



Passive House Association of Ireland
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Response to Consultation on policy options for the new Energy Strategy for Northern Ireland.

This submission is made by the Passive House Association of Ireland (PHAI) on behalf of the PHAI Members.

The Passive House Association of Ireland (PHAI) is a catalyst for the increased awareness of the opportunities and benefits of low energy design based on the Passive House Standard across the construction industry in Ireland and Northern Ireland. Passive House design is seen as a specifically proven successful way of designing such buildings.

The Mission of the PHAI is to promote, educate and facilitate, so as to develop a strong identity, understanding and demand for the Passive House concept.

PHAI is an Affiliated Association with the International Passive House Association.

The Association is non-profit-making in so far that all membership fees collected go toward the promotion of the Passive House Standard..

In preparing this response we have focused on the questions most relevant to our area of interest and expertise.

Barry McCarron
Chair

Chapters 1 - Context

Q1: Do you agree with the overall goal of achieving net zero carbon energy no later than 2050?

The UK Government has committed to bringing all greenhouse gas emissions to net zero by 2050. It is correct that Northern Ireland should support this goal and play its part in achieving it. There is an argument for meeting the target more quickly and indeed Scotland has committed to net zero emissions of all greenhouse gases by 2045, while Wales has committed to net zero greenhouse gas emissions by 2050 but with an aspiration to get there sooner. The Irish government has committed to cutting its emissions by 51% between 2018 and 2030 and to net zero no later than 2050.

The UK Climate Change Committee (UKCCC) report identifies that Northern Ireland is the only UK region which has no specific mechanism for supporting low-carbon heat in residential buildings, non-residential buildings or industry and there has been "next to nil low-carbon heating equipment installed since the suspension of incentives".

The UKCCC also recognises that to be on track to meet the UK's current legislated emissions reduction targets, the buildings sector requires a 14% reduction in energy demand and 25% of heat demand to be met by low-carbon sources by 2030.

The Passive House Association of Ireland would encourage the Northern Ireland Executive to set bold targets, supporting the changes which will be required to meet those targets and have the aspiration to demonstrate leadership on climate change. An opportunity exists to simultaneously address a number of key challenges facing Northern Ireland including fuel poverty and housing, by taking an holistic approach and considering not only the immediate benefits in relation to energy but also the long term benefits both financial and otherwise.

We agree the target date for net zero should be 2050 at the latest and would encourage a level of urgency which seeks to improve on that date. A clear roadmap with intermediate targets will ensure society can monitor progress both individually and collectively.

The Passive House Association of Ireland supports a pathway to net zero that starts with reduction of energy demand primarily through the adoption of the Passive House standard for all new builds and the EnerPHit for existing building retrofits. After the demand for energy has been reduced the pathway and options for providing net zero carbon energy generation are more achievable.

The least costly way of ensuring that domestic and commercial buildings which will exist in 2050 are zero carbon, is to mandate construction of new build property to zero carbon. Moreover due to the holistic benefits of energy efficiency and the need to increase the

scale of provision of housing, an opportunity exists to cost effectively provide much-needed energy efficient housing to a standard which would significantly impact on fuel poverty, energy security, NHS expenditure and economic benefits.

In order to develop the capability within industry to construct buildings to standards such as the Passive House Standard and the UK's Climate Change Committee's Ultra Energy Efficiency Standard, incentives should be provided to encourage the construction of low-energy buildings, whilst providing a roadmap to ensure all buildings are constructed to exemplary low-energy standards in the medium-term.

Therefore building standards policy need to be recognised as a key enabling policy lever for government to realise the significant financial benefits of zero carbon Construction. In order to support this, energy efficient building industry experts should participate in the development of appropriate policy recommendations.

While 30 years may be required to achieve the overall objectives, significant contributions can be made via quick wins, and supporting the right behaviour. For example, by providing support on a cost neutral basis, development of key skills and behaviour change can mobilise the simultaneous reduction of energy demand and associated carbon emissions reductions through driving increased building energy efficiency in combination with low carbon heating sources such as heat pumps.

Chapter 2 - Strategic Framework

Q2. Do you agree with the proposed outcome of “net zero carbon and affordable energy” for the Energy Strategy?

The Passive House Association of Ireland supports the proposed outcome of achieving net zero carbon but doing so in a way which provides a just transition.

The International Energy Agency, along with governments worldwide recognise that energy efficiency offers governments, businesses and households a range of tools and solutions to reduce power bills, curb carbon emissions, and save money at the same time.

This notion of “energy-efficient prosperity” is especially relevant for Northern Ireland with its limited natural resources and high incidence of fuel poverty meaning that it can benefit significantly from investing in energy efficiency improvements that provide affordable and reliable services, while supporting a strong economy and improved quality of life over the long term.

While the cost of renewable energy generation is falling, a societal move to heating, hot water and transport powered by electricity will require significant infrastructure investment. Some of this investment should be focused on reducing the demand on the grid through energy efficiency, by spending to improve the efficiency of buildings, energy demand is reduced, the pressure in the existing grid can be minimised and the need for infrastructure investment reduced.

We would encourage the NI Executive to focus hard on energy efficiency to minimise the requirement for carbon capture and offsetting which in turn will maximise the affordability of the strategy.

The Passive House Alliance of Builders (PHAB) was formed by a group of Directors from PHAI and supported by Invest NI with the objective of supporting the energy transition through demonstrating the opportunities afforded by the passive house standard for the province of Northern Ireland.

They have undertaken a market analysis and segmentation allowing the network to categorise market opportunities and methods of approach. Design workshops have been held and have simultaneously optimised the design and reduced costs in the two key market segments of

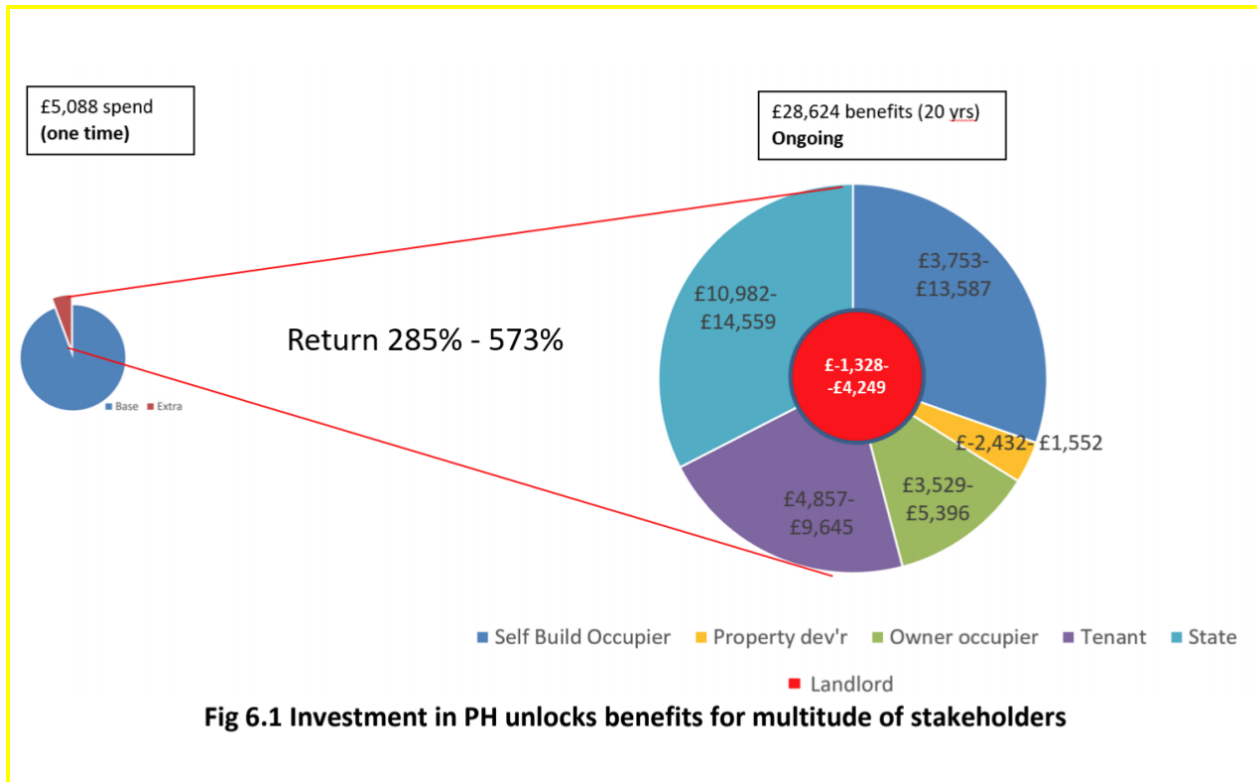
- commercial development of three bedroomed semi-detached dwellings
- three bedroomed social house dwellings.

The PHAB group has significantly reduced the additional costs of exemplary energy efficiency by employing best in class design methods which have proven successful in other markets, in combination with extensive market knowledge.

An Ulster University research paper “Cost Optimal UK Deployment of the Passive House Standard”⁸ outlines an approach to achieve the passive house standard cost optimally in Northern Ireland:

- The extra costs to build a 3 bedroomed dwelling to the Passive House standard can be as low as £5,088
- The extra costs for a three-bedroom social house dwelling were estimated to be £7,536 to £10,798 per unit, with half of this being recoverable under the EEM standard.

An innovative Multiple Benefits analysis has been carried out which shows that 20 year returns exceeding 500% of the invested amount are achievable. The holistic multiple benefits of low-energy standards were quantified for Northern Ireland, and demonstrates that significant returns are achievable over a 20 year period. See figure 6.1



The PHAB network is currently planning the construction of exemplary low-energy buildings which comply with both the Energy Efficiency Multiplier and the Climate Change Committee's Ultra-Energy Efficiency Standard. Further details are available upon request.

References:

Cost Optimal UK Deployment of the Passive House Standard, Shane Colclough, Martin McWilliams, Belfast School of Architecture & the Built Environment. The International Conference on Innovative Applied Energy (IAPE'19) - UNIVERSITY OF OXFORD, OXFORD, United Kingdom:13 Mar 2019 → 15 Mar 2019. ISBN (978-1-912532-05-6)

Q3. Do the five principles identified provide clear direction around the approach that we want to take with the Energy Strategy?

The Passive House Association of Ireland considers the five principles will support the outcome. It is indeed important to place people at the heart of our energy future, ensuring all people can heat and power their homes affordably and to a level which promotes a healthy lifestyle. It is important to do more with less, energy efficiency must be a key objective if we are to address the climate emergency and fuel poverty. We believe that building to the Passivhaus Standard can deliver essential energy efficiency while also delivering comfortable and healthy buildings. Buildings delivered to the Passivhaus Standard will result in a low heat demand which is compatible with heat generation using heat pumps supporting the move to electrification and the replacement of fossil fuels with indigenous renewables. The development of skills and products to support building to this standard will create jobs and help to grow a green economy.

Q4. Are there any key delivery priorities for the Energy Strategy not captured? If so, please outline what you believe should be included.

The Passive House Association of Ireland considers that there is a real opportunity to increase the ambition in relation to reducing emissions from existing buildings through a fabric first approach. The Passivhaus Enerphit standard has demonstrated that it is possible to transform existing stock into exceptionally low energy buildings (based on rigorous academic analysis carried out for more than a quarter-century). By setting a clear target to achieve building energy consumption in line with that which can be achieved by using the Passivhaus or Enerphit standard, and providing a clear roadmap for complimentary ambitious targets in relation to embodied carbon through building regulations and the circular economy, significant reductions in carbon emissions are readily achievable.

Q5. Do our proposed indicators adequately allow us to measure success at achieving the proposed Energy Strategy outcome? If not, please advise on what alternative metrics should be used.

- a) Carbon emissions from energy-related sectors
- b) Jobs and turnover in the low carbon and renewable energy economy
- c) Domestic energy costs relative to household income
- d) Business energy purchases relative to business turnover
- e) Households in fuel poverty
- f) Relative electricity & gas prices

The Passive House Association of Ireland believes that monitoring of energy related carbon for buildings requires the measurement of the energy efficiency of buildings using a comparable metric. Some metrics such as spend on fuel can mask energy efficiency e.g. users of inefficient buildings turning their heating off to save money. Energy use per square metre per annum (kWh/m²/a) is an effective metric when defining a building's energy efficiency. This must be accurately modelled using an approach such as Passivhaus PHPP or CIBSE TM54 to ensure that there is no performance gap between the design performance and actual performance.

Chapter 3 - Scenarios to Net Zero Carbon Energy

Q6. Do you think there are significantly different illustrative scenarios which should be developed? If so, please provide further information.

The clearest path to Net Zero Carbon is captured in the Dutch concept of 'Trias Energetica' or Energy 'Triage'.

This starts with 'designing out problems from the beginning' For instance at the scale of a single building it would involve ensuring that the building benefits from good solar orientation and avoids exposure to prevailing winds. At the scale of urban and land use planning it would ensure that buildings are grouped together to provide a sustainable mix of uses and that they would also have good access to low carbon transportation options including cycling and public

transport. With these initial 'good choices' made the next step is the provision of different technologies. Again at the scale of an individual building it would involve good insulation, triple glazing and heat recovery ventilation. At the scale of urban planning and land use planning it might involve pairing large energy users such as data centres with uses that can exploit the waste heat from such facilities such as community swimming pools or horticultural greenhouses. Finally with the right choices made for transport including ensuring that any commuting is relatively short these journeys can be made via bicycle, e scooter and public transport just as easily if not more easily than by private car.

The Passive House Association of Ireland advises that there should be a fabric first approach to both new build and retrofit of existing stock, with clear targets for energy efficiency regulated through planning and building control.

Chapter 4 - Placing You at the Heart of our Energy Future

Q7: Do you agree with the four consumer population groups we have identified? Please advise on key considerations within each.

- a) Domestic vulnerable consumers
- b) Other domestic consumers
- c) Small businesses
- d) Larger businesses

The four consumer population groups are valid, however The Passive House Association of Ireland would suggest that more granularity is needed for tailoring approaches to each group's needs. For example Ofgem have identified energy Archetypes in Great Britain which offer a greater understanding of household types in terms of size and income as well as fuel type. With NI's diverse consumer energy usage we believe this level of granularity will be useful in developing solutions against key considerations of fuel reliance, fuel poverty and health and wellbeing.

Domestic vulnerable consumers should be a high priority, where any investment has the potential for maximum benefit in terms of fuel poverty and health. Some Councils in GB have recognised the multiple benefits that building social housing to Passivhaus Standards can deliver in terms of health and fuel poverty.

On 12 May 2011, Michael Marmot and his team published their report, "The health impacts of cold homes and fuel poverty," commissioned by Friends of the Earth. The report highlights an obvious, well known, and largely ignored fact—that cold homes waste energy and harm their occupants—and identifies an opportunity for simultaneous gains on three fronts. By improving the thermal efficiency of Northern Ireland homes the NI Local Assembly would

- 1. reduce carbon dioxide ("greenhouse") emissions,
- 2. avoid a major burden of ill health, and
- 3. reduce health inequity

The latter maps closely with social and economic disadvantage. The report delivers three

Messages. Firstly, improving the energy efficiency of the housing stock—to spread “affordable warmth”—would bring multiple health gains, directly and through improved home finances. Secondly, fuel poverty as a result of poor housing stock causes avoidable health inequality and is unjust. Thirdly, reduced fuel use would bring environmental gains, in the short term through reduced air pollution and in the longer term in helping to mitigate climate change.

Northern Ireland has one of the highest levels of fuel poverty in the EU. Households in NI spend more on energy than any other UK region with weekly household expenditure on energy 18% higher than the UK average. According to the Department for Social Development, households in Northern Ireland spend approximately 60 per cent more disposable income on energy than the UK average, due to lower household incomes, greater heat needs and dependence on oil coupled to a low penetration of the gas network which is mainly in urban areas. Oil provides a (carbon intensive) alternative where gas is not available (typically in rural locations), and supplies central heating to 68% of the dwellings in Northern Ireland. Both gas and oil are non-indigenous and nonrenewable and therefore raise security of supply concerns.

The 2016 House Condition Survey (HCS) has indicated that fuel poverty has decreased in Northern Ireland, from 42% to 22%. The reduction is due to a combination of variables, including the fact that in 2016, the cost of home heating oil was at an all-time low with the average price for 500 litres at £125 (January 2016). However, the same amount of heating oil now costs on average £268, over 100% more, indicating that the real rate of fuel poverty far exceeds 22%.

Across the province of Northern Ireland, 35.2% of the electricity consumption is currently from renewable sources, reflecting the high availability of wind energy in the province. There is a target of 40% electricity consumption from renewable sources by the end of 2020, with wind remaining the dominant source of renewable electricity generation in Northern Ireland at 75% (2016 figure). NI has the second lowest Domestic Electricity Prices in Europe: 32% lower than RoI (21p/kWh), 20% below the EU15 average of 17.8 p/kWh and 14% below the UK average (16.5p/kWh)

This potentially represents an opportunity for households to cost effectively provide heat, by e.g. exploiting the high coefficient of performance of heat pumps, thereby generating between three and four units of heat from one unit of electricity.

In addition, it is noted that electric heat pumps are well suited to meet the low energy outputs required of low-energy buildings. However the cost effective use of heat pumps is coupled to providing high levels of energy efficiency through a robust fabric first approach.

NI policy should promote the use of electricity which is becoming increasingly decarbonised given the increasing proportion of renewable energy sources. In order to fully exploit the potential of heat pumps, low-temperature heating systems work best in low-energy buildings. Therefore, building regulations, whilst currently lax, need to have a phased upgrade plan to achieve a standard in line with the CCC recommended Ultra Energy Efficiency standard.

References

Housing Condition Survey

https://www.nihe.gov.uk/house_condition_survey_main_report_2016.pdf

Q8: Do you agree with the five measures identified to “enable and protect” consumers? If not, please outline what else should be included?

- a) Making available information and advice
- b) Offering proactive “wrap-around” support
- c) Providing financial support measures
- d) Driving change
- e) Reviewing statutory protections

The Passive House Association of Ireland supports the measures identified to enable and protect consumers.

A key element particularly for domestic consumers but applicable to all is to clearly explain how an energy efficient building works, how to operate it and crucially the implementation of post occupancy monitoring and evaluation to ensure that any behavioural issues are identified quickly, and adjustments made to ensure the building is performing as designed.

Any advice to consumers must be independent of those groups with vested interests in the energy market. Advertising of energy fuels should be regulated to ensure that consumers are given clear information. For example natural gas is often advertised as a greener alternative to oil, yet it remains a fossil fuel which must be phased out if overall carbon objectives are to be met.

Q9: Do you agree with the proposed scope of the “one stop shop”? Please advise on any different activities you think should be included.

The Passive House Association of Ireland supports the creation of a “one stop shop”, an independent advisor for consumers. It is important that consumers, particularly those in the vulnerable consumer group, have access to trusted advice to support them in making good decisions which are beneficial to them and support the achievement of the overarching outcome.

The Passive House Association of Ireland believes it can offer support to the one stop shop, providing expertise and guidance on energy efficiency and healthy buildings both for new build property and deep retrofit of existing buildings.

Advice in relation to how best to operate low-energy buildings is required by consumers in order to fully benefit from the new technologies being implemented. For example, research demonstrates that it is less expensive to provide low temperature heating on a 24-hour basis in an energy efficient home with high thermal mass (e.g. constructed using traditional concrete

blocks) compared with turning on and off the heating system. Entities such as Housing Associations need to be supported to disseminate information such as this to ensure such operational efficiencies are achieved in practice.

Q10: Which approach do you think should be taken to create this organisation? Please outline your rationale.

The Passive House Association of Ireland would support the funding of an external delivery organisation, with transparent organisational structure and supported by experts in the fields of energy efficiency. The Passive House Association of Ireland and its members have the expertise to support this organisation.

Q11: Do you believe that additional financial assistance to protect certain groups of consumers should be introduced? If so, please identify what consumers should be targeted and what support would be needed.

Vulnerable Domestic Consumers groups to be prioritised for financial assistance for well considered energy efficiency measures to enable them to escape fuel poverty and improve their health outcomes.

Chapter 5 - Grow a Green Economy

Q12: Do you agree with the four identified priority clean energy sectors:

- a) Energy efficiency
- b) Renewable energy
- c) Hydrogen economy
- d) Circular economy

Please advise on any additional areas that you believe should be prioritised and your reasons for this.

The Passive House Association of Ireland supports the four identified priority clean energy sectors and would place energy efficiency as the number one priority which in turn will ease the burden on renewables or other forms of energy generation.

We have concerns over the use of Hydrogen, often hailed as a solution to our energy needs. Much hydrogen is still currently derived from fossil fuels although there are opportunities to produce hydrogen using renewable energy. Hydrogen may provide a solution for particular parts of our economy but more research and development is required and careful messaging around how it is produced to ensure consumers can make informed choices.

We would also encourage a focus on embodied carbon. Operational energy and carbon can be addressed relatively easily using robust building standards such as the Passivhaus Standard, onsite renewables and minimal approved offsetting, however embodied carbon is more challenging. The carbon emitted in the production of materials, goods and services is locked in.

A focus on the use of low embodied carbon materials including timber but also other innovative materials using plant fibres could offer an alternative route for agriculture in Northern Ireland.

Q13: Do you agree with the economic growth opportunities identified within energy efficiency? What supporting policies do you believe are needed to take advantage of these?

The Passive House Association of Ireland believes there are significant opportunities for skills development, innovation and business transformation and growth in supporting energy efficiency, however this can only be truly recognised when the Government sets the standards which will drive business to invest and innovate. The Government should use public buildings as an example to set these standards.

The Erne Campus in Enniskillen has recently been constructed to the Passivhaus Standard and showcases what is possible now but what is urgently required for the future.

Q14: Do you agree with the economic growth opportunities identified within renewable energy? What supporting policies do you believe are needed to take advantage of these?

Q15: Do you agree with the economic growth opportunities identified for hydrogen production, demand and manufacturing within the hydrogen economy? What supporting policies do you believe are needed to take advantage of these?

Q16: Do you agree with underpinning principles identified within the circular economy? What supporting policies do you believe are needed to take advantage of the potential economic opportunities?

Q17: Do you agree that we should develop a green innovation challenge fund? If so, what scale and type of innovative projects should this support?

The Passive House Association of Ireland supports the creation of a green innovation challenge fund. We would encourage this to provide a range of support businesses of different sizes and in particular SMEs. We see value in supporting projects such as:

- New materials
- New supply chains
- Circularity
- Battery Storage Tech
- Home monitoring eg heat pump performance
- Community / District heat networks

This should be both top down and bottom up – the scale needs to be different to other supports in the marketplace (direct capital support). HE/FE sectors have a long history of success in this space and that is something we should support with this fund as they can deliver real practical exemplar projects – two strand approach SME support at £20k and a modest number of strategic supports at £250k.

Q18: Do you believe that we should work with the Utility Regulator to review how energy regulation can facilitate a green recovery and green innovation? If so, how can this be done in a way which protects consumers from the higher risks associated with innovation projects?

Q19: Do you agree with a focus on research mapping, research funding, business linkages and UK opportunity scanning to maximise the impact of the local research base with clean energy specialisms? Please identify specific opportunities in the local research base that could be progressed.

Q20: Do you believe that utilising and tailoring existing education and training routes can meet the short-term skills needs of the clean energy sector? How can activities within these routes be shaped to meet the needs of the sector?

Q21: Do you agree with the proposal to establish an Energy Skills Forum to shape the future skills needs of the clean energy sector? If so, what do you believe the role, remit and membership of such a group should be?

The Passive House Association of Ireland supports the creation of an Energy Skills Forum. The Forum's directives should be transparent, and membership should include public and private representatives, and represent the interests of both low and high skilled workers.

Key skill areas which we believe to be important in relation to energy efficiency include Retrofitting, external wall insulation applications, airtightness, ventilation and heat pumps.

Q22: Do you believe that there is a need for specific measures aimed at ensuring a just transition in Northern Ireland? If so, please advise on what the focus of these should be in addition to the education and training routes already proposed for a low carbon workforce.

Chapter 6 - Do More With Less

Q23: Do you agree that an energy savings target should be set for Northern Ireland?

The Passive House Association of Ireland believes that Energy Efficiency must be at the heart of any energy strategy. The most cost effective approach to reducing carbon is to reduce the amount of energy required to a minimum. By constructing new buildings today to anything less than best in class standards we are adding to the inefficiencies in our existing building stock which will require expensive retrofit between now and 2050 if we are to meet the zero carbon goals required to mitigate the climate emergency. These best in class standards such as the Passivhaus Standard have existed for 30 years, they have been proven to deliver not only excellent energy efficiency but also healthy buildings and are applicable to all building typologies. The Passivhaus Standard sets criteria for energy efficiency based on an optimal cost / benefit balance. The skills exist in Northern Ireland to build to this standard with the Southwest College established as a trainer of both designers and tradespersons. It also works with innovative companies to develop solutions for low energy buildings and has led by example in delivering two pioneering Passivhaus projects of its own, the Passivhaus Classic Crest Centre and the world class Passivhaus Premium Erne College.

To date the adoption of the Passivhaus Standard has been voluntary in NI. There are examples of some councils in GB and Ireland adopting the Passivhaus Standard or similar particularly for housing and public buildings. In order to make the step change required to meet aspirations of a zero carbon society energy efficiency must be mandated. We believe the Passivhaus Standard should be mandated on all new buildings and the Enerphit Standard on all retrofitted buildings to ensure a robust approach to energy efficiency while also delivering healthy buildings where people live, learn and work.

The UK's CCC recommended Ultra High Energy Efficiency standard has a target performance in line with that achieved by the international Passive House standard. As the passive house standard has been in existence for over a quarter of a century, it represents a low-risk, proven method of delivering low-energy buildings which can comfortably achieve the climate change committee's Ultra Energy efficiency standard.

[Q24: Do you agree that Minimum Energy Efficiency Standards should be set to drive improvements in energy efficiency? If so, what buildings should be the early priorities for introducing minimum standards?](#)

The Passive House Association of Ireland agrees that Minimum Energy Efficiency Standards should be set to drive improvements in energy efficiency.

The UKCCC recommends that to drive energy efficiency improvements in homes and buildings, Northern Ireland should:

- Set a clear timetable of standards to drive energy efficiency improvements in owner-occupied, social and private-rented homes.
- Broaden policies to incentivise energy efficiency improvements in all homes rather than restrict it to low-income households.
- Consider policy options to deliver an attractive package for able-to-pay householders aligned to trigger points (such as when a home is constructed, sold or renovated).
- Provide support for 'low-regret' heat technology (eg Heat Pumps and improved energy efficiency standards) in the early 2020s
- Support moves away from oil boilers and resistive electric heating through financial support for low-carbon alternatives in both residential and non-residential properties via heat pumps.

The UKCCC's recommended Ultra Energy Efficiency standard has a target performance in line with that achieved by the international Passive House standard. As the passive house standard has been in existence for over a quarter of a century, it represents a low-risk, proven method of delivering low-energy buildings which can comfortably achieve the climate change committee's Ultra Energy efficiency standard.

Whichever Standard or targets are set it is fundamental that the metric for measuring energy efficiency is clear, simple to understand and can be compared between buildings. Many international standards use a total energy use metric, kilowatt hours per square metre

(kWh/m²). This metric provides a consistent indicator of performance which can be measured throughout the design process and during operation.

The London Energy Transformation Initiative (LETI) have undertaken a significant amount of work in collaboration with the UKGBC, RIBA, CIBSE and others to set energy use requirements for new buildings as follows:

- Residential 35kWh/m²/a
- Schools 65kWh/m²/a
- Offices 55kWh/m²/a

In all cases space heating / cooling demand of 15kWh/m²/a

The Passive House Association of Ireland suggests that housing and public buildings should be prioritised to meet these higher standards, however it is important that they are applied to all buildings sooner rather than later.

The London Energy Transformation Initiative (LETI) has developed an energy hierarchy which should be adopted for Northern Ireland.

- Be Lean
 - Compliance with the fabric efficiency target
- Be Clean
 - Compliance with kWh/m² energy use target
 - Follow the 'delivering low carbon heat' hierarchy
 - Display peak reduction
- Be Green
 - Compliance with onsite renewable energy generation target
- Be Seen
 - New developments to publicly disclose their actual energy and carbon performance for 5 years

[Q25: Do you agree with the general scale and proposed pace of change outlined in DoF's five phase plan for building regulations? If not, please outline what achievable timescale or programme should be implemented and your rationale for this.](#)

The Passivhaus Association of Ireland welcomes the review of Building Regulations, however it believes the pace of change is too slow if we are to meet the overall objective of a net zero carbon society by 2050. It is widely considered that to meet the target in 2050 all new buildings must be zero carbon by 2030 at the latest. Some clients are expecting this level of performance now, some design teams are delivering this level of performance now while others have set internal targets between now and 2030. However these are all voluntary commitments and therefore limited in their overall impact. It is essential that the Government leads by setting ambitious but achievable targets backed up by the financial support and incentives to ensure the targets can be achieved by all. Any delay in implementing higher standards for new

buildings will add to the more expensive challenge of retrofitting buildings to meet the 2050 target.

We would encourage alignment with the GB roadmap as a minimum with interim uplifts to Building Regulations in 2021/22 and alignment with Future Homes and Future Building Standards by 2025. The Welsh Government intends to implement new Building regulations in 2025. Scotland is currently consulting on their New Build Heat Standard with a planned implementation in 2024.

The Passivhaus Standard is a proven standard, applicable to all building typologies and has been successfully delivered in Northern Ireland by local professionals and tradespeople supported by local training and with a supply chain of local manufacturers supplying the innovative products to ensure the standard can be delivered cost effectively.

[Q26: Do you think that we should seek to explore how the rates system can be used to encourage energy efficiency? If so, please outline key issues that would need to be considered.](#)

The Passivhaus Association of Ireland believes that the rates system could be used to both incentivise and penalise building owners based on energy efficiency. A standard rate level could be set for buildings which meet the applicable building standards and are built to appropriate space standards for the building type. Building owners could be incentivised by discounted rates where they choose voluntarily to build or retrofit to a higher standard and are able to verify the performance of the building. This could include annual monitoring to prove that the enhanced efficiency measures are delivering. The rates system could also penalise inefficiency through excess so any building built which is larger than appropriate space standards should be subjected to a higher rates level.

Such an approach would not disadvantage those whose building is appropriately sized and built in line with Building Regulations. It would incentivise those who choose to improve their dwelling beyond current requirements and it would penalise excessive buildings which may comply with building regs but which may be oversized for their purpose or occupancy.

With regard to basing energy efficiency on EPC's it must be recognised that EPCs are not an accurate method for measuring a buildings actual energy efficiency. It is widely recognised that a performance gap exists between the methodology used for EPC's and real world performance. The system for assessing energy efficiency must be updated to be more robust if it is to be used as a means of determining rate valuations.

[Q27: Do you agree that we should introduce a pilot domestic retrofit scheme by spring 2022, followed by a substantive scheme as part of a "one stop shop" approach? If so, what changes are needed to the wider energy efficiency support landscape to ensure a joined-up approach?](#)

The Passivhaus Association would support the introduction of a pilot domestic retrofit scheme at the earliest opportunity and the introduction of a substantive scheme following review of the pilot.

We would caution that any retrofit programme should be robust, coordinated and based on a sound analysis of a property resulting in a detailed and holistic retrofit plan and implementation strategy. We believe the one stop shop is a key element to bringing the correct expertise and advice to consumers.

Any scheme should be based on the published Code of Practice for retrofit, BSI PAS 2035 : Specification for the Energy Retrofit of Domestic Buildings. This advocates a whole building approach, identifying risks and setting out an implementation plan. New roles of Retrofit Coordinator and Retrofit Assessor are defined and professionals in Northern Ireland will need to upskill to deliver these roles

In addition, while an annual EU building renovation rate of 3% is required to be carbon neutral by 2050, renovation rates are currently 1%. Therefore enabling the construction of new build and retrofit of existing buildings to be carried out to best in class energy efficiency standards represents a strategic imperative for policymakers in NI.

[Q28: Do you agree that we should ring-fence the PSO funding for vulnerable consumers including the fuel poor? Please advise on changes you believe should be made to the level and scope of the PSO for energy efficiency.](#)

The Passive House Association of Ireland would support the ring-fencing of the Public Service Obligation (PSO) funding for vulnerable consumers, particularly those in fuel poverty.

[Q29: Do you believe that green private finance solutions have a role to play in supporting domestic consumers to invest in energy efficiency? If so, what specific green finance solutions should be explored?](#)

Bank led products such as discounted mortgages eg Ecology Building Society with discounts at various levels including for Certified Passivhaus Dwellings serve to support consumers when they seek to invest in their properties for example on purchase or when refurbishing their property.

[Q30: Do you agree that Invest NI should deliver a pilot energy efficiency support scheme for businesses, to be followed by a substantive scheme delivered through the proposed "one stop shop" organisation. If so, what type of support do you believe is most appropriate for different groups of business consumers?](#)

The Passivhaus Association of Ireland supports an Invest NI delivered energy efficiency scheme for businesses focused on the design and capital investment phases of a project on the basis that the energy efficiency measures implemented should have a significant payback to businesses over the facilities lifetime. We support the use of the 'one stop shop' as a vehicle to provide the necessary support and advice to businesses enabling them to make informed choices and investment.

Where retrofit of non domestic buildings is a solution any scheme should require the implementation of the Code of Practice set out in BSI PAS 2038: Retrofitting non-domestic buildings for improved energy efficiency – Specification

We believe the EXCEED scheme in Ireland is a useful example which Northern Ireland could base its approach upon.

Q31: Do you believe that green private finance solutions have a role to play in supporting non-domestic consumers to invest in energy efficiency? If so, what specific green finance solutions should be explored?

Q32: Do you agree that we should seek to develop skills and capability, enhance quality assurance and standards, and use an accreditation body to provide guarantees on work undertaken by the energy services for the retrofit sector? If so, how can we help to prepare the sector for these changes?

When retrofitting existing buildings to high energy efficiency standards it is critical that the works are planned, coordinated, rigorously designed and executed to ensure the performance is delivered without creating problems. To that end, retrofit should be controlled by an appropriate body supported by appropriate guidance and regulation and ensuring the correct skills and management are in place. As a starting point recent published best practice by BSI should be adopted:

BSI PAS 2035 : Specification for the Energy Retrofit of Domestic Buildings

BSI PAS 2038 : Retrofitting non-domestic buildings for improved energy efficiency – Specification

To encourage development of skills in the local market, funding should be made available to local businesses either through existing funding mechanisms or bespoke funding streams for this objective.

Q33: Do you agree that information, awareness and behavioural change should be a key strand of future energy efficiency support? If so, what are the key behaviours that should be targeted?

The Passive House Association of Ireland supports the recognition that information and awareness as well as behavioural change are key elements in delivering the energy strategy.

Looking to the future it is critical that the concepts of energy efficiency, clean energy and climate change are key parts of the curriculum for our children enabling them to make better choices in the future than the generations of the past.

At the same time the understanding, perceptions and behaviours of consumers today must be targeted. For example, advice in relation to how best to operate low-energy buildings is required by consumers in order to fully benefit from the new technologies being implemented. For example, research demonstrates that it is less expensive to provide low temperature heating on a 24-hour basis in an energy efficient home with high thermal mass (e.g. constructed using traditional concrete blocks) compared with turning on and off the heating system. Entities such as Housing Associations need to be supported to disseminate information such as this to ensure such operational efficiencies are achieved in practice.

Similarly energy efficient mechanical heat recovery ventilation should operate 24 hours a day. With optimised design and commissioning these systems should use very little energy yet often they are turned off to save energy by users. Simply educating users on how little energy is used and indeed the energy they save can help to change behaviours.

Behaviours linked to perception of temperature are also key. Thermal comfort issues such as draughts, cold surfaces etc can prompt users to turn the heat up. Passivhaus focuses on thermal comfort not just temperature to ensure that users are comfortable at the design temperature day and night.

Q34: What measures do you think can have the most impact to support people to reduce the miles they travel in private vehicles? Please explain your rationale.

Chapter 7 - Replace Fossil Fuels With Indigenous Renewables

Q35: Do you agree with setting a 70% renewable electricity target by 2030, whilst retaining the flexibility to increase this to 80%?

Q36: Do you agree with the criteria identified that would allow in order to consider any future increases in the renewable electricity target?

- a) Projects can be delivered in a cost-effective manner.
- b) Offshore wind can be delivered by 2030.
- c) Storage technologies can minimise system curtailment of renewables.
- d) Greater clarity on electricity demand for heating and transport.
- e) Consumers' bills are not disproportionately impacted.

If not, what alternative criteria might be used?

Q37: Do you agree that we should explore with BEIS the possibility of extending the Contracts for Difference scheme to Northern Ireland? If so, what terms would be needed to ensure generation in the region whilst protecting consumers?

Q38: Do you believe it is possible that an offshore wind project in Northern Ireland could be operational before 2030? If so, please outline what targeted actions could be taken to deliver this.

Q39: Do you believe that a fixed platform offshore wind project should be targeted to be part of the renewable generation mix? If so, how would you propose some of the challenges associated could be overcome?

Q40: Do you believe that floating platform offshore wind offers the best long-term opportunities for offshore wind in Northern Ireland's waters? If so, what additional steps could be taken to encourage these projects?

Q41: Do you believe that other marine renewables can play a key role in our renewable generation mix? If so, please identify what technologies offer the greatest potential and what steps can be taken to support these.

Q42: Do you agree that a strategic approach to planning the location of renewable projects should be taken? If so, please outline practical steps that could be taken to deliver this.

Q43: Do you believe that there should be a requirement for renewable developers to share some of the financial benefits of developments with local communities? If so, what share do you think would be reasonable? If not, please provide your rationale.

Q44: Do you agree with taking separate approaches to on-gas grid and off-gas grid consumers? If not, what approach should be taken?

The Passive House Association of Ireland believes that approaches will need to be tailored to specific consumers needs. We would reinforce that a focus on energy efficiency of the building fabric will reduce the energy demand to a level where energy needs can be met by heat pumps and PV panels.

Where a consumer has sought professional advice and a holistic retrofit plan is designed then a fabric first approach should be implemented with heating demand satisfied by heat pump supported with onsite renewables and the opportunity to benefit from the ongoing decarbonisation of the grid.

Recognising that some elements may require urgent replacement for example a failed boiler it is essential that the 'one stop shop' can offer consumers the best advice at that point in time.

For all new builds energy efficiency should be the primary focus where heat demand can be provided by heat pump. For existing properties where a deep retrofit is planned the resulting energy efficiency should also enable the heating demand to be provided by a heat pump.

The "Passive House Plus" standard combines the low energy demand of passive houses with the integration of renewable energy. Independent monitoring of the first UK Passive House Plus dwelling (Lark Rise in Berkshire), shows how it is possible to achieve a 98% reduction in the electricity consumption from the grid and simultaneously provide an opportunity for the grid to benefit. In this instance, the dwelling exports 10 times more energy to the grid than it imports

over an annual cycle. It demonstrates the viability of a future electrical Grid powered by renewable energy and how to enable the UK to be fuelled entirely by renewable energy.

Details are available here:

<https://www.cibsejournal.com/case-studies/case-study-lark-rise-the-uks-first-passivhaus-plus/>

Q45: Do you agree that we should not rule out potential low and zero carbon heat solutions at this stage? If not, please outline your rationale.

The Passive House Association of Ireland believes that a fabric first energy efficiency strategy should be the foundation for energy transformation in Northern Ireland. By minimising the energy required the need for expensive additional infrastructure is minimised. By enabling consumers to use electricity for energy the reduction in carbon emissions can be delivered through continued decarbonisation of the grid using renewables and other or zero carbon energy sources. Heating and hot water should not be generated using fossil fuels.

Q46: What low and zero carbon heat solutions do you believe we should prioritise for trials? Please identify where such trials should be focused and what key issues should be tested within each.

The Passive House Association of Ireland believes that it is essential to reduce heat energy demand through excellent fabric quality and efficiency and the establishment of targets for space heating demand such as the UKCCC's ultra high efficiency standard or the Passivhaus standard. A widely used target for space heating demand is 15kWh/m² per year. Once this level of energy efficiency is achieved technologies such as mechanical heat recovery ventilation (MHRV), heat pumps and PV panels become more appropriate.

Trials to test the performance of MVHR and Heat Pumps at different levels of fabric performance would be useful to prove the case for an efficiency first approach as well as demonstrating the added benefit of indoor air quality to the occupants.

Q47: Do you believe that the role of heat pumps will be different depending on whether consumers are on or off the gas grid? Please outline what you think the specific roles should be.

The Passive House Association supports the use of heat pumps to provide space heating and domestic hot water in highly energy efficient homes. The question is not so much on or off grid but how efficient the existing building to be powered is. A kWh of electricity is currently approximately 4 times more expensive than a kWh of gas. Simply switching from heating by gas to heating by electricity, even considering the coefficient of performance (COP) for the heat pump, is likely to lead to increased costs to the consumer unless energy efficiency measures are considered at the same time. With a considered fabric first energy efficiency approach such as the Passivhaus Standard for new buildings or the Enerphit Standard for existing buildings the required energy can be minimised to a level where heat pumps can operate efficiently and offer the best efficiency performance to maximise the coefficient of performance with the potential to reduce fuel cost as well as carbon emissions.

Q48: Do you agree that Northern Ireland should develop a pilot grant scheme to support low carbon heat technologies for domestic and small non-domestic consumers? If so, please identify key issues that need to be considered in designing and delivering such a scheme.

Q49: Do you agree that legislative and regulatory steps should be taken to facilitate biomethane injection into the gas network?

Q50: Do you believe that support should be provided to encourage biomethane production for injection into the gas network? If not, please outline what alternative approach should be taken to decarbonising the gas network.

Q51: Do you agree that the local Gas Network Operators should develop and publish a plan to decarbonise gas out to 2050? If so, what key issues must be considered within it?

Q52: Do you agree that the sale and installation of new oil boilers should not be allowed for consumers on the gas grid? Please outline your rationale and, if you agree, what a viable timeline for introducing this might be?

Q53: Do you believe that off-gas grid consumers should have the option to retain oil boilers for use with biofuels? If not, what is a viable timeline for introducing a ban on the use of all oil boilers?

Q54: Do you agree that the local Oil Industry should develop and publish a plan on how biofuels could play a role in decarbonising heat out to 2050? If so, what key issues must be considered within it?

Q55: Do you believe that support should be introduced to promote the uptake of biomass for off-grid consumers? If so, please advise on what support is needed and where it should be focused.

Q56: Do you agree that the sale of coal and wet wood should be banned in Northern Ireland? If so, do you believe this should be extended to include other solid fuels with the exception of kiln dried wood?

Q57: Do you agree that we should develop a Northern Ireland specific strategy that sets an overarching, long-term plan for cleaner, greener transport and shows how we will meet net zero emissions within the transport sector? If so, what Northern Ireland specific issues need to be factored into this in order to accelerate the uptake of Zero Emissions Vehicles?

Q58: Do you agree that an EV communication campaign should be run in Northern Ireland? If so, what key messages would be most impactful for consumers as part of this?

Q59: Do you agree that the private sector and local government have a key role to play in developing EV infrastructure? If so, what barriers can the government address to ensure that such projects are commercially viable?

Q60: Do you agree that we should develop an EV Charging Infrastructure Plan in collaboration with public and private partners? If so, what should the key priorities of the plan be?

Q61: Do you agree that public sector contracts can be a key driver for developing technologies and markets for alternative fuel vehicles? If so, what specific opportunities are there that could be progressed?

Q62: Do you agree that collaborative research will be important to demonstrate alternative fuels? If so, what are the best routes to identify and progress potential projects?

Q63: Do you believe that Compressed Natural Gas/Liquid Natural Gas and/or and synthetic fuels can play a role as an interim measure to decarbonising transport? If so, how can the government help to encourage the private sector to trial and use these fuels?

Q64: Do you believe that CCUS can play a role in Northern Ireland? If so, what potential applications could be the initial focus for demonstration projects?

Q65: Do you believe that our approach to petroleum licensing should change in line with our commitment to decarbonise energy?

Chapter 8 - Create a Flexible and Integrated Energy System

Q66: Do you agree that the Electricity Network and System Operators should produce a pathway to creating a flexible and integrated energy system? If so, please provide evidence to demonstrate what the initial priorities of such a plan be?

Q67: Do you agree that conventional power generation can play an important role in the pathway to decarbonised energy? If so, what opportunities and barriers exist for such plants?

Q68: Do you believe that further interconnection will be needed in the future? If so, is a new revenue mechanism needed to bring forward this investment?

Q69: Do you agree that our power system should be based around flexible solutions to align demand and supply? If so, please advise on what key decisions are needed to achieve this.

Q70: Do you believe that the SEM and DS3 offer sufficient market routes to support the deployment of flexible technologies for generators of all sizes? If not, please provide evidence to demonstrate what additional market routes may be needed.

Q71: Do you agree that a policy framework should be put in place to enhance access to and use of consumer data? If so, please outline key considerations that need to be factored into this framework.

Q72: Do you believe that we should take forward the Energy Data Taskforce recommendations in Northern Ireland? If so, please advise on key differences with Great Britain that need to be factored in.

Q73: Do you agree that a Cost Benefit Analysis of smart meters should take into account the broader benefits they can bring to consumers as an enabler of energy data and a smart system? If the CBA for smart meters is not positive, what alternative approaches can be taken to deliver these benefits for consumers?

Q74: Do you believe that financial support should be provided for micro-generation to increase the number of active consumers in Northern Ireland? If so, what should this support look like? If not, what are the alternatives?

Q75: Do you agree that network charging in a decentralised energy system will need to change? If so, what are the principles that should be adopted in distributing future network costs across consumers?

Q76: Do you believe that a new regulatory framework is needed to protect consumers who engage in decentralised arrangements? If so, what consumer protection measures should be part of this?

Q77: Do you believe that energy communities have a role to play as part of the energy transition? If so, what support is needed to progress these? If not, what are the alternatives?

Q78: Do you agree that the potential of geothermal energy should be further explored, supported by a legislative and regulatory framework? If so, what applications do you believe there are for geothermal energy in Northern Ireland?

Q79: Do you agree that further trials of heat networks should be carried out? If so, what key issues do you think should be tested through these?