1. Scope

There is a specific need for planning and design guidance for heat pumps in the residential sector due to the government proposal to phase out gas-fired heating in new build housing from 2025 and decarbonisation impacts of proposed building regulation changes. Furthermore, this is likely to be extended to retrofit in the 2030s.

The Microgeneration Certification Scheme along with partners EST Scotland, RECC and the Heat Pump Association are about to publish general guidance for heat pumps in single family dwellings, covering both new buildings and refurbishment of existing buildings. However, this includes a section of legal obligations of system installers and a guide to the MCS Heat Pump standard MIS 3005 v 5.0. The CIBSE Domestic Building Services Panel Guide to Heating Systems is also being revised to include heat pump systems and this new guidance should be coordinated with the DBSP Guide.

There is a further outstanding requirement for more specific guidance on the design and installation of heat pump systems for multi-residential buildings (flats/apartments, student accommodation and care homes). This guidance should acknowledge its position in the suite of guidance available or being developed for the design, installation and operation of heat pumps, and where possible be compatible with key associated documents.

Scope of the publication would include (although summary is not exhaustive and would be expected to be further developed by tenderer):

- **Introduction and Purpose of Guidance**
  
  It is expected that this guidance document will start from the perspective that an electric heat pump solution has been chosen (options could be individual ASHP/GSHP, ambient loop GSHP with W2W heat pump, high temp heat network with heat pump in energy centre, low temp LTHW circuit and a HTHW HWS circuit (primary via HIU’s).

  This section should spell out the aspiration of the guidance - that it supports the delivery of low energy, low carbon system design and installation that is safe, easy to use, and delivers affordable heat to residents. It should also address whole life carbon emissions.

  This guidance is intended to take the Designer/Client/Housing Association/Developer/Contractor /Installer through the stages of system selection - site assessment, technology choice, design, installation, commissioning and handover/operation/long term management and maintenance. It will also provide guidance to a building management organisation responsible for the safe and effective working of the system in operation to enable them to develop a site-specific operating plan and procedures.

- **Policy context**
  
  This (short) section will describe the drivers for take up of residential heat pumps including: the climate emergency, decarbonisation of electricity grid, government statements on gas to new homes, future need for heating and cooling service provision in warming climate, potential for capacity constraints on the local (and, at peak times national) electricity grid. Authors will need to be mindful of the risk that this section becomes rapidly out of date and compose accordingly.
- **Heat Pumps System description**
  *Introduction to principal types of heat pumps, air source, ground source, including systems providing heating and cooling, applicability to residential (individual and communal uses), design considerations etc. Precautions around refrigerant leakage etc. This should include guidance to aid decision making by the client and designer.*

- **Site layout and building design for optimal operation of heat pumps**
  *This section would set out the design parameters of a home that will support the efficient operation of heat pumps including - orientation and glazing (type, position etc) shading to prevent excessive solar gain (to reduce overheating and/or cooling requirements in summer), passive fabric and solar design to reduce heating demand in winter, identified location for outdoor units in terms of noise, visual impact, security, condensate disposal etc.*

- **System sizing**
  *Guidance on the design and sizing of the system, including space heating controls and emitters, domestic hot water provision and storage (including design to mitigate risk of legionella, whilst not compromising energy efficiency of system), individual and communal systems (cross ref to CP), consideration of low and higher supply temperatures, including integration into existing as well as new buildings.*

- **System optimisation**
  *Guidance of how to optimize the system, including circulation pumps and storage vessels where appropriate and avoid heat pump oversizing and excessive parasitic loads. Use of low temperature distribution and control mechanisms to minimize energy consumption. Could potentially include a lifecycle cost assessment think about the wording so as not to discourage storage.*

- **Interaction with other services (e.g. cooling or electrical)**
  *Description of interfaces with other services, potential for any clashes. Consideration of integration with cooling: if cooling needs are established, whether the heat pump installation can contribute to meeting cooling needs e.g. through ground coupling, with or without reliance on the heat pump itself.*

  *Consideration of other relevant guidance relating to electrical installations. Emphasis on the need for good passive fabric and shading design even where cooling provision is included.*

- **Installation & commissioning**
  *To include good practice advice and appropriate links to more detailed guidance from other sources, including manufacturers.*

- **Handover, maintenance, aftercare and homeowner guidance**
  *Section should detail the responsibilities of the designers, commissioners and installers to support the provision of a low carbon heating system that is easy and affordable to operate and maintain.*

  *The guidance will need to address the operation of the system for the users, including occupiers of individual dwellings and building operators. It will need to explain the various possible approaches, as well as the fundamental differences between heat pump systems and boiler systems.*

  *The guide could provide a template of sections and guidance that should be provided to building occupiers and residents or an alternative approach that delivers on these aims.*
2. Format

The proposed output is a CIBSE Technical Memorandum, providing design guidance with diagrams and schematics. It is anticipated that it would be 30-50 pages long with references (to be agreed by the selected author). It is expected that this TM will be published as a priced downloadable PDF and hard copy.

3. Justification:

The construction sector and building services engineering profession looks to CIBSE to take leadership in producing design guidance for MEP installations. Whilst there is general guidance available for heat pumps there is insufficient specific guidance for heat pumps applied to multi-residential buildings such as apartments, student accommodation and care homes.

This guide will respond to the government’s proposal to phase out gas-fired heating connections for new homes from 2025 and gradually retrofit, starting in the mid 2030s.

In particular, the guide is intended to bring the principle parties in the supply chain together to address the need to move the market from the current level of heat pump installation to that envisaged in 2025 when a significant majority of new dwellings will be heated using heat pump technologies and provide the guidance to enable that to happen in a way that does not jeopardise the consumer experience.

4. Target audience:

The target audience is broad as it will be relevant for construction and property professionals responsible for developing, designing, building and operating multi--residential buildings. This will include engineers, architects and planners, although it is expected to have most benefit to engineers designing heat pump systems for multi-residential buildings.

5. Similar content

Does any guidance exist on this topic? If so, how is this output different?

There is generic industry guidance for heat pumps but this tends to be for larger systems and more commercial applications. The HPA/MCS guide to residential heat pumps for single family dwellings is relevant. This output will be different as it will address specific needs for multi-residential applications. Specific guidance on system sizing, acoustics, visual impact and integration with low temperature heating systems is urgently needed.

The IEA is due to publish Annex 50 "Heat Pumps in Multi-Family Buildings for Space Heating and DHW", which is likely to contain relevant material for consideration in the guidance, for reference or possibly both.

The CIBSE Domestic Building Services Guide, CIBSE TM51 (currently being reviewed with a view to updating), as well as CIBSE CP2 and CP3 should also be considered.
6. Authoring requirements:

<table>
<thead>
<tr>
<th>Competencies of the author(s) should include:</th>
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<tbody>
<tr>
<td>1. Knowledge and experience of designing and specifying heat pumps in multi occupant residential applications.</td>
</tr>
<tr>
<td>2. Skill and experience in developing technical guidance. Prior experience in authoring CIBSE guidance would be useful, but evidence of successful delivery of and client satisfaction with previous project more relevant.</td>
</tr>
<tr>
<td>3. Have sufficient inhouse resources to deliver the project in the agreed form and to the contracted programme.</td>
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<td>4. Ability to review current industry guidance and summarise key points.</td>
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<tr>
<td>5. Awareness of emerging regulatory changes affecting the specification of domestic heating systems for multi occupied buildings.</td>
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<tr>
<td>6. Capability to provide basic diagrams, images and graphics to be included in the guidance document, but not to produce publication ready graphics or to typeset work - this will be undertaken by CIBSE staff or contractors and managed by the CIBSE knowledge team.</td>
</tr>
<tr>
<td>7. Ability to deliver the draft material in the format and media requested by the CIBSE Project manager.</td>
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The role of authorship should be tendered and selected by a selection panel managed by the Knowledge Management Committee and Director responsible for the Knowledge team.

The CIBSE Knowledge Management Committee, in consultation with the Homes for the Future Group and the CIBSE Heat Pumps Guidance Steering Group, will appoint a steering group to advise on the content and quality of the output.