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TIPS4PED

TIPS4PED - Turning Cities' Planning Actions for PEDs into Success

Project Overview & Digital Twin Applications

HORIZON Innovation Actions | Project: 101139633
TIPS4PED - HORIZON-MISS-2023-CIT-01

Co-funded by
the European Union

Overview

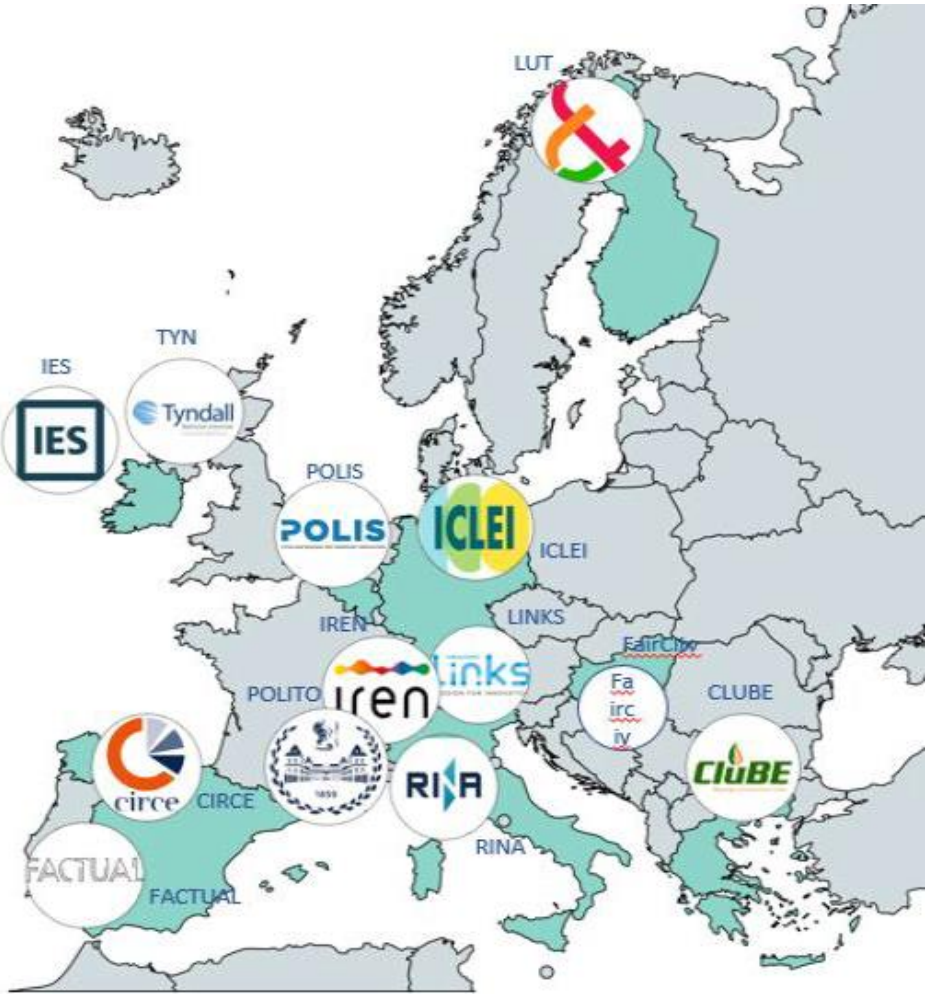
2027

The project will run between January 2024 and May 2027

6.5

with a budget of almost 6.5 million EUR

The TIPS4PED consortium is represented by **17 partners** and 1 affiliated entities **across 7 countries.**



Demos:

- **1 Light House City** (Turin)
- **3 Follower Cities** (Cork, Budapest and Kozani)

Problem statement

CITIES TODAY
Barriers and driving forces

- Lack of technical support
- International & EU Policy
- Financial local incentives
- Social acceptance

- **DRIVER 1**: Cities are large energy consumers and carbon emitters
- **DRIVER 2**: Local governments lack of streamlined and cross-sectoral decision-making procedures
- **DRIVER 3**: Urban systems' complexity presents a challenge for planning, design and management
- **DRIVER 4**: Citizens must be involved in the energy transition
- **DRIVER 5**: Policies are frequently inadequate to tackle sustainability goals in cities

Project objective

TIPS4PED aims to facilitate city planning actions for PEDs:

- supporting municipalities and key stakeholders in the **decision-making process**
- **delivering a series of evidence-based KPIs**
- enhancing **access to information**
- creating a **dynamic district Digital Twin** able to **adapt/optimize the PED over time and space**
- including modules for the **financial, regulatory and administrative support**

The Mission of TIPS4PED

Design, **develop**, and **test** a **Digital Twin-based platform** to support municipalities in implementing **PEDs**

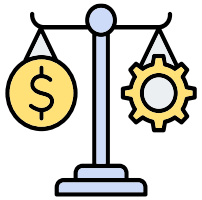
Improve decision-making

Enhance urban sustainability

Reduce energy costs

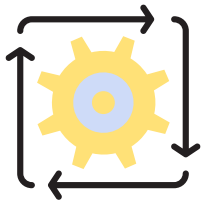
The Mission of TIPS4PED

TIPS4PED's Integrated Assessment Platform is structured in three core modules



FEASIBILITY
Selects the best PED candidate among alternatives

DESIGN and ROADMAPPING
Defines actions and timeline to reach energy positivity



OPERATION
Monitors performance and suggests optimizations

Digital Twins ensure **coherence** across these modules, supporting:

- **Scenario simulation**
- **Cross-domain integration** (buildings, transport, energy)
- **Operational optimization** (real-time management)
- **Real-time monitoring and informed decision-making**
- **Transparency** and **participatory planning** with **local actors**

Role of the demonstration sites

The **IAP will be tested in Turin** (LH) district and will be **replicated in Cork, Budapest and Kozani**. For each city PED DT will be generated using the Integrated Assessment Platform.

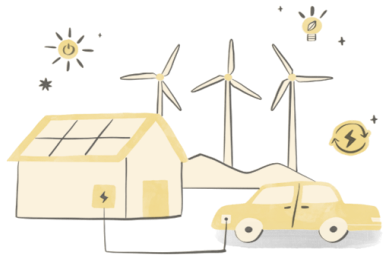
TURIN	CORK	BUDAPEST	KOZANI
			
Implementation and Testing of **ALL** the IAP tools	**Feasibility Assessment Tool** tested in **8 areas** of the **Docklands**.	One out of the three tools will be tested in **district of Kőbánya**	One out of the three tools will be tested in **ZEP area**

Feasibility Phase – the first step towards positivity

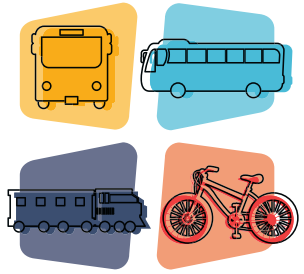
Provide municipalities with a **user-friendly** tool to identify urban areas with the highest potential to become a PED

Based on interoperable modules

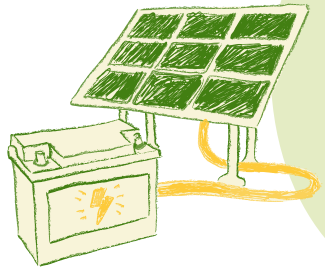
Energy sources and buildings energy demand mapping module + e-mobility demand forecasting



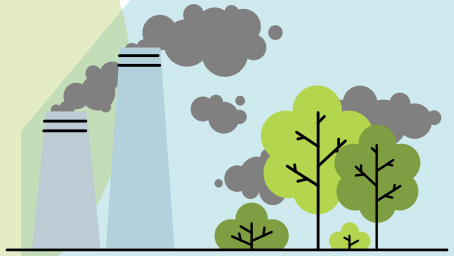
Public Transport and shared mobility energy transition strategies



Analysis of the diffusion of energy conversion technologies and storage systems



GHG emissions calculation module



Preliminary **techno-economic assessment** to understand how close a district is to become a PED and what is needed to achieve it

Feasibility Phase – Workflow

Inputs on the IAP

- IAP inputs collection
- QGIS inputs collection
- Input preprocessing

Baseline Scenario

- Build baseline scenario (current system)
- Integrated demand (buildings + mobility)
- Simulate baseline performance

Future Scenario

- Define target KPIs and optimisation criteria (CO_2 reduction, RES share, costs)
- Optimise integrated energy system (technologies + RES + energy balance)
- Simulate future scenario
- Compare results and select best pathway

Outputs on the IAP

- KPI comparison (baseline vs future)
- Energy & emissions assessment
- Decision-support outputs
- PED Index

- Evaluates **how close a district is to becoming a PED**
- Supports **early-stage planning** and benchmarking across districts

Design and Roadmapping Phase

Enable **long-term planning towards energy-positive districts** by leveraging Digital Twin technology to **simulate interventions** and assess their impacts at multiple scales

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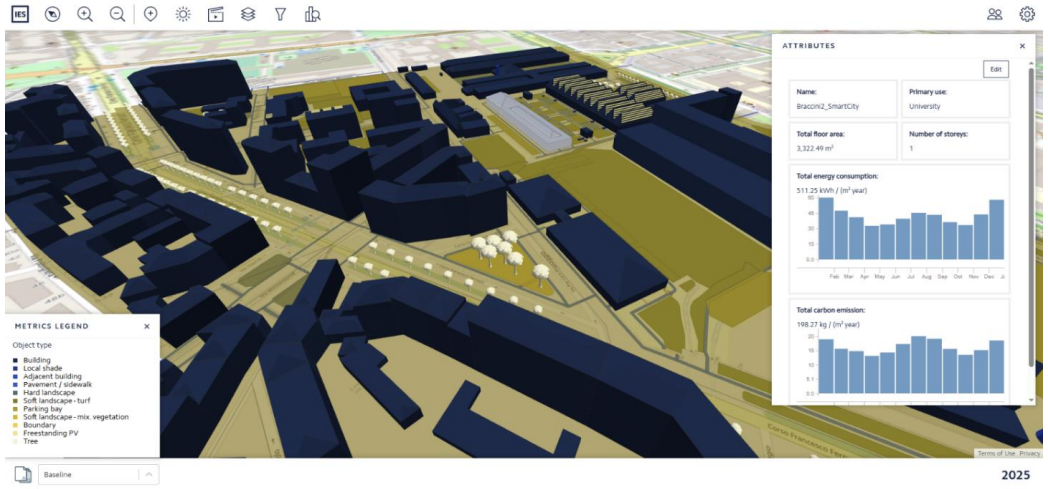
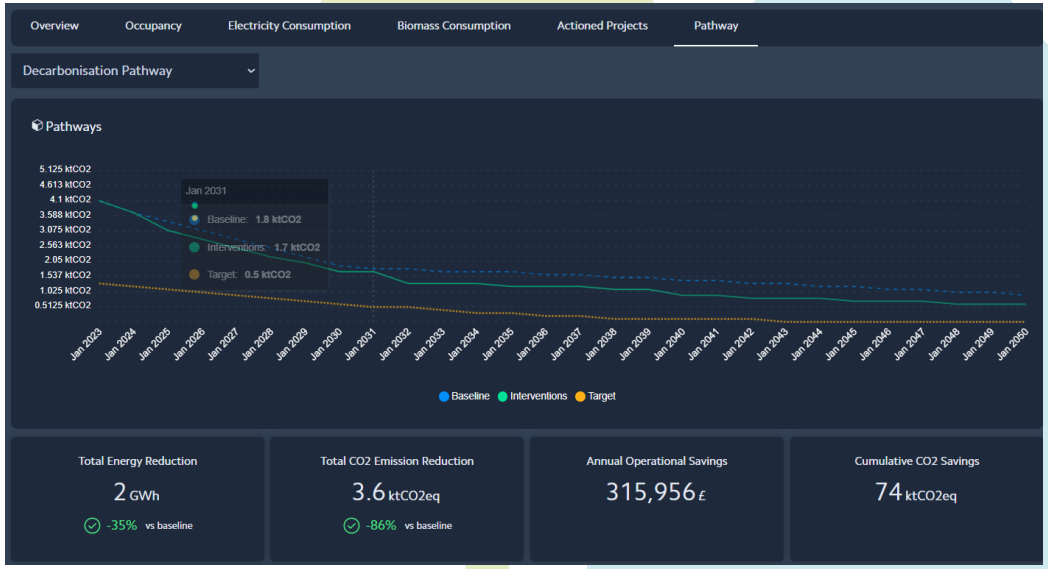
Define **step-by-step pathways for implementing the selected interventions** within a given time horizon.



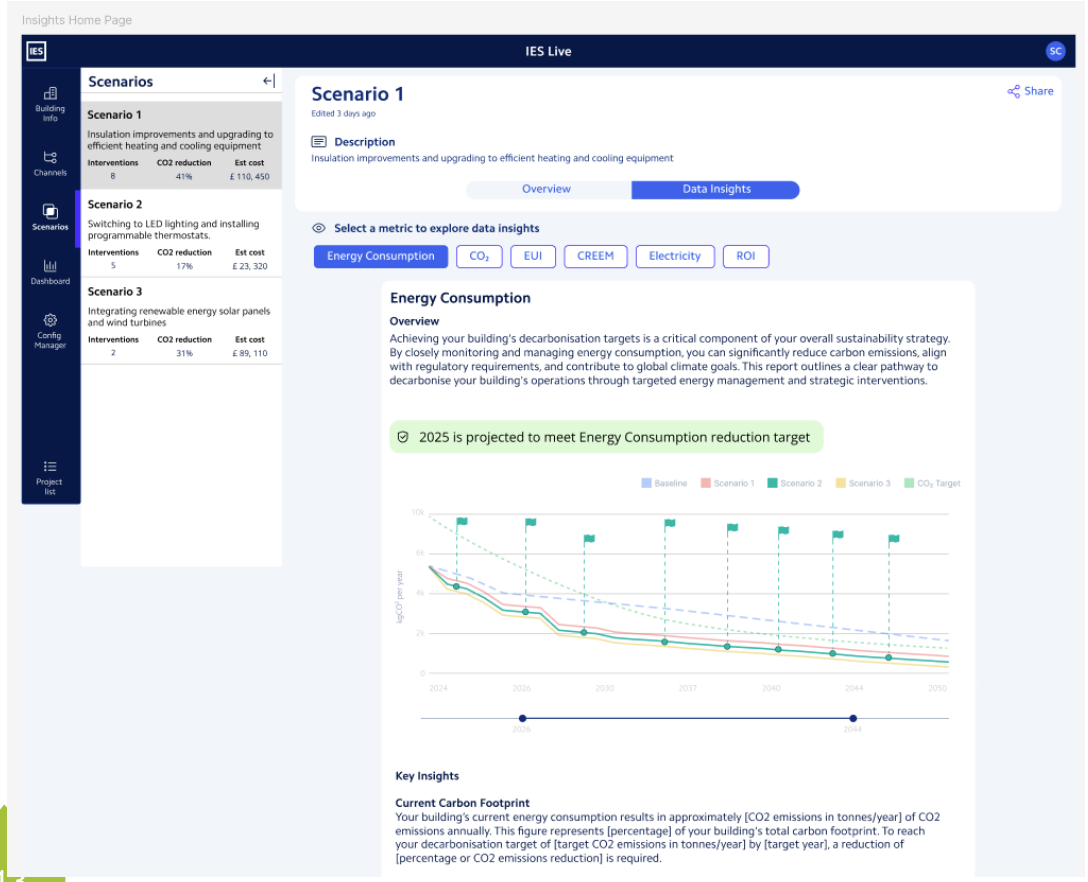


Workflow

Digital twin set up → Data collection, energy modelling, baseline simulation & validation → **Simulation of PED-scale scenarios** → **Roadmap**

Design and Roadmapping Phase

Roadmap – Set of measures needed to reach energy positivity considering Energy/Cost/CO_2



Operation Phase

Enables **continuous performance monitoring and operational optimization** of PEDs through the use of **calibrated digital twins**. Its purpose is to ensure that PEDs maintain energy positiveness over time by dynamically **adjusting operational strategies based on real-time data and predictive simulations**

Workflow

Digital twin set up → Accurate data collection, energy modelling, baseline simulation & calibration (with sensor data) → **Optimised PED Operation** through actionable dashboards

Operation Phase

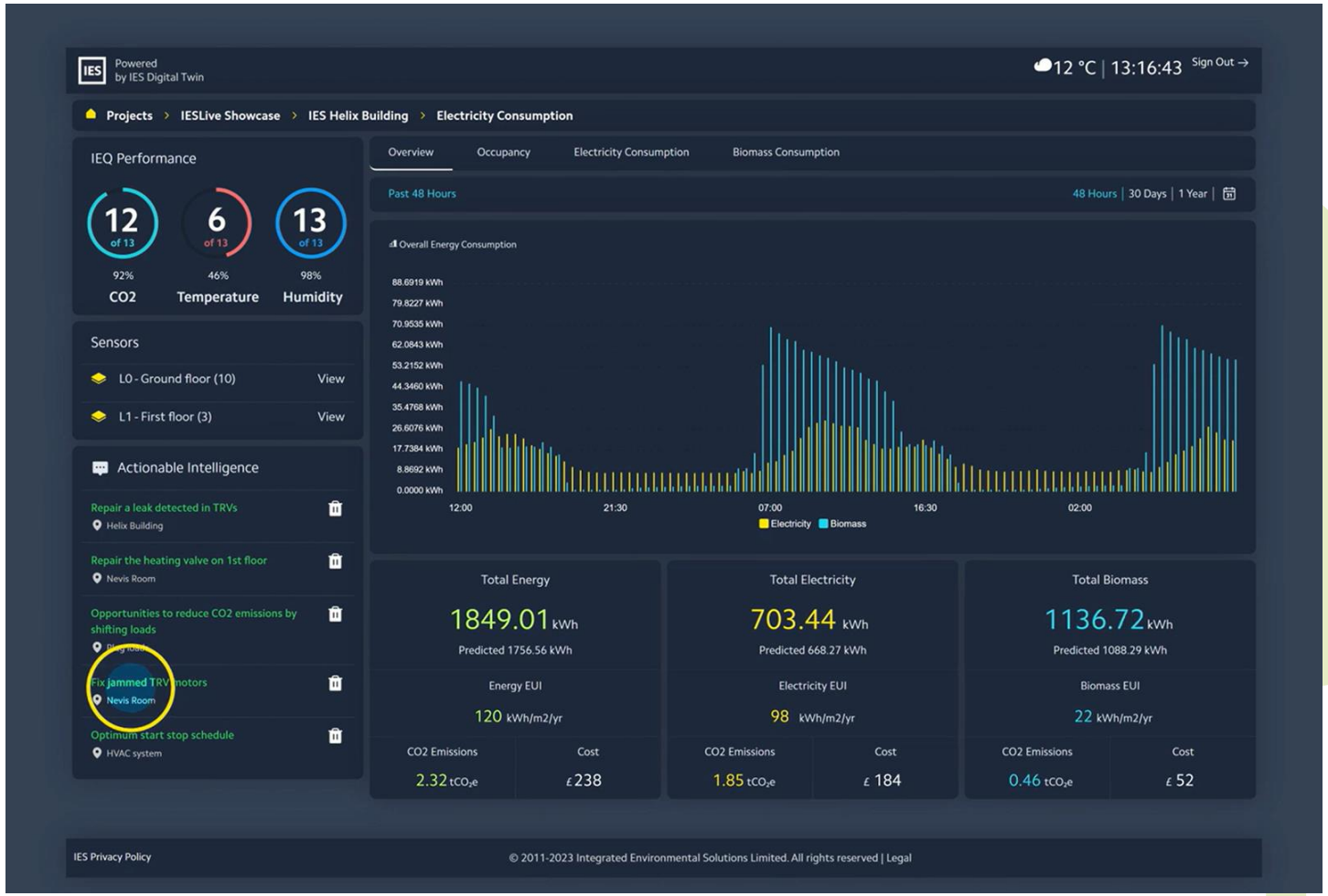
OPERATIONAL DASHBOARDS – PER BUILDING

RELYING ON SENSOR DATA – ENERGY/ CO2/ COSTS OPTIMIZATION

Operation Phase

OPERATIONAL DASHBOARDS – PER BUILDING

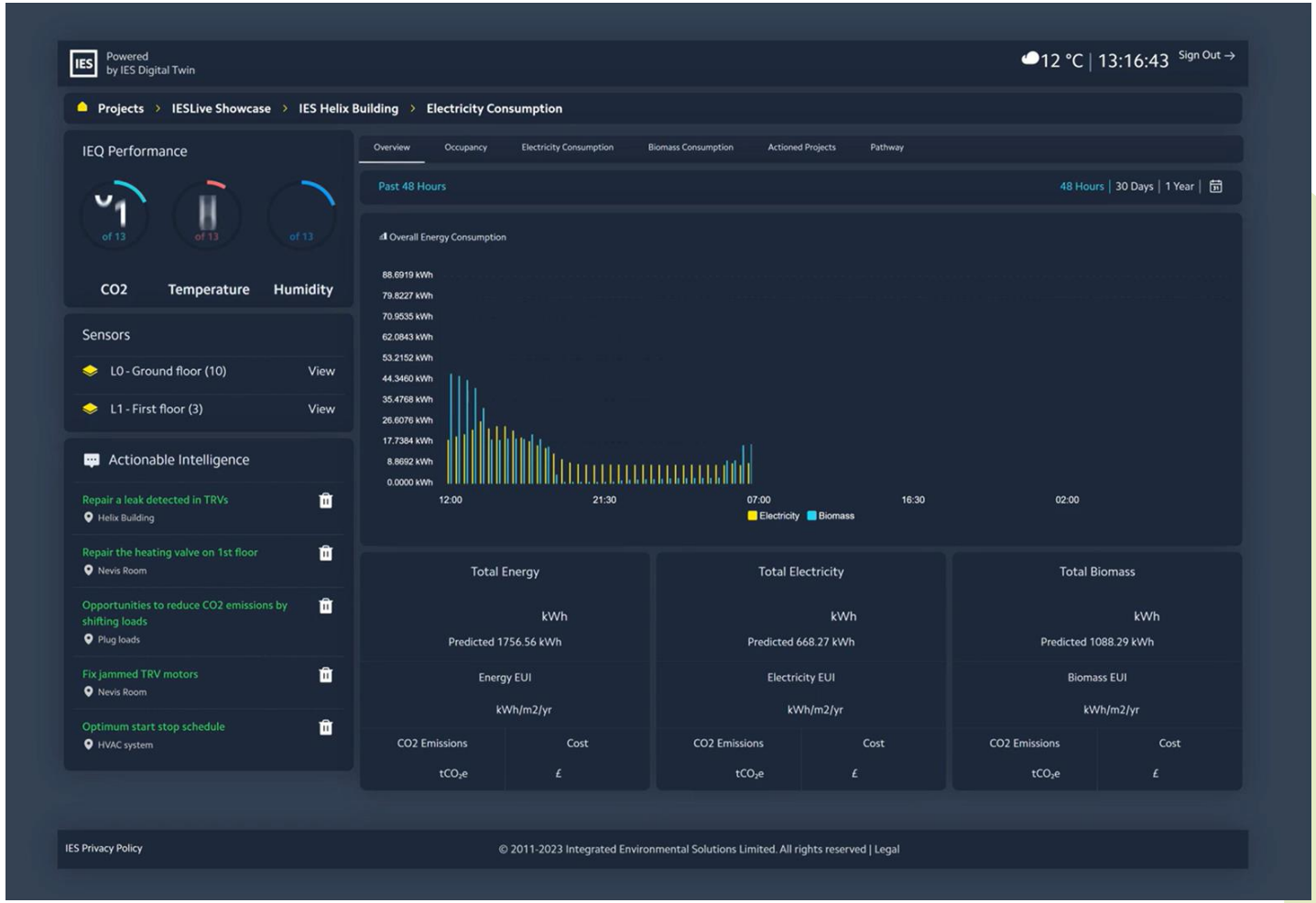
RELYING ON SENSOR DATA – ACTIONABLE INTELLIGENCE



Operation Phase

OPERATIONAL DASHBOARDS – PER BUILDING

RELYING ON SENSOR DATA – DECARBONIZATION PATHWAY



What's Next? Scaling TIPS4PED towards real implementation

Integration into the platform

- Integration of feasibility, design and operation modules into the Integrated Assessment Platform
- End-to-end workflow for PED planning and management

Validation in real urban environments

- Testing in the Lighthouse city: Turin
- Replication and adaptation in Follower Cities: Cork, Kozani, Budapest
- Module-level and platform-level validation

Impact monitoring and assessment

- Monitoring energy, environmental and socio-economic impacts
- Evaluation of benefits at district level
- Feedback to improve tools and support decision-making

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THANK YOU!

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