

## **IEA HTP Annex 60: retrofitting heat pumps in large non-domestic buildings**

### **Progress report for HPT Magazine, October 2023**

## **1 Key information**

### **1.1 Introduction**

IEA analysis shows that over 85% of our buildings need to be net zero by 2050. With heating accounting for over 50% of sector emissions, heat pumps are expected to make a very significant contribution. Heat pumps sales have begun to rise: by 15% globally and 35% in the EU in response to the energy crisis. But installations have to more than triple by 2030 to meet net zero targets.

New buildings can be addressed relatively easily through the building codes. But existing buildings – which make up over half of the potential savings – are much harder. The EU is planning a range of measures including minimum energy performance standards and bans on fossil-fuelled boilers. The UK is considering approaches such as heat pump installation targets for manufacturers. This policy focus will get more intense over the next few years.

Non-domestic buildings are responsible for around 30% of the sector's emissions. However they are notoriously difficult to address because, unlike households, the building stock varies in form, size, function and therefore energy use, leading to a wide variety of possible heat pump system options. Building owners and operators tell us that this creates a considerable degree of confusion about which heat pump system is right for their building.

### **1.2 Objectives and deliverables**

The principal objective of this Annex is to help decision makers deal with this complexity by identifying and quantifying the heat pumps options available more clearly providing simple advice to guide them through the retrofit process.

We will do this by reviewing the available published evidence, performance data and standards, both in the technical and academic literature. This will, we hope help us refine our understanding of the range of heat pump systems available and what guidance is already available that we can use or adapt.

We will also use our industry contacts to speak to a range of organisations that have successfully retrofitted heat pump system to understand the barriers they faced and how they overcame them. The objective will be both to help develop the guidance and also to generate a list of case studies that can be published.

Finally we will develop simple high-level on-line guidance, supported by case studies, to steer decision-makers through the complexity with examples that meet their circumstances. We envisage that the guidance will pose a series of questions with drop-down options that will generate a list of heat pump options together will links to suitable case studies.

The three principal target audiences for the Annex are:

- Building owners and managers, who will need a general understanding of the heat pump system options available to them.
- HVAC system designers and engineers, who will need more detailed information on system options, selection and design.
- Policy makers and their technical advisors, who will need sufficient information to assess the costs and likely outcomes of policy instruments.

We envisage three principal outputs from the Annex:

- On-line guidance to identify the main heat pump system options appropriate for their building, geography and country circumstances and the trade-offs between them.
- A range of case studies that demonstrate the successful deployment of a range of heat pump system options that the guidance tool can point to.
- Ancillary briefing on important issues that can influence decision-making and implementation, for example regulatory issues and grid connection requirements.

These deliverables will be tailored to individual country circumstances and, as far as possible, to fit the requirements of the user based on their role in the organisation.

### **1.3 Meetings**

A hybrid meeting was held at the University of Galway in Belfast April 25-26 2023. The meeting reviewed the activities of the participating countries in detail and considered the general approach to the case studies and the literature review.

Three virtual meetings were also held:

- The first (January 24<sup>th</sup> 2023) considered the general work programme, how the literature review should be carried out and what the output should be.
- The second (July 20<sup>th</sup> 2023) reviewed the preliminary findings of the literature review and kicked off the recruitment of the case studies.
- The third (September 18<sup>th</sup> 2023) reviewed the “logic model” the guidance tool and additional information needed from the case studies.

A “Special Topic” meeting was held on September 19<sup>th</sup> to review our understanding of retrofit decision-making and what the implications were for the development of the guidance. Representatives from Transport for London, University College London, Verco Global and the UK Heat Pump Association were present. The meeting concluded that we should, where practical, consider the role and perspective of the user, and that the case studies were essential in understanding how to do this.

Monthly one-to-one meetings were also established to allow the participants to raise specific issues directly with the OA.

### **1.4 Key data**

Started September 2022, finishes December 2024.

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Participating countries:

Austria  
Canada  
Italy  
The Netherlands  
The Republic of Ireland  
United Kingdom

Further information can be found [here](#).

## **2 Progress**

### **Literature review**

The review uncovered very little information on non-domestic heat pump deployment and almost nothing on guidance for decision makers: perhaps 12 publications in total, mainly in technical or regulatory publications. This does not appear to be a topic that has attracted much academic attention except in general terms focussing on how investment decisions are made in large organisations.

The review did provide considerable background information on the range of heat pump system options available and some indication on how these can vary between countries, for example based on climate. A number of potential case studies were also identified for follow-up.

The limited results of the review mean that we do not plan to write up the results at this point. The publications have been archived and indexed and we will return to this later in the project. We do consider that there may be information available that has not been published for proprietary or confidentiality reasons which may come to light as the project develops.

### **Case study analysis**

The lack of published information on non-domestic heat pump deployment places greater emphasis on identifying case studies and understanding what makes them successful. This meant that this stage of the project has been split into two objectives: to compile a list of case studies for publication and to extract information from the case study organisations to help design the guidance.

We developed a [simple on-line survey](#) for potential case study organisations to complete, asking for basic information on the organisation, the heat pump system adopted and the system it replaced. The survey, together with an explanatory note, was sent to 30-40 potential case studies in September 2023.

We will review progress at the end of October 2023. However we expect that this might be a bottleneck for the project. We may have to change our approach if we receive too few responses.

As a starting point to help us analyse the case studies we reviewed our key knowledge gaps and generated a list of the information we needed to collect once we have some case studies on board.

We also developed a template for the publication of the case studies based on that used for HPT Annex 50.

We also began to scope out how the Annex website would present the case studies, based on EBC Annex 81. We are in discussion with the HPT web team on how this might be implemented on the HPT platform because we do not have a budget to develop our own web platform.

### **Development of the guidance**

We are confident that we understand the technical underpinnings for the guidance, i.e. the main heat pump system options available and how these can be deployed based on the fossil fuel HVAC system they are replacing (or part replacing).

We are still considering how the guidance will work in practice, but we have agreed in outline how the “logic model” will work, i.e. the key questions, filters and ranking criteria that we need to apply to narrow down the options based on the user’s own circumstances.