

BUILD UPON Framework

Capturing the Benefits of Building Renovation

Data Collection Strategy for Housing November 2021



BUILD UPON Framework

The BUILD UPON Framework helps cities and local authorities measure the different benefits of building renovation in a simple and consistent manner. The Framework defines Environmental, Social and Economic indicators that can be measured. It shows how to measure them and provides tools to aid data collection.

The Framework is flexible, easy and free to use. It covers all buildings types. It can be used at a city level - to measure impacts across an entire area and support a city's Sustainable Energy & Carbon Action Plan; or at a project level - to measure the impacts of individual projects. Local Authorities can measure all of the indicators or focus on just one or two to suit their priorities and resources.

This Data Collection Strategy sets out the types of data required to measure all the project-level indicators for housing projets. It notes when the data should be collected and provides guidance and questionnaires to aid data collection.

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This data collection strategy was initially developed in partnership with Leeds Beckett University for Leeds City Council, for use on their housing retrofit projects. For further information about the BUILD UPON Framework see the UKGBC website.





General Approach



SIMPLE

Deliverable by contractor or council Does not require specialist input KPIs and metrics are easily understood



STANDARDISED

Houses, schemes $\&\ cities\ can\ be\ compared$

Aligns with PAS 2035

No cherry picking or under reporting



LOW COST

Will add some cost Costs will be predictable Will not be prohibitively costly



Data Collection Timeline



Notes

- 1. Fuel bills to cover 12 months pre retrofit
- 2. MCS Calculations predicted renewables generation
- 3. PAS 2035 requires airtightness test on Risk Path C projects
- 4. City level UNO modelling required to look at fuel poverty
- 5. PAS 2035 requires 3 month post retrofit questionnaire on all projects
- 6. Weather data degree days looking back 2 years (12 pre & post retrofit)



Natural touch points with occupants

- Pre-retrofit EPC assessment
- Pre-retrofit survey (typically min 3months before retrofit)
- Pre-retrofit induction (typically just before retrofit)
- · Practical completion & handover (at end of retrofit)
- End of defects liability period check-up (min 12 months post practical completion)

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BUILD UPON Framework Indicators + Data Sources



Env.1 is not applicable at a project level - and therefore is not assessed under this data collection strategy



BUILD UPON Framework Indicators + Data Sources



* The BUILD UPON Framework methodology suggests one year of IAQ and temperature monitoring for

Soc.2, 3 & 4. However, pre & post retrofit occupant questionnaires are an acceptable alternative.



BUILD UPON Framework Indicators + Data Sources



Eco.4 is not applicable at a project level - and therefore is not assessed under this data collection strategy



Contractor Questionnaire

ECONOMIC INDICATORS Information required for project as a whole. Desktop analysis, input into the Framework's excel spreadsheet.

Eco.1 Investment in Energy Renovation

This can be assessed on completion of the retrofit through the following data:

- Amount of money spent (not anticipated budget)
- Breakdown by funding type (public, private)
- Breakdown by where money was spent (tax, energy renovation works, associated works, maintenance works, uplift, project team costs)
- Breakdown by whether money was spent locally, nationally or internationally

Eco.3 Jobs in Energy Renovation

This can be assessed on completion of the retrofit through the following data. It will need updating 12 months post completion to allow for work carried out post-practical completion:

- no. of FTE labour days supported during the project (consultants, main contractor, sub-contractors)
- no. & type of businesses involved in the project (consultants, main contractor, sub-contractors, suppliers, manufacturers)

SOCIAL INDICATORS Information required for each individual building/ home. Desktop analysis, input into the Framework's excel spreadsheet.

Generally - Does this retrofit follow PAS 2035:2019? (Yes/No)

If the retrofit is PAS 2035:2019 compliant, then it can be assumed that Criteria 1 is passed for all of the social indicators.



Soc.2 Indoor Air Quality

Criteria 1 – Have measures been taken to ensure adequate ventilation? (Yes/No)

This can be assessed on completion of the retrofit by answering the questions below:

• Has the property's existing ventilation system been assessed & deemed either adequate or where deemed inadequate, upgraded in accordance with Annex C of PAS 2035:2019 Retrofitting dwellings for improved energy efficiency – Specification and guidance? YES/NO

• Has all new ventilation equipment been tested and commissioned in accordance with the relevant part of BS EN 13141 Ventilation for buildings – Performance testing of components/products for residential ventilation? YES/NO/Not Applicable

• Where changes have been made, have the building owner and occupant been provided with guidance on how to maintain and use their ventilation system? YES/NO/Not Applicable

Must answer YES (or not applicable) to all questions to meet Criteria 1.

Criteria 2 – has the retrofit had an impact on IAQ? (IAQ is better, IAQ is worse, IAQ is neither better nor worse)

This can be assessed minimum 12 months following completion of the retrofit through analysis of occupant surveys and/or IAQ monitoring.

Contractor Questionnaire

Soc.3 Winter Thermal Comfort

Criteria 1 – have measures been taken to ensure adequate winter comfort? (Yes/No)

This can be assessed on completion of the retrofit by answering the questions below:

• Has the property's existing heating system been assessed in relation to calculated post-retrofit heat losses & deemed either adequate or where deemed inadequate, upgraded? YES/NO

• Has all new heating system equipment been installed and commissioned in accordance with PAS 2030:2019 Specification for the installation of energy efficiency measures in existing dwellings and insulation in residential park homes and where renewables are used the relevant MCS standards? YES/NO/Not Applicable

• Where changes to the heating system have been made, have the building owner and occupant been provided with guidance on how to maintain and use their heating system? YES/NO/Not Applicable

Must answer YES (or Not Applicable) to all 3 questions to meet Criteria 1.

Criteria 2 – has the retrofit had an impact on winter thermal comfort? (Building is more comfortable in winter, building is less comfortable in winter, building is neither more nor less comfortable in winter)

This can be assessed minimum 12 months following completion of the retrofit through analysis of occupant surveys and/or indoor temperature & RH monitoring.

Soc.4 Summer Thermal Comfort

Criteria 1 – have measures been taken to minimise summer overheating risk? (Yes/No)

This can be assessed on completion of the retrofit by answering the questions below:

• Has the property been modelled using dynamic simulation software to assess overheating risk? YES/NO

• According to the thermal model, does the property meet the criteria of CIBSE's TM59 Design methodology for the assessment of overheating risk in homes or CIBSE's TM52 The Limits of Thermal comfort: Avoiding Overheating in European Buildings for non-residential buildings? YES/NO

• Where the thermal model relies on opening windows for nighttime cooling, can they be securely left sufficiently open at night? YES/ NO/Not Applicable

Must answer YES (or not applicable) to all three questions to meet Criteria 1

Criteria 2 – has the retrofit had an impact on summer thermal comfort? (Building is more comfortable in summer, building is less comfortable in summer, building is neither more nor less comfortable in summer)

This can be assessed minimum 12months following completion of the retrofit through analysis of occupant surveys and/or indoor temperature & RH monitoring.



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Occupant Questionnaires

UKGBC have developed template occupant questionnaires (for housing occupants) to assess the BUILD UPON Framework's social indicators on Indoor Air Quality (IAQ) and thermal comfort (Soc.2, 3, 4). These questionnaires are only necessary if it is not possible to undertake at least one year of post-retrofit IAQ and temperature monitoring in every retrofitted home.

Two questionnaires should be completed - one prior to the retrofit, one 12 months post retrofit. These questionnaires each comprise two sides of A4. The first side, to be completed by the contractor, collates information about the home. The second side, to be completed by the occupant, seeks the occupants' views on their home's indoor air quality and thermal comfort. The questionnaire can be completed in around 10 minutes.

PAS 2035: Note that if the retrofit is PAS 2035 compliant, it will not be necessary to answer all the questions on the first side of the questionnaire pertaining to damp and ventilation. This is because the PAS 2035 process covers the same issues.



PRE-RETROFIT OCCUPANT QUESTIONNAIRE

HOUSING EVALUATION

This survey is being conducted to help understand the impact of retrofit on this home. The information collected will be treated as completely confidential by the survey team. Survey reports will summarise information and not reveal identities of individuals. **Who should fill this in?** Anyone over the age of 18 currently living in the residence. This will normally be one person from single-family households. For HMOs, fill in one form per bedsit.

BACKGROUN	ID								
Name of person filling out this side of the survey:									
Retrofit Programn	ne Name:								
Date of questionn	aire:								
Date retrofit works due to commence on site:									
Estimated duration of retrofit works:									
Property Address	:								
Property Unique F	Reference Numb	er:							
Gas Meter Type &	Reading:	Standard Pre-p	ayment Smart	Reading					
Elec Meter Type &	& Reading:	Standard Pre-p	ayment Smart	Reading					
Have photos beer	n taken of utility t	bills for the last 12	months?	Ye	es No				
Have occupants s	signed the utility I	bill disclaimer?		Ye	es No				
Is this home?	Is this home? detached semi-detached terrace flat other								
Is this home? owner occupied social tenancy private tenancy HMO									
What fuel is used	What fuel is used for cooking: gas, electricity or other?								
Questionnaire Version	6 30 11 21 develop								



CONTRACTOR/COUNCIL TO COMPLETE THIS SIDE

VENTILATION & DAMP If a PAS 2035 Ventilation Assessment has been undertaken for this property, it is not necessary to fill in this section. If in doubt, fill in this section.

What rooms does this home have? In the table below, tick all that apply.

Do any rooms have signs of damp? Note one of the following options for each room: N for none, C for condensation, L for leaks, D for damp, M for mould.

What ventilation equipment is installed in each room? Note one of the following options for each room: **N** for no equipment; **F** for intermittent extract fan; **E** for air extract linked to MEV, MVHR or PSV; **T** for air inlet or trickle vent; **P** for PIV fan; **S** for single room ventilator with heat recovery. MEV = continuous mechanical extract ventilation, MVHR = mechanical ventilation with heat recovery, PSV = passive stack ventilation (not common), PIV = positive input ventilation

Which rooms have min 10mm undercuts on doors? In the table below, tick all rooms that apply.

Which rooms have windows that can be opened? In the table below, tick all rooms that apply.



Please note any other comments here or on an additional sheet, if necessary: eg. blocked air inlets, disfunctional fans, blocked or open chimneys, more detail about moisture problems

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PRE-RETROFIT OCCUPANT QUESTIONNAIRE

BACKGROUND This inform	nation he	lps us understan	d your	r energy us	age and co	nfo	rt needs	
What is your name? first name	, surname	e						
What is your age?	0	30-60	over 6	0	prefer not say	,]	
What is your sex?		female	prefer	not say				
How long have you lived here?		less than 1yr		more than 1	1 yr			
How many other people live wit	h you?	number under 18yrs old		number ove 18yrs old	er			
Is someone normally at home	?	most of the time		evenings &	weekends only	/	other	

Please explain here why you are retrofitting your home: eg. it's free, my landlord insists, reduce bills....

WINTER COMFORT

How would you describe typical conditions in WINTER. If you have not lived here in winter leave these questions blank. *Please tick your rating on each scale.*

Temperature in Winter							
Uncomfortably hot/cold	1	2	3	4	5	Comfortable	If uncomfortable, is it generally?
Variable	1	2	3	4	5	Stable	too too hot cold
Air in Winter							
Uncomfortably dry/humid	1	2	3	4	5	Comfortable	If uncomfortable, is it generally?
Stuffy/smelly	1	2	3	4	5	Fresh/odourless	too too dry humid
Uncomfortably Draughty	1	2	3	4	5	Still	
Conditions in Winter generally							
Unsatisfactory overall	1	2	3	4	5	Satisfactory over	all



ENERGY USE & CONTROLS

How much control do you personally have over the following?	Please tick your rating on each scale.	
Fick the side boxes if having control is important to you.		

Heating System: No Control	1	2	3	4	5	Full Control	Is having control important to you?
Ventilation System: No Control	1	2	3	4	5	Full Control	heating ventilation

If you have anything else to add about your energy or comfort needs please write it here: eg. unusual appliances like hottubs/aquariums, activities like cooking often for others, vulnerable occupants.

SUMMER COMFORT

How would you describe typical conditions in SUMMER. If you have not lived here in summer leave these questions blank. *Please tick your rating on each scale.*

Temperature in Summer							
Uncomfortably hot/cold	1	2	3	4	5	Comfortable	If uncomfortable, is it generally?
Variable	1	2	3	4	5	Stable	too too hot cold
Air in Summer							
Uncomfortably dry/humid	1	2	3	4	5	Comfortable	If uncomfortable, is it generally?
Stuffy/smelly	1	2	3	4	5	Fresh/odourless	too too dry humid
Uncomfortably Draughty	1	2	3	4	5	Still/welcome bre	eeze
Conditions in Summer generally							
Unsatisfactory overall	1	2	3	4	5	Satisfactory over	all

POST-RETROFIT OCCUPANT QUESTIONNAIRE

HOUSING EVALUATION

This survey is being conducted to help understand the impact of retrofit on this home. The information collected will be treated as completely confidential by the survey team. Survey reports will summarise information and not reveal identities of individuals. **Who should fill this in?** Anyone over the age of 18 currently living in the residence. This will normally be one person from single-family households. For HMOs, fill in one form per bedsit.

BACKGROUN	ID	
Name of person fi	lling out this side	e of the survey:
Retrofit Programm	ne Name:	
Date of questionn	aire:	
Date retrofit works	s commenced or	n this site:
Date retrofit works	s finished on this	s site:
Property Address:		
Property Unique F	Reference Numb	per:
Gas Meter Type &	Reading:	Standard Pre-payment Smart Reading
Elec Meter Type 8	& Reading:	Standard Pre-payment Smart Reading
Have photos beer	n taken of utility	bills for the last 12 months?
Have occupants s	igned the utility	bill disclaimer?
Is this home?	detached	semi-detached terrace flat other
Is this home?	owner occupied	social tenancy private tenancy HMO
What fuel is used	for cooking: gas	s, electricity or other?
Questionnaire Version	6 30 11 21 develor	



CONTRACTOR/COUNCIL TO COMPLETE THIS SIDE

VENTILATION & DAMP If a PAS 2035 Ventilation Assessment has been undertaken for this property, it is not necessary to fill in this section. If in doubt, fill in this section.

What rooms does this home have? In the table below, tick all that apply.

Do any rooms have signs of damp? Note one of the following options for each room: N for none, C for condensation, L for leaks, D for damp, M for mould.

What ventilation equipment is installed in each room? Note one of the following options for each room: **N** for no equipment; **F** for intermittent extract fan; **E** for air extract linked to MEV, MVHR or PSV; **T** for air inlet or trickle vent; **P** for PIV fan; **S** for single room ventilator with heat recovery. MEV = continuous mechanical extract ventilation, MVHR = mechanical ventilation with heat recovery, PSV = passive stack ventilation (not common), PIV = positive input ventilation

Which rooms have min 10mm undercuts on doors? In the table below, tick all rooms that apply.

Which rooms have windows that can be opened? In the table below, tick all rooms that apply.



Please note any other comments here or on an additional sheet, if necessary: eg. blocked air inlets, disfunctional fans, blocked or open chimneys, more detail about moisture problems

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POST-RETROFIT OCCUPANT QUESTIONNAIRE

BACKGROUND This information helps us understand your energy usage and comfort needs								
What is your name? first name, surnar	ne							
What is your age? ^{under 30}	30-60 ove	er 60 prefer not say						
What is your sex?	female	sfer not say						
How long have you lived here?	less than 1yr	more than 1yr						
How many other people live with you?	number under 18yrs old	number over 18yrs old						
Is someone normally at home?	most of the time	evenings & weekends only other						

WINTER COMFORT

Since the retrofit...how would you describe typical conditions in WINTER. If you have not lived here in winter leave these questions blank. Please tick your rating on each scale.

Temperature in Winter								
Uncomfortably hot/cold	1	2	3	4	5	Comfortable	If uncomfortable, is it generally?	
Variable	1	2	3	4	5	Stable	too too hot cold	
Air in Winter								
Uncomfortably dry/humid	1	2	3	4	5	Comfortable	If uncomfortable, is it generally?	
Stuffy/smelly	1	2	3	4	5	Fresh/odourless	too too dry humid	
Uncomfortably Draughty	1	2	3	4	5	Still		
Conditions in Winter gene	Conditions in Winter generally							
Unsatisfactory overall	1	2	3	4	5	Satisfactory over	all	



ENERGY USE & CONTROLS

Since the retrofit...how much control do you personally have over the following? Please tick your rating on each scale. Tick the side boxes if having control is important to you.

Heating System: No Control	1	2	3	4	5	Full Control	Is having co important to	ontrol you?
Ventilation System: No Control	1	2	3	4	5	Full Control	heating	ventilation

If you have anything else to add about your energy or comfort needs please write it here: eg. unusual appliances like hottubs/aquariums, activities like cooking often for others, vulnerable occupants.

Have you received a heating & ventilation guide since completion of the retofit / when you moved in. yes

	no	

SUMMER COMFORT

Since the retrofit...how would you describe typical conditions in SUMMER. If you have not lived here in summer leave these questions blank. Please tick your rating on each scale.

Temperature in Summer							
Uncomfortably hot/cold	1	2	3	4	5	Comfortable	If uncomfortable, is it generally?
Variable	1	2	3	4	5	Stable	too too hot cold
Air in Summer							
Uncomfortably dry/humid	1	2	3	4	5	Comfortable	If uncomfortable, is it generally?
Stuffy/smelly	1	2	3	4	5	Fresh/odourless	too too dry humid
Uncomfortably Draughty	1	2	3	4	5	Still/welcome bre	eze
Conditions in Summer generally							
Unsatisfactory overall	1	2	3	4	5	Satisfactory over	all

Data not being collected

This data collection strategy does not require high cost data collection months before retrofits, nor specialist data collection & analysis. The following data is not collected:



TEMPERATURE DATA

- Sensors in homes before and after retrofit
- CIBSE Adaptive comfort analysis
- Quantify comfort takings
- Support winter comfort & overheating assessment



AIR QUALITY DATA

- Sensors in homes before & after retrofit
- Support indoor air quality assessment



RELATIVE HUMIDITY DATA

- Sensors in homes before and after retrofit
- Relative humidity analysis
- Evaluate change in damp risks
- Evaluate occupant behaviour change
- Support indoor air quality assessment



SMART METER DATA

- Requirement for SMET 2 meter (low uptake)
- Relies on energy company
- Support energy/carbon performance assessment

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AIR TIGHTNESS TEST

- Perform test before and after retrofit
- Proxy for quality of retrofit and whole house approach
- Required under PAS 2035 on Risk Path C projects



INTENSIVE TESTS

- Building Performance Evaluation
- U-Value measurements
- Co-heating tests
- Support understanding of energy/carbon performance

