

A. IMPROVING THE WIDER POLICY, PROCUREMENT AND FINANCIAL LANDSCAPE

B. IMPROVING THE DESIGN PROCESS

C. IMPROVED QUALITY PROCESS MEASURES

D. IMPROVING POST COMPLETION AND OCCUPATION MEASURES

Following the publication of our Sustainable Renovation Guide, which discussed the principles of a more holistic approach to retrofit and a number of practical examples, this pamphlet introduces a range of policy proposals which could be actioned by Scottish Government and other agencies to provide the wider context within which these efforts could be best supported.

Specifically, these measures would help:

- ensure Scotland meets its own targets for carbon reduction, health and wellbeing and economic development
- more effectively achieve energy efficiency (reduce carbon emissions and fuel poverty)
- safeguard the comfort and health of people in their own homes
- safeguard the condition of building fabric generally, and Scotland's built heritage

Within the current context of national infrastructure status and spending, these 15 proposals would lead to increased quality in retrofit practice which may cost more in the short term but would save much larger sums in the long term.

SUPPORTING SUSTAINABLE RENOVATION

A. IMPROVING PROCUREMENT, WIDER POLICY AND THE FINANCIAL LANDSCAPE

1. End the VAT disparity

Currently VAT is charged at 20% for retrofit projects but 0% for new build. This directly discourages renovation and encourages demolition and new build. VAT is decided at a UK level but Scottish Government could introduce a number of initiatives to redress the balance; including a new-build tax, developer contributions, adjusted local authority fees for planning or building control or no / low interest loan for retrofit.



2. Increased short term spending on retrofit

To support the actions in this document, there needs to be a shift towards a much higher spend in the short term across a number of areas. This might include greater support for local authorities, more funding to registered social landlords, and some form of financial initiatives like interest-free loans to support private housing improvements.



3. Presumption against demolition

Too much of our built heritage is being lost through demolition, along with its valuable embodied energy. A planning led policy of presumption against demolition combined with fiscal incentives to renovate rather than demolish would help. Compulsory purchase powers for councils or regeneration agencies for properties left derelict, together with funds allocated to retrofit could drive wider regeneration, especially valuable in areas of multiple deprivation.

4. Adjust and enhance the existing energy efficiency 'Route Map'

Scottish Government have prepared an existing Route Map to improve energy efficiency across all tenure types of housing in Scotland. In order to reflect international consensus on the climate emergency, this needs to have targets raised to be closer to zero carbon where possible, and brought forward to 2030.

5. Further education and training

There is currently a lack of awareness among procurement clients and agencies of the scale and nature of change required. There is a skill shortage among designers and also contractors. PAS 2035 offers a suitable process and, via the new roles, a suitable skill set for design teams and should be adopted across the board. On the contractor side, PAS 2030 has now been updated and integrated with PAS 2035 and provides suitable support.

B. IMPROVING THE DESIGN PROCESS

6. Improved overview at design and compliance stages

Most retrofit projects have no-one providing a design overview, nor a comprehensive compliance check. This is important because most problems happen at the interfaces between project elements. All retrofit projects should have someone tasked to provide a design overview of the measures chosen, as in PAS 2035, and be checked by a suitably skilled building control officer, preferably both.

7. Basic maintenance required before energy efficiency retrofit installations

Money for energy efficiency and maintenance often come from different 'pots' meaning some energy efficiency retrofits do not carry out associated maintenance. This can lead to duplicated costs and a reduction in value of the improvements. All financial support for retrofit should mandate that associated building checks, repair and maintenance should be carried out at the same time and support given as required. Quinquennial surveys for all properties need to become mandatory and tied to insurance premiums.

8. Nationalise SAP and retire RdSAP

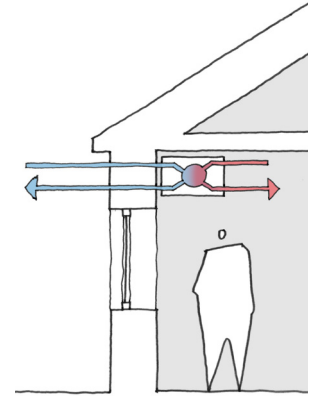
SAP was created under UK Government research (BRE Domestic Energy Model) and later privatised, but due to the critical nature of the situation and need for a robust system we should nationalise SAP so it can be controlled for public good. RdSAP was developed to minimise costs associated with surveying existing buildings but is far from adequate for the level of assessment required and should be retired, with an enhanced SAP used on all projects.

PAS 2035
PAS 2030

9. Improve SAP

To address the challenges facing us, SAP needs to be urgently improved, to include the following:

- Algorithms used should be transparent and public to ensure weightings are accurate
- Large scale co-heating or 'pulse' tests are needed across a range of dwelling types to calibrate SAP results with real monitored results, so we can be more confident and accurate in using results for policy making and projections
- Airtightness to be carefully calibrated to improve accuracy
- Detailed localised weather data is needed in each case with future projections in each case for accuracy and to test against future climate predictions
- More robust engagement and modelling of heating and ventilation systems is needed, including evidence of adequacy of existing systems and controls
- All existing building fabric u value conventions to be calibrated against real u value tests as these appear to be inaccurate and work against cost effective retrofit solutions
- More rigorous modelling of all thermal bridges and thermal bypass potential required



10. Supplement SAP

Assuming that SAP will be retained and used in all projects, a number of additional aspects should be added into the process to adequately address the breadth of sustainability issues arising, ensure adequate performance and reduce risks of long term problems. These could also be handled separately.



- To protect the health of the most vulnerable and reduce risks of asthma and other respiratory problems, stringent indoor air quality (IAQ) guidelines need to be met during all compliance co-heating tests (eg. max. CO₂ levels in each room, relative humidity, temperature and VOC levels, using artificially generated CO₂ and moisture levels)
- Embodied energy / carbon thresholds need to be included, in addition to the operational energy / carbon targets already in place.
- Expand the survey process to take better account of existing building condition, moisture risks and services adequacy
- Measures to avoid fabric decay through design and ongoing maintenance plans and measures should be included.
- A robust system needs to be put in place to allow 'judgement calls' to be made around historic and other unusual properties where 'significance' issues weigh more heavily. This is included in PAS 2035 but could be integrated into SAP to ensure, in particular, moisture, significance and practical issues are sensibly balanced against the energy efficiency imperative.
- Robust targets need to be in place to manage and monitor water consumption
- Robust targets and methodologies need to be in place at the design stage, to tackle waste management on site and in-use.

C. IMPROVED QUALITY PROCESS MEASURES

11. Improved site inspections

Most building performance evaluation projects uncover widespread poor workmanship. This undermines our ability to meet all relevant targets in reality and creates a number of undesirable and sometimes costly consequences. In addition to better design and specification, a critical component is to ensure adequate inspection and supervision



on site on all retrofit projects. There are several roles which could undertake this work; an architect or other designer commissioned to undertake regular inspection, a clerk of works who oversees day to day works and a building control officer visiting on a more regular basis. Ideally all three would be involved, but in each case it is important that they are independent of the contractor and adequately resourced. Under PAS 2035, this role would be the Retrofit Co-ordinator.

- If compliance remains based on SAP, then compliance could be related to a 'pulse-test' or 'co-heating test' which checks if the building is performing as designed
- Existing 'Defects Liability Period' allows for all defects to become apparent within

1 year and be resolved after this period. This could be enhanced to include checks on all systems and a review process for occupants in combination with simple monitoring

- Robust checks on all aspects of waste management on site are required
- All above needs to be funded, made mandatory and enforceable in order to achieve success

12. Enhanced Completion Certificates

In much retrofit work, gaining the building warrant completion certificate is a relatively cursory process, if required at all. By contrast Passivhaus certification, the NHBC warranty and PAS 2035 compliance require a good deal of documentary evidence of good workmanship and performance on site. This approach is needed to ensure reality matches design intent. Examples of evidence which should be used are air pressure tests and thermography of all potential thermal bridges, along with (independently checked) commissioning records for all services and site waste management. Ideally, a co-heating test or 'pulse test' result would also be needed. This evidence would be required before a completion certificate was issued by building control or sign-off was given by the Retrofit Co-ordinator.

D. IMPROVING POST COMPLETION AND OCCUPATION MEASURES

13. Improved handover process

The commissioning and handover process is often rushed with the result that systems do not work as intended and occupants do not really understand how to efficiently control their homes. In addition to more robust commissioning, the handover process needs to be improved. This involves at least; allowing adequate time by both contractor and (ideally) some form of liaison officer or factor, the inclusion of a 'Quickstart Guide' and guidance on the use of all systems including mentoring / feedback interfaces. Ideally, the completion certificate noted above could only be granted once the occupant has 'signed off' that they fully understand the installed systems.



14. Feedback for occupants

It is difficult for occupants to control or improve something which is essentially invisible. Basic monitoring equipment should be installed in all projects with a user-friendly interface which allows for 'real-time' feedback, standard benchmarks and cumulative data (to allow for comparison) on heating and electricity, temperature, relative humidity and CO2 levels in all relevant rooms. This can be linked to apps and could include water consumption.

15. Enhanced defects liability period (DLP)

Most projects already have a 6 or 12 month DLP during and by the end of which all defects which become evident are to be fixed by the contractor. After 12 months, and in addition to ensuring all defects are fixed, there is an opportunity for a liaison officer or factor to visit and review with occupants their understanding of the systems and consumption to help again to use all systems efficiently and ensure comfort and good performance generally.