
# Urban Heat Islands Adaptation & Mitigation

## Why and how?

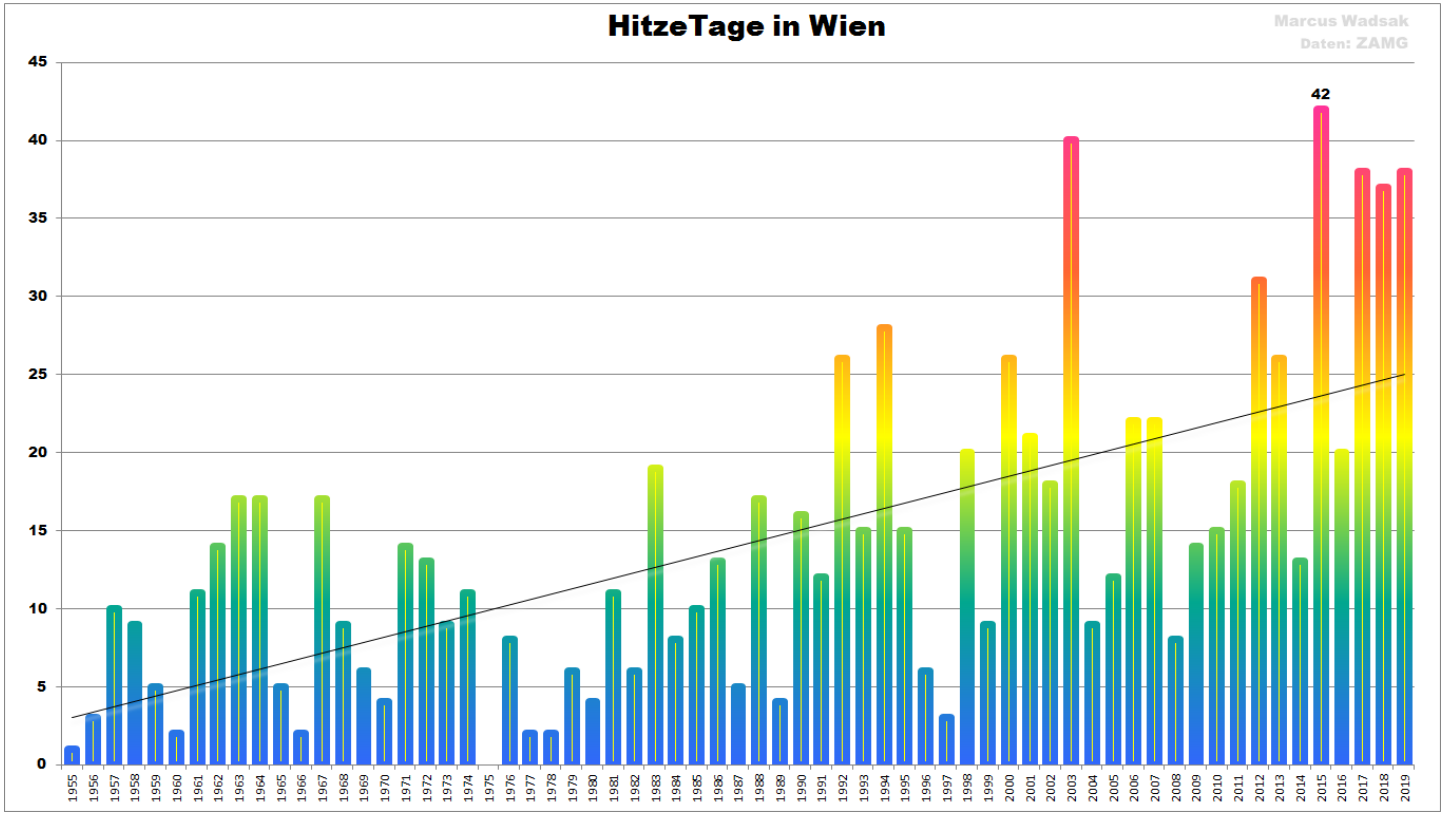
stand-up innovation #5 TOMORROW LIVING

IBA WIEN

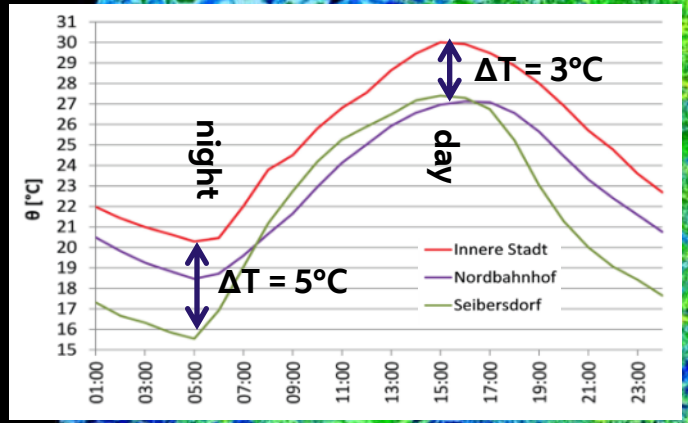


Stadt Wien Umweltschutz

# Climate Change & Urban Heat Islands



# Climate Change & Urban Heat Islands




***Average hourly temperature distribution***
*Urban / rural area*
*Source: Vienna University of Technology*

***Thermal image** of Vienna, MA 22, 2001*



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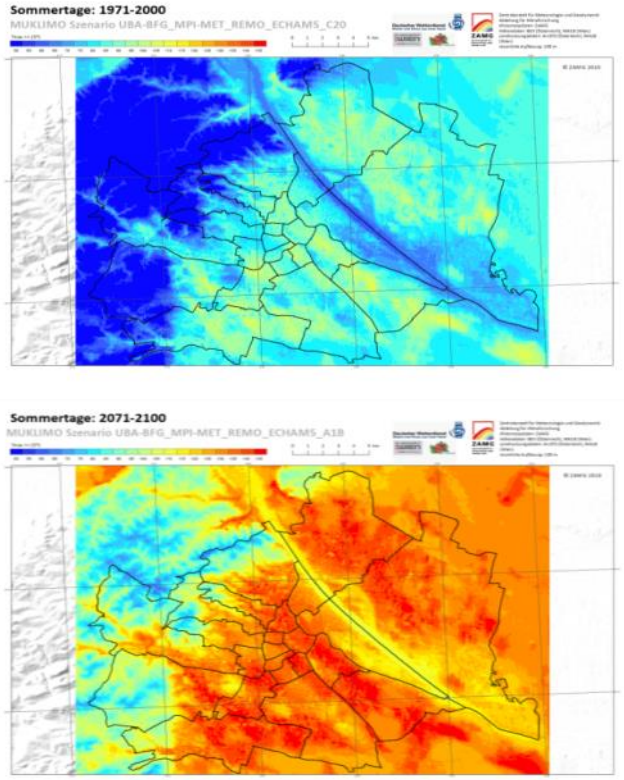
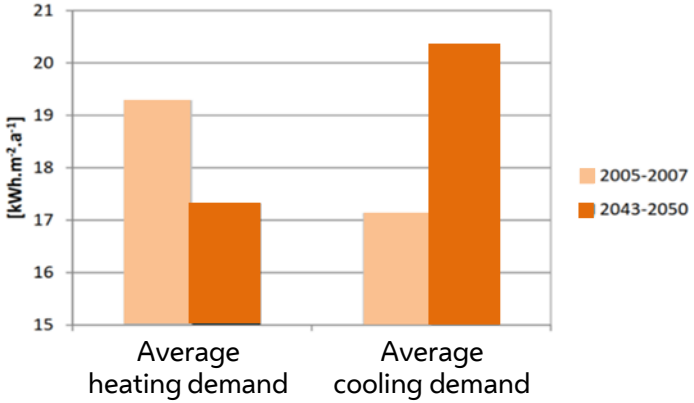
# Climate Change & Urban Heat Islands




Energy supply for heating and cooling during cooler and hotter years - today and in the future (Source: AIT)

MUKLIMO Scenario
Reference Simulation 1971–2000 (top left)
and A1B-Szenario 2071–2100 (bottom left)
(© ZAMG)

# Urban Heat Islands

**Causes and ways to offset them:**

**Sealing: → lack of evaporation cooling**

**Dark surfaces → high radiation absorption**

**High density materials → heat storage**

**Lack of vegetation → no evapotranspiration**

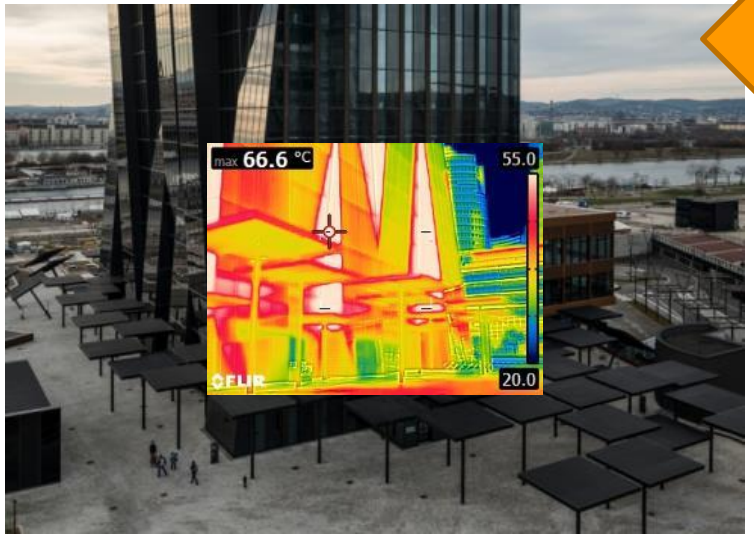
**Urban density → lack of ventilation**

**Waste heat**

# Climate[change]adapation „technical→ nature based “

## Green, Blue, Grey Infrastructure

### DC tower




© ArchiDaily / Dominik Perrault

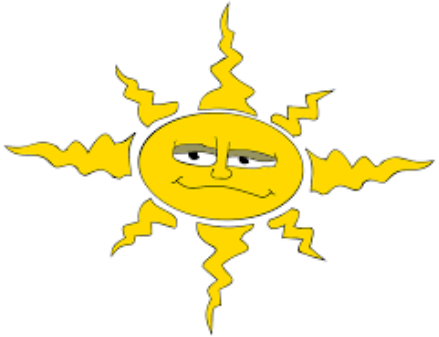
Different approach!

Radiation!
Wind!
Water balance!

### Biotope City

© schreinerkastler.at

# PET & driving factors



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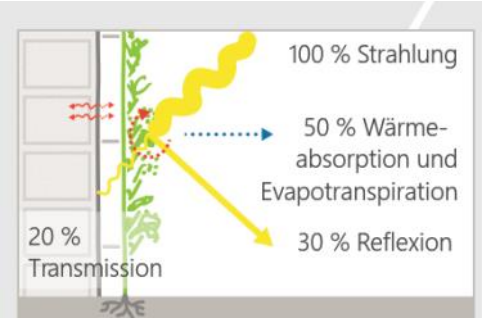
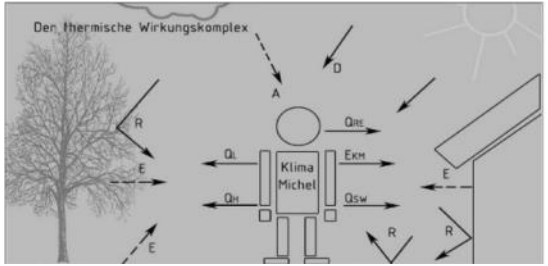



# PET ?




*Physiological equivalent temperature* (PET) is a human biometeorological parameter that describes the thermal perception of an individual.



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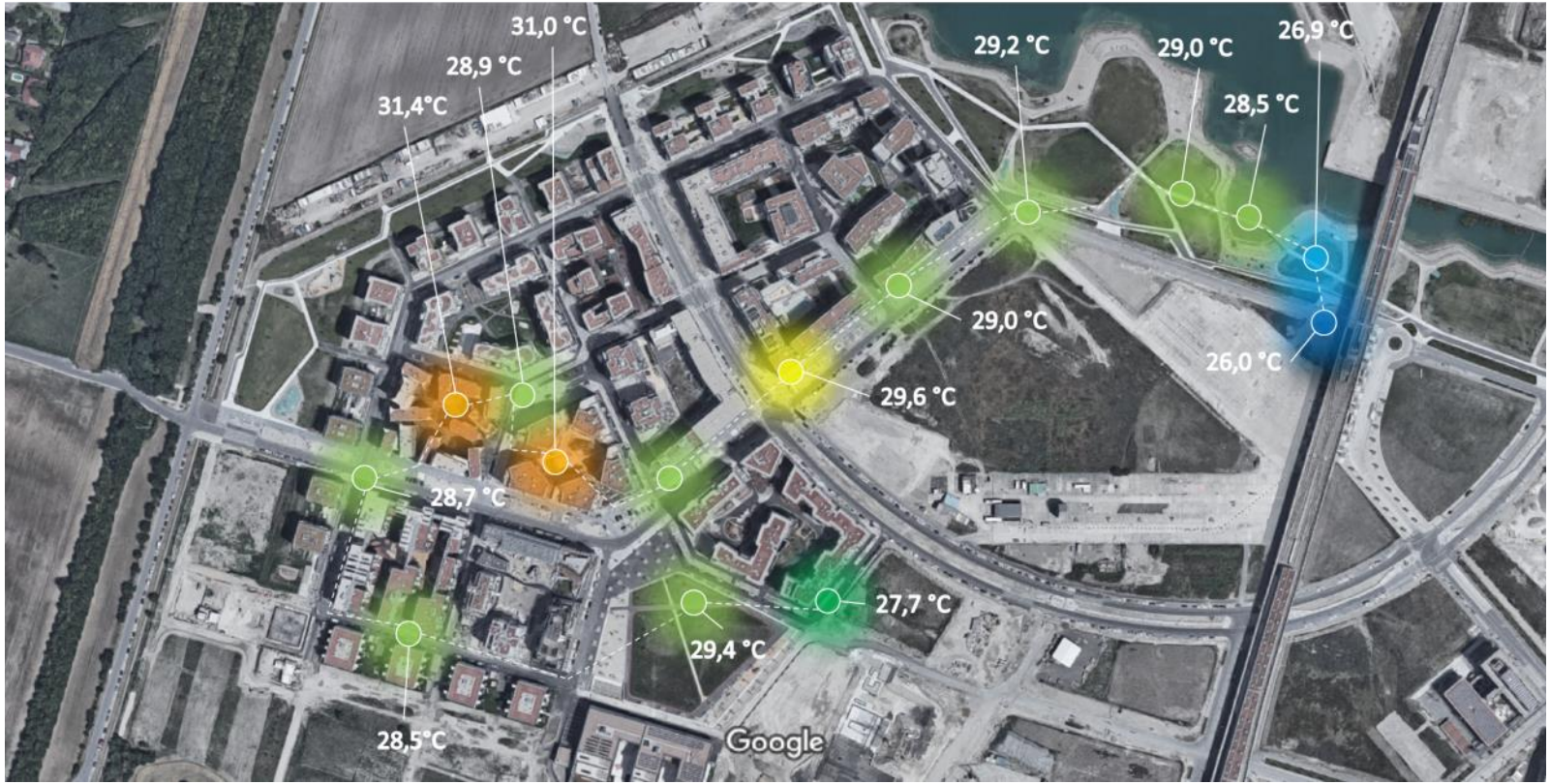
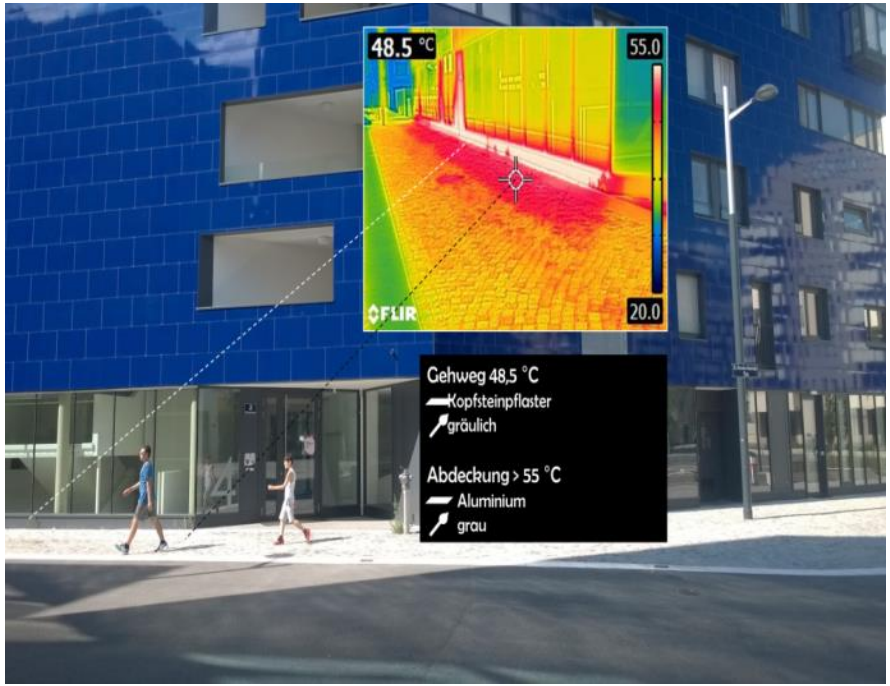
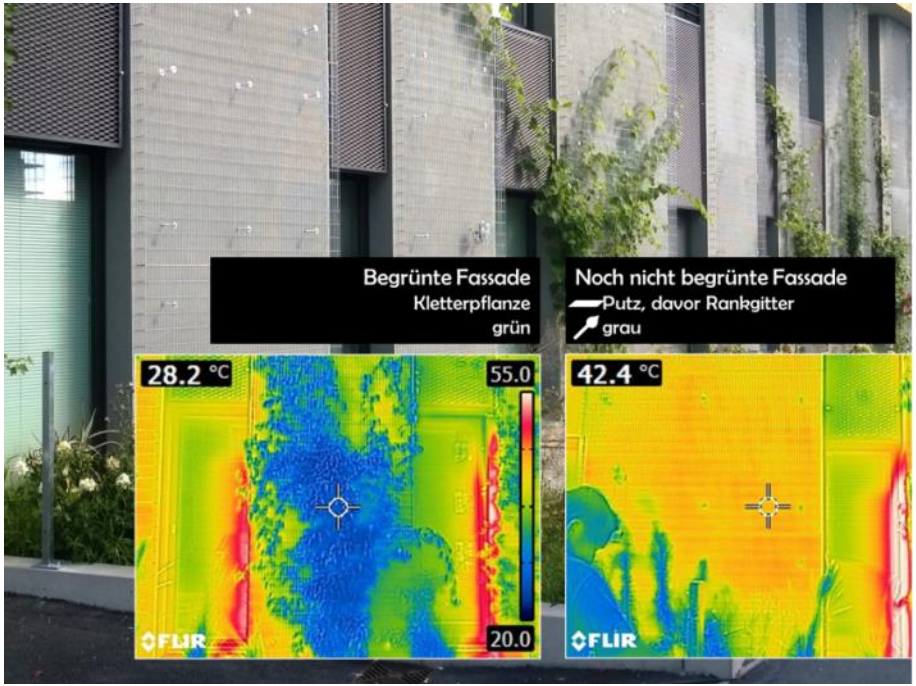
# Tracking UHI's: taking air temperatur

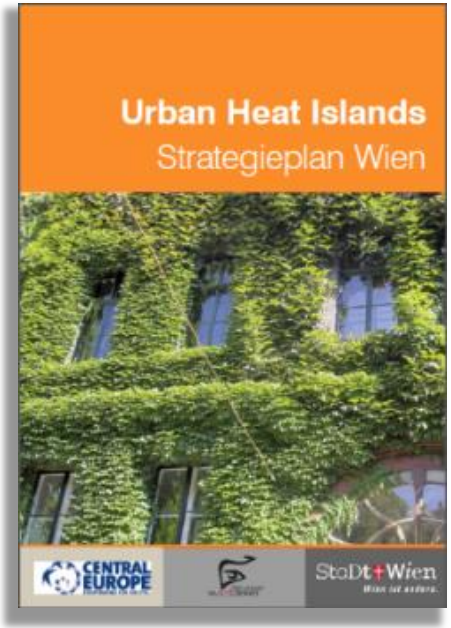


# Tracking UHI's: thermal photography



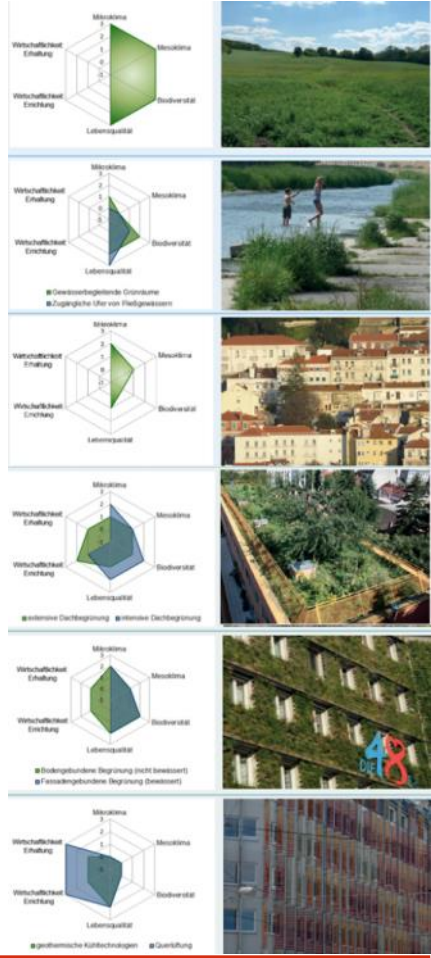
# Adaptation & Mitigation: How?




https://www.wien.gv.at/umweltschutz/raum/uhi-strategieplan.html

## MEASURES

- **Ventilation**, linking of **Green Spaces**
- Adjustment of **Town Structure** and shapes of city areas
- **Brightening the Surfaces** of e.g. pavements and streets, buildings
- Increasing the **Proportion of Green** in streets and open spaces
- **Greening and cooling of buildings**
- Increase of **Water** content in the city
- **Shading** of open spaces and paths
  - Cross-cutting issue!





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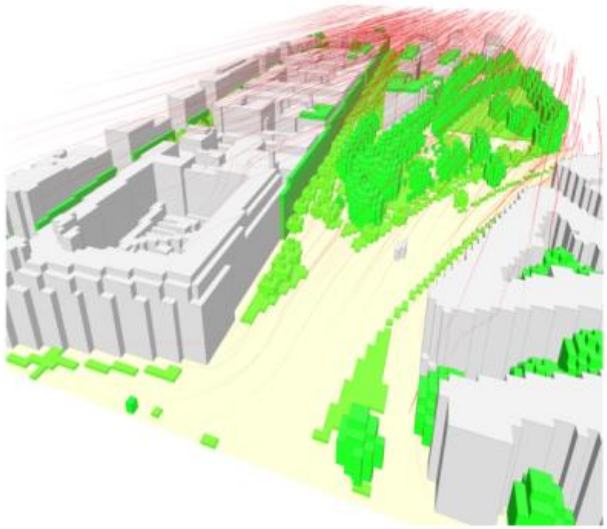
# Adaptation & Mitigation: How?

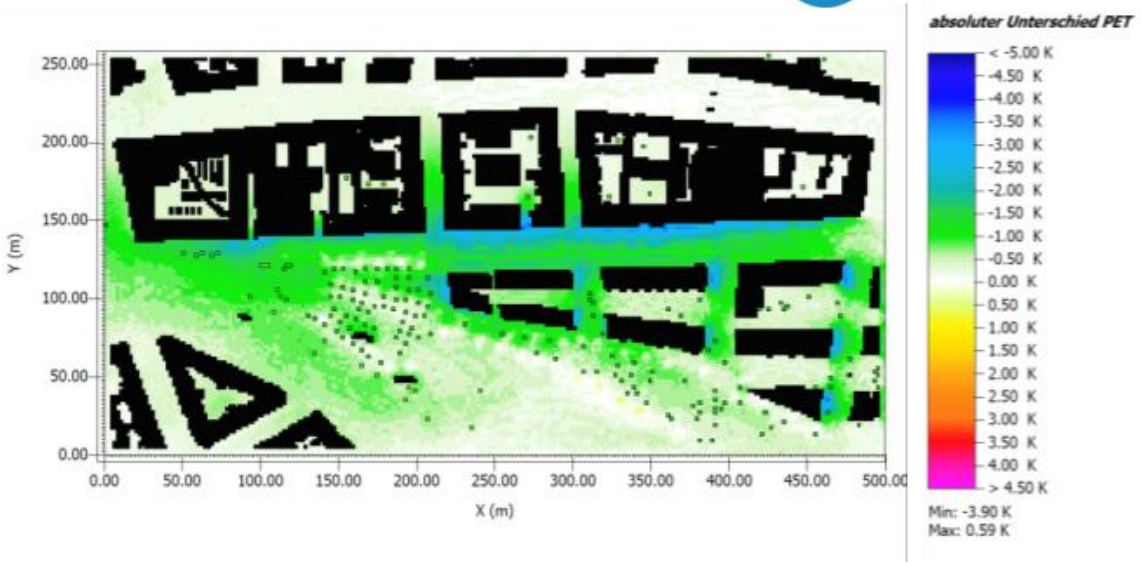
**Project Greening Aspang**

## PLANNING TOOLS: MICROCLIMATE SIMULATIONMODELS

eine Serviceseite des klima+ energie fonds



*ENVI-met Simulationsmodell*
*Szenario (Sohni, 2017)*




Differenze PET -3 °C at 10 pm

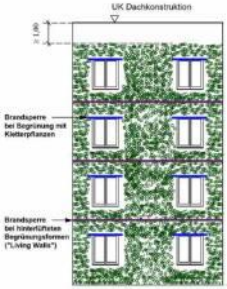
*(source: ENVI-MET 2017).*

# Greening facades – a challenge?


https://www.wien.gv.at/umweltschutz/raum/fassadenbegruenung.html

## INFORMATION WORK

- Introduction – meaning of urban microclimate, building physics properties
- Efforts and costs
- 14 FAQs
- Botanical basics, Technical basics including fire protection
- Systematics for facade greening
- Best practice examples




| Kosten | €/m² |
|---|---|
| € € € € | > 1000 |
| € € € | 500-1000 |
| € € | 100-500 |
| € | < 100 |

# Greening facades – a challenge?

Soil - trough - living walls

# Greening facades – a challenge?

## Different requirenments:

- Environment (temperature, wind, exposition, precipitatoipn…)
- *Building physics, statics, construction…*
- *Ownership (acceptance, commitment…)*
- *Maintenance (irrigation, cutting, fertilization…)*
- *Conservation (material  inspection…)*
- ***Regulations** (building act, traffic act…)*
- Civil law provisions (tenancy law, civil law..)

# Legislative framework:

**Vienna Building Regulation (Amendment 2019):**

Obligations for greening of roofs **and facades (New!).**

Landuse /zoningplan: Settings with general or specific conditions:

*"In case of **new buildings***

*with a fixed building height …. (7.5 m - 26 m), …*

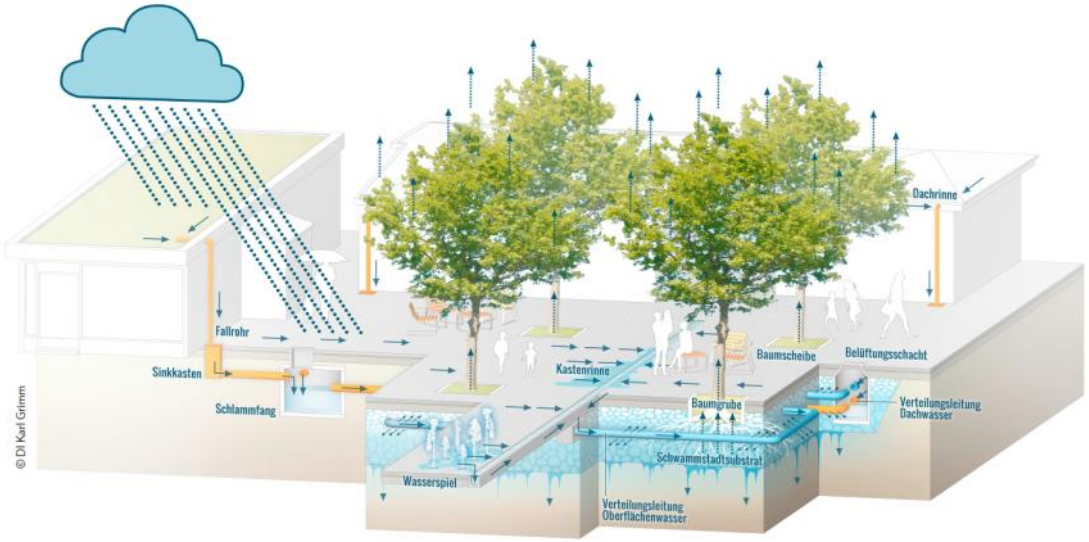
***fronts have to be greened to at least 20 per cent***

*of the relevant front surface, according to the state of the art."*

# Blue Infrastructure – a challenge?

## Johann Nepomuk Vogl Platz

Redesign of Johann-Nepomuk-Vogl-Platz: The redesign is finished. Around 800 m² of space and 150 m² of roof area will be drained from market stalls into the root area of trees and there will be no winter road clearance with the use of salt. This is indicated with an information board. The professional creation of the root space or retention area for water as well as the substrate for the trees was supervised by Karl Grimm on behalf of MA 42.

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EFRE Europäische Union Investitionen in Wachstum & Beschäftigung. Österreich.

# Funding sources & Information Work: „Cool Vienna“

- Promotion of the city of Vienna for **roof, - inner courtyard & facade greening** up to a maximum height **20.200 / 3.200 / 5.200 Euro.**
- „Cooler Bezirk: **5,6 + 8 Mio €** for UHI measures, tree planting
- Wohnfonds Wien: Subsidised housing, ecological measures included
- Oekobusiness Wien: Consultation „Firmengrün“ **480 €** - Co-financing for companies
- Umweltberatung Wien: Eco Counselling NPO awareness rising activities, Telephone holine
- Innovationslabor GrünStatt Grau: professional support
- 150 Grüne Häuser

# The message….


**Keep Cooling, care for biodiversity!**