

Housing, Homelessness and Fair Work Committee

10.00am, Monday, 20 January 2020

Housing Sustainability

Executive/routine Wards Council Commitments	Executive All
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1. Recommendations

- 1.1 It is recommended that Housing, Homelessness and Fair Work Committee:
- 1.1.1 notes that the domestic sector is responsible for around 35% of overall emissions with Council housing responsible for less than 2% of emissions;
 - 1.1.2 notes that the significant investment in improving the energy efficiency of existing Council homes, coupled with the decarbonisation of the grid, has resulted in a 65% reduction in carbon emissions since 2005;
 - 1.1.3 notes the approach to achieving net zero carbon in Council Homes and that progress will be reported as part of the Housing Revenue Account (HRA) Business Plan;
 - 1.1.4 notes the range of innovative energy programmes and projects underway to reduce emissions across the city, tackle fuel poverty and overcome mixed tenure ownership barriers; and
 - 1.1.5 notes that this report will be referred to Policy and Sustainability Committee on 25 February 2020.

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Housing Sustainability

2. Executive Summary

- 2.1 The Council's recent commitment to achieve net zero carbon by 2030 and declaration of a Climate Emergency has placed sustainability and climate change at the centre of strategic and policy discussions.
- 2.2 Council housing is responsible for approximately 2% of Edinburgh's overall carbon emissions, while the owner occupier, private rented sectors (and a small contribution from other registered social landlords) combined are responsible for approximately 33%. A concerted effort is required across the whole domestic sector to help support the transition to net zero carbon. Achieving these higher standards will be challenging both financially and technically, due to the age and construction of existing homes, further compounded by the mixed tenure ownership patterns found across Edinburgh.
- 2.3 Across the Council's existing and new build housing estate significant investment has been made in both building homes to very high energy efficiency standard and retrofitting existing homes to improve their energy performance and help to tackle fuel poverty. Higher standards, as applied to social housing, need to be applied across the wider domestic sector, with the right incentives in place, if carbon emissions are to fall as sharply as is required by 2030.
- 2.4 Opportunities for funding new technologies, collaboration and learning with both the private and academic sectors will continue to be promoted to overcome mixed tenure barriers, invest in its existing housing stock to improve energy performance, promote behaviour change and trial innovative low carbon technology pilots.

3. Background

- 3.1 On [24 August 2017](#), the Council agreed the Programme for the Capital - The City of Edinburgh Council Business Plan 2017/22, including a commitment to deliver 20,000 affordable homes over the next ten years.
- 3.2 [21 February 2019](#), the Council approved the five-year Housing Revenue Account (HRA) Budget Strategy 2019/20 to 2023/24. In addition to this, Council approved a draft 2019/20 capital budget, five-year capital investment programme and 30-year

Business Plan. This included £1,823 million capital investment over the next ten years to deliver the Council's own housing development programme.

- 3.3 On [21 March 2019](#), the Housing and Economy Committee approved the 2019/20 HRA capital programme for investment of £108.954 million in new homes, existing homes (including external fabric and estates) and services. This was a 35% increase on the previous year's approved capital programme and is the largest annual capital investment programme to date in Council homes.
- 3.4 On the [14 May 2019](#), the Corporate Policy and Strategy Committee approved the Council's Sustainability Approach, which included Edinburgh working towards a net zero carbon target by 2030, with a hard target of 2037. In response to this the Housing Service is commissioning two separate pieces of consultancy work on options to achieving net zero carbon across the Council's new build housing programme and the Council's existing stock.
- 3.5 On [31 October 2019](#), the Housing, Homelessness and Fair Work Committee approved the Strategy Housing Investment Plan (SHIP) 2020/25. This SHIP outlines a programme over the next five years which would deliver nearly 9,500 affordable homes across the city. Since the commitment was introduced (2017/18), 2,118 homes have been completed and a further 3,101 homes have been approved.

4. Main report

City of Edinburgh Council's Net Zero Carbon target

- 4.1 The Council's recent commitment to achieve net zero carbon by 2030 and declaration of a Climate Emergency has placed sustainability and climate change at the centre of strategic and policy discussions. This has also raised the profile of Edinburgh as one of the most ambitious cities seeking to tackle climate change to deliver a more sustainable and inclusive city. As a large social landlord in the city with over 19,500 homes and ambitions to build a further 10,000 new homes the Council can lead by example in delivering high quality, sustainable homes at a price that is affordable to the Council and its customers.
- 4.2 Unlike absolute zero emissions, 'net zero' or 'carbon neutral' implies some carbon emissions remain but allows for some form of offsetting. 'Net zero' refers to achieving an overall balance between emissions produced and emissions offset.
- 4.3 Reducing emissions across Council housing should not just focus solely on carbon savings but should also balance affordability with the needs of tenants such as thermal comfort and reduced energy bills. The Housing Service has adopted a fabric first approach which reduces energy demand and is technically, environmentally and economically viable.
- 4.4 A Fabric first approach to building design involves maximising the performance of the components and materials that make up the building fabric itself. Buildings

designed and constructed using a fabric first approach aim to minimise the need for energy consumption through methods such as: maximising air-tightness; increased levels of insulation; and optimising solar gain and natural ventilation.

- 4.5 Low carbon and renewable technologies (including decentralised energy supply systems, cogeneration, district heating, and heat pumps) are a key component of any move towards net zero carbon but should only be considered in addition to, or complementary to advanced fabric measures. Many of these systems can be expensive, can have a high embodied energy and rely heavily on customer behaviour to maximise benefit. It is also important that these low carbon and renewable technologies are appropriate for the building type and can evidence affordability and benefit to tenants. Future legislation will likely mandate their use more widely through building standards.
- 4.6 Carbon offsetting is another approach that can help address the issue of a carbon shortfall once measures have been put in place. This means that any remaining hard to reach emission reductions can be calculated and a price per tonne agreed upon. This total amount could then be paid into a verified carbon offsetting scheme that offsets those emissions by the same amount. This could be in the form of planting forestry in Scotland, investing in offshore wind farms or local community renewable schemes.

Domestic sector carbon emissions in Edinburgh

- 4.7 There are approximately 232,000 domestic properties in Edinburgh. Of these 142,000 (61%) are owner occupied, 56,000 (24%) are private rented, 20,000 (9%) are Council homes and 15,000 (6%) are housing association homes.
- 4.8 Edinburgh has a more challenging set of circumstances compared to other cities in Scotland in terms of reducing carbon emissions within the domestic sector. Edinburgh's population has increased by 63,700 (+14%) since 2005. Over the same period Glasgow's population has increased by 51,800 (+9%) and Aberdeen's by 20,110 (+10%).
- 4.9 In terms of the age of overall housing in Edinburgh, 47% (107,704) of homes were constructed before 1945. Of which approximately 70% (76,000) were built before 1919. As such, Edinburgh has a high percentage of hard to treat pre-1945 properties, many of which require significant fabric upgrades to help reduce energy demand. The mixed ownership patterns found in tenement style housing also presents complexities in terms of gaining agreements from all homeowners in mixed tenure blocks to carry out energy efficiency upgrades. All of which presents numerous challenges in improving energy efficiency.

Scottish Governments Energy Efficient Scotland Programme

- 4.10 The Scottish Government has produced an ambitious Energy Strategy, including a net zero carbon target by 2045. One of the cornerstones of this strategy is the Energy Efficient Scotland Programme (EES). EES builds on existing legislation and programmes that are already supporting the improvement of the energy efficiency of

homes, businesses and public buildings, as well as working with local authorities to develop Local Heat and Energy Efficiency Strategies (LHEES).

- 4.11 EES sets long term domestic standards for the social rented, private rented and owner occupier sectors and proposes that all residential properties in Scotland will be required to achieve an Energy Performance Certificate (EPC) rating of at least EPC C by 2040. For the social rented sector EES is proposing a new Energy Efficiency Standard for Social Housing 2 (ESSH), which proposes to maximise the number of homes in this sector achieving EPC B (SAP \geq 81) by 2032.
- 4.12 With a significantly lower percentage of social housing in Edinburgh (15%) compared to the private rented and owner occupier sector, setting higher standards for social housing will have a limited impact on domestic sector carbon emissions. Higher standards as applied to social housing need to be applied across the wider domestic sector, with the right incentives in place, if carbon emissions are to fall as sharply as is required by 2030.
- 4.13 It is anticipated that the Scottish Government will make significant funding available to support the delivery of the EES programme with funding released incrementally over the next 25 years; aligned to the Government's commitment to achieve net zero carbon by 2045. It will be important to work with government to maximise early opportunities to secure enabling funding and support to meet Edinburgh's more ambitious 2030 target.

Current energy efficiency standards for existing Council housing

- 4.14 Almost 70% of social housing in Edinburgh (both Council and housing association homes) has an energy efficiency rating of either EPC B or C; significantly higher than the private rented (51%) and owner occupier sectors (47%). In addition to this, Edinburgh also has the third lowest percentage (23%) in Scotland for social housing households in fuel poverty. A significant reduction of carbon emissions can be achieved by a reduction in energy demand through more ambitious energy efficiency retrofit measures.
- 4.15 One of the core aims of the HRA Budget Strategy 2020/21 is to invest in bringing existing homes up to the standard of new build, with a key focus on improving the energy efficiency of homes to make them easier and cheaper to heat. Since April 2016, over 10,000 measures have been installed to improve energy efficiency in Council homes, which include 4,400 new heating systems; 3,200 homes insulated; and 2,700 new windows and front doors.
- 4.16 It is anticipated that 86% to 90% of homes will meet ESSH 1 by December 2020. Where possible, the remaining homes will be held in temporary exemptions. Work is also underway to understand the implications of meeting the ambitious ESSH 2 standard. Investment to date, coupled with the decarbonisation of the grid, has resulted in a 65% reduction in carbon emissions of Council homes since 2005.
- 4.17 A further 20% reduction in carbon emissions (85% since 2005) could be achieved if all existing homes were retrofitted to the ambitious ESSH 2 (EPC B). This would also help to reduce energy demand, carbon emissions and energy costs; bringing

more residents out of fuel poverty and preventing others from falling into fuel poverty.

- 4.18 Achieving EESSH 2 will be challenging especially for 'hard to treat' buildings; typically, historical or listed buildings. Based on current measures and existing technologies around half of homes can be brought up to EESSH2 standards. New energy efficiency innovation pilots will be trialled to try and ensure EESSH 2 can be fully achieved as far as is practically possible. The 2020/21 Budget Strategy, presented to this Committee, factors in the cost of delivering EESSH 2 and includes a carbon innovation fund starting in 2021 to trial innovative technologies, approaches to retrofit and support carbon offsetting to ensure Council homes will be carbon neutral by 2030. Case studies of innovative retrofit projects are provided in Appendix 3
- 4.19 Along with energy efficiency measures there is a continued commitment to pilot low carbon technologies to achieve further carbon savings and to monitor and evaluate the benefits of certain approaches that have the potential to be rolled out on a much wider basis. Initiatives supporting energy efficiency and behaviour change are also important and can have a significant impact on how people use energy in the home, which can help lower fuel bills, tackle fuel poverty and reduce carbon. A summary of the initiatives underway is included in Appendix One.

Current energy efficiency standards for new build housing

- 4.20 Section 7 of current Scottish Building Standards relates specifically to sustainability, setting out a range of different standards homes can be built to (ranging from Bronze to Platinum). As of 2017 only 3% of homes in Scotland achieved EPC B or better. Within Section 7 'Bronze' standard is the baseline level for sustainability. Optional upper levels, which can include low or zero carbon generating technology, are specified which allow developers to gain recognition for building to higher standards. Planning authorities may also choose to make constructing to a higher level of sustainability a condition of approval or funding.
- 4.21 All Council new build homes are built to a minimum 'Silver Standard Active' level and have a minimum energy efficiency rating of EPC B. The Scottish Government incentivises local authorities and housing associations to build to this high standard by offering additional grant (£4,000 per home) via the Affordable Housing Supply programme.
- 4.22 Silver Standard achieves 40kWh/m² for houses and 30kWh/m² for flats, between three and four times more energy efficient than homes retrofitted to EESSH 1. For comfort and affordability, silver standard provides benefits to tenants in new homes in terms of energy costs and thermal comfort and includes the use of a low or zero carbon generating technology.
- 4.23 The homes built by the Council up until 2028 will represent an increase of 46% in the total estate. On average these new homes will be 20% larger, representing an increase of +56% in the total floor area, but the impact on increased carbon emissions is only +9%. As such, the carbon impact of the new build housing

programme is minimal. Based on the new build programme incrementally meeting stricter building standards over the course of the ten-year new build programme, it is estimated that the average new build home will produce seven times less carbon than the average existing home.

- 4.24 The piloting of new innovative building design approaches and opportunities for collaborative learning will continue to inform achieving high quality energy efficient homes. A summary of which is set out in Appendix 2.
- 4.25 Opportunities for collaborative learning linked to achieving Passivhaus will be of particular interest. New homes built to the Passivhaus standard help to achieve an ultra-low energy building that requires little energy for space heating or cooling. A number of case studies outlining Passivhaus projects in the UK are detailed in Appendix 3.
- 4.26 A review of the Scottish Building Regulations has commenced to consider the next steps to further enhance the energy performance of buildings and greenhouse gas abatement. The next set of standards and supporting guidance will be introduced in October 2021. Along with these new standards a new version of the national calculation methodology the Standard Assessment Procedure (SAP) will be available before the revised standards and guidance take effect. The revised building standards should provide much clearer guidance for housing developers to achieve higher energy efficiency standards.
- 4.27 Committee is asked to note the significant investment that is being made in Council homes to increase energy efficiency and reduce emissions and to agree that progress with delivering the net zero carbon commitment for Council housing will be reported as part of the HRA business plan process.
- 4.28 Reporting on housing sustainability programmes and initiatives will also be aligned with the Short Window Improvement Plan (SWIP) and form part of the Council's 2030 Sustainability Strategy.

5. Next Steps

- 5.1 Develop a ten-year programme plan outlining how the ambitious EESSH 2 energy retrofit standard will be achieved by 2030 (two years before the rest of the country). This will involve continued collaboration with the Scottish Energy Centre at Edinburgh Napier University to better understand whole house retrofit opportunities and challenges across older housing stock.
- 5.2 Continued collaboration work with both Edinburgh Napier University and Anderson Bell Christie architects to develop and embed an ambitious new build design principle to support the move towards net zero carbon. A detailed report on this proposed new approach will be reported back to this Committee within two cycles.
- 5.3 The HEEPS:ABS 2019-20 programme will be progressed with a target of 1,200 homes and an application for funding for HEEPS:ABS 2020-21 will be submitted to the Scottish Government for consideration, targeting a similar number of homes.

- 5.4 The Decarbonisation Fund project will be commenced early next year with a tenant communications campaign outlining the project and the benefits to tenants.
- 5.5 Further collaboration and partnership working with the Scottish Government will be required to maximise early opportunities to secure enabling funding and support to meet Edinburgh's more ambitious 2030 target.
- 5.6 The Housing Service will seek to maximise learning from work taking place on new low carbon technologies, materials and energy efficiency retrofit methods. This will help to ensure that the right investments are made that can maximise opportunities to reach the highly ambitious EESSH2 standard.
- 5.7 A communications strategy will be developed to target the wider domestic sector with a particular focus on the owner occupier and private rented sectors. This would enable targeted communications to reach householders and private sector landlords advising them of their options in relation to funding available for energy efficiency retrofit or the installation of low carbon technologies. It would also address upcoming legislation that may affect them and signposting to agencies that can offer further support and advice.

6. Financial impact

- 6.1 The Budget Strategy 2020/21, report to this Committee, sets out a draft five year capital investment programme of £190 million (before inflation) to improve the quality of existing homes and estates, with dedicated resources to be made available to upgrading mixed tenure blocks. This also includes c.£12 million towards meeting EESSH 1. The strategy also identifies that an estimated £40 million will be required until 2030 to meet the ambitious EESSH 2 standards. In addition to this, a carbon innovation fund starting in 2021 to trial innovative technologies, approaches to retrofit and support carbon offsetting to ensure Council homes will be carbon neutral by 2030.
- 6.2 The strategy also includes £1.4 billion (before inflation) to develop new affordable homes over the next 10 years, with another £155 million to acquire land for housing development.
- 6.3 As set out in the SHIP 2020/25, there is a funding gap of c.£72 million in order to achieve the 20,000 new affordable homes target. Additional energy efficiency measures, if not backed by further funding from Scottish Government, will only widen this gap or will have to be funded by an increase in tenants' rents.
- 6.4 Over the last two years £6.8 million of funding through the HEEPS:ABS programme has helped approximately 1,800 households. The 2019/20 financial year will see grant funding of £3.6 million targeting approximately 1,200 homes. This funding is extremely important in helping to overcome mixed tenure challenges.
- 6.5 Collaboration with strategic partners is ongoing with a particular focus on joint funding bids for innovation pilots. Other opportunities to maximise funding sources to test new technology pilots, which have the potential to be rolled out on a wider

basis, are prioritised. The recent grant award of £500k in match funding from the Scottish Governments Decarbonisation Fund to trial solar PV and battery storage across 112 properties in Kirkliston is evidence of this.

- 6.6 For new build housing to meet higher sustainability standards beyond Silver standard it is likely to require significant additional investment. This additional cost is partly due to the limited availability of materials and skilled workforce. As more developers build to higher sustainability standards the supply chain will have greater certainty of demand to be able to make the necessary investments in capacity and industrialised capability. As such over the coming years the cost of constructing to these standards and retrofitting existing homes should become less financially challenging.

7. Stakeholder/Community Impact

- 7.1 The Council's ongoing and planned housing sustainability initiatives will have a positive community impact helping to alleviate fuel poverty, reduce carbon emissions, lower fuel bills and address the challenges of mixed tenure ownership in the city.
- 7.2 Around 26% of the homes in Edinburgh are privately rented and there were over 42,000 registered landlords with approximately 57,000 homes. Traditionally, landlords have been slow to improve the energy efficiency of their homes. The Council will continue to work with partners such as Home Energy Scotland to engage private owners and landlords, promoting advice and information services and to encourage landlords to undertake energy efficiency measures.
- 7.3 There is an extensive programme of consultation and engagement with tenants, including surveys, focus groups, tenant panels, tenant led service inspections and resident and community meetings. There is also a dedicated annual budget consultation exercise designed. Making homes easier and cheaper to heat remains a key priority for tenants. A quarter of tenants said they had difficulties affording to heat their homes. Energy costs and the efficiency of homes is a central concern for tenants and feedback has demonstrated a demand for support and investment to make homes more efficient and easier to heat.
- 7.4 On 27 November 2019, a workshop was held with members of the Housing Homelessness and Fair Work Committee covering the current and planned work of the Housing Service and Economy Service in the context of the wider net zero carbon commitment. Both service areas will continue to engage with elected members as work on sustainability strategy is progressed.

8. Background reading/external references

- 8.1 Scottish House Condition Survey: [2017 Key Findings](#)
- 8.2 Scottish House Condition Survey Local Authority Analysis [2015-2017](#)

- 8.3 UK local authority and regional carbon dioxide emissions national statistics: [2005 to 2017](#)
- 8.4 Home Energy Efficiency Programmes for Scotland: [delivery report 2017-2018](#)
- 8.5 Energy Efficient Scotland: [route map](#)
- 8.6 Update on Short Window Improvement Plan, Policy and Sustainability Committee on [25 October 2019](#)
- 8.7 HRA Budget Strategy 2019/24, Finance and Resources Committee on [1 February 2019](#)
- 8.8 2019/20 HRA Capital Programme, Housing and Economy Committee on [21 March 2019](#)
- 8.9 Housing Service Improvement Plan, Housing and Economy Committee on [6 June 2019](#)
- 8.10 Mixed Tenure Improvement Strategy Update, Housing and Economy Committee on [6 June 2019](#)

9. Appendices

- 9.1 Appendix 1 - Summary of existing Council homes sustainability projects.
- 9.2 Appendix 2 - Summary of new Council homes sustainability projects
- 9.3 Appendix 3 - Case studies of exemplar low carbon new build and existing homes retrofit projects

Appendix 1 – Summary of existing Council homes sustainability projects

Project/theme	Detail of project	Time frame
EESHS 1	<ul style="list-style-type: none"> It is anticipated that 86% to 90% of Council homes will meet EESHS 1 by December 2020. The remaining 2,000 homes (10%) will be held in temporary exemptions. Around 8% are due to legal or disposal reasons, i.e. homes in listed buildings, or homes due to be demolished or sold. The remaining exemptions are for technical reasons (i.e. hard to treat or prohibitive costs prevent the upgrade to be carried out) or social reasons (i.e. sitting tenants declining or the Council failed to gain agreement with other owners to carry out the upgrade in communal areas). The Council will continue to work with these latter exempted homes to achieve EESHS 1 wherever possible. 	December 2020
The Council's Energy Advice Service	<ul style="list-style-type: none"> The Council's Energy Advice Service, delivered by Changeworks, is now in its second year and is on track to help around 1,000 Council tenants a year, delivering a financial saving of approximately £210.00 per tenant. 	<i>Date On going</i>
Energy Efficiency Scotland Programme, Area Based Scheme (HEEPS:ABS)	<ul style="list-style-type: none"> HEEPS:ABS acts as an enabling fund by providing financial support to home owners in mixed tenure blocks, which allows the Council to raise the energy efficiency standard of its housing. The 2019-20 programme aims to target 1,200 homes (640 owner occupiers and 570 Council homes) in Edinburgh and will leverage in approximately £8.8 million in total funding. 	On going
Scottish Government Decarbonisation Fund	<ul style="list-style-type: none"> In November 2019, the Council was successful in receiving £500k match funding from the Scottish Government's Decarbonisation Fund to pilot the installation of solar PV and battery storage in 112 Council homes in Kirkliston. If successful, the pilot could be considered for a more widespread roll out across similarly suitable building types. 	2021

EESSH2

- Development of a ten-year delivery programme outlining how the ambitious EESSH 2 energy retrofit standard will be achieved by 2030 (two years before the rest of the country). EESSH 2 sets a target for all social housing in Scotland to meet EPC B (SAP ≥81).
- Retrofitting existing homes to EESSH 2 standard will achieve a maximum energy use for space heating of 35 kWh/m2 (a 70% reduction on EESSH 1 levels).
- This will involve continued collaboration with the Scottish Energy Centre at Edinburgh Napier University to better understand whole house retrofit opportunities and challenges across older housing stock and how the Council can go beyond EESSH 2 to achieve Net Zero carbon.

2030

Appendix 2 - Summary of new Council homes sustainability projects

Project/theme	Detail of project	Time frame
Current New build sustainability standards	<ul style="list-style-type: none"> All Council and RSL new build homes are built to a minimum 'Silver Standard Active'. The Scottish Government incentivises local authorities and housing associations to build to silver by offering additional grant (£4,000 per home) via the Affordable Housing Supply programme. Silver Standard achieves 40kWh/m² for houses and 30kWh/m² for flats, between three and four times more energy efficient than homes retrofitted to EESSH 1. 	On going
Future new build energy standards	<ul style="list-style-type: none"> The Housing Service is currently working with the developer CCG on a pilot to achieving gold standard within the Craigmillar Town Centre development. This hopefully will provide a blue print for achieving further gold standard developments. In addition, there are a number of collaborative learning opportunities currently underway which includes building up a relationship with and learning from Exeter City Council, linked to their Passivhaus programme and also a recent visit to see a Passivhaus scheme in Shettleston, Glasgow. The Housing Service is also working closely with colleagues in Corporate Property to learn from the design and delivery process for Passivhaus schools. Work is ongoing with Anderson Bell Christie architects to explore options for embedding more ambitious new build design principles that help support the move towards net zero carbon. 	On going
Transforming UK construction – Edinburgh & South East Scotland Home Demonstrator	<ul style="list-style-type: none"> A bid has been submitted to the UK Government Industrial Challenge Fund to support a Demonstrator project. The project brings together public sector partners (City of Edinburgh Council, Scottish Futures Trust, Scottish Government, the Construction Scotland Innovation Centre and Edinburgh Napier University with Off Site Scotland (OSS). OSS 	2021

	<p>consists of nine member companies active in the offsite sector both as timber manufacturers and house builders. The project would seek to deliver a new, innovative business model that would support use of offsite construction methods to deliver high quality new homes with a focus on whole life performance and low carbon options. The model seeks to transform core housing development, procurement and construction processes; which if successful, presents an opportunity to positively transform the construction sector and deliver a step change in supply of new homes.</p>	
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Appendix 3 – Case studies of exemplar low carbon new build and existing homes retrofit projects

Norwich City Council - Passivhaus

Location: Norwich

Innovation: Delivering Passivhaus at scale

Project Summary: The £14.7m Goldsmith Street development consists of nearly 100 houses and flats laid out in traditional terraced streets built to Passivhaus standard. With all homes to be available for social rent. Constructing to this standard averaged £1875 / m², in line with the average for the country. Each home faces south in order to maximise solar gain and exposure to natural daylight. The terraces' asymmetrical pitched roofs have a longer, lower and shallower profile to



the north, letting no house experience overshadowing from the one in front of it and permitting a narrower 14-metre street profile that references the nearby Victorian terraces. The higher upfront costs of Passivhaus, greater insulation and triple-glazing plus increased labour costs to ensure airtightness, have been compensated for by using timber frames. The terraces come in regular, orthogonal blocks to reduce the form factor (surface-to-volume ratio, making them easier to heat), which also makes them cheaper to build. Inside, the habitable rooms have larger south facing windows, and smaller rooms; studies and bathrooms are north facing with small windows to lower heat loss.

Impact: One of the main drivers for building to Passivhaus certification was the issue of fuel poverty and the performance gap. Annual energy bills are estimated to be 70% lower than the average households, with expected fuel bills to be approx. £150 per year.

Nottingham CityHomes - Energiesprong

Location: Nottingham

Innovation: The first Energiesprong UK pilot

Project Summary: The Energiesprong (energy leap) initiative, has radically upgraded the energy efficiency of thousands of homes in the Netherlands is now being piloted in Nottingham. Nottingham CityHomes is the first housing association in the UK to pilot near net zero retrofits using the Energiesprong approach. A number of hard to treat social housing homes in Nottingham will be upgraded utilising a manufacturing solution that includes new outside walls and windows, a solar roof and a state-of-the-art heating

system, all installed in a matter of days. The first 10-home pilot project was delivered by Melius Homes. This pilot, which transformed a mix of terraced houses and bungalows, launched in December 2017. A second pilot will improve a further 17 homes, comprising of 10 bungalows and 7 two-bedroom, three-storey houses and is the first wave of a rollout of Energiesprong to 155 Nottingham homes to 2020.



Costs are high, at £85,000 per property initially but are expected to fall to £62,000 by the end of the programme as the supply chain adapts. The local authority won £5m from the European Regional Development Fund to support this project.

Impact: The aim is to generate as much energy as the homes need – making them almost zero net energy. Tenants in phase one, seen monthly energy bills halve. Works not only improve the homes' energy performance, but also dramatically improve the look and feel of the neighbourhood. The model uses an innovative, whole life approach to finance, with the price of the works, equal to the expected planned maintenance costs and energy savings over a 30-year period.

Exeter Living – Passivhaus

Location: Exeter

Innovation: Multi storey Passivhaus

Project Summary: St Loye's Extra Care Scheme, a new £9.8 million development by Exeter City Council is currently under construction. Extra Care housing provides independent living in self-contained apartments for older people who have a range of care needs, with varying levels of support as and when residents need it. The development



includes lounges, dining rooms with roof terraces, hobby spaces, salon and spa treatment rooms and landscaped gardens. The planned four and five-story residential development has incorporated new design thinking that aligns better with the requirements of elderly life, placing strong focus on community and companionship. The scheme will provide 53 affordable apartments aiming to achieve the Passivhaus standard with the overall objective to reduce energy use and make the homes more affordable for tenants.

Impact: The key objectives for creating this exemplar Extra Care scheme was to incorporate the latest thinking with regards to elderly and dementia care design along with

meeting the rigorous Passivhaus energy standard. The Passivhaus standard allows the development to be designed to create optimal internal conditions and to ensure energy bills are reduced by 80% of those of a standard build; a particularly pertinent issue for vulnerable residents.

Portsmouth – EnerPHit retrofit

Location: Portsmouth

Innovation: Multi storey EnerPHit retrofit

Project Summary: The Wilmcote House (a 1960's concrete pre-fab construction) energy retrofit project was designed to meet the EnerPHit standard (Passivhaus retrofit standard). The 11-storey building is owned and managed by Portsmouth City Council and the significant energy savings will



address the serious fuel poverty issues previously experienced by the residents in this development many of whom were unable to adequately heat their homes. Ongoing maintenance issues with the building had led Portsmouth City Council to consider demolition; however, given the scale of relocation costs it became clear that refurbishment was the only practical and cost-effective solution with a long-term financial payback (15 years) against standard over-cladding measures. The extent of the £13m contract included insulating the external envelope with cladding and external wall insulation, replacing the roof, installing triple glazed windows, fitting new hot water cylinders, electric showers and mechanical ventilation heat recovery. The retrofit build cost was approximately £920/m², which is comparable with new-build housing of similar density and quality, providing a strong business case for upgrading existing multi-storey concrete buildings at scale.

Impact: The project will resolve the ongoing maintenance issues with the building and create a new thermal envelope which effectively insulates residents against future energy price rises and significantly extends the lifespan of the building and will result in energy savings of approximately 90%.

Together Housing – Integrated low carbon technology solution

Location: Lancashire and Yorkshire

Innovation: Integrated low carbon and renewable technology

Project Summary: Together Housing one of the largest housing associations in the North of England, managing over 36,000 homes across Yorkshire and Lancashire recently launched an innovative renewable energy pilot which aims to reduce the carbon footprint of their homes, save tenants money on their bills and demonstrate the commercial return of investing in green energy. The £2 million project is jointly funded by European Regional

Development Fund and Together Housing and will see the installation of solar panels on 250 homes. The panels will be complemented by battery storage units, which will enable most of the power generated by the panels to be used in the property during the day and night.

Typically, households with solar panels only use a third of the energy generated, with the



surplus going to the National Grid as the energy can only be generated and used during the hours of daylight, often when the house is empty. In return for free installation of the system and free electricity, residents will have a device fitted to their homes which will remotely capture data which can be used to assess the feasibility of the pilot, with the long-term aim of rolling it out to other Together Housing properties across Lancashire and Yorkshire.

Impact: The project is expected to save each household up to £300 a year on their electricity bills and reduce their electricity-based carbon emissions by 70-80%. It is also anticipated that around 20% of the electricity generated will be surplus, which can eventually be sold directly to energy suppliers.