



Where Did **You Park?**

Imagine returning to your car after the lecture, just to find it feels like a hot sauna.

Meanwhile, your friend, who parked under the only tree on the street, hops in his cool car.

That difference is exactly what we're here to talk about today:

Urban Heat Islands!



In Direct Sunlight:

- The interior temperature of a car can easily exceed 60°C within an hour of being parked in the direct Israeli sun during summer months. The dashboard and seats can become dangerously hot, sometimes reaching 70°C or more.
- Car interiors can heat up by 3°C to 4°C per minute when parked in the sun, with overall temperature increases reaching over 40°C higher than the outside temperature.



In the Shade:

- A car parked in the shade may stay close to the ambient air temperature, typically around 25°C to 35°C depending on the time of year and specific location in Israel.
- Shaded cars interior temperatures are about 15°C to 20°C lower than those parked in direct sunlight.

URBAN HEAT ISLANDS MAPPING



Understanding Urban Heat Islands



Urban Heat Islands are areas within cities that experience higher temperatures than their rural surroundings due to human activities and infrastructure.

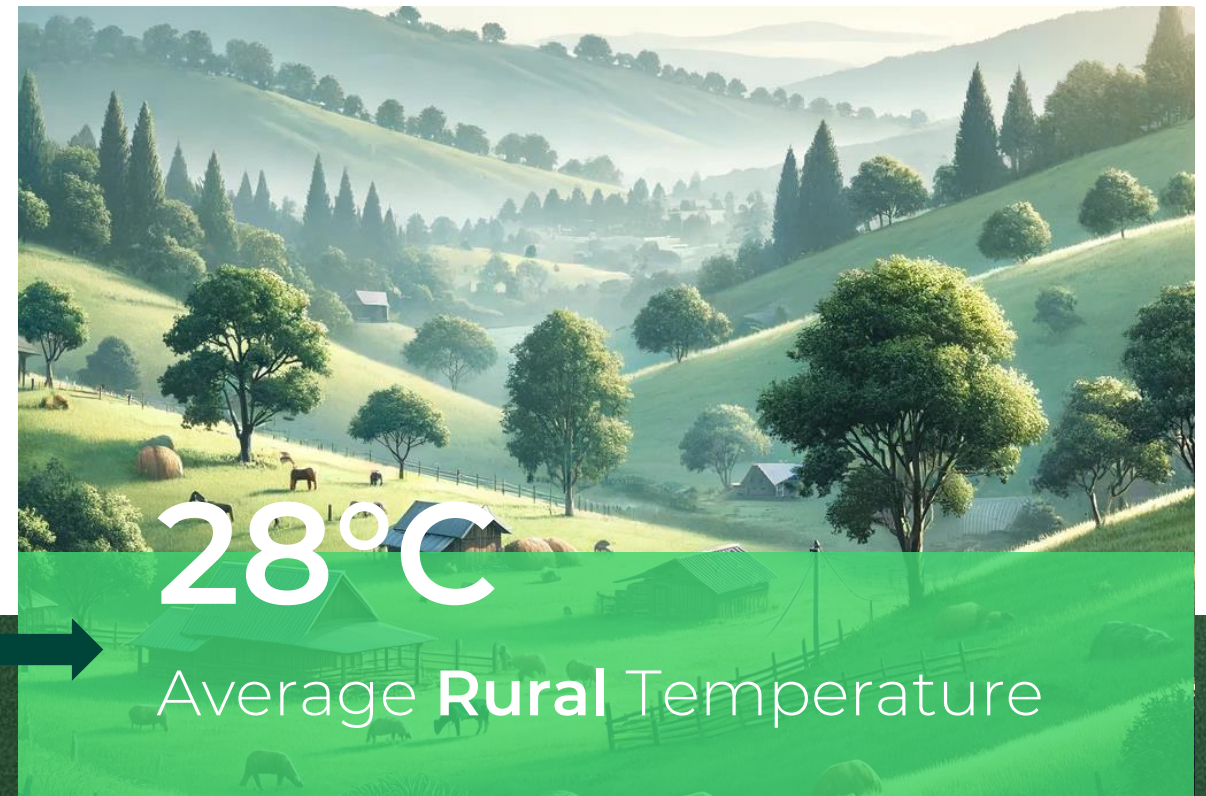


They result from the absorption and retention of heat by buildings, roads, and other manmade surfaces."



Urban Heat Islands

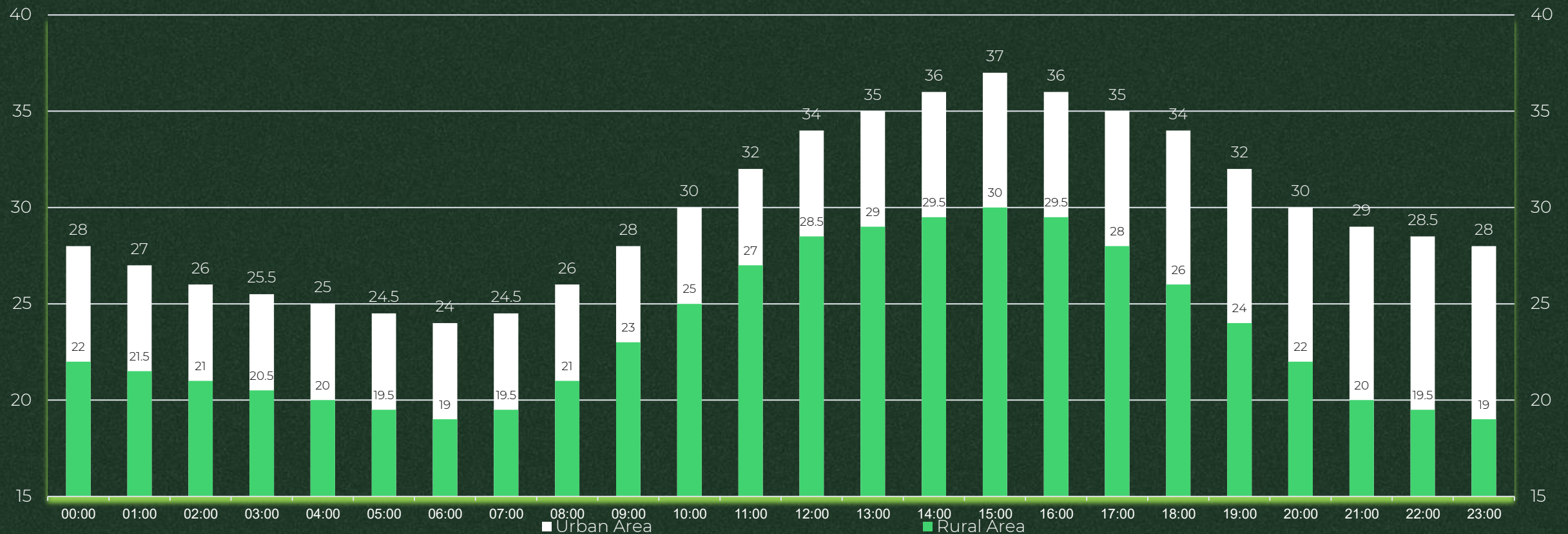
Today, we'll explore how urban areas become significantly warmer than their rural surroundings. This phenomenon affects both the environment and human health, driven by the way we design and use our cities.



*Source: NASA My NASA Data

Temperature Dynamics In Urban **vs. Rural**

Comparative Temperature Fluctuations in Urban vs. Rural





Global Perspective On Urban **Heat Islands**



350 Cities with Temperatures over 35°C



Expected Increase to 1,000 Cities by 2050



Middle East Heating Up Faster than
Global Average

Urban Population Percentage in Israel



Urban Population Worldwide:

Globally, about **56% of the world's population resides in urban areas**. This figure is expected to continue rising as more people move to cities for better economic opportunities and improved living standards

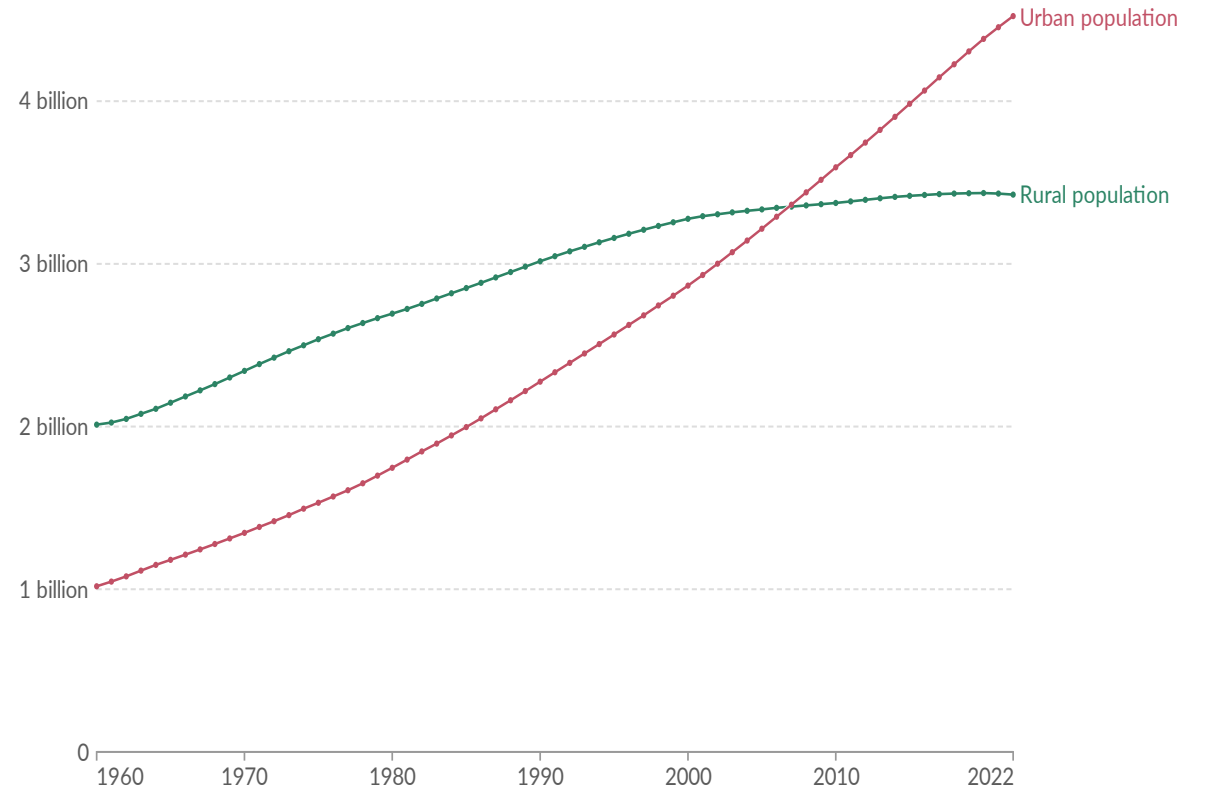


Global Trends:

The trend of urbanization is increasing worldwide. **By 2050, it is projected that nearly 68% of the global population will live in urban areas**, driven by ongoing economic development and rural to urban migration.

Number Of People Living In Urban & Rural Areas, **WORLD**

Our World
in Data



Data source: World Bank based on data from the UN Population Division

OurWorldInData.org/urbanization | CC BY

Note: Because the estimates of city and metropolitan areas are based on national definitions of what constitutes a city or metropolitan area, cross-country comparisons should be made with caution.

Temperature Differences Of Urban Materials



Asphalt:

Studies have shown that asphalt can reach surface temperatures of up to 63°C during the peak summer months.



Buildings:

The surface temperature of buildings, particularly those with dark materials, can range between 45°C and 55°C depending on the level of sun exposure and the material used.



Open Ground (Soil):

Bare soil surfaces in urban areas typically reach temperatures around 45°C in the sun.



Green Areas (Grass):

Grasscovered areas generally maintain lower temperatures, around 35°C to 38°C, which is significantly cooler compared to hard urban surfaces.



Tree Canopy:

Areas under tree canopies can be as cool as 23°C to 25°C, showing the substantial cooling effect of shade and vegetation.

Urban Population Percentage in Israel



Israel:

With a significant majority of its population in urban areas, Israel is among the more urbanized countries in the world. The population is mostly concentrated in major cities like Tel Aviv, Jerusalem, and Haifa.

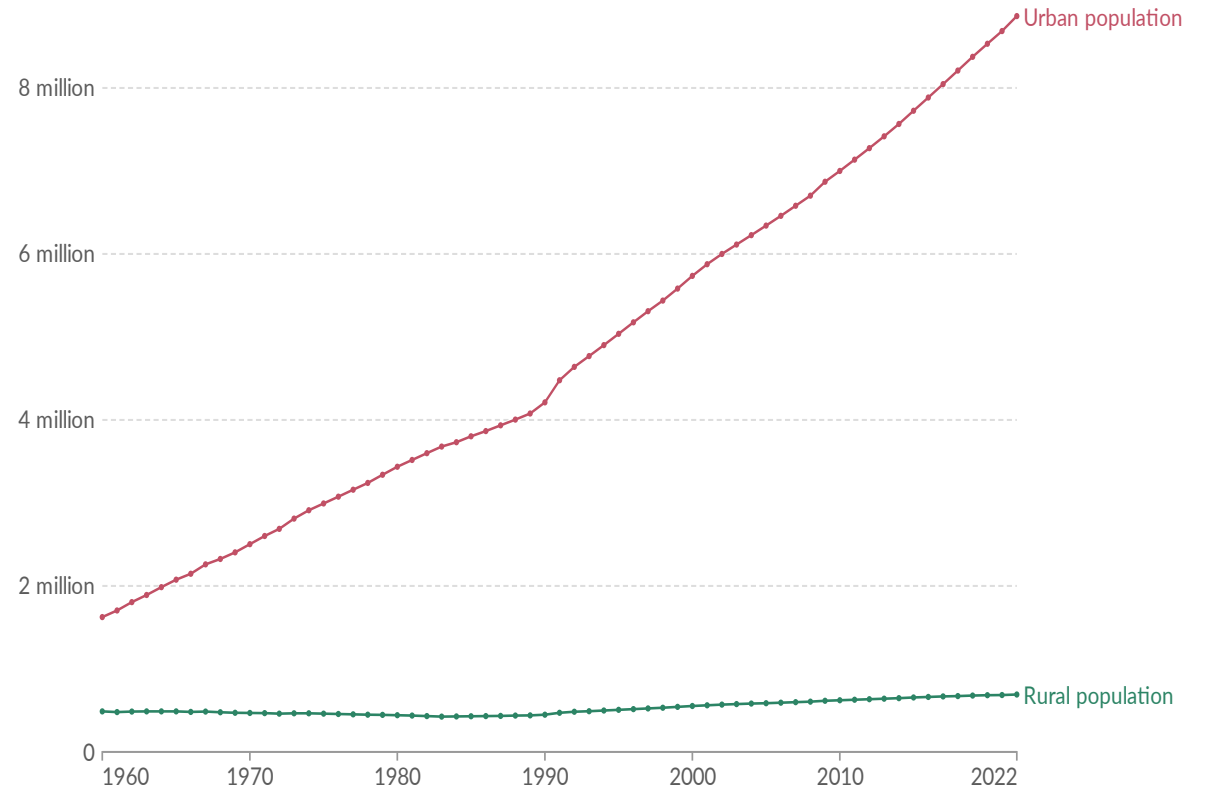


Urban Population in Israel:

As of 2023, approximately 93% of Israelis live in urban areas. This high level of urbanization reflects Israel's concentrated population in cities, driven by economic, social, and infrastructural development.

Number Of People Living In Urban & Rural Areas, **Israel**

Our World
in Data



Data source: World Bank based on data from the UN Population Division

OurWorldInData.org/urbanization | CC BY

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Health Impacts of Urban Heat Islands



Urban Heat Islands pose serious health risks.

Urban Heat Islands pose serious health risks.
Higher temperatures can lead to increased instances of:

30%	Heat Stroke Up by 30%
20%	Respiratory Issues Increase by 20%
20%	Dehydration Rate: Increase by 20%
15%	Hospital Visits During Heatwaves Up by 15%

(especially among vulnerable populations like the elderly and children)
*Source: WHO, Health Impact Studies

Interesting Facts & Projections

01

Lack of Shade in Urban Areas

According to the Survey of Israel, approximately **90% of urban areas in Israel lack shade.**

02

Extensive Tree Cutting:

In 2021 alone, approximately **290,000 trees were cut down** in Israel through about 6,900 felling permits, as noted by geographer Shay Hershko.

03

Rising Temperatures in Major Cities Worldwide:

Currently, there are around **350 major cities globally** where people are coping with **temperatures over 35°C (95°F)**. **By 2050, this number is expected to rise to 1,000 cities**, indicating a severe global warming trend that will **impact millions of people.**

04

Exceptional Warming in Israel:

According to the Israeli Meteorological Service, **2023 was the hottest year in the past 20 years**, particularly in the latter half of the year. Additionally, it is expected that **in the coming years, heat waves will peak at 50°C (122°F)**, with each year breaking previous heat records.

05

Rapid Warming in the Middle East:

The Middle East is warming at a faster rate than the global average.

06

Impact on Functional Capacity:

When temperatures exceed 33°C (91°F), human work capacity decreases by approximately 50%, which affects overall productivity and efficiency.

07

Impact of Road Expansion and Infrastructure:

The expansion of the Acre-Safed road and the addition of interchanges have resulted in temperatures in nearby towns being 2-9°C (3.6-16.2°F) higher than in the surrounding open areas. This highlights how new transportation infrastructure can exacerbate the urban heat island problem in urban environments.

08

Specific Regional Forecasts:

Tel Aviv: 76 days per year with temperatures above 33°C (91°F).
Jerusalem: 60 days per year with temperatures above 30°C (86°F).
The Sea of Galilee: 60 days per year with temperatures around 38°C (100°F).
The Negev: 55 days per year with temperatures above 34°C (93°F).
The Jordan Valley and Arava: 85 days per year with temperatures of around 38°C (100°F).

Environmental Impacts & Costs of Ignoring Urban Heat Islands



Urban Heat Islands increase energy consumption for cooling, raise healthcare costs due to heat related illnesses, and accelerate the deterioration of urban infrastructure, leading to higher maintenance expenses.

20%

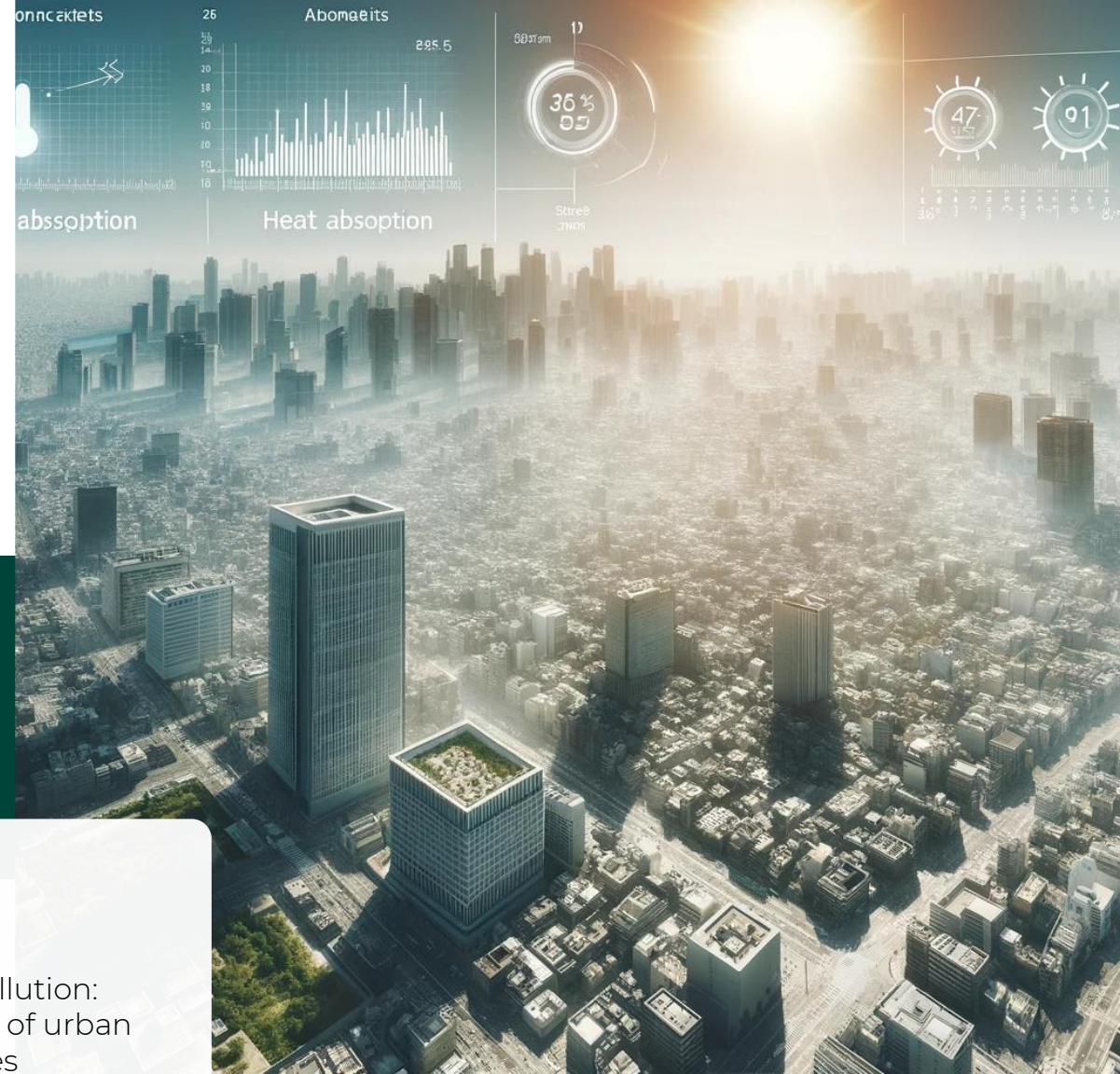
Energy Consumption Increase: **20%** in summer

25%

CO2 Emissions Increase: **25%**

30%

Thermal Pollution: Affects **30%** of urban water bodies





Benefits of Mitigating Heat Islands for City Municipalities



Infrastructure and Energy Savings:

Cities can reduce infrastructure maintenance costs by up to 15% annually by investing in green infrastructure, cool materials, and shading. These investments extend the lifespan of roads and buildings, as well as city assets like parks, playgrounds, and public facilities.



Healthcare and Emergency Services:

Mitigating urban heat islands (UHIs) can reduce healthcare burdens by 20%, lowering demands on emergency services and cutting costs associated with assisting vulnerable populations during heatwaves. This includes savings on resources, emergency transportation, and city-funded programs to support the elderly and children.



Enhancing Public Health and Community Engagement:

Promoting active lifestyles, cooler environments encourage greater use of public spaces, leading to increased community engagement and overall happiness.



Increased Economic Activity:

Cooler, greener urban environments can boost local economic activity by up to 20%, attracting businesses, increasing property values, and enhancing daily activities for residents. This leads to higher tax revenues and more vibrant local economies.



Productivity and Quality of City Services:

Cooler urban environments enhance productivity among city workers and improve the quality of city services. This results in better performance in schools, offices, cultural institutions, and outdoor maintenance, providing superior service to citizens and reducing operational costs.

Future Directions & Recommendations

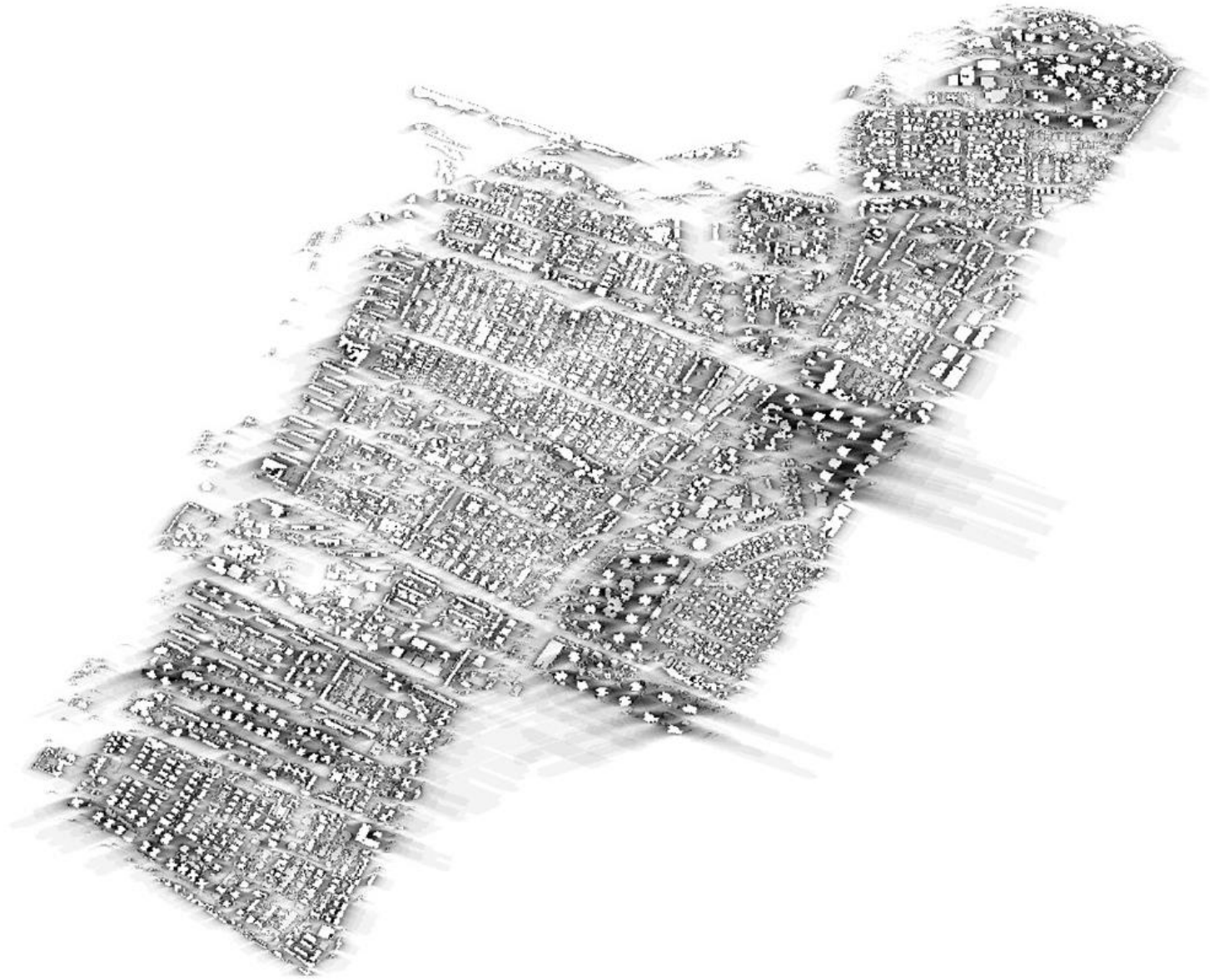
- **Planting More Trees:** Double urban tree count to cool cities.
- **Increasing Green Spaces:** Creating parks and green open areas.
- **Innovative Cooling Technologies:** Utilizing tailored materials and technologies, installing green walls and surfaces..
- **Community Involvement:** Engage public in greening projects.
- **Shading Planning:** Analyzing existing shade and Implementing artificial shading.
- **Urban Planning:** Integrating shading solutions, improving airflow, and planting suitable trees.
- **Promoting Sustainable Transportation:** Enhancing public transportation and creating shaded walking paths.
- **Promoting Green Transportation:** Establishing shaded commuting paths for bicycles and pedestrians.
- **Using Advanced Materials:** Employ reflective and heat-resistant materials.
- **Urban Heat Island Survey:** Mapping heat island hotspots and implementing targeted solutions.
- **Welfare:** Establishing cooling centers to handle extreme heat.



✓ WHAT?

✓ WHY?

● WHERE?

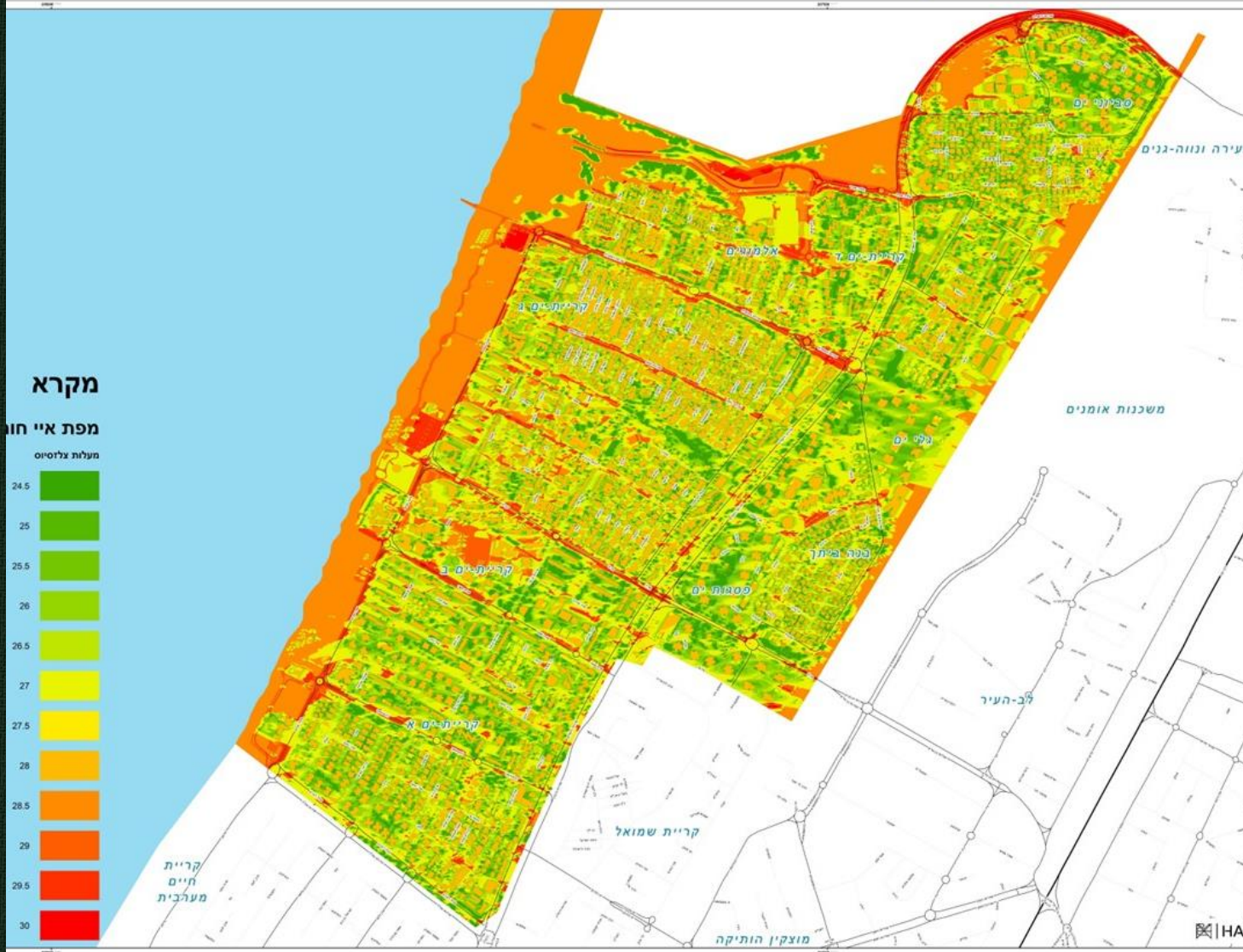




In the heart of our cities,

 | HAMMER GIS

איי חום אורבני - קרית ים

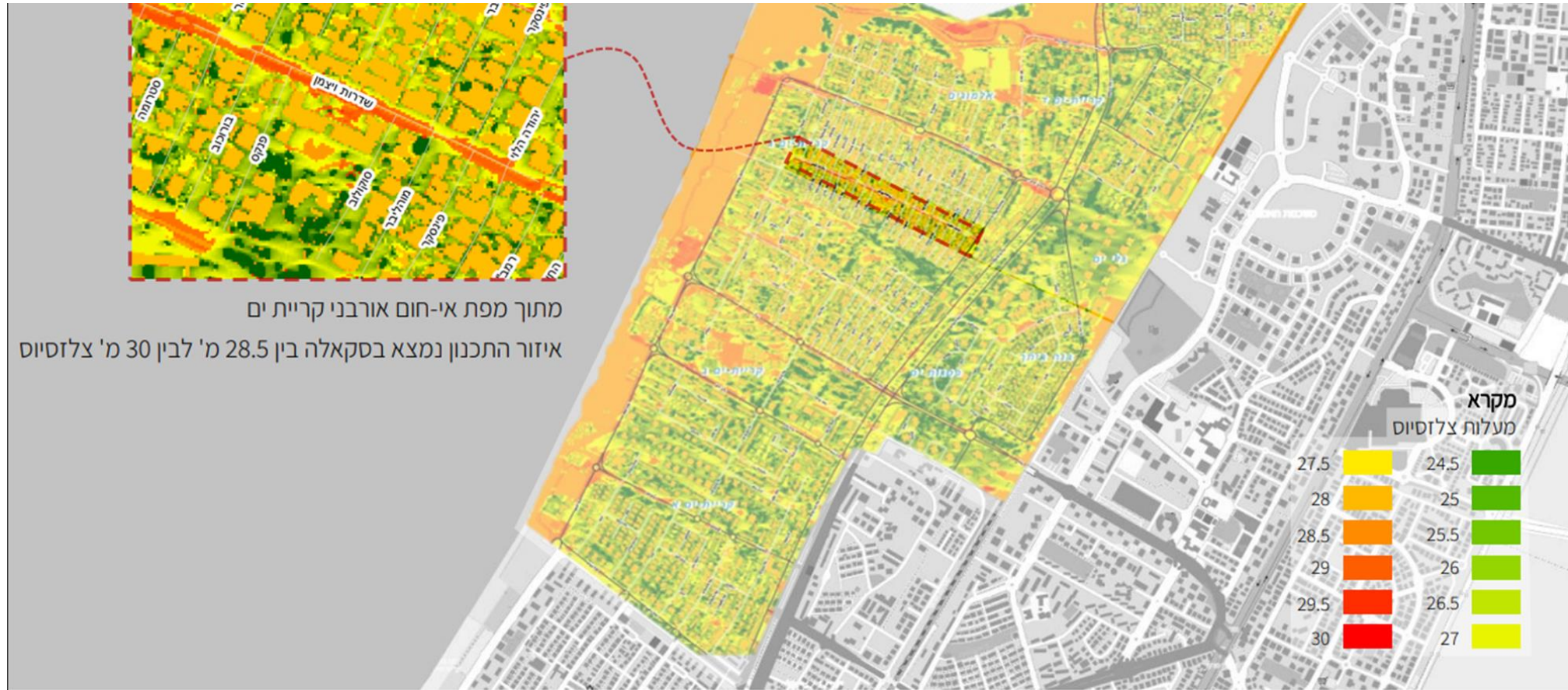


"Conducting a Urban Heat Island survey helps identify specific hotspots and areas most affected by heat, allowing for targeted interventions."



This ensures efficient use of resources and maximizes the impact of mitigation efforts."

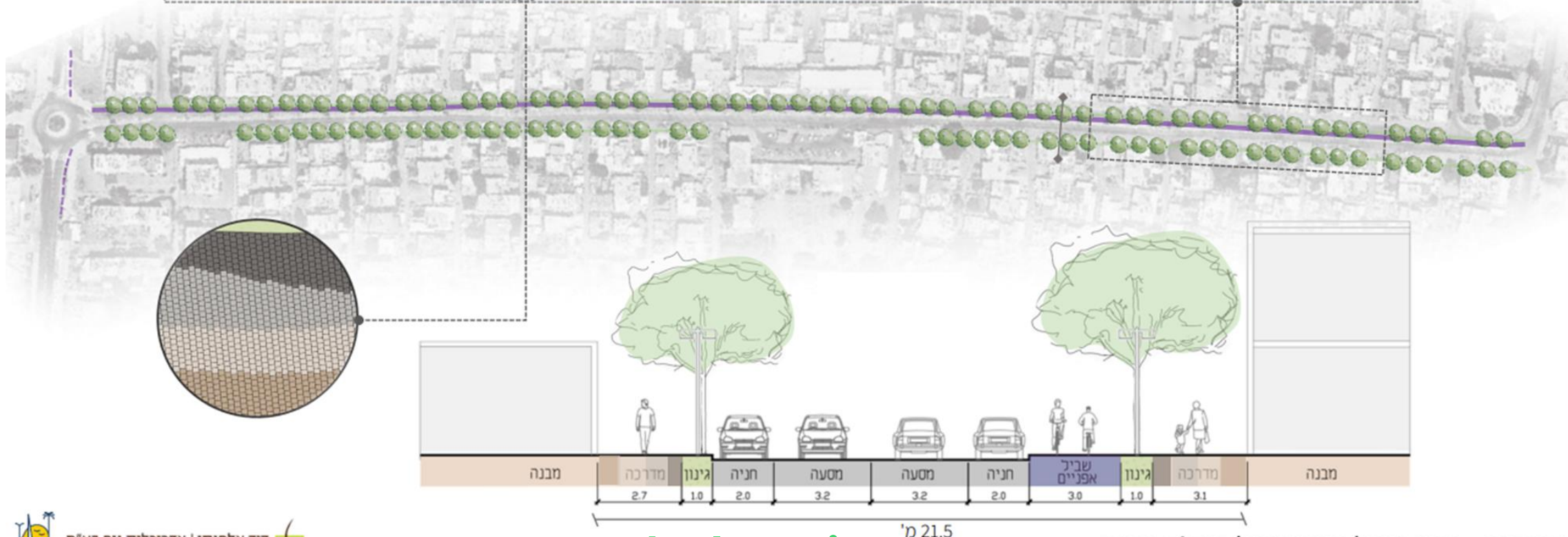
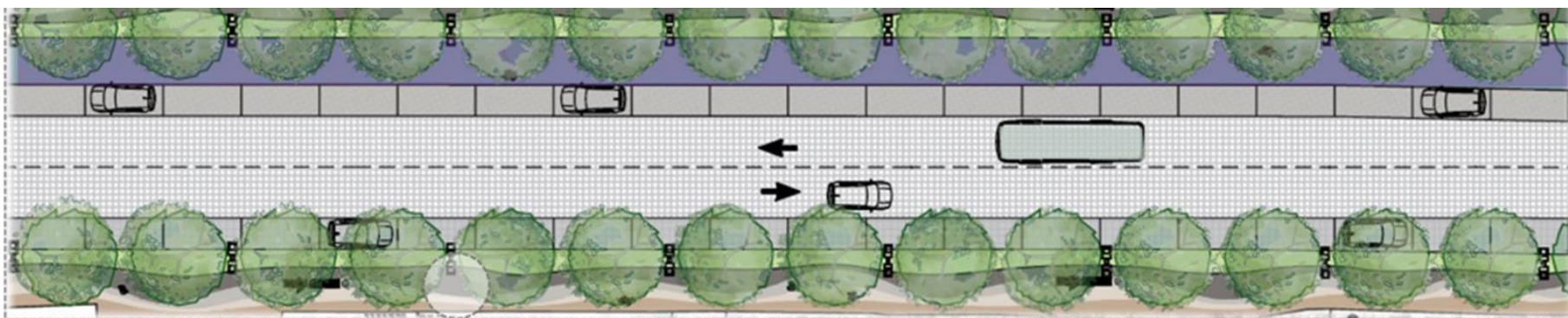
From Survey To Solution | Smart climate biased planning





Current State

קריית ים - רחוב ויצמן | ניתוח פיזי | עצים קיימים בסביבת התכנון



Suggested planning

קריית ים - רחוב ויצמן | תכנון מוצע | הגדלת הרחוב



תנועת הולכי רגל

מוקד פעילות

הפעל את Windows
יצוב עירוני
קרית ים

Walking planning

קרית ים - רחוב ויצמן | תכנון מוצע | תנועת הולכי רגל ומוקדי פעילות

Successful Mitigation Strategies Around The World



Athens: Increased green spaces, added sprinklers, and fountains, reducing temperatures by 6-7°C.



Seoul: Removed highways, restored streams, reduced temperatures by 3.6°C.



Cities like New York and Tokyo have conducted successful Urban Heat Island surveys, leading to significant temperature reductions and energy savings.



Paris: Reduced vehicle use, encouraged cycling, and used river water for cooling, reducing temperatures by 1°C.



Melbourne: Planting 70,000 trees by 2040, increasing tree coverage from 22% to 40%.

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