



# Building cooler, greener, healthier cities

Improving people's quality of life  
by designing sustainable cities.



# About us

ECOTEN urban comfort is an urban & environmental engineering consultancy based in Prague, Czech Republic. It was founded in 2017 and has been growing ever since.



**2017** Incorporation of ECOTEN urban comfort s.r.o.  
Founding Member of the World Alliance for Efficient Solutions

**2018** **Katerva Awards**  
Finalist for the Smart City Challenge - Selected among the top 100 applicants (out of 1000+)

**2019** Climathon by Climate-KIC, Vienna, Austria  
Onboarding with the Copernicus Accelerator

**2020** **Vienna Start-Up Package by Vienna Business Agency**  
• Selected among the top 10 applicants (out of 160+)

**Recommended by the European Commission's Joint Research Centre**  
• European Handbook for Sustainable Development Goals  
Voluntary Local Reviews - Best Practice - 13 Climate Action

**Awarded the Efficient Solution Label by Solar Impulse Foundation**  
• Selected among 1000 solutions worldwide that can protect the environment in a profitable way

**WORLD ALLIANCE**  
for EFFICIENT SOLUTIONS



# A word from the co-founders



Jiří Tencar

*CEO*

Ph.D. in Sustainable Development and Industrial Heritage from the Czech Technical University in Prague. Passionate about green building and architecture, energy efficiency and optimization for buildings, engineering design for smart buildings, resiliency and adaptation to climate change impacts for smart cities.

“Empowering cities to take action against extreme heat. As cities grow in size and population, municipalities will need to invest appropriately in urban environmental projects to make their cities resilient to climate change.”



Sagnik Bhattacharjee

*CTO*

Graduate with a Masters in Urban Environment from Ecole Centrale Nantes. Passionate about urban resilience to climate change impacts, environmental impact in urban ecosystem, Nature-Based solutions to mitigate the impact of climate change in cities.

“With the help of cutting-edge technologies such as microclimate simulations and earth observation, we help cities make the best decisions to support their heat mitigation policies which would ultimately provide the citizens with a better quality of life.”



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# Mission

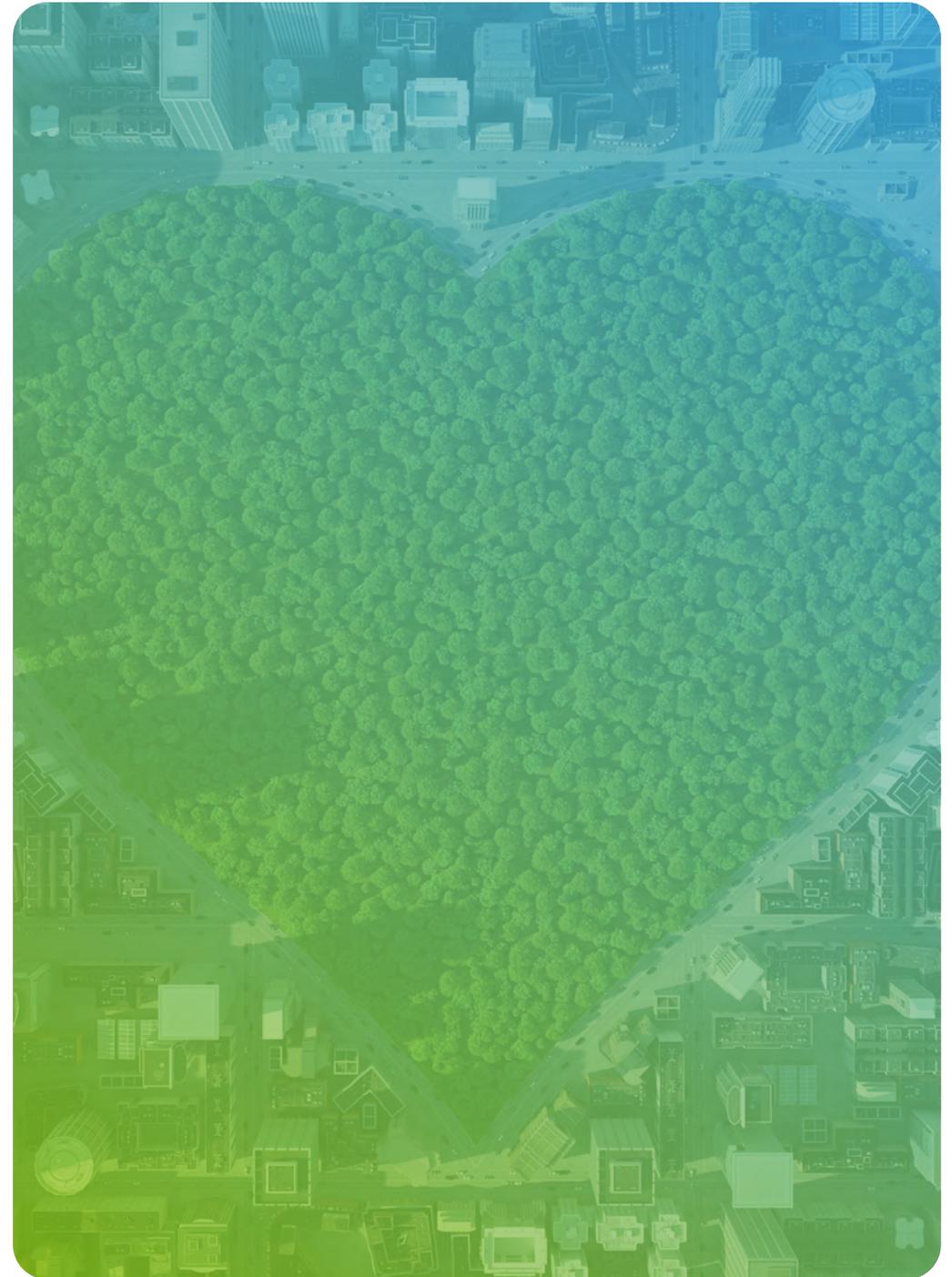
At ECOTEN, we have made it our mission to accompany the various urban stakeholders towards impactful climate action. Through a technical data-driven approach.

We strive to improve people's quality of life by designing greener, cooler, healthier cities.

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# Vision

We are convinced that the future of our planet will depend on the ability of our cities to adapt, and we must use everyone's potential to build those **resilient cities**.





## The company

The company was co-founded by Dr. Jiri Tencar, Sagnik Bhattacharjee and Clément Imbert with the ambition to design „cooler“ cities for an optimal quality of life in a rapidly changing urban environment. Our services are tailor-made for our clients and evolve according to their needs but the challenges we address are centred around public health improvement, energy savings and sustainable design for the built environment.



— Sustainable Development Goals

# Our services

The urban population of the World has grown rapidly from 751 million in 1950 to 4.2 billion in 2018. And is projected to reach 6.7 billion by 2050 according to the UN. Cities getting denser and warmer exacerbates the phenomenon of Urban Heat Islands and worsens the consequences of extreme heat events.



## CLIMATE CHANGE EFFECTS and CONSEQUENCE



OUR SERVICES

# Urban Heat Resilience

Through the use of sociodemographic and geospatial data, we are mapping cities to highlight where cooling infrastructures are needed to slow down the warming.

The Urban Heat Vulnerability Assessment enables decision-makers to implement more efficient heat mitigation strategies to protect the citizens and provide a pleasant urban environment.

A

# Case study: City of Vienna

The value of our mapping tools lies in our ability to cross-analyse different data sets:

## Exposure Index Map

The level of exposure to higher temperatures

## Sensitivity Index Map

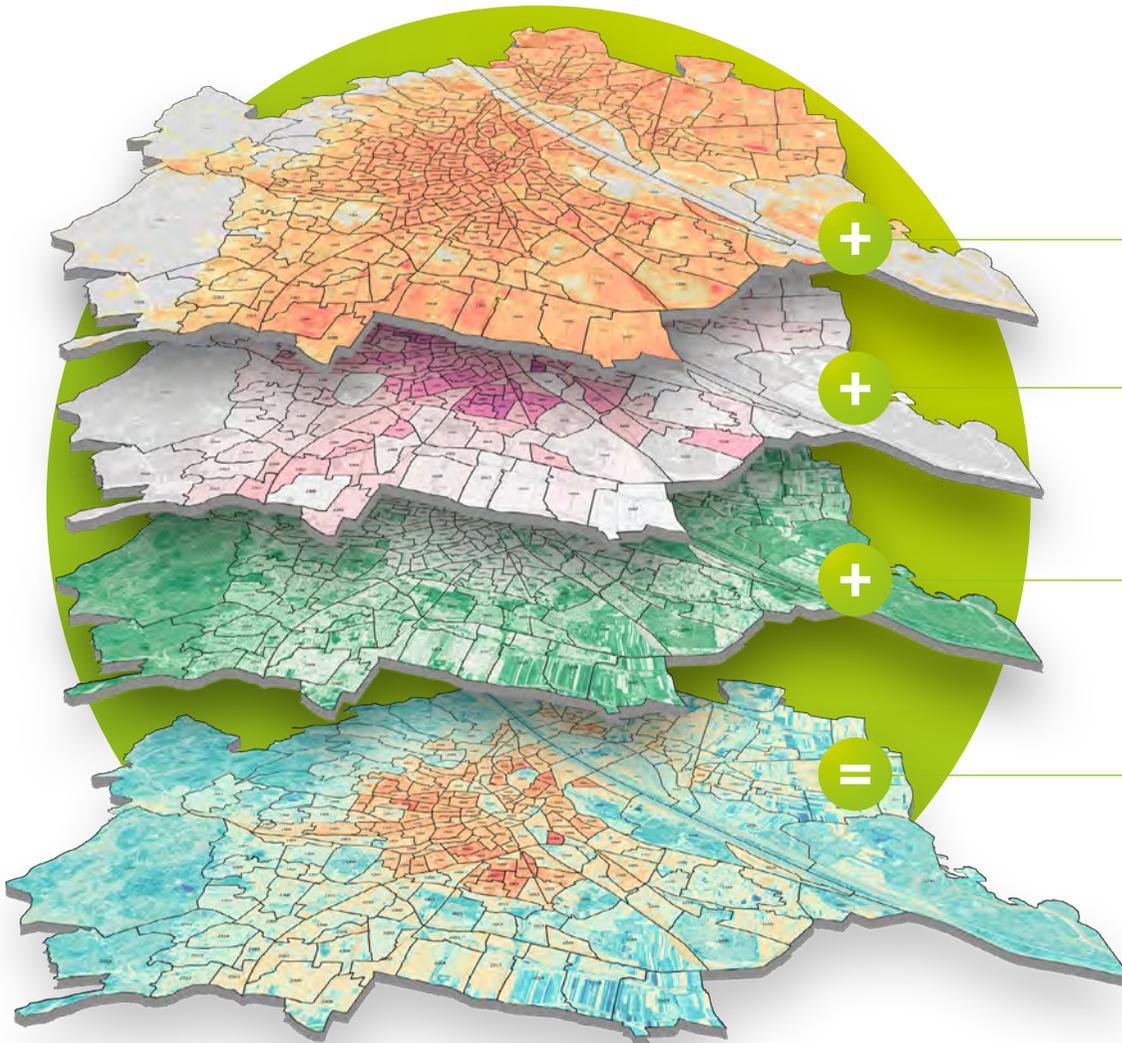
The density of vulnerable population in districts to extreme heat (children and elderly citizens)

## Adaptive Capacity Index Map

The level of existing heat resilient infrastructures (blue-green infrastructures, health care, building conditions and other)

## Critical neighbourhoods identified

Neighbourhood ranking according to the Urban Heat Vulnerability Index initiated Cool Street Plus Project.



OUR SERVICES

# Our guidance

Our urban environmental engineers recommend nature-based solutions adapted for the urban morphology to cool down critical hotspots.

Nature-based solutions for urban designs (NBS)

B



## Breathable cities

Implementation of vegetation (trees, grass, green roofs and walls), creating protective shadows and evapotranspiration.



## Fresh cities

Implementation of water bodies within urban areas, acting like a heat captor helping to cool the city and improve the quality of life.



## Livable cities

Implementation of different materials, colors, as well as shapes of structures and buildings helping to protect against the heat from solar radiation.





Material and colors

Grass

Building shapes

Humidification of roads

Waterbodies

Green roof and walls

Trees

## OUR SERVICES

# Urban Microclimate Simulations

We simulate different urban nature based solutions. We evaluate their impact over time and determine the most efficient strategies to implement in order to create resilience.

Using advanced 3D modelling technology and computational fluid dynamics, we provide microclimate simulations to help urban stakeholders better understand the impact of potential urban projects according to the following microclimate components over time:

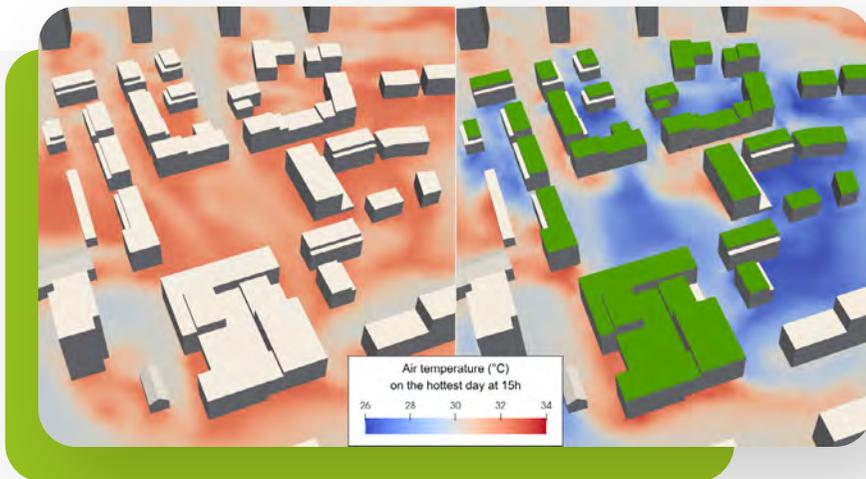
Sun radiation – Wind speed and direction – Humidity – Air temperature – Thermal Comfort



# Case study: Pardubice

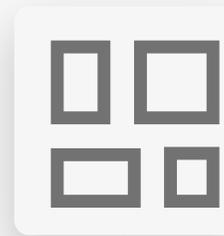
The value of our Microclimate Simulation tools lies in ability:

- To assess the evolution of the air temperature for both urban scenarios: the current situation VS the Blue-Green strategy, for a given area.
- To assess the impact of diverse urban projects on climate comfort levels. Measured by the Universal Thermal Climate Index (UTCI), what represents the level of heat stress felt by people.
- To assess the wind flow distribution of the wind coming from the direction of a Brewery to evaluate if the unpleasant smell from the Brewery is likely, or not, to be distributed across the developing urban area.



In this comparison between bared (left side) and cooled neighbourhood (right side), we are able to understand the air temperature variations. The green patches represent green roof on top of the buildings in the neighbourhood.

WITHOUT VEGETATION



31,8 °C

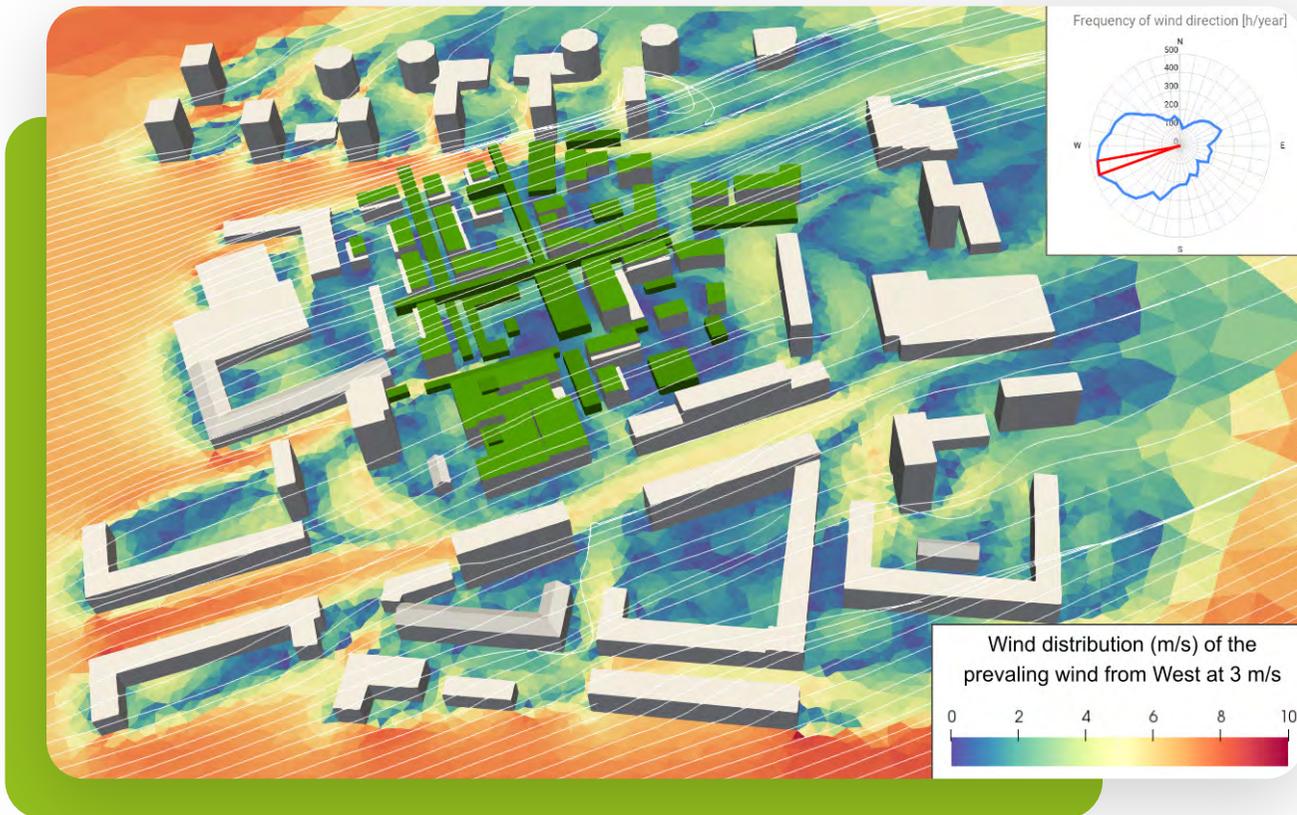
WITH VEGETATION



27,2 °C

VS

# Urban Microclimate Simulation



Simulating the most frequent wind, coming from West at the speed of 3 m/s, proved that inhabitants are fairly protected from brewery smell due to smart urban design.

# Application examples

## Thermal comfort

- Predict the impacts of Blue-Green-White urban design strategy upon the urban environment.
- Compare different design strategies helping cities to select the most efficient option.
- Assess the properties of innovative materials

## Wind safety

- Simulate the flow of wind and how it impacts the urban environment around a building.
- Optimally locate public transport stops
- Optimally locate wind turbines

## Solar Cadastre

- Assess the solar flux and determine the solar power potential of roofs and optimally locate solar panels



# Human-centered Climate Index

The Universal Thermal Climate Index (UTCI) is one such thermal comfort index based on human heat balance models and designed to be applicable in all seasons and climates and for all spatial and temporal scales.

## Micro-climate components



Radiation



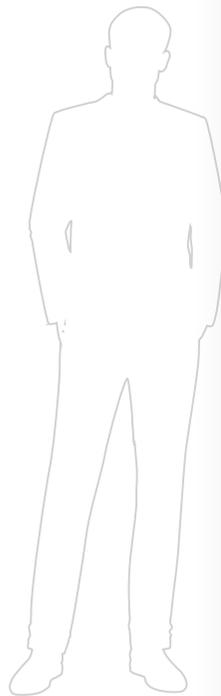
Wind speed and direction



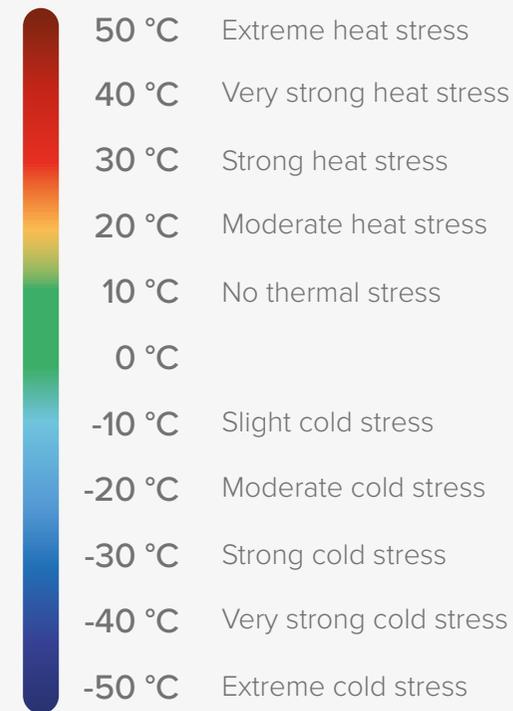
Air humidity



Air temperature



## Universal Thermal Climate Index



# Our scope of work

## WHO

Architects  
Urban Designers

Building Designers  
Infrastructure Engineers

Municipalities  
Urban Planners

Real Estate Agencies

## OFFER

Implementing and validating nature based building design strategies to reduce the problem of extreme heat in urban areas

Implementing and validating the impacts of innovative construction materials and design strategies on building and infrastructure projects

Urban heat vulnerability assessments, heat mitigation strategies, environmental recommendations and climate simulations

Assessments of climate change impacts such as heat waves and the urban heat island effect upon building and urban development projects

## YOU GAIN

- **Expertise**
- **The validation** of the project's resilience

- **Credibility**
- **Reliability** for the quality of your material or project

- **Time:** we help you take action now
- **Money:** projects are efficiently located
- **A better understanding** of how to take action

- **Expertise** with a complementary assessment
- **The validation** of the project's resilience

## What the experts say about us?



**Birgit Hebein**

*Climate protection deputy mayor of Vienna*

"For the first time we have a map that shows us where cooling is urgent and allows us to take specific measures."



**Nils Larsson**

*Executive Director, International Initiative for a Sustainable Built Environment (iiSBE)*

"This kind of modelling will be very useful for the work we are doing in performance assessment in small urban areas"



**Boguslaw Witkowski**

*Founder of Twon Planning Design and Architecture (TPDA Witkowski)*

"Very efficient tool, could integrate our global numerical city modelling program."



**Tomáš Ctibor**

*Founder and Executive Director at 4ct*

"We have been collaborating with ECOTEN in the field of sustainability and ecology and we are not surprised that Vienna chose to work with them as well."

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## What the media say about us?

### ORF.at

"Ecoten's analysis should help to defuse the heat spots and counteract the climate crisis in the short and long term through urban planning. „We now have a study that says that by 2050 our city will heat up by up to eight degrees," says Hebein. That is why rapid action is necessary."

### FPO-Wein.at

"The heat map created for Vienna by the start-up ECOTEN impressively confirms many years of warnings given by the FPO-Ottakring."

# Contact

Find out about our various projects and how our approach enables local authorities, urban development stakeholders to co-build the Cities of Tomorrow.

## Address

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## We are also online

-  [www.urban-comfort.eu](http://www.urban-comfort.eu)
-  [ecoten](#)
-  [ecoten-urban-comfort](#)

