

Incorporating climate change adaptation in housing policy delivery – workshop report

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1 Introduction

ClimateXChange designed and facilitated a half day workshop to explore the impacts of climate change for the housing sector, how climate change adaptation can become integrated into everyday practice, and what this means for future policy development.

The event built on the ClimateXChange [report](#), Incorporating climate change adaptation in housing policy delivery – lessons from three case studies (O'Neill 2018), that uses three case studies from Scotland to illustrate how climate change adaptation can be part of delivering housing policy outcomes.

The workshop was designed to gather information that can help inform the second Scottish Climate Change Adaptation Programme.

1.1 Workshop format

Six 'seed' ideas were derived from housing policy outcomes and the co-benefits of climate change adaptation to provide stimulus for discussion:

- All homes are sustainable, warm and dry.
- We use our land to reduce flood risk, secure food supply, protect Scotland's ecosystems and provide the homes people need.
- All developments have multifunctional greenspace for recreation and flood management.
- Heating and cooling is 'smart', affordable and environmentally friendly.
- Retrofit is always done to the highest standards, considering energy efficiency, indoor air quality, affordability, comfort and future climate.
- People have the information and support to maintain their homes based on their needs and the climate now and in the future.

Participants were invited to stretch these ideas to imagine their fullest realisation with no financial, legislative or time constraints. Finally, participants were asked to consider what might be achievable towards these ideals by 2050 and 2023.

1.2 Level of engagement

The twenty-six participants were positive about the opportunity to talk about climate change and housing. The format created space for open discussion within a structured framework and generated information across a broad range of related topics including: planning and placemaking, green space, flooding and water management, energy, and building standards. This broadly reflected the range of backgrounds of the participants.

1.3 Main messages

The following observations are important for both climate change policy, and policy making more widely:

- Participants appeared to consider the impacts of climate change, climate change mitigation and climate change adaptation in the round rather than as separate issues.
- Several similar points arose via different seed ideas. This perhaps reflects that to realise co-benefits and streamline activities, action will be most effective in the nexus between policy areas and between policy and practice.

1.4 Reporting

Points noted by participants have been consolidated into an overall set of principles (Principle1-10), more specific key points (KP1- KP34) and several recommendations and actions (R1-R30) for policy makers.

All the points noted by participants during the discussion are listed in Annex A.

2 Principles

Participants discussed a variety of ideas and concepts through the six seed ideas. The following principles were strongly articulated as part of a cross cutting vision for housing and climate change:

- Principle 1. Everyone regardless of tenure has access to good quality, healthy, warm, dry and comfortable homes.
- Principle 2. Fuel poverty is eliminated.
- Principle 3. People are healthier and happier reducing costs on NHS etc.
- Principle 4. Heating and cooling homes is affordable with passive methods (orientation, materials, shading etc.) for new homes and fabric first improvements (energy efficiency, repairs etc.) to older homes preferred. This is complemented by greater opportunity for community energy generation, micro-renewables etc.
- Principle 5. Land is viewed as a national resource. The right place is allocated for the right thing (agriculture, catchment management, energy developments, biodiversity, homes) with mitigation required for change of use (e.g. use of agricultural land for housing, or flood risk management).
- Principle 6. Placemaking is the norm. New developments are sustainable and connected to existing places with green space, space for water, access to local services and sustainable local energy.
- Principle 7. Multifunctional greenspace is part of everyday life and meet the needs of the whole community. It supports social interaction, sustainable play and recreation; encourages active travel; enhances skills development and learning through interaction with nature and opportunities for food/fuel growing; increases local biodiversity; provides shade, minimises urban heat island effect and helps manage water.

- Principle 8. Water is managed sustainably throughout the catchment. The location of new homes is informed by flood risk, compensatory storage is required for removal of permeable surfaces (e.g. to build extensions or pave driveways), rainwater and grey water is recovered.
- Principle 9. Behaviour is changed to the extent that there is no need for incentives. Members of the public can make informed choices about low carbon and adaptive behaviours, the construction industry is well trained in low carbon and adaptive construction and retrofit, and government is an enabler of this change.
- Principle 10. Learning from retrofit for energy efficiency is incorporated into adaptive retrofit. Long term sustainable finance helps ensure good quality, holistic retrofit across tenures.

3 Key points and recommendations

There are several decision points in the lifecycle of a home where action to adapt to climate change or to mitigate carbon emissions can most easily be taken.

Policy makers can also use levers to help encourage behaviour change.

Broadly these levers and decision points are:

Levers

- Legislation, strategies and policies
- Financing and affordability

Decision points

- Design and construction of homes and places
- Change of ownership/ occupancy
- Maintenance, renovation and repair

These have been used as a mechanism to sort the key points from the workshop discussion.

3.1 Legislation, strategies and policies

Attendees indicated that they would like:

- KP1. Nationally consistent approaches for adaptation and retrofit that include all types of housing stock with no difference in quality for different housing tenures.
- KP2. Defined approaches to conflicts and trade-offs and sharing of benefits.
- KP3. Evidence based outcomes with standardised metrics and measures.
- KP4. Zero carbon (or net carbon positive) homes and businesses with minimal/zero energy costs.
- KP5. High quality greenspace as part of all new developments with plans in place for maintenance.
- KP6. Provision of services rather than commodities. E.g. comfort in the home instead of energy with a minimum basic provision for all freely/cheaply.
- KP7. Primary heating and cooling provided by sustainable sources with storage to maximise benefits.
- KP8. Greater consideration of novel or innovative solutions such as using SUDS as a thermal store.

3.1.1 Recommendations/ actions

- R1. Ensure that SCCAP complements and builds on other existing/ upcoming Government policy and strategies.
- R2. Agree a long-term, holistic (fabric, energy, environment) pathway to zero carbon and adapted homes.
- R3. Map conflicts (i.e. energy efficiency is not necessarily compatible with air quality/ comfort.) and research changes for longevity before they are implemented.
- R4. Determine what 'warm and dry' means for different groups and ensure measurements and standards can deliver this.
- R5. Expand requirement to meet Scottish Housing Quality Standard and Energy Efficiency Standard for Social Housing to include all tenures.
- R6. Decentralise energy production and supply, for example enable energy prosumers (produce and consume), support community energy schemes and consider district heating for all new builds through Local Heat and Energy Efficiency Strategies.
- R7. Introduce national standards for greenspace/ green infrastructure and a national system of monitoring, maintenance reporting and quality assessment.
- R8. Ensure greenspace with a flood risk management function can be publicly adopted/vested.
- R9. Use co-production to identify information needs and develop education programmes on climate, health impacts on household behaviours, affordability, waste.

3.2 Financing and affordability

Attendees indicated that they would like:

- KP9. A long-term planning and support strategy with multi-year budgets.
- KP10. Cross thematic funding, so that e.g., energy efficiency and adaptation can be carried out together.
- KP11. Clear incentives for sustainable drainage and green space.
- KP12. A support mechanism for quick trials of new approaches.

3.2.1 Recommendations/ actions

- R10. Explore different/ new models of home ownership e.g. co-housing to provide opportunities for sustainable homes and better greenspace management/ ownership.
- R11. Introduce mortgage/ finance products tied to sustainable home solutions.
- R12. Use the infrastructure levy to support green infrastructure.
- R13. Align budgets and action programmes. Provide longer term certainty on funding and permit flexibility in funding timescales and levels where appropriate (e.g. to allow property to be upgraded at once).
- R14. Use the local council tax review to consider incentives for energy efficiency and adaptation measures, and contributory area-based charging for surface water.
- R15. Introduce equivalent of Non-Domestic Energy Framework for domestic properties.

3.3 Design (and construction) of homes and places

Attendees indicated that they would like:

- KP13. Risk sharing and collaboration to ensure developments deliver multiple positive outcomes.
- KP14. Well planned housing/ town developments that link people to the surrounding environment.
- KP15. Cities that are smarter and denser.
- KP16. Car free cities/ neighbourhoods with increased space for green infrastructure.
- KP17. An increase in pocket parks and smaller greenspace to improve access for all ages and abilities.
- KP18. Places designed to ensure that no surface water enters the sewer.
- KP19. Wider coordination of flood risk management methods with provision of multi-functional greenspaces.
- KP20. The design (orientation and materials) of all buildings to reduce the need for heating and encourage natural cooling with minimal unwanted heat loss.
- KP21. Reliable, easy to use heating and cooling that is only on when people are in.
- KP22. Storage and retention of non-personal information on buildings (structure, energy system etc.)
- KP23. A rich Agri-environment with reduced run-off and flooding, soil erosion etc.

3.3.1 Recommendations/ actions

- R16. Use local development plans to secure land for green space and flood risk management before land is allocated for housing.
- R17. Use mixed use developments to align agendas (e.g. non-domestic buildings exporting excess heat to homes, reducing distances between homes and work)
- R18. Enable increased use of green architecture for shading/ flood risk management.
- R19. Optimise site layout and building design for passive heating and cooling.
- R20. Carry out energy modelling of settlements with whole energy plans for all settlements/ localities/ local authorities.
- R21. Review building standards to ensure energy efficiency is near zero carbon.
- R22. Introduce standards for heating and cooling controls and consider automation vs. user control and behaviour change.

3.4 Change of ownership/ occupancy

Attendees indicated that they would like:

- KP24. Building users to understand the construction and performance of their home (energy efficiency, heating and cooling, adaptation etc.).
- KP25. A review of the effectiveness of Energy Performance Certificates and consideration of higher target rating for change of ownership/tenancy.
- KP26. Planting in gardens for shade.
- KP27. A range of properties to meet people's needs at different stages of their lives.

3.4.1 Recommendations/ actions

- R23. Increase supply of a range of property types so that occupants can choose the most appropriate home for their current needs rather than simply what is available or what they are allocated.
- R24. Enable owners to make informed choices on retrofit and repair by improving prediction of ‘savings’ (e.g. money, carbon), and providing evidence and advice on how to realise increased property values through carrying out works.
- R25. Provide advice for new occupants on how to achieve comfort for their own needs. E.g. through Tenant Information Packs, and energy bills and heating controls that are easily understood.

3.5 Maintenance, renovation and repair

Attendees indicated that they would like:

- KP28. Renovation/ improvement of existing housing stock to ensure it meets existing building standards as a minimum.
- KP29. Clarity on responsibility and accountability for all maintenance and retrofit improvements (particularly private landlords and owner occupiers).
- KP30. Long term plans for whole houses/ settlements that are linked to other renovations. For example, whole-house, relevant, simple, home renovation plans.
- KP31. Unintended consequences of retrofit to be minimised (i.e. insulation installed and replaced due to damp issues).
- KP32. Retrofit of historic buildings to consider their original use. (e.g. retrofit that does not negatively affect the structure and function of a traditional building).
- KP33. Retrofit of multiple elements at once to a ‘2050 standard’ rather than in steps, e.g. insulation, micro-renewables, storage, whole house ventilation, ‘self-sufficient’ supply (energy security).
- KP34. Individual property protection for flooding incorporated where required.

3.5.1 Recommendations/ actions

- R26. Fully identify stakeholder and organisational responsibilities for homes and climate change.
- R27. Establish a single trusted point of information, available in different formats, for building owners and users, with clear concise, up to date information on choices for retrofit, energy efficiency, sustainability, climate change, and funding. An online service complemented by high street advice centres and advice teams that can carry out home visits.
- R28. Work with the supply side actors to improve quality of renovation and retrofit. For example, introduce a ‘retrofit standard’, regulate installation, introduce certification for designers/ installers and training on retrofit skills for all types of buildings.
- R29. Introduce a requirement for compensatory surface water management for home extensions or other removal of impermeable surfaces. Consider banning paving front gardens for parking.
- R30. Run behaviour change engagement and training for public and private sector landlords and housing officers.

4 Annex A – Workshop notes

All homes are sustainable, warm and dry	
Ideal	<p>Strategic/ concepts</p> <ul style="list-style-type: none"> • Scotland wide approaches to share benefits. • Long term pathway to zero carbon homes: fabric, energy, environment. • Mortgage/ finance product tied to sustainable home solution. • Government incentives for energy efficiency for all tenures e.g. council tax incentive, subsidy for interventions. <p>Energy</p> <ul style="list-style-type: none"> • Energy modelling of settlements with whole energy plans for all settlements/ localities/ local authorities. • All areas have access to low cost energy solutions. • Energy as a common social good (minimum basic allocation for all) <p>Building fabric</p> <ul style="list-style-type: none"> • External wall insulation or maximise measures. • Sustainable: materials, maintenance as HOMES. <p>Standards and metrics</p> <ul style="list-style-type: none"> • Outcome driven with consistent/ standardised metrics and measures (What, why, for whom?) • All properties meet Scottish Housing Quality Standard and Energy Efficiency Standard for Social Housing. • Private landlords are also responsible for maintaining standards.
2050	<p>Strategic/ concepts</p> <ul style="list-style-type: none"> • Provide services i.e. comfort in home (not energy) i.e. resilience (energy / adaptation). <p>Energy</p> <ul style="list-style-type: none"> • Eliminate fuel poverty. • Heating becomes cheap, or a fixed amount is free. • Consider energy ‘prosumers’ (produce and consume). <p>Building fabric</p> <ul style="list-style-type: none"> • For retrofit, ‘2050 standard proof’ homes in one go, not in steps. • Consider all types of housing stock, existing and new, urban and rural etc. <p>Standards and metrics</p> <ul style="list-style-type: none"> • Determine what ‘warm and dry’ means for different groups and introduce measurements and standards to apply this. <p>Co-benefits</p> <ul style="list-style-type: none"> • People become more healthy/happy, reducing costs on NHS etc.
Next 5 years	<p>Energy</p> <ul style="list-style-type: none"> • Explore energy as a ‘service,’ a common social good - minimum allocation of energy for all. • Increase awareness and public perception. • Define and publicise the choices for agencies, householders’ businesses and developers. <p>Standards and metrics</p> <ul style="list-style-type: none"> • Practical standards – review fitness for purpose, what can we measure now, and for whom?

We use our land to reduce flood risk, secure food supply, protect Scotland’s ecosystems and provide the homes people need	
Ideal	<p>Strategic</p> <ul style="list-style-type: none"> • Longer term thinking (and regeneration and development). • Collaboration and risk sharing to ensure development delivers multiple positive outcomes. <p>Land use and allocation</p> <ul style="list-style-type: none"> • The land is seen as a national resource. • Prime agricultural land is given more protection. • Land is used for energy generation. • The ecosystem services that we lose when we build on land is recognised and mitigation/compensation occurs. • Biodiversity net gain becomes the norm. <p>Placemaking</p> <ul style="list-style-type: none"> • Homes are located where people can access services without the need for cars and there is wider use of brownfield land. • Smarter, denser cities but not tower blocks. <p>Water management and flooding</p> <ul style="list-style-type: none"> • Flood risk management methods are co-ordinated more widely and tied into providing multi-functional green networks, enhancing biodiversity, active travel etc. • Catchment management. • Incentivise Natural Flood Management systems that prevents flooding in cities – ecosystem services (Agri-incentive schemes). • More modelling on flood risk and location of homes with a view to mitigating risks. • Change the way surface water / drainage is charged in Scotland. • Provide clear incentives for sustainable drainage and greenspace. • Move to contributing area (rate) based system for both domestic and non-domestic (incentivise better practice).
2050	<p>Strategic</p> <ul style="list-style-type: none"> • Outcomes approach with structured approach to ‘conflicts’ and trade-offs. • Flexible adaptation pathways approach. • Embed land use strategy approach. • Support innovation: More making, less ‘taking’ (building in incentives). <p>Land use and allocation</p> <ul style="list-style-type: none"> • Understand, anticipate and respond to identifiable needs to provide the right place for the right things: tree, home, field, cow, corncrake etc. • Provide space for renewable energy technologies: wind, solar, micro-hydro • Understand ‘land take’. • Diverse rural landscape that protects biodiversity sites, watercourses. • Rich agri-environment with reduced run-off and flooding, soil erosion etc. <p>Placemaking</p> <ul style="list-style-type: none"> • Well planned housing/ town developments that link people to surrounding environment. <p>Water management and flooding</p> <ul style="list-style-type: none"> • Driveways are ‘drain-aways’ and not concrete/ impermeable. • Waste water recovery systems in developments.

We use our land to reduce flood risk, secure food supply, protect Scotland’s ecosystems and provide the homes people need	
Next 5 years	<p>Strategic</p> <ul style="list-style-type: none"> • Use proposed review to local council tax (domestic/ business) to think about surface water charging and ‘payee’ responsibility. • Longer term planning and budget for climate change adaptation. <p>Water management and flooding</p> <ul style="list-style-type: none"> • Model flood risk with direct link to planning consents, natural flood management and land values.

All developments have multi-functional greenspace for recreation and flood management	
Ideal	<p>Strategic</p> <ul style="list-style-type: none"> • All homes have access to high quality multi-functional greenspace. There is a national policy for percentage and type, and a consistent delivery approach across all local authorities. • New housing developments have integrated, well maintained and connected green networks and corridors. There is no difference in the quality of greenspace for different housing tenures. • Secure greenspace before allocating land for housing. Capture land value uplift to pay for it. • Developers must deliver and maintain greenspace, it is non-negotiable. • National SUDS/ GI maintenance reporting and quality assessment. • Increase green architecture – shading/ flooding/ green roofs. • Multifunctional greenspace: <ul style="list-style-type: none"> ○ Is an essential part of all new developments. ○ Is well managed and adaptable, meeting the needs of the whole community now and in the future. ○ Is part of everyday life, supports social interaction and sustainable play, encourages active travel, provides jobs, and enhances skills development and learning through interaction with nature. ○ Provides opportunity for community/ communal growing food/ fuel, outdoor education, useable lakes, rivers etc. ○ Includes biodiversity rich SUDS wetlands, diverse wildlife, wildflower meadows, urban woodland but also space for recreation. ○ Minimises urban heat island effect and provides shade. ○ Includes green/ active travel routes to sustainable transport. No cars. Facilities such as bikes (Inc. electric bikes) for transport. <p>Urban creep and surface water management</p> <ul style="list-style-type: none"> • Water management systems are integrated. • Places designed where no surface water enters the sewer. • All home extensions must have offset surface water management with bans for paving over front gardens for parking. • All greenspace that has a ‘flooding’ function to be publicly adoptable/ vested to ensure maintenance.
2050	<ul style="list-style-type: none"> • Car free cities free up space for green infrastructure. • No urban golf courses. • Different ‘new’ models of home ownership e.g. co-housing provides opportunities for better greenspace management/ ownership. • Smaller greenspace and pocket parks make greenspace accessible for all ages. • A national system of monitoring greenspace quality and quantity is in place.

All developments have multi-functional greenspace for recreation and flood management	
Next 5 years	<ul style="list-style-type: none"> • National Planning Framework IV and land use strategy are linked. • Infrastructure levy should support green infrastructure. • NPF4 should require local development plans to identify GI requirements for every housing allocation. No more drawing lines around housing allocations equalling 'here be houses,' it's about places. • National standards for greenspace/ GI and system for monitoring it. • Alignment of budgets and action programmes.

Heating and cooling is 'smart' affordable and environmentally friendly	
Ideal	<p>Passive design</p> <ul style="list-style-type: none"> • The orientation, design and materials of buildings mean they have less need for heating and can be naturally cooled. • Heating and cooling is easy to use. • There is planting in gardens for shade. • Residential homes/schools/hospitals designed and built to allow for heating and ventilation. <p>Affordable</p> <ul style="list-style-type: none"> • No one cold, no fuel poverty. • Increase rather than decrease income. <p>Smart</p> <ul style="list-style-type: none"> • Networked heating systems with operation easily understood by occupiers. • Reliable in the face of weather extremes. • Heating only on when people in. <p>Micro-renewables</p> <ul style="list-style-type: none"> • Primary heating and cooling linked to sustainable sources solar, wind, ground/air source pumps. • SUDS as thermal store.
2050	<ul style="list-style-type: none"> • All homes are healthy and comfortable. • There is no fuel poverty. • Homes and businesses are zero carbon (or net carbon positive homes) and energy costs are minimal/zero. • Heating and cooling is passive, achieved through building design/layout. • Greater decentralisation of energy supply and more community level schemes. • More low carbon infrastructure.
Next 5 years	<ul style="list-style-type: none"> • Standards to control heat/ cooling (automation vs. user control). • Building standards review – energy efficiency to near zero carbon. • Education/ awareness raising for building users. • District heating considered for all new builds– role of local heat and energy efficiency strategy.

Retrofit is always done to the highest standards, considering energy efficiency, indoor air quality, affordability, comfort and future climate	
Ideal	<p>Strategic</p> <ul style="list-style-type: none"> • Standardise all systems to reduce cost re spaces, training and fitting practices. • Make sure changes are researched for longevity before they are implemented. • Improve planning of projects to identify conflicts. • Introduce a 'retrofit standard.'

Retrofit is always done to the highest standards, considering energy efficiency, indoor air quality, affordability, comfort and future climate	
	<ul style="list-style-type: none"> • Address the supply side actors. Improve quality through regulation of installation, certification of designers/ installers and training on retrofit skills for all types of buildings. • Removing time limits on funding would enable more planning for retrofit programmes to ensure they are done correctly. • Removing level limits on funding could enable property to be upgraded once, rather than bits at a time. Historic buildings that require more funding could also be treated. • Retrofit of historic buildings that considers their original use. (e.g. retrofit that does not negatively affect the structure and function of a traditional building.) • Existing buildings brought to the same level as required for new buildings. • Retrofit of multiple elements at once, e.g. geothermal, solar, battery storage, air source heat pump, whole house ventilation, ‘self-sufficient’ supply (energy security). <p>Tenure and responsibility</p> <ul style="list-style-type: none"> • Landlords/ factors held legally accountable for retrofit/energy efficiency improvements. • Challenge: Retrofit to the highest quality requires a reduction in control/ freedom from private citizens; a ‘whole house’ project may involve changes they don’t agree to. • Challenge: Energy efficiency and comfort are not necessarily compatible. <p>Co-benefits</p> <ul style="list-style-type: none"> • Sustainable rainwater disposal incorporated. • Flooding property protection incorporated where identified as required. • Ensure ventilation/ air change is attainable without undue heat loss.
2050	<p>Strategic</p> <ul style="list-style-type: none"> • Cross thematic funding i.e. energy efficiency not at expense of adaptation • Meet Scottish Government carbon reduction targets. • All domestic and majority of non-domestic buildings meet current building requirements. • Minimise/ eradicate unintended consequences of retrofit (i.e. insulation installed and replaced due to damp issues). <p>Energy efficiency</p> <ul style="list-style-type: none"> • Introduce equivalent of Non-Domestic Energy Framework for domestic properties. • Get properties to EPC band C. • Variable comfort homes. <p>Tenure and responsibility</p> <ul style="list-style-type: none"> • Owners/ private landlords maintain their properties and actively reduce carbon emissions. • People will be amenable to moving to properties related to need rather than want including downsizing as required (ideally into homes on the same estates).
Next 5 years	<p>Strategic</p> <ul style="list-style-type: none"> • Focus on supply side actors for retrofit and beyond (renovation etc.) This can improve standards and provide new opportunities. • Carefully map conflicts between criteria i.e. energy efficiency is not necessarily compatible with air quality/ comfort. • Carry out feasibility study on future funding streams with a view to making grants and funding more sustainable and holistic. Funding could be directed towards cross cutting climate change themes, within funding secured across financial years to enable development of well planned projects that ensure the retrofit measures are done to the highest standard. <p>Energy efficiency</p> <ul style="list-style-type: none"> • Set higher EPC requirements for change of ownership/ tenancy.

Retrofit is always done to the highest standards, considering energy efficiency, indoor air quality, affordability, comfort and future climate	
	<p>Tenure and responsibility</p> <ul style="list-style-type: none"> • Ensure all housing officers receive formal training to a high standard. • Make rental preferable to ownership.

People have the information and support to maintain their homes based on their needs and the climate now and in the future	
Ideal	<p>Strategic (needs and responsibilities)</p> <ul style="list-style-type: none"> • Standard ‘benchmark’ database for projects/ measures on buildings. • Improve prediction of ‘savings’ (e.g. money, carbon) on projects. • Legislation to insist that landlords adhere to tenancy contracts with penalties for failure. <p>Information and support</p> <ul style="list-style-type: none"> • A well-publicised dashboard/ ‘Expedia’ style website / database with clear concise information on retrofit, energy efficiency, sustainability, climate change, funding. Complemented by high street branches. • Information available in different formats. • Information on how to achieve comfort for their own needs. • People understand their energy use and fuel bills. • An energy advice team who are available across Scotland to do home visits. • Education on climate, health impacts on household behaviours, affordability, waste.
2050	<p>Strategic (needs and responsibilities)</p> <ul style="list-style-type: none"> • Behaviour is changed. Understanding the issues becomes normal. There’s no need for incentive. • Clear responsibilities and accountability. • Defined timescales for improvements and certainty for long term investment planning • Long term plans for whole house/ settlement that are linked to other renovations. • Storage and retention of non-personal information on buildings (structure, energy system etc.) • Renovate and/or improve existing housing stock to ensure access to good quality homes for all. Run behaviour change engagement across the public and private sector to increase likelihood of success. • Mixed use developments – a mechanism for aligning agendas <p>Information and support</p> <ul style="list-style-type: none"> • Information is easy to access, clear to understand and support systems are available for all people. E.g. home visits from energy advice teams. • People are actively engaged in monitoring their energy use and mitigating climate change. • Provide enough information for people to make informed choices on adaptation energy options etc. • Provide information on how retrofit can improve property value to encourage uptake by owner occupiers. • Introduce a strategy for long term support that does not require immediate effectiveness. • Single point of information. Instant access to up to date incentives/ solutions (overcome constantly changing schemes). • More choice regarding uptake of tenancies, no take it or leave it.
Next 5 years	<p>Strategic (needs and responsibilities)</p> <ul style="list-style-type: none"> • Use evidence to agree desired outcomes. • Establish ways to measure impact of measures/ improvements. • Review effectiveness/impact of EPCs.

People have the information and support to maintain their homes based on their needs and the climate now and in the future	
	<ul style="list-style-type: none">• Fully identify stakeholder and organisational responsibilities for homes and climate change• Whole-house, relevant, simple, home renovation plans.• Quick tests to find out what works (instead of extensive research which looks at the past).• Less optimism, more acceptance of possible conflicts and problems. <p>Information and support</p> <ul style="list-style-type: none">• Consult with people, what do they know, identify their information needs.• Consider how best to enable choice.• Use co-production to develop education programmes on energy efficiency and climate change, a long term, consistently branded, household friendly one stop shop advice centre and advice teams, an incentive programme.• Compensate tenants for improvement made at their own expense.

5 References

O'Neill, M (2017). *Incorporating climate change adaptation in housing policy delivery – lessons from three case studies*. ClimateXChange, Edinburgh