ABUD

Advanced Building
& Urban Design

SUSTAINABILITY AT ALL SCALES

ABUD is a consultancy firm empowered

by engineers, architects and researchers

specialized in sustainable building

and urban design.

General Company Information

Industry	R&D and consultancy in sustainable building and urban design
Headquarter	Budapest, Hungary (Europe)
Company type	SME
Clientele	Governmental and municipal stakeholders; Architectural studios and engineers; Constructors and operators; Investors and developers; Scientific and professional organizations and universities
Scale	Building / Neighborhood / Urban
Academic papers	97+ in renowned international journals
EU funding programmes	Framework 7, Horizon 2020, Urban Innovation Action (with 153 partners from 32 countries)

Fields of Expertise

Strategies for Sustainable and Smart **Urban Transformation**

Research & Innovation

Sustainable Building
Engineering and Design Consultancy

Diagnostics & Rating Systems

Qualifications

DESIGN AND ENGINEERING

- Architectural and Building Engineering
- ClimaDesign®
- Urban Design
- Urban Planning and Management
- Urban and Facility Energy Engineer
- Energy & Environmental Engineering
- Mechanical Modelling Engineering
- Building Energy Engineering
- ECBC Master Trainer
- Smart Buildings & Cities
- Renewable Energy Systems & the Environment
- Electrical & Computer Engineering

DATA SCIENCE

SOCIOLOGY AND SOCIAL ANTHROPOLOGY

ENVIRONMENTAL MANAGEMENT

- Environmental Management and Sustainability Science
- Environmental Sciences, Policy and Management
- Regional and Environmental Economics
- European and International Public Administration
- Social Policy
- Design Management

CERTIFICATIONS

- LEED AP BD+C
- BREEAM International Assessor
- BREEAM in Use Auditor
- LEED AP BD+C, CEA
- WELL AP

Technische Universität München

AALBORG UNIVERSITY

CEU CENTRAL EUROPEAN UNIVERSITY

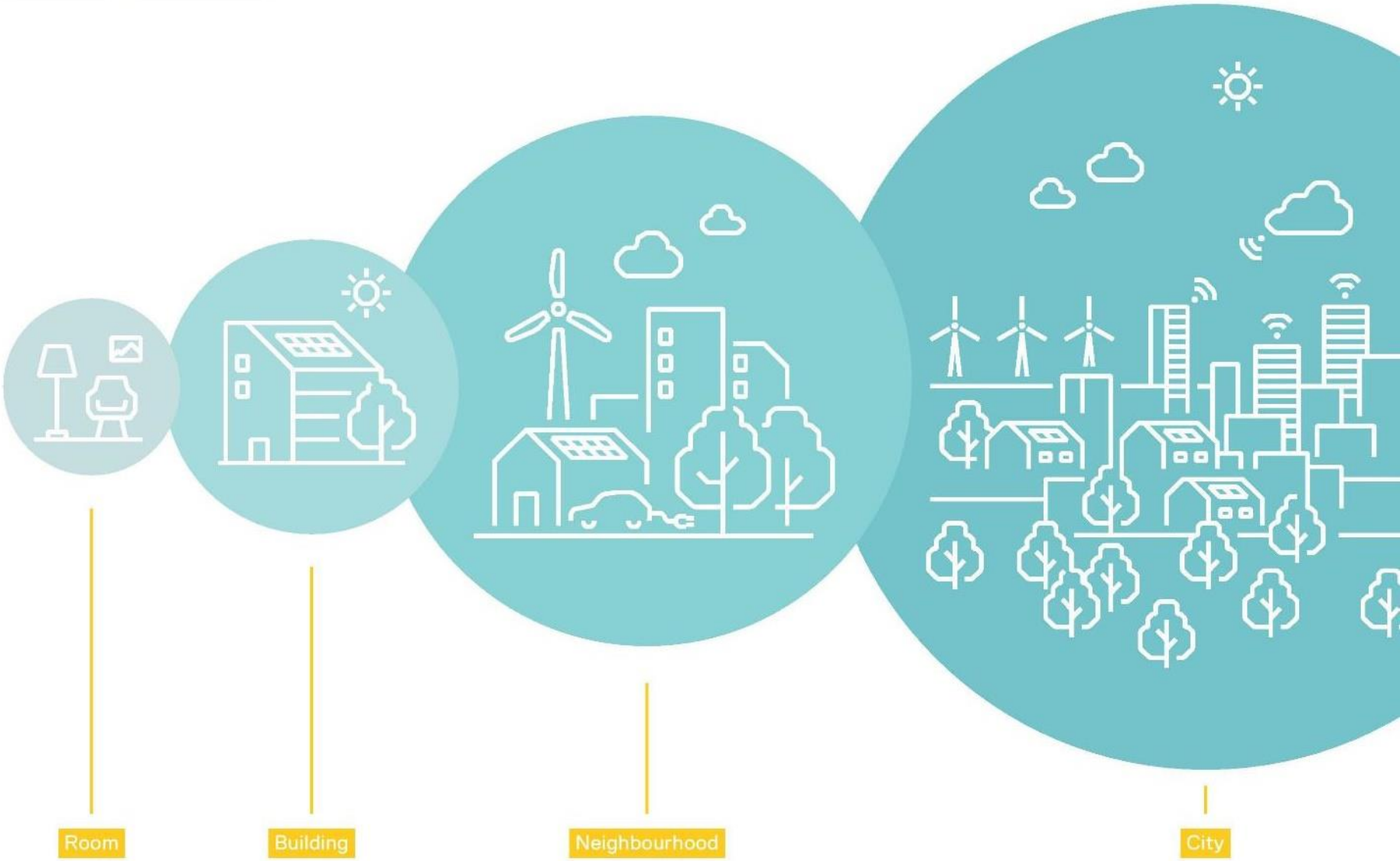
INTERNATIONAL WELL BUILDING INSTITUTE™

MŰEGYETEM 1782

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

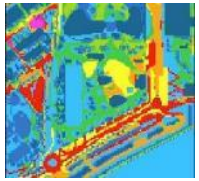
BREEAM®

DGNB

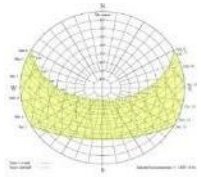

Room
Building
Neighbourhood
City

Analytic Tools

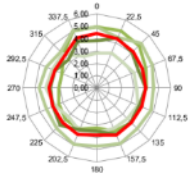
Conceptual Design



Climatic / Micro climatic conditions

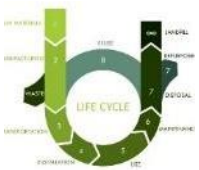


Solar access analysis



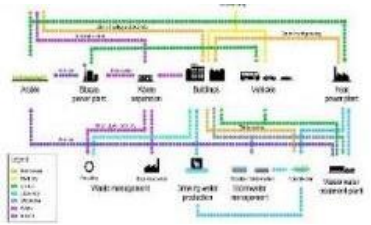
Natural ventilation possibilities

Urban wind analysis



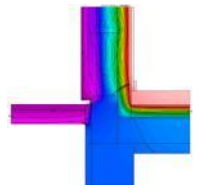
Life cycle analysis

District scale energy concepts

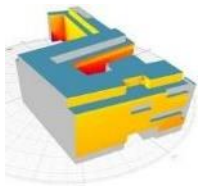


Functional schemes

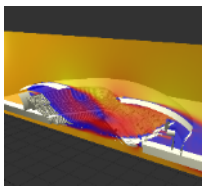
Detailed Design



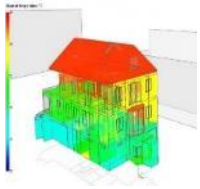
Complex structural analysis



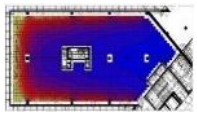
Solar access analysis



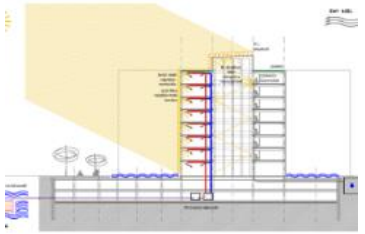
CFD analysis



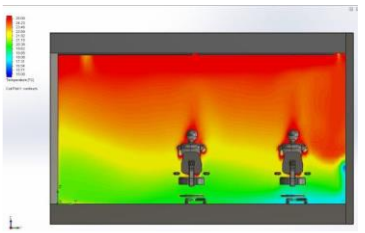
Dynamic energy simulation



Internal lighting simulation



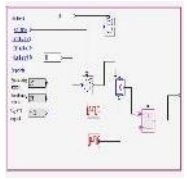
Building scale energy concepts



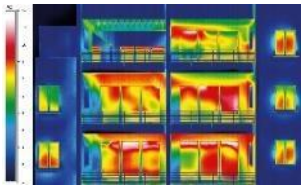
Building scale comfort concepts

Analytic Tools

Construction / Occupancy

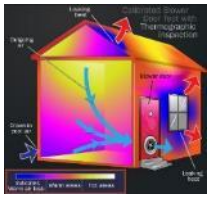


Dynamic energy simulation

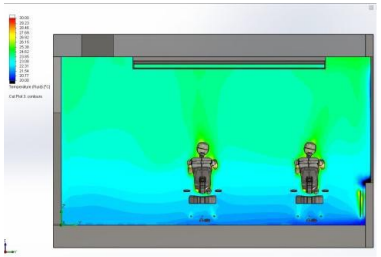


Thermal imaging

Energy metering



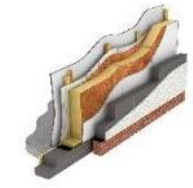
Blower door test



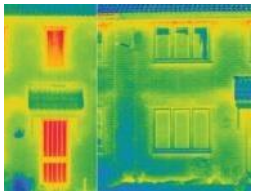
Comfort optimization

Monitoring strategy

Renovation

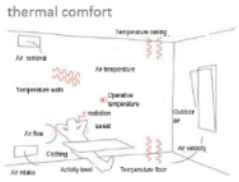


Complex structural analysis

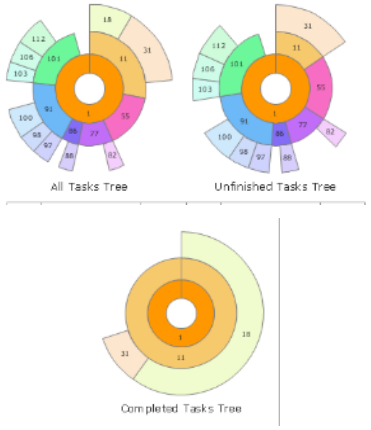


Thermal imaging

Energy audit



Comfort analysis



Energy retrofitting strategy and renovation packages

Urban Scale

Sustainable, Resilient & Smart Cities and neighbourhoods

URBAN DEVELOPMENT STRATEGIES

URBAN SUSTAINABILITY CONCEPT DEVELOPMENT | CLIMATE STRATEGIES FOR RESILIENT CITIES

SMART CITY STRATEGIES | ENERGY EFFICIENT RETROFITTING STRATEGIES

URBAN BIG DATA EXPLOITATION & APPLICATION STRATEGIES | CIRCULAR ECONOMY

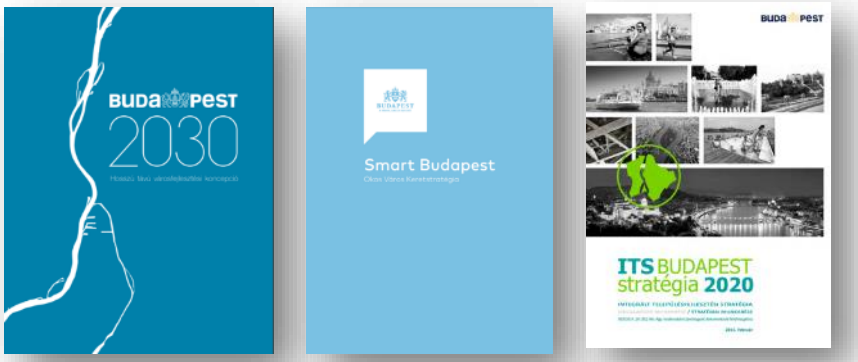
DATA-DRIVEN CONSULTATION | PARTICIPATORY PLANNING SUPPORT

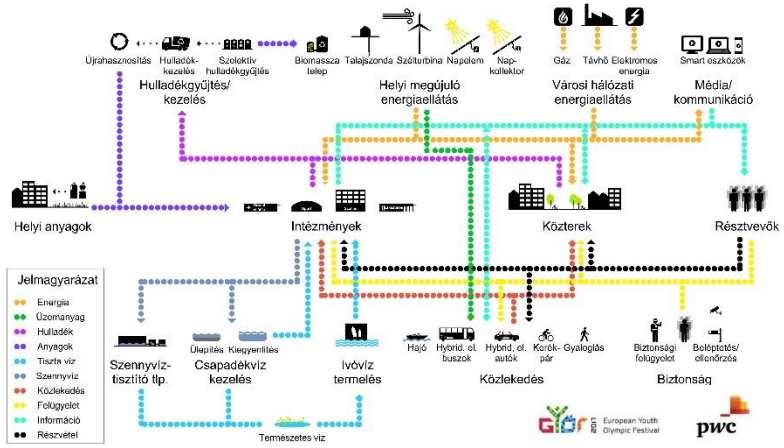
TOOLS AND METHODS

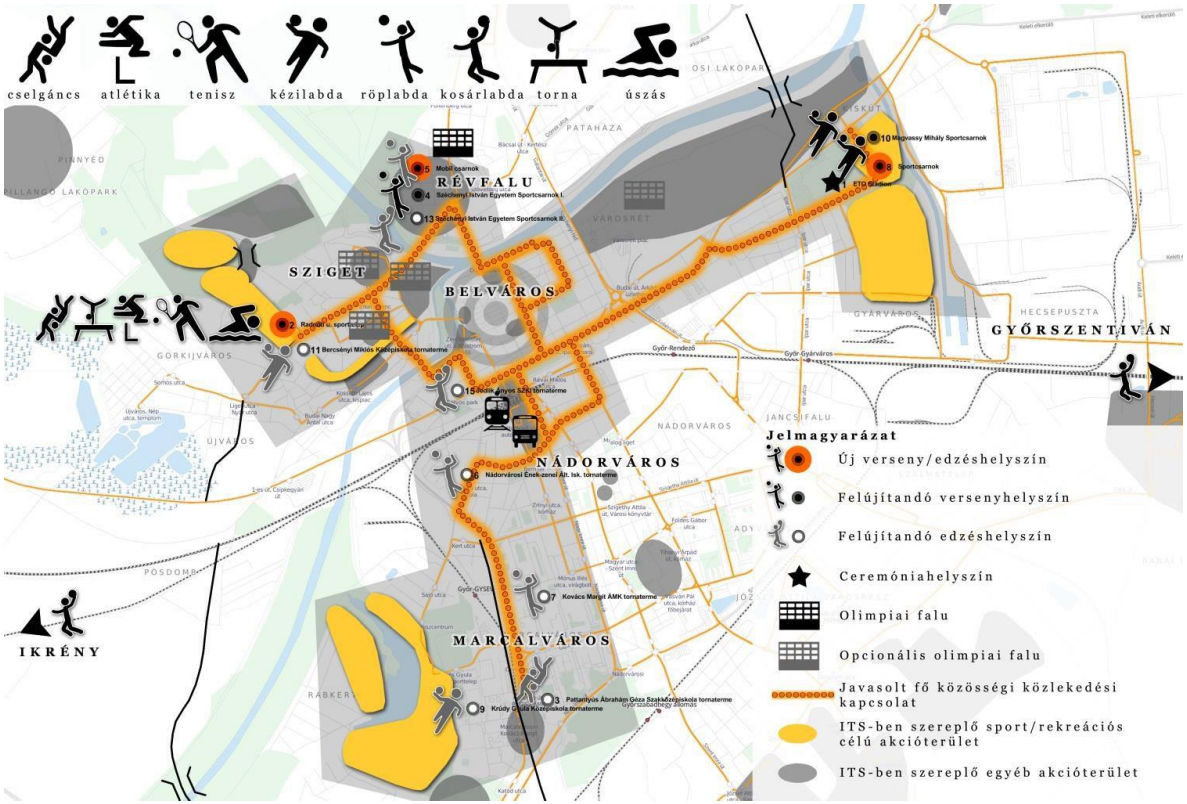
- Energy modelling (building to urban scale)
- Thermal comfort analysis in community spaces
- Urban data collection, analysis and assessment
- KPI development
- Analytics and simulation of spatial configurations, networks, information distribution
- GIS supporting services
- Spatial network & experience analysis and simulation
- Geosemiotic analysis
- Coordination of demonstration sites for state-of-the-art projects

REFERENCES

- **Budapest Smart City Strategic Framework**
- **Smart City Strategy for Győr (with PwC)**
- **Budapest 2030 Urban Development Concept**
- **Integrated Urban Development Strategy for Budapest 2020**
- **District level climate strategies**







In an ecological model for the City of Győr, we integrated the guidelines of sustainable and compact urban development with a focus on circular economy.

Image: integrated economy scheme; European Youth Olympics Festival opreational scheme, Development opportunities (map) 2017, Győr © ABUD

GREEN ROOFS FOR BUDAPEST

NATURE-BASED SOLUTIONS | THERMAL OUTDOOR COMFORT | MICROCLIMATE AND HUMAN THERMAL COMFORT | URBAN HEAT ISLAND | GREEN INFRASTRUCTURE | GREEN ROOFS

Why Green Roofs are the best option?

Green Roofs compared with other GI practices

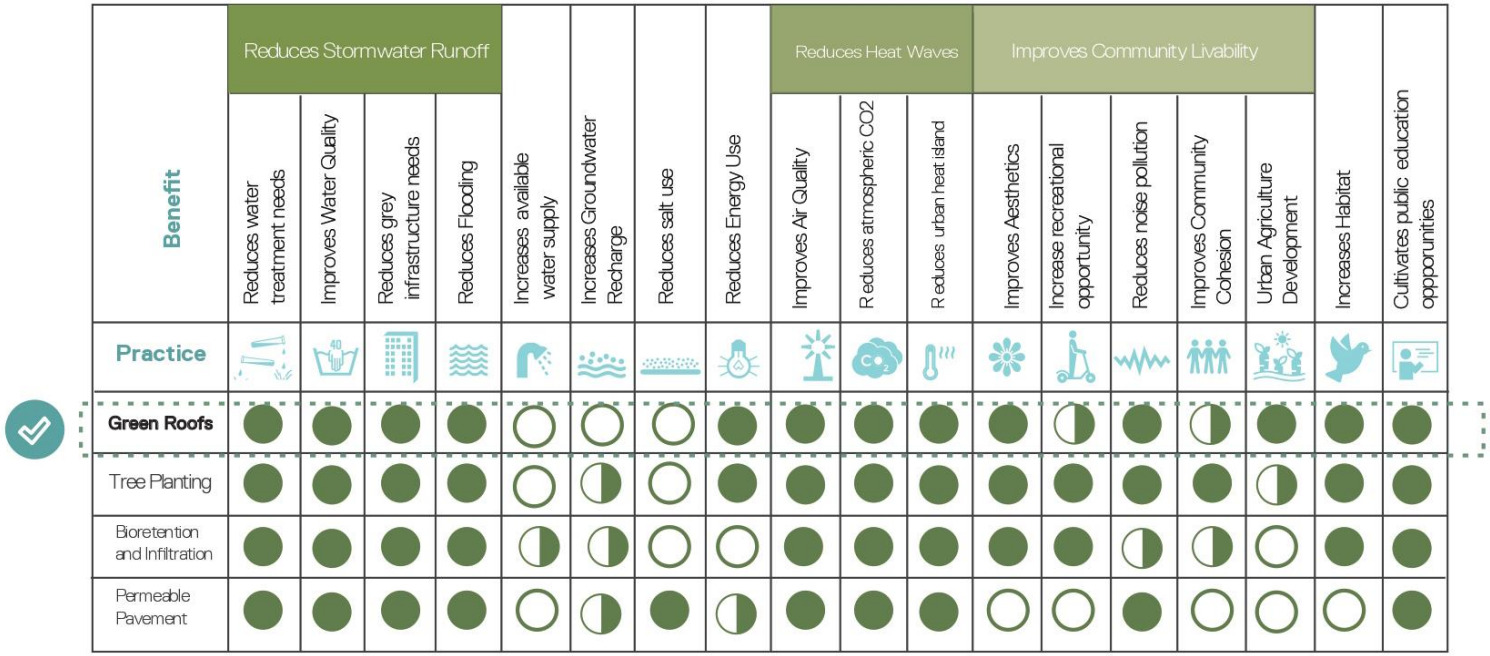
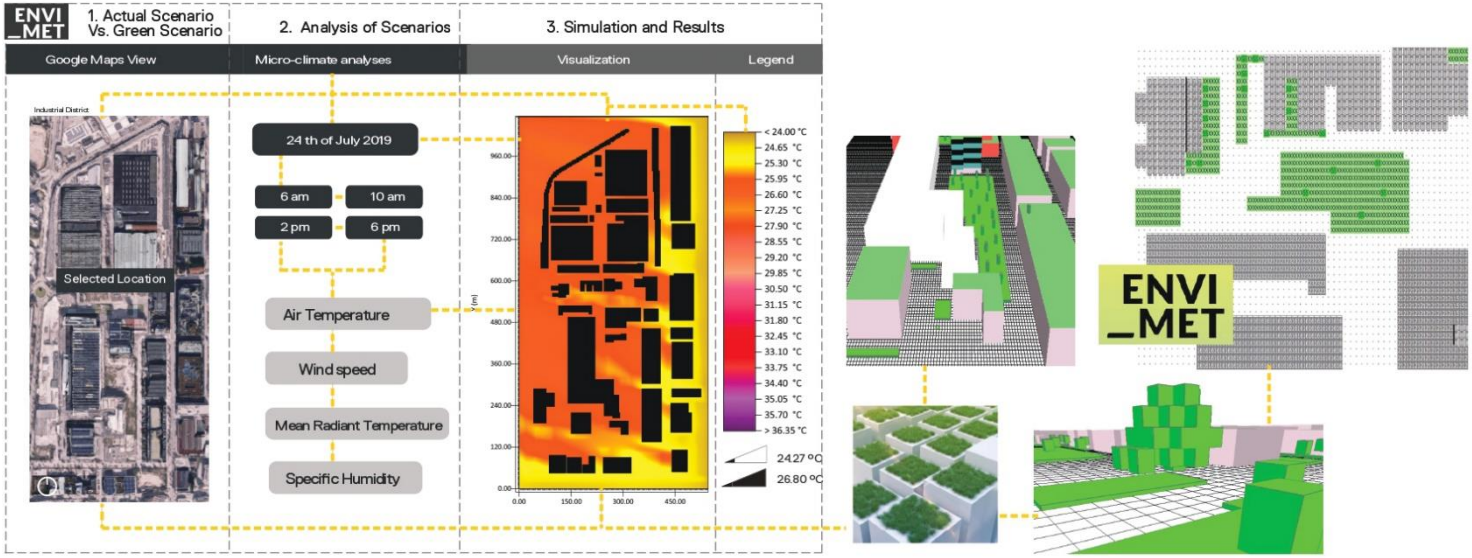


Chart of Green Infrastructure Benefits

The proposal implies a set of urban and environmental analyses, focused on the impacts of neighbourhood-scale green roof implementation for air temperature reduction and thermal outdoor comfort in Budapest.

Supported by Microclimate Analysis



Service Design Approach

The practice and participatory indicators demonstrate that green roof cooling effects improve neighbourhood micro-climate. The scenarios will be evaluated through dynamic simulation models using ENVI_met software, by the analysis of Universal Thermal Climate Index (UTCI) for human thermal comfort.

BUDAPEST ZOO

SUSTAINABILITY CONCEPT DEVELOPMENT

IDP COORDINATION

STRATEGY FOR ENERGY EFFICIENT OPERATION

LIFE CYCLE ANALYSIS

NATURE-BASED SOLUTIONS

SOLUTIONS FOR UHI EFFECT REDUCTION

SUSTAINABLE WATER AND MATERIAL MANAGEMENT

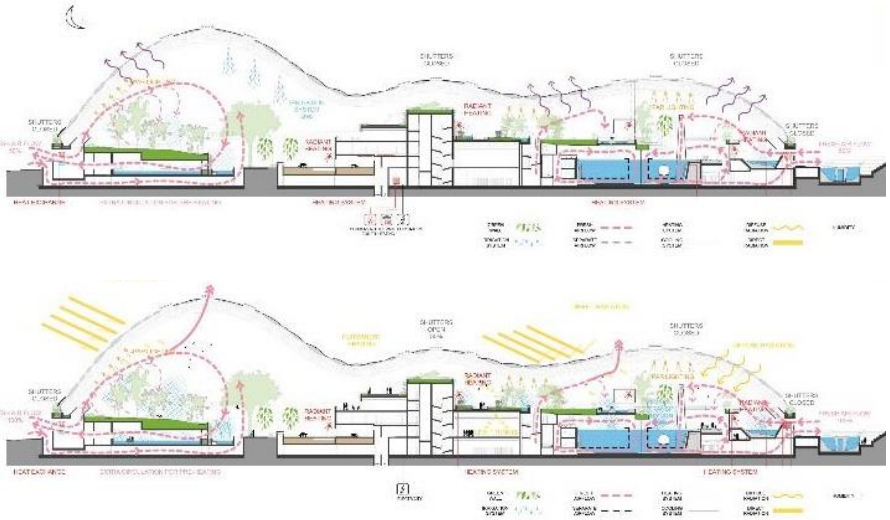
ANALYSIS OF ON-SITE ENERGY POTENIAL

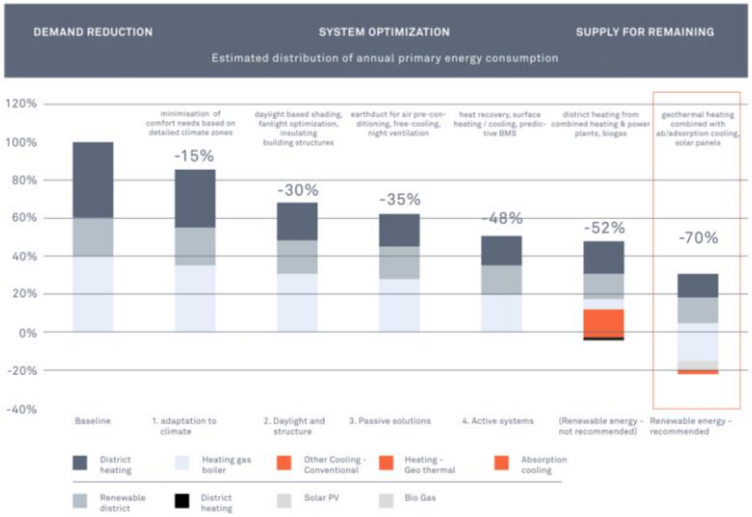
The project area is a UNESCO World Heritage Site in a mixed urban environment, with two thermal water networks.

Image: Southwest aerial view of the Pannon Park with the Biodome (Design Phase, 2016) © Budapest Zoo and Botanical Graden

We managed to radically reduce the site's energy consumption, using advanced analytic tools and natural solutions, like the utilisation of the cooling effects of plants or the thermal bath's heat and surplus water.

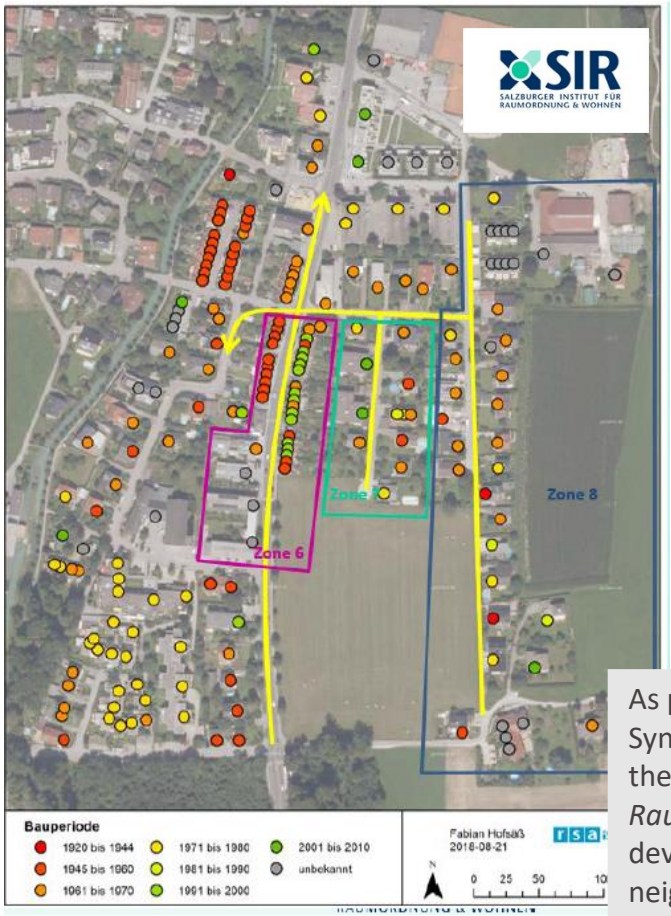
Images: the Biodome under construction © Attila Károly Nagy; seasonal operational schemes and a diagram for system optimization © ABUD





POSITIVE ENERGY DISTRICT, SALZBURG

SUSTAINABILITY CONSULTANCY | DYNAMIC SIMULATION OF ENERGY SYSTEMS | COST ANALYSIS | OCCUPANT BEHAVIOR ANALYSIS | CLIMATE SCANARIO ANAYLSIS | URBAN SCALE MOBILITY ASSESSMENT | EV MODELLING AS POTENTIAL ENERGY STORAGE



As part of the research project Syn.ikia, *Smart City Salzburg* and the *Salzburger Institut für Raumordnung und Wohnen* will develop a positive energy neighbourhood of about 30 buildings.
Images © SIR

We plan to achieve plus energy production by demand reduction, renewable energy production, harmonization of demand and production and thus peak shaving, and development of microgrids. *Images © SIR*

CLIMATE STRATEGY FOR THE 18TH DISTRICT

SUSTAINABLE COMMUNITY | COMPLEX SUSTAINABILITY

SOLUTIONS FOR UHI EFFECT REDUCTION | NATURE-BASED SOLUTIONS

SUSTAINABLE WATER AND MATERIAL MANAGEMENT | ANALYSIS OF ON-SITE ENERGY POTENIAL

The climate strategy will set out the objectives and frameworks for local action on climate change. After the assessment of current emission levels and most endangered natural and built resources, we set up targets and actions in the areas of adaptation, mitigation and citizen-empowerment with participatory methodologies.

A klímastratégia főbb eredményei számokban

36

konkrét terv és intézkedési javaslat a kerület klímavédelmi jövőképéhez

közel **600**

kitöltött lakossági kérdőív

3

részvételi workshop szakértőkkel, döntéshozókkal és fiatalokkal

2500 db

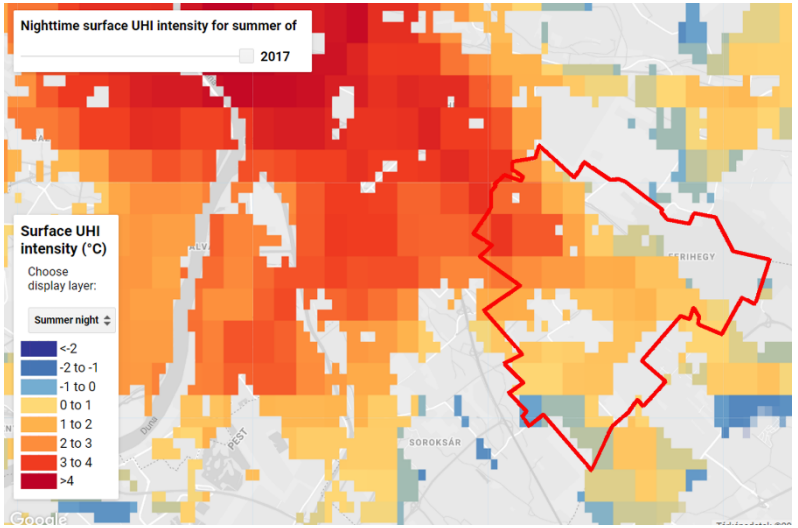
a Klíma Kupa során gyerekek által kitöltött feladatlap, élménybeszámoló és/vagy rajzos feladat

5

levegőminőség-mérő állomás kihelyezése a kerület különböző pontjain

19

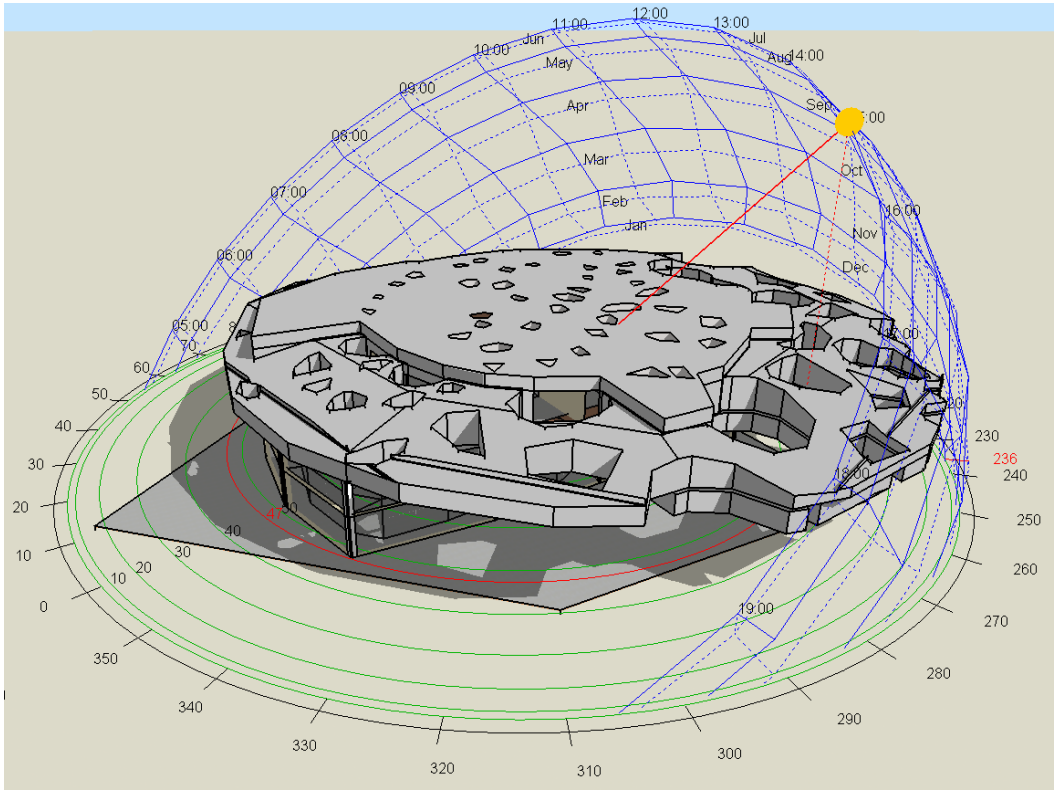
különböző, izgalmas klímabarát kihívás és játék az iskoláknak és óvodáknak készített kiadványban



HUNGARIAN HOUSE OF MUSIC

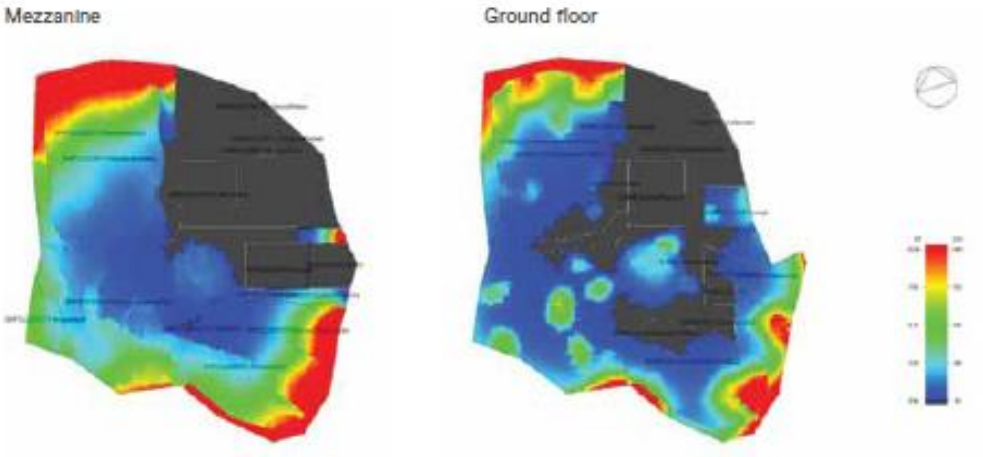
BREEAM NEW CONSTRUCTION MANAGEMENT | BULDING ENERGY MODELLING | DAYLIGHT ANALYSIS | COMFORT ANALYSIS | ANALYISIS OF HVAC SOLUTIONS

Due to the special perforation of the ”floated” roof, several versions of daylight analyses were needed to evaluate the natural lighting conditions under the roof. *Image © Sou Fujimoto Architects*



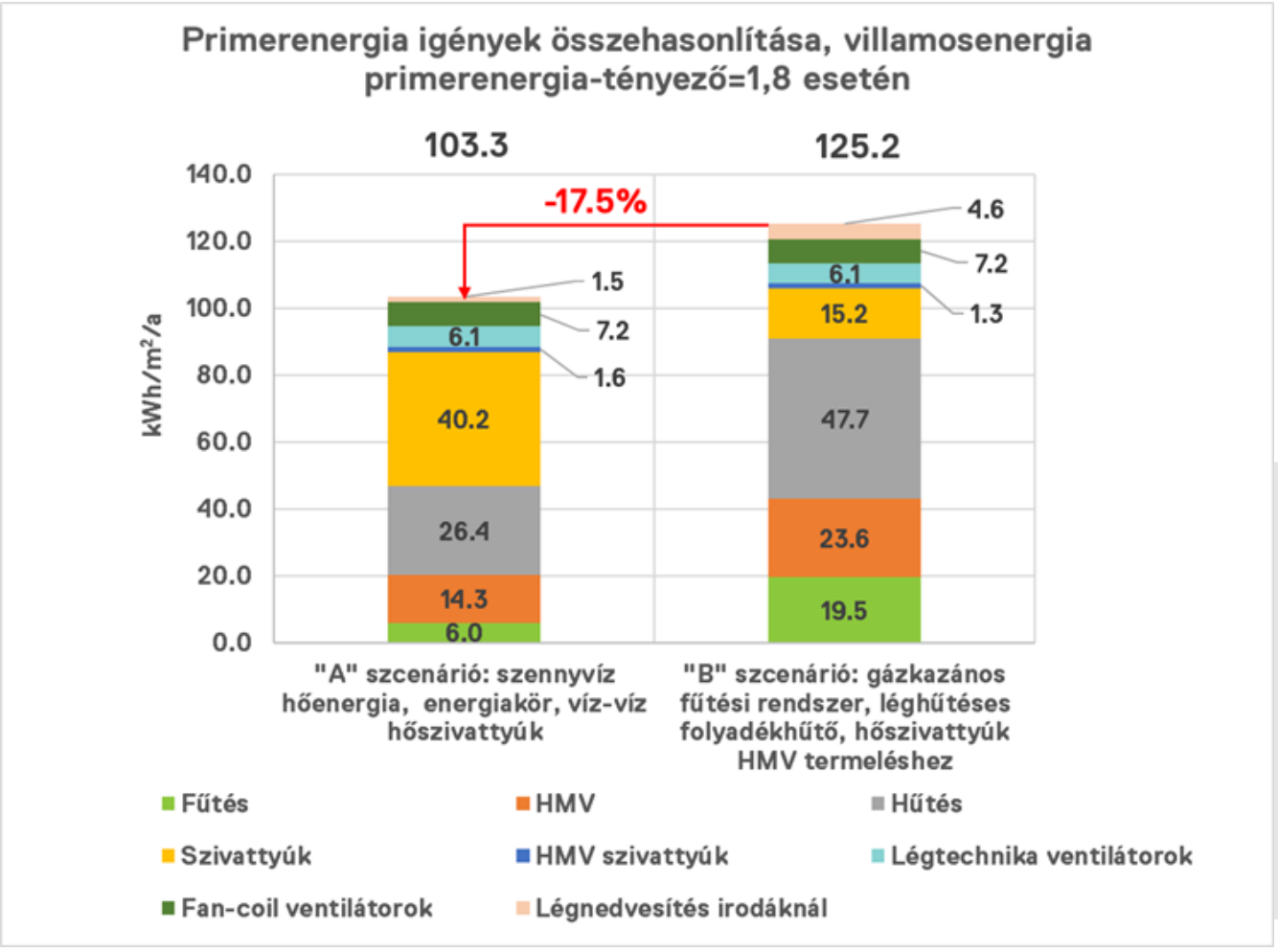
BREEAM daylight analysis confirming minimum values of average daylight factor required for event spaces. *Image © ABUD*

Thermal model of the building to analyse comfort, energy demand and shading performance. *Image © ABUD*

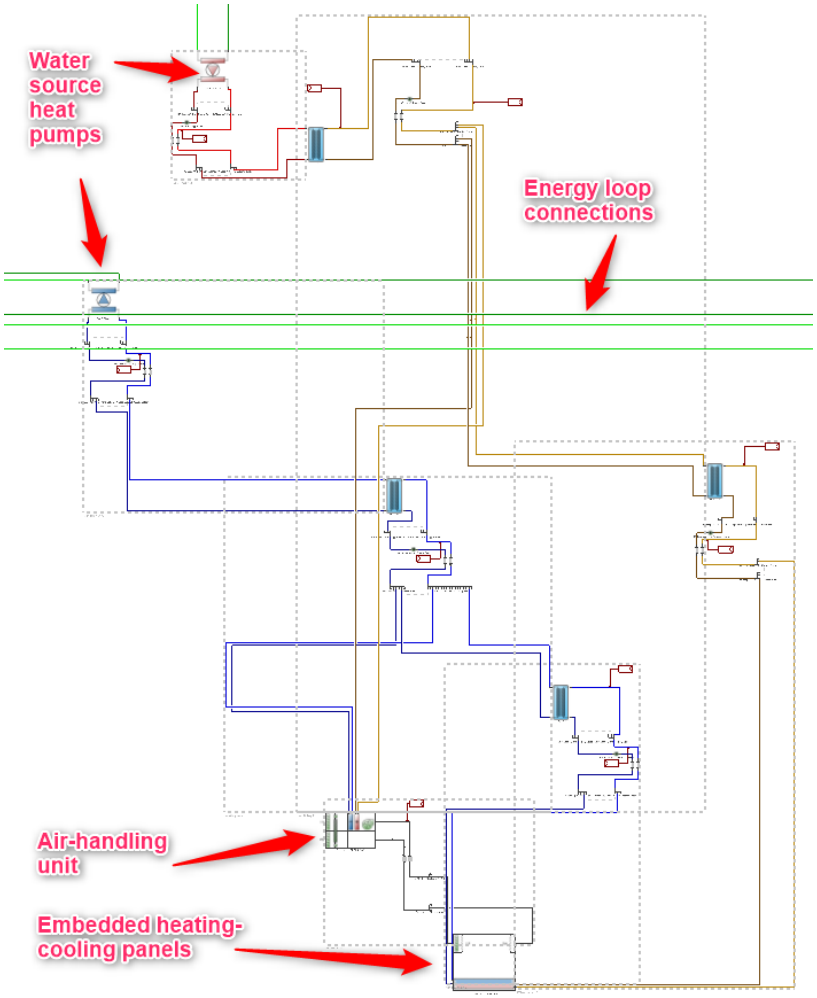


Neighbourhood project, Budapest

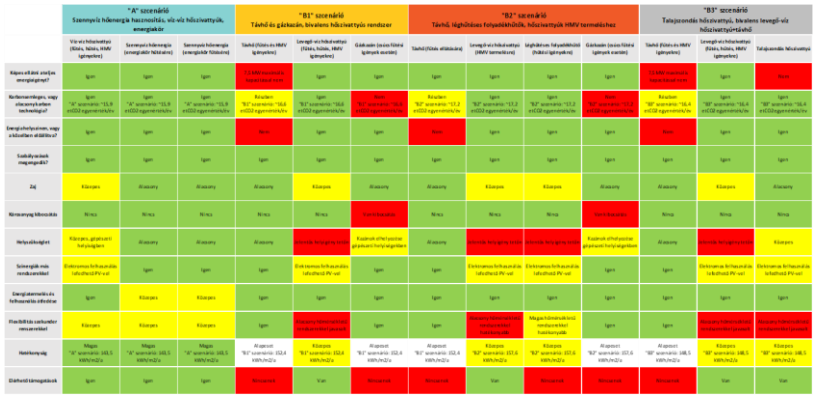
ENVELOPE OPTIMIZATION | SUSTAINABLE WATER MANAGEMENT | ENERGY STORAGE | NATURAL VENTILATION ANALYSIS | PARAMETRIC OPTIMIZATION | INFRASTRUCTURE STRATEGY | ENERGY STRATEGY | RENEWABLE ENERGY

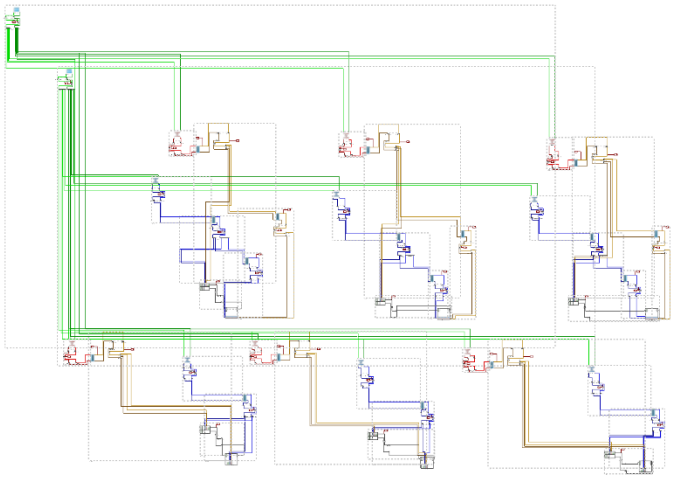


This new neighbourhood has mixed functions (resIdential, office, retail) in total 300,000 sqm. ABUD conducted natural ventilation analysis an envelope optimization with parametric design, renewable energy potential asessment, investigation of electric vehicles' building energy storage potential, etc.



Results of 5th generation district heating-cooling system



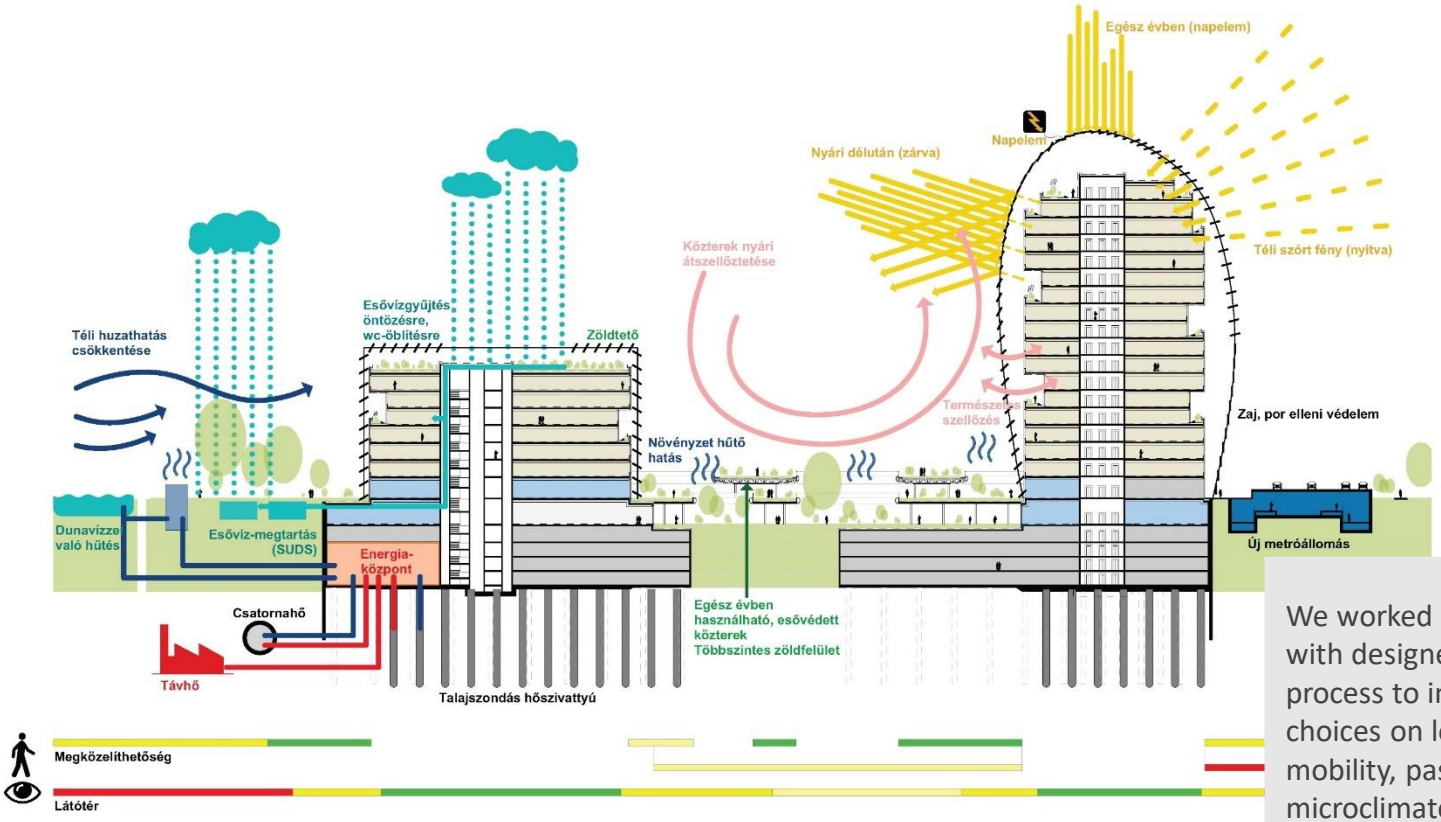


Mechanical system of 5th generation district heating-cooling system

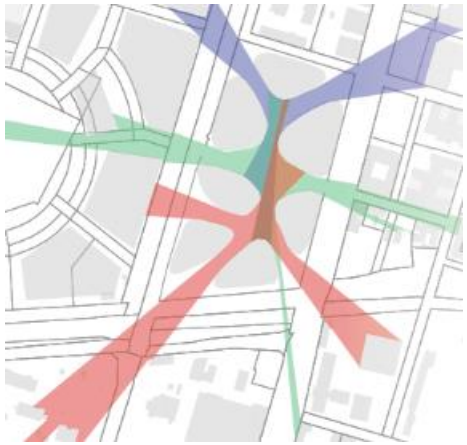
CITY 2020 COMMERCIAL DISTRICT

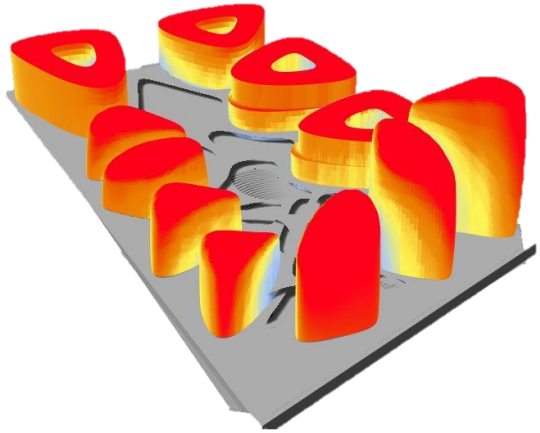
URBAN DESIGN SUPPORT | SPATIAL CONFIGURATION ANALYSIS WITH SPACE SYNTAX

OPTIMIZATION OF PEDESTRIAN MOBILE SYSTEMS | FLOW-BASED LAND-USE PLANNING



We worked in close cooperation with designers in an iterative process to inform design choices on local and larger scale mobility, passive solar design, microclimate (including urban heat-island effect), and sustainable drainage. *Image: operational scheme © ABUD*





We used graph analysis techniques on spatial representations to:

- Predict accessibility from spatial configuration
- Predict ease-of-traverse and wayfinding for pedestrians
- Predict intensity of pedestrian flows
- Objectively assess the visual charachter of built form
- Predict eye-movement of pedestrians due to built form

Images: Analysis of fields of vision; Analysis of built form; UHI analysis; Accessibility prediction of street network © ABUD

Building Scale

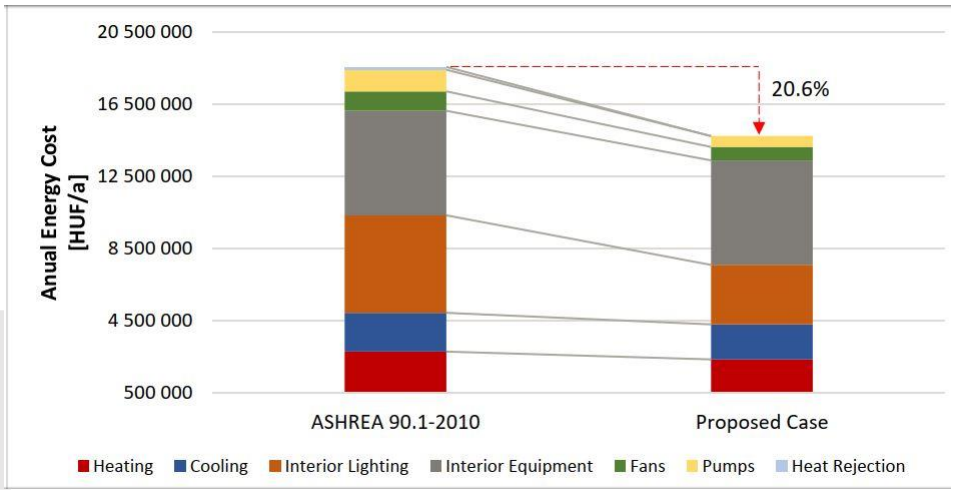
Energy efficient & Human-centred Buildings

ALPHAGON OFFICE BUILDING

ENVELOPE OPTIMIZATION | RENEWABLE ENERGY | SUSTAINABILITY CONSULTANCY | DAYLIGHT ANALYSIS | INDOOR COMFORT ANALYSIS | GREEN RATING ASSESSMENT

Our focus was on evaluating the potential impacts of characteristically different façade and building services solutions to meet the client's expectations with regards to energy and comfort performance (Energy Optimisation). The studies broadly classify into façade, lighting, HVAC and renewable energy technologies (GSHP, PV) to access and energy performance analysis.

Image © ABUD

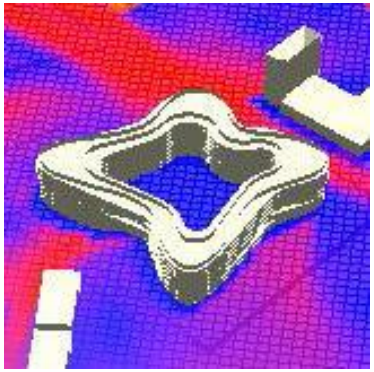


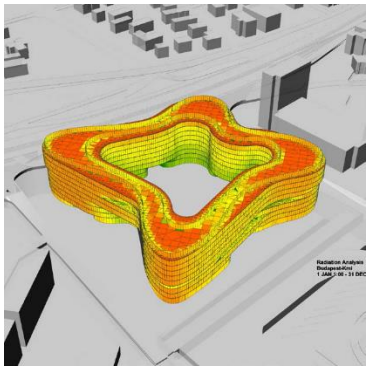
Energy savings in LEED / EAc2, ASHRAE baseline vs. Proposed case

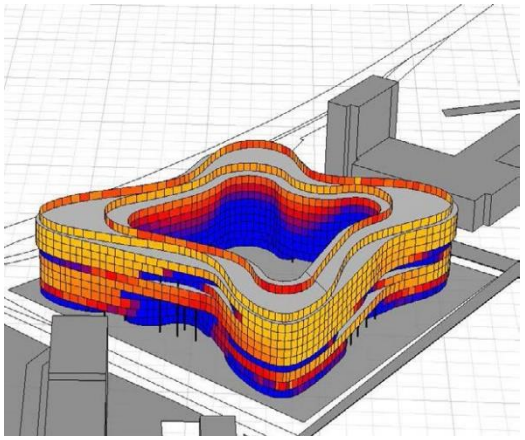
BUDAPEST ONE OFFICES

SUSTAINABILITY CONSULTANCY | ENERGY MODELING | DAYLIGHT ANALYSIS | SUSTAINABLE WASTE- AND WATER MANAGEMENT

COMPLEX COMPUTER ANALYSIS | SOLAR ACCESS ANALYSIS | CFD | ENERGY SOURCE MIX | PARAMETRIC DESIGN





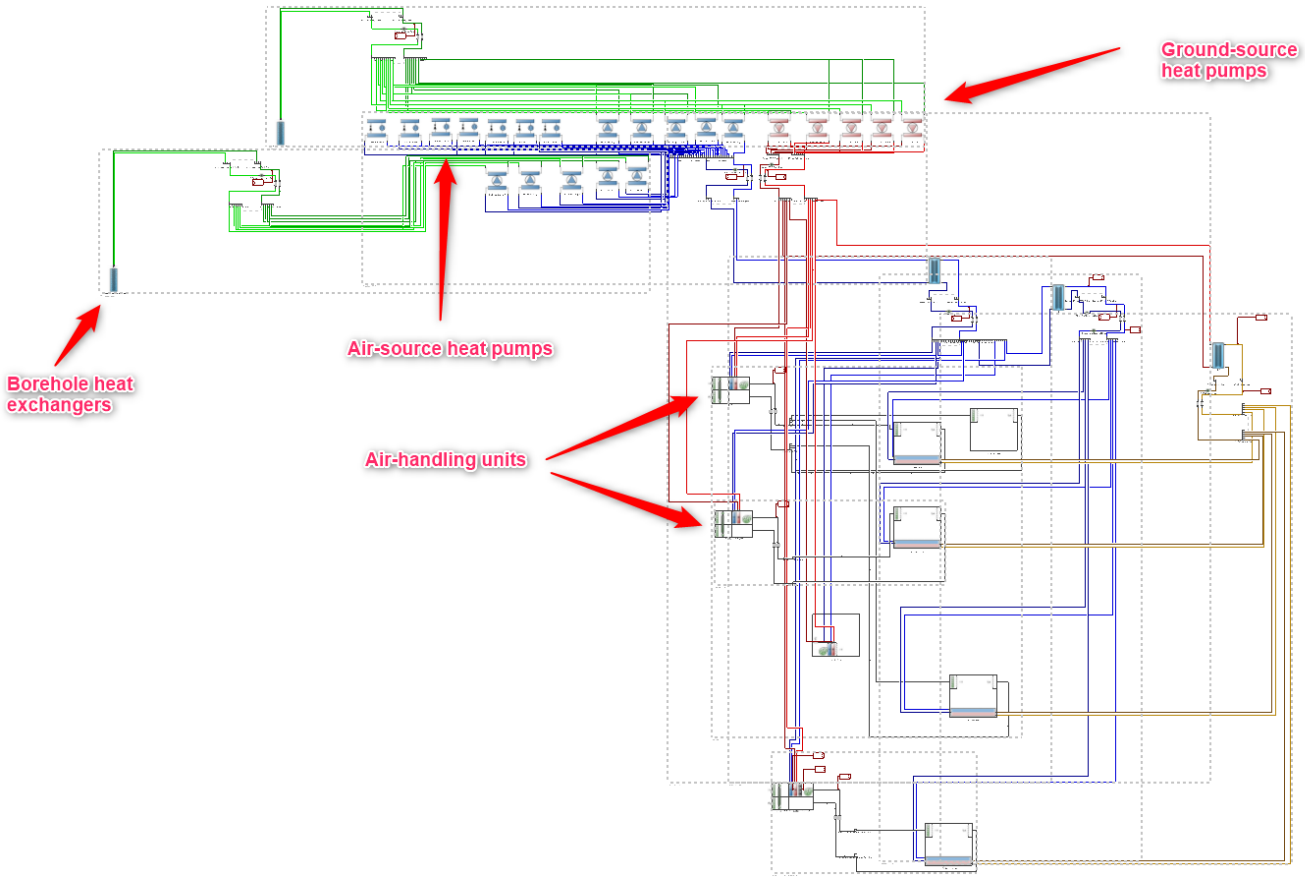


Before the conceptual design phase ABUD conducted investigations regarding climatic conditions, direction of the wind, traffic, transportation, building access and functional relations. The building shape was formed during a parametric design process, and the environmental effects of the decisions were analysed. Computer analyses were run: solar potential analysis, daylight analysis, CFD simulations.

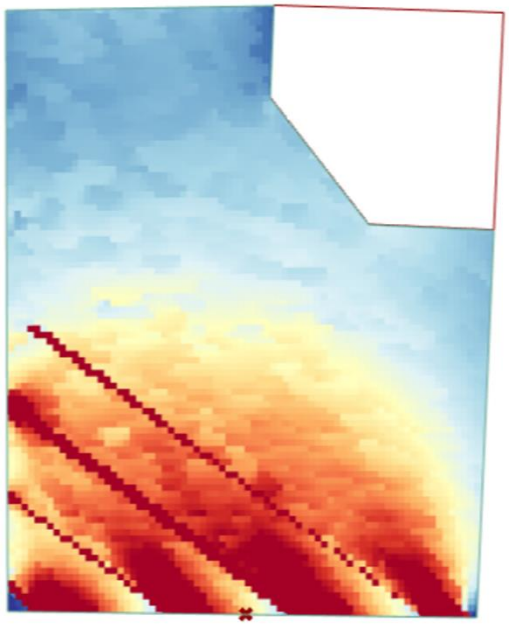
Building Complex, Budapest

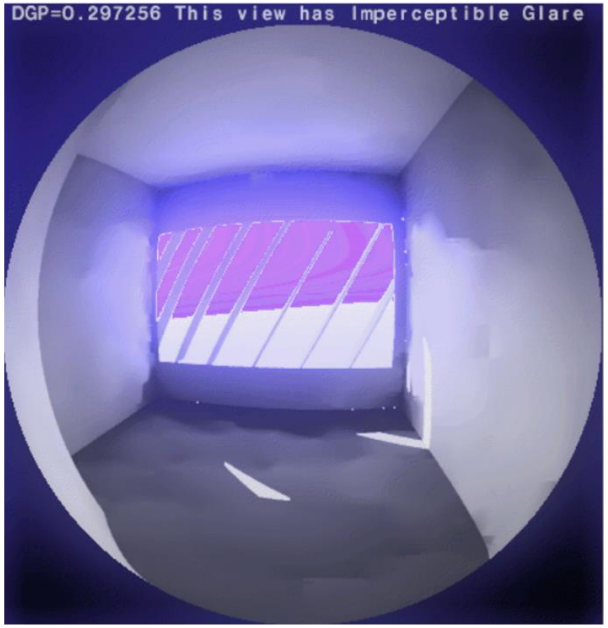
SUSTAINABILITY CONSULTANCY | DAYLIGHT ANALYSIS | BULDING ENERGY MODELLING

ANALYISIS OF HVAC SOLUTIONS | COMFORT ANALYSIS

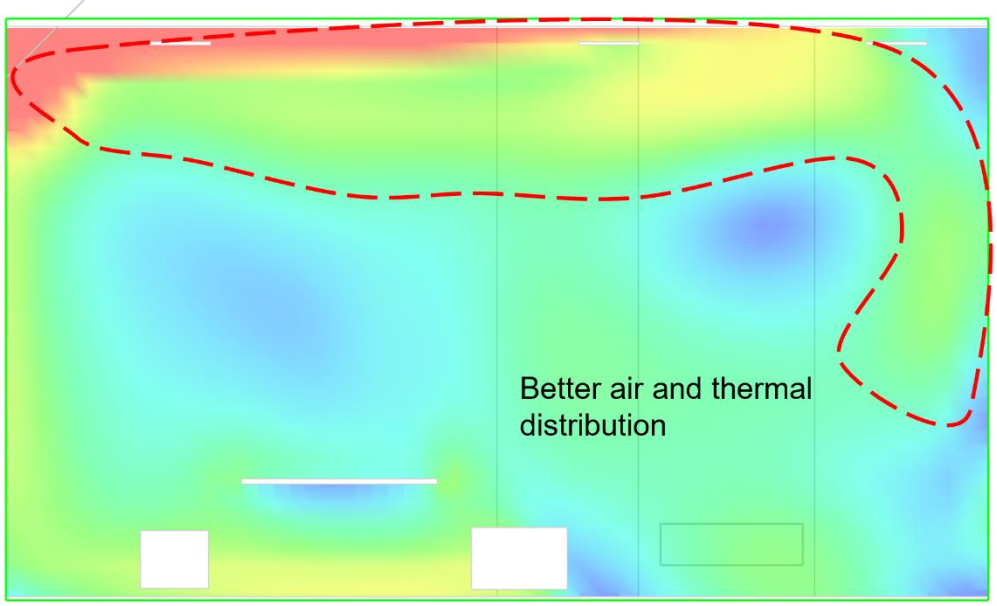


Visual representation of the mechanical system model



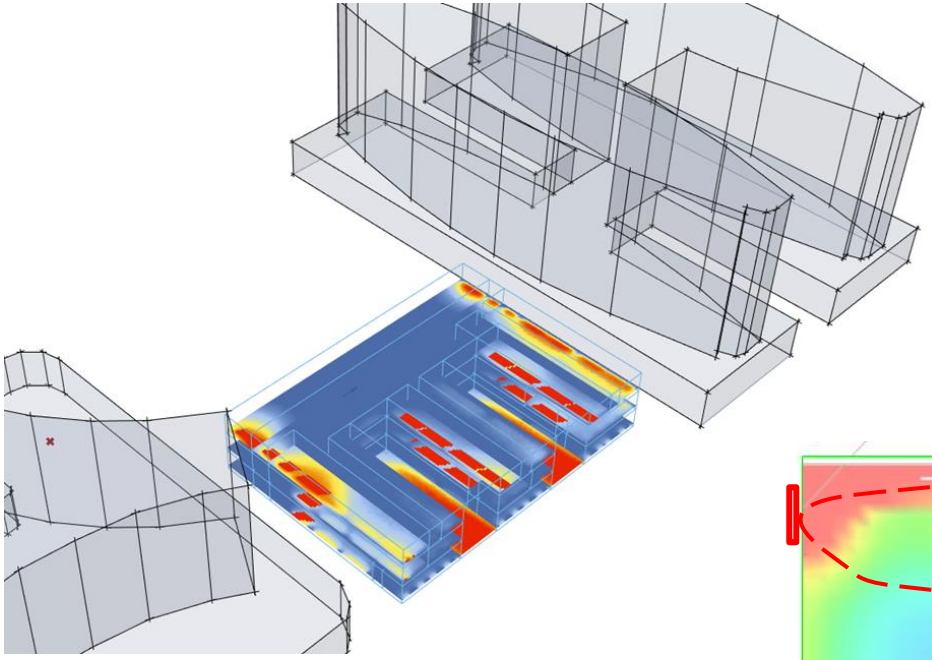


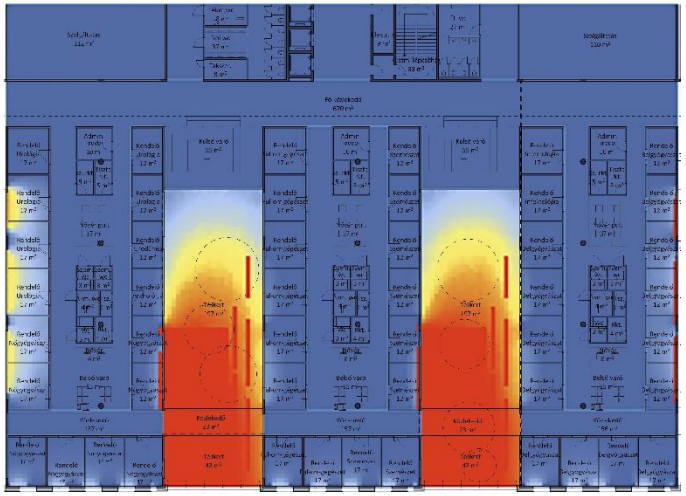
Parametric envelope optimization

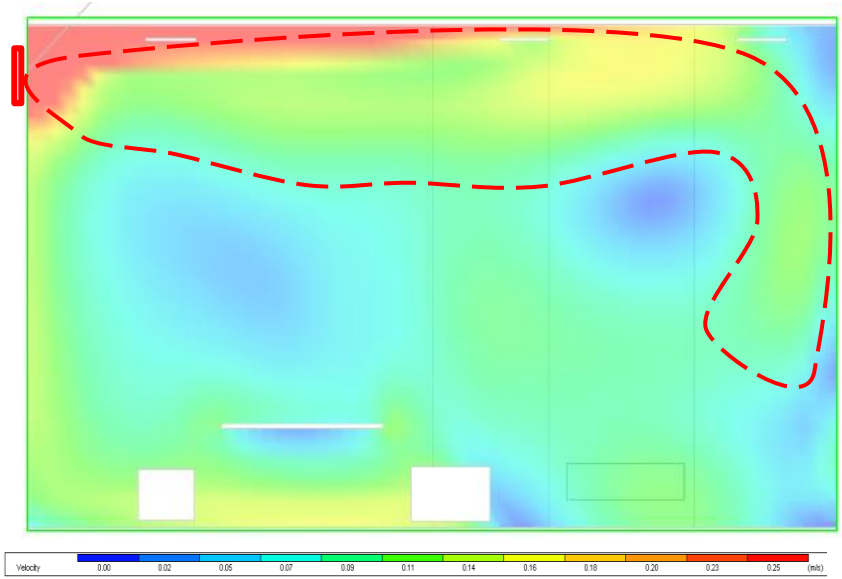


CFD Analysis

Different skylight-shading options were analyzed in the atria to determine the ideal balance between energy demand and visual comfort.





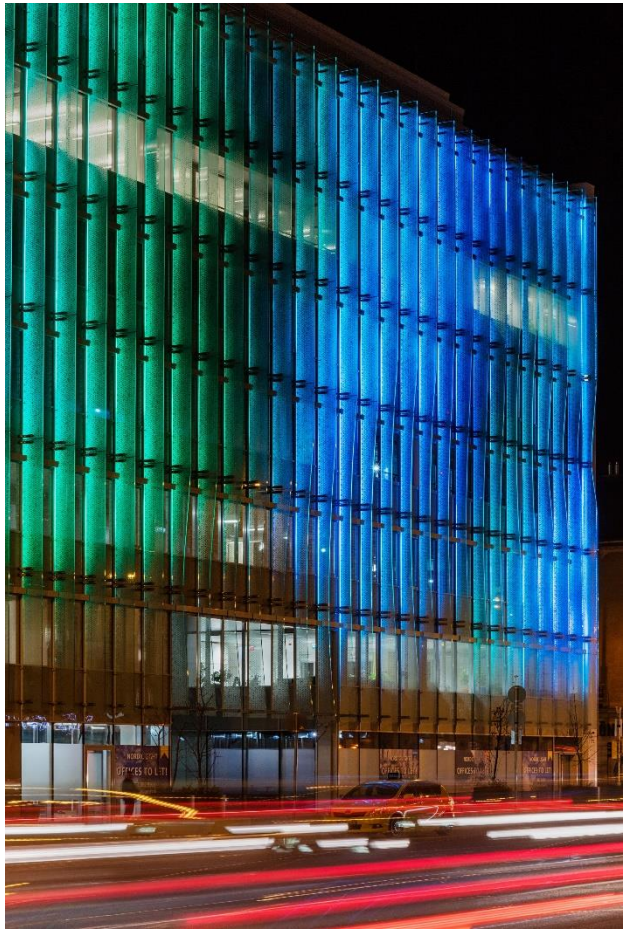


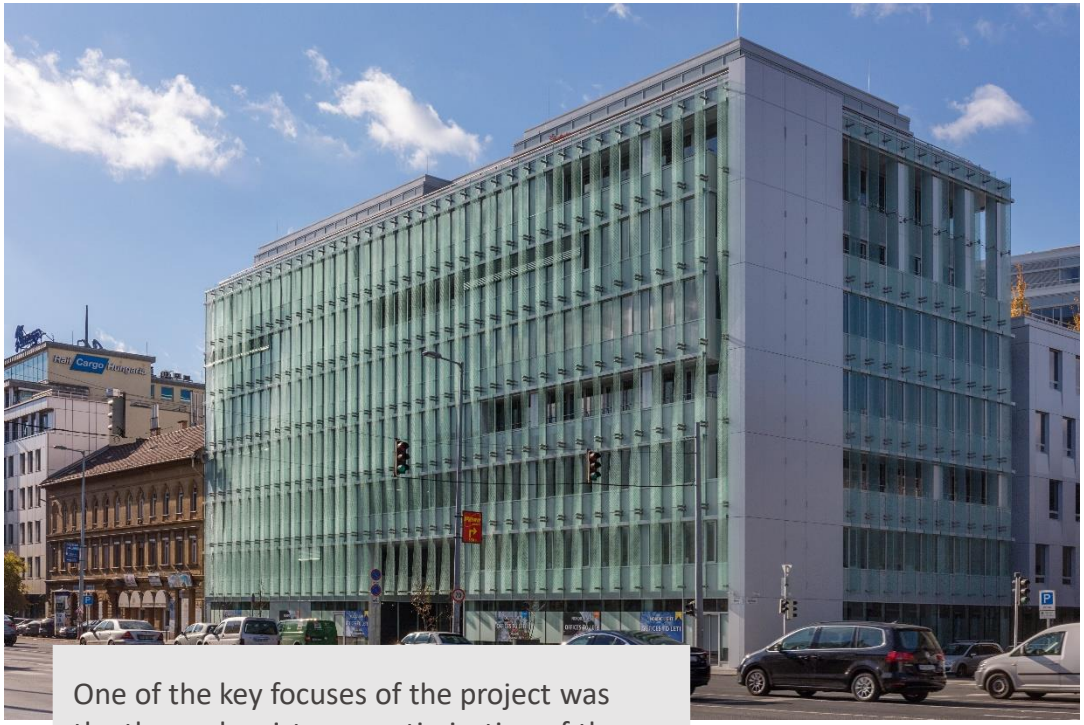
Room-level CFD analysis was used to optimize the ventilation system in the wards from the thermal comfort perspective.

NORDIC LIGHT OFFICES

SUSTAINABILITY CONSULTANCY | LEED CERTIFICATION | FACADE VENTILLATION CONCEPTS | ONSITE-OFFSITE COMPARATIVE ANALYSIS

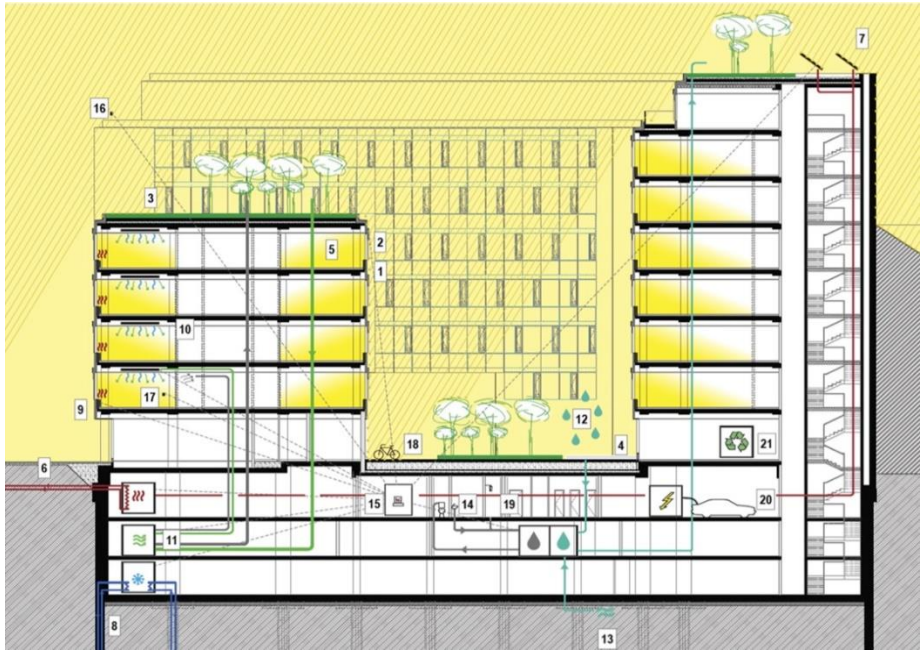
COMPLEX DYNAMIC BUILDING ENERGY SIMULATION | NET ZERO ENERGY CONCEPT | ANALYSIS OF RENEWABLE ENERGY POTENTIAL

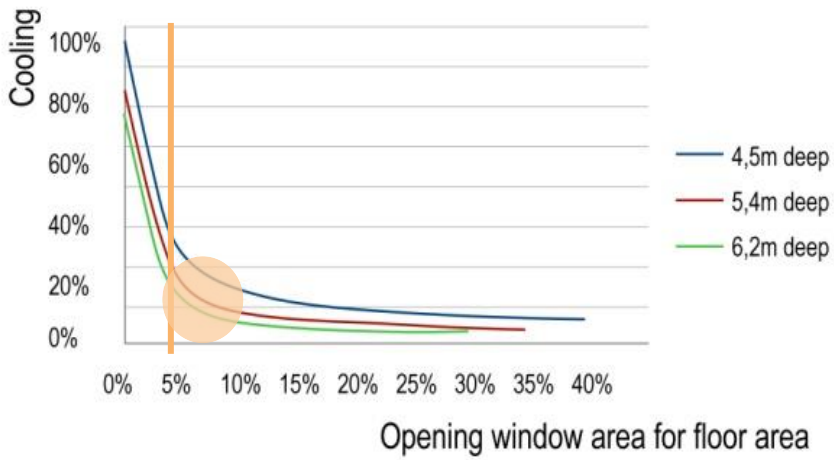




One of the key focuses of the project was the thermal resistance optimisation of the building envelope, with special emphasis on the effects of climate change and on summer overheating problems.

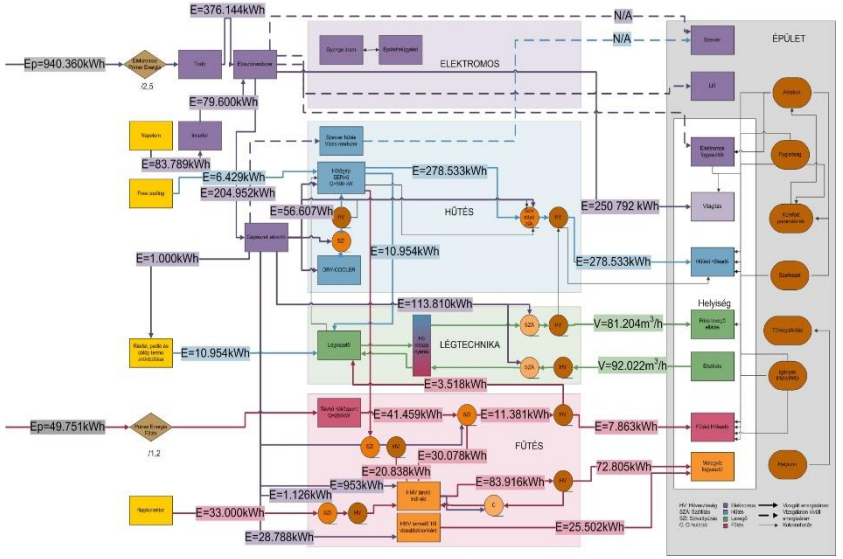
Images © ABUD, Bujnovszky Tamás, 2017





The designs were backed by more than a year of research work. The outcome of this research was a holistic system that not only takes into account energy considerations but also covers a wide range of other aspects from built-in materials, through water use and management systems, natural illumination and ventilation concepts to the media interface of the facade.

Images: operational scheme; effectiveness of natural ventillation; energy distribution chart
© ABUD



E-CO-HOUSING

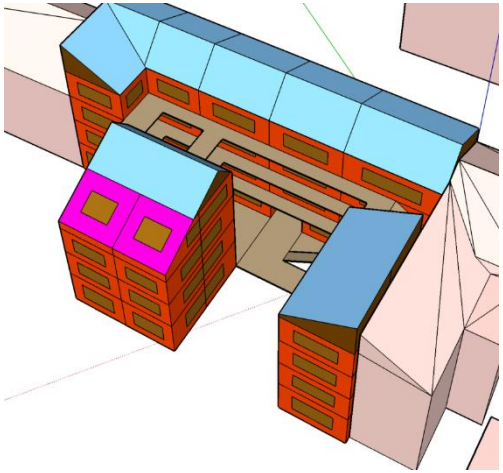
ARCHITECTURAL DESIGN | LIFE CYCLE ANALYSIS | BULDING ENERGY MODELLING

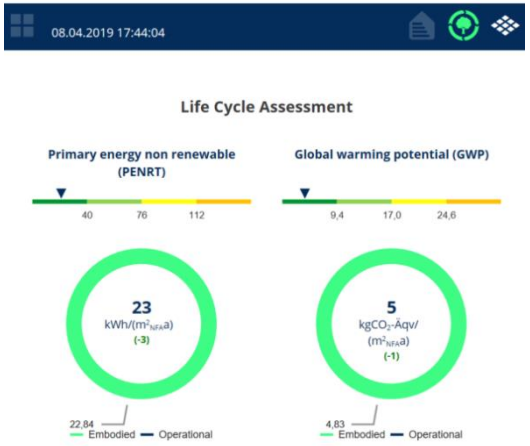
PARTICIPATORY DESIGN: METHODOLOGY & COORDINATION

OCCUPANT BEHAVIOR ANALYSIS

E-Co-Housing provides a new model of affordable, cooperative housing, simultaneously focusing on the economic and social empowerment of the tenants, the energy efficiency of the building and smart building solutions.
Image © ABUD

Life Cycle Analysis (with Caala software) helped to make an informed decision already at an early design phase, providing a chance to compare construction materials. *Images © ABUD*





Research & Innovation

SmartCEPS

SMART CITY | DECISION-MAKING TOOL | CITY DIAGNOSTICS

SUSTAINABLE URBAN TRANSFORMATION | URBAN COMFORT

Smart City Evaluation Platform and Service

_Self-assessment tool
_Consultancy and action plan
_Match-making channel
_Smart governance

SmartCEPS

SYN.IKIA

POSITIVE ENERGY NEIGHBOURHOOD | POLICY-MAPPING | RENEWABLE ENERGY

SUSTAINABLE PLUS ENERGY NEIGHBOURHOODS | SOCIAL PERFORMANCE

Our Tasks

_Development and demonstration of a plus energy multi-story apartment
_Participation in the technological integration of buildings and HVAC systems into a smart environment
_Policy mapping
_Analysis and development of a methodology for the measurement of the multiple benefits

JUSTNature

NATURE-BASED SOLUTIONS | GHG EMISSIONS REDUCTION | REGENERATIVE URBAN ECO-SYSTEMS | AIR-QUALITY IMPROVEMENT | ECOSYSTEM SERVICES

Our Tasks

_Development of multidimensional, circular, self-learning monitoring framework and NbS datamodel
_Policy and metagovernance toolbox for governments
_Development and simulation of a novel governance network model for grassroots nature-building communities
_Urban ecosystem creation, restoration, expansion

Diagnostics & Rating Systems

LEED Certification

H2Offices

Budapest, Hungary
Client: SKANSKA
65 000 m^2
LEED BD+C Core and Shell
Targeted level: Platinum

Nordic Light Trio

Budapest, Hungary
Client: SKANSKA
Area: 17 501 m^2 (GBA)
LEED BD+C Core and Shell v4
Obtained level: Gold

Mill Park

Budapest, Hungary
Client: SKANSKA
Area: 56 323 m^2 (GBA)

Achieved level: Gold

BREEAM® BREEAM Certification

Budapest One Business Park

Budapest, Hungary
Client: FUTUREAL
Area: 66 500 m^2 (GBA)
Achieved level: BREEAM Very Good Design Stage (2019) | BREAAM Very Good Post-Construction Stage (2021)

Corvin Technology & Science Park/1

Budapest, Hungary
Client: FUTUREAL
Area: 18 134 m^2 (GLA)
Achieved level: Very Good (Post-construction Stage, 2020)

Corvin Technology & Science Park/2

Budapest, Hungary
Client: FUTUREAL
Area: 15 388 m^2 (GLA)
Achieved level: Very Good (Post-construction Stage, 2020)

WELL Certification

H2Offices

Type	WELL Core & Shell v2 pilot
Location	Budapest, Hungary
Year	ongoing
Client	SKANSKA
Area	26 148 m^2 (GBA)
Obtained level	WELL Precertification (2021)

Corvin Innovation Campus 1

Type	WELL Core & Shell v1
Location	Budapest, Hungary
Year	ongoing
Client	FUTUREAL
Area	19 430 m^2 (GBA)
Obtained level	WELL Platinum Precertification (2021)

V43 – Advance Tower

Type	WELL Core & Shell v1
Location	Budapest, Hungary
Year	ongoing
Client	FUTUREAL
Area	12 501 m^2 (GBA)
Obtained level	WELL Platinum Pre-certification

Every project is unique. We adapt our solutions to the climatic, socio-cultural and economic conditions.

ABUD

Advanced Building
& Urban Design

THANK YOU FOR YOUR ATTENTION

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