

INTERNATIONAL CONFERENCE

ENERGY IN BUILDINGS ATHENS 2025

ΥΠΟ ΤΗΝ ΑΙΓΙΔΑ ΤΟΥ ΤΕΕ

SATURDAY
NOVEMBER 15, 2025

- DECARBONIZATION & ENERGY SECURITY
- SUSTAINABILITY & GREEN TRANSITION
- ARTIFICIAL & BUILDING INTELLIGENCE
- ENERGY SAVING IN COMMERCIAL & INDUSTRIAL APPLICATIONS

09:00-18:00 | @ DIVANI CARAVEL HOTEL, ATHENS

COMMUNICATION SPONSORS

B2Green

T-PRESS

ΕΡΜ Ο
ΥΠΡΟΜ ΚΟΖ

ΚΤΙΠΙΟ
ΕΚΔΟΣΕΙΣ

ΠΡΑΣΙΝΟ
green

Digital Twins as enablers of a Smarter & Energy Efficient Building Sector

Elissaios Sarmas (EPU-NTUA)

Data & Buildings

- AI-Based Services for finer-grained Energy **Profiling and Forecasting**
- Data-driven services for Energy Recourse **Management**
- Data-Driven Energy & Non-Energy Services for **Enhanced Comfort and well-being**
- Data-driven services for **Renovation Roadmaps** and **Energy Efficiency Financing**
- Services supporting Decision-Making under Uncertainty for **Efficient and Climate Resilient Buildings**

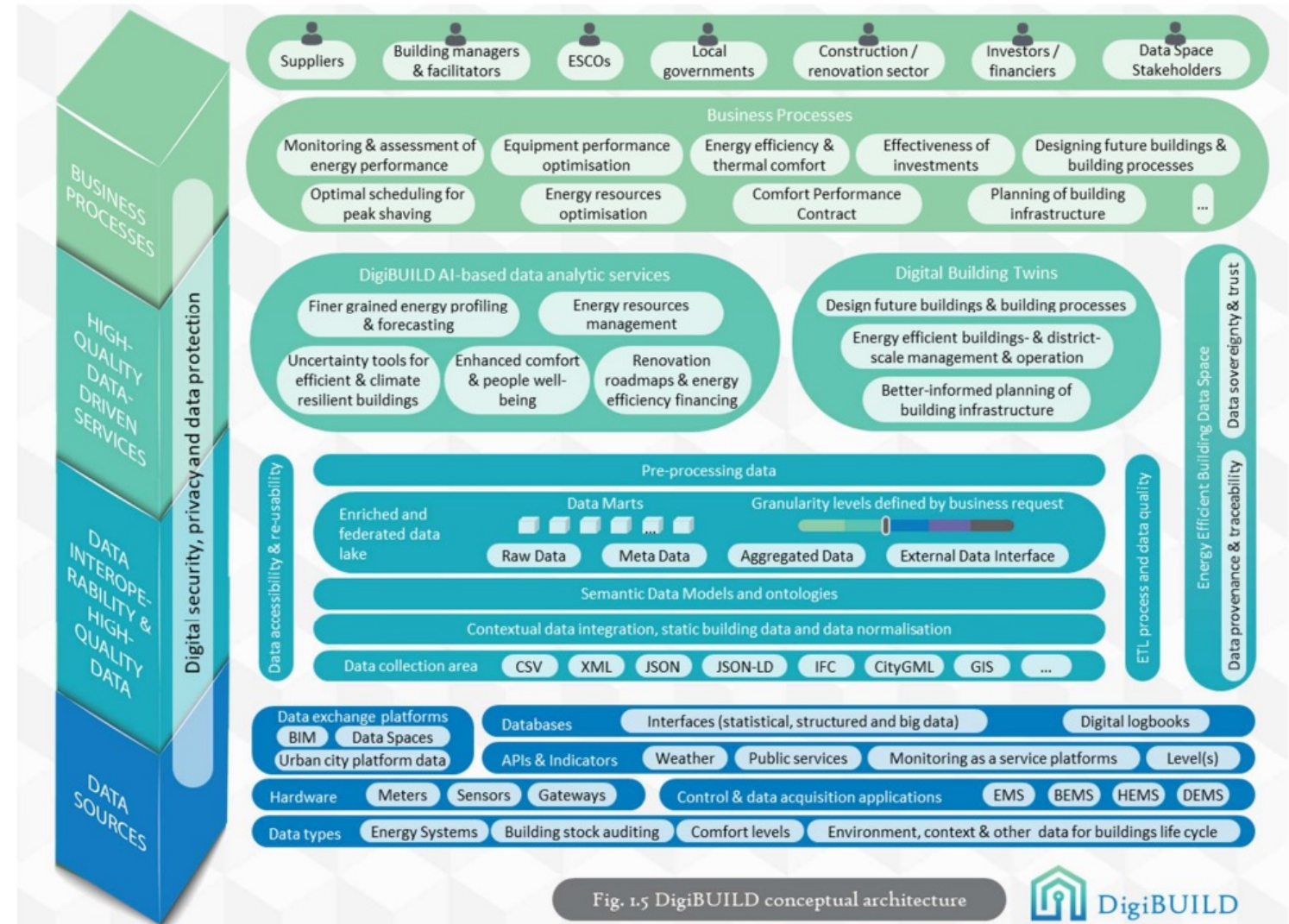


Fig. 1.5 DigiBUILD conceptual architecture

Energy Efficiency Performance Benchmarking

HVAC Benchmarking and Units Replacement Recommendations in Office Buildings

- Scalable approach
 - **User-friendly** web-app
 - **Integrated** with the building's BMS
- Monitoring & Benchmarking
 - Models **User behavior** and **occupancy patterns**
 - Real-time data **monitoring** and **visualization**
- Replacements Recommendations
 - **Economic returns** and **energy savings**
 - Used to **replace HVAC equipment** in NTUA

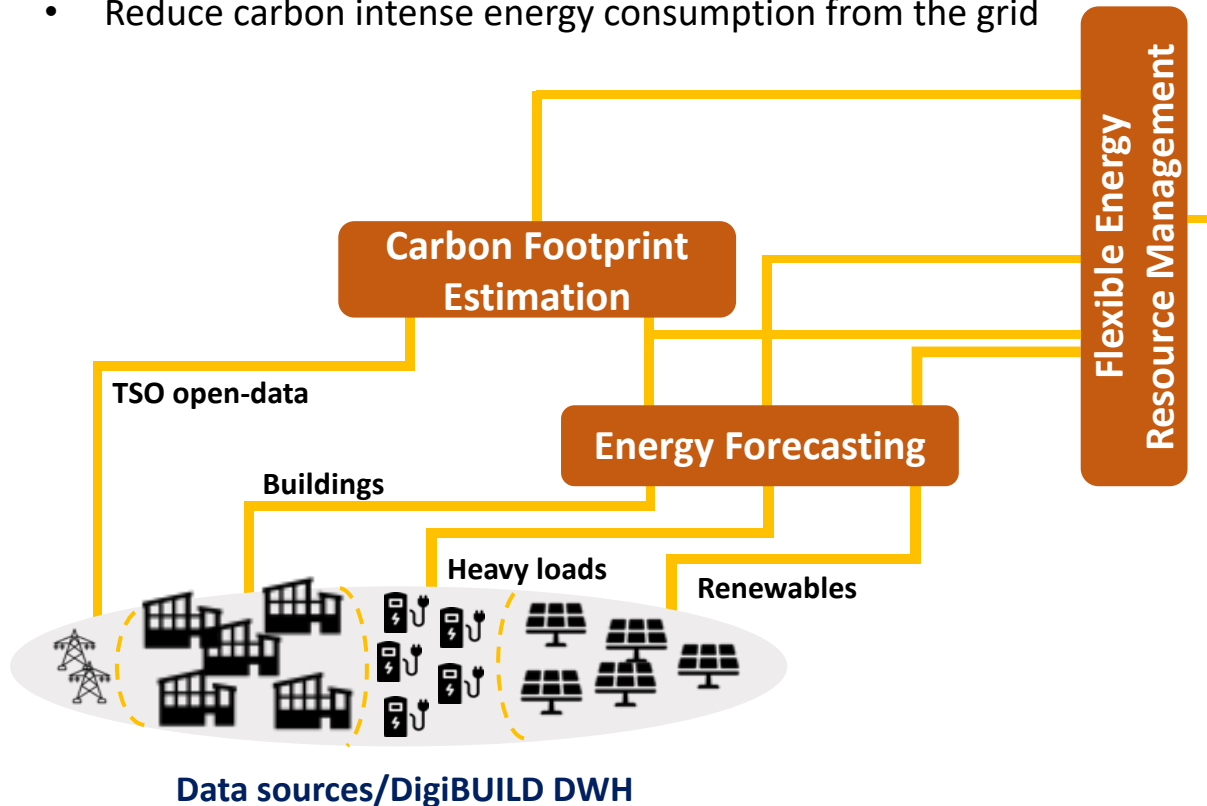


Stoian, D., Spiliotis, E., Stamatopoulos, E., Sarmas, E., & Marinakis, E. (2024, July). A web-based decision support tool for efficiently monitoring and upgrading HVAC systems. In 2024 15th International Conference on Information, Intelligence, Systems & Applications (IISA) (pp. 1-7). IEEE.

Optimal Management of Energy resources in the Built Environment

Towards zero-carbon buildings

- Heterogeneous data sources & Interoperable services
- Multiple AI-based models in action
- Energy grid informed decision support & Increased self-consumption
- Reduce carbon intense energy consumption from the grid



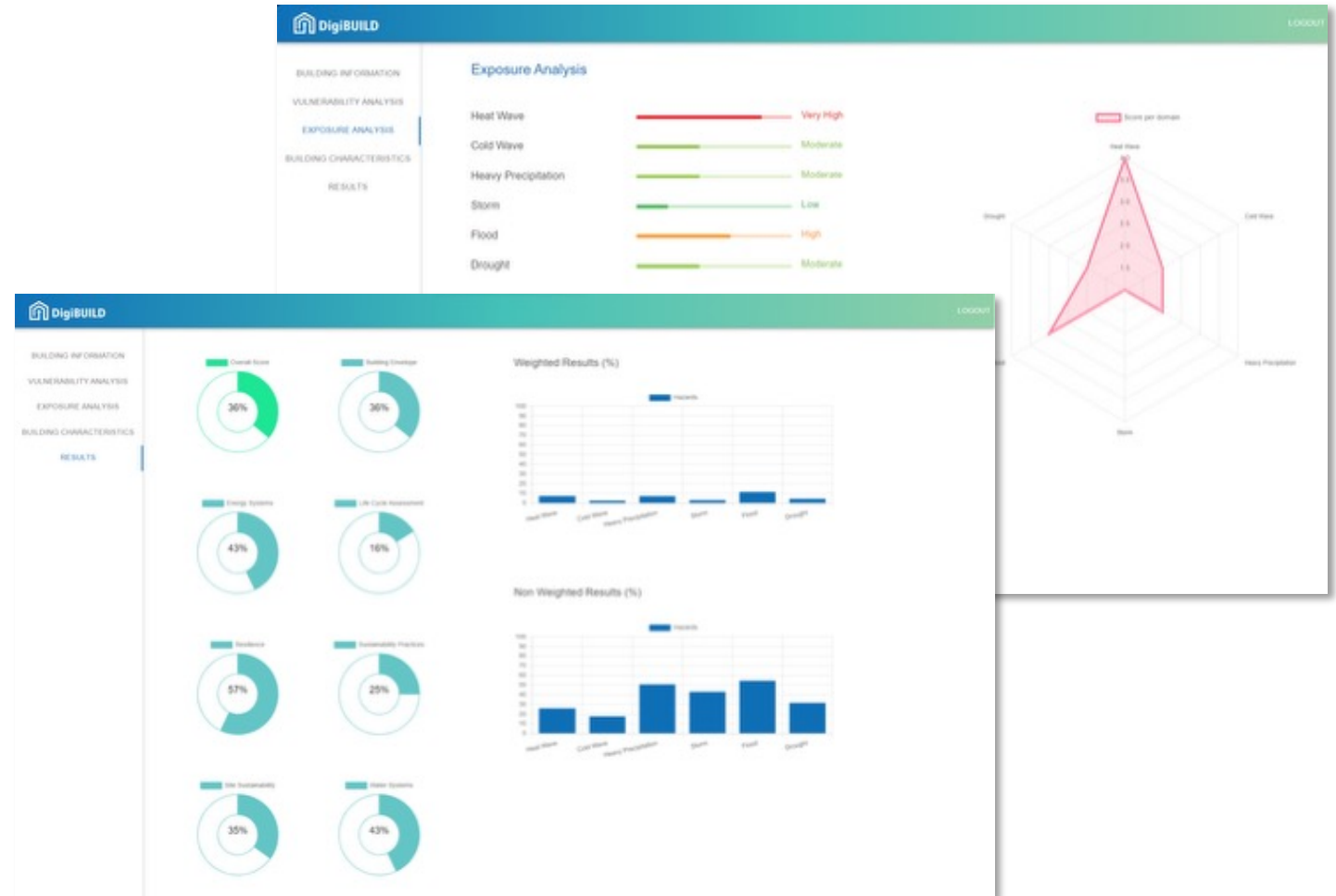
Testasecca, T., Lazzaro, M., Sarmas, E., & Stamatopoulos, S. (2023, May). Recent advances on data-driven services for smart energy systems optimization and pro-active management. In *2023 IEEE International Workshop on Metrology for Living Environment (MetroLivEnv)* (pp. 146-151). IEEE.



Buildings Climate Resilience Assessment Tool



- ✓ Assesses a building's ability to **anticipate, prepare for, respond to, and recover** from climate events.
- ✓ A **dynamic weighting system** based on climate exposure was developed, allowing for **location-specific** resilience assessments.
- ✓ Evaluates **vulnerability** in different domains of **buildings' components** (energy systems, building envelope, water systems, etc.)



Stamatopoulos, E., Forouli, A., Stoian, D., Kouloukakis, P., Sarmas, E., & Marinakis, V. (2024). An adaptive framework for assessing climate resilience in buildings. *Building and Environment*, 264, 111869.

From ready-to-market AI-based services...



How resilient is your building?

ResiBUILD is a smart, user-friendly tool designed to help you assess how resilient your buildings are to today's – and tomorrow's – climate hazards. As climate disasters grow more frequent and intense, it is important to ensure safety and be prepared. ResiBUILD makes it easy to **evaluate your building's resistance** to the specific hazards that threaten your area, from floods and heatwaves to storms and more. It identifies **weak points**, **highlights strengths**, and provides clear resilience scores for your entire building and each of its components. Whether you're a homeowner, architect, planner, or developer, ResiBUILD empowers you to strengthen your structures, **reduce risk**, and build for a safer, more climate-resilient future.



Local Hazard Risk

Identifies threats like floods, storms, and heatwaves based on location.



Building Assessment

Evaluates key components like structure, energy, and water systems.



Resilience Scoring

Calculates scores for your entire building and its critical components.



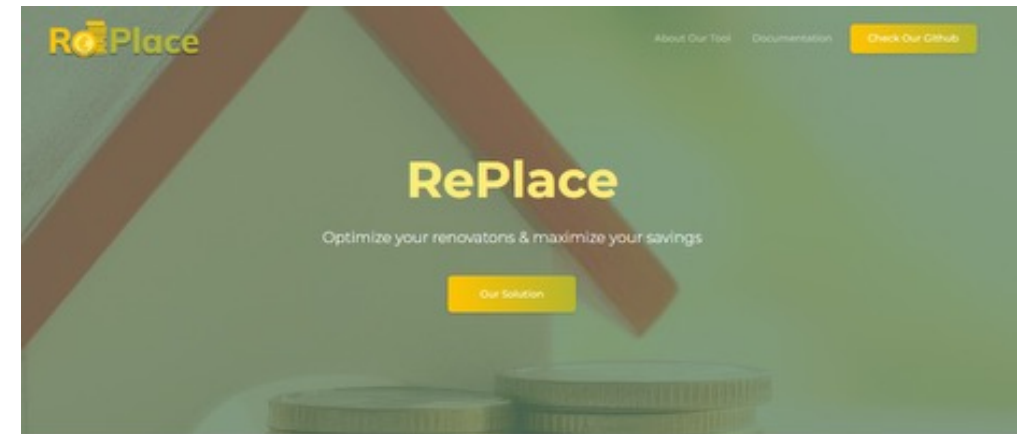
Smart Insights

Provides actionable suggestions for improving climate readiness.

Get your assessment easily now!

You can find our tool on GitHub or try it through our website for free.

Check our tool



Start planning your energy-efficiency renovation

RePlace is a one-stop-shop designed to transform your building into an energy-efficient powerhouse, using the most **effective energy-saving measures**. Whether you're a homeowner, property manager, or developer, RePlace goes beyond simple upgrades – it's your guide to **smarter, more sustainable renovations**. Our tool can help you prioritize energy-saving measures, such as better insulation or efficient HVAC systems, by **analyzing your budget**, exploring and modeling **all possible scenarios**, and finally pinpointing the perfect blend of **financial savings**, **environmental impact**, and **comfort**. With a user-friendly interface and powerful algorithms, RePlace takes the guesswork out of deep renovation, providing you with a **personalized, cost-effective upgrade plan**. Start transforming your space with confidence – sustainability, savings, and simplicity, all in one place.



Building Modeling

Enables you to choose suitable measures for your building and set your renovation goals.



Renovation Pathways

Models and ranks every possible renovation scenario to find the most effective and cost-efficient path.



Smart Insights

Get the best renovation options with informative financial, energy and environmental data.

Plan your renovation now!

You can find our tool on GitHub or try it through our website for free.

Check our tool



...towards Buildings' Digital Twins & Building Logbooks



Digital Twins for building operation



Digital Twins for energy efficient buildings



Digital Building Logbooks



Digital Twins for scale management and operation

Key partners



INTERNATIONAL CONFERENCE

ENERGY IN BUILDINGS ATHENS 2025

ΥΠΟ ΤΗΝ ΑΙΓΙΔΑ ΤΟΥ TEE

THANK YOU! Q & A

NAME: Elissaios Sarmas
EMAIL: esarmas@epu.ntua.gr

09:00-18:00 | @ DIVANI CARAVEL HOTEL, ATHENS

COMMUNICATION SPONSORS

B2Green

T-PRESS

ΕΠΕΜ Ο
ΥΠΕΡ ΤΗΝ ΚΟΖ

KTIPIO
ΕΚΔΟΣΕΙΣ

ΠΡΑΞΙΝΟ 

GOLD SPONSOR

 **ARISTON**
GROUP

 ARISTON

 WOLF

 elco

 AEROGAMMI S.A.

 interplast

 Midea MBT
ΟΜΙΛΟΣ
ΠΟΤΥΣΚΟΤΗ

 Haier
KOKOTAZ

 LG Business
Solutions

 AHI
Center

 AIRTECHNIC
www.airtechnic.gr

 Mechanical
Solutions
AQUARK

 menerga
a systemair company

 AC

 dimtech

 ITM

 prihoda

 ebc
ELECTROMECHANICAL
BUILDING
EQUIPMENTS

 systemair

 FERNOX
MAKES WATER WORK

 TRANE

 FUJITSU
AIRSPACE

 westnet
AUX

 GEBERIT

 wilo

 IDATOR

 zeb
The Energy Building