

# Home Energy Dynamics (HED) – Frequently Asked Questions

We have prepared a short set of FAQs to address some initial queries for our Home Energy Dynamics (HED) toolkit. If your enquiry is not answered here, please send an email to [info@es.catapult.org.uk](mailto:info@es.catapult.org.uk) with a short description.

## **What is HED?**

Home Energy Dynamics (HED) is a domestic energy dynamic simulation toolkit developed to analyse the performance of heating systems and their interaction with control systems, building fabric, weather, and consumer requirements in UK housing stock.

HED simulations consider the building fabric (geometry, construction types, thermal conductivity and capacity of materials), heating sources (including appliances), heat distribution system, heating control, hot water demand, occupant profiles and preferences, weather conditions, and building orientation.

## **What does it do?**

HED provides a detailed model of heating and hot water in homes. It makes comparisons across a range of retrofit measures, such as changes to the building fabric (e.g. adding insulation, upgrading windows), and changes to the heating system and control. HED models hydraulic flows, and can identify sources of discomfort (such as cold spots, overheating) as well as energy inefficiency.

## **How is HED different?**

HED differs from existing tools and software as it considers occupancy profiles and preferences and uses verified and accurate data sources.

The modelling of hydraulic flows allows for radiator balancing, pressure management, and pump performance analysis. HED is flexible and fast, allowing upgrade options (i.e. new heating system, fabric improvements) to be tested and assessed quickly.

## **What is HED used for?**

The primary purpose of HED is to identify and compare upgrade options, assessing the effect of different technologies and the optimum level of their implementation (e.g. size of boiler, thickness of insulation, combinations of technologies), developing pathways to low carbon heating without compromising householder comfort.

From this primary purpose, HED has been used to assess the effect of upgrade options on the design of district heating networks, and to determine the optimum use of an air source heat pump

(i.e. either in isolation, or in combination with other heating technologies). Used in aggregate, HED will soon be able to quantify the performance of a large numbers of dwellings, considering upgrade options in unison.

### **When should I use HED?**

HED should be used when assessing the thermal performance of domestic dwellings and the possible upgrade options to develop a pathway to low carbon heating.

### **Can I use Home Energy Dynamics on an office building or schools?**

The toolkit is specifically designed for domestic applications, using knowledge of the building regulations, construction styles, and materials used in UK housing over the last 100+ years to make use of the toolkit both efficient and reliable.

Non-domestic buildings use a wider variety of materials, geometries, building services, and usage patterns and therefore cannot be modelled with the existing toolkit.

### **What are the outputs of HED?**

Modelling a domestic dwelling with HED gives a quantified evaluation of the current and possible heating performance (both in terms of energy usage and meeting comfort targets) based on reasonable upgrades to building fabric, heating system and control, leading to a recommended pathway of upgrades to achieve comfortable and low carbon heating.

HED can also be used to troubleshoot homes with heating issues, offering solutions which can be demonstrated and quantified through simulation.

### **How do I access HED?**

Send us an email with a short description of your query or project to [info@es.catapult.org.uk](mailto:info@es.catapult.org.uk) and we will be happy to discuss your requirements.