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London Plan Guidance Documents

‘Be Seen’ energy monitoring guidance

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London Plan Policy	Policy SI 2 Minimising greenhouse gas emissions
Planning Application type and how the London Plan Guidance will be applied	All major development (detailed, outline and hybrid applications). Developers and owners will be required to report energy performance data as a scheme is planned, built out and in use.
Who is this guidance for?	Anyone involved in the planning, design, construction, delivery and operation of new major development including planning applicants, energy consultants, designers, developers, contractors, building owners, network operators, facilities managers and local government officials.

1 Introduction

1.1 What is this guidance?

1.1.1 This guidance explains the process that needs to be followed to comply with the ‘be seen’ post-construction monitoring requirement of Policy SI 2 of the London Plan.

1.1.2 It sets out what each responsible party needs to do to comply with the policy from the inception stage of a development to full occupancy. Planning applicants will need to ensure that each responsible party is aware of their design and reporting responsibilities at each reporting stage.

1.1.3 It also provides information on the ‘be seen’ monitoring portal, which will house all data submissions, and breaks up the process into three reporting stages during which information needs to be submitted (that is – planning stage, as-built stage and in-use stage).

1.2 What is ‘be seen’ energy monitoring?

1.2.1 To truly achieve net zero-carbon buildings we need to have a better understanding of their actual operational energy performance. Although Part L calculations and Energy Performance Certificates (EPCs) give an indication of the theoretical performance of buildings, it is well established that there is a ‘performance gap’ between design theory and measured reality.

1.2.2 To address this gap the London Plan Policy SI 2 ‘Minimising greenhouse gas emissions’ introduces a fourth stage to the energy hierarchy; the ‘be seen’ stage, which requires monitoring and reporting of the actual operational energy performance of major developments for at least five years via the Mayor’s ‘be seen’ monitoring portal.

1.2.3 The ‘be seen’ policy establishes post-construction monitoring as good practice, enabling developers and building owners to better understand their buildings and identify methods for improving energy performance from the project inception stage and throughout the building’s lifetime.

1.2.4 Ensuring that the actual energy and carbon performance of buildings is aligned with the estimated energy and carbon performance will also be a key factor in achieving a zero-carbon London.

1.2.5 The energy performance data that will be collected will provide an evidence base which could help inform future industry-wide benchmarks or performance ratings for major building typologies based on in-use performance.

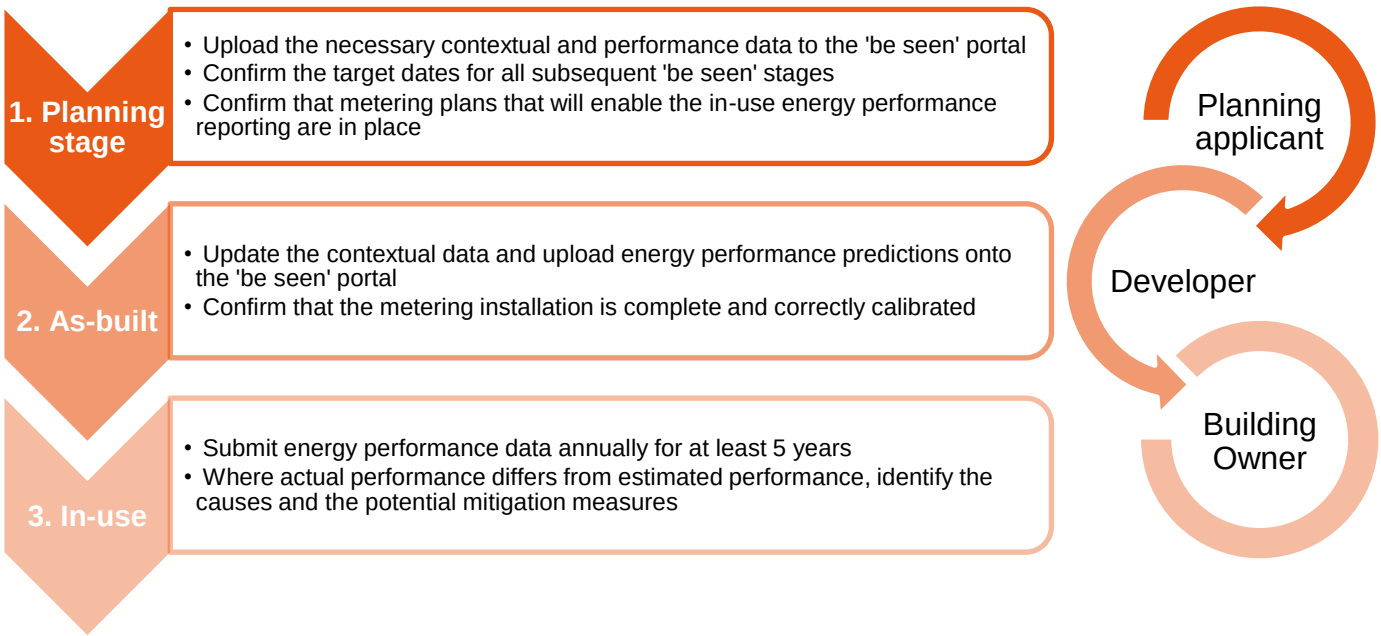
1.2.6 An effectively implemented post-construction monitoring regime can have a number of benefits including environmental (for example, carbon emissions reduction) and socio-economic (for example, reduced occupants’ bills, raised awareness around energy usage).

2 ‘Be seen’ framework

2.1 Process and responsibilities

2.1.1 The ‘Be seen’ energy monitoring guidance requires the reporting of energy performance data as a scheme is planned, built out and in use. The responsibility for providing the data at each reporting stage lies with the legal owner of the development at that particular reporting stage. Figure 2.1 outlines the ‘be seen’ process through the reporting stages of a development, including who specifically is responsible for reporting at each stage. Appendix 3 sets out these responsibilities in more detail.

Figure 2.1 ‘Be seen’ process and responsibilities



2.1.2 In those cases where the legal owner changes from one reporting stage to another, each responsible party will be expected to ensure that all affected parties (for example, developer, building owner, landlord or occupier) are aware of their ‘be seen’ responsibilities at subsequent reporting stages. This should be an obligation clearly captured in the legal agreement between all parties.

2.1.3 For the purposes of the ‘be seen’ policy a development is split into a number of ‘reportable units’ (RUs) which applicants will need to report against individually. Where a development has multiple owners the responsibility for

reporting sits with the owner who has management responsibility for that RU. Further information on RUs is provided in section 2.4 and examples of how a development might be separated into RUs are set out in Appendix 2.

Ensuring data accuracy

2.1.4 Applicants and developers should adopt third-party quality assurance mechanisms to ensure accuracy in their submissions of both predicted and measured performance. The responsibility for quality assurance of the data submitted and the metering arrangements lies with each responsible party at each reporting stage. An explanation of the third-party mechanisms adopted to quality assure the submission for each development will be expected to be submitted at the as-built and in-use reporting stages. Allocating the same person/team/organisation from design to in-use operation who will oversee the monitoring process for all different stages and who will be familiar with the intricacies of each project would be beneficial.

2.1.5 Some of the ‘be seen’ indicators are reliant on the best estimates of design teams (for example, energy storage technologies and predictions of performance for district heating and cooling systems) which is why developers are expected to adopt third-party quality assurance mechanisms. However, for some of the ‘be seen’ requirements, quality assurance methods are inherent:

- At as-built stage, the Part L calculations used to predict the output of renewable energy technologies, and the Standard Assessment Procedure (SAP) calculations used to predict the regulated energy uses for residential buildings are undertaken by accredited assessors and subject to third-party audit.

- At the in-use stage, Display Energy Certificate (DEC) assessments are undertaken by accredited assessors operating under the oversight of third-party external audit schemes. Minimum standards are set on the data quality required in order to produce a rating.

- District heating and cooling systems are subject to the Heat Network (Metering and Billing) Regulations 2014 (as amended). This states that “Where a meter to which these regulations apply is installed it must accurately measure, memorise and display the consumption of heating, cooling or hot water by a final customer” and ensures that good quality billing data is available on which ‘be seen’ reporting should be based.

2.1.6 Where good practice methods exist for specific ‘be seen’ tasks (for example, the CIBSE TM54: Evaluating Operational Energy Performance of Buildings at the Design Stage) these have been specified in the guidance to ensure consistency.

Data anonymity

Residential reportable units

2.1.7 Data will be submitted to the GLA at RU level, with each RU incorporating at least five dwellings. This ensures anonymity of the data for any individual dwelling.

2.1.8 Developers/building owners should ensure that metered data submitted by individual residential occupants is held and processed in accordance with the consent document provided to each participating occupant and is aggregated to a RU level before it is submitted to the GLA.

2.1.9 Data on district heating or cooling consumption is only requested on an aggregated basis to ensure that data from an individual dwelling is not disclosed.

Non-residential reportable units

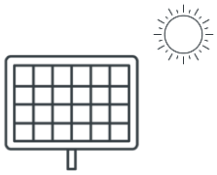
2.1.10 The only data privacy issues envisaged for non-residential units relate to national security buildings (for example, Ministry of Defence buildings) and premises with commercial sensitivity (for example, industrial process buildings). Planning applications for these typologies are generally scarce in London. Should these come forward, they will be reviewed on a case by case basis.

2.2 Performance indicators

2.2.1 Energy performance data should be reported for the six performance indicator groups which are described in Table 2.1.

Table 2.1 ‘Be seen’ performance indicator groups

Performance indicator group	Description
 **Contextual data**	Contextual data relating to the development’s reportable units (RUs) includes non-energy information such as data on location and typology/use of buildings.

Performance indicator group	Description
 **Building energy use**	The energy and fuel imports into each RU of a development including data from national energy grids (for example, electricity, gas etc.) and district heating connections. This information will enable the building owner to report on the amount of energy being consumed on-site for distinct building uses.
 **Renewable energy**	The renewable energy generation within the development will identify how much energy is being generated on-site and where this is used.
 **Energy storage equipment**	Data on the building’s energy storage equipment.
 **Plant parameters**	Plant parameters relate to the performance of heat or cooling generation plant within energy centres that form part of a development. This will include energy inputs and outputs of energy centres, energy use and contribution of heating and cooling technologies, and network efficiency data to monitor losses in district and communal energy networks.
 **Carbon emissions**	The development’s estimated carbon emissions at planning stage based on the appropriate carbon emission factors, as set out in the GLA’s Energy Assessment Guidance. When on-site carbon reductions have been maximised, but a carbon shortfall still exists, applicants will be expected to report on and confirm the carbon offsetting contribution to the relevant local

Performance indicator group	Description
	authority’s fund in line with the net zero carbon target.

2.2.2 Appendix 1 provides a high-level summary of all the reporting requirements for all three ‘be seen’ stages.

2.3 Reporting to the GLA

2.3.1 Responsible parties (for example, planning applicants, developers or legal owners) will need to provide accurate and quality assured estimates of each of the performance indicators at each stage of the process through the appropriate ‘be seen’ reporting webform (that is – planning, as-built and in-use).

2.3.2 The ‘be seen’ reporting webforms, the ‘be seen’ reporting spreadsheet and access to the ‘be seen’ portal are available on the ‘be seen’ webpage of the GLA’s website[1]. Any queries or feedback can be submitted to: ZeroCarbonPlanning@london.gov.uk.

2.3.3 The responsibility for reporting will be secured through a legal agreement (Section 106 agreement) between the local authority and the responsible party (that is – the owner) and should be clearly defined. It is possible to use planning conditions but a Section106 obligation is preferable. Draft legal wording has been shared with local authorities which sets out all ‘be seen’ obligations for the various reporting stages. Although each responsible party may identify an alternative person who is responsible for monitoring and reporting (for example, design team, specialist service, energy manager etc.) the ultimate responsibility will lie with the owner.

2.3.4 This guidance does not mandate any additional enforcement or remediation mechanisms, though individual local authorities may choose to investigate these further. For example, Islington Council have developed Green Performance Plans which require applicants to set out the arrangements for addressing performance in the event that the agreed objectives are not met at the end of the monitoring period.

2.4 Reportable units (RUs)

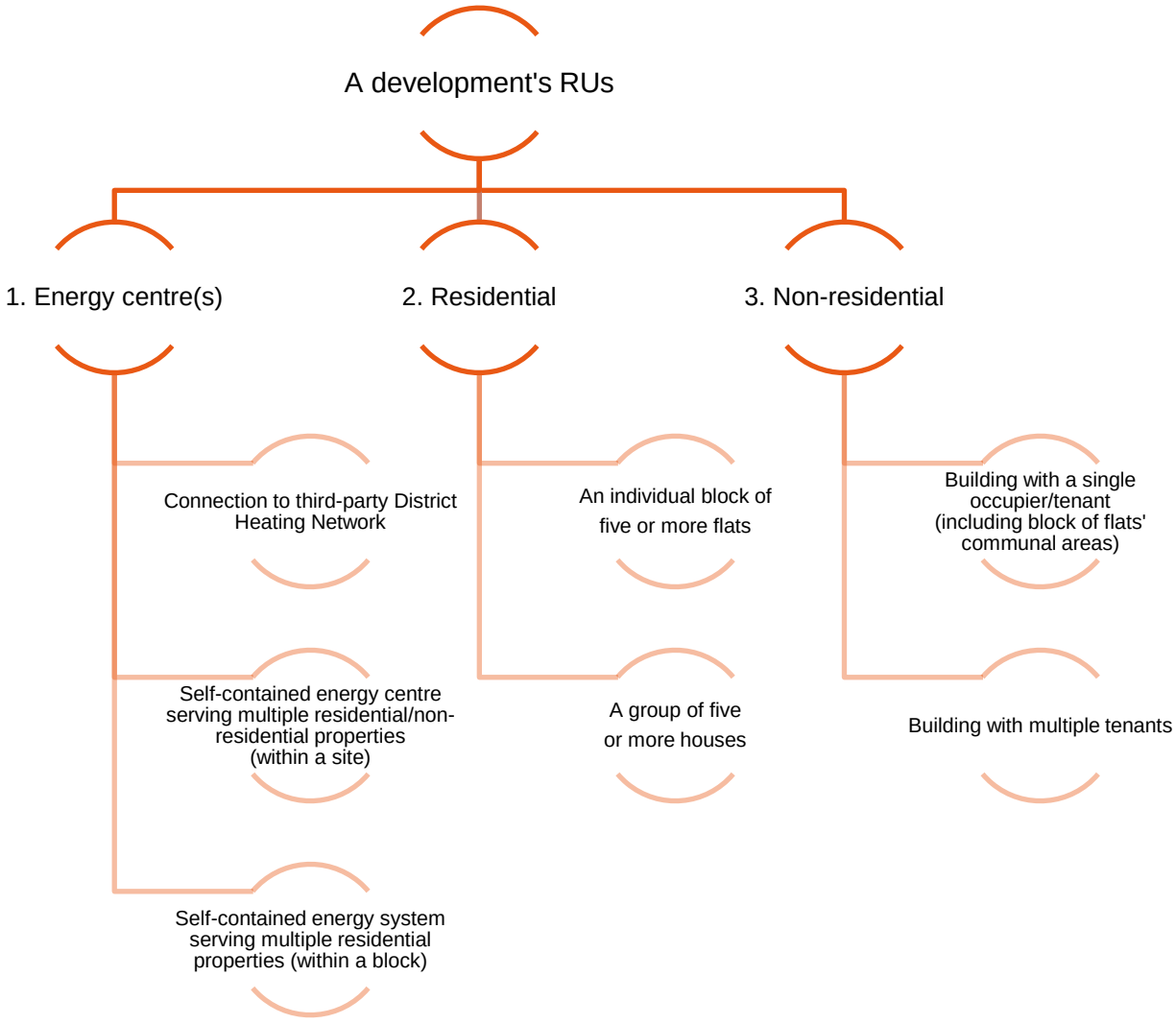
2.4.1 Developments can be made up of a mix of uses, phases and tenures. At the planning stage reporting is done for the entire development as a whole.

[1] https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/london-plan-guidance-and-spgs/be-seen-energy-monitoring-guidance

However, to allow for more comprehensive reporting at the as-built and in-use stages, a development is split into a number of ‘reportable units’ (RUs) which applicants will need to report against individually:

- The energy centre RUs
- The residential RUs
- The non-residential RUs

Figure 2.2 Visual representation of a development’s reportable units



Energy centre reportable units

2.4.2 An energy centre RU is one of the following:

- A connection to an existing third-party district heating or cooling network.
- Each self-contained energy centre falling within the scope of the development’s planning application, serving multiple non-residential or residential properties with heating, cooling or electricity via a distribution network.
- Each heating and/or cooling energy system serving multiple residential properties for example, a communal heating system in a block of flats.

Residential reportable units

2.4.3 Each residential RU within a major development should be reported against separately. A residential RU qualifies as:

- An individual block of five or more flats.
- A group of five or more houses all planned to be completed within a three-year period[2].

2.4.4 Five dwellings is the threshold at which anonymity of energy data is accepted and is therefore adopted as the minimum size of an RU. This is in line with the Statistics of Trade Act 1947[3] according to which the aggregation of five or more returns would ensure the information could not be tracked back to any one individual return.

2.4.5 Where dwellings form part of a mainly non-residential building, they should be separated out from the non-residential RU and treated as a separate residential RU. If the total number is less than five dwellings, they should be added to other residential units in the development, if applicable, or considered de minimis (see paragraph 2.4.10). For cases where there are less than five apartments above a non-residential development then this would become de minimis.

[2] The three year period has been selected to support the practicality of monitoring the performance of the whole RU in a timely manner.

[3] Statistics of Trade Act, 1947 10 & 11 GEO. 6. Ch. 39 page 7: para 9 (disclosure of information) section 5(a)

2.4.6 Note that common areas of a block of flats are treated as a single occupier/tenant non-residential RU, in a similar manner to how they are treated under Part L of the building regulations[4].

Non-residential reportable units

2.4.7 Each non-residential RU within a major development should be reported against separately. A non-residential RU is an individual building/facility with either:

- a single (non-residential) occupier/tenant
- multiple (non-residential) tenants, with each RU being a tenant's premises.

2.4.8 Each non-residential RU should be determined so that a DEC can be produced for it. This could be a discrete 'building' as defined by the Energy Performance of Buildings Regulations[5] or it could be premises within a building that would often be separately let.

2.4.9 Appendix 2 provides examples of how some typical developments would be separated into RUs.

De minimis threshold

2.4.10 A de minimis threshold applies, where the gross internal floor area (GIA) of a RU is less than 250m^2 and the expected emissions for the unit are less than five per cent of the development's total emissions. De minimis buildings are only required to report energy generation from renewable energy technologies[6]. Note that the de minimis threshold applies to the total area of the same typology/use. For instance, a row of class E(a) premises that in total is above 250m^2 (but each individual unit is less than 250m^2) and produces more than five per cent of the development's total emissions, would need to be reported separately as an RU.

[4] Unheated common areas are expected to be de minimis in terms of carbon emissions hence they would be excluded, provided that the expected consumption didn't exceed the de minimis thresholds. Open access decks are, by definition, excluded from the GIA and therefore do not constitute part of a building. Furthermore, these would in most cases be de minimis.

[5] The Energy Performance of Buildings (Certificates and Inspections) (England and Wales) Regulations 2007: http://www.legislation.gov.uk/uksi/2007/991/contents/made

[6] This is likely to be most material for multi-residential buildings with on-site renewables.

3 Planning stage: process and requirements

3.1 Process of data submission

3.1.1 During the planning stage, the responsibility for data submission via the planning stage webform and ensuring accurate estimates as the design develops lies with the applicant. The applicant will be expected to ensure that all affected parties (for example, developer, building owner, landlord or occupier) are aware of their responsibilities at subsequent reporting stages. This should be appropriately secured through a legal agreement (Section 106 agreement) between the local authority and the applicant specifically for the as-built and in-use reporting stages. The responsibilities for reporting should be clearly set out in this agreement. Draft legal wording is available for local authorities to use[7].

3.1.2 For all major applications (detailed, outline and hybrid applications), the applicant should provide estimates of each of the performance indicators listed in Table 3.1 at the planning stage (RIBA Stage 2/3), that is – at the same time as the energy strategy and all other planning application documents. The applicant should also provide target dates for the submission of updated information at the as-built and in-use stages.

3.2 Reporting requirements and process of data generation

3.2.1 Energy strategies, which are required to demonstrate compliance with wider aspects of Policy SI 2, will contain the majority of the necessary evidence requested at planning stage (that is – building energy use data, carbon emissions and carbon offsetting estimates), as outlined in Table 3.1.

3.2.2 At this stage of reporting, estimates are provided for the entire development as a whole, not for individual RUs.

3.2.3 For both residential and non-residential uses, the carbon emissions estimates submitted at planning stage should be calculated using the version of carbon factors agreed for use in the energy strategy. More information on the expected carbon factors to be used at planning stage can be found in the GLA’s Energy Assessment Guidance[8].

3.2.4 For residential uses, the methodology for reporting energy consumption (kWh/m^2) and carbon emissions (tonnes CO_2/m^2) estimates should follow a

[7] https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/london-plan-guidance-and-spgs/be-seen-energy-monitoring-guidance

[8] https://www.london.gov.uk/what-we-do/planning/planning-applications-and-decisions/pre-planning-application-meeting-service-0

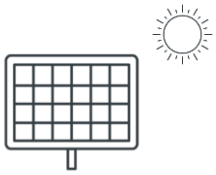
Building Regulations Part L compliant methodology using the SAP tool. This is as per current planning calculation and reporting methodologies.

3.2.5 For non-residential uses, energy consumption (kWh/m^2) and carbon emissions (tonnes CO_2/m^2) estimates should be informed and then reported using two separate methodologies. Applicants will firstly be required to submit the Building Regulations Part L compliant figures, in line with London’s existing planning approach. These should be the same as the data included in the GLA’s Energy Assessment Guidance.

3.2.6 Additionally, analysis guided by CIBSE TM54, which recommends using a tailored Part L model for the estimates of regulated and unregulated loads, should be undertaken and its findings should be reported in the ‘be seen’ reporting webform. A TM54 analysis gives more accurate predictions of a building’s energy use. This approach also aligns with the reporting requirements under the GLA’s Whole Life-Cycle Carbon (WLC) Assessment Guidance. The CIBSE TM54 findings should therefore also be used to represent the regulated and unregulated energy requirements for non-residential uses of Module B6 (operational energy use) of BS EN 15978, in line with the WLC requirements. Please note that a CIBSE TM54 analysis is only required for non-residential uses that do not fall under the de minimis threshold, as with any other ‘be seen’ requirement.

Table 3.1 Planning stage performance indicators

Performance indicator group	Description
 **Contextual data**	• Location Unique Property Reference Number (UPRN) or Address (if no UPRN available) • Site plan • Typology/use (all included) • GIA (m^2) for each typology/use • Anticipated target dates for each ‘be seen’ reporting stage (that is – as-built and in-use as per Figure 2.1)
 **Building energy use**	• Grid electricity consumption (kWh) • Gas consumption (kWh) • Other fuels consumption (kWh) • District heating/cooling consumption(kWh) (if applicable)

Performance indicator group	Description
 **Renewable energy**	• Energy generation (kWh)
 **Carbon emissions**	• Carbon emissions estimates (tonnes CO_2/m^2) for residential and non-residential uses separately as well as the whole development • Carbon shortfall for the entire development (tonnes CO_2) • Estimated carbon offset amount (£)

4 As-built stage: process and requirements

4.1 Process of data submission

4.1.1 Once the as-built design has been completed (upon commencement of RIBA Stage 6) and prior to the building being handed over (if applicable), an update should be provided to the GLA of the estimated performance indicators submitted at planning stage. This will include a number of additional indicators and a greater level of detail compared to the planning stage, along with some additional contextual information. This allows any changes in the detailed building design to be taken into account and will ensure greater accuracy of the energy and carbon estimates being reported. Also, reporting from this point on will be for individual RUs.

4.1.2 The responsibility for submission of all data at this stage via the as-built webform will formally sit with the legal owner. This information will normally be provided by the developer. Much of the information is likely to be generated by the developer’s contractor responsible for the construction of each RU and/or their subcontractors or the developer’s own consultants. All suppliers involved need to be made aware of the requirement to report on the as-built energy performance estimates and this requirement should be reflected in the contractual obligations of each subcontractor or consultant.

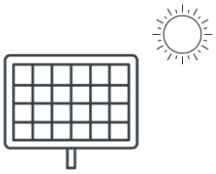
4.1.3 Although the legal owner or developer may subcontract some or all aspects of this process to the relevant energy centre or building design teams, they retain the liability for ensuring the data is provided to the GLA.

4.2 Energy centre performance indicators

4.2.1 Estimates of each of the indicators outlined in Table 4.1 are required for each energy centre included as part of the development. Any indicators not relevant to the site (for example, if the development is not connecting, or is not initially connecting, to a third-party district heating network) can be excluded.

Table 4.1 As-built stage performance indicators for energy centre RUs

Performance indicator group	Description
 **Contextual data**	• Confirmation that a quality assured metering plan is in place and submission of the relevant metering schematics • Information on quality assurance mechanisms
 **Plant parameters** ***Energy centre inputs***	• Grid electricity consumption (kWh) • Gas consumption (kWh) • Other fuels consumption (kWh)
 **Plant parameters** ***Efficiency & contribution of each heating/cooling generation plant***	• Delivered efficiency of each heating (and/or cooling) generation plant (%) • % of heat supplied from each individual heating (and/or cooling) generation plant

Performance indicator group	Description
 **Plant parameters** ***Network efficiency data***	• Predicted losses from heat/cooling distribution pipework (between energy centre and consumer meters) (kWh)
 **Plant parameters** ***Third party*** District Heating Network ***(DHN) networks***	• District heating/cooling energy import (kWh) • District heating/cooling exported (to outside development) (kWh)
 **Renewable energy**	• Renewable electricity generation (gross) (kWh) • Solar thermal heat generation (kWh)
 **Energy storage equipment**	• Battery storage capacity (kWh) • Net electricity flow to Electric Vehicles (EVs) (kWh)

4.2.2 Developers will be expected to provide the predicted energy performance data for the district heating system based on the best available calculations provided by the energy centre design team.

4.2.3 Phased uptake of customers will affect network performance and in larger schemes the uptake of customers may be spread over an extended period. In order to account for this, the predicted performance of the energy centre must be submitted from the point where 50 per cent of the expected customer base (by energy consumption) is connected or within five years of the energy centre supplying its first consumer, whichever is sooner. Once one of these thresholds is reached, annual reporting will be expected and this can be extended to up to ten years of operation where needed.

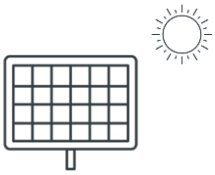
4.2.4 At this stage developers should confirm to the GLA, via the ‘be seen’ reporting webform, that metering schematics have been produced and that metering installation is complete and correctly calibrated to allow for the required measured data after occupation to be submitted. Developers will also be expected to submit the as-built stage relevant metering schematics and information on their quality assurance mechanisms that is – an explanation of the third-party mechanisms which have been adopted to quality assure the submission.

4.3 Residential and non-residential performance indicators

4.3.1 For all residential and non-residential RUs, estimates of the performance indicators presented in Table 4.2 should be submitted separately for each RU. The indicators for plant performance, renewable energy generation and energy storage equipment relate to systems directly linked to that RU (that is – houses supplied by individual heating systems, solar photovoltaic (PV) panels connected to individual dwellings, retail units supplied by individual heat pumps etc.) rather than systems linked to centralised arrangements (for example, energy centres), which are covered by section 5.2.

Table 4.2 As-built stage performance indicators for residential and non-residential RUs

Performance indicator group	Description
 **Contextual data**	• Updates of contextual data provided at planning stage, if necessary (for example, typology/use) • GIA (m^2) for each RU • Confirmation that a quality assured metering plan is in place and submission of the relevant metering schematics • Information on quality assurance mechanisms

Performance indicator group	Description
 **Building energy use**	• Grid electricity consumption (kWh) • Gas consumption (kWh) • Other fuels consumption (kWh) • District heating/cooling consumption(kWh) (if applicable) • Predicted DEC grade and rating (for non-residential RUs only)
 **Renewable energy**	• Renewable electricity generation (gross) (kWh) • Solar thermal heat generation (kWh)
 **Energy storage equipment**	• Battery storage capacity (kWh) • Net electricity flow to EVs (kWh)
 **Plant parameters** ***Energy exported***	• District heating energy exported (kWh) • District cooling energy exported (kWh)

Performance indicator group	Description
 **Carbon offsetting***	• Carbon shortfall for the entire development (tonnes CO_2) • Confirmation of carbon offset amount (£)

**The carbon offsetting figures apply to the entire development rather than the individual RUs.*

4.3.2 Carbon and cost related figures will be automatically calculated by the 'be seen' portal, once the information for the as-built stage has been submitted, and will be presented as part of the development's performance summary. The resulting carbon emissions will be calculated using the carbon emission factors which the planning application was consented against. This will enable a direct comparison with the previous stage.

4.3.3 Cost estimates on occupants' energy bills will be based on energy cost data taken from the Quarterly Energy Prices publication[9] (BEIS), which provides separate energy costs for residential and non-residential customers.

Residential reportable units

4.3.4 When submitting data against the performance indicators in Table 4.2 for residential RUs, developers should, for each dwelling or identical dwelling type:

- Undertake estimates of regulated energy consumption and renewable energy generation for each dwelling using SAP software.
- Undertake estimates of unregulated energy consumption using the BREDEM (BRE Domestic Energy Model) 2012 methodology[10].
- Determine capacity of battery storage, net electricity flow to EVs and district energy exported (if present) based on design team or manufacturer's estimates.
- Provide confirmation via the 'be seen' reporting webform, that quality assured metering plans have been produced and that metering installation is complete and correctly calibrated to allow for the required measured data after occupation to be submitted, including utility meters, renewable generation and battery storage/EV technologies. Developers will also be

[9] https://www.gov.uk/government/collections/quarterly-energy-prices

[10] https://www.bre.co.uk/page.jsp?id=3176

expected to submit the as-built stage relevant metering schematics and information on the third-party quality assurance mechanisms that have been adopted.

- Aggregate the results within each residential RU. For utility supplies this should be the sum of regulated and unregulated loads, accounting for any energy use displaced by renewable energy generation within the dwelling.

4.3.5 If dwellings receive district heating or cooling, developers should provide a schedule of the dwellings included in each residential RU to the district heating operator in preparation for the in-use reporting stage. The District Heating Network (DHN) operator’s obligations to provide the ‘be seen’ relevant DHN performance data should be clearly reflected in the contractual obligations (or heat supply agreement) between the development’s legal owner and the network operator.

Non-residential reportable units

4.3.6 When submitting data against the performance indicators in Table 4.2 for non-residential RUs, developers should:

- Produce a draft whole building DEC[11] certificate and submit the associated xml file. The predicted energy consumption should be undertaken using the CIBSE TM54 methodology. This method tailors a Part L calculation to reflect the expected occupancy and usage of the building and calculates unregulated loads, again based on expected use and occupancy of the building.
- Predict the DEC grade and rating using the CIBSE TM54 results. For a building/facility with multiple tenants the RU is each tenant’s premises. This requirement can be met by assuming generic tenants for tenancies where leases to actual tenants have yet to be signed.
- Determine capacity of battery storage, net electricity flow to EVs and district energy exported (if present) based on the developer/contractor design team or manufacturer’s estimates.
- Provide confirmation to the GLA, via the ‘be seen’ reporting webform, that quality assured metering plans have been produced and that metering installation is complete and correctly calibrated to allow for the required measured data after occupation to be submitted. Developers will also be expected to submit the as-built stage relevant metering schematics and information on the third-party quality assurance mechanisms that have been adopted.

[11] A de minimis threshold applies where the floor area of a RU is less than 250m^2 GIA and the expected emissions for the unit are less than 5 per cent of the development’s total emissions. De minimis buildings are only required to report energy generation from renewable energy technologies, if applicable.

4.3.7 The majority of the information requested as part of the as-built 'be seen' requirements for non-residential RUs should be acquired from the xml output file generated by the software used to predict the DEC rating. The remaining information should be provided by the developer's contractor/technical consultants.

4.3.8 Currently DEC certificates only apply to buildings occupied by a public authority. However, the government explains that private organisations may elect to follow the same approach on a voluntary basis[12]. The DEC route has been selected by the GLA as a consistent means to compliance for all non-residential RUs. The DEC xml data file and the output from the DEC generation process will allow the submission of data to the 'be seen' reporting webform to be automated to minimise data entry effort and risk of human error. The generation of a DEC certificate can only be overseen by a qualified assessor, ensuring consistency of approach with the in-use data and with other development submissions.

4.3.9 The information that will be made available from the DEC xml file and that which should be collected by the developer/contractor is presented in Table 4.3.

Table 4.3 Data sources for non-residential performance indicators

Performance indicator group	Individual indicator	Unit	Sources of information	
			DEC xml	Developer/ Contractor
Contextual data	Expected hours of use per annum (p.a.)	hrs p.a.	✓	
	Floor area (GIA)	m^2	✓	
Building energy use	Grid electricity consumption (input)	kWh	✓	

12 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/452481/DEC_Guidance__rev_July_2015_.pdf

Performance indicator group	Individual indicator	Unit	Sources of information	
			DEC xml	Developer/ Contractor
	Gas consumption (input)	kWh	✓	
	Other fuel consumption (input)	kWh	✓	
	District heating consumption	kWh	✓	
	District cooling consumption	kWh	✓	
	Predicted DEC grade and rating	A to G; rating	✓	
Renewable energy*	Renewable electricity generation (gross)	kWh	✓	
	Solar thermal heat generation	kWh	✓	
Energy storage equipment	Battery storage capacity	kWh		✓
	Net electricity flow to EVs	kWh		✓
Plant parameters *Energy exported^*	Total district heating exported	kWh		✓
	Total district cooling exported	kWh		✓

* *For a building/facility with multiple tenants where offices are not the predominant use type and the RU is each tenant’s premises: renewable energy data should be reported for the whole facility.*

^ *Only required where the RU exports heat or cooling into a wider heat/cooling network. This is not captured by the DEC xml file and must be stated separately.*

5 In-use stage: process and requirements

5.1 Process of data submission

5.1.1 During the in-use stage (RIBA Stage 7), responsibility for monitoring and reporting actual performance rests with the legal owner. Where a building is handed over by the developer to the owner prior to occupation, the developer has the obligation to transfer information about the ‘be seen’ responsibilities. This includes how the development is broken down into RUs, the steps followed to date to achieve compliance with the policy and a link to this guidance document so that they understand which indicators must be reported in the upcoming years. These obligations should be reflected in the handover (or sales) contract between the various parties.

5.1.2 The building owner should monitor and report annual energy performance data for each qualifying RU via the in-use webform for at least five years once the defects liability period (DLP) is complete. A DLP is usually estimated to be between 6 and 12 months and rarely lasts longer than 15 months. The ‘be seen’ portal will allow for up to ten years of in-use data submissions to improve reporting accuracy.

5.1.3 For residential RUs, the developer/building owner should begin monitoring once the DLP is complete. They should then report for the first time 12 months after the DLP is complete and then every year for a further four years. This allows enough time for the properties to reach full occupancy within the monitoring period.

5.1.4 The reporting period for energy centre RUs begins when the connected customers’ consumption totals 50 per cent of the energy centre’s proposed output at design stage or within five years of the energy centre supplying its first consumer, whichever is sooner.

5.1.5 For non-residential RUs, reporting applies from the point at which a DEC can be provided during the in-use stage. DECs cover a year during which the whole building is considered occupied for at least 11 months. Whole building DECs identify weighted annual hours of use for the entire building. A tenant DEC in a multi-tenanted non-office facility ensures that only occupied space is included.

5.1.6 Building owners who are no longer involved with the building during the five-year reporting period are responsible for passing on their monitoring and reporting responsibilities to the new building owner.

5.1.7 If the in-use evidence submitted shows that the as-built performance estimates have not been or are not being met, the owner should investigate the matter, identify the causes of underperformance and the potential mitigation measures , and set these out in the relevant comment box of the ‘be seen’ reporting webform. This performance data will give developers

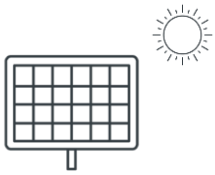
and building owners a better understanding of how each RU operates. Owners will have the opportunity to justify divergences at in-use stage from earlier predictions via the ‘be seen’ reporting webform and constraints will be acknowledged on a case by case basis.

5.2 Energy centre performance indicators

5.2.1 The in-use performance indicators that should be reported for the energy centre RUs are presented in Table 5.1. These align with the indicators required at the as-built stage with the exception that some of the data is reported through two data points (for example, the energy exiting the energy centre, and the energy billed to consumers). This allows the system indicators to be calculated based on primary data.

Table 5.1 In-use stage performance indicators for energy centre RUs

Performance indicator group	Description
 **Contextual data**	• Information on quality assurance mechanisms
 **Plant parameters** ***Energy centre inputs***	• Grid electricity consumption (kWh) • Gas consumption (kWh) • Other fuels consumption (kWh)
 **Plant parameters** ***Efficiency & contribution of each heating/cooling generation plant***	• Energy input to each heating/cooling energy conversion plant (kWh for each energy carrier) • Energy output from each heating/cooling energy conversion plant (kWh for each energy carrier)

Performance indicator group	Description
 **Plant parameters** ***Network efficiency data***	• Total district heating (and/or cooling) output from production centre • Total district heating/ cooling supplied to customers (kWh)
 **Plant parameters** ***Third party DHN networks***	• District heating/cooling energy import (kWh) • District heating/cooling exported (to outside development) (kWh)
 **Renewable energy**	• Renewable electricity generation (gross) (kWh) • Solar thermal heat generation (kWh) • Renewable electricity exported (kWh) • Renewable electricity used on-site (kWh)
 **Energy storage equipment**	• Battery storage capacity (kWh) • Net electricity flow to EVs (kWh)

5.2.2 Developers should collect the energy performance indicators in Table 5.1 using direct metering of the energy centre and consumers. It is likely that the responsibility for reporting this data annually will be transferred to the operator of the site-wide or third-party district heating system at this stage.

The operator should ensure data protection is in line with national regulations. When the developer and/or building owner contracts with a party to operate the network for their development or with a third-party district heating system to provide heating and cooling to their development, these contracts should incorporate these responsibilities. In those cases where existing agreements, such as heat supply agreements, are already in place with DHN operators, developers will still be expected to ensure that network operators provide the necessary information. The operator is the entity that bills consumers for their energy consumption. For smaller communal or district energy systems, the operator may be the managing agent of the building where the heating and/or cooling plant is located.

5.2.3 The necessary smart metering infrastructure should be in place to enable the collection of the indicators outlined above. This should be in line with the metering plans produced at as-built stage. Information should be submitted on the third-party quality assurance mechanisms that have been adopted for the data and metering arrangements.

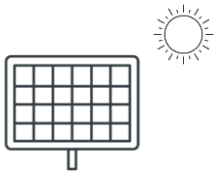
5.2.4 The reporting period for energy centre RUs begins when the connected customers’ consumption totals 50 per cent of the energy centre’s proposed output at design stage or within five years of the energy centre supplying its first consumer, whichever is sooner. Once one of these thresholds is reached, annual reporting will be expected for a minimum of five years and this could extend for up to ten years of operation where needed.

5.3 Residential and non-residential performance indicators

5.3.1 For all residential and non-residential RUs, the in-use performance indicators are presented in Table 5.2 and should be reported separately for each RU. As per the as-built requirements, the indicators for plant performance, renewable energy generation and energy storage equipment relate to systems directly linked to the RUs (that is – houses supplied by individual heating systems, PV panels connected to individual dwellings, retail units supplied by individual heat pumps etc.) rather than systems linked to centralised arrangements (for example, energy centres etc.).

5.3.2 Each output should be reported against the RU that its energy generation is an input to. For instance, PV on a block of flats would usually be connected to the landlord’s distribution board and should therefore be captured under the common areas non-residential RU. Directly grid connected renewables (for example, stand-alone renewable installation connected only to the grid and not to any building) included as part of the development would also be expected to be reported as part of the development reporting requirements.

Table 5.2 In-use stage performance indicators for residential and non-residential RUs

Performance indicator group	Description
 **Contextual data**	• Update of GIA (m^2) for each RU, if necessary • Update of typology/use for each RU, if necessary • Information on quality assurance mechanisms
 **Building energy use**	• Grid electricity consumption (kWh) • Gas consumption (kWh) • Other fuels consumption (kWh) • District heating/cooling consumption(kWh) (if applicable) • Measured DEC grade and rating (for non-residential RUs only) either for the whole building or for individual tenanted uses (see paragraph 5.3.10**Error! Reference source not found.**)
 **Renewable energy**	• Renewable electricity generation (gross) (kWh) • Solar thermal heat generation (kWh) • Renewable electricity exported (kWh) • Renewable electricity used on-site (kWh)
 **Energy storage equipment**	• Battery storage capacity (kWh) • Net electricity flow to EVs (kWh)

Performance indicator group	Description
 **Plant parameters** ***Energy exported^***	• District heating energy exported (kWh) • District cooling energy exported (kWh)

^ Only required in situations where the RU exports heat or cooling into a wider heat/cooling network. This is not captured by the DEC XML file and must be stated separately.

5.3.3 As with the energy centre RUs, the necessary smart metering infrastructure should be in place to enable the collection of the indicators outlined above. This should be in line with the metering plans produced at planning and as-built stages. Information should be submitted on the third-party quality assurance mechanisms that have been adopted for the data and metering arrangements.

5.3.4 As with the as-built stage, carbon and cost related figures will be automatically calculated by the ‘be seen’ portal, once the information for the in-use stage has been submitted, and will be presented as part of the development’s performance summary. The resulting carbon emissions will be calculated using the carbon emission factors applied at the two previous reporting stages for consistency purposes and to enable direct comparison.

Residential reportable units

5.3.5 To submit in-use data, and in line with national metering requirements, the developer/building owner should ensure that individual smart meters are installed in each dwelling. Although the ‘be seen’ methodology does not ask for separate reporting of regulated and unregulated energy uses, developers will be expected to include the necessary level of submetering and/or smart meters to enable this level of granularity which will be useful for occupants and developers. This should be in line with national metering requirements.

5.3.6 For residential RUs, access to and collection of in-use performance data is challenging. Permission needs to be sought from occupants to access their energy performance data, including in-use energy consumption, renewable energy generation and energy storage equipment capacity. This will require occupant consent on an annual basis and the results should be aggregated for each RU before being reported. This is because any data from dwelling-level smart utility meters (for example, electricity and gas meters) is strictly controlled through the Data Communications Company (DCC) to provide data privacy.

5.3.7 To recognise the challenges in securing occupant consent, legal owners should target collection of the relevant data for at least five or 15 per cent (if this is greater than five) of the dwellings of a single RU. This information should then be extrapolated to account for the total number of dwellings which comprise the RU.

5.3.8 However, where energy is provided from a district energy supply (either third-party or communal supply within a block of flats/group of houses), the developer/building owner will be expected to obtain the metered energy consumption provided by the network from the district energy provider (aggregated to RU level), for each residential RU served by a district heating or cooling system. This could be taken from a physical upstream meter, or by summing the consumption billed to each consumer in each RU. As long as each RU includes at least five customers, privacy will be maintained.

Alternative options for securing residential data

5.3.9 There are a number of alternative options legal owners can consider to secure residential data, including:

- Developers who are also the energy provider to residents will have access to residential data and so we expect all such developers to provide the data for 100 per cent of dwellings. L&Q Energy is one such example of a developer with an in-house energy provider operating for some of its schemes.
- Installing Automatic Meter Reading (AMR) devices which are linked to a specified receipt point and where the data is managed by a sole contractor. The London Borough of Ealing have undertaken this approach by partnering with Energence to monitor the performance of renewable and low-carbon technologies installed in new developments.
- Investigating with UK Power Network (UKPN) the potential for installing upstream meters in the distribution network, for example an entire block of flats or street of houses.
- Installing aggregate electrical metering to a consistent standard on sub-distribution serving residential apartments.

Non-residential reportable units

5.3.10 In submitting in-use data, developers/building owners for non-residential RUs comprising whole buildings with a single occupier and either >250m^2 gross internal floor area (GIA) or buildings with <250m^2 GIA but contributing more than five per cent of total carbon emissions of the development, are required to commission an official DEC.

5.3.11 In submitting in-use data, developers/building owners for a building / facility >250m^2 GIA with multiple tenants, are required to:

- Produce a Landlord Energy Statement (LES)[13], a tool that enables landlords to give their tenants who need to prepare a DEC an industry standard summary of their share of the energy provided by the landlord's services to the whole facility.
- Commission an official DEC for each tenant’s premises. This can be done either by the developer/building owner mandating each tenant to produce their own DEC, once they have provided tenants with their individual LES, or by mandating tenants to share their annual energy purchases with the developer/building owner, in which case the landlord should commission all official DEC certificates.
- Commission an official DEC for the whole building/facility. This will be comparable on a like-for-like basis with the whole building/facility DEC predicted at as-built stage, albeit the latter would have assumed generic tenants for tenancies where leases had not been signed.
- Submit the DEC xml data file(s) from the DEC software as per the as-built process.
- Determine renewable electricity exported and used on-site, capacity of battery storage, net electricity flow to EVs and district energy exported (if present) based on the developer/contractor design team or manufacturer’s estimates.

5.3.12 The information that will be made available from the DEC xml file and that which should be collected by the developer/contractor is presented in Table 5.3.

5.3.13 The submission of data from all tenanted premises is the legal owner’s responsibility and it is recommended that it is enshrined within the contract between landlord and tenant for all tenanted units.

[13] The LES was developed by the British Property Federation (BPF) to provide a methodical way to allocate landlord purchased energy to each tenant in a multi tenanted building. The LES is a precursor to producing a DEC for each premises. The DEC for a premises accounts for the energy purchased directly by the tenant of that premises, plus (if applicable) the energy supplied to the premises by the landlord, plus the premises fair share of the energy used by the landlord within the common parts of the facility. The LES covers the latter two elements. For more information: http://www.les-ter.org/home.html

Table 5.3 Data sources for non-residential performance indicators

Performance indicator group	Individual indicator	Unit	Sources of information	
			DEC xml	Developer/ Contractor
Contextual data	Floor area (GIA)	m^2	✓	
Building energy use	Grid electricity consumption (input)	kWh	✓	
	Gas consumption (Input)	kWh	✓	
	Other fuel consumption (input)	kWh	✓	
	District heating consumption	kWh	✓	
	District cooling consumption	kWh	✓	
	Predicted DEC grade and rating	A to G; rating	✓	
Renewable energy*	Renewable electricity generation (gross)	kWh	✓	
	Solar thermal heat generation	kWh	✓	
	Renewable electricity generation (export)	kWh		✓
	Renewable electricity generation (used onsite)	kWh		✓

Performance indicator group	Individual indicator	Unit	Sources of information	
			DEC xml	Developer/ Contractor
Energy storage equipment	Battery storage capacity	kWh		✓
	Net electricity flow to EVs	kWh		✓
Plant parameters *Energy exported^*	Total district heating output	kWh		✓
	Total district cooling output	kWh		✓

^ Only required in cases where the RU exports heat or cooling into a wider heat/cooling network. This is not captured by the DEC XML file and must be stated separately.

6 Best practice guidelines

6.1 About this section

6.1.1 The previous sections set out the minimum requirements to comply with the 'be seen' policy. However, developers are encouraged to consider and implement additional best practice industry guidelines. Depending on the RU typology and scale, there are various initiatives which, if implemented, could lead to greater levels of accuracy in terms of energy performance estimates. Developers are encouraged to set their own targets, as best practice, which is also supported by frameworks presented below that fall under the acceptable 'be seen' methodologies.

6.2 Setting a DEC target rating at planning stage – non-residential developments

6.2.1 The 'be seen' process requires applicants and developers to produce and submit DEC certificates and the associated DEC grade and rating at as-built and in-use stages for non-residential RUs.

6.2.2 For all non-residential RUs, applicants are encouraged to go further than this minimum requirement by submitting, as part of the planning stage, a target

DEC rating in the form of a whole building DEC grade (for example, an "A" or "B" and potentially a rating as well).

6.2.3 The mechanism of producing a DEC rating from the early stages provides a target baseline to work from which the design team can sign up to and which can be transferred as and when ownership of the development changes. This approach leads to a clear, well understood target to compare against as the design progresses.

6.2.4 The Best Practice DEC target for a new office building is B40[14] (DEC Grade B, Rating 40). Similar high performing targets could be adopted for other building types.

6.3 NABERS UK: Design for Performance (DfP) – office developments

6.3.1 NABERS UK is a system for rating the energy efficiency of office buildings across the UK and is administered by BRE. NABERS provides a rating from one to six stars for offices to help building owners to understand their building's performance versus other similar buildings, providing a benchmark for progress.

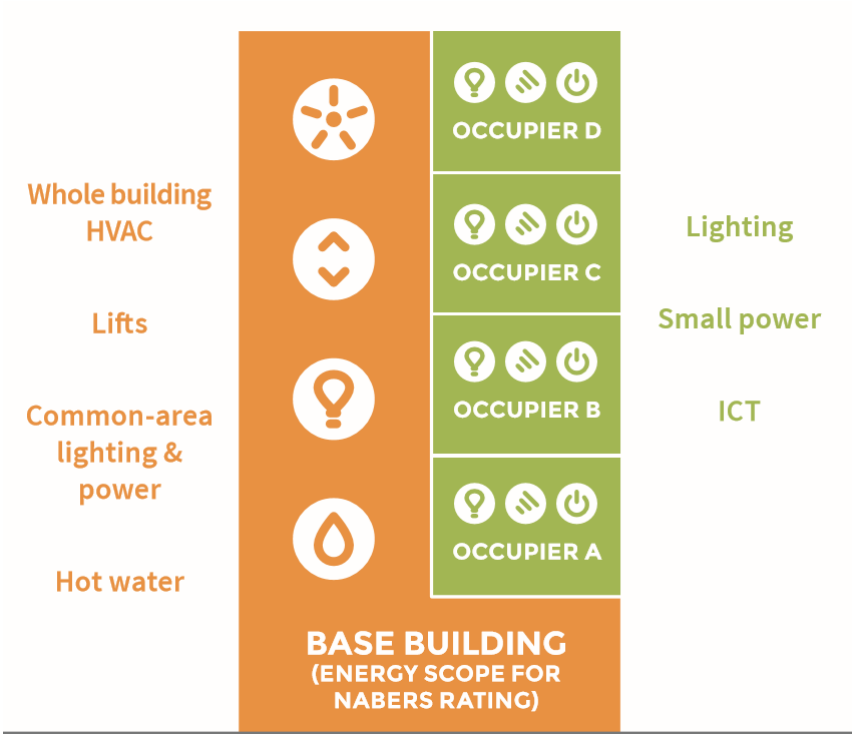
6.3.2 NABERS UK offers two products: NABERS Energy ratings and NABERS Design for Performance (DfP). Unlike design-based ratings, NABERS Energy ratings measure and verify the actual energy use of offices, helping building owners to accurately track and communicate the energy performance of their buildings. DfP is a framework whereby a developer or owner commits to design, build and commission a new office development or major refurbishment to achieve a specific NABERS Energy rating.

6.3.3 DfP requires a base building energy rating target to be set at the start of a project which is then embedded in contractual requirements for the supply chain, becomes a Key Performance Indicator (KPI) for the design process and design tools and is ultimately verified after a year of occupation as a measured rating by an independent accredited assessor.

6.3.4 The scope of the base building rating is illustrated in Figure 6.1. The base building is the responsibility of the building owner/landlord and covers whole building Heating, Ventilation and Air Conditioning (HVAC) and all energy used in the common parts including lights, small power, lifts, external lighting, dedicated car parks, standby generator, etc. The tenants are responsible for their energy use for their lighting and power inside their premises.

[14] Recommended by LETI, UKGBC and RIBA.

Figure 6.1 NABERS Energy rating scope



6.3.5 As an alternative to submitting a target DEC rating (as outlined in section 6.2) the GLA encourages planning applicants putting forward office[15] buildings with a GIA of >5,000m^2 to submit, as part of the planning stage process, a NABERS Energy rating instead. The best practice NABERS Energy rating target for a new multi-let office > 5,000m^2 GIA is 5 stars[16]. Applicants choosing to follow this methodology, will be required to measure and disclose the base building rating throughout all 'be seen' reporting stages (that is – as-built and in-use), as they would for a DEC grade and rating.

6.3.6 The process of importing the data from the NABERS Energy rating framework to the 'be seen' reporting webform will be made available on the 'be seen' webpage.

[15] Separate use classes for commercial uses including retail and offices have now been replaced by use class E. The most relevant building typology or use should be selected in providing data. Amendments to the reporting webforms will be considered once the related changes to Building Regulations are published.

[16] 5 stars is the recommended minimum base building rating for commercial offices in operation from 2025. See https://www.ukgbc.org/ukgbc-work/net-zero-carbon-energy-performance-targets-for-offices/ (UKGBC, January 2020).

6.3.7 In line with the NABERS DfP, applicants and developers should ensure that the appropriate metering arrangements are in place to permit the necessary energy metering and base building rating to be determined. Applicants and developers are also encouraged to consider using the full NABERS DfP framework as it includes "advanced simulation" (detailed HVAC plant and control modelling) and goes beyond the minimum requirements of a Part L model (used for CIBSE TM54).

6.3.8 For further information please refer to the BRE website[17].

6.4 Advanced modelling simulation

6.4.1 The GLA encourages developers of all non-residential building uses (other than offices) of at least 5,000m^2 GIA to estimate annual energy consumption (kWh) and intensity (kWh/m^2) by undertaking an advanced simulation (detailed HVAC plant and control modelling) during the as-built stage. Guidelines are set out in the BREEAM Guidance Note 32 (GN32). These modelling principles can be applied to any non-residential building in order to obtain detailed insight and a robust prediction of operational performance. Advanced simulation, particularly in large-scale buildings, is pivotal in providing far greater insight into a building's likely energy performance and can therefore lead to a narrower performance gap. The principles of advanced modelling simulation can be applied to any building typology.

6.5 CIBSE TM63 Operational performance: Modelling for evaluation of energy in-use

6.5.1 CIBSE's TM63 *Operational performance: Modelling for evaluation of energy in-use* aims to provide a methodological framework to undertake measurement and verification of building energy performance in-use. The document has been developed to help designers, contractors, building managers and other stakeholders understand the procedures that need to be followed to undertake an effective measurement and verification exercise.

6.5.2 The methodology presented in the document provides: an understanding of the modelling approaches and their potential impact on the performance gap, guidance on the development and validation of calibrated energy simulation models, a method that can be used to evaluate energy performance in-use and identify causes of the performance gap and finally an understanding of the distinction between deviations in performance from a theoretical baseline related to operational modifications or technical shortcomings.

[17] https://www.bregroup.com/nabers-uk/

6.5.3 Although the methodology is presented for non-residential buildings, it can also be applied to other types of buildings. The GLA encourages design teams to use the methodology to help establish and explain the performance gap in their buildings particularly in instances where large divergencies are being reported. This will help establish the root causes leading to this performance gap.

6.6 Integrated smart energy systems

6.6.1 Currently, smart meters (SMETS2) with an in-home display have to be provided for new homes and advanced meters / half-hourly meters are provided for non-residential buildings. Such systems help raise awareness and make users responsible for their energy consumption.

6.6.2 The GLA encourages developers to consider smart energy systems that provide integration between different systems, including landlord/owner and tenant/occupant, electric vehicle charging points, security systems, white goods (if installed), etc. Separate submetering for heating & hot water for residential uses and submetering to allow energy consumption by use type for non-residential buildings is also encouraged.

6.6.3 Ideally the system should provide secure, remote access to data and should allow occupants and building owners to access this data. It should also provide secure, remote communication of consumption data between the meter and the supplier.

6.7 Occupant overheating feedback

6.7.1 Smart building functions allow occupants of residential and non-residential developments to report issues with overheating and/or internal temperature monitoring. This is standard process for non-residential buildings where overheating issues are usually reported to the building manager who controls the plant and equipment.

6.7.2 Developers/building owners are encouraged to implement solutions which allow occupants to communicate issues associated with overheating to the building owner. This could be done through the building management system (BMS) by undertaking occupant surveys to identify overheating concerns, or by setting up an online system allowing occupants to flag issues that can then be investigated.

6.8 Other in-use best practice methodologies

6.8.1 A number of other best practice methodologies exist, which are applicable to all non-residential building typologies and which developers may want to consider, including:

- The CIBSE TM22[18] Energy Assessment and Reporting Methodology which provides a method for assessing the energy performance of an occupied building based on metered energy use and a “bottom up” assessment of the installed plant and equipment present in the building. The approach is supported by a software tool.
- Soft Landings[19] provides a step by step process for clients and their project teams to follow in order to tackle issues driving the performance gap at all stages of the design and construction process.

18 https://www.cibse.org/Knowledge/knowledge-items/detail?id=a0q20000008I7eWAAS

19 https://www.bsria.com/uk/product/vBG24D/soft_landings_and_design_for_performance_bg_762019_a15d25e1/

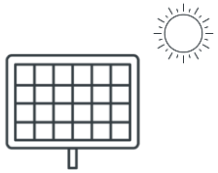
Appendix 1 Summary of indicators for all ‘be seen’ stages

A1.1.1 The table below includes a high-level summary of the reporting requirements for the three ‘be seen’ stages for all RU types. For further detail on what is required at each stage, please refer to relevant section of the guidance.

Table A1.1 Summary of indicators and requirements for all ‘be seen’ stages

Indicator	Planning stage	As-built stage		In-use stage	
	Whole development	Energy centre reportable units	Residential and non-residential reportable units	Energy centre reportable units	Residential and non-residential reportable units
 **Contextual data**	• Location UPRN or Address • Site plan • Typology/use • GIA for each typology/use • Anticipated target dates for each ‘be seen’ reporting stage	• Confirmation that a quality assured metering plan is in place and submission of the relevant metering schematics • Information on quality assurance mechanisms	• Updates of contextual data, if necessary (for example, typology/use) • GIA for each RU • Confirmation that a quality assured metering plan is in place and submission of the relevant metering schematics	• Information on quality assurance mechanisms	• GIA update for each RU, if necessary • Update of typology/use for each RU, if necessary • Information on quality assurance mechanisms

Indicator	Planning stage	As-built stage		In-use stage	
	Whole development	Energy centre reportable units	Residential and non-residential reportable units	Energy centre reportable units	Residential and non-residential reportable units
			• Information on quality assurance mechanisms		
 **Building energy use**	• Grid electricity consumption • Gas consumption • Other fuels consumption • District heating/ cooling consumption (if applicable)	N/A	**(SAME AS PLANNING STAGE plus:)** • Predicted DEC grade and rating (for non-residential RUs only)	N/A	**(SAME AS PLANNING STAGE plus:)** • Measured DEC grade and rating (for non-residential RUs only)

Indicator	Planning stage	As-built stage		In-use stage	
	Whole development	Energy centre reportable units	Residential and non-residential reportable units	Energy centre reportable units	Residential and non-residential reportable units
 **Renewable energy use**	• Energy generation	• Renewable electricity generation (gross) • Solar thermal heat generation		**(SAME AS AS-BUILT STAGE plus):** • Renewable electricity exported • Renewable electricity used on-site	
 **Energy storage**	N/A	• Battery storage capacity • Net electricity flow to EVs			

Indicator	Planning stage	As-built stage		In-use stage	
	Whole development	Energy centre reportable units	Residential and non-residential reportable units	Energy centre reportable units	Residential and non-residential reportable units
 **Plant parameters**	N/A	a.1. Grid electricity consumption a.2. Gas consumption a.3. Other fuels consumption b.1. Delivered efficiency of each heating/ cooling) generation plant b.2. % of heat supplied from each heating/ cooling generation plant	• District heating/ cooling energy exported	**a. (SAME AS AS-BUILT STAGE)** b.1. Energy input/output to/from each heating/cooling energy conversion plant c.1. Total district heating/ cooling output from production centre c.2. Total district heating/ cooling supplied to customers **d. (SAME AS AS-BUILT STAGE)**	**(SAME AS AS-BUILT STAGE)**

Indicator	Planning stage	As-built stage		In-use stage	
	Whole development	Energy centre reportable units	Residential and non-residential reportable units	Energy centre reportable units	Residential and non-residential reportable units
		c. Predicted losses from heat/cooling distribution pipework d. District heating/cooling energy import/export			
 **Carbon**	• Carbon emissions estimates for residential, non-residential and whole development • Carbon shortfall for the entire development	N/A	• Carbon shortfall for the entire development • Confirmation of carbon offset amount	N/A	N/A

Indicator	Planning stage	As-built stage		In-use stage	
	Whole development	Energy centre reportable units	Residential and non-residential reportable units	Energy centre reportable units	Residential and non-residential reportable units
	• Estimated carbon offset amount				

Appendix 2 Application of RUs to typical development examples

A2.1.1 This appendix provides indicative examples of how RU definitions could be applied to a range of different development scenarios.

A2.1.2 The residential RU definitions include a deliberate element of flexibility to enable developers to group residential and non-residential elements in a logical manner to account for phasing and physical layout of the development. The following examples have been set out on the basis of achieving compliance with the minimum requirements of the ‘be seen’ policy while observing data privacy requirements.

A2.1.3 In non-residential buildings, it is common for a mix of tenants with differing use activities to occupy a larger building or complex. In some cases, a tenancy can be separated entirely from the other aspects of a building or complex. A typical example is retail units on the ground floor of a larger office building. Where these units are designed to be entirely independent from the rest of the building for example, have their own independent utility supplies, access and HVAC services, each self-contained unit can be treated as a separate RU to the remainder of the building.

A2.1.4 The converse case is where a unit shares access, HVAC systems or an energy supply with other aspects of the building in which case it would be treated as a tenancy within the larger building for the application of ‘be seen’. In order to robustly share the landlord energy consumption in these cases, the Landlord Energy Statement is used.

Example 1: Single block of flats of 25 units with individual heating systems

The 25 residential units in the block comprise one residential RU.

The common areas of the block comprise a non-residential RU. This is assessed against de-minimis thresholds; if it is deemed de-minimis then only renewable energy data would be reported for this element.

Example 2: Single block of flats of 25 units with individual heating systems and a gym as part of the communal area

The residential units in the block comprise one RU.

Where the gym is self-contained this can be treated as a separate non-residential RU to the common areas of the block of flats and there are therefore two single tenanted non-residential RUs present (the common areas and the gym). Each would be assessed against de-minimis thresholds.

Where the gym is not self-contained, the common areas and gym would be treated as a single RU. Where the gym is operated by a separate company to the common parts of the building there would be two tenants in the RU. Where the same organisation operates both elements it would be a single tenant RU.

Example 3: Single block of flats of 100 units with communal heating system

The residential units in the block comprise one RU.

The common areas of the block of flats comprise a non-residential RU. If this is deemed de-minimis then only renewable energy data would be reported.

The communal heating system comprises an energy centre RU.

Example 4: Single occupier office/leisure centre with separate café/retail on ground floor

There are two approaches available depending on how the café/retail unit is provided with energy and HVAC services.

1. Where the café/retail unit is self-contained, the office/leisure centre and café/retail unit would each be defined as their own RU and reported separately. Two DECs would be prepared supported by a Landlord Energy Statement.
2. Where the café/retail unit is not self-contained, the building is a single RU with two tenants. A single DEC would cover the whole building which would be considered mixed-use (office/leisure centre + café/retail unit).

Example 5: Multi-let office/retail building

Where the office/retail units are self-contained each office/retail unit would be defined as its own RU and reported separately. Each unit would be assessed against de-minimis thresholds separately (<250m^2 and <5 per cent of projected total carbon emissions for the development).

Where a landlord has responsibility for energy consuming common facilities such as car parking, external lighting, signage or management offices (this is commonly the case in retail parks), a LES should be prepared and the landlord energy use allocated to each office/retail unit and included in the DEC of each RU.

Example 6: Shopping mall

A shopping mall is treated as a multi-tenanted RU (that is – one RU per tenant) and the energy consumed by the mall area and other landlord’s services (such as car parks, etc.) is assigned to the tenancies using the LES. A DEC certificate would be required for each separate RU.

Example 7: Mixed-use development (residential and non-residential) with single energy centre supplying entire development

The residential dwellings in each residential block of over five dwellings comprise one RU. Any blocks with fewer than five dwellings should be combined with an adjacent block until the threshold is met.

Any independent residential units (houses) are combined into a single RU of five or more dwellings.

The common areas of each residential RU are treated as a separate non-residential RU. If this is deemed de-minimis then only renewable energy data would be reported under ‘be seen’.

The energy centre comprises an energy centre RU.

Each non-residential building or self-contained non-residential tenancy is assessed against the ‘be seen’ criteria to determine whether it qualifies as a single occupier or multi-tenanted (office or non-office) RU.

Example 8: Mixed-use development (residential and non-residential) with one energy centre per block and retail units supplied by individual systems

The residential dwellings in each residential block of over five dwellings comprise one RU. Any blocks with fewer than five dwellings should be combined with an adjacent block until the threshold is met.

Any independent residential units (houses) are combined into a single RU of five or more dwellings.

The common areas of each residential RU are treated as a separate non-residential RU. If this is deemed de-minimis then only renewable energy data would be reported under ‘be seen’.

The energy centres serving each block would comprise individual energy centre RUs (that is – one RU per energy centre).

Each non-residential building or self-contained non-residential tenancy is assessed against the ‘be seen’ criteria to determine whether it qualifies as a single occupier or multi-tenanted (office or non-office) RU.

Appendix 3 Reporting responsibilities

Responsibility for providing the data at each stage of the process is set out in the tables below.

Energy centre RUs

Table A3.1 Responsibility for providing data associated with energy centre RUs

‘Be seen’ stage	Responsibility
Planning	Planning applicant
As-built	Developer
In-use	Network operator

Residential RUs

Table A3.2 Responsibility for providing data associated with residential RUs

‘Be seen’ stage	Owner occupied	Private rented sector	Social housing
Planning	Planning applicant		
As-built	Developer		
In-use	Freeholder (via for example, building management company)	Freeholder (for example, building head lease owner)	Freeholder (for example, social housing operator)

Non-residential RUs

Table A3.3 Responsibility for providing data associated with non-residential RUs

‘Be seen’ stage	Owner occupied	Private rented sector	Social housing
Planning	Planning applicant		
As-built	Developer		
In-use	Building owner*		

**In-use reporting for premises in a multi-let non-office (for example, shopping/leisure centre) can be delegated through lease terms by the building owner to each tenant in which case the building owner must provide each tenant with a Landlord Energy Statement (LES).*

Appendix 4 Glossary of abbreviations

AMR – Automatic Meter Reading
BEIS – Department for Business, Energy & Industrial Strategy
BPF – British Property Federation
BMS – Building Management System
BREDEM – BRE Domestic Energy Model
CIBSE – Chartered Institution of Building Services Engineers
CO_2 – Carbon Dioxide
DCC – Data Communications Company
DEC – Display Energy Certificate
DfP – Design for Performance
DHN – District Heating Network
DLP – Defects Liability Period
EPC – Energy Performance Certificate
EV – Electric Vehicle
GIA – Gross Internal Area
GLA – Greater London Authority
HVAC – Heating Ventilation Air-Conditioning
LES – Landlord’s Energy Statement
NABERS – National Australian Built Environment Rating System
PV – Photovoltaic
RU - Reportable unit
SAP – Standard Assessment Procedure
SMETS - Smart Metering Equipment Technical Specifications
TM – Technical Memorandum
UKPN – UK Power Networks
UPRN – Unique Property Reference Number
WLC – Whole Life-Cycle Carbon