Report & recommendations of the Policy Committee task group on: Passive Housing

January 2017

Cllr Andrew Cooper (Chair)
Cllr Gemma Wilson
Cllr Andrew Marchington
Cllr Naheed Mather

Purpose

This report summarises the findings and analysis of the Policy Committee task group on Passive Housing, and presents their recommendations for endorsement by Policy Committee to be presented to the council's Cabinet for consideration.

Scope of the work agreed by Policy Committee:

The task group was established by Policy Committee in January 2016, at which point the scope of the work was agreed as follows:

- Set out proposals for the intention, principles and direction of travel for a policy position on passive housing.

- The work will seek to establish the potential and implications of introducing a requirement to adopt passive house principles for new build housing and establish the circumstances where this could apply.

- It will seek to develop:

    - A proof of concept – i.e. to identify what is possible, legal and feasible, informed by professional challenge and input.
    - A suggested scope for the policy (including, for example, whether it should apply to all new housing, to housing development on all council land, on housing development on some council land and/or as a condition of sale of council land for development purposes)
    - Implementation options and timescales, having regard to appropriate lead-in times for developers, partners and other stakeholders
    - An assessment of the potential social and economic benefits or dis-benefits, having regard to the priorities in the Kirklees Economic Strategy and Joint Health and Wellbeing Strategy
    - Consideration of the potential and feasibility of exploiting the opportunities provided by a new policy position more ambitiously – for example, opportunities for local manufacturing and construction.

What is Passivhaus?

Passivhaus (or Passive House) is an advanced low energy construction standard for buildings. By using high performance insulation and making a building completely draught free, it effectively eliminates heat loss to create a building with very low environmental impact. The majority of heating required comes from 'passive' sources such as sunlight, emitted heat from electrical appliances, and even body heat, meaning almost no traditional heating system is required.

A passive house is an energy-efficient building with year-round comfort and good indoor environmental conditions without the use of active space heating or cooling systems. The space heat requirement is reduced by means of passive measures to the point at which there is no longer any need for a conventional heating system; the air supply system essentially suffices to distribute the remaining heat requirement.

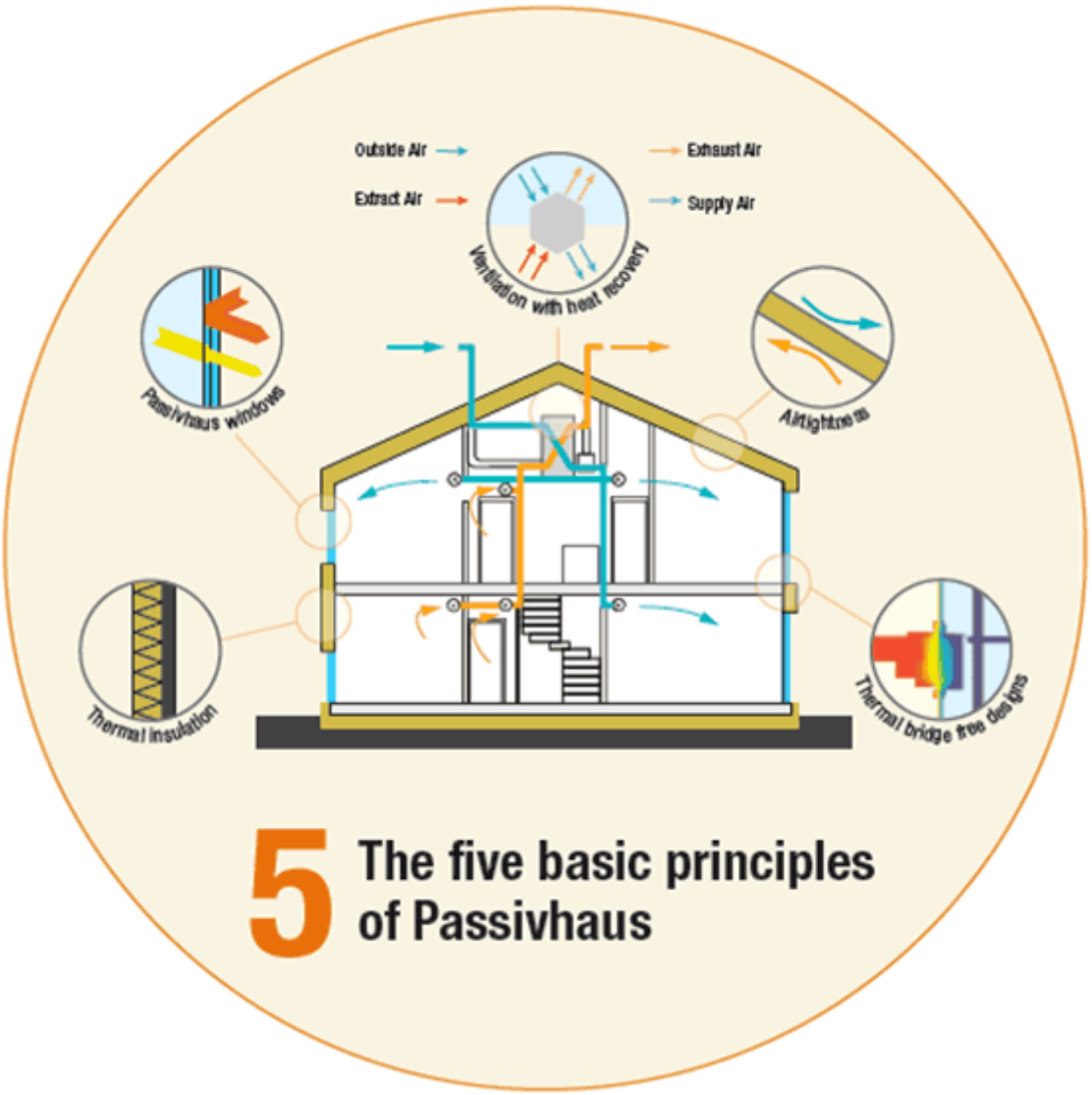
A passive house provides very high level of thermal comfort and provision of whole-house even temperature.

The concept is based on minimising heat losses and maximising heat gains, thus enabling the use of simple building services. The appearance of a passive house does not need to differ from a conventional house and living in it does not require any lifestyle changes.

In the UK, this typically involves:

- very high levels of insulation
- high performance windows with insulated frames
- airtight building fabric

- 'thermal bridge free' construction
- a mechanical ventilation system with highly efficient heat recovery



The Passivhaus Standard is a construction standard developed by the Passivhaus Institut in Germany (http://www.passiv.de). The Standard can be met using a variety of design strategies, construction methods and technologies and is applicable to any building type.

Qu. Which of the pictures on the previous pages are Passive Houses?

Ans. All of them.

"The passive approach to construction is based on simple principles, reliable technology and is well tested particularly in northern Europe. It produces homes that require as little as 15 kilowatt hours of power per year to heat one square metre of floor space compared to 80 to 100 for most modern homes. Moreover, it is only marginally more expensive to produce a passive house. If we can build homes that do not need expensive and damaging fossil fuels to power them, why contemplate building anything else?"

The RSA, 2013

Summary and conclusions

The need to build significantly more homes and to cut carbon emissions are national policy priorities for all political parties. From a climate change perspective, given that 27% of the carbon emissions of the UK come from our homes, the energy performance of housing is a significant issue. The 2008 Climate Change Act requires:

- a 34% cut in 1990 greenhouse gas emissions by 2020, and
- at least an 80% cut in emissions by 2050.

It will be impossible to meet the 2050 objective without changing emissions from homes.

The failure to deliver more and better quality homes in the UK is already having serious social impacts. This policy has therefore been developed acknowledging the wider housing policy challenges for Kirklees and nationally, and in particular the need to achieve housing growth to meet the needs of the Kirklees population. We need a holistic policy approach to the housing crisis – and not to view housing quality and volume as mutually exclusive, producing houses that are cheap to build but expensive to run. Instead we need to ask how we can increase the quality as well as the numbers of homes in Kirklees; using approaches which help stimulate the local economy and improve the health and wellbeing of Kirklees residents.

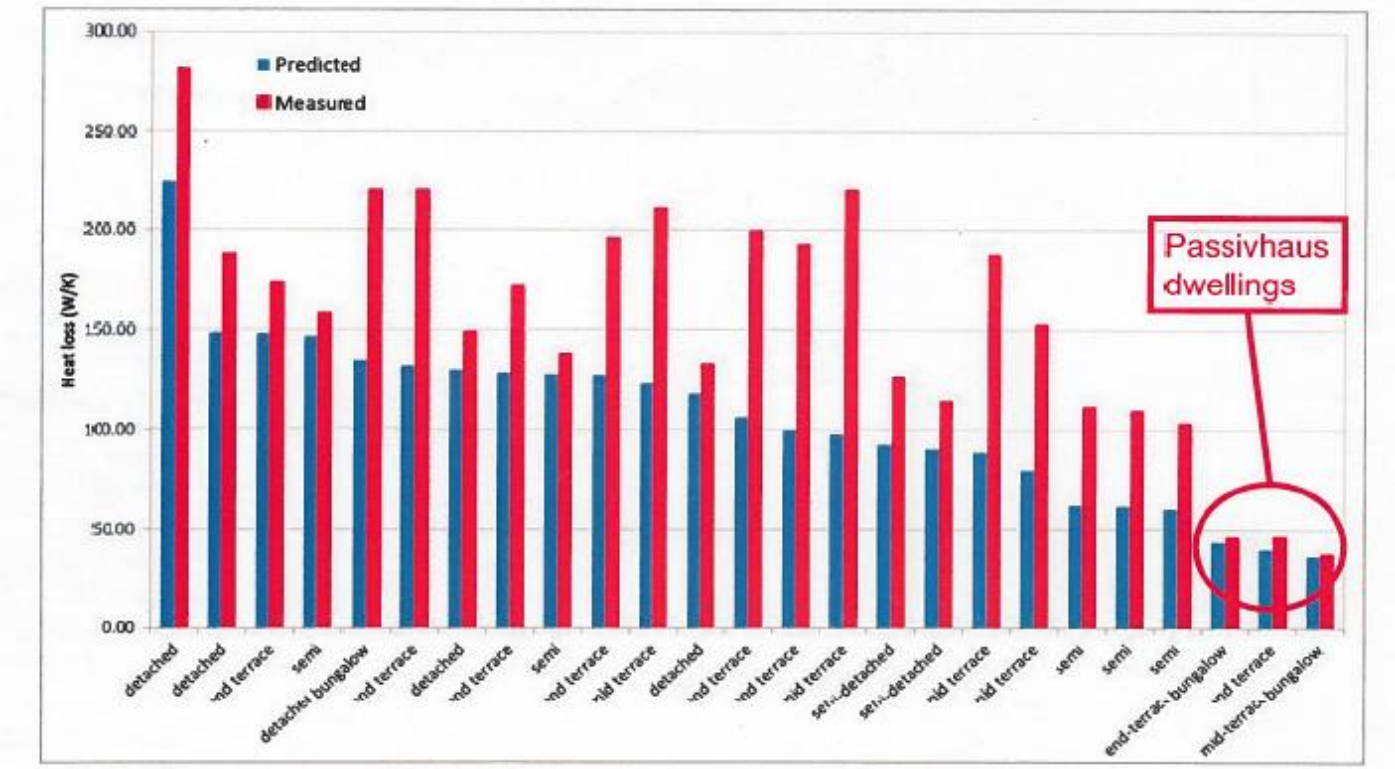
Roughly one third of the working age population in Kirklees live on low to middle incomes. Nearly two thirds of households in Kirklees earn less than £25,000. Following the economic downturn, there has been a change to living standards in a typical working household in Kirklees, with households, in effect, £37 worse off each week or £1,964 per year, now than in 2008.

In this context, the cost borne by households because of the poor energy performance of our homes is significant. As the table below demonstrates, even compared to modern building regulations for new homes, the potential for household savings are substantial.

	New build to 2013 Building regulations:	Passivhaus standard	Annual saving
4 bedroom detached	£1,050	£620	£430
3 bedroom semi	£780	£450	£330
4 bedroom mid terrace	£760	£450	£310
1 bedroom ground floor flat	£500	£380	£120

Seen at a population level, if there is a need to provide 29,000 additional homes by 2031, this represents a potential opportunity to save over £9m annual household spending which could be available to improve people's standards of living or spent in the local economy.

A particular benefit of the passive house standard is the rigour and quality assurance process which means that the energy savings estimated are actually delivered in reality. This contrasts with traditional construction techniques, where there is a significant difference between modelled energy performance and what occupiers experience in reality. The table below illustrates this 'performance gap'.



A key concern in developing this policy is not to burden the construction sector with requirements that might inhibit new development. Cost is therefore a significant consideration and the task group looked in some detail at this issue.

The evidence in terms of any additional cost associated with passive house suggests that building a passive house can cost in the range of 0 – 25% more than the current UK construction standard. In the UK context this is in part a reflection that passive house is a relatively new innovation to the UK housing sector, with only several hundred passive homes having been built to date, compared with over 20,000 in Germany. Given these relatively small numbers, much of the UK data is derived from one-off commissioned homes or small scale developments which lack economies of scale. The panel visited a current development (CITU in Sheffield), where by building at scale and using off site construction techniques the developer plans to deliver passive house standard at zero additional cost – suggesting that if mechanisms can be found to stimulate passive house building at larger scale then cost differentials will continue to reduce. The issue from a policy perspective is therefore how to enable or stimulate increased scale and avoid the chicken and egg scenario where new innovations are perceived as more costly which then inhibits their uptake. Additionally, until demand for passive homes increases, volume house builders in particular lack the motivation or incentives to change.

Our proposed policy approach is therefore a phased one, with an enabling focus, aimed at progressively increasing demand for and volumes of passive homes, building up the local evidence base, and increasing economies of scale. This will focus initially on council-supported pathfinder projects and by enabling and supporting demand from residents, including those interested in self- build and custom-build.

Incentives are different in the social housing sector. Housing associations and other social landlords have an ongoing interest in the maintenance and running costs of the homes they manage. Their tenants are also more likely to be on lower incomes and to be in fuel poverty. So, we also propose working with the social housing sector in Kirklees and across West Yorkshire to explore opportunities for social housing passive house pathfinder schemes. This will provide additional local learning and evidence on cost-benefit and on tenant experiences and outcomes.

The St. Mary's development in Oldham, which has two passive houses and four other "Code 6" ones keep the tenants heating costs to under £3 per week, with associated benefits for the landlord and the wider public sector.

"I Googled it but I was still sceptical. But it's great. There are no draughts and it's quiet. I was in a freezing council house which I used to pay £35 a week to heat, way more than 10% of our income, and it was still cold. It was horrendous what we were paying and it was a breeding ground for illness. They should definitely build more like this".

Alison Isaacs and her husband Darryl-Paul outside their home in Oldham
Alison Isaacs and her husband Darryl-Paul outside their home in Oldham which has been insulated in a scheme expected to save the council and NHS hundreds of thousands of pounds. Photograph: Christopher Thomond

One of the issues that contributes to potential cost pressures for passive house is that developers who are used to working in a certain way may over-estimate the additional costs of any new requirements and under-appreciate the cost savings that can be made, for example due to the reduced requirements for space heating. The phased approach to implementing this proposed policy allows for the construction and house building sectors to continue to build understanding, knowledge and the skills base for passive house construction.

Passive house standards can be achieved using many different construction techniques – it is a relatively simple, "fabric first" approach – focusing on superior insulation and airtightness – which reduces the requirements for space heating. The passive house in Denby dale which the panel members visited, for example, is a cavity wall, stone construction that looks similar to many standard new-build homes in the area. Notwithstanding this, a technique likely to see significant expansion in recent years is the use of off-site construction methods. The market for off-site construction is rapidly expanding, and many analysts believe this will be a key ingredient in tackling the UK's housing crisis. This provides a unique opportunity for Kirklees to position itself to benefit from this growth and achieve a rapid scaling of high energy performance housing. The task group propose that adopting a proactive and forward looking policy on passive housing, which provides clear goal of working towards all new build development to passive house standards, will provide industry certainty and enable the development and expansion of off-site construction in the region creating opportunities for skills, jobs and economic growth. The policy will support the region to gain market-leader advantage in this expanding sector.

The phased approach allows time for the industry to adapt and prepare and is based on creating the right local conditions and stimulating demand.

Work of the task group

The task group undertook a combination of site visits, evidence gathering meetings and discussion, supported by desktop research. A summary of key points and conclusions drawn from the task group sessions is provided below.

Visit 1 – Denby Dale passive house

- Provided task group members with a practical perspective seeing a 'real-life' house built to passive house standard
- Opportunity to ask practical and technical questions about passive house construction and liveability
- Importance of air-tightness / ventilation
- Importance of considering design pre-planning
- Importance of knowledge and quality across procurement, design and build
- Fabric-first approach to insulation and air tightness
- Perspective from a committed and passionate owner

Visit 2 – CITU development

- Provided the opportunity to discuss capacity and scale (this development is 100+ homes)
- The visit confirmed the "ordinariness" of the development – passive house is not a particularly complex innovation.
- Perspective from this developer on how scale can bring down costs and opportunities to further reduce costs by using off-site construction methods.

Meeting 2

Certification

- The process for quality assurance and certification was described for members
- Certification costs are currently: £2k - £3k per dwelling
- Could certify random sample on larger development sites
- Importance of occupant behaviour and therefore advice to potential occupants
- 'Performance gap' between quoted performance of traditional new build and actual performance contrasted with quality assured process for certified passive house.

Local Plan context

- Some debate as to how proactive vs reactive we could be as a Local Planning Authority
- Soundness test for Local Plan includes how it is considering climate change with requirement to adopt proactive strategies to mitigate and adapt
- Local Plan for 1% additional housing over 15 years – is context for this, in terms of numbers/impact
- Many improvements to existing homes don't require planning permission (therefore Local Plan doesn't apply) – these could be considered in corporate policy
- When setting local standards must do so in a way that is consistent with Government zero carbon policy AND adopt nationally described standards (i.e. building regulations)
- If considering local requirements, need a robust and credible evidence base
- Could "encourage" higher standards but most LAs not including these as prescribed in local plan policies due to the need for accordance with NPPF, soundness test, need for flexibility / viability
- Sensitivity test re viability - +5% to build cost as a proxy (i.e. above this thought of as not viable)
- BUT Local Plan is only one of the tools in the planning toolbox
- Higher standards could be achieved via design guidance, in neighbourhood plans, local development orders
- Opportunity for policy 'hooks' in local plan to support an 'enabling' policy

- New requirement to have a self-build/custom build register. Self-build/custom build homes are exempt from CIL charges so the viability issue might be improved for energy efficient housing which comes through this route. Could be enabling opportunities here, especially in relation to council owned land

Meeting 3 – summary of larger scale developments elsewhere in UK

- Consistent evidence of higher build costs but in a range of 0-25% - however, this reflects early days for passive house in the UK
- Importance of an integrated design process emphasised
- Some evidence of need for a phased shift, due to ability of volume housebuilders to meet passive house standards (in particular air tightness). Suggests need for planned approach to growing the knowledge and skills base across the system.
- Some early problems with mechanical ventilation and heat recovery, since resolved
- Need for good quality assurance
- Management and tenant awareness is key

Meeting 4 – housing stakeholders perspectives

- Tenants viewpoint in terms of what it feels like to live in a passive house: significantly lower running costs, less condensation but will feel and look different and tenant awareness of how it works is important
- Additional build costs but anticipate costs will reduce as volumes increase
- Potential maintenance savings (whole lifecycle costs – e.g. as a result of less condensation), boiler replacement savings
- Adaptations – could the properties take these in the future e.g. tracking for hoists? It will be important to think this through at the design stage and also consider other types of equipment not requiring alterations.
- KNH and Building services – is this an opportunity to develop in house expertise i.e. staff trained to deliver and build passivhaus homes in partnership with other bodies.
- Certification – this is a rigorous process and has an associated cost. One way to manage this could be to do a random selection for certification i.e. 4 out of 100 properties.
- No sub-contractors gives better overall control of the build and final product
- The Policy position will send the message of what we need – this will then lead to training and provision.
- If tenants are paying less for energy this may have a positive impact on rent payments.
- Can learn good practise from other schemes such as the potential to share electricity from “communal” solar panels.

Meeting 5 – Passivhaus Trust Seminar for Local Authorities in Leeds

- Perspective from large developer Keepmoat – Nigel Banks Group Research and Development Director – Referred us to the 5 year monitoring report for householder experience of living in a Passivhaus in the Wimbish project in Norwich.
- Detailed input from Emma Osmundsen - Shadow Director (Development) & Client Lead (Build) and also a Chartered Surveyor – principal learning point was that a consistent policy and informed scheme design sees significant reductions in unit costs.

RECOMMENDATIONS

Draft Policy Statement

This policy statement sets out Kirklees Council's ambitions to achieve low energy, passive house performance standards for new build developments in Kirklees.

This is an enabling policy that seeks to create the conditions locally that are needed for new build developments in Kirklees to have energy performance standards that exceed the energy requirements of Building Regulations, delivering higher quality buildings, increased affordability and delivering significant economic and wellbeing benefits.

The policy describes a phased approach to implementation to allow time for the relevant industry conditions to develop. Each phase of implementation is conditional on achieving evidence based systems conditions, to ensure that the desired policy outcomes are feasible and achievable.

The long term vision is: that by 2026 all new build developments will achieve energy performance equivalent to passive house standard without negatively impacting on the desired rates of development.

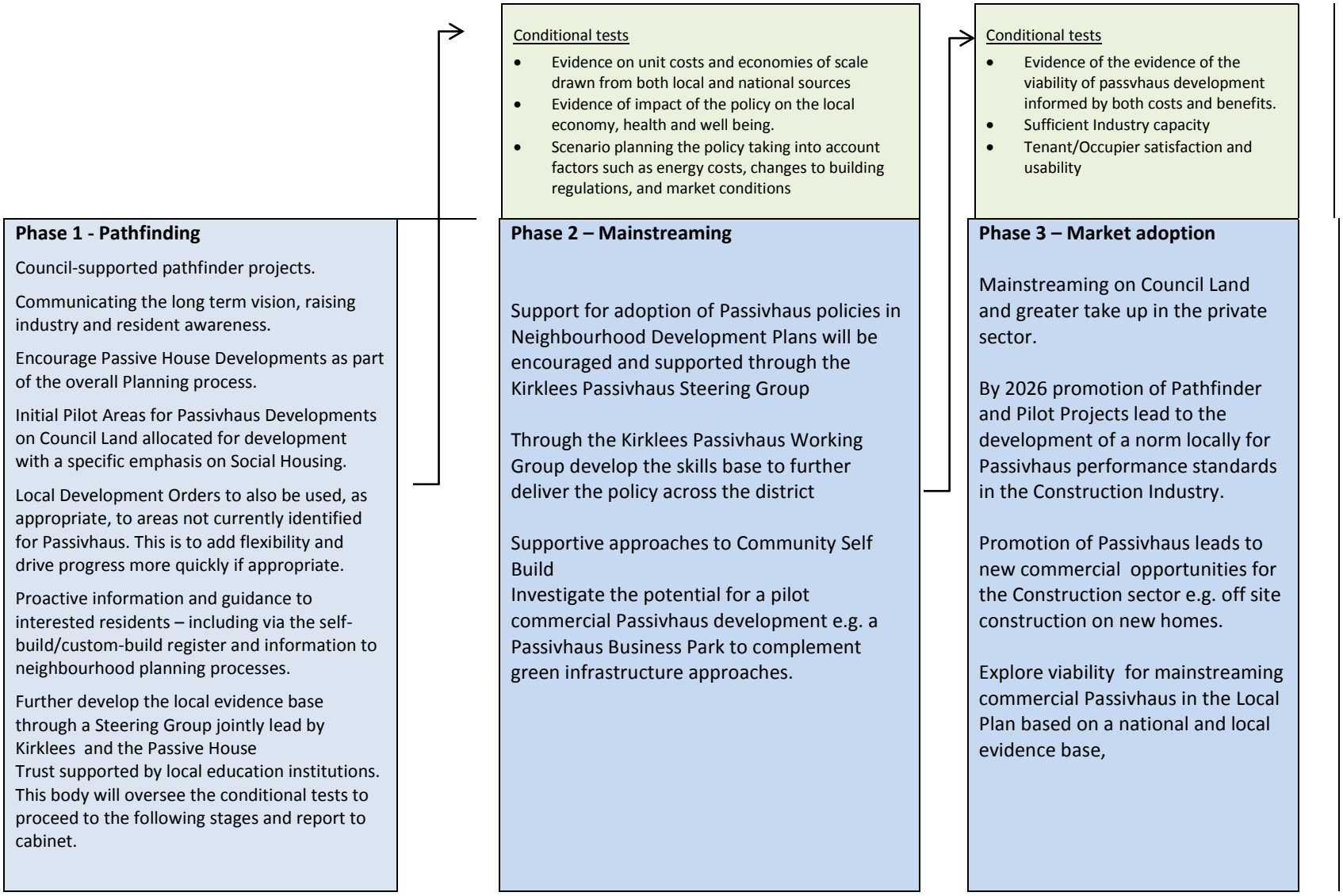
Achieving this policy goal will support the Kirklees Economic Strategy and Joint Health and Wellbeing Strategy by:

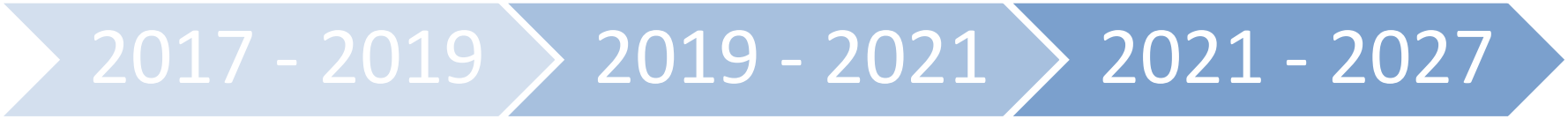
- Creating the potential for the construction and house building industry in Kirklees to build a competitive advantage and exploit market-leader opportunities, for example in the offsite construction of new homes and in the sustainable building industry.
- Creating cost savings for occupiers on energy bills, freeing up disposable income available to be spent in the local economy
- Reducing lifetime building and management costs, e.g. through maintenance savings associated with reduced dampness and condensation and reduced rental arrears.
- Delivering warmer and healthier homes that are of higher quality than traditional new build
- Reducing greenhouse gas emissions contributing to UK commitments in the Paris Climate Change Agreement.

A key element of the policy will be the guiding of the policy by a Steering Group jointly led by Kirklees Council and the Passivhaus Trust supported by local educational institutions. It's role will be to:-

- Oversee the progress of the policy
- continually update the evidence base to ensure the policy remains fit for purpose
- ensure conditional tests are met before progressing to further stages of the policy
- carry out scenario planning taking into account factors such as energy costs, changes to building regulations, and market conditions

Details of the proposed timetable for achieving this policy are appended.


Conditional tests
Evidence on unit costs and economies of scale drawn from both local and national sources
Evidence of impact of the policy on the local economy, health and well being.
Scenario planning the policy taking into account factors such as energy costs, changes to building regulations, and market conditions
Conditional tests
Evidence of the evidence of the viability of passvhaus development informed by both costs and benefits.
Sufficient Industry capacity
Tenant/Occupier satisfaction and usability
Phase 1 - Pathfinding
Council-supported pathfinder projects.
Communicating the long term vision, raising industry and resident awareness.
Encourage Passive House Developments as part of the overall Planning process.
Initial Pilot Areas for Passivhaus Developments on Council Land allocated for development with a specific emphasis on Social Housing.
Local Development Orders to also be used, as appropriate, to areas not currently identified for Passivhaus. This is to add flexibility and drive progress more quickly if appropriate.
Proactive information and guidance to interested residents – including via the self-build/custom-build register and information to neighbourhood planning processes.
Further develop the local evidence base through a Steering Group jointly lead by Kirklees and the Passive House Trust supported by local education institutions. This body will oversee the conditional tests to proceed to the following stages and report to cabinet.
Phase 2 – Mainstreaming
Support for adoption of Passivhaus policies in Neighbourhood Development Plans will be encouraged and supported through the Kirklees Passivhaus Steering Group
Through the Kirklees Passivhaus Working Group develop the skills base to further deliver the policy across the district
Supportive approaches to Community Self Build
Investigate the potential for a pilot commercial Passivhaus development e.g. a Passivhaus Business Park to complement green infrastructure approaches.
Phase 3 – Market adoption
Mainstreaming on Council Land and greater take up in the private sector.
By 2026 promotion of Pathfinder and Pilot Projects lead to the development of a norm locally for Passivhaus performance standards in the Construction Industry.
Promotion of Passivhaus leads to new commercial opportunities for the Construction sector e.g. off site construction on new homes.
Explore viability for mainstreaming commercial Passivhaus in the Local Plan based on a national and local evidence base,


2017 - 2019
2019 - 2021
2021 - 2027