

Institute for Public Policy Research



NORTHERN POWERHOMES

**A GREEN RECOVERY
PLAN TO DECARBONISE
HOMES IN THE NORTH**

**Marcus Johns and
Sarah Longlands**

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SUMMARY

A ROADMAP FOR DECARBONISATION

There is huge potential for economic stimulus provided by a programme of housing decarbonisation in the north of England. Not only are warmer, healthier homes with lower emissions crucial to our journey to a net-zero carbon future, but they could also form a key element in the government's efforts to 'level up' the North's economy in a time of pandemic.

Direct emissions from housing need to be reduced by 24 per cent by 2030 to meet the UK's Paris Agreement commitments, and further impetus is required to meet the legally binding net zero 2050 target, let alone the 2030-2040 targets of many of the North's local authorities. But sufficient progress is not being made and a fresh drive is needed to decarbonise housing.

Many people in the North have been left behind with regional inequalities set to worsen in the context of the Covid-19 pandemic. Poor housing (the worst in Europe) combined with low incomes and rising unemployment have left many people with a bleak future. A new ambitious programme of decarbonising the North's housing, starting with social housing providers, could help restart the recovery and provide a much needed plan for a specific economic intervention that contributes to the government's much-discussed agenda of 'levelling up'.

Decarbonising the North's housing to support jobs and household incomes

Mapping out a clear pathway to decarbonise household heating and hot water systems based on shovel ready technology for decarbonisation would involve:

- retrofit measures to improve energy efficiency in over 5 million northern households
- replacing polluting heating systems with heat pumps in 4.6 million northern homes
- 1.1 million northern homes being connected to heat networks.

In achieving this, this report finds that 77,000 direct jobs in the North and 111,000 indirect jobs across the UK could be created by 2035 with a lifetime investment in the programme of £143 billion required. Annually, those jobs could generate £3.85 billion GVA direct in the North and an additional £5.61 million indirect GVA in supply chains around the country.

Social housing providers are the key players, with demonstrable historic capacity to deliver home improvement projects and the scale available to drive supply chain development.

The report finds that their catalytic role could unlock decarbonisation for housing of other tenures by driving supply chain growth, pushing down costs, and driving up skills development over time.

To retrofit all of the North's social housing stock, pump priming the wider economy for a larger programme, would require a total investment of £2.36 billion a year over a 10-year period, half of which (£1.18 billion) should be committed, as a minimum, by government in grant funding.

Retrofitting our skills system to deliver the green homes stimulus

To maximise the impact of the economic stimulus outlined above, we must address the demand and supply led challenges within the labour market. Our research has found that there are still too few firms with the expertise and knowledge of the

housing retrofit market to meet existing demand, let alone the stimulus package outlined above. There is work to be done to help support existing firms to diversify as well as support young people currently training to be plumbers, plasterers and heating engineers to consider specialising in housing decarbonisation. Crucially, with levels of unemployment rising across the North, the decarbonisation of housing could provide a source of new jobs, skills and training opportunities for people who have lost their job during the pandemic.

Many social housing providers already do much to drive skills and demand in their own organisations, including skills support for their technical teams and through their supply chain. But more could be done, particularly in partnership with local colleges, local enterprise partnerships, institutes of technology and the energy hubs. In addition, the research finds that there are opportunities within colleges to raise awareness of retrofit careers amongst prospective and existing students. Greater devolution of skills and employment support to combined authorities could also play a pivotal role in helping the North to become a leading centre for excellence in housing decarbonisation.

KEY RECOMMENDATIONS

1. A home improvement programme for the North

The government should commit to a 10-year programme of targeted investment in decarbonising the North's social housing stock. We recommend that government make an annual investment of £1.18 billion of pump priming investment which would be matched by social housing providers. This could provide market transformation at scale helping to build demand, develop supply chains, promote technological pathways, drive long term cost reductions, and build skills. To maximise impact, we also recommend the following.

- A regional audit of housing stock across the North to produce better data with which to target investment and key housing stock archetypes.
- Develop a menu of options for decarbonising housing by co-ordinating the regional audit above and the experience (as it develops) of decarbonisation in the social housing sector, helping share knowledge, provide social housing providers with confidence in technological pathways, and provide private owners with options and confidence. This menu could also be used to determine acceptable interventions for future government schemes.

2. A stronger more responsive and localised skills system fit to deliver the work

The government and stakeholders should seek to increase skills demand.

- Social housing providers should 'lead by example' by offering training accreditation to their own technical teams as well as from within their own supply chain through the procurement process.
- Implement a programme of awareness raising about the business opportunities of retrofit which targets firms in the North, including plumbers and heating engineers. This could be coordinated by the energy hubs and NP11.
- Pilot a regional housing public campaign. Over a 12-month period, a public campaign to raise awareness of decarbonised home heating choices, as well as advertising the funding support available. This should also include active participation from the public, for example, citizens' juries with social housing tenants and tradespeople.

Key actors including central and local government, local colleges, and social housing providers should strengthen the supply of skills for decarbonisation.

- The Department for Business Energy and Industrial Strategy (BEIS) should work closely with the Department for Education (DfE) to examine how enrolment timetables within further education (FE) can be made more flexible so as to

increase supply of places for trades skills, with the option to pilot a different approach in the North. This could form part of the forthcoming FE white paper.

- BEIS and the energy hubs should work with housing providers to pilot incentive schemes for northern-based firms which subsidise training and accreditation opportunities in low-carbon heating systems.
- Social housing providers should develop partnerships with their local colleges and LEPS' (local enterprise partnerships) employment and skills boards to get their help in making retrofit skills a priority for economic recovery.
- Combined authorities with devolved responsibility for adult skills budgets should be encouraged to prioritise retrofit skills to boost take-up.

3. Additional recommendations

We have also identified a number of recommendations for central and local government which are necessary to accelerate the decarbonisation of homes in the North but applicable elsewhere in the country.

1. Develop local authority heat plans.
2. Develop a local and combined authority planning strategy for low-carbon new homes.
3. Extend the national low-carbon housing grants until at least March 2022.
4. Bring an end to local authority austerity and introduce a fair funding model.

TABLE S.1: PROPOSED TIMELINE FOR THE HOME IMPROVEMENT PROGRAMME FOR THE NORTH

Year	Key step	Outcomes
Early 2021	Formation of a Northern Housing Decarbonisation Steering Group with representatives from housing providers, Combined Authorities, LEPS/the NP11, and BEIS' regional energy hubs. Negotiations with BEIS, MHCLG, and HMT on funding options for social housing decarbonisation funding arrangements and commitment to long-term decarbonisation funding from central government.	Agreement of funding programme and devolution of funding to combined and local authorities in the North to administer to social housing providers Regional campaign pilot to improve awareness of home heating choices starts
2021	Local authorities and combined authorities develop local heat plans in partnership with skills providers including colleges and universities. Regional audit of housing stock quality across the North.	Establishment of a Northern Skills Plan for housing decarbonisation setting out key devolution asks from combined authorities.
2022	Housing decarbonisation menu available to social housing providers following completion of the regional audit with appropriate interventions for key dwelling archetypes.	Extended low-carbon housing grants end in March. Regional campaign pilot ends and is evaluated with lessons learnt for similar, national campaigns.
2025	Interim evaluation of the social housing decarbonisation programme for the North with publication of lessons learnt to date and a technological options menu for different housing archetypes which is aimed to inform owner occupiers and the private rental sector.	A clear menu of options based on success in the social housing sector, significant uptake in training programmes boosting labour supply, and the development of supply chains in the North flowing from the social housing decarbonisation programme encourages accelerating uptake in other tenures of energy efficiency retrofit and decarbonised heat.
2030	All homes in the North attain EPC C performance or better. Social housing decarbonisation programme completes: all homes in the North's social sector have decarbonised heating systems. Evaluation of social housing programme and 'lessons learnt' to review policy for owner occupied and private rental stock.	Approximately 53,000 jobs are created in retrofit by this point. £23.6 billion, 50 per cent from government grant funding, has been invested in the North's social housing by this point.
2035	All homes nationally attain EPC C performance. Peak of economic impact related to this decarbonisation programme.	Approximately 77,000 jobs are created across the programme by this point boosting GVA nationally (directly and indirectly) by £9.46 billion per annum (in current prices).
2050	Programme completes: all homes in the North have decarbonised heating systems.	

Source: Authors' analysis

1. INTRODUCTION

Decarbonising society is one of the biggest challenges that we have ever faced. The UK is responsible for 4.4 per cent of historic emissions, and if everyone around the globe lived like the average UK citizen, we would need 2.5 planets' worth of resources to sustain civilisation (EJC 2020). Not only is decarbonisation necessary for the UK, but it also presents an opportunity for providing decent and sustainable work, and enabling everyone to live in safe, warm, and decent homes.

Within the national picture, the North faces its own journey to decarbonisation. The home of the industrial revolution, much of today's global emissions-related crises have their genesis in our past. Our region is well placed to drive us into a brighter future and benefit from the next phase of human development: decarbonisation.

1.1 DECARBONISATION AS A PATH TO A NET ZERO FUTURE

The UK is on a journey to a net zero carbon emissions future, with widespread political support for action to reduce UK emissions (CCC 2020). In the North, 64 councils and combined authorities have declared a climate emergency, most setting a target date for achieving net zero, including by 2030, 2038, and 2050 in line with government policy (CACC 2020; BEIS 2019). However, the UK's progress is not fast or substantial enough to build the long-term change needed to meet its target of net zero by 2050 (CCC 2020).

Heating and hot water for UK homes account for one-quarter of our national energy use and 15 per cent of emissions (ibid). In order for UK housing to meet the UK's goals in line with the Paris Agreement, a 24 per cent reduction is needed in direct emissions from households by 2030, and a 15 per cent reduction is required in energy used for heating by 2030 (CCC 2019a). Related emissions have declined significantly since 2013, but decarbonisation is not happening at sufficient speed or scale (Webb et al 2020). Heating, both for space and for water, dominates domestic energy use – accounting for 79 per cent together (61 per cent and 18 per cent respectively) (Morgan and Killip 2017) and the way in which heat is generated, predominantly by gas boilers, is the principle source of direct household emissions in the UK. Decarbonising household sources of heat and improving household energy efficiency thus represents a significant element of the decarbonisation of homes and their role in mitigation of and adaptation to further climate change.

The UK has a unique retrofit challenge, with poor comparative energy efficiency and the oldest housing stock in Europe (ibid). The North's housing stock is among the oldest in the UK – 24 per cent of homes in the North were built before 1919 and 44 per cent before 1944. Many homes are non-decent:¹ A quarter of homes in the North East built before 1919 are non-decent, rising to 43 per cent in the North West, and 47 per cent in Yorkshire and Humber (Smith Institute 2018).

¹ The Decent Homes Standard (2006) centres on four statutory minimum standards, which is that homes should be free of category 1 hazards under the Housing, Health and Safety Rating System; be in a reasonable state of repair; have reasonably modern facilities and services; provide a reasonable degree of thermal comfort (Smith Institute 2018).

1.2 DECARBONISATION AS ECONOMIC STIMULUS

Housing decarbonisation could provide a significant economic stimulus for the North and for national prosperity as part of our economic and social recovery from Covid-19. By coordinating the necessary investment in Northern homes and delivering at scale, there will be significant demand generated in the economy which could ‘crowd in’ private investment over time. This report estimates this impact by modelling one suggested pathway.

Coupling this with improvements to the training and skills system can provide a whole-economy approach to decarbonising the North’s housing and capturing its economic benefits.

1.3 DECARBONISATION AS A PATHWAY TO BETTER HEALTH AND WELLBEING

Housing quality is also an important social determinant of health and so the decarbonisation of homes can also have a positive impact on health and wellbeing, as well as reducing pressure on the NHS and social care services.

1.35 million homes in the North fail to meet decent home standards – many are in the private sector and many are owned by older homeowners (Smith Institute 2018). Poor housing condition is dangerous. It is dangerous at all stages of life; for children, it can impact on healthy development (including causing asthma) while for older people cold, damp homes can exacerbate existing health conditions.

The North’s climate is wetter, cooler, less sunny, and windier than the South, and indeed climate variation is also seen from east (drier, warmer, sunnier, less windy) to west. There is also considerable variation across the North, including colder winter temperatures in higher or more rural areas. This has a consequence for the heating of homes and providing comfort.

1.4 THE POLICY CONTEXT FOR HOUSING DECARBONISATION

The wider context for this report is the government’s commitment to reducing the UK’s greenhouse emissions to zero by 2050. Successive governments have seen the challenge of climate change as an economic opportunity with ‘clean growth’ identified as one of four ‘grand challenges’ in the industrial strategy (BEIS 2018).

The clean growth strategy argues that improving the energy performance of the UK’s buildings is simultaneously a challenge and an opportunity. It set an ambition for ‘as many homes as possible to be energy performance certificate (EPC) band C by 2035 where practical, cost-effective, and affordable’, and for all fuel-poor homes to reach this target by 2030 (BEIS 2017). A heavily caveated target that we are not on course to obtain without a drastic shift in our trajectory, nationally and regionally. Meanwhile, BEIS is consulting on improving the energy performance of privately rented homes in England and Wales with a preferred policy scenario being that all new lets in PRS (private rental sector) are in properties that have an EPC rating of C by 2025 and all PRS tenancies achieve this level by 2028 (BEIS 2020d). This would be a considerable acceleration of targets in the PRS.

From a regulatory standpoint, the Committee on Climate Change (CCC) estimates that residential buildings need to reduce emissions by 83 MtCO₂e by 2050 – a reduction of approximately 83 per cent (CCC 2019a) The challenge of meeting this target is significant, particularly given that only 1.3 per cent of new housing met the highest possible energy efficiency standards (EPC rating of A) in 2019 (MHCLG 2020c). Moreover, more than two in three homes in the North have an EPC rating below C. In addition, there are also embedded emissions from construction, and these can account for up to “half of the carbon impacts associated with the building over the course of its lifecycle” (Green Building Council 2020).

To meet targets, existing improvements need to come from existing stock, though improvements are needed in standards for new homes. A further challenge is the effect of the abrupt cancellation of the 'zero carbon homes' standard for new homes in 2015. This is due to be replaced by the 'future homes standard' by 2025. The consultation for this new standard was completed in 2019 but the government are yet to publish their conclusions (MHCLG 2019)

1.5 HOUSING DECARBONISATION: A DRIVER OF POST COVID-19 RECOVERY

The economic crisis caused by the Covid-19 pandemic has prompted government to see decarbonisation as a key plank of the nation's economic recovery as part of their 'Plan for Jobs 2020' announced as part of fiscal stimulus in July 2020 (HM Treasury 2020). This includes the following.

- **Green homes grant:** A £2 billion investment in reducing carbon emissions offering a grant for homeowners and landlords via a voucher towards the cost of installing energy efficiency improvements (BEIS 2020b). The voucher covers up two-thirds of improvements up to a maximum of £5,000 generally or full cost up to £10,000 for low-income homes. The scheme is time-limited with vouchers redeemed by March 2021. Local authorities have also been invited to bid for a share of the £2 billion (approximately £500 million) to allocate in their areas for all tenures (Heath 2020b). Government argue that this will help to improve 600,000 homes and support 10,000 new jobs.
- **Public sector decarbonisation scheme:** Provides grants to public sector organisations to fund energy efficiency and heat decarbonisation initiatives. Eligible organisations can apply for up to 100 per cent of grant funding for their scheme, limited by a maximum ratio of £500 per tonne of carbon (CO₂e) saved over a project's lifetime. Projects are required to be completed by March 2021 (Salix 2020). This has been developed alongside the public sector low carbon skills fund which is a £32 million scheme which is also managed by BEIS and a delivery body, Salix Finance.
- **Social housing decarbonisation fund demonstrator (SHDF demonstrator):** A £50 million programme² which aims to support social landlords to adopt new approaches to improving homes for higher energy efficiency, reduced carbon emissions and lower household bills (BEIS 2020e). The scheme is an add-on to the existing whole house retrofit innovation competition. It encourages applications from local and combined authorities to work with social landlords to deliver housing decarbonisation at scale. The deadline for this grant was October 2020 with decisions on successful bids expected in December 2020, and schemes completed by 2022. There is some suggestion that this fund may be a pilot project for a larger 10-year social housing decarbonisation fund, originally promised at £3.8 billion in the Conservative party's selection manifesto (Heath 2020a).

These new initiatives are intended to support existing decarbonisation efforts, including the work of energy hubs. There are five energy hubs across England (Midlands, North East and Yorkshire/Humber, North West, South East, South West). These operate at arm's length from BEIS. They aim to increase public sector capacity, including combined and local authorities, to develop energy schemes. While the remit is broader than housing decarbonisation, they can play a supporting role. Energy hubs also administer specific grants to support decarbonisation including the rural community energy fund.

² £38 million in England, up to £3 million in Wales, up to £2 million in Northern Ireland and up to £7 million in Scotland.

2. A ROADMAP FOR GREEN ECONOMIC STIMULUS: THE TASK AND ITS BENEFITS

Decarbonising the North’s housing is a necessary part of our net zero journey. However, several potential pathways to this journey exist. This section presents a pathway that takes immediate action while making the case for the economic benefits.

2.1 THE SCALE OF THE TASK

IPPR previously identified the need for 21 million homes across the UK to receive energy efficiency measures, 19 million homes to have heat pumps installed, and 5 million homes to be connected to heat networks in order to decarbonise UK housing (Webb et al 2020). Within that, decarbonising the North’s 6.8 million homes is a monumental challenge. Regional analysis of the identified pathway suggests the need for around 5 million homes to be retrofitted broadly to achieve an EPC rating of C with additional measures to improve energy efficiency in some EPC C homes to meet requirements for decarbonised heat technologies, 4.6 million homes to have a heat pump installed, and 1.1 million homes to be connected to heat networks.

Economic benefits in this section are estimated on achieving an EPC rating of C across all tenures in the North by 2030 and full installation of heat pumps and heat networks to fully decarbonise heating systems by 2050.

TABLE 2.1: A HOME IMPROVEMENT PLAN FOR THE NORTH REQUIRES 5 MILLION HOMES TO BE RETROFITTED FOR IMPROVED ENERGY EFFICIENCY AND 5.7 MILLION HOMES TO RECEIVE ZERO-CARBON HEATING SYSTEMS

Regional analysis of the home improvement plan for England

Proposed interventions	Retrofit	Heat pumps	Connections to a heat network
North East	885,700	808,800	334,000
North West	2,409,900	2,158,100	497,600
Yorkshire and the Humber	1,718,800	1,596,000	252,300
North	5,014,400	4,562,800	1,083,800

Source: Author’s analysis of Webb et al (2020)

Note: Numbers may not sum due to rounding. These figures are estimates and there is significant uncertainty about the detail of housing stock, future technological advancements, and the impact of this on applicable interventions required. This should be borne in mind when interpreting these figures.

BOX 2.1: Choosing the right technological pathway to act quickly

The pathway presented in this report recommends that heat pumps³ become the main source of domestic heating – with heat networks where household density makes that feasible. This is the principle assumption of the plan and impact analysis in this report, building on recent IPPR research, which highlighted that heat pumps face fewer barriers than other technological pathways to rapid rollout. This conclusion is rooted in three key considerations (Webb et al 2020):

1. Technological readiness
2. Cost for consumers
3. Energy security and supply chains

Technological readiness

Given the urgency, we prioritise heat pumps and networks because they are already available. This is not to say that the often-positing pathway of replacing natural gas with hydrogen in both the gas network and household boilers is not possible or scalable. It is an assessment that hydrogen is far from ‘shovel-ready’ and does not yet appear to be able to offer a genuinely zero-carbon pathway due to the manner of its production.

Ground, air and water source heat pumps are powered entirely by electricity which can be generated by zero-carbon means. It is technically feasible (though highly challenging) to decarbonise the national grid with existing technology, and significant potential for this to become easier with improvements and potential rapid cost reductions (CCC 2019b).

Heat networks, the majority of which provide both heat and power, have various fuel sources including natural gas, biofuels, biomass, biogas, or municipal waste – and potentially in the future hydrogen too. Their relative flexibility provides for their being a ‘no-regrets’ option. Heat networks improve efficiency regardless of their fuel (including fuel which emits carbon) when compared to standard use of gas boilers in domestic settings, and decarbonising their fuel is relatively straightforward (Emden, Aldrige and Orme 2017) and likely to become easier in future.

Cost for consumers

Current estimates suggest that running costs for households in hydrogen-dominant and heat-pump-dominant scenarios are comparable when operated as designed. Moreover, the future price of heat pumps is expected to fall significantly (Webb et al 2020).

Energy security and supply chains

Energy security is a considerable challenge for nations and regions in the 21st century. Research suggests that the hydrogen supply chain will necessitate an increase in natural gas imports, worsening rather than improving energy security. Renewable energy generation meanwhile is more secure and unit costs are (and have been) falling (ibid).

3 Air, ground, and water source heat pumps are a means of electric central heating.

2.2 RETROFIT AND ENERGY EFFICIENCY MEASURES

Improving energy efficiency in housing stock is an essential part of decarbonising housing stock. This applies regardless of technological pathway.

Data availability on the energy efficiency of the North's housing stock is poor, though detail and quality of information on local housing conditions is much better in the social housing sector. However, this information is unstandardised and often incomparable between housing associations. Local breakdowns of main source of heating, existing insulation and other crucial elements required to classify housing archetypes and estimate the necessary interventions required are simply unavailable, and regional breakdowns do not provide a sufficiently rich picture to identify at that level the exact retrofit measures required (MHCLG 2020a).

However, it can be estimated that two-thirds of the North's housing stock, some 4.6 million homes, do not meet an EPC C standard (ibid). All of these homes would require retrofit by 2035 to meet the government's target with additional measures required in certain circumstances to meet the design parameters of a heat pump heating system (Webb et al 2020).

In this report, and in its economic impact analysis, primary interventions are:

- cavity wall installations and upgrades
- solid wall installations and upgrades
- loft insulation installations and upgrades.

Energy efficiency installations and upgrades of this type (herein referred to as retrofit) are high turnover, high employment activities where increasing demand has large employment impacts (Laybourn-Langton et al 2017).

The future of retrofit is highly uncertain (Morgan and Killip 2017), and especially when considering future maintenance, product lifespans, and the impact of consumer behaviour on maintenance needs and timeliness of replacement. Additional retrofit elements can be implemented quickly and cheaply, including replacing doors and windows – however natural replacement rates suggest already positive trends (ibid), which might not require additional impetus beyond 'whole-house approaches'.

Research modelling the implementation of large scale retrofit in the UK has predicted a highly uneven rate of installation with respect to many measures, including heating systems (ibid) with uneven demand which creates a challenge for instilling confidence in the sector which is required for the development of sustainable, home-grown supply chains and sufficient skills provision. In this vein, a large scale publicly funded housing decarbonisation programme – initially focusing on the social housing sector as a countercyclical investor in this current period of severe economic contraction – presents the best route.

2.3 THE ECONOMIC CASE FOR HOUSING DECARBONISATION IN THE NORTH

Decarbonising housing presents substantial opportunities for the North. These include job creation, savings on energy bills, reducing fuel poverty, and healthier lives lived in warmer, healthier homes.

The need for a net zero stimulus for the North

Far too often, economic policymaking in the UK has focused on supply-side approaches (Laybourn-Langton et al 2017). To face up to the true scale of the challenge required post-Covid-19, not least to meet the UK's net-zero mission, a supply-side approach alone will not cut it (Laybourn-Langton et al 2017). Moreover, the UK's often 'spatially blind' economic approach has benefitted particular sectors and regions outside of the North despite not being designed to do so explicitly (Raikes 2019). A large, regionally-informed stimulus package will help regions like

the North to recover – mitigating the longer-term costs of mass unemployment, hysteresis, and depressed demand that is likely to occur.

Away from the immediate crisis, the North needs sustained investment to prepare it for the future. The question of where low-carbon energy technologies should be deployed is just as important as which ones and how much of each (Emden and Murphy 2019). This too is true of where national, regional, and local industrial strategy considers and promotes the location of supply chains. Decarbonising housing in the North represents a massive demand-side boost for the economy, well in keeping with the government’s levelling up agenda.

The absence of such stimulus could see a levelling down. The North is highly exposed to the transition to a decarbonised economy because of potential job losses associated with the removal of carbon intensive technology. The North’s economy is more carbon intensive than the average for the English regions (Laybourn-Langton et al 2017), highlighting need for a just transition (Emden and Murphy 2019).

Job creation

At the national level, estimates vary but suggest large opportunities. 34,000 full-time equivalent (FTE) jobs within the next two years could be created by investing in energy efficiency measures only (EEIG 2020), while 325,000 jobs could be created by 2035 nationally by pursuing the suggested pathway (Webb et al 2020).

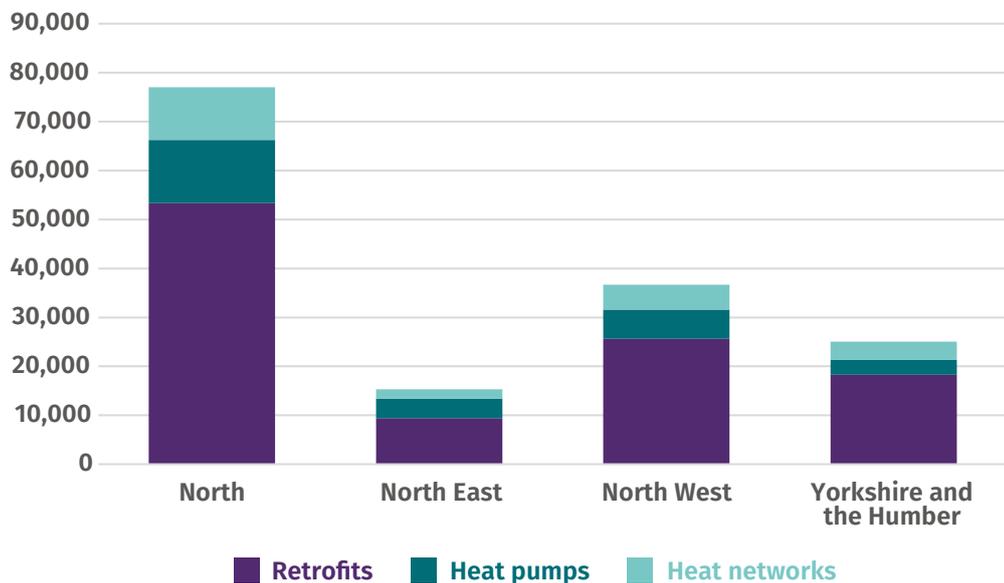
Building on this analysis by IPPR (ibid) to scope the specific economic opportunity for the north of England, we estimate that the North could see direct demand for approximately 77,000 jobs by 2035 (Webb et al 2020; Jung and Murphy 2020).

2035 would represent the peak year for the proposed programme and assumes ‘s-shaped’ curves in terms of the adoption of heat pumps, heat networks, and retrofit activity. Taking a fabric-first approach⁴ requires jobs in retrofit to be created very rapidly and at scale. Meeting a 10-year target demands most retrofit jobs to be created very early in the programme. Our estimates suggest that the majority of the 53,000 retrofit related jobs would be created by 2030 (in line with Webb et al 2020) while jobs in installing decarbonised heating systems would peak at a later date – approximately around 2035 (ibid). Subsequently, the sooner that you can begin the programme of decarbonisation, the more jobs you can begin to create and the more impactful the economic impact could potentially be for the north of England.

⁴ Fabric-first approaches prioritise first the building fabric like insulation, then improving or replacing heating systems, and then additional measures such as on-site microgeneration of renewable energy.

FIGURE 2.1: THE NORTH COULD GAIN 77,000 DIRECT JOBS BY DECARBONISING ITS HOUSING STOCK

Number of direct jobs that could be created by technology by region by 2035



Source: Author's analysis of Webb et al 2020

TABLE 2.2: THE NORTH COULD GAIN 77,000 DIRECT JOBS BY DECARBONISING ITS HOUSING STOCK

Number of direct jobs that could be created by technology by region within the North by 2035

Potential jobs	North	North East	North West	Yorkshire and The Humber
Retrofits	53,000	9,000	26,000	18,000
Heat pumps	13,000	4,000	6,000	3,000
Heat networks	11,000	2,000	5,000	4,000
Total	77,000	15,000	37,000	25,000

Source: Author's analysis of Webb et al 2020

Note: Numbers may not sum due to rounding. These figures are estimates and there is significant uncertainty about total job creation related to preferred technologies, rates of adoption and the correct interventions (and at what point) for different housing stock archetypes. This should be borne in mind when interpreting these figures.

Supply chain job opportunities

This scale of investment would not only support those directly involved in the installation of measures – such as heat pump installers, heating engineers, plumbers, joiners, labourers, window fitters and so on – but in supply chains too.

We estimate that such a programme in the North could support 111,000 indirect jobs in wider supply chains at the UK level.⁵

5 It must be noted that the calculations used to derive this figure assume that inter-industry relationships described by the UK input-output analytical tables (ONS 2020a) remain constant under the investment. Given the size of investment, it is likely that supply chains will shift and this could alter the actually observed indirect employment generated.

This figure is calculated by estimating the industrial structure of job creation estimates identified in recent IPPR research (Jung and Murphy 2020; Webb et al 2020) and considering further evidence on the employment profile of different interventions (ETI 2018; HPA 2019; Laine 2020; Emden, Aldridge and Orme 2017; Kammen, Kapadia and Fripp 2004) and the UK input-output analytical tables (ONS 2020a). Altogether, we estimate a high indirect⁶ employment multiplier of around 2.4.

While energy efficiency is particularly labour intensive, the installation of heating systems, such as heat network energy centres, can be capital intensive (ETI 2018). The manufacture of heat pumps, hydraulic interface units, and other necessary elements of a plan to decarbonise housing presents an opportunity to capture further economic benefits.

Commitment to funding a large-scale decarbonisation project could provide the necessary certainty to encourage the growth of home-grown supply chains, ensuring that employment in low carbon supply chains is located in the North and instil confidence for training and skills providers (Emden and Murphy 2019).

The opportunity for using supply chain development to help address the deep regional inequalities in the UK across a variety of economic and social outcomes (Raikes, Giovannini and Getzel 2019) should not be overlooked. Indeed, the UK's construction supply chain is domestic and often highly localised, with particular strength in the Midlands and the North (HM Government 2018)

2.4 CONSUMER SAVINGS FROM REDUCING FUEL POVERTY AND ENERGY EFFICIENCY

A concerted effort to improve energy efficiency through retrofit and installing decarbonised heating systems can also address fuel poverty.

There are approximately 731,500 fuel poor homes in the North – around 11 per cent of households (BEIS 2020c). This is higher than England overall (10.3 per cent). Fuel poverty is highest nationally in the North West (12.5 per cent). Of the 10 local authorities with the highest precedence of fuel poverty, seven are in the North West. Those local authorities are:

- Liverpool (highest in the North and 3rd nationally) at 15.6 per cent
- Manchester (2nd in the North and 4th nationally) at 15.5 per cent
- Blackpool (3rd and 5th) at 15.2 per cent
- Pendle (4th and 6th) at 15.2 per cent
- Eden (5th and 7th) at 14.7 per cent
- Blackburn with Darwen (6th and 8th) at 14.6 per cent
- Barrow-in-Furness (7th and 9th) at 14.4 per cent.

There is considerable concentration of fuel poverty in certain locations, particularly the large cities of the North as shown in figure 2.2 below.

Improved energy efficiency measures can improve comfort drastically while reducing energy bills. Together this could help tackle fuel poverty and improve quality of life. However, during discussions with stakeholders concerns were raised that new sources of heating – and particularly air-source heat pumps – can result in large increases to household energy bills if the consumer does not adapt to the different way that heat pumps are operated compared to traditional.

People on low incomes often need to make unacceptable choices between heating or eating (Webb et al 2020) and stakeholders told us that people often run their gas

6 or 'Type I'

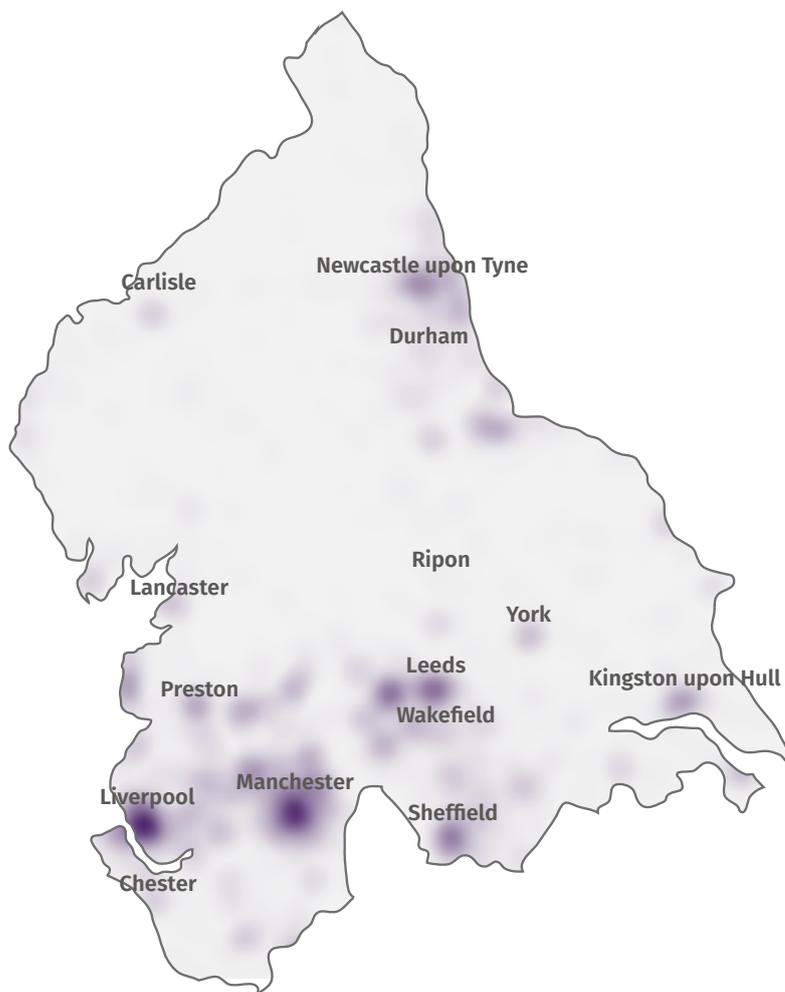
boilers for hot water and heating for a limited period (often one or two hours) to keep bills down. Indeed, there is clear evidence that lockdown in poor-quality, non-decent homes in the North has given rise to a disproportionately negatively impact on people's health and wellbeing. During the first lockdown period, the condition of poor quality housing worsened and there was a significant increase in energy usage, which caused further anxiety for many people who were struggling prior to the pandemic or who had new-found experience of income precarity. This relates particularly to poor thermal comfort or the lack thereof, which is likely to worsen over the course of the winter and second period of lockdown (Brown et al 2020)

But, this consumer behaviour can increase costs in decarbonised heat-source scenarios like a heat-pump pathway. This speaks to the low consumer awareness of heat pumps and the importance of awareness raising and education in any future schemes.

It also highlights the need to demonstrate that decarbonised heat sources either can or will be cheaper to run alternatives. The price of renewable energy is falling – and this is projected to continue. For example, offshore wind has fallen from around £150/MWh to £40 in recent years (CCC 2020).

FIGURE 2.2: FUEL POVERTY IS HIGHLY CONCENTRATED IN PARTICULAR AREAS, ESPECIALLY THE LARGEST CITIES IN THE NORTH

A heatmap of households in fuel poverty by LSOA in the north of England



Source: BEIS (2020c)

Previous research has shown that in new-build properties with high energy efficiency standards, savings generated by heat pump heating are higher, saving £85 per household per year across the life of the build, than the same energy efficiency measures with a gas boiler, saving £55, when compared to current standards of new-build properties. It has been estimated that energy conservation measures can reduce energy costs for tenants by up to 40 per cent, a significant saving (Smith Institute 2018, Verco and Cambridge Econometrics 2014). In 2014, modelling by Verco and Cambridge Econometrics (2014) found that average energy bill savings for low income homes (accounting for comfort take⁷) was £245 per annum and £416 for other homes.

2.5 THE SCALE OF INVESTMENT REQUIRED TO DECARBONISE THE NORTH'S HOMES

Previous IPPR analysis estimated that a national programme would cost £10.6 billion per year to 2030 and £7 billion per year from 2030 to 2050 – not including heat networks (Webb et al 2020). We estimate that the pathway for the North outlined in this report would demand a total of £143.07 billion investment, which concentrated to a ten-year period would equate to an annual investment of £14.31 billion.

Incorporating further information based on our discussions with stakeholders, the English Housing Survey (MHCLG 2020a), Currie and Brown (2019), and Myers et al (2018) has allowed us to create preliminary cost estimates for a decarbonisation programme of all tenures in the North – including estimating the costs of heat networks.

TABLE 2.3: TO BE ACHIEVED OVER A 10-YEAR PERIOD, OUR HOME IMPROVEMENT PLAN FOR THE NORTH WOULD REQUIRE £14.31 BILLION INVESTMENT PER ANNUM OVER 10 YEARS

Estimating the total and average costs of the home improvement plan for the North

	Total interventions (homes)	Total cost (£bn)	Average cost per home under the programme (£)	Annually if concentrated over a 10-year period (£bn)
Retrofit measures	885,700	96.62	19,300	9.66
Heat pumps	2,409,900	5.39	5,000	0.54
District heat networks	1,718,800	41.07	9,000	4.11
Total	5,014,400	143.07		14.31

Source: Authors' analysis of Webb et al 2020, Currie and Brown 2019, Delta Energy and Environment Limited, and stakeholder discussions

Note: figures may not sum due to rounding.

It should be noted however that there is significant uncertainty in these figures, and it does not account for falling prices over time, which we expect for measures such as heat pumps to take place in the next decade. Indeed, Currie and Brown (2019) find that a central combined cost for installation and product costs indicates a fall of 89 per cent in installed cost by 2030 on 2017 prices – a significant saving.

Estimating costs for retrofit is difficult because of considerable variation in prices both in terms of the required measures and geographically. Stakeholders

⁷ Comfort take describes the idea that homes with fuel poor residents often overheat their homes and this behaviour is often overlooked in modelling. It could be that after energy efficiency measures are installed, residents who previously overheated their homes might seek a higher level of thermal comfort which has become more affordable and therefore mitigating some of the otherwise modelled savings.

highlighted that there are significant variations between regions, for example it was suggested that prices are up to £3,000 higher for heat pump installation in London than in Humberside.

Meanwhile, discussions with housing associations highlighted significant variation in per dwelling costs, ranging from £15,000 to £45,000. Most approaches are ‘whole-house’, taking improvement measures, including insulation and heating systems, together. However, ambition expressed in our discussions varied greatly in terms of standards – from aiming for EPC ratings of C through to aiming for homes to be net zero and self-sufficient in energy – with associated different costs. Our research also highlighted that there is variation because of the different pathways planned, including retrofit standards, heating systems, and energy generation. Variation in costs also arises because of varied stock quality, especially EPC classification (ie higher numbers of properties with low EPC ratings cost more to retrofit). In addition, age and density of stock, all influence a provider’s ability to make ‘area-based’ savings at scale.

2.6 OUR PROPOSAL: A HOME IMPROVEMENT PROGRAMME FOR THE NORTH

This chapter has outlined a proposed pathway for decarbonising the North’s housing. Broadly, a retrofit programme which upgrades all of the North’s housing stock to an EPC rating of C by 2030. This also includes further retrofit measures that may be required to maximise the effectiveness of heat pumps, alongside the actual installation of heat pumps and heat networks.

We estimate that this could improve more than 5 million homes, creating around 77,000 direct and supporting 111,000 indirect jobs with an investment of £143.07 billion required.

We estimate that these jobs could generate around £3.85 billion direct GVA per annum in the North and an additional £5.61 indirect GVA per annum across the UK.⁸ There would be further economic benefits than are recorded here, including induced impacts from spending of employees supported by this stimulus programme in local economies, benefits in terms of business expansion, new start-ups seeking to play a role in supply chains, and so on.

A programme which prioritises investment in social housing

To deliver this programme, we recommend that the investment should be targeted at the social housing sector. The sector has the scale, institutional memory, and geographic spread around the region to develop, roll out, and evaluate a large-scale decarbonisation programme in partnership with combined and local authorities. Building momentum in social housing, could in turn help drive market demand and skills adoption which could in time, lower costs and encourage take up by other tenures.

18 per cent of housing in the North is social housing⁹ (MHCLG 2020b), some 1.27 million homes. Decarbonising this stock would contribute significantly to emissions targets, is large enough to encourage supply chain development and demand for skilled labour, and would be located in a sector which has historically demonstrated its ability to manage large-scale projects effectively, such as delivering improvements for 1.4 million homes at a cost of £37 billion under the decent homes programme from 2001-2011, around half of which was government funding (Smith Institute 2018).

⁸ These estimates assume that those jobs were in operation, generating GVA, today and are in 2018/19 prices. These estimates also assume no leakage, displacement, substitution at the national level, and incorporate analysis from ONS 2020b.

⁹ Defined here as either rented from housing associations or from local authorities or other public sector.

We would estimate that the 1.03 million social homes need to be upgraded under a home improvement programme for the North. This is an imperfect estimate, which adjusts the total number of social homes in the North proportionately to the wider home improvement plan with additional English Housing Survey data (MHCLG 2020a). However, a significantly more detailed analysis of stock in the North is required to accurately depict the true scale of the challenge, costs, and benefits.

In light of the need for an economic stimulus for the North, the role of the social housing sector in pump-priming supply chains, we argue for the North’s social housing to be a pilot for home improvement with a 10-year programme from 2020 to 2030 with a total investment required of £2.36 billion in the programme.

TABLE 2.4 IN TOTAL FOR OUR HOME IMPROVEMENT PLAN FOR THE NORTH, THE SOCIAL HOUSING SECTOR WOULD SEE AN INVESTMENT OF £23.57 BILLION

Estimating the total and average costs of the home improvement plan for the North

	Total cost (£bn)	Average cost under the programme per property (£)	Annually over a 10-year period (£bn)	Minimum government grant funding annually over 10 years (£bn)
Retrofit measures	15.08	16,500	1.51	0.75
District heat	0.98	5,000	0.10	0.5
Heat pump	7.50	9,000	0.75	0.38
Total	23.57		2.36	1.18

Source: Authors’ analysis of Webb et al 2020, Currie and Brown 2019, CCC 2019a, Delta Energy and Environment Limited, MHCLG 2020b and stakeholder discussions

2.7 FUNDING THE HOME IMPROVEMENT PROGRAMME

There are different models by which this investment could be sourced. In light of the clear economic benefits of decarbonisation as a stimulus, and the importance of meeting emissions targets, we argue that at least 50 per cent of the investment required for the social housing sector should be government investment to pump-prime the stimulus, which could be fed into the social housing decarbonisation fund – or as part of a pilot programme in the North.

This would equate to a minimum £11.78 billion over 10 years or £1.18 billion required annually from government. This would be matched by social housing providers’ contributions through their existing resources or raising private finance. IPPR has previously recommended a blended approach, dividing costs evenly, including recommending that the Bank of England work with financial institutions to reduce the risk profile of decarbonisation activity to reflect the environmental (and, as revealed in this research, economic) benefits, thus reducing borrowing costs (Webb et al 2020).

The economic impact modelling that we present is one pathway over a particular time period. Acting faster could accelerate the delivery of economic benefits and achieve peak employment (modelled above as 2035) faster. IPPR have previously (Webb et al 2020) recommended a pathway that aims for the following.

- Bringing socially rented homes to an EPC rating of B or higher by 2030.
- Minimum energy efficiency standards for private rented stock rising to an EPC rating of B by 2030 with the exception of hard-to-treat stock.
- All homes to have an EPC rating of C by 2035.
- Improving all homes to sufficient levels of heat retention to install heat pumps (generally taken to be a high EPC C rating or low EPC B rating, depending on stock) by 2050.
- Decarbonising household systems in their entirety by 2050 (using heat pumps and heat networks in this pathway).

3.

RETROFITTING OUR SKILLS SYSTEM FOR HOUSING DECARBONISATION

To maximise impact of a housing decarbonisation stimulus package requires action to ensure our skills system is able to meet the challenge.

3.1 THE JOBS CHALLENGE OF HOUSING DECARBONISATION

The supply and demand dynamics of housing decarbonisation is a ‘chicken and egg’ challenge. The industry required to take on the challenge of decarbonising our homes is emergent as demand from customers is still in a latent phase. At the same time, there are not yet enough skilled workers with the requisite levels of skills, training and accreditation to take on the scale of home improvements outlined in this report.

The improvement of homes in terms of retrofit and energy efficiency, heat pumps and heat networks require a range of skills and professions. Table 1 outlines some of the types of jobs which are most closely associated with housing decarbonisation. Some of these jobs will require additional training on top to allow professions such as plumbers or electricians, to diversify into the housing decarbonisation market. In addition, only registered tradespeople can carry out the work on housing decarbonisation which means they must obtain the TrustMark and Microgeneration Certification Scheme (MCS).¹⁰

TABLE 3.1: TYPE OF ROLES ASSOCIATED WITH HOUSING DECARBONISATION

Role	NVQ level required	Length of training	Average salary (when qualified)
Plumbing and heat engineer	NVQ 2	Two to three years	£18-35k
Plumbers	NVQ 2/3	Up to four years	£18-40k
Electricians	NVQ 3	Up to four years (but fast-track options available)	£32,000
Plasterers	NVQ 2	Apprenticeship – learn on the job	£14-30,000

Source: Authors' analysis

¹⁰ Both TrustMark and the MCS scheme have committed to ensuring that their two accreditation schemes are increasingly complementary. See: <https://www.trustmark.org.uk/blogs/news/2019/06/26/mcs-trustmark-announce-collaboration>

In addition to these jobs, many housing associations and local authorities also need people with new skills to help assess and design schemes and projects to decarbonise their own housing stock. For example, energy assessors, retrofit assessors and coordinators (in accordance with PAS 2035 accreditation).

TABLE 3.2: ACCREDITATIONS ASSOCIATED WITH HOME HEATING SYSTEMS

Type of certification	What is it?	Average time to complete	Costs (approximate)
TrustMark	<p>Established in 2005, TrustMark is the Government Endorsed Quality Scheme which covers any work that a consumer chooses to have carried out in or around their home.</p> <p>All providers must be accredited TrustMark as a condition of the Green Home Grant Scheme.</p> <p>Companies apply to 'join' TrustMark and sign up to a core set of criteria which are reviewed and updated annually. Companies can also join via operators such as the Federation of Master Builders.</p>	Six to eight weeks.	Unknown
PAS 2035 (published by British Standard Institute)	<p>A framework for 'whole scheme' project delivery which TrustMark scheme users will be required to comply with when carrying out domestic work to retrofit homes.</p> <p>The government have made compliance with PAS 2035 mandatory for all public funded projects including ECO schemes.</p>	<p>Five retrofit roles have been developed within PAS2035.</p> <p>Training for these roles delivered by private providers including retrofit assessor and coordinator.</p>	Cost of training courses which vary by provider
Microgeneration Certification Scheme (MCS)	MCS is an industry-led quality assurance scheme, which demonstrates the quality and reliability of low carbon approved products and installation companies.	Six to eight weeks for assessment but preparation work can take several months.	<p>£750 (1st time)</p> <p>£614 (annual renewal fee)</p>

Source: Authors' analysis

3.2 CAN THE SKILLS SYSTEM MEET THE CHALLENGE?

UK skills shortages in many sectors have been widely documented, both nationally and in the UK. The UK Skills Survey 2018 found that a third of vacancies across the UK were hard to fill (DfE 2018). The majority of these vacancies (67 per cent) were reported as being hard to fill because of a lack of skills, qualifications or experience amongst applicants (ibid). Given that the housing retrofit industry is still very much in its infancy, it is likely that this sector will also be experiencing a disproportionate level of 'hard to fill' roles. During the course of this research, we explored the skills challenge with key stakeholders and a number of recurring themes emerged.

Increasing skills demand by improving awareness among firms

The pathway outlined in this report focuses on the use of heat pumps. The growth in heat pump heating systems will need to be facilitated by existing heating engineers and installers who decide to invest time and money into training to fit these new systems. There are over 100,000 registered gas engineers in the UK who are well capable of rapidly retraining to deliver low carbon heating, given sufficient demand (Heat Pump Association 2020). In contrast, it has been estimated that there are just 600 MCS accredited heat pump installers in the UK (Grist 2020).

The challenge is how to incentivise the take-up of training/accreditation in these new systems among existing firms. The lack of accredited TrustMark and MCS accredited installers in the North was highlighted as an issue by almost every stakeholder in this research. In the North West, for example, it was reported that there are only 13 companies with the appropriate TrustMark/MCS accreditation. Not only does this potentially delay viable schemes but the lack of competition may mean that installers can charge more (Heat Pump Association 2020).

Stakeholders reported that potential providers do not have a strong awareness of the potential business opportunities of low-carbon heating systems and that more could be done to actively support suppliers to gain accreditation, examples included the following.

- Housing providers working with accreditation providers to explore what can be done to raise awareness and increase supply. Because both TrustMark and MCS are specifically approved by BEIS, it was felt that the government could do more to encourage wider take up of these schemes through awareness raising campaigns with the industry and through schemes to subsidise take up of the accreditation.
- Opportunities through procurement to strengthen and support the wider supply chain – many housing providers work closely with firms across the building industry. Stakeholders suggested that by working with firms in their supply chains, housing providers could help to raise awareness of opportunities in decarbonisation and routes to accreditation. Similarly, local and combined authorities could examine how their providers could be supported through the procurement process to become accredited through TrustMark and MCS. In some areas, the planning system is being used to encourage this through for example, the requirement for developers who have been granted planning permission, to develop a localised employment and skills plan.

Boosting the market by increasing awareness amongst customers

One of the reasons existing firms may not be seeking training and accreditation in these new technologies is that consumer demand for products such as heat pumps is low. For example, there are 1.6 million sales of gas boilers per annum compared with less than 30,000 heat pumps (CCC 2019b).

Research shows that consumers tend only to think about the replacement of central heating systems when something goes wrong and at this point, awareness of the relative advantages or disadvantages of low-carbon home heating systems as opposed to gas, is generally low (Policy Connect 2019).

The lack of consumer awareness of heating systems and their impact was raised during our research. It was felt that when implementing any form of retrofit/home heating scheme, that it was important that there was investment in education and awareness raising with tenants about how the changes to their home should be managed, for example, the differences in how a heat pump system works compared with a conventional gas boiler. This was particularly linked to the issue of fuel poverty discussed in chapter 2 – and some stakeholders had

concerns about installing new heating systems in homes experiencing fuel poverty, due to the need for significant behavioural changes to keep heating costs low.

Raising awareness of potential careers and training opportunities

While the training/accreditation process for existing tradespeople is a potential challenge, there is also an argument for raising awareness amongst school leavers and potential career switchers of the opportunities that the decarbonisation of housing can present, for existing careers that they may be considering, such as plumbing, electricians and plasterers. For some young people, the opportunity to specialise in low-carbon heating systems and retrofit may be an additional incentive to train. Secondary and further education establishments have a key role to play in this process. Stakeholders that we spoke to felt that awareness raising amongst colleges of this opportunity was highly variable and sometimes down to the individual interests of school and college principals/governors.

Some housing associations are actively engaging with their local colleges to explore how they can help fill skills gaps in their organisations, specifically in relation to retrofit. In addition, it was argued that housing providers had a role in '*leading by example*' by ensuring that their own building and technical teams were able to access additional training and accreditation which would enable them to deliver housing retrofit services including heat pump installation. Many housing providers run their own apprenticeship schemes and there were examples given of how these are being tailored to focus more explicitly on retrofit housing skills.

Enrolment timetable in further education

Traditionally, people enrol to take up courses like plumbing, engineering and building in September of each year. This means that even though the Covid-19 crisis will trigger demand for skills courses, the supply may be limited by the enrolment timetable. There was some concern raised as to whether the frequency of timetabling needed to increase to keep pace with the potential demand for professions to help address the challenge of decarbonisation. Apprenticeship training has changed to include January and April start dates so it would make sense to broaden out other training opportunities to offer year-round starts. Indeed, this may have knock on benefits for FE staff who are on insecure employment contracts.

In addition, the regional energy hubs may also be able to help catalyse access to training, for example, the Midlands Energy Hub has developed a skills training competition. This works closely with providers to offer training courses on new decarbonisation technologies more rapidly than is usually feasible in the existing FE system.

There may also be opportunities to develop partnerships between housing providers, LEPs and the new institutes of technology (IoTs)¹¹ to help grow future skills and capacity in this area

Skills provision not keeping pace with demand

As noted above, there was widespread concern that there was a mismatch between the government's grant schemes for housing decarbonisation and the ability of the market to deliver in terms of skills and accredited providers, particularly given the timescales. Consensus amongst stakeholders was that the supply end of the market needed to be in place in advance, or at least run in parallel, with the demand side interventions. Instead, there was a danger that initiatives like the green homes grant would fail to deliver because it far exceeded the capacity of providers; which one person characterised as 'putting the cart before the horse' The government have

11 IoTs are collaborations between further education (FE) providers, universities and employers.

introduced the public sector low carbon skills fund, a £32 million scheme managed by BEIS, which aims to support upskilling within the public sector. But stakeholders argued that more was needed to encourage *private* sector providers to get on board.

While the government had focused on the delivery of green home improvements, it was suggested that more should be done to focus on the skills piece. The Covid-19 pandemic, it was argued, was making home improvements difficult in some areas because of having to work within the confines of social distancing requirements. However, the delivery of skills and accreditation training, could be more easily done online, particularly with people who may be interested in transferring into the industry having been made redundant.

A regional approach to raising awareness and improving skills/accreditation

One of the reflections from this research is that there is an opportunity to employ a more regional approach to raising awareness and improving skills and accreditation. As our discussions with stakeholders revealed, there needs to be a place-based approach to thinking about heating and energy schemes because different parts of the North will vary in terms of suitability for different heating technologies. For example, rural areas and smaller towns, may require a different approach to city and district centres. Local enterprise partnerships and combined/local authorities may be able to play a key coordinating role through local skills advisory panels or boards. These groups help to oversee projects to address skills gaps in the area covered by the local strategic partnership or combined authority area as well as linking these to needs for employment and retaining. Typically, their membership includes private, public and further/higher education. In addition, many LEPs have specific task forces or panels which are dedicated to particular sectors, like the green economy. These groups can help to raise awareness and raise the profile of skills gaps and how this can be addressed to help maximise the economic benefits of housing decarbonisation.

Previous work has been done in this area by local and combined authorities to consider how best to coordinate the development of low carbon projects, capitalise on supply chain opportunities, and deliver the right skills provision in the long term (see, for example, Business Growth Hub 2020 and GMCA and New Economy 2016).

Supporting skills transition for people made unemployed during Covid-19

The turnaround time for heating engineers, plumbers and electricians, along with the enrolment timetable at many colleges was a cause for concern in terms of making sure that recently unemployed people could benefit from programmes of work to decarbonise housing, particularly in the context of Covid-19.

Our discussions with stakeholders suggested that support could be provided to people made recently unemployed, particularly for people who came from a technical background or in related industry, for example, air conditioning engineers, electrical engineers and people with a background in manufacturing. It was felt that these people could more easily transfer into opportunities in the low-carbon housing sector.

In addition, stakeholders felt that there was much that housing providers could do to help direct their own tenants towards courses and on the job training so as to be able to take up opportunities in this industry in the longer term. One provider was speaking directly to their local college about how to signpost and encourage tenants to attend bespoke courses/training support as well as become job ready, with the potential for them to employ their own tenants eventually. Another provider described how they were developing a new district heating project in an area with high deprivation where they have deliberately targeted the area for their

apprentices and staff including working with local schools, advertising locally and working with the local Job Centre Plus.

Lack of diversity in the professions

Generally, our research revealed a concern about the lack of diversity, especially in gender and race/ethnicity amongst the tradespeople who tend to carry out the majority of the work in the home improvement industry. Even in areas with high levels of diversity within the population, stakeholders reported difficulties in recruiting a diverse range of technical employees and contractors. This was not just a problem from an equalities point of view, but it also suggested that these careers were not as open to some groups, thereby reducing the potential flow of people into the industry to help meet the potential demand from housing decarbonisation. Stakeholders argued for greater awareness raising within colleges and in schools to help demonstrate the opportunities and particularly the emerging careers in low-carbon housing schemes. There have also been nationwide schemes to encourage take-up of trades like plumbing by women, for example, the 'get girls plumbing campaign' (Watersafe 2014) and these could be explored in a more targeted way for low carbon and retrofit.

Funding to incentivise and accelerate supply side

Another recurring theme from the discussions was the need for more funding to be made available to help incentivise and accelerate the provision of training and skills, particularly for people working in professions where they could easily diversify into low-carbon heating systems or housing retrofit. Encouraging people to diversify in this way can be difficult because training and skills development is costly in terms of money and time and there may be no guarantee that the promised benefits materialise. Therefore, to maximise take-up, it may be necessary to subsidise or pay for training/accreditation and if possible, link this to the offer of future work (entry to which is conditional upon completion of training).

There may also be opportunities to use the adult education budget (AEB), where it is devolved to support skills and training in the decarbonisation of housing. The AEB funds education and training for adults aged 19 and above. The devolution of the AEB to combined authorities with directly-elected mayors mean that they have a direct lever with which to support skills and training for housing decarbonisation.

3.3 CONCLUSIONS

This chapter has outlined many of the wider demand and supply side challenges for decarbonising housing. One of the conclusions is that many existing firms and their workforce may be easily transferrable to operate within the low-carbon housing industry but that several factors prevent these firms from diversifying, including lack of demand for low-carbon heating amongst consumers and a lack of awareness that potential business opportunities exist in the retrofit sector.

4.

A ROADMAP FOR CHANGE: CLEARING THE HURDLES

Beyond the skills system, there are additional challenges that must be overcome to maximise the impact of an economic stimulus.

4.1 A LONG-TERM COMMITMENT TO A NET ZERO AGENDA FOR HOUSING DECARBONISATION

Nearly all the stakeholders we spoke to argued that there was an important opportunity for this government to provide longer term and consistent commitment to net zero housing than it has hitherto done. The short-term nature of existing funding envelopes and previous schemes' legacies have limited impact and eroded trust amongst supply chain businesses. This is widely reported in research including CCC (2019a) and RICS (2020).

Our discussions particularly highlighted:

- the lack of clarity over preferred or feasible technological pathways to meet targets
- the lack of confidence in funding over the long run restricting the ability to raise finance
- the capacity to develop longer-term projects when there is a constant slew of short-term competitions for funding at both housing provider and local authority level
- the ability to deliver on too-tight timescales for many existing funding programmes that don't increase capacity over time
- concerns about future regrets if technological pathways or funding models are changed post-installation in stock.

The absence of a long-term commitment has limited the development of the market and made investment in one technology or another, risky business, what one stakeholder described as a akin to a Betamax vs VHS debate. Some stakeholders reported that they were waiting on more specific guidance from government on a preferred technological pathway which will meet their targets with some suggestion that the government's forthcoming heat policy roadmap could help inform decisions about technological pathways. However, there was little confidence that greater clarity would, in reality, be forthcoming.

Currently the government have made available a range of specific funding streams to support action on housing decarbonisation. But the timeframes are limited, with many of the schemes announced in July 2020 coming to an end in 2021. The limited scope of these funds, alongside the potential scale of the potential market in the North risks limiting the opportunities for sustainable solutions in the longer term. In addition, it does not provide a strong signal to firms that that it is worth investing in new skills and training.

Stakeholders we spoke to argued that it was important that lessons from the energy company obligation (ECO) and green deal schemes were learned this time around. While well subscribed, these schemes' impact was limited by the short-term nature

of the funding and the steady reduction in the feed-in tariff. The short-term nature of the initiatives also had negative impacts on the market as stakeholders reported companies who could have potentially benefitted from the scheme being reluctant to do so because of the short-term nature of the scheme. In addition, it encouraged opportunistic behaviour where unreliable operators took advantage of the scheme. At the other extreme, some good-quality private contractors, who invested in the business ended up going bust when government support ended.

The majority of the funding for housing decarbonisation is held centrally and requires applicants to 'bid' for funding in a series of competitive rounds. Again, this may limit uptake of the scheme. Instead, the government should consider devolved allocations of funding to organisations like combined authorities who can work at scale with housing providers.

4.2 DEVELOP A CLEARER UNDERSTANDING OF HOUSING STOCK CONDITIONS

A recurring theme from the discussions we held with stakeholders was that there is a serious lack of information about the overall state of housing stock across the North. Many organisations have conducted their own stock condition surveys, but these are not done to an agreed methodology which can make comparisons between areas and tenures difficult.

Having a clearer understanding of stock quality would provide a much better evidence base to decarbonise housing at scale, enabling the investment to be better targeted, thereby achieving better value for money. It would also enable investors to better quantify the return on investment (Laybourn-Langton et al 2017). This would address broader neighbourhood issues and bring together social and private housing stock in areas with high levels of mixed tenure. Additionally, by onboarding private sector stock in neighbourhoods into their programme, the economies of scale available to the social housing sector could result in savings for private owners, improve the viability of community-level interventions like heat networks, and reduce disruption in certain patterns of development, like terraced housing.

It is clear from our discussions, that a lot of work is already taking place to better understand housing stock conditions, for example where social housing providers are working with organisations including Data Mill Leeds and Loughborough University to gather detailed, live, and innovative new data about the performance of their housing stock as part of retrofitting programmes. These examples should be built upon to see how they might be scaled up across larger areas of the North.

4.3 SUPPORT MARKET TRANSFORMATION TO DELIVER AT SCALE

Currently, the evidence from this research is that capacity of the market to fulfil even the ambitions of the government's green homes grant is limited. There are too few firms with the expertise to deliver the scale of housing decarbonisation that is required. Stakeholders reported reluctance on the part of companies to expand and take on more staff to meet the clear demand generated by the Green Homes Grant, because of concerns about the long term prospects for the scheme (given that it is due to complete in March 2021).

To fully harness potential economic benefits, market transformation is required (Green Building Council 2020). This will require collaboration across the North with all parts of the supply and value chain.

A long-term commitment with sufficient pump-prime funding from government into the social housing sector could catalyse confidence for businesses, bring costs down and encourage investment and growth. If action could be taken across the North to prioritise retrofit in social housing, then this could help create enough

momentum within the market to encourage early adoption within the private rented sector in the longer term.

4.4 ADOPT A NEIGHBOURHOOD APPROACH TO MAXIMISE OUTCOMES

Housing leads in core cities particularly raised the age of housing stock as a challenge across tenures. Not only are many of these homes of poor quality, but they also, typically, have very little equity and are based in areas characterised by low values. This means that regardless of improvements, homes in these areas will not see any significant appreciation in value because of their low equity base. Furthermore, a significant proportion of this housing is owned by the private rented sector. Subsequently, it was suggested that the dynamic between housing decarbonisation and housing value is crucial to the success of any future programme of housing decarbonisation.

Any measures to retrofit homes in areas of older housing, regardless of tenure, should be undertaken as part of a coordinated approach to neighbourhood improvement.

4.5 WORK WITH CONSUMERS TO RAISE AWARENESS AND MAXIMISE IMPACT

Stakeholders reported that alongside the physical improvements to homes, one of the key lessons from previous work is the need to work with consumers to ensure that they understand how to live in a more energy-efficient environment.

Social housing providers who were rolling out retrofit argued that these were only as good as the information and education programmes that operated alongside them. These programmes give consumers confidence in how to use new equipment (such as heat pumps) and how to maximise energy efficiency measures so as to keep household bills low.

In addition, as noted in chapter 3, consumer understanding and awareness of low-carbon central heating systems is low. The North should pilot a public awareness raising campaign to explore alternatives to gas central heating and in addition, could explore the usefulness of citizens' juries amongst social housing tenants to develop a better understanding of people's perceptions and views about home heating and climate change.

5.

DECARBONISING THE NORTH'S HOUSING:

A STRATEGY TO SUPPORT LEVELLING UP

This report makes the case for a targeted economic stimulus to decarbonise housing in the North which, as we know, is typically older and poorer quality than stock in other parts of the UK. Indeed, our proposals provide a chance to not only tackle climate change but improve standards of housing for some of the North's most deprived communities. Furthermore, with the right level of investment and a targeted approach, the decarbonisation of housing stock could support a significant number of jobs, business growth and investment in a time of significant economic hardship. The benefits of improvements will also be felt by residents with household savings on energy delivering wider multiplier benefits for local economies.

We estimate that if delivered at sufficient scale decarbonising housing in the North, across all tenures could help to support and create:

- 77,000 direct jobs in the North and 111,000 indirect jobs across the UK (by 2035)
- an investment of £143.07 billion in improving northern homes
- additional GVA of £3.85 billion directly in the North and £5.61 billion indirectly per annum across the UK.

KEY RECOMMENDATION 1: A HOME IMPROVEMENT PROGRAMME FOR THE NORTH

We recommend that this economic stimulus should take the form of a 10-year home improvement programme of targeted investment in decarbonising *social housing stock* in the North.

This would require a dedicated capital investment programme which sees the government approve the devolved allocation of funding to combined and local authorities across the North.

We suggest a phased model of total annual investment of £2.36 billion per annum, of which central government funds half through a grant programme, with social housing providers contributing the rest, from 2020 to 2030 to fully decarbonise social housing stock in the North. Using the social housing sector to pump-prime supply chains and encourage the skills system could result in improved costs for the private sector, which – alongside government support for private housing stock as outlined in IPPR research previously (Webb et al 2020) – could drive the full programme required to decarbonising the North's housing and unlock the full economic benefits as estimated in this report.

To maximise economic benefits, we would recommend that the procurement supply chain process which is used to deliver the outcomes should seek to lock in local economic benefits including coordination of recruitment and procurement

process between organizations including colleges, Job Centre Plus, housing associations and other frontline employment and skills agencies.

In addition, we would also recommend that as part of this investment, a regional audit of housing stock quality across the North should be developed in parallel with the programme of work to decarbonise housing. This could be coordinated by the energy hubs in the North West, North East and Yorkshire and the Humber, and draw on existing good practice amongst housing providers.

An audit which provides clarity over housing archetypes in the North should be used to develop a housing decarbonisation menu of appropriate interventions for different archetypes further informed by the social housing decarbonisation programme recommended above as it develops. This would help social housing providers across the North to find consensus on particular pathways housing decarbonisation and make it simpler to act. Built using detailed understanding of housing stock, considering prevalent archetypes and affordable, technologically ready, and secure sources of heat and retrofit measures, it would provide a guide to social housing providers, and later the private sector, to guide investment decisions and build confidence in acting now without regret.

TABLE 5.1: PROPOSED TIMELINE FOR THE HOME IMPROVEMENT PROGRAMME FOR THE NORTH

Year	Key step	Outcomes
Early 2021	Formation of a Northern Housing Decarbonisation Steering Group with representatives from housing providers, Combined Authorities, LEAs/the NP11, and BEIS' regional energy hubs. Negotiations with BEIS, MHCLG, and HMT on funding options for social housing decarbonisation funding arrangements and commitment to long-term decarbonisation funding from central government.	Agreement of funding programme and devolution of funding to combined and local authorities in the North to administer to social housing providers Regional campaign pilot to improve awareness of home heating choices starts
2021	Local authorities and combined authorities develop local heat plans in partnership with skills providers including colleges and universities. Regional audit of housing stock quality across the North.	Establishment of a Northern Skills Plan for housing decarbonisation setting out key devolution asks from combined authorities.
2022	Housing decarbonisation menu available to social housing providers following completion of the regional audit with appropriate interventions for key dwelling archetypes.	Extended low-carbon housing grants end in March. Regional campaign pilot ends and is evaluated with lessons learnt for similar, national campaigns.
2025	Interim evaluation of the social housing decarbonisation programme for the North with publication of lessons learnt to date and a technological options menu for different housing archetypes which is aimed to inform owner occupiers and the private rental sector.	A clear menu of options based on success in the social housing sector, significant uptake in training programmes boosting labour supply, and the development of supply chains in the North flowing from the social housing decarbonisation programme encourages accelerating uptake in other tenures of energy efficiency retrofit and decarbonised heat.
2030	All homes in the North attain EPC C performance or better. Social housing decarbonisation programme completes: all homes in the North's social sector have decarbonised heating systems. Evaluation of social housing programme and 'lessons learnt' to review policy for owner occupied and private rental stock.	Approximately 53,000 jobs are created in retrofit by this point. £23.6 billion, 50 per cent from government grant funding, has been invested in the North's social housing by this point.
2035	All homes nationally attain EPC C performance. Peak of economic impact related to this decarbonisation programme.	Approximately 77,000 jobs are created across the programme by this point boosting GVA nationally (directly and indirectly) by £9.46 billion per annum (in current prices).
2050	Programme completes: all homes in the North have decarbonised heating systems.	

Source: Authors' analysis

KEY RECOMMENDATION 2: BUILDING A STRONGER, MORE RESPONSIVE, AND LOCALISED SKILLS SYSTEM TO DELIVER THE HOME IMPROVEMENT PROGRAMME FOR THE NORTH

The economic stimulus package set out above will help to provide a significant boost to demand for retrofit skills across the North but more needs to be done to connect the opportunity with the potential beneficiaries which include school leavers, career switchers, people in technical jobs who have been made redundant and firms who deliver traditional trades such as plumbing and heating engineers.

Increase skills demand

- Social housing providers should **'lead by example'** by offering training accreditation to their own technical teams as well as from within their own supply chain through the procurement process.
- A programme of awareness, coordinated by the Northern Powerhouse, energy hubs and NP11, raising about the business opportunities of retrofit should **target firms in the North**, including plumbers, heating engineers, builders and plasterers/decorators. From this work, partners should develop a Northern skills plan for decarbonisation.
- Pilot a **regional housing public campaign**. At a time when people are tending to spend more time at home because of the Covid-19 pandemic, the importance of home central heating and comfort has become important. Subsequently, this could present a useful moment to encourage people to think more consciously about the home heating choices that they make and plan. Over a 12-month period, a public awareness raising campaign could operate to explore home heating choices, as well as advertising the funding support available. We would suggest that this should also include active participation from the public, for example, citizen juries with social housing tenants and tradespeople to provide opportunities to learn more about people's views and perceptions and about how to encourage greater take up of schemes in future.

Strengthen supply of retrofit skills in the North

- BEIS should work closely with the Department for Education (DfE) along with skills leads in the regions to examine how enrolment timetables within HE can be made more flexible so as to increase supply of places for trades skills, with the option to pilot a different approach in the North. This could form part of the forthcoming FE white paper.
- BEIS and the energy hubs should work with housing providers to pilot incentives schemes for northern based firms which subsidise training and accreditation opportunities in low carbon heating systems. This could be done alongside the awareness raising campaigns outlined above.
- Social housing providers should **develop partnerships** with their local colleges and employment and skills boards (within LEPs) to get their help in making retrofit skills a priority for economic recovery. This collaborative work could also include the use of IoTs. Strengthening the remit of LEPs could boost local productivity through enhanced and extended partnership working – encourage employers to pursue the 'high road' to business success.
- Combined authorities with devolved responsibility for adult skills budgets should be encouraged to prioritise retrofit skills and work with colleges and housing providers to boost take-up.

FURTHER NATIONAL RECOMMENDATIONS FOR CENTRAL AND LOCAL GOVERNMENT: POLICYMAKERS SHOULD ADOPT POLICIES TO ACCELERATE DECARBONISATION OF HOMES IN THE NORTH WHICH ARE ALSO APPLICABLE ACROSS THE COUNTRY

We have also identified a number of national recommendations to accelerate the decarbonization of homes in the North.

- 1. Develop local authority heat plans:** Area-based, whole-house approaches will be vital in reducing costs (through economies of scale) and helping to meet wider goals. Local authorities can help convene stakeholders to implement heat networks where possible and work with electricity providers to ensure local electricity supply is ready for neighbourhood-level changes. The government should also permit local authorities to implement heat zoning in their local plans to allow local authorities to make longer term plans for infrastructure such as heat networks.
- 2. Develop a local and combined authority planning strategy for low-carbon new homes:** Homes built with gas boilers will need their heating systems replaced within the next decade or so for local areas to meet 2030 net zero targets. New homes should be prevented from connecting to the gas network and using carbonised heat sources imminently – further building market demand. This should be considered as part of the planning white paper.
- 3. Extension of the national low-carbon housing grants until at least March 2022.** The current grants and funding regime for housing decarbonisation is not fit for purpose and should be extended until at least March 2022. In addition, the government should work closely with their preferred accreditation providers to examine how take-up from firms can be increased.
- 4. End to local authority austerity and introduce a fair funding model:** Local authorities will play a significant role in marshalling both their economic recovery and preparing their places for a net-zero future – including by supporting the decarbonisation of their local housing stock. But, their housing and planning capacity, especially in the North, has been disproportionately lost (NHC 2020). This follows 10 years of austerity which has greatly reduced their capacity (Johns 2020), and the stresses of responding to Covid-19 and related financial difficulties. Local authority capacity is fundamental to a successful decarbonisation agenda and a fair funding model is urgently required to restore capacity and ready it for the task ahead.

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