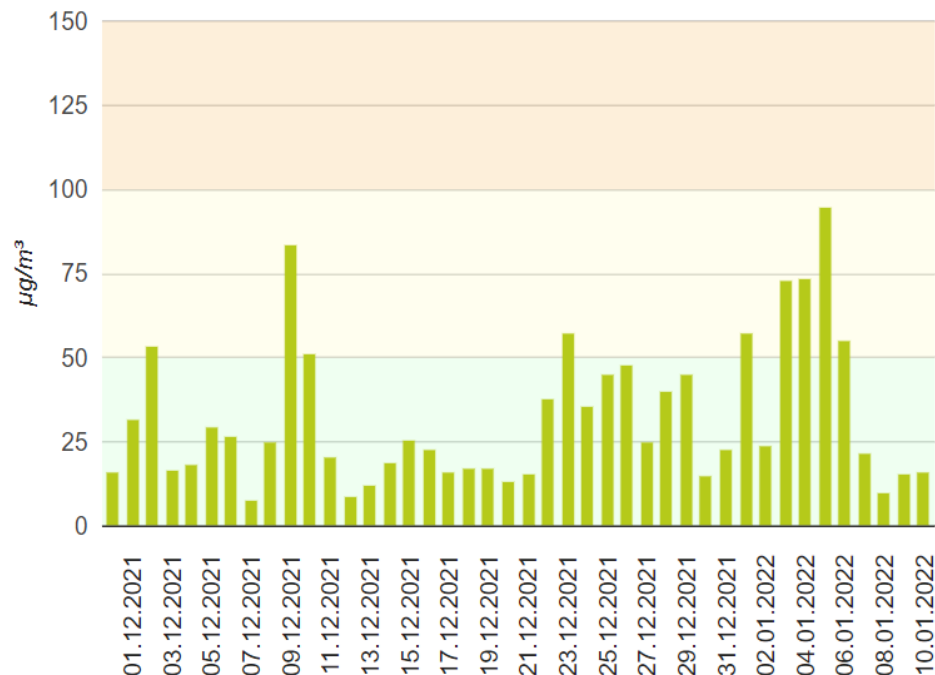
- the domestic heating is one of the main sources of air pollution (see *the map above*)

Sofia is making steps to a clearer air:

Existing strategy and programs:

- Sofia has a strategic document for improving the air quality
- web portal for informing the citizens - <https://air.sofia.bg/>
- A program for replacement of the old domestic heating stoves with new non-polluting ones

Фини прахови частици < 10 μ m (μ g/m³) - средноденонощни стойности (24 часа)



Добро

(0 - 50 μ g/m³)

Умерено

(51 - 100 μ g/m³)

Средно

(101 - 150
 μ g/m³)

Високо

(151 - 200
 μ g/m³)

Много високо

(> 200 μ g/m³)

Sofia is making steps to a clearer air: Existing projects



INNOAIR Project:

- demand responsive green public transportation
- bonus system for citizens using shared mobility and sustainable transport
- congestion charge and LEZ introduction

COMPAIR Project:

- citizen science - citizens using sensors for measuring air pollution
- dashboard with real time metrics
- involving students and parents
- information campaign

The logo for the COMPAIR project, with 'COMPAIR' in green and blue text and a green Wi-Fi symbol above the 'AIR' part.

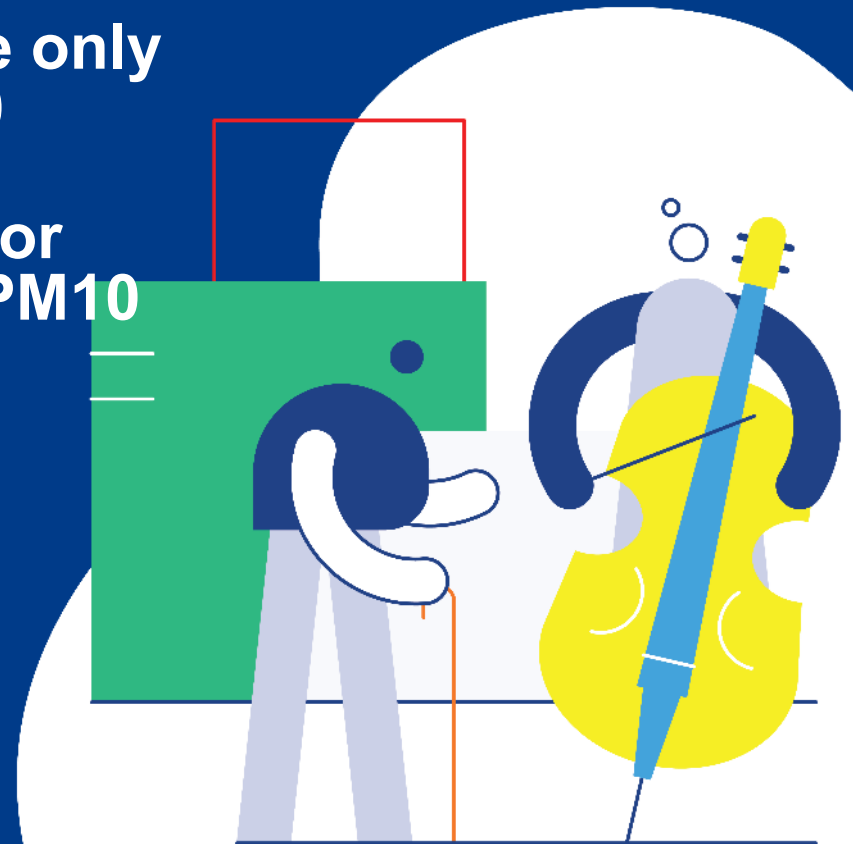
Urban Mobility and Air pollution - CITY AMBITIONS

- more people switching to more sustainable way of moving around the city
- eliminating the mud spots in the city and turn them into green areas or multifunctional places in the neighbourhoods like parking or community zones
- creating an optimized public transport network + last mile transportation
- implementing the 15-minute city theory
- protection of the green corridors of fresh air from the mountains



Urban mobility and Air pollution - Currently Ongoing Initiatives

- ❑ Developing more routes for school busses and integrating them into the public transport system
- ❑ Green ticket - cheaper and available only for the days with high level of PM10
- ❑ White ticket - free public transport for days with extremely high levels of PM10



Urban mobility and Air pollution - Solutions

- ❑ Using a tracking and gamification bonus system for stimulating and supporting citizens using sustainable ways of going to work
- ❑ Using a bonus system for supporting businesses with green systems for deliveries of goods for the restaurants, courier services, etc.



Urban mobility and Air pollution - Solutions



- ❑ Low Emission Zone - planned to start introducing it in summer of 2022

URBAN GREEN in Sofia - current situation

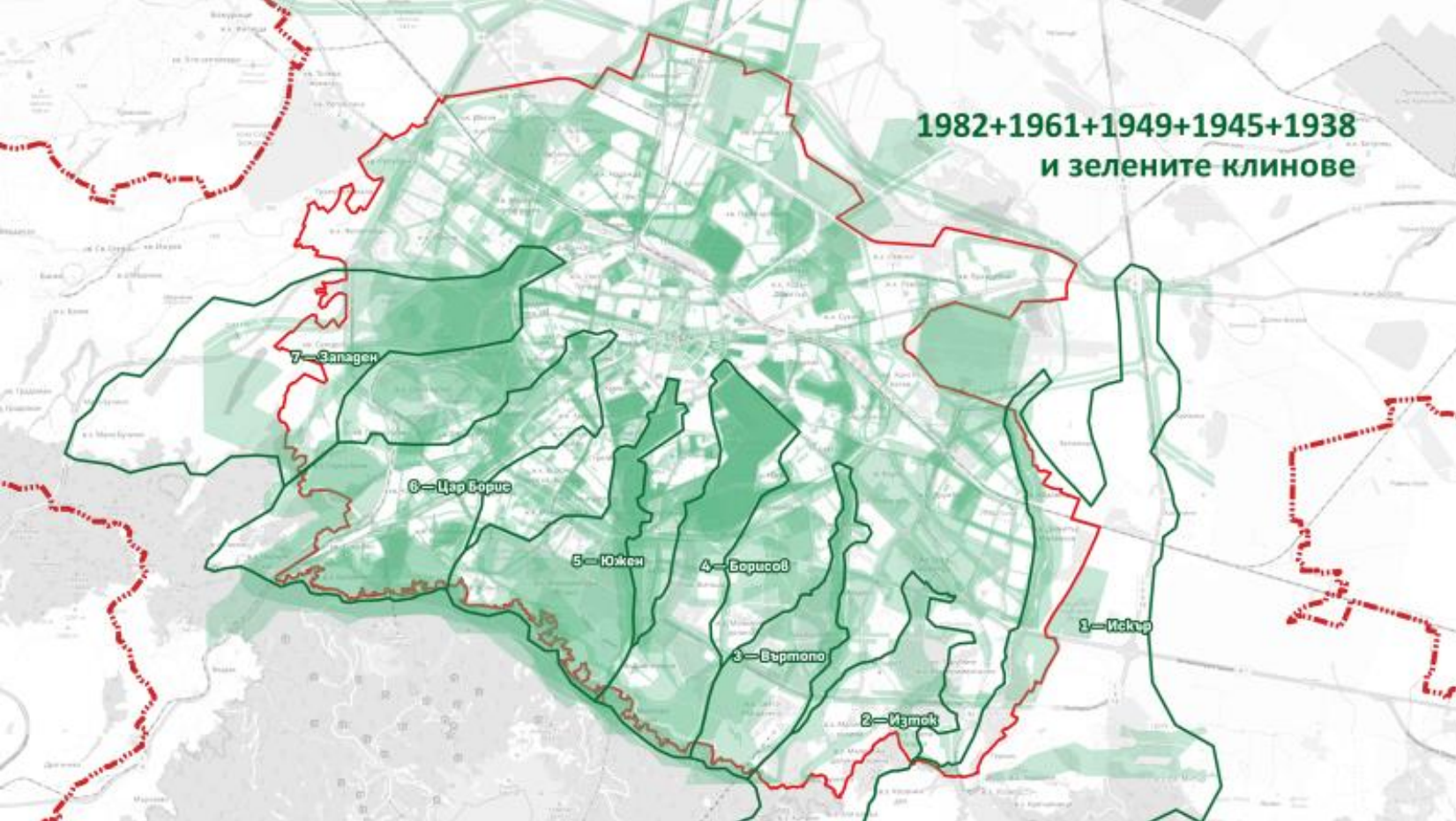




- Vitosha, Plana, Lulin Mountains
- Green corridors
- Big urban parks and gardens

Programs and projects:

- Program “Green Sofia” for citizens
- The new forest of Sofia
- My green kindergarten and school



Green corridors

3,5% of Sofia Municipality area is planned for parks and gardens.

25% of them is already existing parks and gardens

=> 75% are potential for urban parks

URBAN GREEN in Sofia - Challenges



Адрес, Регион	Место жительства	Вместе с детьми до 18 лет	Вместе с детьми до 18 лет с ограниченными возможностями	Вместе с детьми до 18 лет с ограниченными возможностями	%
Москва	80 370	25 250	10 000	28 000	47
Санкт-Петербург	10 000	3 000	1 000	3 000	30
Челябинская область	10 000	3 000	1 000	3 000	30
Татарстан	10 000	3 000	1 000	3 000	30
Самарская область	10 000	3 000	1 000	3 000	30
Волгоградская область	10 000	3 000	1 000	3 000	30
Брянская область	10 000	3 000	1 000	3 000	30
Воронежская область	10 000	3 000	1 000	3 000	30
Липецкая область	10 000	3 000	1 000	3 000	30
Тульская область	10 000	3 000	1 000	3 000	30
Ярославская область	10 000	3 000	1 000	3 000	30
Ивановская область	10 000	3 000	1 000	3 000	30
Костромская область	10 000	3 000	1 000	3 000	30
Владимирская область	10 000	3 000	1 000	3 000	30
Нижегородская область	10 000	3 000	1 000	3 000	30
Орловская область	10 000	3 000	1 000	3 000	30
Калужинская область	10 000	3 000	1 000	3 000	30
Тверская область	10 000	3 000	1 000	3 000	30
Ямало-Ненецкий автономный округ	10 000	3 000	1 000	3 000	30
Ханты-Мансийский автономный округ	10 000	3 000	1 000	3 000	30
Магadanская область	10 000	3 000	1 000	3 000	30
Чукотский автономный округ	10 000	3 000	1 000	3 000	30
Ненецкий автономный округ	10 000	3 000	1 000	3 000	30
Республика Саха (Якутия)	10 000	3 000	1 000	3 000	30
Республика Коми	10 000	3 000	1 000	3 000	30
Республика Карелия	10 000	3 000	1 000	3 000	30
Республика Ингушетия	10 000	3 000	1 000	3 000	30
Республика Дагестан	10 000	3 000	1 000	3 000	30
Республика Чечня	10 000	3 000	1 000	3 000	30
Республика Адыгея	10 000	3 000	1 000	3 000	30
Республика Крым	10 000	3 000	1 000	3 000	30
Республика Абхазия	10 000	3 000	1 000	3 000	30
Республика Северная Осетия-Алания	10 000	3 000	1 000	3 000	30
Республика Тыва	10 000	3 000	1 000	3 000	30
Республика Хакасия	10 000	3 000	1 000	3 000	30
Республика Алтай	10 000	3 000	1 000	3 000	30
Республика Бурятия	10 000	3 000	1 000	3 000	30
Республика Саха (Якутия)	10 000	3 000	1 000	3 000	30
Республика Тыва	10 000	3 000	1 000	3 000	30
Республика Хакасия	10 000	3 000	1 000	3 000	30
Итого	10 725	43 780	16 400	54 000	100



ЗЕЛЕНАЯ
СОФИЯ

СТРОИМ СОВМЕСТНОЕ
БУДУЩЕЕ

Around 50% of the citizens have access to urban parks and gardens

=> 10,1 m² urban park area per citizen

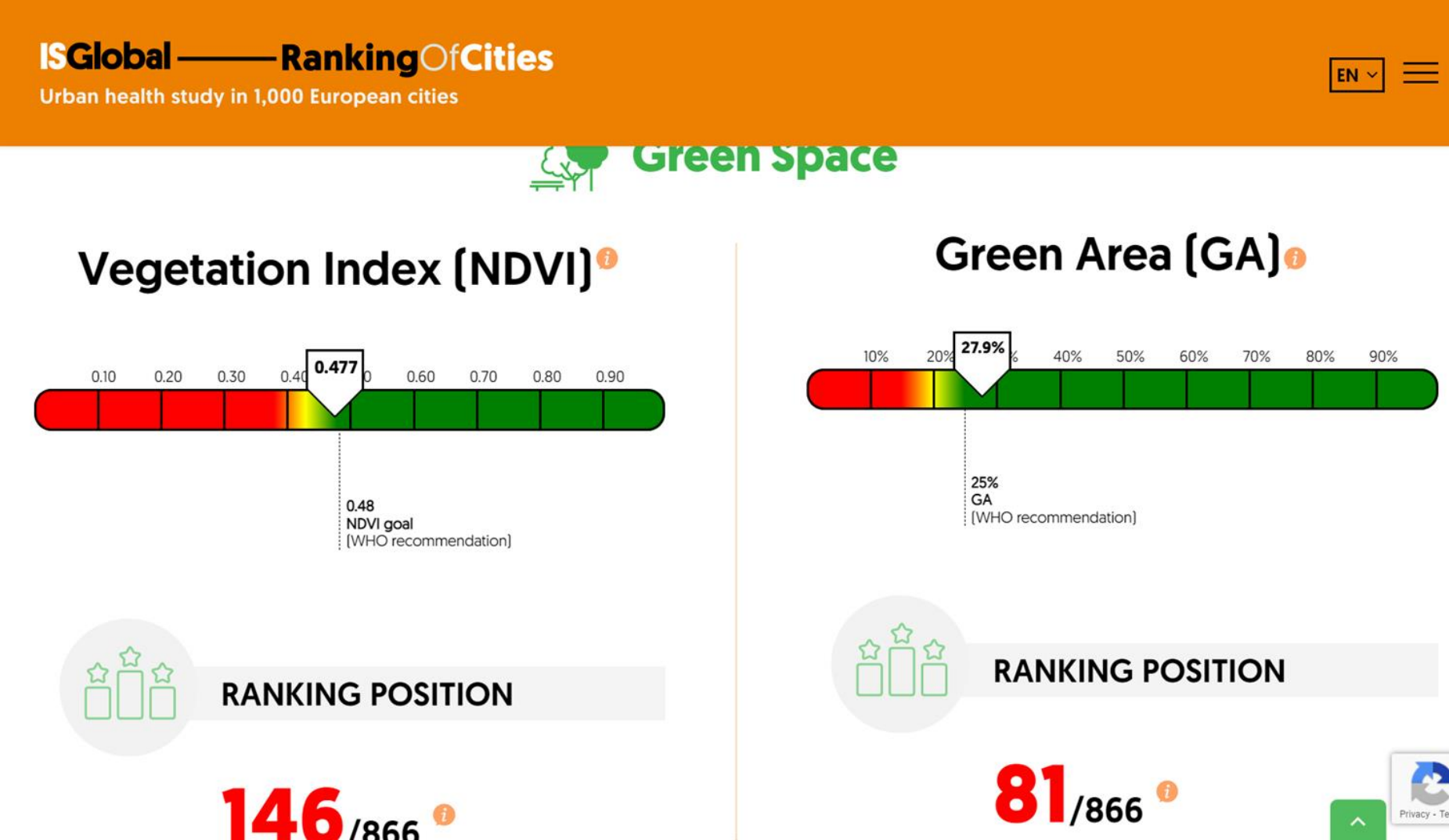
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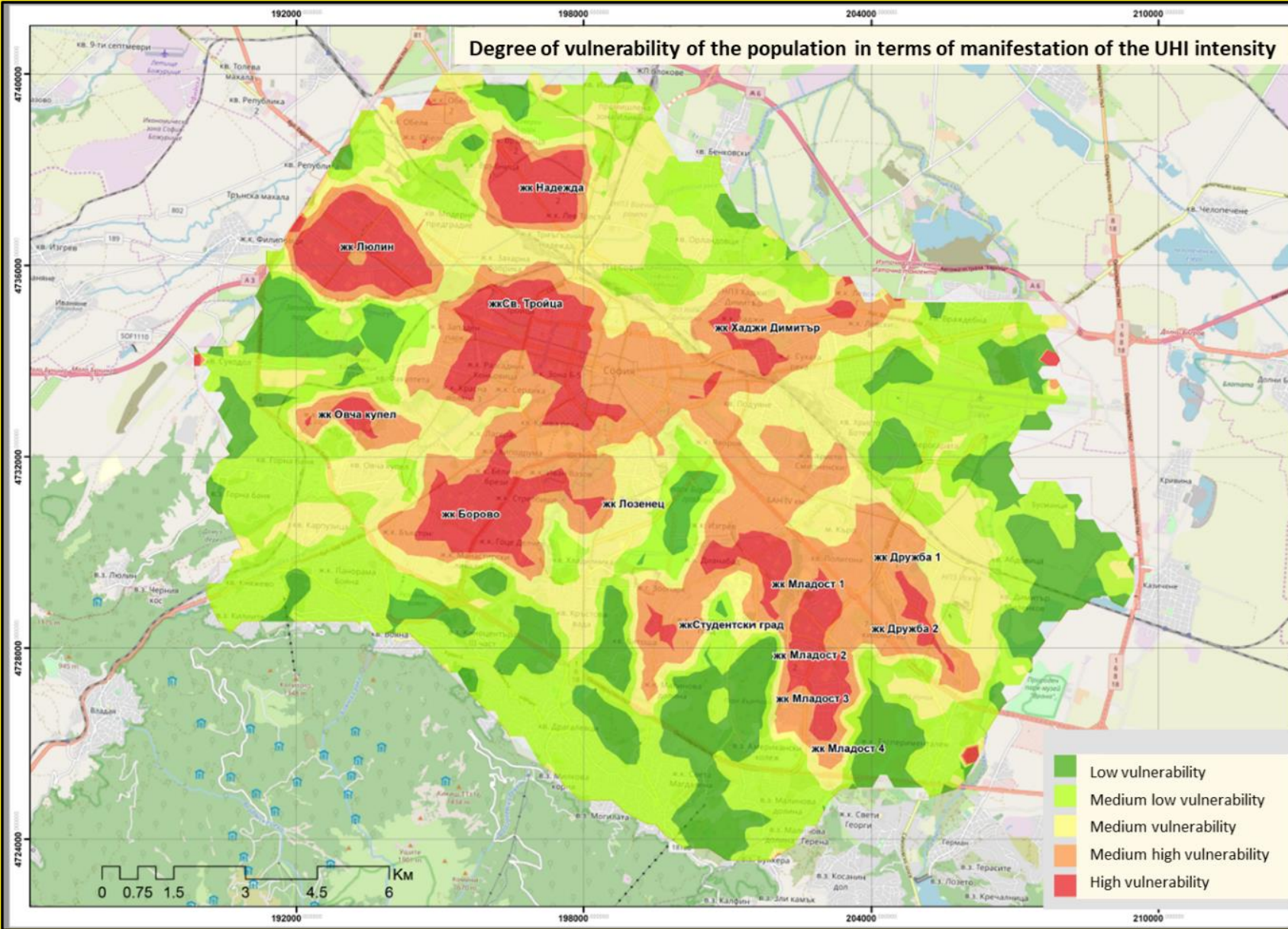
ЛЕГЕНДА

- сгради отдалечени на повече от 300m до зелени площи
- зелени площи за обществено ползване

Network analysis of population access to green areas

Sofia is ranked #81 among 866 European cities having mortality due to lack of green spaces.





➤ Strong urban heat island (UHI) effect

URBAN GREEN in Sofia - solutions





SOFIA URBAN GREEN CONFERENCE 2022

**Urban Green Conference
2022 planned for May
2022**

**+ several online events
before and after that**

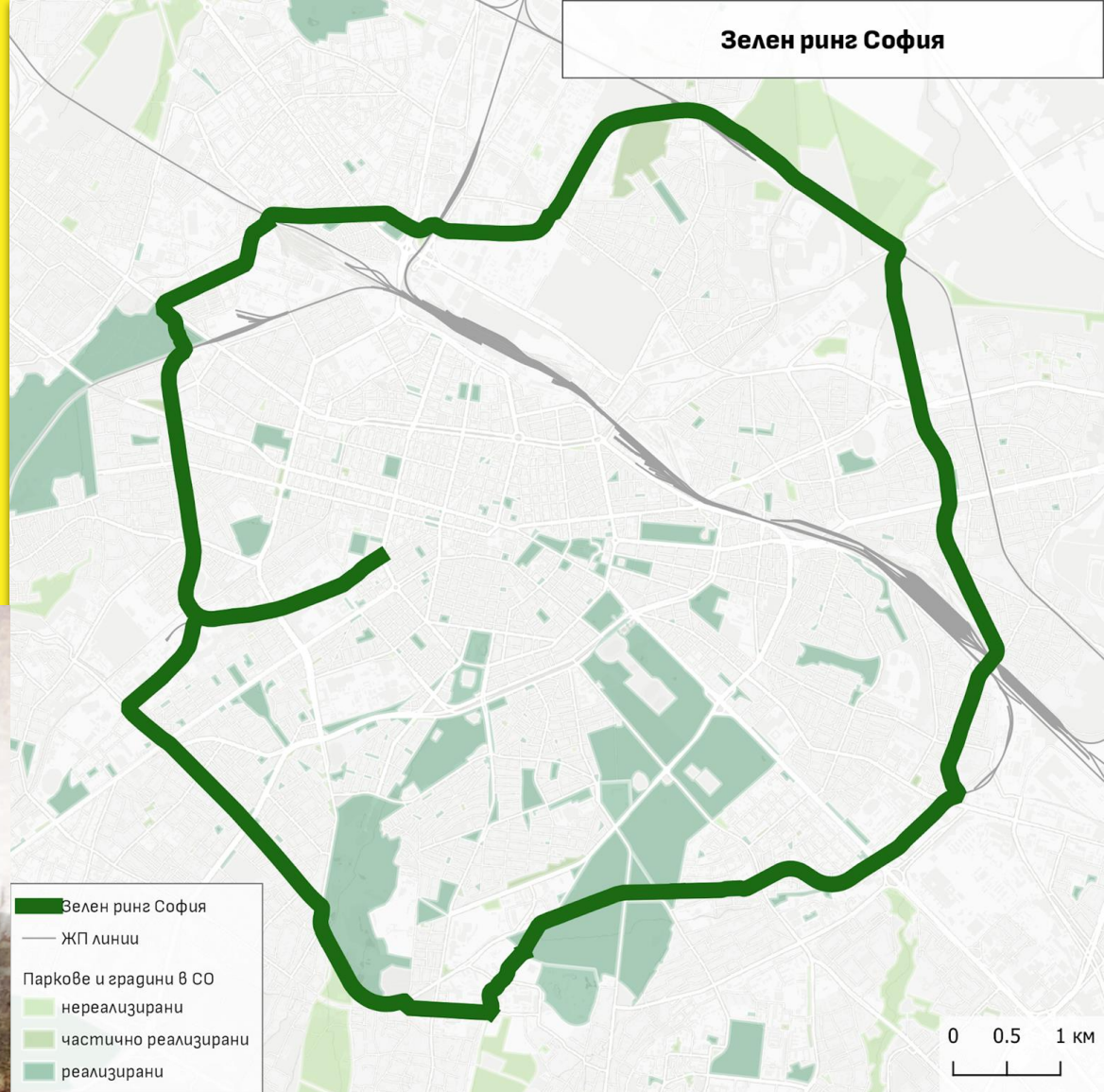
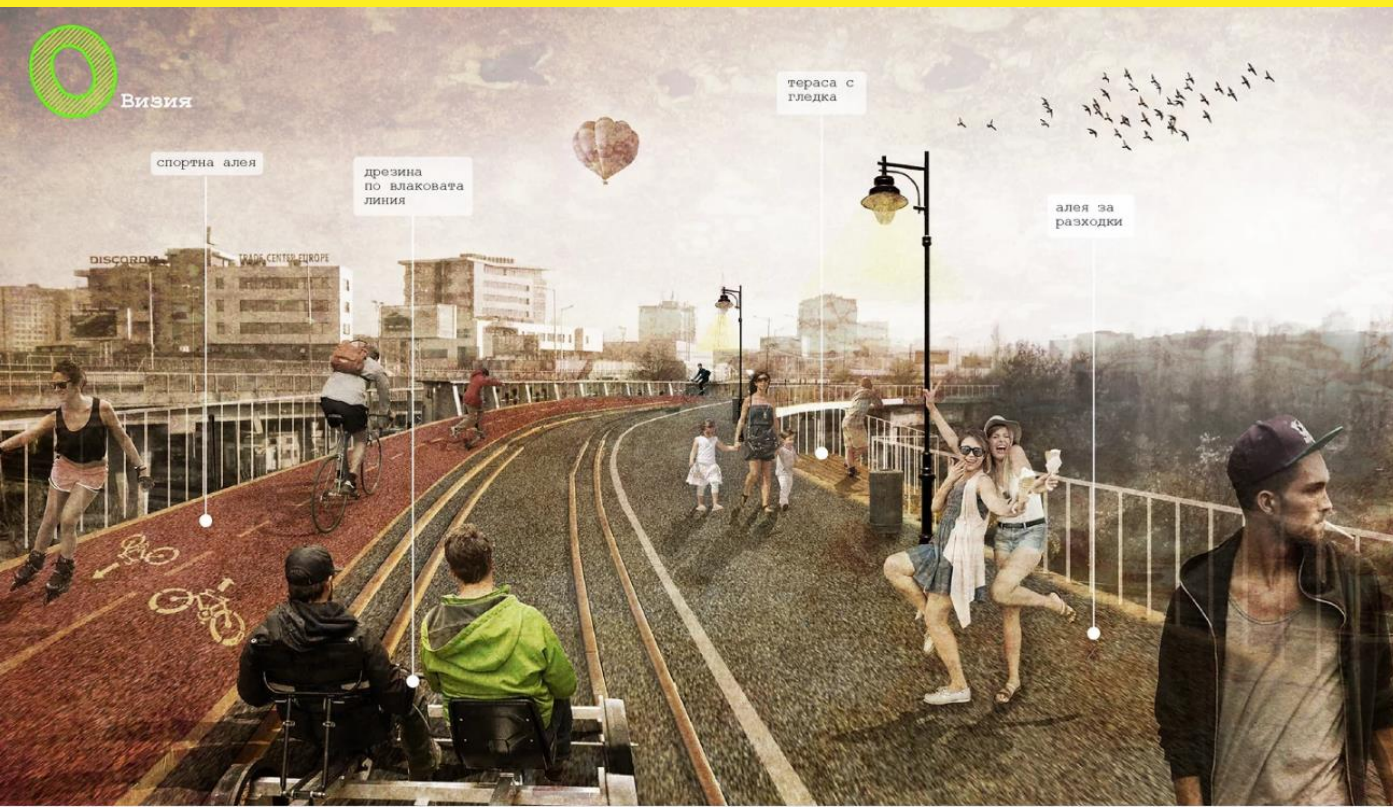
Park Lozenets

- + Developing a new urban park in one of the green corridor areas - Lozenets using entirely new approach



Green line Sofia

new linear park, initiated
by citizens





ЗЕМЕНА
СОФИЯ
столична община

Website
www.sofia-da.eu