



Finanziato  
dall'Unione europea  
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## WEPOP Project – International Dissemination Activity within PRIN 2022

The **WEPOP – WEearable Platform for Optimised Personal Comfort** project (Prot. 2022RKL3J), funded by the **European Union – Next Generation EU**, under **Mission 1 “Digitalisation, Innovation, Competitiveness and Culture”, Component 2**, within the **PRIN 2022 Programme**, continues to strengthen its international positioning through high-level scientific dissemination activities.

Within this framework, **Prof. Anna Laura Pisello** and **Dr. Veronica Martins Gnecco** participated in the **IEA EBC Annex 87 meeting**, held on **3–4 April 2025** at the **Fraunhofer Institute for Solar Energy Systems (ISE)** in **Stuttgart, Germany**, after a first fruitful meeting still of the Annex 87 partnership in Tokyo (University of Tokyo and Tokyo Conference Centre for the IAQVEC conference) where prof. Pisello and the WEPop coordinator **prof. Marco Arnesano** also contributed.

The participation represents a strategic dissemination action fully aligned with the scientific objectives, methodological framework, and expected impacts of the WEPop project.

## Scientific Contribution of WEPop within the framework of Annex 87 (IEA EBC - Annex 87 - Energy and Indoor Environmental Quality Performance of Personalised Environmental Control Systems)

Recent research has highlighted the limitations of traditional indoor environmental comfort assessment methods, which often fail to capture the **subjective, multidomain, and dynamic nature of human comfort perception**. In response, **personal comfort approaches** have emerged as one of the most promising paradigms, enabling the integration of **physiological, environmental, and personal data** to improve comfort prediction, building control strategies, and energy efficiency.

The WEPop project directly addresses these challenges by developing a **novel edge-computing platform** for **real-time personal comfort measurement and control**, exploiting the convergence of:

- wearable physiological sensors,
- environmental IoT sensing systems,
- artificial intelligence-based Personal Comfort Models (PCMs).

Despite recent technological progress, existing studies remain limited to small sample sizes, single comfort domains (thermal or visual), and highly controlled laboratory conditions, preventing large-scale real-life applications. WEPop responds to this gap by targeting **multidomain comfort, intra- and inter-subject variability**, and **real operational contexts**, providing evidence of:

- enhanced occupants' comfort (dissatisfaction reduction > 5%);

- improved building energy efficiency (minimum –10%).



Figura 1 - Foto di gruppo presso l'istituto che ha ospitato il meeting scientifico con la prof. Pisello e la dott.ssa Martins Gnecco



Figura 2 Foto del meeting presso il Fraunhofer ISE

### Alignment with Annex 87 Objectives

The scope and objectives of **IEA EBC Annex 87 – Personalised Environmental Control Systems (PECS)** are strongly aligned with WEPOP's research vision. Annex 87 focuses on the development of **design criteria, control strategies, and operational guidelines** for PECS, aiming to enhance:

- personal comfort and health,

- energy efficiency,
- resilience of buildings, including post-pandemic scenarios.

Annex 87 explicitly includes **wearable systems** for heating, cooling, ventilation, lighting, and acoustics—precisely the technological and conceptual core of the WEPOP platform. The discussions held during the Stuttgart meeting on:

- multidomain comfort integration,
- interaction between general HVAC systems and PECS,
- control strategies and long-term performance in real buildings,

directly support the WEPOP ambition to bridge the gap between theoretical personal comfort models and real-life implementation.

### **WEPOP Work Plan and Contribution**

The WEPOP project is structured into **six Work Packages**, involving **four Research Units** with complementary expertise:

- **WP1 – Project Management** (Leader: ECAMPUS)
- **WP2 – Physiological Sensing System** (Leader: UNIPA)
- **WP3 – Environmental Sensing System** (Leader: UNIVPM)
- **WP4 – PCM Platform Development** (Leader: ECAMPUS)
- **WP5 – Platform Validation and Control System Interface** (Leader: UNIPG)
- **WP6 – Dissemination and Exploitation** (Leader: UNIVPM)

The participation in Annex 87 directly contributes to **WP2-3-6**, reinforcing international networking, knowledge exchange, and scientific impact, while also feeding back into **WP4 and WP5** through shared methodologies, validation strategies, and control concepts.

### **Impact and Dissemination Value**

The engagement of WEPOP researchers in Annex 87 (more than 50 participants actively engaged into the network) strengthens the project's role within the international research community working on **personalised comfort, PECS, and human-centric building control systems**. It also supports the broader objectives of the **PNRR and PRIN 2022 programmes**, fostering scientific excellence, international collaboration, technology transfer towards more sustainable, energy-efficient, and user-centred buildings.

Through this mission, WEPOP confirms its contribution to advancing **next-generation indoor environmental comfort paradigms**, where human well-being, digital innovation, and energy sustainability are fully integrated.

## Partners:



The research has been funded by European Union, next Generation EU, Mission 1 Component 2, through the WEPOP (Prot.2022RKLB3J) "WEearable Platform for Optimised Personal comfort" project, within the PRIN 2022 program.

