Resource Hub

Planning a BPE – where to start and common techniques

BPN training module 2

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Resource Hub Series

These training documents are to help anyone involved in a building project to understand what Building Performance Evaluation is, who will undertake what and when. We present the benefits of these efforts, which include occupant satisfaction, lower environmental impact, and reducing risk. We want the user of this series to have the confidence and information to be able to get the evaluation programme they need to achieve their goals for their project.

There are 5 modules. A fuller description of all of these in provided in Module 1.

Module 1 - BPE: What, why and the benefits that it brings

Module 2 - Planning a BPE: Where to start and common techniques

Module 3 - Undertaking dwelling BPE

Module 4 - Data interpretation, reporting and taking action

Module 5 - The performance golden thread: BPE and robust QA

Modules will all be freely available from the BPN Resource Hub.

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01 Introduction to module 2

Module 1 explained what Building Performance Evaluation (BPE) is and why we need it. In summary, BPE assesses various aspects of a home including physical properties such as construction quality, operating efficiency and costs (e.g. relating to energy and water use), environmental impact, internal conditions; and other related factors such as occupant comfort and satisfaction. This is done most successfully as an ongoing process throughout all stages of the development of a dwelling.

As described in Module 1, the benefits it brings include:

- Helping to flag potentially serious failures in performance, to guide prompt remedial action.
- Helping to keep occupants happy with their homes.
- More efficient, better performing homes overall, with lower running and maintenance costs, better environmental impacts, and improved levels of comfort.
- Helping to futureproof homes,
- Reputational benefits to those involved in delivery.
- Protection of investment.
- Personal, professional and organisational development with lessons learned for future projects.

Module 2 builds on Module 1 to guide you on how to begin a BPE programme, providing more detail on how to implement it and when.

To assist with your planning, we have described the timing of BPE against the RIBA Plan of Works. We also cover various considerations that affect your planning for BPE – including engaging occupants and the delivery team, taking into account seasonal impacts on timing, and how to plan for using feedback/findings.

Module 2 also provides further details on the techniques of BPE, including when they are appropriate and the sorts of results they produce, and how they might inform each other or additional evaluation activities.

Following this module, you will know when to ask for BPE, who to ask and what to ask for, and how the results may influence the project.

02 Engaging project participants

Occupants

For BPE to be successful, engagement of occupants is vital. When the project involves an existing dwelling or a self-build project, the occupant will be involved early on. A good understanding of their priorities (such as how the home will feel to live in, how they will interact with it and how much it will cost to run) will result in meaningful targets being set at the start of the project that can usefully inform the whole process. In many cases, the feedback of the occupant may be all the in-use BPE that you require (see In Use (RIBA Stage 7)) – it may be the key indicator of performance.

For many new build schemes, the occupant may not be involved until later in the process. However, they will still need to be considered throughout the planning process to ensure that the BPE work is not overly intrusive or disruptive, and that they are willing to be involved. You should consider:

- Informed consent, including a right to withdraw
- Equality and diversity (e.g. adjustments that may be required to meet the needs of occupants).
- Adherence to General Data Protection Regulations (GDPR) – key principles include lawfulness, fairness and transparency; purpose limitation; data minimisation; accuracy; storage limitation; integrity and confidentiality (security); and accountability.

Further guidance on interaction with occupants can be found in Module 3 of this training package. Further guidance on use and protection of data can be found in Module 4.

Architects, retrofit coordinators, building performance evaluators

Various professionals can help plan and implement your BPE programme, alongside planning the building work. If you wish to make BPE part of your project, this can be raised with the architects you consider for your project and should be considered as part of their costs and the costs of the project.

For renovation or improvement work, you might use a retrofit coordinator. Again, planning the BPE programme can be part of their remit.

At various stages, you are likely to need specialist building performance testers. For example, they can carry out airtightness testing on site, measure whole fabric heat loss or take thermal images, and interpret the results. Some information on these specialists, the level of expertise required and indicative cost is given in the Building Performance Evaluation Guide from WoodKnowledge Wales.

Contractors

Various contractors will need to take part in, or at least be aware of, the evaluation programme. Understanding the performance targets and how these are to be achieved on site (or may be compromised by particular actions) are an important part of achieving good building performance. As various evaluations are made, reviewing the results with the onsite team will enable appropriate remedial action as necessary.

Communicating issues successfully can be aided by choosing the most appropriate BPE technique and presentation of results. Graphs and charts do not necessarily communicate effectively, whereas photographs (or thermal image) may do. In either case, it is important to give the context and to clearly explain the findings and implications. Concerns will gain credibility when backed up with empirical evidence, resulting in a more proactive response. A well-designed occupant survey will ask a range of questions, helping to paint a fuller picture of the home's performance and pinpoint problems. This is particularly powerful if considered alongside other evaluation results.

For example, we might find that the home is struggling to get to temperature, the occupant feels confused by the usability of the heating controls, but the thermography showed a well-insulated building envelope. In this case, we can reasonably send the heating engineer back to look at the system and controls set up, knowing that it's unlikely to be a problem with the building fabric.

How does BPE differ between new homes and refurbishment projects?

As discussed in Module 1, the BPE techniques used whether you are dealing with a new build or an existing building undergoing refurbishment are broadly the same. However the expectations of the occupants may be significantly different. This is reflected in the targets set and the questions asked of those occupants.

In the case of an existing home, occupants will expect an improvement on pre-retrofit performance (e.g. warmer in winter but perhaps also cooler in summer, or other improvements such as better ventilation). In some cases, this can simplify the BPE process. For example, a light-touch retrofit might not be expected to significantly change the internal temperature of the home. It is then appropriate to avoid the complexity of giving an assessment of comfort before and after and

comparing these. Instead, it may be appropriate to ask the occupant for feedback on the *change in internal conditions* post-retrofit only, or to look at changes in energy usage before and after. This method helps simplify data collection and make BPEs easier for occupants to participate in.

03 BPE in project stages

As touched upon in Module 1, in order to help you plan your BPE programme, it is important to know when BPE should be considered throughout the project cycle. The guidance below provides more detail using the RIBA Plan of Work. This is a widely recognised framework for the stages of a building project, either a new build or retrofit.

In this section, we have indicated what BPE techniques are used at each project stage. The following Section 04 Common techniques describes the most commonly used in more detail.

Strategic Definition and Preparation and Briefing (RIBA Stages 0-1)

Setting targets, reflecting on past projects

Early on, measurable intended performance outcomes should be set, and it is against these that the project will be tested. Where possible, the key objectives of the occupant should be sought and should help to inform the targets - as well as other aspects of the project process such as design strategies, specifications, occupant engagement (including through BPE), and the handover and aftercare strategy.

At this early stage, if this is not the first BPE project of any parties (architects, clients, property management team, retrofit coordinators, contractors), they can reflect on lessons learnt on other projects that have undergone BPE.

There are some widely accepted sets of targets that, when met, produce a sustainable home. These include Passivhaus certification and the RIBA 2030 Challenge (both summarised in the WoodKnowledge Wales Building Performance Evaluation Guide), and EnerPHit for refurbishment.

Engagement with all parties can begin at the earliest stages of the project. They may be involved with setting the key objectives and targets/performance outcomes and it will likely also be important to set expectations around the timetable for implementing BPE, including discussing the design, evaluation strategy, and possible reinforcement action to ensure performance targets are met..

Concept Design, Developed Design, Technical Design (RIBA Stages 2-4)

Creating and testing a design to realise the project's targets

In the early stages of a project, the project targets/intended outcomes should become core drivers in the conceptual design of the home, or the chosen retrofit strategies. This will involve aspects such as orientation of the home, window sizing, form factor and shape, in the case of new-build homes. For both new-build and retrofits, it will involve which measures and strategies are pursued – including an outline of the energy, fabric design, airtightness, ventilation and vapour permeability strategies. At Stages 3-4, these concepts and strategies will be set out in much more detail.

The BPE techniques listed below can be used to test the design and highlight decisions which may impact on the potential to meet performance targets, drawing upon technical analysis and professional experience. This will inform the final design.

By Stage 4, you should also have the detailed plan for how the BPE monitoring and evaluation will be carried out, to ensure proper budgets are set aside and that any building integrated monitoring equipment is identified for inclusion in the technical design. It is likely that preliminary energy models will be created during Stages 2-3, with more detail added in the technical design phase, Stage 4. This will finalise the targets that you seek to achieve and confirm via the BPE.

BPE Methods

- Site visits can be helpful to the design team
- Design reviews (including energy, fabric design, airtightness, ventilation, acoustics (from outside and internally, e.g. from ventilation system), thermal bridging and moisture risks)
- Early stage overheating analysis
- Procurement review – to ensure procurement matches the project targets.

You (and/or your architect, retrofit coordinator or building performance evaluator) will also need to plan for the BPE activities which will be carried out in subsequent Stages.

If the reviews reveal shortcomings, these should be dealt with in the design stages to avoid targets being missed.

POP-OUT 1 Passivhaus Certification

In the case of a new build home with a low in-use energy target, like PassivHaus, the form factor, orientation and basic geometry would be decided early in design stages with an aim to minimise fabric heat losses, maximise useful heat gain and avoid overheating. These key design decisions would help ensure that the technical design of the homes is as straightforward and cost-effective as possible. The Passivhaus Planning Package is used to model the design and predict whether it will meet the performance targets.

Manufacturing & Construction (RIBA Stage 5)

Realisation of the design to ensure performance

This stage should be focused on ensuring the design and specification are executed as planned, avoiding inappropriate changes that may compromise the performance, and carrying out quality assurance.

Any changes to the design or specification should be checked so that the target performance is still met. Deviations from the design, either because alternatives are chosen or because the implementation of the design is not of good quality, will potentially undermine the performance of the building.

Towards or at the end of construction, certain BPE methods can help to identify defects which might otherwise be difficult to find; these include thermal imaging, air permeability tests and fabric tests.

A timely review of the results of evaluations made in this stage with appropriate contractors, will allow remedial action to be taken while this is possible.

Any in-situ monitoring equipment which is integrated into the project will also need to be commissioned. This will mean calibrating and validating equipment to ensure that it's reading the correct temperature, energy output, etc. so that any data logging is accurate, post-construction.

BPE Methods

- Building walk-through, resolving queries and additional on-site checks, including checking construction quality and recording with photographs:
    - Air permeability test – ideally carried out as soon as the building envelope is complete. This help to avoid leaks being hidden by internal works and finishes.

    - Acoustic checks – a qualitative assessment, including installation of sound insulation and installation and commissioning of ventilation systems.
    - Fabric tests (e.g. measurements of whole fabric heat loss (currently these are onerous but new techniques are emerging), thermal imaging survey / spot checks)
- Commissioning review.

There should be ongoing consideration for:

- Design review (e.g. using outputs/findings of review to make checks against construction stage BPE; updating design and/or building models if changes are made at the construction stage)
- Handover and induction review (e.g. planning for this to take place, reviewing handover plans/documentation)

Handover (RIBA Stage 6)

Handover stage should be focused on ensuring that any monitoring and evaluation process is fully explained to the residents of the homes, and that they are aware of how to use any controls or monitoring equipment which might better enable them to use their homes effectively and efficiently.

BPE Methods

- Commissioning review (where e.g. re-commissioning or seasonal commissioning is required)
- Handover and induction review

In Use (RIBA Stage 7)

The in-use phase is when the in-use BPE (otherwise known as Post-Occupancy Evaluation (POE)) is carried out, with occupant feedback and analysis of the performance of the home as it's being used. Ideally, the BPE should be arranged to minimise any time requirements on the occupants, or disruption to their daily living and to the property itself.

As described in Module 1, the level of detail of the information gathering varies depending on the goals of the project and also on the outcomes of preliminary testing. The British Standard for in-use Building Performance Evaluation (BS 40101:2022) gives thorough guidance on this and you may wish to seek an evaluator who is familiar with the Standard. The Standard recommends three levels of data collection at the in-use stage, increasing in detail and complexity:

Preliminary Evaluation is made by collecting occupant feedback and the evaluator's observations, with some coarse data for energy use and generation (if applicable).

Light BPE adds monitoring of internal environmental conditions. Significant issues may come to light with this level of evaluation, and these will, in turn, direct further investigations. BS 40101:2022 has a list of options under the Investigative BPE category.

Standard BPE - a larger number of optional building performance parameters are measured, such heat loss calculations and thermal imaging, giving robust performance verification and comprehensive insight into the performance of a home. It is also intended to look at the building 'in the round' by considering the cross-impact of factors affecting performance (for example, how temperatures and occupancy affect energy consumption, etc.).

The British Standard, BS 40101, also defines **Investigative BPE**. This includes more involved testing, used when a problem has been identified or more detailed information is otherwise needed.

The in-use stage is when the overall performance of the dwelling can be considered, with particular reference to the targets set at the outset and the satisfaction of the occupants. Any further necessary remedial action can be identified at this time.

Monitoring of energy/water consumption and internal/external conditions (where carried out) is typically undertaken for 12 months. However, if monitoring has been permanently installed, its use might be ongoing and inform a program of preventative maintenance. This kind of monitoring can also be very useful in helping to explain and substantiate occupant feedback, for example.

By reviewing in-use findings alongside each other, and alongside findings from the BPE undertaken at earlier project stages, the performance of the home can be better evidenced and understood, and conclusions can be drawn that will inform future projects that you or your advisors and contractors are involved with.

BPE Methods

- Site visit with occupants to allow collection of their observations.
- Occupant feedback (to assess comfort, satisfaction, wellbeing, needs and usability)
- Commissioning review (where e.g. re-commissioning or seasonal commissioning is required)
- Energy use and generation monitoring and review
- Water use monitoring and review
- Internal conditions (e.g. temperature, relative humidity and carbon dioxide (CO_2))
- External conditions (e.g. temperature, humidity, exposure)

POP-OUT 2 Rotherham Estate study

In-use BPE was carried out as part of the Innovate UK BPE programme on rented housing in Rotherham owned by The Guinness Trust Partnership. One resident was found to have a bill for £2500 for a year (around 2013). Further investigation revealed fault with the heat pump and that the internal thermostat temperature for the hot water vessel had been set to 80°C instead of 65°C at the commissioning stage. Energy reduction was 30% once these issues had been rectified. Other issues were uncovered for other residents including inappropriate use of the immersion heater (causing excessive electricity bills) and being unaware of an MVHR system. For the full report on this study, see here.

04 Common techniques

The targets set for a project will inform not only the design and upgrades (or measures) implemented in the project but also the techniques needed to determine the building performance. Here we briefly describe some of the most common techniques that you may anticipate using. Further, more detailed guidance is available in the WoodKnowledge Wales Building Performance Evaluation guide.

Construction reviews

Construction reviews involve a range of techniques which help to establish the construction quality of a home and look for any defective building fabric or services elements. Walkthroughs can help identify things like poorly located building controls, convoluted air ducts, or ineffectively lagged heating pipes, which can all contribute to poor performance.

Construction reviews include:

- Design review – including review of key building parameters, performance targets and predictions
- Building walk-throughs and additional on-site checks

- Procurement review
- Commissioning review – when services (e.g. heating, ventilation) are set-up for operation, it is important that this is done well to ensure that those systems work effectively and efficiently. Checks should be carried out on the whole system, and can consider acoustic checks, ensuring systems are not overly noisy.
- Handover and induction review

Most construction reviews also involve reviewing the results of air pressure testing and thermographic imaging and of occupant feedback (see below).

Air pressure testing

IMAGE 2: Pulse test practitioner. Image credit: Build Test Solutions

Air permeability or air pressure testing is commonly used in UK to establish the overall airtightness of both new build and retrofitted homes. For new build homes, this is often required by Building Regulations - see also POP-OUT 3 Building Regulations.

Two different methods are commonly used; the oldest and most common is the fan pressurisation ('blower door test') method which requires pressurising the home to high pressure, by putting a fan testing kit within the door frame. The second test is the low-pressure pulse ('Pulse') method, which pressurises the home to a much lower pressure. Both can be used under the Building Regulations in England and Wales to demonstrate compliance with airtightness requirements for new build. The Pulse test has a specific protocol set out by the Insulation Assurance Authority (IAA) to support the ventilation assessment of homes receiving insulation measures as part of a low-energy retrofit.

POP-OUT 3 Building Regulations

In the four nations of the UK, different relevant regulations apply. For example, Building Regulations in England and Wales require all new build homes to undergo an air pressure test; in Northern Ireland and Scotland a sample of new build homes must usually be tested. Details on current regulation should be sought. A good starting point for understanding these is the Designing Buildings Wiki

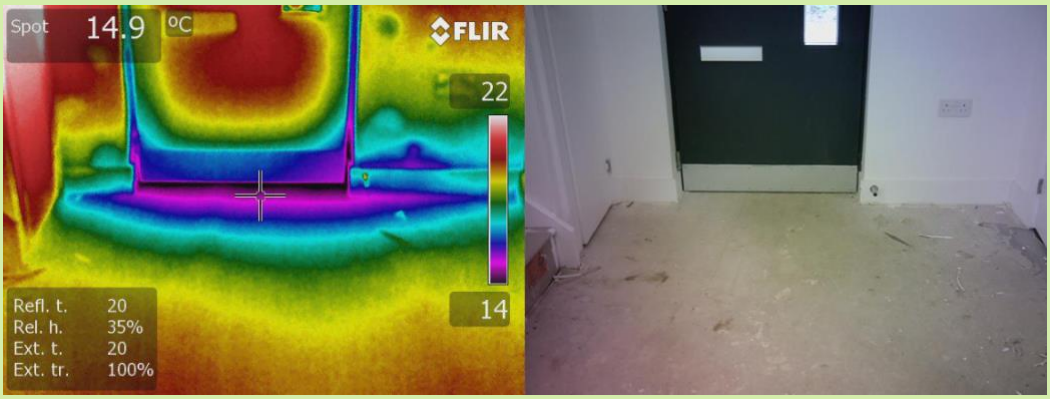
Thermal Imaging

Thermal imaging, also known as thermography, gives a visualisation of heat loss through various elements of the building fabric, and can help identify defects within the construction. A picture of the warm and cold surfaces is produced. When they are taken with care by a knowledgeable person with good quality equipment who can set up the test properly and interpret the data appropriately, thermal images are very useful at providing qualitative information, illustrating where

and why problems have occurred. When certain elements of the building are under-performing, thermal images help visualise *why* certain aspects of low-energy construction are especially critical to achieving good heat retention.

POP-OUT 4 Informative images

This image clearly shows a significant drop in temperature at the base of this door. Such visual information is compelling and provide a good starting point for explaining a problem or deficiency to a contractor.



From *State of the Nation review: Performance evaluation of new homes*

Occupant feedback

Gathering feedback from occupants is vital because results from this technique can guide further investigation, which may or may not be necessary. This is covered in more detail in Section 05.

Energy usage and generation and water usage

For more information, we look at energy and water consumption and energy generation. Water consumption can also give a deeper understanding of energy consumption.

To look at energy consumption, you need to plan on exactly how you're going to collect, clean and analyse the data. A lot of monitoring capabilities are now permanently integrated into the home's technology, and some devices do most of those functions for you. Consumption data can now be extracted from a range of smart metering devices, 3rd party equipment, or even some smart thermostats. However, that's not always the case with prepayment meters, so it's important to be aware of what the main metering arrangement is. A simple solution may be to take meter readings at regular intervals, however this requires either regular site visits, or residents who are keen to participate.

User control review

Modern homes and refurbishments often employ technology which may be novel to residents. Ventilation controls, smart thermostats, heat pumps etc., will have adjustable settings and may also have seasonal overrides. Some devices will require regular cleaning, maintenance, servicing and changing of parts. This information should be explained to residents such that they can use new technologies efficiently and effectively. Occupant feedback and an observational assessment can capture residents' views on such technologies and controls and gauge how successful they are.

During Technical Design, it is useful to consider if some of the controls and devices specified can also be used for monitoring (see below), which some technologies enable more easily than others.

Internal environmental conditions

It's very helpful to monitor internal environmental conditions, such as temperature, CO_2 levels and relative humidity. This is in line with British Standard BS 40101's Standard BPE. Monitoring CO_2 is becoming more common; in Scotland, this is now required in the main bedroom in new build homes, as that is the room which is often occupied by two adults for 6-8 hours a day, without opened windows, thus experiencing the worst air quality in the home.

There are a number of smart devices which can now monitor environmental conditions for various locations within a home, but care is needed to be sure what the sensor measures and monitors, and how they present the results. For example, some less expensive sensors are marketed as 'air quality monitors', and give readings of CO_2 levels in parts per million (PPM). However the fine print clarifies the sensors are actually measuring Volatile Organic Compounds (VOCs) instead of CO_2 and then converting the measurement to a 'CO_2 equivalent'. This is problematic because VOCs can arise from many sources. For example, making a stew in a slow cooker or spraying perfume in a room can register as an increase CO_2 even though it is in fact an increase in other particles which are being detected by VOC sensors.

Some smart technologies will collect various forms of data, at various intervals. They can even remove spurious readings and create plots. Some will store data for extended periods of time, offering comparisons, e.g. year on year. Depending on the type of evaluation required, you can either take spot readings or download time series data for more detailed analysis. If you can collect the data you need for the in-use BPE and the occupant is keen to monitor their own home on an ongoing basis, choosing the right system can be cost-effective for the occupant.

Devices that log internal temperature and humidity and present the results online can be especially helpful for social housing settings. For example, with such devices significant build-ups in humidity within the home could be identified remotely then action taken understand the issue and to improve the situation. This might negate the need for call-outs to resolve mould and mould damage that might otherwise have arisen, and help to avoid health risks.

POP-OUT 5 Indicators of non-ideal internal environmental conditions

Temperature is an indicator of a number of characteristics of the home and its occupants. For example, it can give insight into how intensely the resident may use their heating. A home which is kept at 21°C 24 hours a day is going to use more energy than an identical home which only heats for a few hours a day, or which maintains a lower set-point. It can also give insight into the performance of the envelope in terms of thermal performance and airtightness, if you look at how quickly and steeply the temperature declines overnight. Well-insulated, airtight homes may only loose a degree or two, overnight, when the heat is off and there is no sun warming the walls and windows. A poorly insulated draughty home may lose 6 degrees or more and thus require more heat in the morning to bring it back up to temperature. Again, this is a useful thing to look at in homes which have received retrofits because insulation added to a home should help significantly improve the thermal retention in the coldest and darkest part of the day when no supplemental heating energy is being added to the home.

Relative humidity helps flag risks of condensation and mould growth and underventilation and can also help flag significant construction problems (such as a failed damp proof membrane or defective rainwater goods). Monitoring CO_2 also helps identify issues of underventilation, or assurance that ventilation is adequate, but doesn't necessarily flag risks of mould growth and surface condensation.

05 Occupant feedback

A good quality, clearly phrased occupant survey, questionnaire or interview consists of predominantly standardised questions, with some tailoring to the specifics of the home / development and the new build / retrofit scenario. Questions about comfort and controllability (how the homeowner feels about using the controls) and air quality should all be standard to allow for comparability between different homes and developments. There should be some variations in terms of which technologies are referred to – for example, a home which has solar thermal should ask a specific question or two which are different to homes which employ solar PV.

Ways of collecting feedback

Different approaches will yield different levels of information:

- **Surveys** – straightforward questions with limited available responses, these will allow lots of occupants to be questioned quickly, and the brevity will encourage participant.

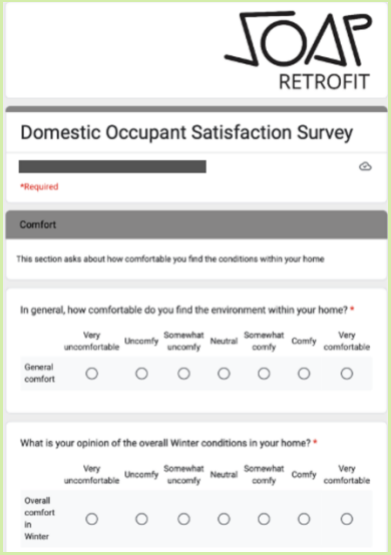
  Q. How is the temperature of your home?
  A. Too hot / too cold / just right.

- **Questionnaires** – longer, more in-depth questions which allow more subtle response. Responses are more qualitative. These will be more involved and require more time from the occupant.

- **Interviews** – requiring more time from both interviewer and occupant, there needs to be greater commitment. It will often involve a visit and on these occasions, a tour can provide great insight.

POP-OUT 6 Example survey

Surveys usually consist of questions with a 7-point scale for responses. In the case of a refurbishment project, either questions may be asked pre- and post-retrofit (as in this case), or just post-refurbishment, with reference to improvements , such as '*How has the temperature of your home changed in winter, since the retrofit was complete*?' with a 7-point scale ranging from '*significantly warmer*' to '*significantly cooler*' with a neutral option of 'about the same' in the middle.


SOAP RETROFIT

Domestic Occupant Satisfaction Survey

*Required

Comfort

This section asks about how comfortable you find the conditions within your home

In general, how comfortable do you find the environment within your home? *

	Very uncomfortable	Uncomfy	Somewhat uncomfy	Neutral	Somewhat comfy	Comfy	Very comfortable
General comfort							

What is your opinion of the overall Winter conditions in your home? *

	Very uncomfortable	Uncomfy	Somewhat uncomfy	Neutral	Somewhat comfy	Comfy	Very comfortable
Overall comfort in Winter							

Do we need to do surveys, questionnaires and interviews?

Gathering occupant feedback is an important element of in-use BPE, helping the evaluator to interpret the meaning behind measure and monitored data. It therefore forms a critical strand of the BPE standard BS40101:2022.

One method of enquiry per household will often suffice. Ultimately, surveys, questionnaires and interviews collect – broadly – similar feedback on the homeowner's subjective view of the home and its features, and the process of any works to their home. However, there are times when one method is preferable to another for a variety of reasons.

Considerations should include technical competency, connectedness and language barriers. Data protection and sensitivity about sharing information should also be considered.

For example, a written survey may be difficult for residents who do not speak English as their first language to engage with. It may be preferable in that case to have a housing liaison officer who can speak their native language to interpret the survey as an interview and record their responses in English for analysis. Private homes which are well connected to the internet may get a good response with an online survey (potentially incentivised with a voucher prize, for responding within a given time frame), whereas homes with more elderly residents may struggle to access or use the required technology.

Using a mixture of methods to gain insight from occupants may be necessary, but if the same format of questions and answers is adhered to, data can be compared.

The impact of timing on occupant feedback

The timing of seeking occupant feedback will have an impact on the responses you receive and the robustness of the results.

With new build homes, it's best to get initial feedback shortly after move-in, but waiting until they've had at least 9 months in the property (with several months of peak summer and winter) is important to get a full picture of comfort.

Seasonality in a retrofit project especially matters when it comes to asking residents about perceived improvements as a result of the changes. For example, people who have PV installed in winter won't necessarily notice an impact on their electricity bill for several months, as PV generation is highest in the summer period. Conversely, insulation installed in summertime won't have apparent comfort and energy benefits until at least November or December. So, timing a survey, questionnaire or interview to ask the right questions at the right time is crucial. For example, an initial survey could be used to get feedback shortly after the process. This would capture any immediate concerns. A second survey could then be carried out in January to capture feedback on the home in the heating season. This is an effective approach when the refurbishment has taken place after the start of April.

Data privacy

All data collection must be sensitive to privacy concerns and adhere to GDPR. See more here.

Red Flags

There are a number of red flags from occupant feedback and observations around the building process which could give us a quick indication something has gone awry and that action needs to be taken..

- **Lack of response from design/build team.**
  This might be because of time constraints but it could indicate that a performance target is perceived as unrealistic or there is an issue but not sure how it can be addressed.

- **Anomalous results for one dwelling of sample.**
  If the results for one dwelling amongst a sample differ substantially from the rest it may indicate either a testing error, unusual externalities (e.g. weather conditions), or different occupant behaviours. The result may be an outlier. However, it is still important to the occupants of that dwelling and should be investigated to understand the cause.

- **Anomalous results for one aspect.**
  Further investigation of the test results and checking technique will be required.

- **A rushed commissioning or handover.**
  This is an important stage to ensure good building performance is achieved.

- **Large quantities of occupant feedback where only a few words would suffice.**
  Generally, if people are happy, they'll just give you a few words of positive feedback. However, be careful that you have taken care to ask the right questions through an appropriate channel.

- **Occupant feedback which is contrary to the intended outcomes of a project.**
  For example, energy bills rising following extensive fabric improvements, such as insulation, requires more investigation. However, the problem may be to do with how the heating controls were explained to the user.

- **Occupant feedback on topics other than BPE.**

We will explore Red Flags in more detail in Module 3.

Resource Hub

Planning a BPE – where to start and common techniques

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