Technical Department report to Technology Committee, June 2019

The Technical team supports CIBSE activities and contributes to a wide range of external initiatives and bodies, as well as managing the Institutions day to day interactions with government with technical advice and input. This includes:

- Technical contributions, advice and support to various activities across CIBSE;
- Managing CIBSE responses to consultations and calls for evidence from Government Departments, Select Committees, the Devolved Administrations, Greater London Assembly and other public bodies;
- Contributing to various government working groups and advisory panels;
- Working with the Centre for Digital Built Britain at Cambridge, the UK BIM Alliance and BSI on digital transformation initiatives in the sector;
- Contributing to British, European and International Standards making activities and participating in strategic oversight of standards in the sector, in particular for digitalisation, retrofit and refurbishment and engineering services;
- Our objective in all of this activity is to deliver public benefit, enhance CIBSE’s impact with external bodies and add value to CIBSE membership.

Who we work with

We work with a number of government departments and other non-governmental public bodies. Our primary government connection is with the Ministry of Housing, Communities and Local Government, MHCLG, in particular the Building Safety Programme, which is responsible for all aspects of building regulations and the response to Dame Judith Hackitt’s Independent Review of Building Regulations and Fire Safety.

We also work with the Department of Business, Energy and Industrial Strategy, BEIS, on aspects of energy policy and more recently on the regulation of construction products after the UK leaves the EU. We participate in the ongoing development of policy for heat networks and district energy, including the provision of CIBSE CP1 on Heat Networks, which supports the heat networks development funding programme.

CIBSE belongs to the Construction Industry Council (CIC), the umbrella for the professional bodies in the built environment, where we provide a range of technical contributions to the CIC post-Grenfell activity and seek to influence the work of CIC to benefit society. Working in a collaborative and consensual forum can be a challenge, but as the fragmentation and confrontation which is endemic in the sector is being ruthlessly exposed in the aftermath of Grenfell and the Independent Review, there has never been a more important role for the professional bodies in coming together to provide leadership.

There is also an emerging challenge to the professional bodies to respond to the work of the Industry Response Group on competence, and to provide a response to the recent Committee on Climate Change report on net zero carbon targets.

Other key bodies with which we engage are the Royal Academy of Engineering, the Committee on Climate Change (CCC), the Greater London Authority (GLA) and both the Welsh and Scottish Governments. We are involved in the Welsh government review of Part L in Wales.

There is a growing programme of activity to support the digitalisation of the construction sector, and the technical team works with the Centre for Digital Built Britain at Cambridge University, with the UK BIM Alliance of various parties seeking to drive the adoption of digital processes in the sector, the Construction Products Association and, of course, the British Standards Institution committee on standards for digitalisation in the sector and through them we contribute to the work of both European and International standards bodies.
What we are working on

For a full review of the current range of regulatory initiatives the Technical Director’s column in the February Journal provides a summary.

The primary focus for the past eighteen months has been on the Grenfell Tower fire. The Independent Review of Building Regulations and Fire Safety has highlighted the need for buildings that perform and are safe, but are also comfortable, promote health and wellbeing of their users and do not have significant adverse impacts on the local environment. The drive for carbon reduction must go hand in hand with many other aspects of building performance. CIBSE is committed to support the Review findings and implementation.

It is anticipated that government will publish further details of its implementation plans, including a consultation on significant legislative changes, early in June, subject to other political constraints.

The Communities and Local Government Select Committee highlighted CIBSE’s work on overheating last year, which has prompted the announcement of a review of the treatment of overheating in the current review of Part L and F of the Building Regulations in England. As a result we are now involved in further work to inform the review of Part L and F. Recognition that overheating is a significant problem which needs to be considered within the context of building regulations is largely due our ongoing work on this particular topic over the past decade, illustrating the significant influence that the Institution has behind the scenes.

Grenfell Tower and Building Safety

The primary focus of CIBSE work over the past two years has been the response to the Grenfell Tower fire. The Independent Review of Building Regulations and Fire Safety has highlighted the need for buildings that perform and are safe, but are also comfortable, promote health and wellbeing of their users and do not have significant adverse impacts on the local environment. The drive for carbon reduction must go hand in hand with many other aspects of building performance. CIBSE is committed to support the Review findings and implementation.

The Society of Façade Engineering has actively contributed to work in response to the Grenfell Tower fire, in particular to the changes to Building Regulation 7 introduced at the end of 2018. A working group on facade performance has been set up to consider the changes and the many questions of interpretation that it has generated. The Society has also contributed to the ongoing work on professional competence in response to the Independent Review, alongside other CIBSE participants.

Input to continuing Post Grenfell activities is a significant ongoing commitment. CIBSE contributed to the consultations on restricting the use of combustible materials in external walls and on the use of assessments in lieu of tests, and through the Society of Façade Engineering continues dialogue with the Ministry over the ban on combustible materials. We are grateful for the contribution of a number of CIBSE volunteers to the post Grenfell activity.

CIBSE Guide E: Fire Safety has been revised and the new 2019 edition is now at the printer.

MHCLG continue to maintain a very comprehensive online compendium of Grenfell related information.
Current Consultations

1. Fire performance of external cladding systems: Draft revision of BS 8414 Parts 1 & 2

The British Standard Institution (BSI) has issued the draft revision of BS 8414 for comment. This standard is published in two parts:

- Part 1: Test method for non-loadbearing external cladding systems applied to the masonry face of a building; and
- Part 2: Test method for non-loadbearing external cladding systems fixed to and supported by a structural steel frame.

All submitted comments will be given consideration prior to publication of the revised standard. The consultation closes on 8 July and CIBSE plans to submit a response.

More information on open consultations is available in the current consultations section of the CIBSE website.

Recent Closed Consultations

Since the Committee met in February the following consultations have opened and closed:

1. Designing the Industrial Energy Transformation Fund (closed 31 May)

The Industrial Energy Transformation Fund (IETF) was announced in the autumn Budget in 2018. The Fund will support businesses with high energy use, such as energy intensive industries, to transition to a low carbon future and to cut their energy bills and carbon emissions through investing in energy efficiency and low-carbon technologies. The IETF has a UK-wide budget of £315m over five years to 2024.

In designing the scheme, the Government needs to consider how best to balance the two objectives. This could include design features such as differentiated criteria for different types of project, budget or sectoral ring fencing, phasing of the energy efficiency and industrial decarbonisation elements or even creating two separate schemes.

For the industrial decarbonisation objective, there is a range of choices in how the IETF could support the transformation of industries in preparation for a low carbon future. This would complement the Industrial Clusters Mission which covers many of the UK’s world-leading industries. In particular, some options for IETF’s decarbonisation focus include:

- Near-term carbon emission reductions as IETF covers the next few years while the Industrial Clusters Mission will support long-term decarbonisation;
- Promoting investment in particular technologies;
- Supporting technologies that are strategically important to long-term emissions reductions such as hydrogen and CCUS;
- Supporting demonstration at scale of particular technologies (e.g. electric arc furnaces);
- Mature deployable technologies, such as heat pumps, biomass steam boilers, biomass, combined heat and power;
- Uptake of low carbon industrial processes, such as low carbon steel or cement production.

This informal consultation sought views and supporting evidence to help the Government design the fund, focusing on the benefits and barriers to industrial decarbonisation.

This consultation closed on 31 May. CIBSE did not submit a response to this consultation as there were no significant comments from CIBSE Members.
2. Draft National Air Pollution Control Programme (NAPCP) (closed 14 March)

The Programme sets out how the UK will meet legally binding emission reduction commitments (ERCs) for 5 damaging pollutants: nitrogen oxides, ammonia, non-methane volatile organic compounds, particulate matter and sulphur dioxide.

Under the National Emissions Ceiling Directive and the transposing domestic legislation, the National Emissions Ceiling Regulations (2018), the Secretary of State is required to prepare and publish a UK National Air Pollution Control Programme (NAPCP) by 1st April 2019. Subject to EU Exit negotiations the NAPCP must also be submitted to the EU Commission on this date.

As air quality is a devolved matter and the devolved administration have their own independent policies, the UK needs to work collaboratively with each administration to achieve its statutory objectives. The NAPCP is a UK wide document and sets out the proposed measures and technical analysis, which demonstrate how the legally binding 2020 and 2030 emission reduction commitments (ERCs) for 5 damaging pollutants (nitrogen oxides, ammonia, non-methane volatile organic compounds, particulate matter and sulphur dioxide) can be met across the UK.

In this consultation the Government sought views on the draft NAPCP and the use of the estimates of abatement associated with the policy measures, and also asked for any additional analysis or evidence that could be used. The Government also asked about clean air plans across the UK.

This consultation closed on 14 March. CIBSE did not submit a response to this consultation as there were no significant comments from CIBSE Members.

3. The future for small-scale low-carbon generation (closed 5 March)

Government believes that the small-scale low-carbon generation should not be exported to the grid for free and proposes a Smart Export Guarantee (SEG) which would place an obligation on electricity suppliers to purchase electricity exported to the grid from small-scale low-carbon generators.

The Government was consulting on its proposal for a mandatory supplier-led route to market: the Smart Export Guarantee (SEG). Under the SEG, the Government would legislate for suppliers to remunerate small-scale low-carbon generators for the electricity they export to the grid.

Remuneration would be available to all the technologies currently eligible for the FIT scheme up to 5MW in capacity and would be based on the following design:

- BEIS mandates that larger electricity suppliers (>250,000 domestic electricity supply customers) offer small-scale generators a price per kWh for the electricity they export to the grid. Smaller suppliers can opt to voluntarily provide a SEG tariff but must adhere to the rules and guidance associated with the SEG;
- Suppliers would determine the tariff per kWh for remuneration, and the length of the contract;
- Suppliers would be obliged to provide at least one export tariff;
- Remuneration must be greater than zero and at times of negative pricing generators must not be required to remunerate suppliers for electricity exported to the grid;
- Electricity exported to the grid from eligible generators must be metered - for domestic installations we expect smart meters to enable this;
- No levelisation of costs is proposed but suppliers providing the SEG should be able to account for their administration costs in setting of the tariff levels;
- Suppliers must register eligible installations for the settlement process and settle in accordance with the requirements in the Balancing and Settlement Code (BSC).

This consultation closed on 5 March 2019. The evidence gathered from this consultation will allow Government to decide on whether, and how, to proceed with the SEG.

CIBSE did not submit a response to this consultation as there were no significant comments from CIBSE Members.
4. Decarbonising heating: Overview of current evidence (closed 22 February)

Government has reviewed the evidence base on options to deliver long term heat decarbonisation. The review report gives an overview of the key issues arising from the review and seeks to:

- highlight different characteristics of the main alternative sources of low carbon heat and approaches to achieving transformational change;
- set out strategically important issues, 'strategic inferences', which have been drawn from the evidence available to help focus the development of a long term policy framework;
- identify key areas that require further exploration to inform the development of a new long-term policy framework for heat.

In this consultation the Government sought views on the strategic inferences identified, the priority areas requiring further development, any important omissions, the parties best placed to deliver in these areas and opportunities for enhancing co-ordination. The consultation closed on 22 February and CIBSE submitted a response.

CIBSE believes that overall, the review of evidence seems comprehensive in terms of the technological options appraised. CIBSE also welcomes the reference to whole system thinking, the attention to consumer implications and the acknowledgement that policy will be needed. However, the institution has some concerns about the scale of ambition and the lack of firm proposals, particularly in relation to the timescale for development of policy, and the urgent need to address energy efficiency in new and existing buildings. CIBSE agrees that some areas need more time and flexibility, however, other areas are unequivocal: the need for a strong policy framework, and the need to reduce heat demand.

All responses to public consultations that CIBSE has submitted are published in the closed consultations section of the CIBSE website.

Building Information Modelling Standards

The CIBSE Digital Steering Group continues to bring together all interested elements of the Institution and building services sector to consider the implications of the digitalisation of construction. The Group leads development of the CIBSE Digital Engineering Series, Product Data Templates and the BIMHawk tool. It also provides a significant input to BSI activity on standards in this field. These are playing an important role in ensuring international adoption of security minded Building Information Modelling (BIM) processes and collaborative ways of working, in particular the ISO 19650 series of standards.

The first two international standards for BIM, BS EN ISO 19650–1 Organization of information about construction works – Information management using building information modelling – Part 1: Concepts and principles and – Part 2: Delivery phase of assets, were published in January. These are accompanied by a National Annex and Foreword to aid implementation in the UK and describe how “BIM Level 2” transfers to the ISO framework.

Published Document, PD 19650-0, gives transitional guidance on how the ISO develops the familiar BS and PAS framework. Further guidance for new users is under development. For further coverage see the article by CIBSE Digital Consultant Carl Collins in the February issue of CIBSE Journal.

Work on part 3, on BIM in the operational phase of a building, and part 5, on security minded BIM, is proceeding towards publication in 2020.

REHVA

CIBSE is a founder member of REHVA, the Federation of European Heating, Ventilation and Air Conditioning Associations. Although there was a major workshop at the REHVA Annual Meeting in April 2018 to discuss the ASHRAE proposals for a Global HVAC&R Alliance, there has been little further progress, and discussions about some form of global alliance continue in the background.
There was further discussion about the ASHRAE REHVA relationship and a proposed MoU at the Annual Meeting in May 2019 was discussed, but was not approved. REHVA Journal is now accessible via the CIBSE website.

**Domestic Building Services Panel (DBSP)**

The DBSP is dedicated to the furtherance of best practice in the survey, design, installation, commissioning, operation and maintenance of building services for dwellings in the UK. This is for the safe, efficient and reliable provision of comfort in domestic buildings through the services, and also the systems associated with energy supply and use. The Panel is impartial and open to participation by professional and trade bodies who have an interest in the provision of building services in dwellings in the UK. The DBSP maintains and develops guidance in the design and installation of domestic building services systems and is currently updating the Domestic Heating Design Guide. In 2019, 2,227 copies of this Guide were sold.

**Current CIBSE research activities**

**CIBSE sponsored projects**

CIBSE supports research activities for the advancement of knowledge in all areas of building services engineering. These range from supporting academic research as partners or as stakeholders and also providing a dissemination route of research outputs, to funding research projects such as Doctorate and Post Doctorate studies, Knowledge Transfer Partnerships and Engineering Doctorates.

**CIBSE/Heriot Watt University Knowledge Transfer Partnership - guidance on the sizing of hot and cold water systems** (October 2017 – January 2019, Academic Supervisor: Prof Lynne Jack, Heriot Watt University)

This CIBSE and Heriot Watt Knowledge Transfer Partnership (KTP) project, funded by Innovate UK to develop a new method for the assessment of design flow for domestic hot and cold water services for medium-large scale domestic residential installations. This two-year project aims to update current CIBSE guidance on the sizing of hot and cold water systems in order to maximise system efficiency. The project follows on from the phase 1 collaboration with Chartered Institute of Plumbing and Heating Engineering (CIPHE) and the Loading Units Normalisation Assessment (LUNA) group to review the use of loading units as a method for sizing domestic hot and cold water systems. The Research Report from Phase 1 is here: http://cibse.org/knowledge/knowledge-items/detail?id=a0q0000000CBW9IQAH

The KTP Associate, Achala Wickramasinghe, presented her work at the CIBSE B2P Live 2018 and is currently collecting measured data to validate the model she has developed over the last year.

**Achieving Nearly Zero Energy Building Standards in a changing climate**

(September 2017 – September 2020, Academic Supervisor: Dr Ali Bahadori-Jahromi, University of West London)

In collaboration with the University of West London, this research aims to define Nearly Zero Energy Buildings (NZEB) to investigate whether NZEB buildings can remain operational under future weather conditions.

The CIBSE sponsored PhD student, Radwa Salem, submitted a paper for publication in the July 2019 Building Services Research and Technology (BSER&T) Journal – Special Issue on overheating. The paper investigates the impacts of a changing climate on overheating risk and energy performance for a UK retirement village adapted to the nZEB standards.
Weather data for daylight modelling (Start date: Sept 2017)
(September 2017 – December 2019, Academic Supervisor: Prof John Mardaljevic, Loughborough University)

In collaboration with Loughborough University, this CIBSE sponsored postdoctoral two-year project aims to develop dedicated weather files for daylight modelling in order to maximise the potential for natural daylight for the comfort and wellbeing of occupants but also to reduce energy demand for artificial lighting.

The postdoc researcher, Eleonora Brembilla, has submitted a paper for the CIBSE Technical Symposium 2019 that provides a summary of her analysis so far.

Assessing overheating in homes – an industry methodology
(September 2016 – September 2020, Academic Supervisors: Prof Mike Davies and Dr Anna Mavrogianni, University College London)

This PhD project is being undertaken by CIBSE sponsored London Loughborough Centre for Doctoral Training student Giorgos Petrou. Building on CIBSE TM59: Design Methodology for the Assessment of Overheating Risk in Homes, uses parametric analysis of the UK housing stock to investigate causes of overheating in various domestic typologies to identify effective mitigation options. The recently published paper “Can the choice of building performance simulation tool significantly alter the level of predicted indoor overheating risk in London flats?” was published in Building Services Engineering Research &Technology (BSER&T).

Giorgos has also submitted a paper to be published in the July 2019 Building Services Research and Technology (BSER&T) Journal – Special Issue on overheating that looks at the influence of occupancy patterns in the risk of overheating in homes

Energy Benchmarks
(July 2015 - ongoing, Academic Supervisor: Prof Dejan Mumovic)

CIBSE is collaborating with UCL to revise the CIBSE energy benchmarks in Guide F, and review the methodology used for their production. Dr Sung Min Hong has developed protocols for the collection and analysis of various energy use datasets towards producing and/or updating energy benchmarks. The analysis also produced building typologies based on their energy use that has further informed the benchmarking process.

The UCL research team, in collaboration with the Digital Engineering in-house expect at CIBSE and with Cloud Enterprise have developed an online dynamic platform for the release of the revised energy benchmarks. In its first phase the platform provides a user interface that could be interrogated by the user in order to provide them with customized information. The platform offers the capability to regularly update the energy benchmarks when new datasets become available. Future phases of the platform development will allow users to input energy data of their buildings and benchmark their energy use against national and regional building stock.

The Energy Benchmarking Tool was presented at the CIBSE Build2Perform Live 2018 event on the 27th November where it attracted a lot of interest from CIBSE Members and other attendees. Following the presentation at the B2P the team has also been approached by various non-for-profit organisations that collect building energy and other data, to collaborate in this project and share their data towards further expanding the scope of the platform. The official launch of phase 1 of the online platform is scheduled for February 2019. The team has already started work on phase 2 of the development of the platform.
Research on the effects of circadian lighting on health and wellbeing
Jointly funded by CIBSE and BRE Trust, ‘Circadian lighting effects on health and wellbeing’, investigates the impacts of cool coloured lighting on occupant comfort. It aims to find optimal control strategies for circadian lighting to maximise health and wellbeing benefits.

The output of the first stage of the project is a report which provides a review of the existing literature on circadian lighting and how this affects human health and wellbeing. The report is published on the Knowledge Portal at: http://cibse.org/knowledge/knowledge-items/detail?id=a0q0O00000CF7o9QAD

Stage two of the project is now collecting data from site measurements and occupant interviews. The results of stage two will be available in summer 2019.

Other Collaborations

Energy efficiency in the hospitality sector
(2015 – 2021, University of West London and Hilton Group)
CIBSE is involved in an advisory role in two PhD research projects sponsored by the Hilton Group to investigate energy efficiency options for their UK stock. This collaboration offers CIBSE access to the hospitality sector and the challenges of trying to meet the MEES – Minimum Energy Efficiency Standard.

Total Performance of Low Carbon Buildings in China and the UK
(2016 – 2019, UCL and Tsinghua University)
This jointly funded EPSRC and NSFC project seeks to develop methods to allow meaningful comparison of performance gaps in the UK and China in a way that is flexible enough to allow for national context, such as differences in policy, construction, climate and occupant behaviour. Focusing on eight UK case studies the research team has identified varying degrees of performance gap across different criteria and demonstrated how high resolution and high granularity data may identify when and why buildings under-perform.

CIBSE is a member of the steering group of the project and a CIBSE TM based on the case studies is due to be published later in the year.

Urban Albedo Calculator
(August 2017 – September 2020, Kent, Brunel and Loughborough Universities)
CIBSE has been invited to be a member of the steering group of this EPSRC funded research which investigates the seasonal effects of albedo on urban temperature using London as a case-study. Specifically, it aims (a) to investigate experimentally the impact of urban fabric on urban albedo and (b) to develop an empirical model to predict changes in urban albedo in relation to changes in urban fabric and solar altitude with a specific focus on advanced materials such as phase changing materials. The development of an urban albedo calculator that is able to explore seasonal variations would aim to produce albedo values that could be used to predict the urban heat island with high accuracy.