



## CERTH's IoT Platform: an application in the nZEB Smarthouse DIH

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# The nZEB Smart Home DIH

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- A rapid prototyping & novel technologies demonstration infrastructure resembling a real domestic building where occupants can experience actual living scenarios while exploring various innovating smart IoT-based technologies.
- **Fully operational** Digital Innovation Hub since 2017
- **Constantly evolving collaborations** in Regional, National, & EU level
- Already participates/has participated as a pilot infrastructure in more than **20 R&D** projects
- **Active role** in most EU initiatives for DIHs so far



# Solutions



Smart Energy  
Microgrid



Smart RES



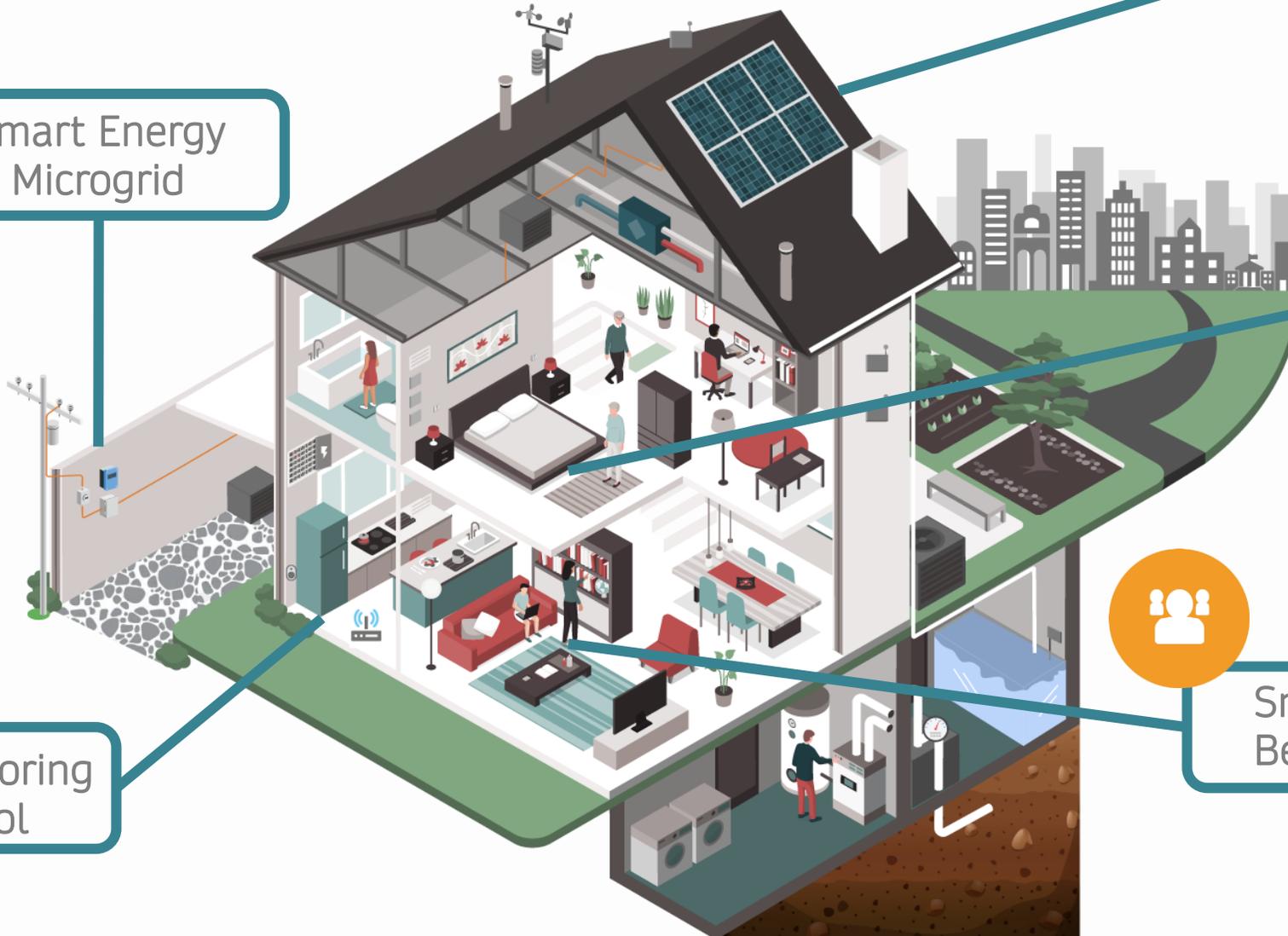
Smart Health



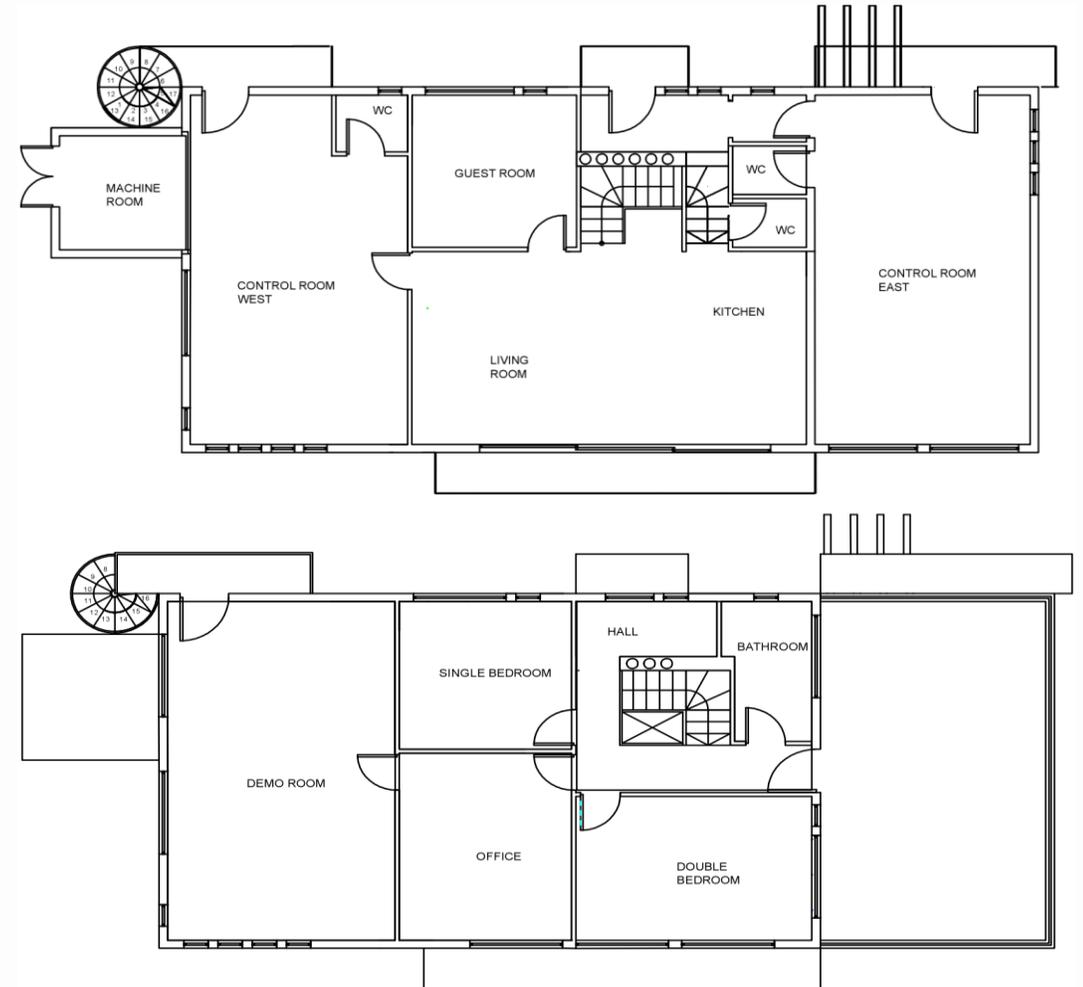
Smart Human  
Behaviour Analysis



Smart Monitoring  
& Control



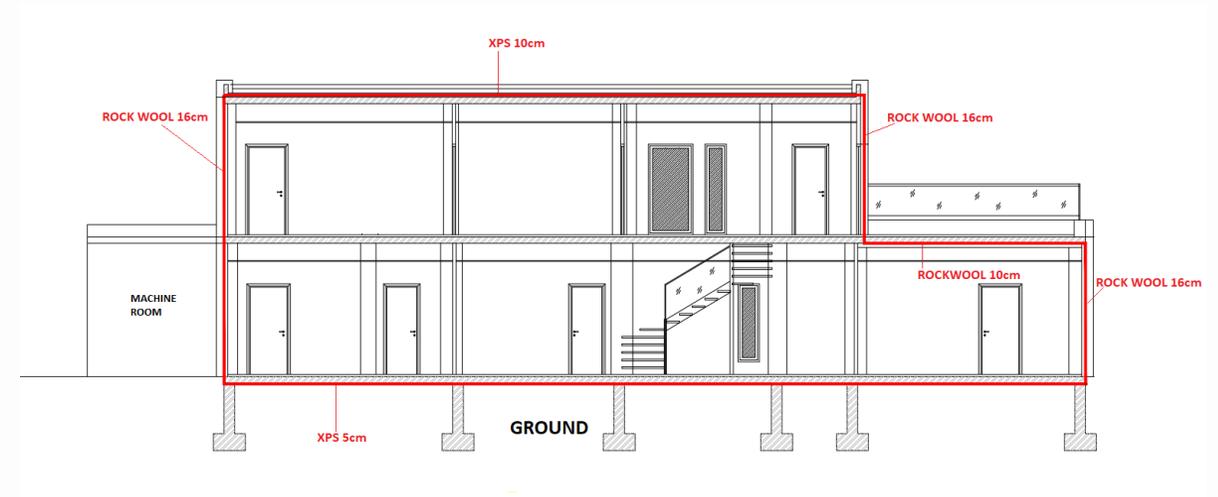
# Infrastructure



As the first Smart near-Zero Energy Building in Greece, it combines **enhanced construction materials** and **intelligent ICT solutions** creating a future-proof, sustainable and active testing, validating and evaluating ecosystem.

# Infrastructure – the state of the art construction concept

- Cutting-edge envelope **insulation materials**
  - Thermal insulation
  - Sound insulation
  - Fire protection
  - Passive Ventilation
  - Mechanical endurance
- **Triple and Double glasses** for windows with extremely **low thermal losses (0.6 / 1.1 W/m<sup>2</sup>)**
- Complete access to the envelope for further interventions



# Infrastructure – the first grid connected microgrid in Greece

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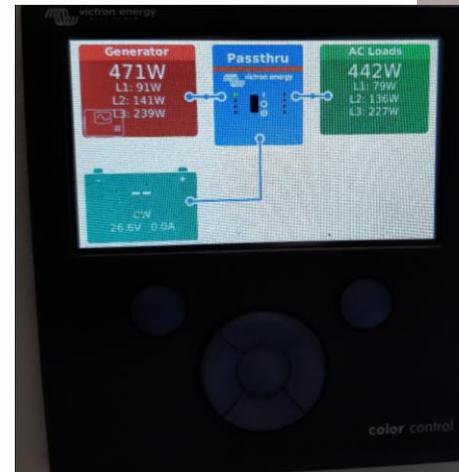
- Integration of **multiple heterogeneous renewable energy technologies** into a single ecosystem:
  - 9,57 kWp Thin Film CIS **PVs** (rooftop)
  - 0,85 kWp a-Si **PVs** (east facade)
  - 2 kWp Vertical Axis Wind Turbine
  - 5 kWh Li-on **Battery**
  - Controllable and non Controllable **Loads**
  - Up to 22kW **EV Charger** – V0G / V1G
  - Protection systems for automated / controlled transition from grid-connected to **islanded operation** and vice versa.
- Real-time optimized energy management

# Infrastructure – the first grid connected microgrid in Greece



# Infrastructure – smart, interoperable monitoring & control systems

- Light dimming
- HVAC full control
- Smart, wifi-enabled home appliances
- Multi-layered smart meters (electricity, water etc.)
- A highly diverse (IoT) multi-sensorial & actuation network for multidisciplinary case studies (environment, energy, health, etc.)
- **One advanced, flexible solution to unify them all: CERTH's IoT Platform**



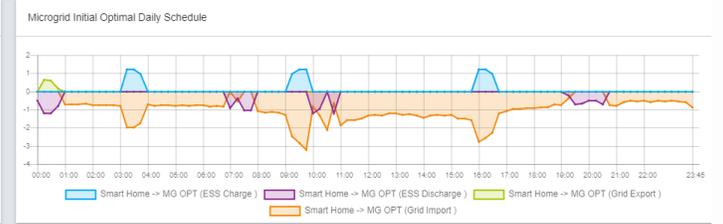
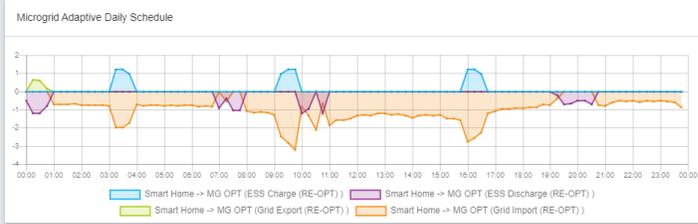
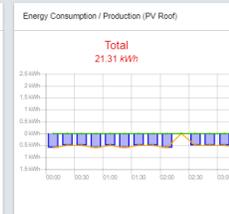
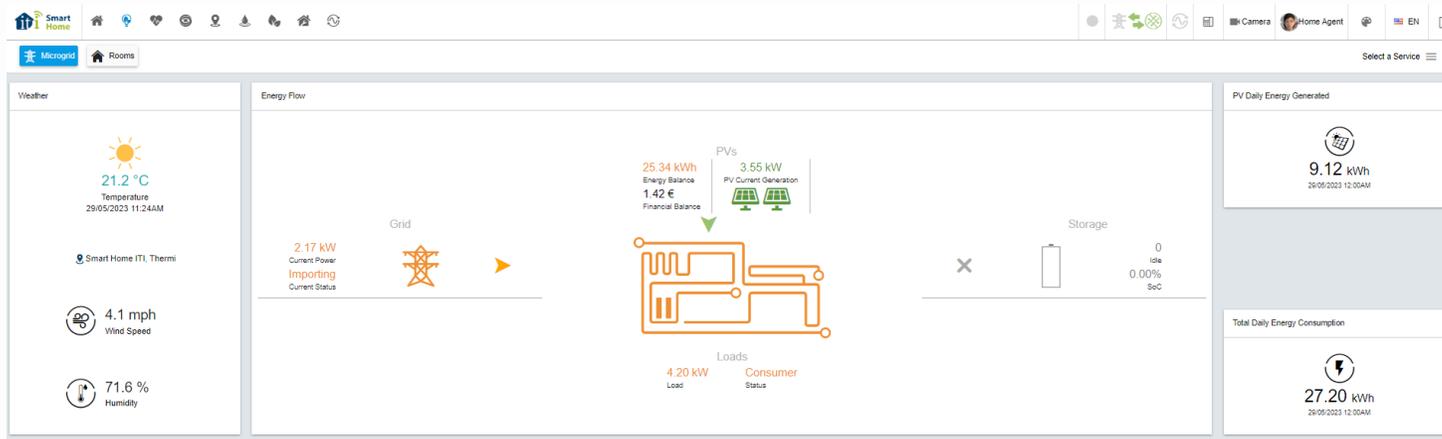
# IoT Platform – semantic interoperability

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- Aggregating devices using different communication protocols through a single management interface



# IoT Platform – monitoring, control and intelligence



# Real-life testbed– in-house developed service robots

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*a Digital Innovation Hub*

*powered by CERTH/ITI*

**Live demonstration**

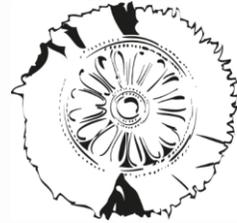


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**Thank you**

**Questions?**

Project Partners



**POLITECNICO**  
MILANO 1863

