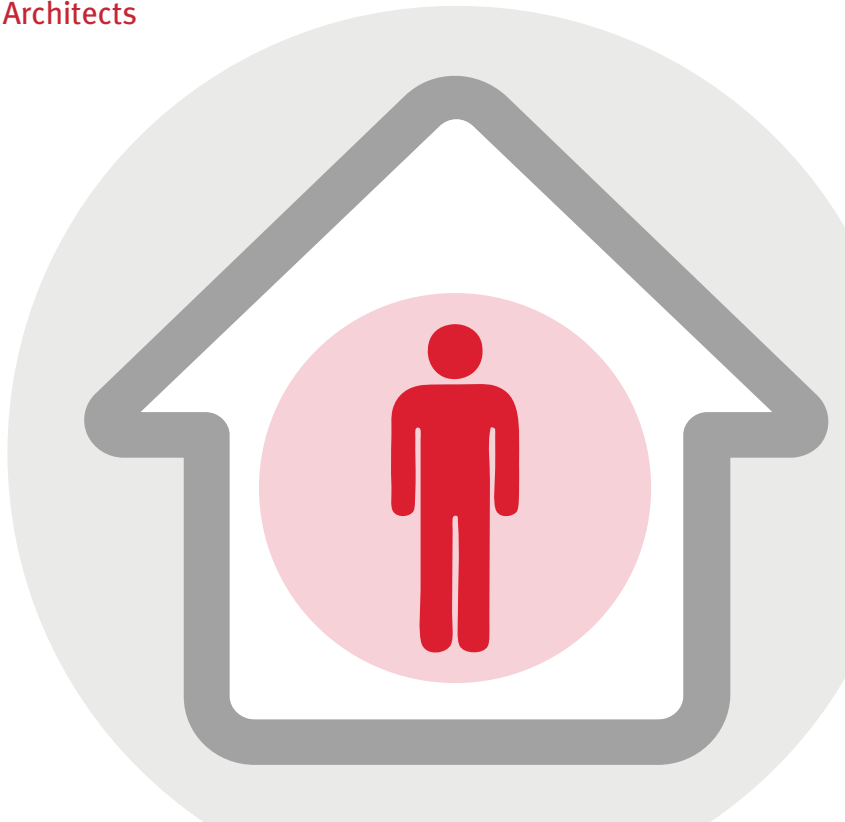


# Hab-Lab

John Gilbert Architects





Our dedicated building performance specialist tests buildings and feeds this knowledge back into the design process



## Hab-Lab

Hab-Lab is a unique service developed and led by John Gilbert Architects (JGA) in partnership with the Mackintosh Environmental Architecture Research Unit (MEARU) at Glasgow School of Art.

We undertake on-site building performance evaluation and monitoring to provide an evidence base that can be used to improve the energy efficiency and durability of buildings as well as the health and comfort of residents.

With this in-depth understanding of how occupied buildings really work in the long term, we can provide bespoke advice to assist you with the demands of owning and managing properties.

Our service is tailored to:

- housing associations
- local authority housing departments

Hab-Lab delivers better housing performance, reduces fuel poverty and improves resident satisfaction.



We use a range of equipment to measure and monitor buildings.

Data gathered enables us to build a credible evidence base and provide clients with practical advice. Clients can be confident they are investing in effective, long-term solutions.



PassivTEN project: working with Milnbank Housing Association, JGA and MEARU analysed traditional tenements and proposed upgrades to achieve Passivhaus standard.

Both JGA directors are certified Passivhaus designers and the practice has a long standing interest in Passivhaus, focussing on closing the performance gap.



## Background

Building design is developing rapidly with improved energy efficiency and airtightness changing the way buildings perform. We are now experiencing a performance gap (see below) – the difference between the way buildings are expected to perform and actual results.

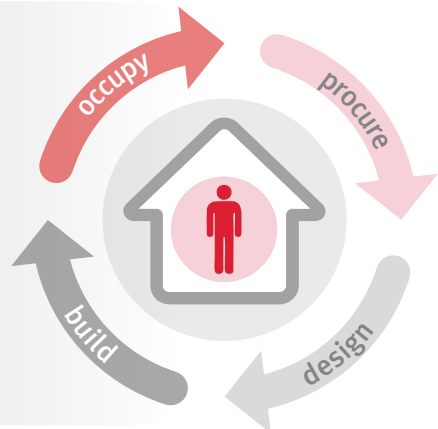
Building performance evaluation (BPE) responds to this performance gap and we have worked with many clients to establish a full understanding of conditions, providing practical steps to achieve savings and resolve problems.

Many of our clients know that ticking the boxes is not enough to realise potential energy savings – poorly applied energy efficiency measures can lead to problems with moisture, condensation or mould while energy bills remain high.

JGA and MEARU have worked together over the last decade to address issues of energy efficiency, fuel poverty, indoor air quality and occupants' health in new and retrofit projects.

The performance gap is the difference between the way buildings were designed to perform and how they actually perform when occupied.

The reasons for this gap can be found throughout the design process, starting with the way they are procured, through design itself and construction, as well as in the way people use buildings.



# Our four areas of study

All projects are different but will tend to contain a mix of the following types of support:

## Compliance

A desktop exercise is often required to establish compliance with regulatory or funding requirements. We have experience working with tools including SAP, RdSAP, Scottish Section 6 accreditation, Passivhaus, EnerPHit, EcoHomes and other assessment techniques. We have particular expertise in energy efficiency standard for social housing (ESSH) compliance in hard to treat housing stock.

## Environment

Improving the indoor environment is key to the health of people and buildings. We can provide short-term snapshots or long-term monitoring to examine air quality and internal conditions in your properties including acoustics, temperature, humidity and pollutant levels. We can use this data to help you to adapt heating and ventilation strategies as well as material choices.

## People

When assessing energy performance and internal conditions in buildings, the biggest variable is almost always people – their behaviour and occupation patterns. To achieve meaningful improvement, it is often crucial to engage with occupants. Our diagnostic tools and tactics can help to educate and motivate people to engage with buildings they use and improve energy performance. In addition, we work with people who procure and deliver buildings to expand understanding of best practice, for example with airtightness and ventilation.

## Measurement

We can undertake a range of physical tests and monitoring such as thermal imaging, air pressurisation, energy monitoring, building integrity checks, in-situ U-value tests. Often we find the results are not as predicted and this real-world data can be used as the basis for finding alternative ways to achieve the savings anticipated.

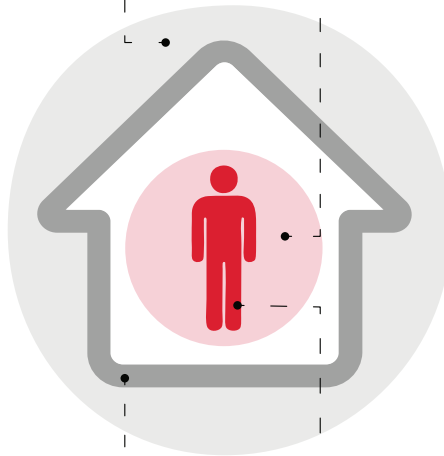


## Compliance

- SAP/ RdSAP/ EPC
- SBEM
- EESHH
- Building Control- Section 6 & 7
- Passivhaus (PHPP)
- EcoHomes (BREEAM)
- Energy Assessment
- Retrofit Proposal Review
- Funding Assessment

## Environment

- Thermal Temperature
- RH/ Vapour Pressure
- IAQ- CO2
- Formaldehyde/ VOCs
- Particulate Matter
- Indoor-Outdoor Data Loggers
- Acoustic Performance
- Heating & Ventilation Checks



## Measurement

- Post Occupancy Evaluation (POE)
- U-Value Tests
- Airtightness
- Thermography
- Hygrothermal Modelling (WUFI)
- Energy Monitoring & Submetering
- Building Integrity Checks
- Performance Gap Assessment
- Co-Heating Test

## People

- Occupant Surveys
- DomEARM
- BUS
- Handover Support
- Quick-start Guides
- Education of Staff
- Toolbox Talks/ Training

Hab-Lab Areas of Study

Heating check list.  
To get your heating system started, please follow carefully the recommendations below:  
Step 1. Set a programme based on your lifestyle on the programmer located in the kitchen.  
Step 2. Set the temperature of the heating system in the control panel located in the boiler.  
You can keep your home comfortable by using the thermostatic valves located in each room.  
You can also set the room thermostat to the lowest comfortable temperature between 18 and 21°C.

### Setting the programmer

Open the flap on the front of the unit. Press the RESET button using a non-metallic object (e.g. pencil/matchstick) until you hear a click and the red light on the front of the unit comes on and the LCD goes blank. This will reinstaate the preset programmes and sets correct day and time.  
The settings are made during manufacture and are not changed in the unlikely event that the settings are changed.  
+1HR override



No 2 Cross Gait, Ayr

# Quick Start Guide

- Plan
- Heating
- Hot Water
- Ventilation
- Phone, TV & Internet
- Saving Energy



Occupants' understanding of their home and systems is critical to the real life performance of a building. JGA & MEARU have developed quick start guides for occupants and the templates used in the Scottish Technical Standards. Guides were produced for JGA's newbuild housing for Ayrshire Housing



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tips to use your sun-space sliding  
ndows visit [www.wind.co.uk](http://www.wind.co.uk)





## How we work

We offer a focused, low cost process which provides practical solutions to performance issues and ensures that the benefits of building performance evaluation can be more widely applied. Every project is different but broadly our services can be described as follows:

### Partnership

To gain the most from the process we aim to work with several key partners at a time, each committing to the project for 2-3 years and sharing the findings openly as a group at regular workshops and seminars. This enables each partner to learn from the findings of the others as well as their own, greatly increasing the value of the investment.

This period allows us to monitor properties over the first heating season and then develop solutions which can be deployed and monitored again over the following winter to ensure that proposals are working as intended. The timescales also allow for training, occupant engagement and complementary support.

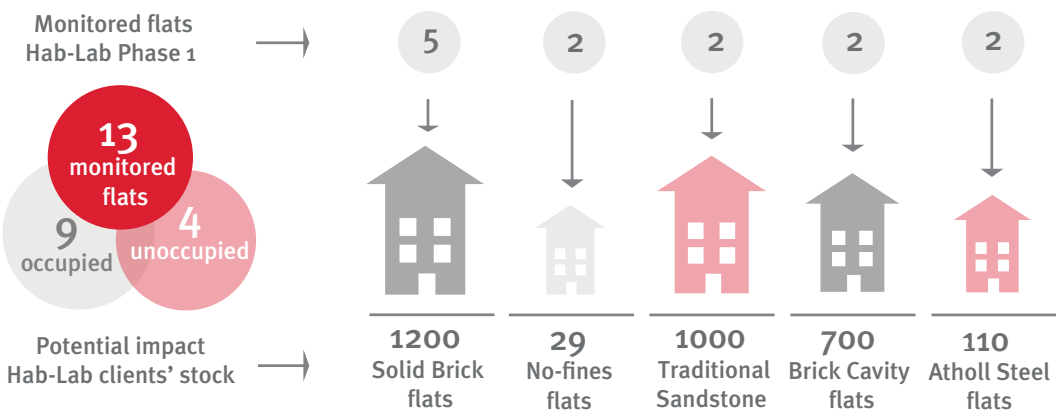
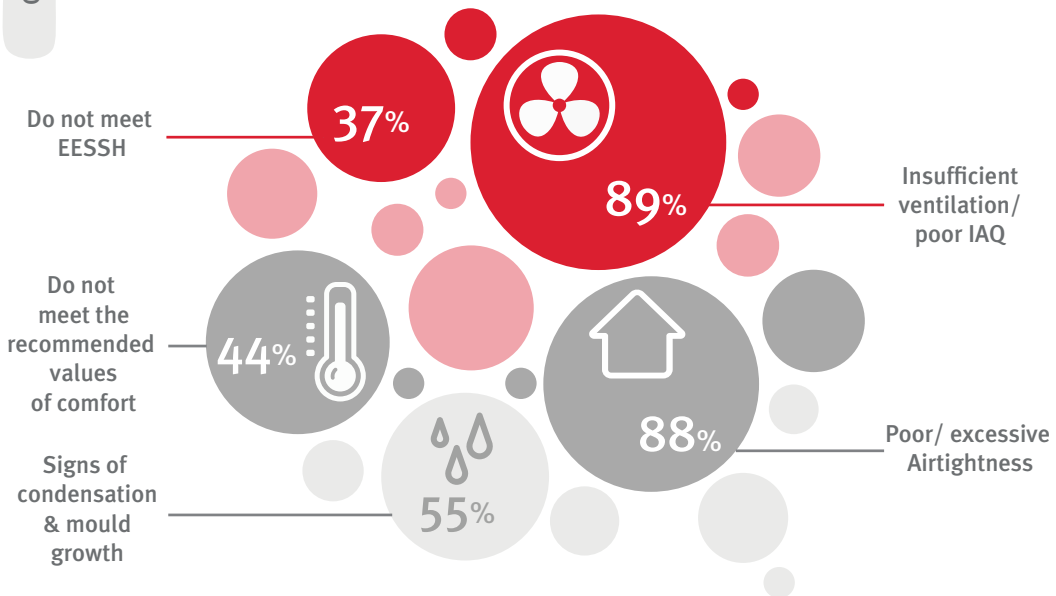
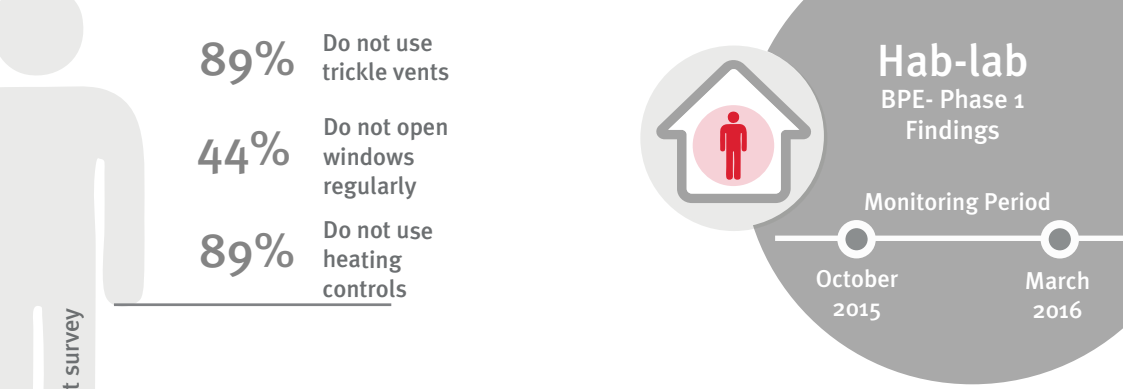
### Seasonal

A seasonal consultancy tends to involve a period for capturing data, (usually over the winter), time for analysis and then a final report offering conclusions and recommendations. To allow time to gain sufficient data to witness trends and engage with occupants, work usually take between 4-8 months. The project includes regular meetings with clients to discuss the issues and provide guidance and training.

### Snapshot

Our technical advice focuses on the evaluation of a particular part of the building or system – the performance of this area or aspect will be studied and the method of how other elements interact and work as a whole are not considered.

This programme covers a period of three months and includes the delivery of a technical report with practical recommendations.



## Findings 2015/2016

The findings of our Partnership Phase 1 project are shown opposite. This project was undertaken over the winter of 2015 with four housing associations and one local authority housing department.

The findings show that the performance gap is very real: the majority of properties had inadequate ventilation and air quality, while half showed signs of condensation and mould growth and/or failed to meet recommended values of comfort.

These findings corroborate other research and we can say with confidence that most conventional energy efficiency measures are not delivering to their potential. Moreover, they are causing unintended consequences and risks to the health of occupants and the properties.

As part of the partnership approach, we proposed bespoke solutions for each client.



JGA won the Saltire Society's Innovation in Housing award in 2014 (for PassivTEN) and again in 2016 for Hab-Lab.

We provide a new, professional service of evidence-based design and advice.



## Impact

The Partnership Phase 1 project involved only 13 monitored flats but the potential impact of benefits applied to over 3,000 similar properties managed by the partnering organisations.

The benefits of improved installations extends to almost every home in Scotland and importantly, the lessons learnt are now being applied in new developments by the Hab-Lab partners.

Potential benefits of the Hab-Lab service experienced by current and previous clients include:

### Potential Benefits

- Optimised efficiency leading to lower fuel bills for residents and less risk of fuel poverty.
- Improved indoor environments for residents minimising health risks.
- Better void management and technical assistance on repair options.
- Effective deployment of available funding and evidence to assist seeking extra funding.
- Economical EESSH compliance in hard to treat properties.
- Enables you to achieve the best value from your newbuild and retrofit programme by checking the actual performance delivered.



Measuring the performance of mechanical ventilation + heat recovery (MVHR)

## Partnership Case Study : Clyde Valley Housing Association

The first phase of this 2.5 year project involved extensive monitoring of two properties selected by the client. Energy consumption was monitored, infra-red thermography, airtightness testing and in-situ U-value tests were carried out along with indoor air quality testing, mould sampling and qualitative interviews with the occupants. The findings were shared with all five partners during a series of workshops and a range of recommendations produced.

Based on the evidence gathered, retrofit solutions were proposed to improve air quality and thermal comfort while also reducing heat loss. An innovative natural ventilation solution was installed along with upgrades to the building fabric, ventilation and heating systems and controls. The houses are currently being monitored to establish the success of the installed measures.

Clyde Valley Housing Association has benefited from reports on other stock types and five workshops on building performance.



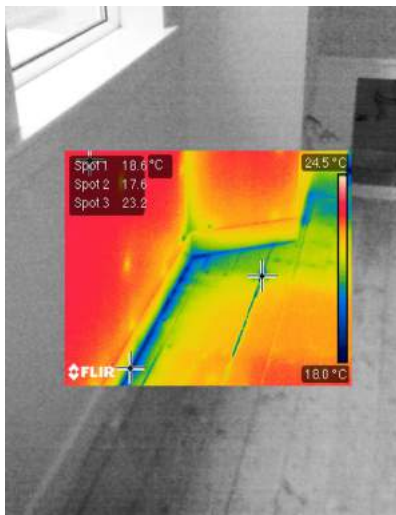
## Seasonal: Girvan Overcladding Retrofit Evaluation

Deploying a similar array of equipment and techniques to a full-scale BPE, we worked with Ayrshire Housing to monitor two no-fines blocks in Girvan. Linking the findings to other investigations we developed a revised set of design and specification documents to be used in an upcoming overcladding project. These measures will optimise the performance of the external wall insulation and ensure improved internal air quality for occupants and minimise mould risks to the structure.



## Snapshot Case Study: Auchentorlie Technical Report

Renfrewshire Council installed three different internal wall insulation systems and wanted to establish which had been most effective. JGA conducted a technical evaluation using in-situ U-value testing along with a range of supplementary techniques including thermography. While the three systems performed reasonably similarly, the main issue was differences and inadequacies in installation resulting in thermal bridging and bypass. A clerk of works watch list was also part of the final report.



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