Heat in buildings strategy - achieving net zero emissions: consultation

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30 April 2021

About Energy Systems Catapult

Energy Systems Catapult (ESC) was set up to accelerate the transformation of the UK's energy system and ensure UK businesses and consumers capture the opportunities of clean growth. ESC is an independent, not-for-profit centre of excellence that bridges the gap between industry, government, academia and research. We take a whole-system view of the energy sector, helping us to identify and address innovation priorities and market barriers to decarbonise the energy system at lowest cost.

We welcome the opportunity to comment on this consultation given our extensive work on buildings decarbonisation, our work on innovative business models such as Heat as a Service, the innovation trials in our test environment, the Living Lab and with innovators through our incubation programme Energy Launchpad.

Our Position

Energy Systems Catapult broadly supports the intention of Scottish Government's proposed actions to meet its climate change targets, ensuring a just transition, driving economic growth, and addressing fuel poverty.

Our work is centred around transforming the energy system, which involves a substantial focus on place-based activity, and our whole systems view considers the interactions between the traditional energy silos of power, heat and transport, but also seeks to understand how market arrangements and policy drivers can work collectively to deliver net zero.

ESC is appreciative of Scottish Government's urgency to address the issues of heat decarbonisation and look forward to working with the Scottish Government on these issues in future.

Summary

The proposed measures indicate a good direction of travel and we would urge Scottish Government to consider the following in its proposals:

Potential of new business models such as Heat as a Service

- We are encouraged by Scottish Government's appetite for new business model innovations including concepts such as Heat as a Service, which offers a new model for how businesses sell heating, and tailored heat offerings based on individual preference (e.g. – a conceptual 'warm home') opposed to buying kilowatt hours of fuel. Such an approach can fundamentally shift public attitudes towards energy and we believe that new business models and innovative service offerings can play a key role in making low and zero carbon choices attractive for consumers.

- In our recommendations to Scottish Government on how to understand and apply the potential of HaaS, we suggest that the approach can also help those at risk of fuel poverty, targeting measures at those who struggle to pay or whose homes perhaps are expensive to heat
- HaaS can encourage and enable consumers to improve the energy efficiency of their homes and install low carbon heating; and help policymakers tackle fuel poverty.

Building skills and supply chain

- We do not have the skills urgently needed to assess, install, and advise on the appropriate low regret technologies available at the moment and supply chain capacity far below the capacity to manufacture the 600,000 heat pumps targeted in the Prime Minister's 10-point plan. Without further emphasis on addressing these barriers, there is a risk that the market for installing low carbon technologies will simply be led by a fragmented and underdeveloped supply chain. It is imperative that the skills agenda is taken in tandem with the overall Heat in Buildings strategy.

Promoting whole systems thinking

- Whilst Local Heat and Energy Efficiency Strategies (LHEES) explicitly focus on heat decarbonisation and energy efficiency, we suggest that the approach should be undertaken as part of wider local energy strategies and decarbonisation plans, including aspects such as transport and spatial planning, local energy resources and renewable generation areas. It is worth building on Scotland's pioneering Climate Assembly to involve many more people in plans to decarbonise their areas.

Public Engagement

- It is imperative to consider how to deliver the low carbon solutions that the public actually want. Public engagement remains one of the key barriers to net zero and Scottish Government is right to point out that we need a change in perspective to get the public on board. Individuals and organisations must see energy efficiency and low and zero emissions heating interventions as positive choices, and we encourage proposals which focus on enabling people to gain trusted advice.

Creating Favourable Market Conditions

- Under current policies and market conditions there is both a lack of incentive for consumers and a lack of reward for suppliers for switching to low carbon heating technologies. Environmental and other policy levies cause gas to be favoured over electricity, and as underlined in the consultation, skews consumer choice towards fossil fuel-reliant technologies. We welcome moves to address the imbalance caused by consumer levies.

Responses to Selected Questions

Chapter 2 – A 2045 Pathway for Scotland's Homes and Buildings

1. To what extent do you support the pathway set out for achieving the 2045 net zero target and the interim 2030 target?

ESC supports the pathway set out by Scottish Government in the Heat in Buildings Strategy which signals good intention towards achieving the 2045 net zero ambition. As outlined in the consultation, targeting measures to boost energy efficiency, a focus on place-based programmes and the importance of driving decarbonisation through a combination of technologies can help Scotland's overall aims of meeting its

climate change targets, whilst ensuring a just transition, driving economic growth, and addressing fuel poverty.

2. What are your views on our assessment of strategic technologies in low and no regrets areas to 2030?

Over the next decade, policy should focus on implementing the strategic technologies which are available in the near term, whilst allowing markets to explore and develop alternative options in the run up to 2045.

As suggested in the consultation, energy efficiency measures, heat pumps and heat networks will comprise the most viable low regret options in the short term, however it is important to consider how innovation can drive the most suitable technologies in future.

Additionally, the UK as a whole does not currently have the skills urgently needed to assess, install, and advise on the appropriate low regret technologies available currently, whilst supply chain capacity is unable to manufacture the 600,000 heat pumps targeted in the Prime Minister's 10-point plan. Without further emphasis on addressing these barriers, there is a risk that the market for installing low carbon technologies will simply be led by a fragmented and underdeveloped supply chain.

There is not yet a national training framework covering all the skills required to handle low carbon technologies put forward by the *Each Home Counts* review, including relevant assessment, advice, integration of low carbon technologies and post-installation evaluation. As a result, there is a significant skills shortage in specifying and delivering high quality outcomes to decarbonise homes.

Our ambitious Net Zero targets will require both retraining and upskilling the current workforce, as well as identifying training programmes and accreditations for a new generation of tradespeople. Current training curricula are focused on new build and gas heating systems, and the few 'low carbon' training schemes that exist are fragmented and insufficient to meet the scale of change required.

It is also critical to make these technologies appealing, by ensuring they deliver the energy outcomes people want for a price they can afford to pay.

Chapter 3 - People

10. What in your view are the opportunities, if any, available to key organisations, such as local government, businesses and trade associations and community or other non-government organisations, in supporting this public engagement activity?

It is imperative to consider how to deliver the low carbon solutions that the public actually want. Public engagement remains one of the key barriers to net zero and Scottish Government is right to point out that we need a change in perspective to get the public on board. Individuals and organisations must see energy efficiency and low and zero emissions heating interventions as positive choices, and we encourage proposals which focus on enabling people to gain trusted advice.

In a recent blog post on public engagement, we highlighted that positive, real-world experiences would be pivotal in driving change at scale. We welcome the proposals to build upon existing advice services and the focus on taking steps to raise awareness and understanding of new technologies. People often need to experience something new so they can form a view on it. Most people didn't know they needed a smart phone before, then tried one and now they can't live without them. Which is why it's so important to try things out in the real world. This can be hard with innovative business models like Heat as a Service, but it's not impossible.

Our real-world test environment the Living Lab aims to trial domestic energy and decarbonisation solutions with the aim of de-risking and scaling innovations for the wider market. At the centre of the Living Lab is a growing network of over 200 trial-ready homes across England, Scotland and Wales with a variety of tenures, property types and demographics.

ESC delivered a trial across 100 homes in our Living Lab as part of Phase 2 of the SSH programme which investigated how consumers used heat and tested their interest in buying HaaS. It found that 85% of Living Lab households trialling HaaS were open to switching to low carbon heating when it came time to replace their incumbent gas boiler – compared to around a third of the general population – as long as current levels of comfort and cost could be guaranteed,[1] suggesting disruption in homes was less of an issue as long as the desired outcome was delivered.

Giving the public practical experience of new policies, regulations and market arrangements will enable them to provide better input into their design as they will understand the trade-offs involved. Scottish Government can use this kind of public engagement activity to create the conditions where innovative business models such as Heat as a Service become familiar and work well for consumers.

In our Heat as a Service review for Scottish Government, we put forward a range of 6 recommendations for the concept to move forward:

1. **Learn**: Continue to engage with the Danish authorities to understand lessons from its HaaS Support Scheme for oil boilers, and implications for Scotland.

2. **Place**: Use local area energy plans (such as the Local Heat and Energy Efficiency Strategies in Scotland) to pick the places where HaaS has most potential in Scotland

3. **People**: Work directly with businesses and consumers to understand how to overcome the challenges they have with selling and buying HaaS in Scotland.

4. **Trial**: Invite businesses to test HaaS with consumers in Scotland to explore how it can be designed, delivered and achieve Scotland's decarbonisation aims.

5. **Intent**: Set out a roadmap on the potential for HaaS to contribute to heat decarbonisation and tackling fuel poverty, to encourage industry to invest in understanding the potential.

6. **Legislate**: Develop and deliver any legislation needed to unlock the HaaS opportunity

Developing products and services that people are engaged with can help local governments, businesses, trade associations and communities to deliver on their targets; designing approaches through the steps laid out above will save time, reduce costs and increase support.

18. In your view, is there any further action that we, or other key organisations (please specify), can take to protect those on lower incomes, and those in or at risk of falling into fuel poverty, from any negative cost impact as a result of the zero emissions buildings transition?

In our recommendations for Scottish Government on how to understand and apply the potential of Heat as a Service (HaaS), we suggest that HaaS can help those at risk of fuel poverty and be targeted at those who struggle to pay or whose homes perhaps are expensive to heat.

[1] https://es.catapult.org.uk/reports/smart-energy-services-for-low-carbon-heat/

As suggested in the evidence review, HaaS could help overcome two of the main barriers to low carbon heating; cost and comfort. It has been found that people at risk of fuel poverty do not just want to minimise what they spend, rather they want to be able to manage how much they spend whilst getting the heat they want.

As part of our work on Fair Futures, ESC conducted an innovation trial, Fuel poverty in a smart energy world which explored how innovative technologies such as smart heating controls impacted vulnerable energy consumers. Our research found that most people thought it would be useful to understand the cost of their heating and there was a desire to know upfront that they could afford to heat their home in future.[2]

One recommendation was that innovators could design and develop smart local energy systems in a way that engaged and enabled fuel poor consumers to buy and use their energy in ways that are important to them (e.g. wellbeing), rather than focusing on minimising cost.

One prototype we developed, focused particularly on fuel poor households is Warmth on Prescription – an innovation trial, aiming to deliver warm homes to vulnerable energy consumers by heating their homes to 'healthy temperatures' at no additional cost to them. Our findings indicated that health care practitioners liked the idea, people that had smarter heating controls installed found it much easier to control their heating and overall people felt healthier and more comfortable.[3]

We found that vulnerable households want to use heat in the same ways as other households but found that there can be serious implications if costs were more than expected.[4] For this reason we would encourage smart energy systems to play a part in the decarbonisation of heat journey, encouraging offerings such as smart energy controls, and service offers such as HaaS and Warmth on Prescription.

Chapter 4 -Place

21. What are your views on how we can support place-based deployment of zero emissions heat within our delivery programmes?

ESC's work on Local Area Energy Planning (LAEP) can be a critical enabler of place-based heat decarbonisation, helping to guide decision-making to transform local energy systems. LAEP provides a data-driven approach to analysing the cost-optimal, low-carbon solutions for a local area, for example by recovering elements such as waste heat from industrial processes to be captured and located nearby potential users of that heat.

Local Authorities will be vital in this transition, LAEP offers a way for development control in the planning system and central government investment in local capacity & capability development to be brought together. Local Planning Authorities can use planning powers to set standards for developers and impact the direction of local energy plans.

[2] https://es.catapult.org.uk/reports/fuel-poverty-in-a-smart-energy-world/
[3] http://www.peoplelab.energy/2020/07/21/warmth-on-prescription/

[4] https://es.catapult.org.uk/reports/fuel-poverty-in-a-smart-energy-world/

22. What is your view on how best to engage, and support, local communities in the planning and implementation of the heat transition in their area?

As suggested in response to Q10, public engagement remains one of the key barriers to net zero and there needs to be a significant change in perspective at scale to make people aware of the heat transition in their local areas. Policy must work to deliver the products and services the public actually want.

The key will be to go from deep conversations with a small number of citizens through Climate Assemblies, to engaging many thousands of people in each area with more detail on what high level plans mean for each household. Understanding what citizens want, in their homes, will improve the plans in each area, making them more deliverable and more investable because it's easy to demonstrate public support.

Our Innovating to Net Zero Report, highlighted that the uptake of unfamiliar low carbon heating technologies such as heat pumps and heat networks will be driven by new market propositions that go above and beyond the incumbent gas boiler,[5] a technology which is familiar, easy-to-use, and relatively cheap for many households.

Our insights report, Understanding Net Zero: A Consumer Perspective sought to understand public attitudes to climate change, low carbon technologies and behavioural shift. It highlighted that only 49% of people identified gas boilers as a contributor to climate change, with an acceptance from those in the 49% that making the change to lower carbon alternatives would be both difficult and expensive.[6]

Designing technologies and services that consumers want will ultimately drive confidence, engagement and desirability, and will be crucial to the low carbon heat transition, particularly at a local level. Overcoming these barriers at scale will be difficult, but our research suggests innovative offerings, propositions and business models could be a way to approach this.

We are piloting digital means of consulting thousands of people on plans to deliver Net Zero by 2038 in the Greater Manchester Combined Authority region, and we would be keen to share the findings with Scottish Government to see how they might apply such an approach.

26. Do you agree with the approach to LHEES set out above? If not, please give reasons to support this.

LHEES identifies priorities for spatial zones based on policy priorities set by local authorities and can be a useful starting point to develop wider local energy strategies. LHEES is explicitly focused on heat decarbonisation and energy efficiency, rather than a whole systems view, however it is recognised that LHEES should not prevent wider planning.

In the imminent (at the point of writing) Ramboll / ESC methodology review for Scottish Government, our assessment of LHEES suggested that whilst there is value the LHEES approach, it should be undertaken as part of wider local energy strategies and decarbonisation plans including perspectives on transport and spatial considerations, which could be used in conjunction to identify elements such as local resources and renewable generation areas.

The LHEES methodology could be adapted to incorporate a wider whole system view as it currently only considers heat and energy efficiency. The strategy development approach should ensure that solutions are not considered in isolation.

[5] https://es.catapult.org.uk/reports/innovating-to-net-zero

[6] https://es.catapult.org.uk/reports/net-zero-a-consumer-perspective

Local Area Energy Planning (LAEP) pioneered by ESC is a method for analysing cost effective, low carbon solutions for a local area and its energy systems. Local Area Energy Plans could be used to understand and evaluate the cost-optimal solutions for local areas given a localities' characteristics suggest which technologies may be most suitable for a certain area, and used in tandem with LHEES to add value in non-technical aspects such as local skills and supply chains.

We would also recommend exploring how the LHEES approach can be combined with scenario modelling to identify low-regret options for zoning, to help stakeholders understand cost and carbon emissions implications. The Local Area Energy Planning Ofgem methodology states that technical analysis could combine decision and scenario modelling, enabling stakeholders to understand the cost and carbon emissions implications.

Chapter 6 – Kick-starting the Investment in the Transition

38. Do you agree with the strategic funding priorities set out above?

SMEs often lack the time and resources to consider, evaluate and implement energy efficiency and/or low carbon measures. Learnings from previous schemes similar to Energy Efficiency Business Support have indicated that SMEs require much more than an interest free loan if they are to install new technology e.g. remuneration for loss of trade as a result of shutting business for 2-3 days. Existing schemes which offer energy efficiency measures at a discount are still struggling to get projects over the line because the SMEs need a turn-key service, not just an audit or discount. A recent trial which targeted 7500 SMEs for a low carbon trial managed to convert 120 SMEs only, highlighting the challenge. A lack of understanding and confidence in savings from the measures installed have also been highlighted as key reasons for not implementing measures.

Therefore, additional consideration should be given to how best to align low carbon and energy efficiency measures with SMEs operations to help better highlight the value created. For example, encouraging or incentivising fit out specialists to promote and market low carbon solutions will help to integrate appropriate technologies into a refurbishment process, rather than disrupting the daily operation of SMEs.

40. What are the opportunities and challenges we face in maximising our £1.6 billion investment?

To maximise the opportunity created through the provision of £1.6bn we recommend focusing on and identifying business models which enable the whole net zero pathway to be financed. Allowing potential investors to cherry-pick which interventions to finance without limitation presents a risk which could lead to profitable interventions being financed and public money being unable to finance less financially 'efficient' or higher risk interventions required to achieve net zero. This would risk leaving Scottish Government with the responsibility for funding harder-to-treat measures through short-term focused initiatives which are unlikely to support a long-term market development.

Identifying the co-benefits that will accrue as a result of energy efficiency and low carbon heating should also be a considered as a key opportunity. These could include NHS & Local Authority savings attributable to fewer hospitalisations and reduced social care costs as a result of providing a healthier living environment. Not all co-benefits can be internalised, however business models should be able to incorporate some of these benefits, made all the more achievable through leveraging national or local government funding. The economic, health and social impacts will likely be accrued over a longer-term time frame, but understanding their impact is paramount to demonstrating a viable business case and will help to justify a longer-term market framework.

41. What are your views on the role of government funding over the next five years? For example, should it be focused towards significant increases in the volume of renewable heat and energy efficiency measures installed or more targeted at specific priority groups or technologies?

There is a huge amount still to learn if we are to build a net zero future everyone can enjoy. It is worth investing a small proportion of this investment now to learn how to invest the rest wisely later on.

A proportion of public funding should continue to be targeted at priority groups such as those living in fuel poverty and other vulnerable households. Targeted whole house retrofits will have a significant and beneficial impact on those who receive access to the Warmer Homes Scotland scheme. However, financial support in the form of grants is unlikely to solve the wider socio-economic problem of fuel poverty in the short-term due to the scale of the problem. Therefore, a longer-term approach which aims to reduce the capital costs and de-risk investment in low carbon heating and energy efficiency measures is required to create a sustainable long-term market where the supply chain is able to support in tackling the problem, through viable service models which place the customer at the heart of the offer.

Over the next five years, policymakers must work to figure out how to tackle the harder problem of encouraging owner occupiers to decarbonise their homes. Undoubtedly this will take time to learn, but there is scope to scale up quickly within few years. Investing now can help forge a tried and tested approach to scale in the future.

42. What are your views on how we can use our funding to leverage and encourage private sector and other forms of investment?

Private investment and capital are required for building heat decarbonisation. Returns from infrastructure projects are typically made by generating revenues from operation of an asset, delivery of a service, or from the sale of the asset.

There are a range of technologies available to support the decarbonisation of heat in buildings, some of which do not yet offer a compelling return on investment and risk profile to attract private sector investment. Building decarbonisation is ultimately an infrastructure priority but the business models and technologies required do not yet offer acceptable risk profiles to infrastructure funds and investors. Business models for smart metering/data and, to a certain extent, flexible power solutions now exist in the market, but low carbon heating and energy efficiency are still lagging. Aligning residential low carbon heat and energy efficiency with these other key areas, potentially through revenue support mechanisms in addition to financing support, will help to give confidence to the finance industry and leverage further investment.

Therefore, a combination of public and private funding should be used to support and de-risk those specific asset classes to help encourage lower cost of capital investment from the private sector. Attracting private finance for heat decarbonisation programmes led by local authorities may also enable a more strategic approach for financing, aligning with wider community benefits. This would allow development of a wider programme that integrates benefits from multiple projects, compared with the more traditionally siloed approach that is often found with Public Works Loan Board (PWLB) or grant funding. For example, Green bonds are fixed-income securities that governments can issue to raise capital for a project that contributes to a low-carbon economy. Green bonds can be particularly attractive to institutional investors seeking to increase their participation in green infrastructure investment. Currently, these are not available at the scale required in the UK but are widely used internationally.

Developing a co-ordinated and visible pipeline of heat decarbonisation projects should be considered to generate interest from investors and demonstrates the size of the investment opportunity. Scottish Government should also ensure communication of project activity across LAs, helping to find opportunities

to collaborate on projects. This will help to generate economies of scale for efficient use of public funds, and to aggregate projects to create the scale of investment investors are looking for.

Chapter 7 – Working Towards a Long-Term Market Framework

45. What are your views on the approach outlined above to take action towards a long-term market framework for net zero emissions in buildings?

We are encouraged by Scottish Government's proposals towards a long-term policy framework and its focus to target a pathway to encourage energy efficiency and low carbon heating in homes, its capital funding commitment to kickstart development, and proposals for an underlying regulatory framework which would work to encourage investor and consumer confidence in the low carbon heating market.

Scottish Government is correct to posit that behavioural change and public attitudes must be transformed considerably before low carbon technologies become positive, viable choices and that new, innovative approaches to financing heat decarbonisation and energy efficiency measures will be key help develop this transition.

As suggested in response to Chapter 3, co-designing policies and trialling them in real-world test environment such as ESC's Living Lab will give government more confidence in products and services which will work for people and businesses.

EPC Reform and Green Building Passports

Our overall view is that governments should be thinking much more radically about EPC reform and how this can link to green finance products to reflect real-world energy and carbon performance data, including reforms to the way in which the Standard Assessment Procedure (SAP) and the Energy Performance Certificate (EPC) are used in regard to net zero and the concept of building passporting to document changes to buildings. We have also proposed the idea of introducing carbon performance requirements for all buildings (see our Six Steps to Zero Carbon Buildings work cited below).

ESC's incubator programme, Energy Launchpad works with several innovators in the buildings space who have highlighted challenges associated with the SAP accreditation process. The team have been supporting innovators to help navigate the process and therefore have direct feedback on the shortcomings of the process.

Current policy centred around meeting EPC target 'x' by an arbitrary date will fail to incentivise smart new innovations that the UK urgently requires for net zero buildings. At the moment, there is a significant lack of incentive and recognition through routes into SAP through Appendix Q for innovative technologies.

Heat as a Service

We are encouraged by Scottish Government's appetite for new business model innovations including concepts such as Heat as a Service, which offers a new model for how businesses sell heating, and tailor heat offerings based on individual preference (e.g. – a conceptual 'warm home') opposed to buying kilowatt hours of fuel. Such an approach can fundamentally shift public attitudes towards energy and we believe that new business models and innovative service offerings can play a key role in making low and zero carbon choices attractive for consumers. Businesses can see the potential to pioneer new approaches in Scotland and would be keen to work with policymakers to learn how to make HaaS work, as is happening in Denmark.

Creating Favourable Market Conditions

Scottish Government is absolutely right to focus on the imbalance of energy pricing which currently tips the balance in favour of high carbon technologies in the UK.

Under current policies and market conditions there is both a lack of incentive for consumers and a lack of reward for suppliers for switching to low carbon heating technologies, which is a key barrier which arises due to the imbalance in effective carbon pricing. Environmental and other policy levies cause gas to be favoured over electricity, and as underlined in the consultation, skews consumer choice towards fossil fuel-reliant technologies. We welcome the proposals to rebalance consumer levies.

A policy framework to drive building decarbonisation

Energy Systems Catapult have laid out a proposed framework in its 'Six Steps to Zero Carbon Buildings'. The Six Steps aims to create a coherent set of new planning processes, standards, obligations, subsidies and market incentives that can combine to drive action throughout the supply chain and highlights the need to make heat decarbonisation a shared responsibility, incentivising action across vectors and stakeholders.

1) **Funding a new wave of place-based programmes** – investing strategically in energy improvement, retrofit and skills development could hold the key to building up demand and driving long term market competitiveness for low carbon solutions by region or area. This could involve a mix of public investment, coordinated by local authorities (e.g. from post-Brexit regional 'prosperity' funds) as well as private sector partners and contributions from existing funding programmes. This would also align with objectives around stimulating post-COVID19 economic recovery across UK regions.
2) **Rolling out Local Area Energy Planning (LAEP)** – by using robust data analysis to create integrated local energy plans, decarbonisation can be driven through coordinated investment in energy infrastructure from a whole systems perspective. LAEP is a critical enabler of decarbonisation and is a method for analysing cost-effective, low carbon solutions for a local area and its energy systems.
3) **Making energy networks invest to reach Net Zero carbon** – with Ofgem re-engineering its RIIO processes and guidance, ESC have been advising and supporting the regulator with the future development of the RIIO2 price control framework, with LAEP put forward as a possible model to guide strategic investment for electricity distribution networks (DNOs)[7]
4) **Phasing in carbon performance requirements across all buildings** – akin to an MOT required by car owners, minimum standards based on carbon emissions could phased in to address building carbon performance, perhaps introduced at the point of sale, or when a property changes hands. Over time, markets could open up and competition could help tip the balance for property owners in favour of low carbon technologies.
5) **Rewarding low carbon choices through energy bills** – a new carbon credits scheme could reward consumers to reduce their actual carbon emissions through their energy bills. Working alongside Step 4, suppliers could measure actual usage against a carbon performance benchmark which tightens over time. When a property's emissions fall below or above that benchmark, the property owner is then given a respective bill reduction or surcharge.
6) **Building markets for new finance products for low carbon solutions** – helping people to afford the upfront cost of low carbon solutions will be key to heat decarbonisation. As well as public grants and funding, government could encourage private markets to develop and offer green mortgage-style services to encourage uptake of low carbon products.

[7] https://es.catapult.org.uk/reports/local-area-energy-planning-the-method/

Proposals for a public energy company

Establishing a retail energy company comes at a high expense whilst also locking out innovation from the private sector. New entrants to the energy retail market over the past 5-10 years have displaced customers from the 'Big 6' by offering more competitive and consumer-centric tariffs. These stakeholders are now able to offer additional value aside from the supply of energy and have expanded into low carbon home improvements, dynamic pricing, Time of Use tariffs and electric vehicles. Additionally, recent evidence of public energy companies does not bode well given the public market exits of both Bristol Energy and Robin Hood, which have come at a significant price to taxpayers.

As an alternative we would encourage Scottish Government to explore the option of **establishing a national energy services company (ESCo) which could partner with retail suppliers in the market**. This approach would still allow the ESCo to focus on key priorities such as fuel poverty, area-based decarbonisation, and community initiatives, but without exposing a state-run entity to market risks within the wholesale market. This type of approach would enable the leveraging of a range of low-cost public and private finance options, including green bonds, energy company obligations and grants. A national ESCo would also create an opportunity to explore and validate non-repayable debt which focuses on capturing the additional value of energy efficiency improvements, including fuel poverty, health, employment, air quality.

Another option could be to create the market conditions for service providers, as evidenced in Europe. In Denmark for example, government is working with business to design new market rules that enable consumers to buy heat as a service delivered by heat pumps. Co-creating new market arrangements is a hugely valuable activity and learning how to harness market forces to deliver public policy goals could be a promising step forward.

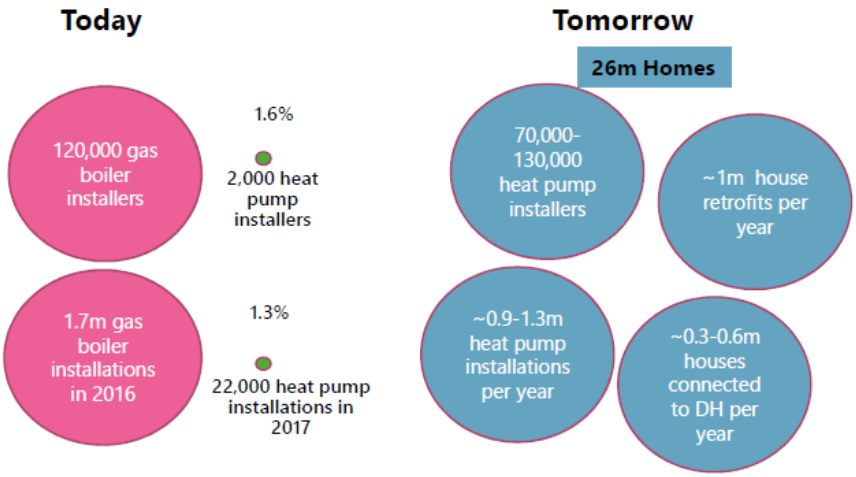
Chapter 9 – The Economic Opportunity

57. In recognition of the proposals in the forthcoming skills consultation, what further action can be taken to support skills development in Scotland over the lifetime of this strategy?

The building and heating sector is not able attract enough people for 'business as usual', but now needs hundreds of thousands more staff. The buildings sector will need to attract both new entrants, upskill current professionals and develop new working practices if Net Zero is to be achieved. This is doable, but only if there is a genuine step change in our approach to the skills agenda.

ESC has interviewed over 60 individuals and organisations to understand the skills requirements for the transition to net zero which highlighted a triple challenge for building decarbonisation: the areas that urgently need addressing can be broadly split into three categories – quantity, quality and complexity.

Quantity – the size of the problem is enormous, and currently there is not enough tradespeople and relevant skills to carry out the work at the scale required. With over 26m homes in the UK, there are millions of individual interventions that need to be coordinated nationally, regionally and locally. Our ambitious Net Zero targets will require both **retraining and upskilling the current workforce**, as well as identifying training programmes and accreditations for a **new generation of tradespeople.**
In the UK as a whole, to service our 26m homes by 2050 we need to ramp up our efforts considerably as shown in the diagram below:



Quality – current training schemes fall short of the requirements needed for the low carbon transition with **many training programmes focusing on fossil fuel technologies**. Where training is available, for instance with heat pump installers, programmes focus purely on installing the technology, rather than on a whole system integration and customer aftercare and advice.

Complexity – consumer confidence in the building decarbonisation journey will be key to driving the low carbon transition. Today's supply chain is fragmented and piecemeal, with **customers often having to manage relationships with different points of contact** which can be both confusing and time consuming. Each home will **require different solutions** so it is important that this gap is addressed.

We are encouraged by Scottish Government's approach towards enterprise partnerships through initiatives such as the South of Scotland Economic Partnership (SOSEP), and its launch of the skills-based Green Academies. ESC think that this could work as a perfect opportunity to support skills and boost economic growth in these areas and would encourage proposals which build on these foundations.

Overall, there must be an ambitious long-term plan which will deliver a step change in skills development and training. This must work to raise ambition and improve coordination to solve the triple challenge outlined above.

55. What more can be done to support the development of sustainable, high quality and local jobs in the heat and energy efficiency supply chain across the breadth of Scotland?

Continued grants to support with market development are welcomed due to the current lack of opportunity for private financing, however **Government grants alone will not achieve the £33bn of investment required for reaching net zero in buildings**. A clear and validated trajectory of how to de-risk the technologies associated with net zero buildings is required to accommodate the risk appetite of investors.

Support from Scottish Government should be **focused on developing immature and high risk technologies**, followed by clear market signals to encourage investment by the private sector and support the development of a long-term and sustainable market and supply chain. Investment should be guided by industry surveys to establish the initiatives and support required by Scottish industry. Similarly, a long-term low carbon building supply chain competitiveness programme should be considered as a means of providing training to help build an integrated supply chain and adapt skills within existing supplier, encouraging a whole systems approach to building decarbonisation.

Investors require a clear understanding of how energy efficiency business models can scale, along with a comprehensive suite of regulatory standards and mechanisms which aim to overcome the long pay back

periods associated with energy efficiency and low carbon assets. This market failure should be focused on and addressed to ensure supply chain and infrastructure investors can realise the project scale and returns and required.

58. Are you aware of any barriers to the reskilling of existing oil and gas heating engineers to equip them to install low and zero emission heating?

The existing Scottish (and rest of UK) low carbon heating supply chain has a problem in that **it does not have the scale or technical capabilities for domestic heat decarbonisation** and, although the current demand for these services is relatively low, if a shift in policy were to be introduced it is **unlikely the installer base would be able to respond immediately**.

We support the proposals for a just transition and **encourage a practical strategy** to conduct market research which identifies the transferable knowledge within the oil and gas heating engineer base to develop a training initiative to support the re-skilling of existing high carbon installers.

We do however suggest considering some of the practical barriers for heating engineers:

The Gas Safe Register (formally CORGI) and Microgeneration Certification Scheme (MCS) are nationally recognised quality assurance and safety schemes intended to ensure safe working practices and consumer welfare when installing gas boilers and heat pumps respectively. Feedback from a previous parliamentary group for renewable and sustainable energy (PRASEG) event suggests installers feel the MCS is structured to provide 80% consumer protection and 20% technical capability , and the scheme is thought of as a **costly layer of bureaucracy which acts as a barrier to entry for smaller installers**.

The Gas Safe register provides a self-certification facility to allow businesses to comply with a legal requirement which states that a local authority must be informed when the installation of any heat producing gas appliances is undertaken. There is no other audit or quality assurance checks placed on installers, but they must reregister every 3 years to maintain their certification.

The **exact costs of each certification scheme are difficult to quantify** as it varies depending on which accreditation organisation is used and the time taken for the individual to complete the required stages. However, due to the low numbers of heat pump installers in the industry the cost of accreditation is amortised across a much smaller portfolio of customers which ultimately translates into higher costs for the consumer.

This is a **considerable amount of additional resource, particularly for self-employed/sole traders**, and especially when the additional qualification requirements listed have some crossover with mandatory modules contained within the NVQ syllabus. For example, the level 3 plumbing and heating requirements offer a heat pump pathway which covers installation, servicing and maintenance of heat pumps and amounts to 80 hours of classroom learning. **Streamlining the MCS process for candidates who have pursued a relevant pathway may help to encourage more installers to engage with low carbon heating solutions** rather than seek an alternative pathway, such as oil firing and solid fuel. At present, a lack of demand and high accreditation costs have resulted in MCS registered installer numbers falling to approximately 2,000, therefore a shift to low carbon heating will require significant accreditation investment from installers.

ESC Recommendations:

- Evaluate the opportunity for **streamlining MCS based on existing syllabus** to understand whether certain requirements could be removed, and costs reduced, without creating a risk for the consumer.

- **Survey industry and demonstration partners** to discover the time taken to transfer to low carbon heat in hypothetical scenarios based on installer experience/skill level and establish whether the results can influence training requirements.
- Engage with installer base to understand whether this type of initiative would encourage them to install/promote more low carbon solutions

Chapter 10 – Working with the UK Government

60. To what extent do you agree that the issues identified must be addressed jointly by the UK and Scottish governments to unlock delivery in Scotland?

ESC support the proposals by Scottish government in this chapter and believe that it is imperative devolved administrations work together. As suggested in the consultation, many aspects of energy policy remain outside of the remit of Scottish Government, and instead reserved to the UK Government. UK Ministers must take decisions to facilitate Scotland's own pathway and therefore tight collaboration be needed moving forward.