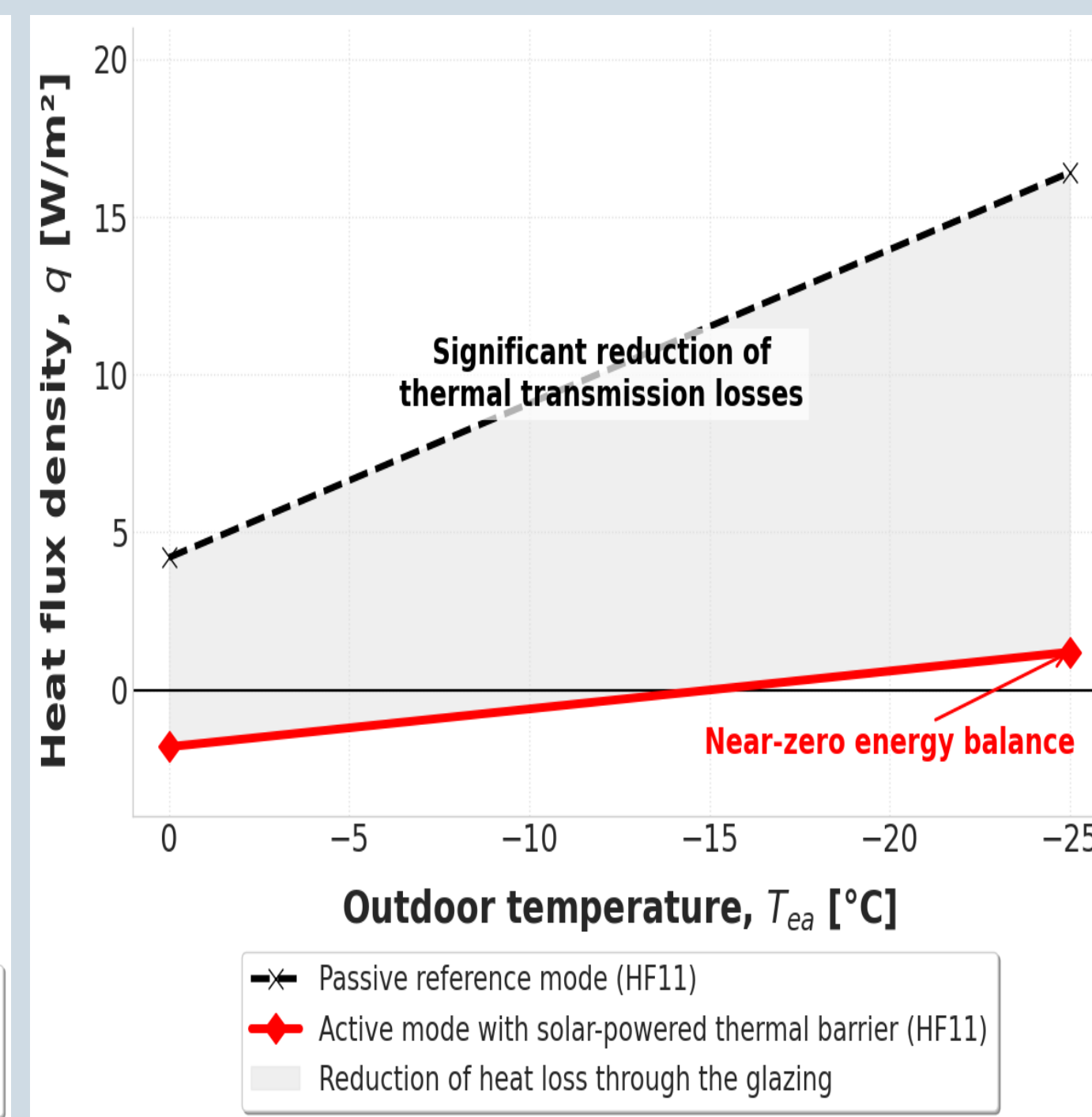
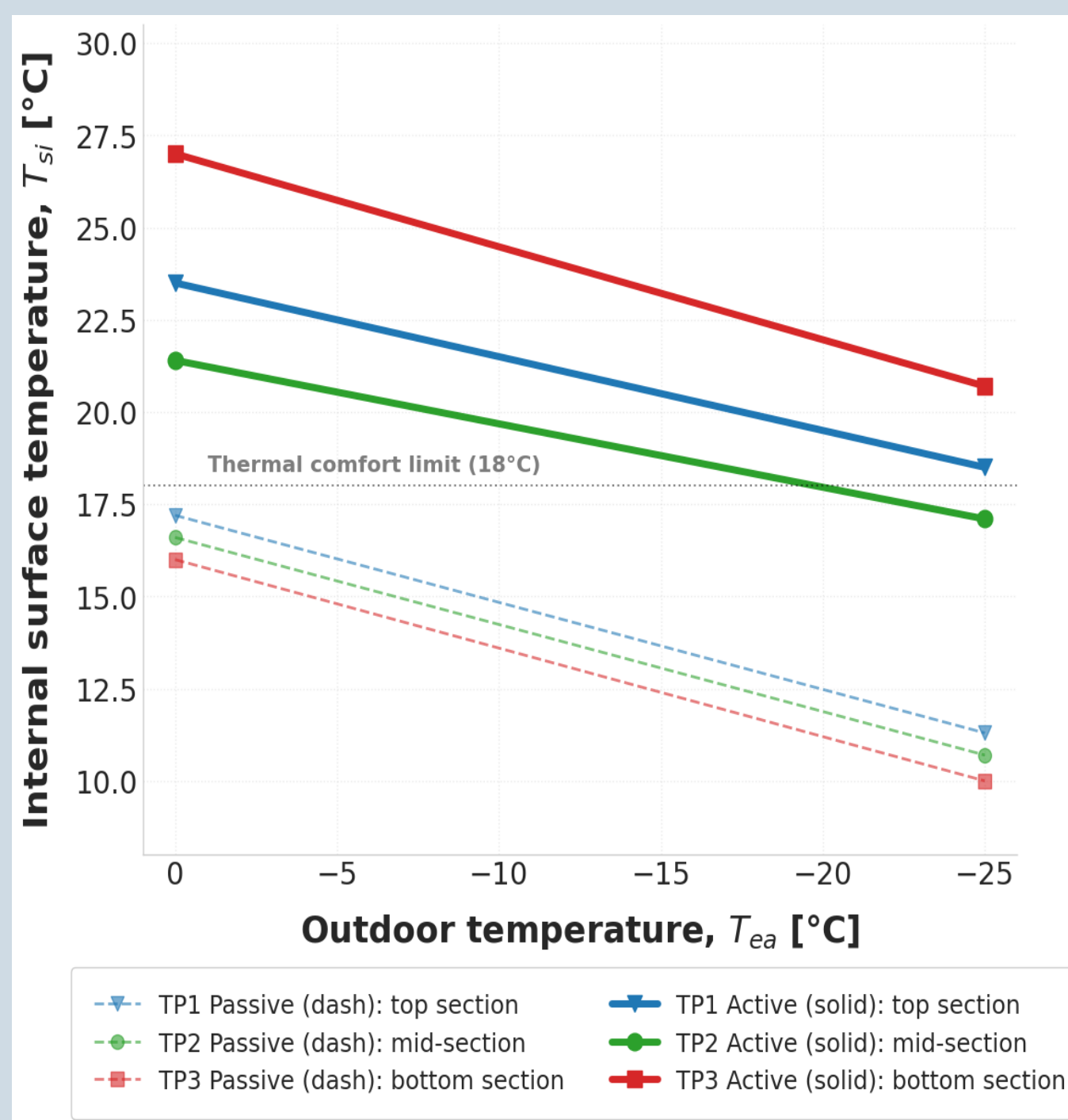


PV-powered active glazing achieves a "near-zero thermal balance", reducing heat flux from 16.4 W/m² to 1.2 W/m² while maintaining a surface temperature of 17.1 °C.



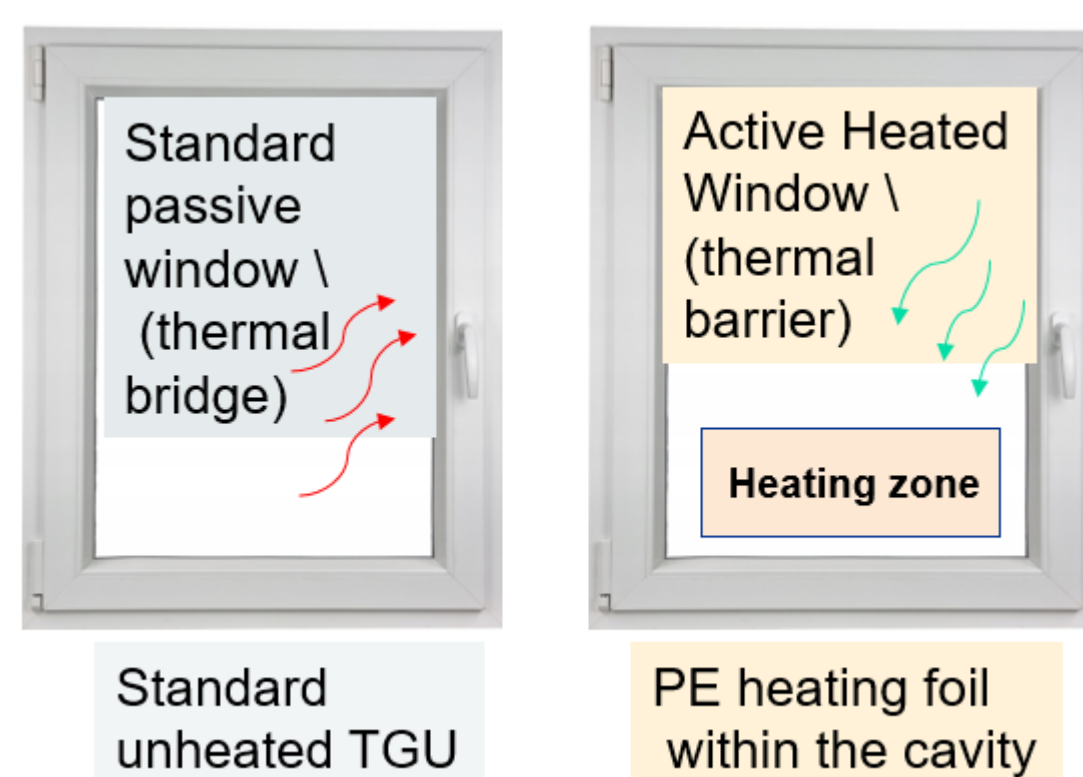
Introduction

The building sector accounts for approx. **32% of global energy demand** and **34% of greenhouse gas emissions**.

Windows are traditionally the most inefficient envelope components, responsible for **30–50% of total transmission heat losses**.

An autonomous "smart window" system integrating:

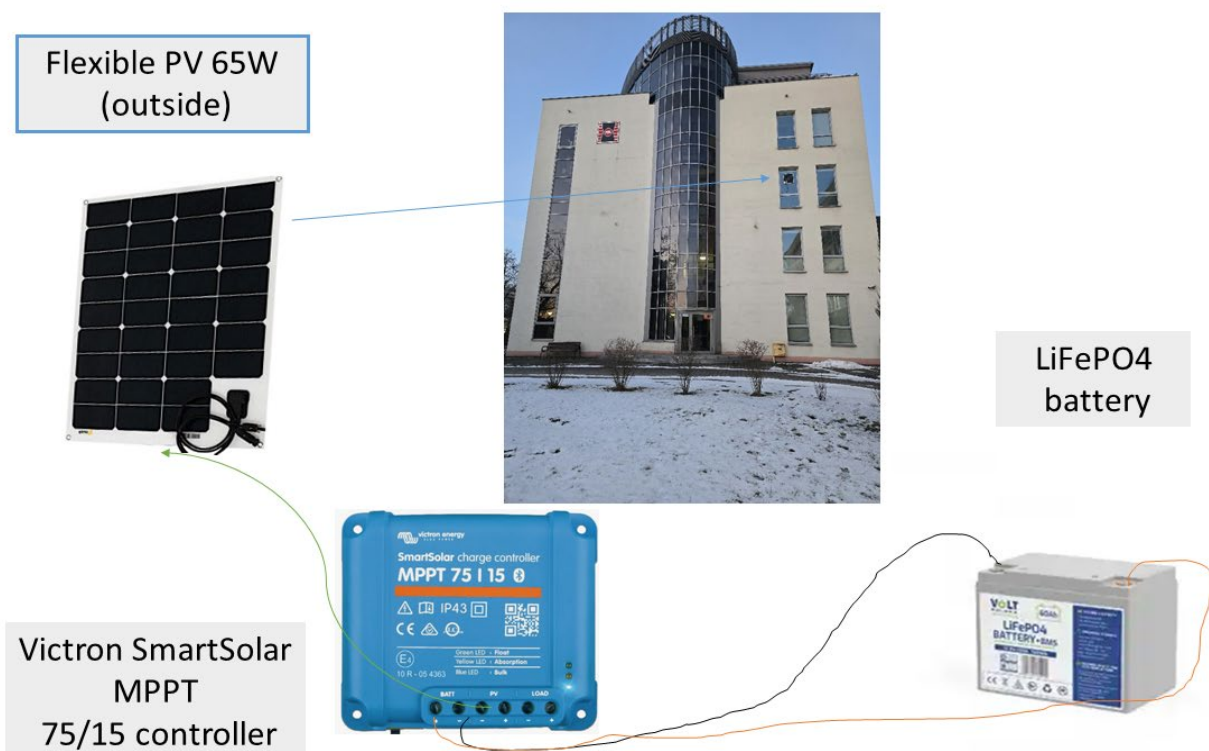
- triple-glazed unit (TGU);
- active polyimide heating element (on surface 5);
- standalone photovoltaic (PV) supply with energy storage.



To transform from a passive „thermal bridge” to an „active thermal barrier”.

Materials and Methods

In-situ field installation



Laboratory test



Results

