PROPOSED DOMESTIC BUILDING ENVIRONMENTAL STANDARDS [SCOTLAND] BILL

Comments on Proposals

Item	Comments	
1.0	It is very welcome to see Members of the Scottish Parliament with a high interest and engagement in raising energy efficiency and housing quality standards, and in particular the reduction of the requirement of energy for heating.	
2.0	The focus of the comments below is in the use of Passivhaus and/or a single approach to achieving reductions in energy consumption.	
3.0	Passivhaus has a number of high quality features, as set out in the proposed Bill. Some particular characteristics include:	
3.1	A comprehensive design approach [PHPP] in calculating energy performance.	
3.2	The certification on completion means that the building should perform as designed.	
3.3	In order to achieve certification, it is understood that there is a requirement to use, in some cases, only certified products which are Passivhaus Trust tested and approved. This provides a level of quality assurance. It is understood that the Passivhaus Trust gains an income from the testing process; equally, successful manufacturers will be able to charge a premium on their product values.	
4.0	**Single Approach**	
4.1	A main concern regarding the exclusive use of Passivhaus standards is the exclusive use of one particular design system, albeit a good one, over all other approaches. A non-exhaustive list of existing alternative design assessment methodologies and/or standards might include: • Energiesprong - Energy net zero focus, Dutch origins, presence in UK; standard and methodology • BREEAM - BRE in origin -assessment and standard • LEED - US origin - Leadership in Energy and Environmental Design • NABERS - National Australian Built Environment Rating System - UK approach exists • Minergie - Swiss quality assessment and certification methodology and standard - also used elsewhere. • Living Building Challenge - Stringent green building standard, US in origin.	

	• IES - Integrated Environmental Solutions - Assessment Software [understood to have been developed in Scottish universties].	
4.2	Market Effect - The requirement to use only certified products in some elements of the build may be considered anti-competitive. There have been examples where non-certified products may perform better in context than certified ones, as well as being cheaper. Certification ensures that the product will meet a particular standard – it does not guarantee that it is the best product.	
5	**Thermal Performance, Ventilation and Indoor Air Quality**	
5.1	As thermal performance improves, the greater is the requirement to ensure satisfactory ventilation and to assure good indoor air quality.	
5.2	Used in the right context, where maintenance and filter changes can be guaranteed, can mean that Passivhaus ventilation systems can filter out certain natural or man-made pollutants from the fresh air intake, securing a high quality level of incoming fresh air.	
5.3	There are contexts, particularly in social housing, where access for changing the filters in Passivhaus MVHR systems cannot be assured. Lack of filter changes poses risks to the health of the occupants and to the performance and longevity of the ventilation apparatus.	
5.4	An approach to addressing the above is to locate the MVHR externally to the property to be accessed by maintenance staff. In a recent design feasibility study, this led to an increase of around two square metres to the footprint of each property plus additional costs for fire-proofing, leading to an overall increase in capital cost of around 10% compared to Glasgow Standard Gold Hybrid. This does not include the maintenance costs.	
5.5	There is a concern that Passivhaus represents a higher risk in terms of ventilation design compared to alternative ventilation strategic approaches. The approach is to effectively seal the building, bringing it to an extremely low design air change rate, and making it solely reliant on the functioning of the mechanical ventilation system. This places the occupants at risk if, for whatever reason, the ventilation system fails or does not function as it is designed, resulting in poor air quality.	
5.6	Alternative approaches to ventilation are available; one current favoured preference [which has been used by John Gilbert Architects, who are referenced in the bill proposal] is the use of sunspaces, effectively glazed-in balconies, which can operate as thermal buffer zones in winter, passive heat stores, pre heat installations for fresh incoming air, can be opened up as balconies in summer, and provide solar shading to the	

	main part of the house in hot weather. Balconies for flatted accommodation have recently been recognised as funding-eligible within the Housing Association Grant guidelines.	
5.7	While it is possible to have sunspaces or balconies in conjunction with Passivhaus properties, It is understood that PHPP design does not recognise the benefit that sunspaces can bring in terms of thermal contribution. Other thermal design approaches do allow for this.	
5.8	An additional significant benefit of sunspaces is that the ventilation and passive heating provision is fully controllable by the occupant, meaning that the residents are empowered to manage their temperature and ventilation intuitively.	
5.9	Passive stack ventilation systems allow for moist damp air to be removed from the wet areas of the house without the use of fans and power, while facilitating natural cross ventilation. There is a trade off with an increased loss of warmed air. These can be used in conjunction with sunspaces to mitigate these losses.	
5.10	The use of covered or enclosed or covered drying spaces for laundry, as recommended in the Home Laundry Study by the Mackintosh Environmental Architecture Research Unit, ensures that moisture within the home can be minimised. This is helpful in secured good indoor air quality. These can be used in conjunction with sunspaces.	
6.0	**Fuel Poverty and Health**	
6.1	The Bill rightly references the need to address fuel poverty and health issues particularly arising from cold damp housing.	
6.2	A recent study by Strathclyde Uni. into the performance of CO2 monitors [Building Regs Requirement for newbuild] notes that while occupants are sensitive to comfort in terms of heat and cold, people do not readily identify poor indoor air quality, represented by excessive levels of CO2 in the home.	
6.3	Asthma has been on the increase in Scotland over the last two-three decades, and it has been established that poor indoor environment is either the cause or trigger for asthma attacks.	
6.4	The lower the air change rate, the greater the risk to respiratory health from indoor pollutants e.g. PVC from carpets and other flooring materials.	
6.5	The experience of social landlords will confirm that some tenants in newbuild properties [and older ones] will switch off fans in order to save	

	money. This results directly in increased humidity and mould formation, adversely affecting health.	
6.6	This risk is exacerbated where air change rates are low and there is a continuous managed ventilation system, and where the whole house is designed to be ventilated primarily by mechanical ventilation.	
6.7	As well as occupants switching off, many tenants control their budgets through prepayment meters. This means that if the money runs out, the ventilation stops.	
6.8	As well as self-disconnection, there remains the risk that power companies may cut off power supplies following non-payment.	
6.9	Almost all housing, including Passivhaus, allows for the opening of windows to facilitate ventilation. This however is counter-intuitive as the majority of people are aware that opening windows means losing heat and wasting money.	
6.10	All of the above concerns are magnified significantly with the recent extreme increases in power costs and the cost of living generally, making it much more likely that low income households will switch off any electrical systems in order to save money.	
6.11	Taken together, the more that ventilation systems, which are critical to housing design with high thermal performance, rely primarily on electricity and technology, the greater is the risk to occupant health in the event that the system is not running for any and all of the above reasons.	
7.0	**Conclusions**	
7.1	This respondent supports the drive and enthusiasm for increases in standards for thermal performance, but this requires to be in conjunction with standards and guarantees in improved air quality.	
7.2	Passivhaus is a comprehensive and very successful approach to house design but must be used in the appropriate housing context. In particular, it may be inappropriate in some social housing contexts.	
7.3	A number of thermal and ventilation design and assessment systems which can reach high performance standards are available. All have varying strengths and weaknesses. It is inappropriate to select one commercial system for exclusive and universal application to meet statutory requirements, requiring all contexts and designers to use it.	

7.4	The mandatory use of a single commercial system, and its certified products to achieve statutory consents, can be perceived as anti-competitive and could be open to legal challenge by other product manufacturers.	
7.5	A number of certified products may require to be imported, which may run counter other areas of sustainable policy including the circular economy, local enterprise and increased carbon footprint from transportation.	
7.6	The over-reliance on technical solutions to achieve satisfactory indoor air quality poses an increased risk to the health of the occupants where the technology fails or is not fully maintained.	
7.7	Although MVHR offers low cost in use, mitigating fuel poverty, where the electrical supply is not available to the ventilation system e.g. due to disconnection, self-disconnection or switching off the system, there is an increased risk to respiratory health. This primarily affects lower income households and may therefore contribute to increased health inequality.	
7.8	A single standardised approach risks stifling the innovation in design from which Passivhaus itself emerged.	
7.9	The Building Standards currently allow for flexibility in approach in achieving high thermal performance and ventilation standards, and should continue to do so.	
7.10	Building Standards have been on a continuous trajectory of improved thermal performance and indoor air quality requirements and should be encouraged to continue, and to raise standards further.	
7.11	Future legislation might consider the requirements for building products and household furnishings to meet higher environmental and ecological standards, leading to reduced toxicity in the home.	
7.12	Certification of products and systems can and is being achieved through the specifications and commissioning certificate requirements developed by clients and architects. This could be enhanced, or taken as an additional Building Control completion requirement.	
7.13	Any changes in requirements of the construction standards to the building fabric should be focused on upgrades to the Building Standards rather than to Planning Requirements or alternative legislation.	