

Introducing energy use targets in planning policy

BRIEFING NOTE

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This briefing provides a summary of a review carried out by CIBSE on the approach to setting energy targets in planning policy. It covers the following:

- Recent developments in the regulatory and industry context which would support such an approach
- The available evidence to set energy use targets in planning policy
- CIBSE's recommended, evidence-backed approach to implement such targets
- Examples of precedent in existing or proposed planning policy.

The use of energy targets in policy has been called for by industry, in particular the London Energy Transformation Initiative (LETI), and a number of local authorities are in the process of incorporating them into policy. This briefing intends to help them do so with a robust, evidence-backed and consistent approach. It is part of a wider set of recommendations from CIBSE on creating an effective regulatory framework for net zero carbon buildings, as per box below.

Existing CIBSE position on a regulatory framework for net zero carbon buildings

This note re-iterates and builds upon existing CIBSE recommendations, in particular through the following statements as well as several consultation responses:

- Briefing: Steps to Net Zero Carbon Buildings, 2019
<https://www.cibse.org/getmedia/bdaf4dee-5980-4b58-871c-a24e88c010d4/CIBSE-Steps-to-net-zero-carbon-buildings.pdf.aspx>
- Position Statement: Operational Net Zero Carbon Buildings, March 2020
<https://www.cibse.org/News-and-Policy/Policy/CIBSE-Position-Statements/Operational-Net-Zero-Carbon-Buildings>
- Position Statement: Towards a Better Planning Framework to Address Climate Change, March 2020
<https://www.cibse.org/news-and-policy/policy/cibse-position-statements/towards-a-better-planning-framework-to-address-climate-change>
- Building Performance Network joint statement on operational performance, signed by CIBSE alongside the RIBA, UKGBC, and LETI, among others: <https://building-performance.network/advocacy/building-performance-joint-position-statement>

The Steps to Net Zero Carbon Buildings Briefing includes the following recommendations:

- Recommendation #1: Introduce clear targets for the operational performance of buildings
- Recommendation #2*: Provide incentives to adopt operational targets
- Recommendation #3*: Introduce mandatory disclosure of energy performance.

* NB: Recommended for 2019/20 at the time of publication in 2019, i.e. recommended within a short timeframe.

The Position Statement on the Planning Framework recognises the leadership role that Local Authorities can play in setting targets that go beyond regulatory minima, and recommends "*Local authorities (...) should be encouraged to require evidence of operational performance, rather than relying on as-built standards only.*"

1 WHY ENERGY USE TARGETS?

Target-setting using current Building Regulations Part L and EPCs cannot be relied upon to deliver energy and carbon savings. The reasoning for this is not explained here as it is extensively covered elsewhere, including in the references in the Box on page 1. An alternative approach is needed and the point of energy use targets is to:

- Include all energy uses, rather than the approach in Building Regulations which only include regulated uses
- Reflect actual use and occupancy of the building, rather than the approach in Building Regulations which use set assumptions
- Be simple, encouraging consideration of all possible opportunities for improvements. By contrast, Building Regulations set targets by reference to a notional building, where missed design opportunities such as building shape, orientation, and layout are mirrored, creating shifting targets which do not facilitate comparisons between buildings and which reduce incentives for design optimisation.

Energy use targets are not necessarily Energy Use Intensity (EUI) targets. EUI targets have a simplicity which is useful in itself, particularly for non-specialist audiences. However, given the diversity of the building stock and of occupancy patterns, and with the current state of evidence, CIBSE recognises the value of using energy ratings (e.g. Display Energy Certificates – DECs, NABERS UK) as well as EUIs, particularly in sectors where variations in occupancy and special uses can be significant.

2 THE QUESTION OF “BURDEN”: A CHANGING LANDSCAPE

Setting energy performance targets in policy (with monitoring in-use), if it is to be effective, in turn leads to associated requirements on project teams:

- Energy performance modelling, to inform the design and check targets are achievable
- Energy monitoring and disclosure, to report on whether the targets have been achieved and, if not, why.

These activities are not routinely performed on most projects, which is one of the important reasons behind the performance gap. However, the regulatory context is evolving and should reduce the “burden” introduced by a policy requiring these activities. Two important developments are very relevant:

2-1 - Building Regulations Approved Document L2 2021 – Requirement for energy forecast

For new non-domestic buildings over 1,000m² TUFA, the new Building Regulations Part L and Approved Document (in force from 15th June 2022): this now requires a forecast of energy performance to be provided to the owner, in addition to the calculations provided for compliance with the Part L target. The Approved Document clearly acknowledges that “*The compliance outputs of SBEM or other Building Regulations compliance tools are not suitable for direct use as energy forecasting estimates for any size of building*” (§9.4).

Unfortunately, in the Approved Document this can be met through a range of methods, such as benchmarks and design calculations. This could mean anything or have little value to the owner and to Local Authorities (e.g. benchmarks could be of mediocre practice, design calculations could represent peak occupancy rather than realistic profiles etc).

* “Burden” is used here as commonly used planning term, not a CIBSE view.

Recommendation for policy: This new Building Regulations requirement creates an opportunity in the non-domestic sector: without introducing additional requirements, planning policy could make the best use of it by requiring performance modelling and aligning with the same size threshold (i.e. 1,000m² TUFA), but specifying that the accepted method is “*an energy forecasting methodology such as CIBSE’s TM54*” i.e. option 9.4c in the Approved Document. The latest TM54 edition (2022) allows for a range of methods, including “generic” TM54 dynamic modelling as well as Passivhaus PHPP and NABERS UK, so this is not restrictive. An equivalent requirement or recommendation would still need to be introduced for the residential sector in planning policy, as it is not currently in the Building Regulations.

2-2 - Operational ratings, beyond public buildings

There are confirmed plans by BEIS to introduce an operational rating system and disclosure requirements for non-domestic buildings beyond public buildings.

While not yet in place, and at the moment without setting targets, this regulation will ultimately require measurement and reporting of energy use across the non-domestic sector. The first phase will apply to commercial offices, before a gradual roll-out to the rest of the non-domestic sector.

This new requirement will reduce any burden perceived to be associated with a planning policy requiring monitoring and disclosure of in-use performance.

3 - EVIDENCE BASE THAT ENERGY USE TARGETS COULD BE SET

3-1 Sources of evidence

There are two key types of Evidence which support the introduction of energy use targets, and their selection. These are in-use data from existing buildings; and modelling of the performance that could reasonably be expected. Both are useful in the content of policy setting.

A number of studies carried out by Local Authorities have concluded that there is sufficient evidence for energy use targets to be applied in at least some sectors, and accordingly have produced evidence base reports to support changes in their policy. Those found as part of this review are detailed in Section 5 - Key Precedents and listed in the References.

The following additional sources of information are also useful:

- Modelling and identification of exemplar schemes, used by LETI for the establishment of energy use targets for homes (using PHPP), offices (using dynamic modelling similar to NABER modelling) and schools (using PHPP).
- Green Construction Board Buildings Mission report, which identified exemplar buildings or schemes (consuming less than half the energy use of the sector average) for homes, offices and schools.
- Review of in-use performance in homes, schools and offices from CIBSE Awards submissionsⁱⁱⁱ. This included a comparison with the LETI targets, adding further evidence of their feasibility in practice, especially for homes and schools.

It is expected that the evidence base will continue to grow as a result of drivers for Net Zero and for performance disclosure, including those described in Section 1. This has already been observed anecdotally in submissions to the CIBSE awards in recent years.

3-2 Sector-specific considerations and recommendations for policy

Homes

Homes is a key sector where a number of studies have concluded there is sufficient evidence for energy use targets to be applied. The Greater Cambridge Net Zero Carbon Evidence Base report^{i,viii} is an important reference on this.

The Climate Change Committee, based on their own modelling of what is needed and feasible, recommends that new homes should meet a space heating demand target (15-20 kWh/m²/yr)ⁱⁱ.

CIBSE has found in-use data evidence of housing schemes which meet the LETI targetsⁱⁱⁱ.

Recommendation for policy: CIBSE supports the introduction of energy use targets for homes.

Schools

A number of studies carried out by local authorities have concluded there is sufficient evidence for energy use targets to be applied to schools. The Greater Cambridge Net Zero Carbon Evidence Base report^{i,viii} is a useful reference on this.

CIBSE has found in-use data evidence of schools which meet the LETI targetsⁱⁱⁱ.

Recommendation for policy: CIBSE supports the introduction of energy use targets for schools. If through an EUI target (rather than a DEC rating), it may benefit from the introduction of some adjustments to cover specific uses where they are present in the school. This may be particularly relevant for secondary schools, and less needed for primary schools where a more standardised approach may be sufficient.

Offices

The Greater Cambridge evidence report provides some evidence that energy use targets could be set for officesⁱ.

This CIBSE review has found additional evidence that energy use targets could be set for offices, including:

- Performance modelling carried out to inform the targets set by the LETI one-pager. This was published in BSERT^{iv}.
- Review of in-use performance from offices, including recent CIBSE awardsⁱⁱⁱ.

Recommendation for policy: CIBSE supports the introduction of energy use targets for offices. In this sector, **it is recommended to include the option of operational ratings** (e.g. DECs, NABERS UK ratings, upcoming Operational Ratings to be introduced by BEIS) **rather than just allowing for targets as EUIs**. This will provide flexibility to take account of factors such as occupancy hours (DECs, NABERS) and occupancy density (NABERS). Potentially, the use of NABERS UK ratings would also allow setting separate targets for landlords and tenants, which can be useful in the case of speculative offices.

To mirror the new Building Regulations energy forecast requirement and streamline requirements on applicants, it is recommended that this should apply from a threshold of 1,000 m² TUFA.

Other non-domestic sectors

Beyond homes, schools and offices, there is currently less consensus on whether an energy use target approach could be used in other sectors, and what these targets should be, especially if they were expressed as EUI. This is because of wide variations in building uses, the lack of up-to-date, robust rating systems, and the still limited public availability of energy performance data.

The CIBSE review of awards projectsⁱⁱⁱ concluded that Higher Education may be a sector “ready” for energy use targets, due to the availability and quality of data.

Other sectors such as hotels and warehouses may also be well suited to energy use targets being set within a short timeframe, as it is likely that utilities costs are a significant part of running costs and well understood by building operators. However, the data is not widely available so it is likely that target setting by Local Authorities would require dedicated modelling, evidence gathering and engagement with these sectors.

As far as CIBSE are aware, such target-setting and industry engagement work has not yet been carried out, but may commence soon for example as part of the recently launched cross-industry Net Zero Carbon Buildings Standard.

Recommendation for policy: On balance, it is recommended that:

- Option 1: If possible, Local Authorities should engage with industry and seek the development of sector-specific targets, where they do not yet exist. Once targets are created then the approach would be the same as in the residential, schools and offices sectors.
- Option 2: If Option 1 is not possible given time and/or resource constraints, then as for the residential, schools and offices sectors, applicants in other non-domestic sectors should be required to carry out building performance modelling at the design and as-built stages, but they could put forward their project-specific targets rather than report against sector-wide targets set by planning policy. Ideally, these project-specific targets should be informed by scenario testing, as recommended by TM54, and they should be expressed as EUI as well DEC ratings (where such ratings exist for that building use) or the upcoming operational rating system (once it exists beyond offices). These project-specific targets could be benchmarked to drive performance and help the Local Authority assess submissions, for example against the targets proposed in the Greater Cambridge evidence reportⁱ, DEC ratings, and CIBSE energy distribution curves. Once buildings are operational, the requirements would be the same as for the other sectors, but with reporting against the project-specific target rather than a sector-wide target set in policy. Overall, the approach would then be as consistent as possible across all sectors, the only difference being sector-wide or project-specific targets.

Alternative option: A more ambitious approach would be to introduce targets for at least some of these sectors, for example:

- those in the Greater Cambridge evidence report
- a DEC B(40) rating: the logic would be to use a rating aligned with that applying to offices (e.g. from LETI). This may be valid in some sectors, but not in all, as the DEC rating system needs an update.

On balance, Options 1 and 2 are recommended, as the evidence base for the Alternative Option is not yet considered robust enough, which could lead to challenges at the local plan investigation stage, or from individual applicants.

4 – APPROACH TO IMPLEMENTING ENERGY USE TARGETS

There are several opportunities to improve on the current Building Regulations-based approach, while still keeping flexibility and acknowledging the current state of evidence and skills available within industry:

4-1 Step 1: Require performance targets, monitoring and reporting

Important benefits should be realised with a policy which requires project teams to:

- Produce performance modelling (rather than regulatory compliance modelling only)
- Incorporate performance-based improvements in the design
- Monitor actual performance against expectations
- Report on actual performance (whether publicly or, if needed, to the Council only) and explain discrepancies with design expectations.

This means that targets may evolve in the future, and in this first stage they do not have to be associated with penalties if they are not met in practice, but project teams could be requested to provide explanations on the performance gap between target and monitored energy use (e.g. as is the case in the London Plan “Be Seen” policy).

4-2 Step 2: Use data from Step 1 to inform the next Step

The data gathered from Step 1 i.e. data on expected and actual performance, could then inform sector-wide target-setting by the Council at the next policy review, so that:

- In sectors which already have targets, these can be refined if needed, and confirmed.
- In sectors which do not yet have targets, these can be created using a wider evidence base than currently available.

If resources are constrained, priority could be given to developing targets for the sectors most likely to maximise impact in that Local Authority, based on floorspace and expected energy use, as well as viability.

5 - KEY PRECEDENTS

The main relevant policies already in place are in the London Borough of Islington and in Greater London:

The Green Performance Plan required by **Islington Council** Policy since 2013 (policy DM7.1 in the Local Plan^v and DM40 in the Environmental Design Planning Guidance^{vi}), includes the setting of project-specific targets and reporting in-use following a 2-year monitoring period. Unfortunately, enquiries have been sent to the Council, from which it is not clear whether in-use energy data received as outcome of this policy has been analysed, nor whether the data and/or the result of the analysis (if any) will become publicly available in the future.

The **London Plan** “Be Seen” policy SI2 requires reporting against project-specific operational targets[†]. It requires an explanation when project-specific operational targets are not met, but no penalty. The carbon offset payments are set through the Part L assessment and associated target, not the operational performance assessment.

[†] This uses TM54 for non-domestic uses but unfortunately for the residential sector it currently allows the use of SAP to set targets - this is NOT recommended by CIBSE, as SAP is not an energy performance assessment.

In addition, at the time of this note a number of local authorities have policy proposals which would set targets for energy use and, in some cases, space heating demand, and/or which would introduce in-use monitoring and reporting requirements.

Policy CC/NZ under the proposed **Greater Cambridge** Local Plan^{vii}, (First Proposals for consultation in November 2021, with consultation results currently being analysed) proposes that all new buildings would be required to achieve a space heating demand target (15-20kWh/m²/yr) and total energy use intensity target (35kWh/m²/yr for dwellings, and varying targets for non-domestic buildings including 55kWh/m²/yr for offices, 65kWh/m²/yr for schools, and a range from 35 to 150kWh/m²/yr across other non-domestic building types). The evidence base includes a technical feasibility report^{viii} including PHPP energy modelling of three housing types and one primary school, and a cost report^{ix}. The evidence report states that targets proposed for the other sectors are not based on modelling, but “professional experience, and case studies”. For schools and offices, these targets align with the LETI targets - see sections 2.3 and 2.4.

Policy SEC1 Energy and Construction under the **Cornwall Council** Climate Emergency DPD^x (currently under examination by the Planning Inspectorate, submitted in November 2021), proposes that residential development would be required to achieve a space heating demand target (30kWh/m²/yr) and total energy consumption target (40kWh/m²/yr). There is no proposal for an equivalent requirement for non-residential development. The evidence base^{xi} is based on PHPP energy modelling and cost modelling of a typical typology (a semi-detached house); it is based on more onerous targets than proposed in the draft policy (space heating demand target of 15kWh/m²/yr and total energy use target of 35kWh/m²/yr).

Policy CC2.3 under the proposed new **Merton** Local Plan^{xii} would require, for all new dwellings or non-residential development over 500m² GIA, to meeting Part L targets, as well as FEES but also, in parallel, to produce and disclose anticipated EUIs, using PHPP or CIBSE TM54. The LETI EUIs are provided as reference, with applicants “*expected to make reasonable endeavours*” to achieve them. By 2025, targets will be set in EUIs and space heating demand. For all major development, the proposed policy also requires monitoring and reporting of energy use over 5 years.

Policy S6 under the proposed **Central Lincolnshire** Local Plan^{xiii} (under consultation until 9th May 2022, with consultation responses currently being analysed) proposes that new homes would be required to achieve a space heating demand target (15-20kWh/m²/yr) and total energy demand target (35kWh/m²/yr), with no unit having a total energy demand in excess of 60 kWh/m²/yr. The proposal was subjected to a viability report. The evidence report on carbon reduction targets^{xiv} xxx makes reference to a Technical Feasibility Report (Task D) but this could not be found on the consultation website. However, the proposed targets are aligned with the LETI targets for new homes - see section 3. There is no proposal in this policy for an equivalent requirement for non-residential development.

It is understood that relevant policies are may also be proposed locally in **West Oxfordshire**: a high-level strategic study^{xv} makes reference to the NZ Bicester policy and Salt Cross (now referred to as Oxfordshire Garden Village) Area Action Plan (AAP) as ambitious examples. Those could not be sourced[‡]. A supporting study for the Oxfordshire Garden Village AAP^{xvi} proposed energy use targets for offices and homes, in line with the LETI targets, but it is not known whether they have been incorporated in the submitted AAP.

[‡] The website of the Salt Cross Area Action Plan includes numerous documents about the examination process, but does not seem to include the draft Area Action Plan itself; the consultation webpage for that plan seems to have expired. The website for the Oxfordshire Garden Village includes the planning application documents, but not the draft AAP.

It is also understood that the **London Borough of Haringey** are considering an EUI-based policy for their new Local Plan, but the proposals for this new Plan are at an early stage, and no relevant evidence for this note could be found.

6 - REFERENCES

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- ⁱ Greater Cambridge, Net Zero Carbon Evidence Base, Non-Technical Summary, Rev1, August 2021 <https://consultations.greatercambridgeplanning.org/sites/gcp/files/2021-09/Greater%20Cambridge%20Local%20Plan%20Net%20Zero%20Carbon%20Evidence%20Base%20-%20Non%20Technical%20Summary%20FINAL.pdf>
- ⁱⁱ Climate Change Committee, Housing Fit for the Future, 2019
- ⁱⁱⁱ Godefroy J., CIBSE Journal, Making Data Count, April 2021 <https://www.cibsejournal.com/general/making-data-count/>
- ^{iv} Cohen R, Desai K, Elias J, Twinn R. Net zero carbon: Energy performance targets for offices. Building Services Engineering Research and Technology. 2021;42(3):349-369. doi:10.1177/0143624421991470 <https://journals.sagepub.com/doi/abs/10.1177/0143624421991470>
- ^v Islington Local Plan: Development Management Policies, 2013 <https://www.islington.gov.uk/~media/sharepoint-lists/public-records/planningandbuildingcontrol/publicity/publicnotices/20192020/20190821developmentmanagementpoliciesadoptionjune20131.pdf>
- ^{vi} Islington Environmental Design Planning Guidance, 2012 <https://www.islington.gov.uk/~media/sharepoint-lists/public-records/planningandbuildingcontrol/publicity/publicconsultation/20192020/20190926environmentaldesignspdoctober2012.pdf?la=en&hash=17F43F5F7052CC8CC5E3D1A9591DAD133BA5B16B>
- ^{vii} Greater Cambridge, Local Plan, First Proposals, October 2021 <https://consultations.greatercambridgeplanning.org/sites/gcp/files/2021-10/First%20Proposals%20-%20FINAL%20FURTHER%20REVISED%2028.10.21-red.pdf>
- ^{viii} Greater Cambridge Local Plan: Net Zero Carbon Evidence Base, Task D - Technical Feasibility, Rev I, May 2021 https://consultations.greatercambridgeplanning.org/sites/gcp/files/2021-08/NetZeroTechnicalFeasibility_GCLP_210831.pdf
- ^{ix} Greater Cambridge Local Plan, Cost Report, Final, July 2021 https://consultations.greatercambridgeplanning.org/sites/gcp/files/2021-08/NetZeroCostReport_GCLP_210831.pdf
- ^x Cornwall Council, Climate Emergency Development Plan Document, Pre-Submission consultation, Draft Master with Edits, February 2021 <https://www.cornwall.gov.uk/media/1gkn3rla/sd01-cedpd-draft-master-with-edits.pdf>
- ^{xi} Cornwall Council, Climate Emergency Development Plan Document, Energy Review and Modelling Report, Rev J, Feb 2021 <https://www.cornwall.gov.uk/media/mfob2hbj/eb004-energy-review-and-modelling-report.pdf>
- ^{xii} Merton proposed new Local Plan, 2021 <https://www.merton.gov.uk/system/files?file=0220climate20change20merton20local20plan20reg1920july21.pdf>
- ^{xiii} Central Lincolnshire Local Plan, Consultation Draft, June 2021 <https://www.n-kesteven.gov.uk/central-lincolnshire/local-plan-review/>
- ^{xiv} Central Lincolnshire Local Plan, Climate Change Evidence Base report - Task C Carbon Reductions Targets, Rev D, February 2021 <https://www.n-kesteven.gov.uk/central-lincolnshire/local-plan-review/>
- ^{xv} Environmental Change Institute, Pathways to a zero carbon Oxfordshire, 2021 <https://www.eci.ox.ac.uk/publications/downloads/PazCo-final.pdf>
- ^{xvi} Assessing the trajectory for net-zero buildings for the Oxfordshire Cotswolds Garden Village, May 2020 <https://www.westoxon.gov.uk/media/hdnjcnf/trajectory-for-net-zero-buildings-for-the-oxfordshire-garden-village.pdf>