

# **GREENPASS<sup>®</sup>** **REFERENCE** **BOOK**



**climate-proof urban development and architecture**

## **GREENPASS GMBH**



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[www.greenpass.at](http://www.greenpass.at)



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[/enablinglivablecities](https://www.facebook.com/enablinglivablecities)



[/greenpass-enabling-livable-cities](https://www.linkedin.com/company/greenpass-enabling-livable-cities)



[/greenpass-enabling-livable-cities](https://www.youtube.com/channel/UC...)





# ENABLING LIVABLE CITIES





# URBAN CHALLENGES

NOWADAYS

# 6

**GREENPASS® is covering up to main urban challenges:**



**Climate**



**Water**



**Air**



**Biodiversity**



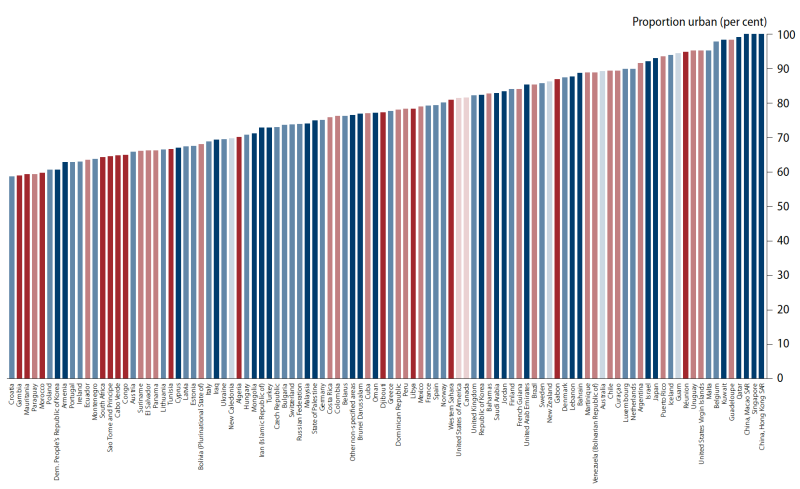
**Energy**



**Cost**

## Soon 4 of 5 EU citizens will live in cities

While urban growth accelerates worldwide, urban areas are getting more and more vulnerable to climate change. Urban Heat Islands (UHI), air pollution and pluvial flooding are major threats to urban neighbourhoods and the health and wellbeing of citizens.



Note: Countries or areas with 90,000 inhabitants or more in 2014.

Source: United Nations - World Urbanization Prospects (2014)



# IMPACTS

## ON HEALTH AND WELL-BEING

**766**

**HEAT vs. TRAFFIC  
RELATED DEATHS**



**2018**

**400**

In the year 2018 - Austria had almost twice as many heat related deaths (766) than traffic related deaths (400) - trend continuing.

Source: AGES/Statistik Austria



# CLIMATE RESILIENT URBAN DEVELOPMENT AND ARCHITECTURE

Picture: Office Building from Viennese Municipality Department for Waste (MA48)





48 ER

48

48  
Für Wirtschaft,  
Straßenreinigung und  
Stadtpark

5. Einsiedler-  
gasse

1. Haupt-  
platz



**GREENPASS**® is the **1<sup>st</sup> all-in-one** Software-as-a-Service (SaaS) **solution** for **climate-proof** urban development and architecture **worldwide** - powered by **ENVI-MET**.

The **GREENPASS**® **toolbox** consists of 3 **easy-to-use** and **standardized** tools, tailor-made for **each stage** and applicable at **all levels & types** of urban planning and design: from entire cities to individual objects, both for **retrofit** and **new developments**.

The innovative technology has been **scientifically developed** in the course of several international R&D projects in the last **9 years** and successfully applied by more than **35 national and international projects**.



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# SaaS

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## Software as a Service



### PLANNING

of climate-resilient urban development and architecture



### OPTIMIZATION

by enhancing cost-effectiveness and performance of projects



### CERTIFICATION

by offering the 1<sup>st</sup> international certification standard for climate-resilient urban development

**GREENPASS**® enables developers, urban planners, architects and municipalities to evaluate, optimize and certify development projects regarding 6 main urban challenges - ensuring climate-resilience and cost-efficiency.

**GREENPASS**® serves as an evaluation and steering instrument for municipal authorities, allowing e.g. urban development plans and design competitions to be aligned with climate change adaptation targets.

**+ 35 projects**  
in more than 5 countries

**01**

## Assessment

Fast and rough check of a project's potential climate performance in preliminary design phase.

**COMING SOON**

**02**


## Pre-Certification

Comprehensive information about a project's most important key performance indicators providing a reliable basis for design competitions and evidence-based decision making.

**03**

## Certification


Ongoing optimization and official certification of a project's climate-resilience (including a full range of indicators) to deliver the best results on climate efficiency performance and return on investment.



**Design check based on database analysis**

**5 Key Performance Indicators**


- Thermal Load Score
- Thermal Comfort Score
- Thermal Storage Score
- Run-off Score
- Carbon sequestration Score
- Thermal performance
- Wind resistance
- Shading area
- Evapotranspiration
- Albedo
- Radiation
- Leaf Area
- Investment cost CI
- Maintenance cost CI
- Water demand
- Cooling degree hours
- and many more



**Project evaluation based on quick ENVI-met® simulation**

**12 Key Performance Indicators**

- Thermal Load Score
- Thermal Comfort Score
- Thermal Storage Score
- Run-off Score
- Carbon sequestration Score
- Thermal performance
- Wind resistance
- Shading area
- Evapotranspiration
- Albedo
- Radiation
- Leaf Area
- Investment cost CI
- Maintenance cost CI
- Water demand
- Cooling degree hours
- and many more



**Full project optimization and certification**

**28 Key Performance Indicators**

- Thermal Load Score
- Thermal Comfort Score
- Thermal Storage Score
- Run-off Score
- Carbon sequestration Score
- Thermal performance
- Wind resistance
- Shading area
- Evapotranspiration
- Albedo
- Radiation
- Leaf Area
- Investment cost CI
- Maintenance cost CI
- Water demand
- Cooling degree hours
- and many more

# COST

## DYNAMIC AND TRANSPARENT PRICING-SYSTEM

Cost-Sample		
Tool	Project Area	Fee*
<b>02 - Pre-Certification</b>	5.000 m <sup>2</sup>	€ 7.650,00
	10.000 m <sup>2</sup>	€ 11.400,00
<b>03 - Certification</b>	5.000 m <sup>2</sup>	€ 12.500,00
	20.000 m <sup>2</sup>	€ 25.150,00

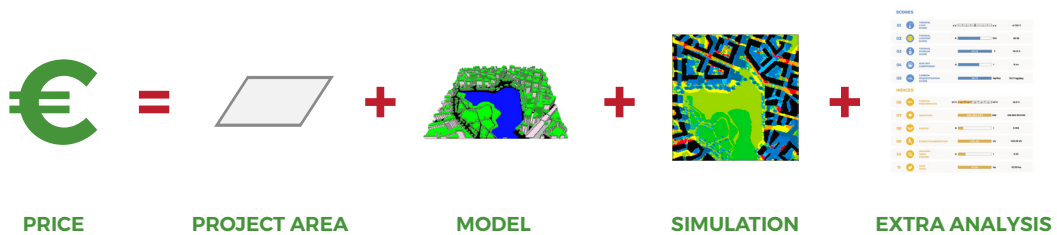
\* fee is based on criteria checklist and project parameters

The **GREENPASS**® Services are based on a dynamic and transparent price-model-system, based on the size of **project area** and the following base parameters:

- **Model** (topography, complexity, ...)
- **Simulation** (scenarios, optimization, ...)
- **Analysis** (extra analysis, ...)



### CRITERIA CHECKLIST



# CUSTOMERS

## NATIONAL AND INTERNATIONAL

We've already realised and optimized more than 35 national and international projects with several top architectural of-

fices, small and large building developers as well as municipalities and large cities.

### ARCHITECTS

**STUDIOVLAY**  
ZT-GMBH

Rüdiger  
Lainer+  
Partner **RLP**

**F+P**  
Architekten

CHRISTIAN  
ANTON  
PICHLER  
ZTGMBH

BREATHE.EARTH

**SUPERWIEN**  
architektur urbanismus

**u.m.a.**architektur  
ziviltechniker | gmbh

**MO**  
SER

**PRIOR**  
+PTNRS

**schluder**architektur

### DEVELOPERS

amadei**REAL.**

**ARE** AUSTRIAN  
REAL  
ESTATE

**ARWAG**  
Wohnen im schönsten Wien

**B.A.R.I.**  
UNTERNEHMENSGRUPPE

**BIG** BUNDES  
IMMOBILIEN  
GESELLSCHAFT

**BUWOG**  
group

**EGW**

**FLAIR**  
Real Estate

MEIN HEIM  
**GEDES**AG

**GESIBA**

**heimbau**

**Kallco**

**KÖPPEL**  
KALLINGER  
PROJEKTE

**KIBB**

**migra**  
WOHNEN. FÜHLEN. LEBEN.

**M**  
tischek

**nhg**

**ÖSW**

**PMP**  
IMMOBILIEN

**R**  
RHOMBERG

**SCHWARZATAL**  
GEMEINNÜTZIGE WOHNUNG- & FREIZEITANLAGEN GMBH

**WBV-GPZ**  
WOHNBAUVEREINIGUNG  
FÜR PRIVATANGESTELLTE

**SGN**  
wohnen

**WIEN SÜD**  
Wir gestalten Lebensraum

**WE**

### CITIES

**Stadt Wien**

**MA22** Mit unserer  
Umwelt

**wien3420**  
aspersen development AG

**wiener  
umwelt  
anwaltschaft**

**wohnfonds\_wien**  
fonds für wohnbau und städterneuerung

**STADT  
GRAZ**

**krems:energieautark**

**KLAGENFURT**  
AM WÜRTHERSEE

**Città di Segrate**

# TOP 5 PROJECTS



## PRE-CERTIFICATION

RANKING	PROJECT ID	PROJECT NAME	CUSTOMER	TCS
<b>1</b>	<b>AT-2018-008</b>	<b>GUSSHAUSSTRASSE</b>	<b>DEVELOPER</b>	<b>74.10</b>
2	AT-2019-006	POST CITY LINZ	ARCHITECT	73.25
3	AT-2018-007	SEESTADT 4405 OPT	CITY	72.37
4	AT-2018-004	GASWERKGASSE	DEVELOPER	71.37
5	UK-2019-001	SILVERTOWN QUAYS - PHASE I	DEVELOPER	66.44



## CERTIFICATION

RANKING	PROJECT ID	PROJECT NAME	CUSTOMER	TCS	DEGREE	DEGREE
<b>1</b>	<b>AT-2017-002</b>	<b>BIOTOPE CITY CCA</b>	<b>DEVELOPER</b>	<b>52.34</b>	<b>85 %</b>	<b>GOLD</b>
2	AT-2016-001	FLAIR IN THE CITY	DEVELOPER/CITY	45.62	79 %	GOLD
3	AT-2019-001	PENZ	DEVELOPER	62.26	54 %	SILVER
4	AT-2019-002	UNH	DEVELOPER	68.09	51 %	SILVER
5	AT-2018-009	ANGERER STRASSE	ARCHITECT	TBD	TBD	TBD







# PRE-CERTIFICATION



# EUROGATE II

ASPANGGRÜNDE | A-1030 VIENNA



**ID** AT 2016-003



**11** ha PROJECT AREA



**VIE** 48°11'18.4"N | 16°23'40.2"E



**CO** MUNICIPALITY & DEVELOPER



EUROGATE II Tender



EUROGATE II Urban design competition incl. microclimate proof



EUROGATE II Policy, land use plan & development plan



EUROGATE II Detailed design



EUROGATE II Construction Phase





**2**

**WEEKS  
TIME-OF-SERVICE**



**8**

**INTERNATIONAL  
DESIGN DRAFTS**



**AS**

**FACTBASED  
JURY SUPPORT**



## PROJECT RESULTS

**Thermal Comfort Score (TCS):** 20.60

For the project **EUROGATE II**, a **GREEN-PASS® Pre-Certification** has been applied within an urban development competition in the year 2016 as 1<sup>st</sup> microclimate competition proof in Austria/Europe.

The 8 design drafts had to consider microclimatic aspects in the competition, with focus on the building structure and orientation. The different drafts has been analysed regarding climate-resilience and finally ranked as fact-based decision support for the competition jury.



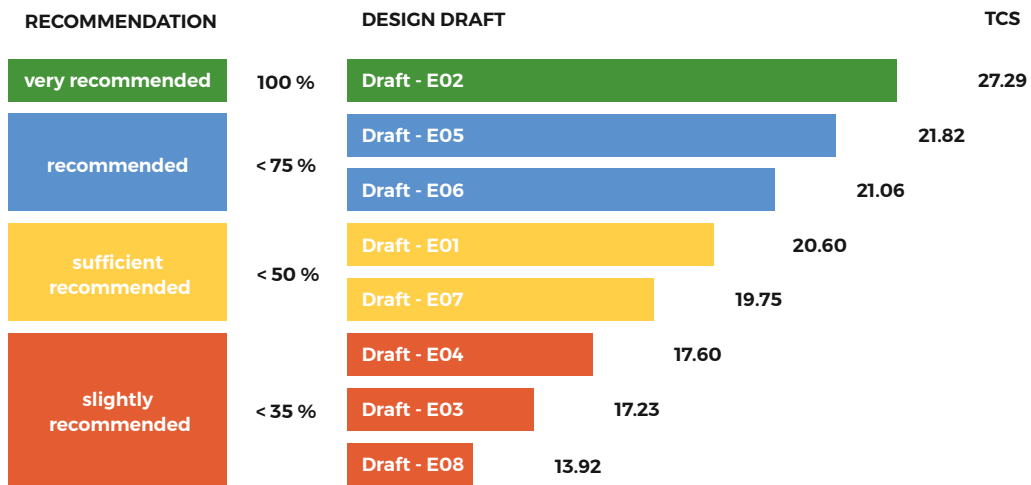
**1<sup>st</sup> MICROCLIMATE COMPETITION PROOF**



# EUROGATE II



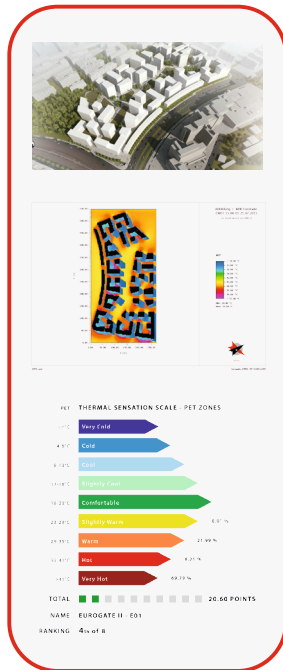
## Thermal Comfort Ranking



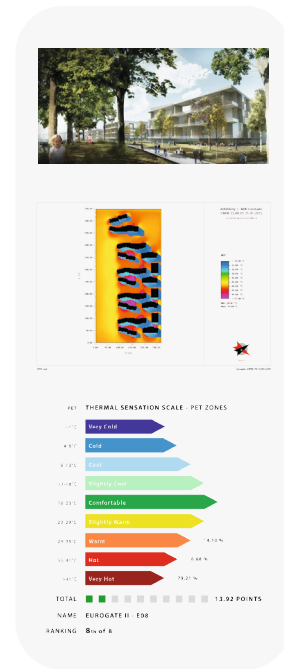
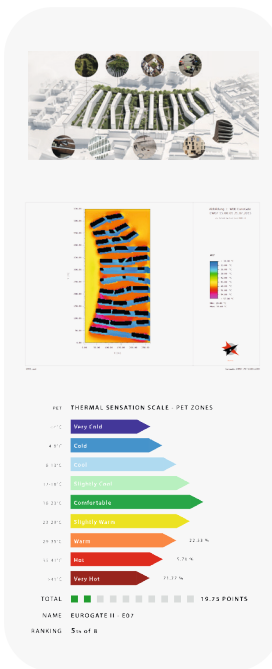
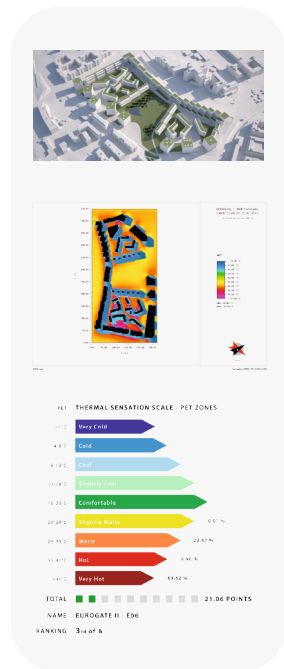
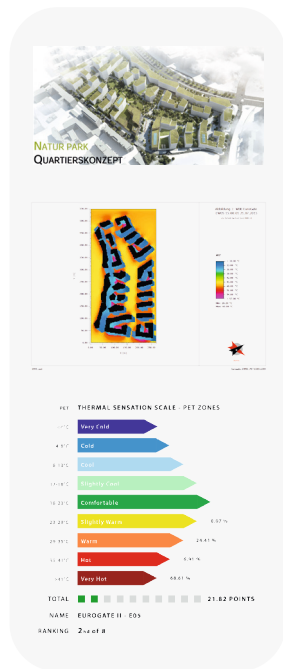
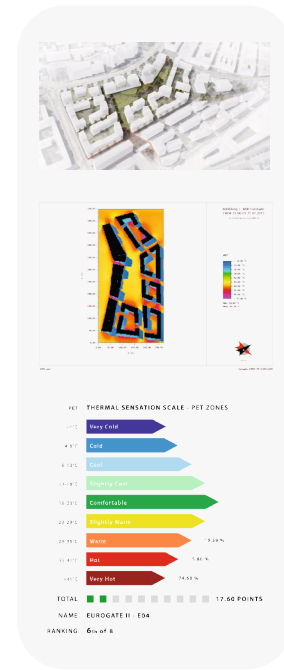
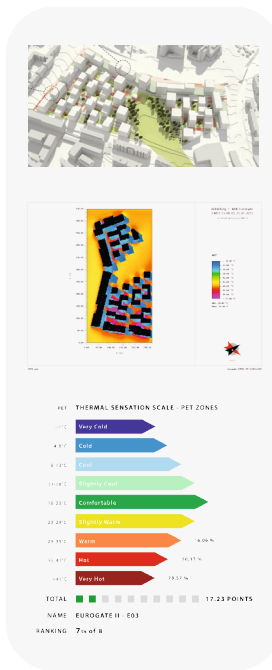
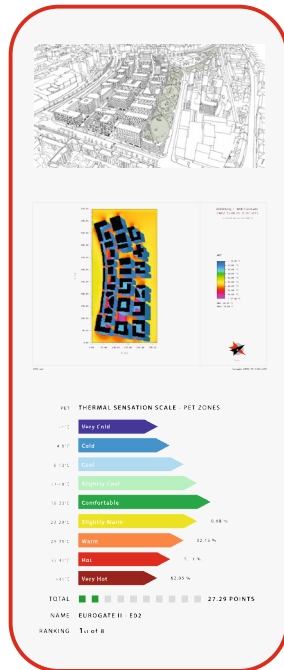


# DESIGN DRAFT EVALUATION AND RANKING

## Winner Total



## Winner Microclimate





# aspersn SEESTADT

SEETERRASSEN NORD | A-1220 VIENNA



**ID** AT 2018-007



**24** ha PROJECT AREA



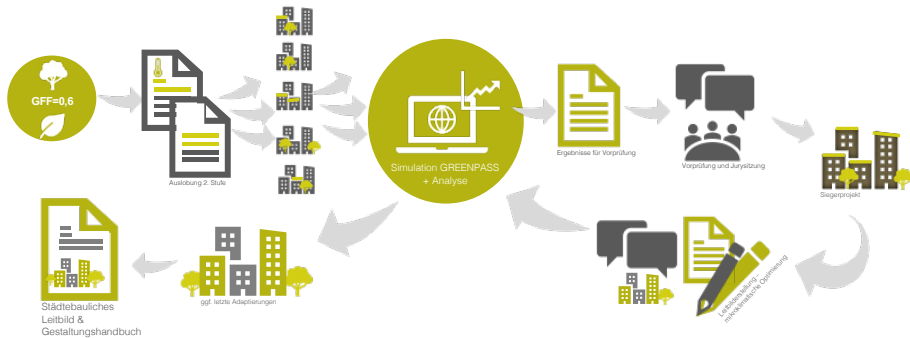
**VIE** 48.229207 | 16.506469



**3420** ASPERN DEVELOPMENT



**R&D** GREEN.RESILIENT.CITIES



wien3420  
aspersn development AG



RAUM  
POSITION.  
SCHREIBERS + ALLMEIER + ZIEGLER

GREEN 4 CITIES





**3**

**WEEKS  
TIME-OF-SERVICE**



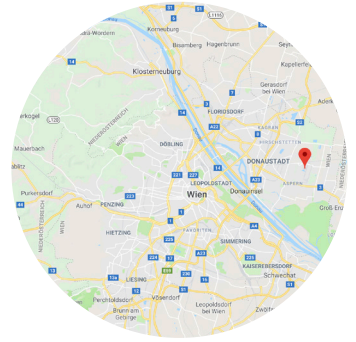
**6**

**DIFFERENT  
DESIGN DRAFTS**



**AS**

**FACTBASED  
JURY SUPPORT**



**2**

**PHASE  
COMPETITION**



**1**

**ITERATIVE  
OPTIMIZATION**

## PROJECT RESULTS

**Thermal Comfort Score (TCS):** 72.37

For the project **aspersn SEESTADT**, a **GREENPASS® Pre-Certification** has been applied within an urban development competition in the year 2018/2019 in the frame of the R&D project green.resilient.cities..

Microclimatic aspects has been officially defined in the tender and had to be considered by the 6 design drafts in the 2-phase competition phase. The different drafts has been analysed regarding climate-resilience and finally ranked as fact-based decision support for the competition jury. The winner has been optimized in an iterative process to the best performing draft.



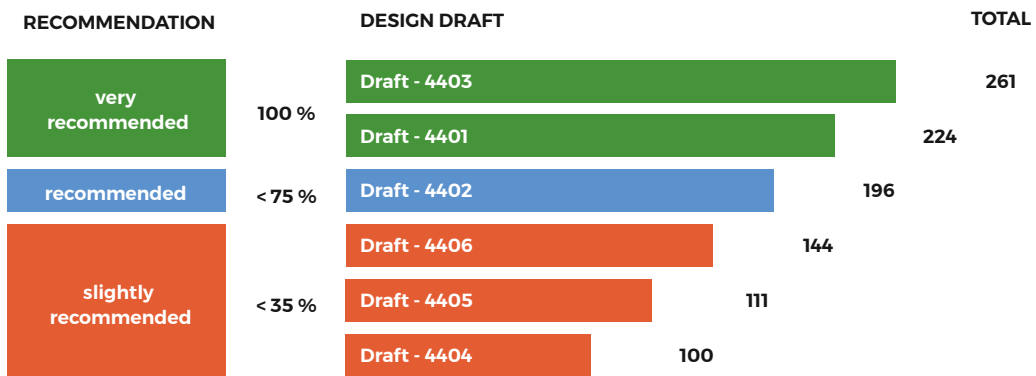
## COMPETITON TENDERS & RESILIENCE PROOF



# aspersn SEESTADT



## Thermal Comfort Ranking



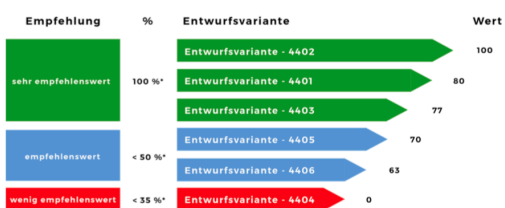
### 01 | TLO - THERMISCHER ABLUFTSTROM WERT



### 02 | TCS - THERMISCHER KOMFORT WERT



### 03 | TSS - THERMISCHER SPEICHERFÄHIGKEITS WERT



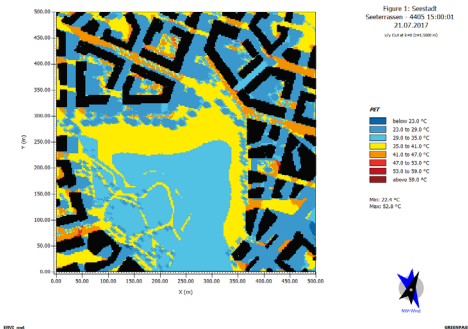




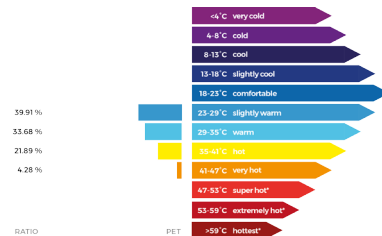
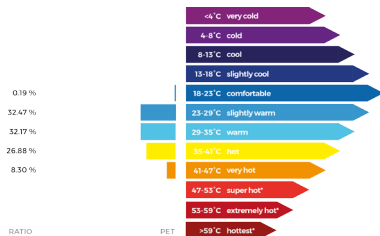
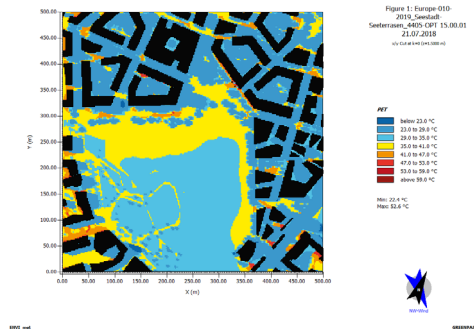
# DESIGN DRAFT OPTIMIZATION



## PLANNING



## PLANNING OPTIMIZED



**02 TCS TOTAL 66.98 PUNKTE**

NAME: Seestadt 4405

SZENARIO: Planung

AUSWERTUNG: Sommertag 15.00

ID: Austria-2019-002

TOOLBOX: GREENPASS® Pre-Certification

THERMISCHER KOMFORT WERT

**02 TCS TOTAL 72.37 PUNKTE**

NAME: Seestadt 4405 OPT

SZENARIO: Planung

AUSWERTUNG: Sommertag 15.00

ID: Austria-2018-007

TOOLBOX: GREENPASS® Pre-Certification

THERMISCHER KOMFORT WERT



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# GUSSHAUSSTRASSE

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GUSSHAUSSTRASSE | A-1040 VIENNA



**ID** 2018-008



**700** m<sup>2</sup> PROJECT AREA



**VIE** 48.197591 | 16.373003



**1** BUILDING DEVELOPER



**2**

**WEEKS  
TIME-OF-SERVICE**



**2**

**DIFFERENT  
DESIGN DRAFTS**



**3**

**REFERENCE  
SCENARIOS**



## PROJECT RESULTS

**Thermal Comfort Score (TCS):** 74.10

For the project **Gusshausstrasse**, an extended **GREENPASS® Pre-Certification** has been applied.



**AS OFFICIAL CLIMATE ATTEST FOR PERMISSION**



# GUSSHAUSSTRASSE



Abb. 2: Vergleich Thermal Load Score | Gusshausstrasse Varianten

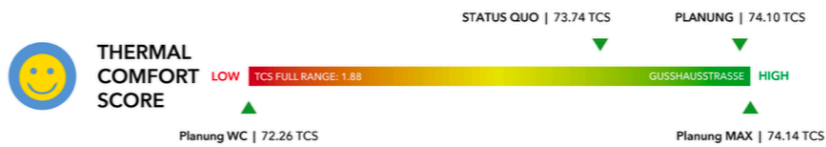


Abb. 3: Vergleich Thermal Comfort Score | Gusshausstrasse Varianten

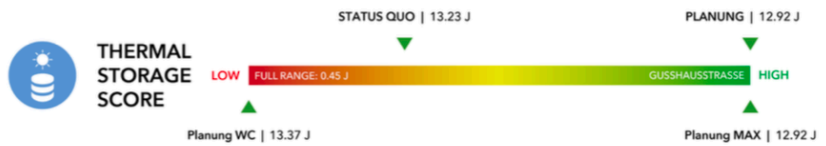


Abb. 4: Vergleich Thermal Storage Score | Gusshausstrasse Varianten

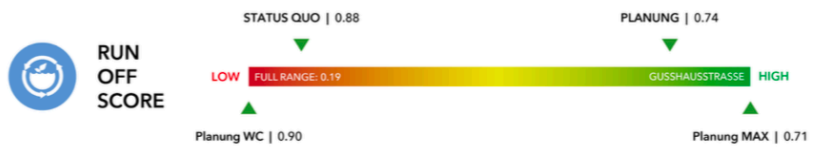


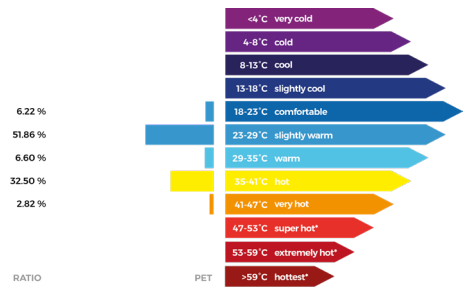
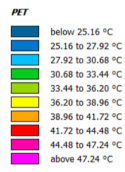
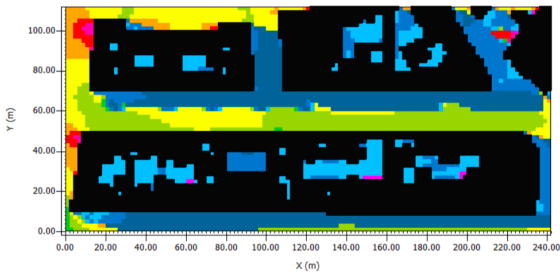
Abb. 5: Vergleich Thermal Run-Off Score Score | Gusshausstrasse Varianten





# BEFORE AND AFTER COMPARISON

Figure 1: Amadel Real - Gusshausstrasse - Planung  
15:00:01 21.07.2017  
x/y Cut at k=2 (z=1.5000 m)



**02 TCS TOTAL 74.10 POINTS**

**NAME** amadel Real Gusshausstrasse

**SCENARIO** Planning Status Quo Worst Case Best Case

**EVALUATION** Summer day 15:00

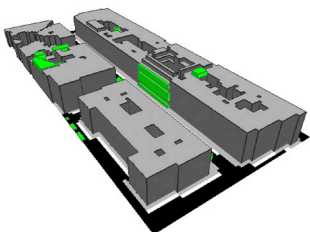
**ID** AT-2018-011 Clear Add Edit

**TOOLBOX** GreenPASS Pre-Certification

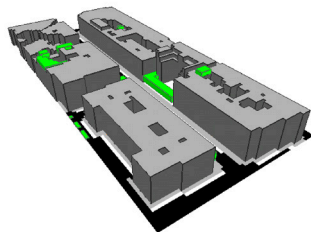
\* Thermal Comfort classes super hot, extremely hot and hottest have been set up for visual illustration and differentiation of hot temperatures in thermal images. They represent global measuring conditions but do not cover the reality of TCS.

ENVL\_met

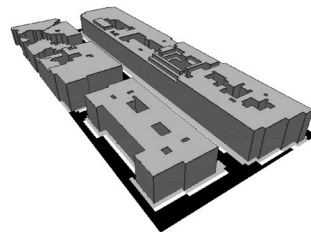
GREENPASS



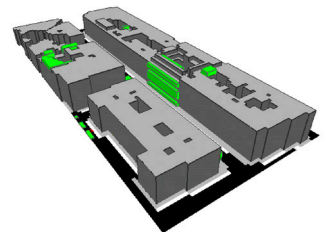
PLANNING



STATUS QUO



WORST CASE



BEST CASE





# CERTIFICATION



# CERTIFICATION

## FLAIR IN THE CITY

SCHERBANGASSE 3 | A-1230 VIENNA



**AT** 2016-001



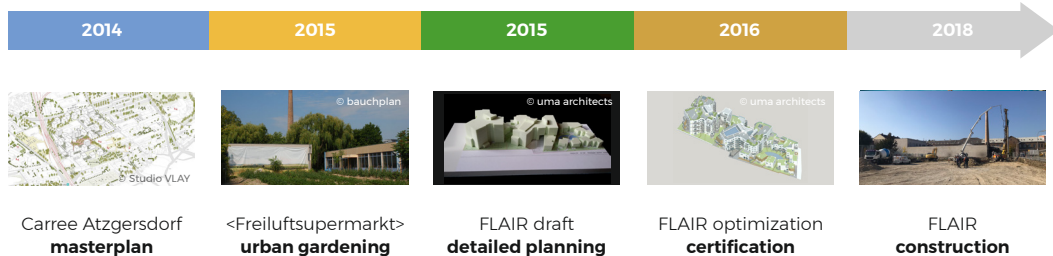
**0.6** ha PROJECT AREA



**VIE** 48°8'54.633"N | 16°17'34.953"E



**1** BUILDING DEVELOPER + MUNICIPALITY







**30**

**(NET) DAYS  
TIME-OF-SERVICE**



**1**

**ITERATIVE  
OPTIMIZATION**



**1<sup>st</sup>**

**OFFICIAL  
CERTIFICATION**



## PROJECT RESULTS

<b>Total Degree of fulfillment:</b>	79 %
<b>Thermal Comfort Score (TCS):</b>	45.62
<b>Run-Off Score (ROS):</b>	0.2

The project **FLAIR in the City**, is the worldwide first **GREENPASS® GOLD** certified project - since 2016.

The design draft from u.m.a. architects has been analysed in detailed design phase regarding 6 urban main challenges. Based on the results, the planning has been optimized in an iterative process with the architects and the building developer towards climate-resilience by considering costs.

The certificate has been an highly valuable bonus for the part-sale of the residential house system, to a sustainable and green investment fund.



**1<sup>st</sup> OFFICIAL GREENPASS® GOLD CERTIFICATE**



# CERTIFICATION

## FLAIR IN THE CITY

45.62

TCS score

up to 10°C

cooler PET

up to 1°C

cooler  
Air Temperature

126 t

CO<sub>2</sub>-sequestration

GOLD

GREENPASS®

only 16 %

sealed area

1.312 m<sup>3</sup>

annual water  
demand GI

274 m<sup>3</sup>

regular water  
storage GI

0.2

mean run-off Score

60 €

investment cost/m<sup>2</sup> GI

1.27 €

yearly maintenance  
cost/m<sup>2</sup> GI

54 %

of costs of  
MOD scenario

### LEGEND

PET | Physiological Equivalent Temperature

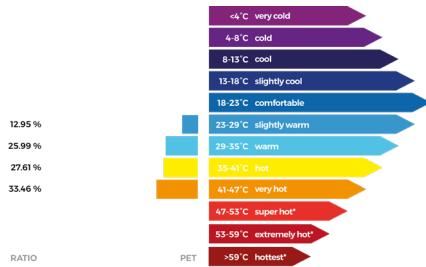
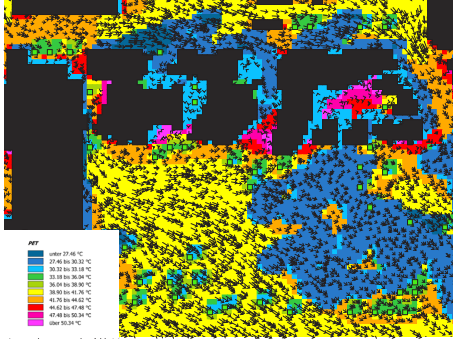
TCS | Thermal Comfort Score

MOD | Moderate Scenario

GI | Green Infrastructure



## PLANNING



**02 TCS** TOTAL 44.95 POINTS

NAME: FLAIR in the City

SCENARIO: Planning

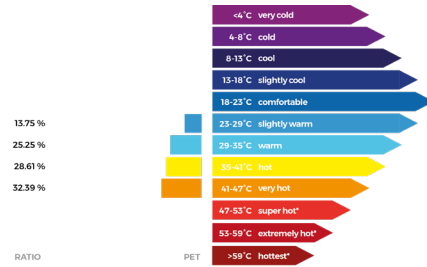
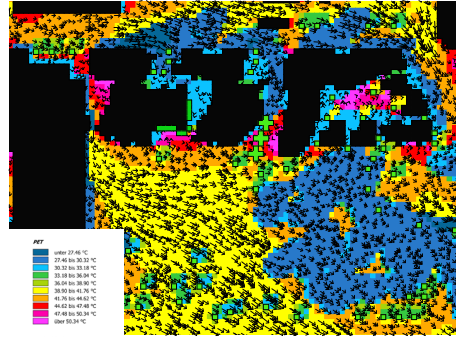
EVALUATION: Summer day, 15:00

ID: AT-2016-001

TOOLBOX: GREENPASS® Certification

**THERMAL COMFORT SCORE**

## PLANNING OPTIMIZED



**02 TCS** TOTAL 45.62 POINTS

NAME: FLAIR in the City

SCENARIO: Planning

EVALUATION: Summer day, 15:00

ID: AT-2016-001

TOOLBOX: GREENPASS® Certification

**THERMAL COMFORT SCORE**

PLAN | 44.95 TCS

PLAN OPT | 45.62 TCS

LOW

HIGH

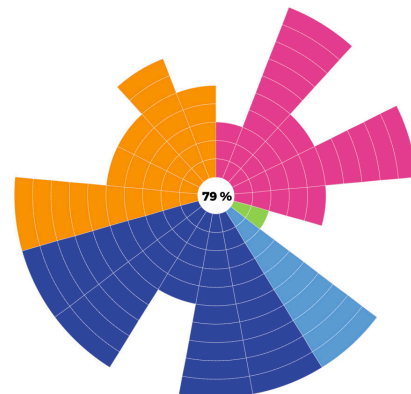
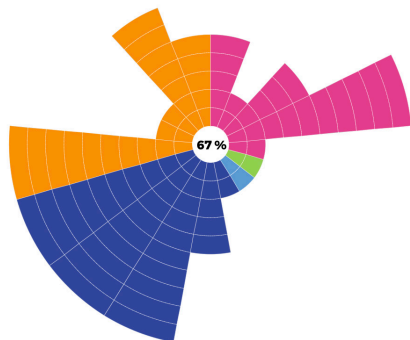
TCS FULL RANGE: 5.60

FLAIR Atzgersdorf VIENNA

WC | 42.34 TCS

MOD | 46.60 TCS

MAX | 47.94 TCS





# CERTIFICATION

## BIOTOPE CITY CCA

TRIESTER STRASSE 91 | A-1100 VIENNA



**AT** 2017-002



**4.5** ha PROJECT AREA



**VIE** 48.166539 | 16.350087



**6** BUILDING DEVELOPER



Biotope City masterplan



co-creative planning process



Biotope City detailed planning



Biotope City certification



Biotope City construction





**45**

**(NET) DAYS  
TIME-OF-SERVICE**



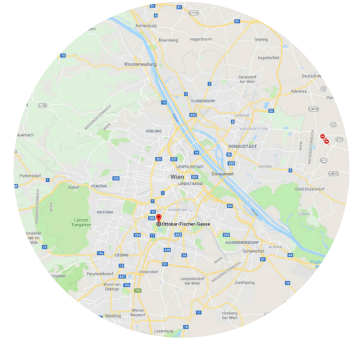
**2**

**ITERATIVE  
OPTIMIZATION**



**1<sup>st</sup>**

**PLACE CERTIFICATION  
RANKING**



## PROJECT RESULTS

<b>Total Degree of fulfillment:</b>	85 %
<b>Thermal Comfort Score (TCS):</b>	52.34
<b>Run-Off Score (ROS):</b>	0.4

The project **BIOTOPE CITY CCA**, has become **GREENPASS® GOLD** certified.

The design draft from u.m.a. architects has been analysed in detailed design phase regarding 6 urban main challenges. Based on the results, the planning has been optimized in an iterative process with the architects and the building developer towards climate-resilience by considering costs.

The certificate has been an highly valuable bonus for the part-sale of the residential house system, to a sustainable and green investment fund.



**SOCIAL HOUSING  
(IBA VIENNA CANDIDATE)**



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# VALUED BENEFITS

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featuring



## Standardized and fact-based results

Become standardized, transparent and easy understandable results for fact-based decision making.

## Optimized return on investment

Optimize your projects performance and efficiency by return on investment and high investment security for the optimal future proofness.

## High thermal comfort and quality of life

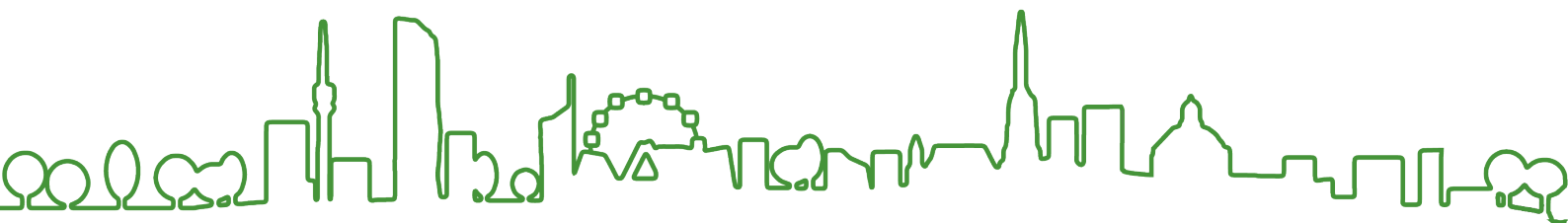
Ensure high thermal comfort for your project and following a high quality of life for inhabitants.




# CLIMATE-PROOFED URBAN DEVELOPMENT AND ARCHITECTURE

100 %



**GREENPASS®** supports and contributes to following UN Sustainable Development Goals (SDGs)‘



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