SEEP consultation response:

ENERGY STRATEGY – SCOTLAND'S ENERGY EFFICIENCY PROGRAMME (SEEP)

NATIONAL INFRASTRUCTURE PRIORITY FOR ENERGY EFFICIENCY

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This consultation response addresses the 'scenarios' section of the consultation, and the corresponding questions 4 – 26.

Scenarios

The role of regulation, standards and financial incentives

4. How might regulation and standards be used most effectively across the different sectors and when should they be applied across the lifetime of the programme?

Regulation and building standards, set at a national level, will have a crucial role in ensuring delivery of SEEP.

The regulatory regime should eventually coordinate with and support the delivery of local heat and energy efficiency strategies (LHEES). Applications of regulations could be applied to relevant zones specified within LHEES, to ensure that all building types comply with the needs of their local area (e.g. connecting to district heating where appropriate).

We favour a long-term standard consistent with the Programme vision and objectives could be set with a long-period for compliance.
This is because:

- Building owners are typically slow to invest in energy efficiency. There is disruption involved in installing measures. Energy prices are also often a small proportion of total expenditure which makes these investments a low priority. Incremental increases in standards will mean repeated disruptions, potentially higher total cost, and less overall effectiveness. This could trigger grievances among owners.
- Setting the higher standard required from the start will give property owners a clear message about where they must get to and by when. This offers more control over how to manage the improvements and costs, and against what timetable.
- Upgrades can also be triggered at key points alongside to support meeting these longer-term standards (e.g. point of sale, new rental contract or renovation). However, the overall rate of such activity is unlikely to be high enough to meet the required targets without a final deadline for compliance with standards.

Encouraging a more comprehensive / 'whole-house' approach to retrofit*
The research literature generally advocates a more 'whole-house' approach to retrofit as being preferable to a 'piece-meal' approach, although the evidence is to a degree mixed. It seems reasonable to assume that incremental targets would be more likely to result in a more piece-meal approach than a single target, although there is no documented evidence for this (due, to some extent, to a lack of retrofit regulation of retrofit standards in the UK or internationally).

Operating under the assumption that a single target would be more likely to result in a whole-house approach we will now outline some of the benefits of a whole-house approach, as outlined in the literature and some of the literature that elaborates on the outcome of a more piece-meal approach:

1. Cost, energy and time effective

A comprehensive approach as opposed to a more piecemeal approach, is generally perceived as "more cost and energy effective (Haines & Mitchell, 2014). This is partly because there are significant complementarities between some measures. For example,

- The disruption of some retrofitting (emptying a room and cleaning afterward) can be reduced by doing everything at once rather than over multiple occasions.
- If you are insulating an internal wall it makes sense to think about changing the windows at the same time.

The Retrofit For the Future project from the Technology Strategy Board makes several points about the benefits of a comprehensive, integrated approach (TSB, 2014).

2. A single, cost-effective change, rather than multiple, possibly cost-effective, possibly not cost effective changes

In terms of payback period and straightforward economic calculations, a change from D to C is less likely to be cost-effective than a change from E to C. Changing from an E property is likely to involve more 'low hanging fruit' which is generally more cost-effective. Moving from E to D is likely to be more cost-effective still (cherry-picking low hanging fruit), but if you ultimately have to move to C anyway it might be preferable to make sure it is not broken up into a cost-effective movement and then a non-cost-effective one. This might seem trivial but politically it might be very important i.e. getting people to make the D to C (less cost-effective move) may be a target for revisions if it occurs at a later stage, isolated from the more cost –effective measures.

'Cherry picking' of measures (Sweatman & Managan, 2010) can create a 'lock-in effect' (Paulou et al., 2014) with future retrofit becoming progressively more expensive, more difficult and less attractive (Galvin, 2010; Jones, Lannon, & Patterson, 2013)."

3. Limited trigger points, limited opportunities for change

If regulation to move to higher energy efficiency standards is to be connected to particular trigger points i.e. point of sale/rental, moving house etc. then it should be acknowledged that these are limited occurrences, and therefore, there will be limited occasions for energy efficiency improvements. With this in mind it may make more sense to regulate for one movement rather than several.

We recognise the danger that this single target will result in a lot or homes being left to the last minute and the target being watered down under political pressure (or scrapped). Generally, however, EPC ratings are gradually creeping up anyway and as long as policy support remains in place this will continue. Many properties therefore will achieve a rating of D or above by early 2020s without an interim target.

Policy support mechanisms that encourage greater improvements in energy efficiency by offering improved loan rates or higher grant levels for higher levels of energy efficiency improvement i.e. 25% grant with 0% loan for moving to C or above, and only a 0% loan, with no grant for moving to D, may help to encourage movement to the ultimate C rating at a faster rate without an interim target of D and the temptation to do the more easier, lower

hanging fruit instead of doing a more comprehensive set of measures in a single, energy-effective action.

Setting standards and regulation with timeframe realistic for the development of skills and supply chains*

Another important aspect to consider is that the success of regulations and standards is also reliant on those expected to implement them. Alongside building awareness amongst property owners, it is important to ensure that regulations are set with a timeframe that allows industry to respond (for example, developing awareness, training as necessary), and then maintained. For example, with the introduction of condensing boilers there was a 10-year lag between the introduction of grants to incentivise uptake and the introduction of a standard that led to condensing boilers constituting 100% of annual boiler sales. Even then, the natural replacement cycle of boilers meant that a large stock of non-condensing boilers remained in place for years after the standard was introduced (Killip, 2011).

Voluntary standards could play a role in supporting the development of skills and supply chains. Alongside longer-term required standards, a system of voluntary standards could be created, potentially linked to support programmes. E.g. more extensive support available for retrofits that meet a higher performance standard. International experience (such as the KfW programme in Germany) indicates this can be effective in both retrofit and new build sectors.

In addition, benchmark standards can be helpful in communicating energy efficiency; an issue particularly important given the role that local word-of-mouth can play in raising awareness of energy efficiency in communities where programmes are on offer. However, lessons from the UK government's Code for Sustainable Homes should also be drawn: such voluntary standards need to be supported with financial incentives, and a timetable for voluntary standards to become mandatory should be clearly and credibly articulated.

Establishing a forward-looking voluntary/mandatory standards approach for existing buildings would also reduce (though not eliminate) partial retrofit of buildings which would then need to be revisited some years later. In addition to the disruption and transaction costs this causes, 'cherry-picking' of the 'low hanging fruit' can make the subsequent improvements less financially attractive to the building owner. As articulated above, a package of measures may, when taken together, 'pay for itself' (against whatever criterion), while some components of the package may not when appraised individually.

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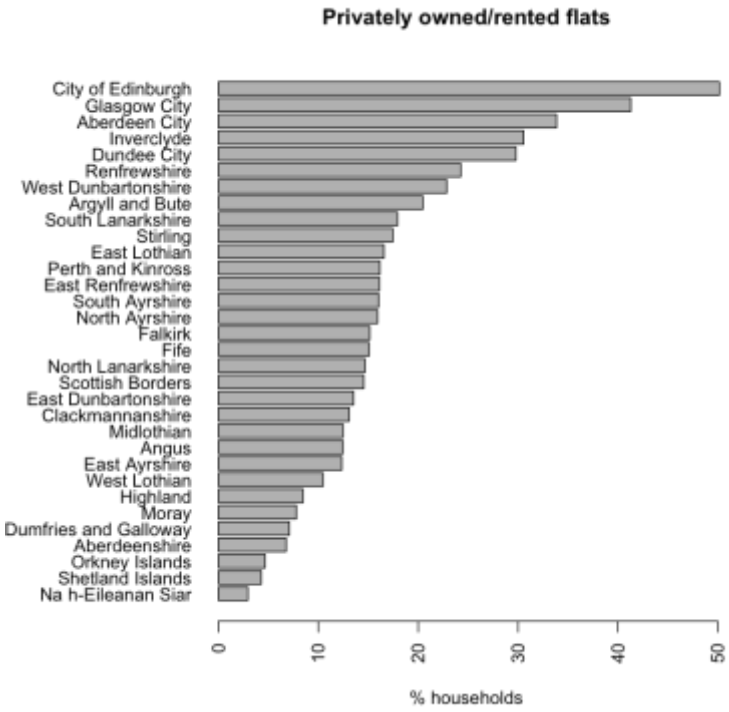
5. What should be the trigger points for buildings to meet standards? Should this differ between domestic and non-domestic buildings, and if so, how?

As far as possible, a single set of trigger points should be used for clarity and consistency. These should include for example: point of sale; point of major renovation where building owners must apply for planning permission or must meet specified building regulations; point of replacement of a heating/cooling system; start of new rental contracts/leases. Particular emphasis should be placed on trigger points when other building work is being undertaken, such that costs can be shared. Renovation is one of these, but point of sale is also often significant and a moment when building ownership is refinanced (meaning costs of energy efficiency can be rolled into mortgage borrowing, which is often the cheapest form of borrowing available to households). (Danish Government, 2014).

Introducing a trigger point based on replacement of heating systems should include provisions to support new training for all heat/gas services suppliers to ensure that they are equipped to engage with the building owner to identify the most energy efficient/low carbon options for replacement. Heating engineers are a critical interface for building owners and may be the *only* people with whom the issue of energy supply is discussed.

Complications in use of trigger points may arise in areas of Scotland where there is a high volume of privately owned and rented flats. Tenement buildings, for instance, have a mix of owner-occupancy and privately rented with different sale and rental contracts timescales in each individual flat. This would make it difficult to apply a whole building approach via a trigger point mechanism in these cases. Private landlords can also be more difficult to reach, and to our knowledge there are not comprehensive landlord registers. These issues are likely to be more acute in certain areas of Scotland. In Edinburgh, Glasgow, Aberdeen, Inverclyde and Dundee for instance, there are high proportions of households living in privately owned or rented flats. Figure 1. shows the proportion of households in each Local Authority that live in non-social housing flats. Edinburgh has the highest, with 50% of households in privately owned or rented flats, followed by Glasgow with 41%.

Figure 1. The proportion of households in each Local Authority that live in non-social housing flats (Census, 2011)



Another particular challenge to consider is the private rented sector, a large part of which is made up of a disparate group of landlords who own less than 4 properties. A Department for Communities and Local Government Private Landlords Survey (2010) that surveyed approx.. 1000 landlords. suggested that 81% of individual landlords nationwide only had one property, whilst 97% owned one to four. Data on this sector is not readily available.

A previous study considering issues of retrofitting energy efficiency of the private rented sector in London (Wilson & Wade, 2014) highlighted a couple of issues for this group in particular:

- Lack of liquidity – rental yields might not be particularly high, and independent landlords might not have access to larger sums of money for substantial improvements
- An EPC is required whenever a property is rented. However, in this study we had a sample of seven London Boroughs' EPC data and found that only 49% of households in the PRS had an EPC attached to them…could be lack of awareness amongst this group?

References:

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6. What do you think are the benefits of using financial and fiscal incentives to support energy efficiency in domestic and non-domestic buildings? Please give examples, from Scotland or elsewhere, of where incentives have been used in this way to good effect.

It is common for new regulation to be matched with some financial and/or fiscal incentive which makes compliance easier and lessens the likely rate of grievances.
Long term, stable incentives also improve business confidence in investment and innovation for supplying the energy efficiency market.

Easy access to capital (low cost loans or mortgages) to upgrade property is a proven facilitator for action (see for example Association for the Conservation of Energy (ACE) for the World Energy Council (WEC) (2013))

In addition there are examples, such as the German KfW programme, of a higher level of incentives being made available for property owners undertaking more ambitious upgrades. Higher incentives for more ambitious work should also support the necessary development of a whole-building approach to retrofit which can also reduce the total period of work and disruption and help to manage costs.

Incentives are however insufficient without pressure to act through regulation or other form of necessity (see for example research on the domestic sector: (Wilson, C. et al., 2015). A successful example of matching regulation with incentives is the Scottish regulation of the social housing sector, where successive increases in housing standards (SHQS & EESSH) have been matched by interest free loans to RSLs.

Evidence about the cost effectiveness of tax rebates/fiscal incentives for energy efficiency upgrades is mixed, because they are often accessed primarily by higher earners and are therefore paid to owners who would potentially have carried out such work without the tax benefit (see for example Nauleau, M. (2014)).

The impact of energy efficiency support on the public finances is also a consideration. German KfW programme subsidises energy efficiency loans, but macroeconomic calculation indicates the stimulatory effect on the economy (energy efficiency supply chains) and consequent tax income results in a net positive impact on the public finances (see Kuckshinrichs, et al., 2015).

In the private rental domestic sector, the 'split incentives' issue is likely to mean that easy access to low cost or zero interest loans, combined with regulation and an effective enforcement agency, will be significant for investment. In the commercial rented sector, 'reputational' incentives could also be used. For example, public procurement could specify the highest energy performance standards as a requirement for lease of office buildings; prominent energy performance labelling, as in the Australian NABERS and the US Energy Star Buildings programmes, has also worked to improve investor returns and to attract energy efficiency investment (Mallaburn, P., 2016)

References:

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7. What is the best approach to assessing energy efficiency and decarbonisation improvements to buildings? How could existing approaches best be used or improved and at what level and scale (e.g. unit, building or area) should assessment be carried out?

While consistency in measurement and messaging is important, it is also important to use the right tool for the right purpose. Metered energy consumption data is appropriate for issues such as monitoring aggregate progress, possibly identifying where energy efficiency measures are not working, and improving the accuracy of modelling (taking into account the likely performance gap between potential energy reductions and actual for different technologies). This could be achieved for example by using digital metering data, which is increasingly available. However, to assess and regulate the energy performance of buildings it is important to use a measure that abstracts away from differences in the ways people use buildings. Otherwise meeting regulatory standards could be achieved by keeping homes cold, and the standard achieved by a building would change when its occupants change.

A particular issue for SAP is that ratings are driven by estimated energy costs, meaning installation of low cost / high carbon central heating (methane gas) is at present a valid. This limits the momentum for low carbon/renewable solutions. In addition, the use of SAP in EPC ratings embeds a degree of discretion over ratings, which introduces potential inconsistencies in practice and potentially allows 'EPC shopping'.

The SAP building level assessment also needs to be integrated with consideration of district and communal heating options. SAP's design means energy sources, heating technology and fabric efficiency are all reduced to a single figure. This makes it hard to apply the heat

hierarchy consistently, and, with the development of LHEES, may mean some supply options (and hence EPC ratings) are only available in certain zones. Unless there are clear reasons to adopt different fabric performance standards for different energy supply vectors, energy efficiency regulation should focus on a minimum fabric standard, and use other mechanisms to support or require switching of supply for heating. A fabric standard could be expressed in terms of final energy demand for heating. An alternative (which could perhaps sit alongside an overall performance standard) is to regulate the performance of components (e.g. specify maximum U-values for walls, roofs, etc.) or even just to stipulate measures to be installed (loft insulation, cavity wall insulation, etc.). Separating fabric efficiency from supply would mean building owners would be regulated on the issues they are best placed to control, and not on issues such as infrastructure development that require coordinated action.

Another advantage of regulating specific measures is the high proportion of homes which are owner-occupied or privately rented flats (over 20% across Scotland, and around 50% in Edinburgh). The considerable challenge of coordinating works across multiple owners of one building (e.g. external SWI) will be exacerbated by allowing individual flexibility in how more abstract performance standards are to be met.

It is also important to ensure that assessment is carried out by individuals with sufficient training to conduct the task. For example, with regard to the Green Deal, the Department of Energy and Climate Change have suggested that 'as many as 11% of Green Deal assessors and 14% of Green Deal installers' were suspended due to 'non-compliance with Green Deal scheme requirements' (Rosenow and Eyre, 2016). Also, use of standard assessment models is best supported by individuals with experience of buildings/ construction/ retrofitting, due to individual nature of different properties.

Reference:

Rosenow, J., & Eyre, N. (2016). A post mortem of the Green Deal: Austerity, energy efficiency, and failure in British energy policy. *Energy Research & Social Science*, *21*, 141–144.

Appropriate levels and sources of funding

8. How should energy efficiency improvements and lower carbon heat supply installed through SEEP be funded? In particular, where should the balance lie between grant funding and loans for homeowners, landlords and businesses?

We agree that there is a necessary requirement for grant funding for householders and small businesses who cannot afford to pay for improvements. We also recognise that the Government budget for energy efficiency is limited and that other forms of finance packages will be crucial in ensuring the affordability of measures for many building owners.

Grant funding should be targeted on those least able to pay. For housing this should be based on the revised Scottish definition of households in fuel poverty. For SMEs and small private landlords, use of fiscal incentives may be more manageable, based for example on business rate reductions or for small landlords a tax allowance set against spending on energy performance upgrades. Lost tax income should be set against increased tax revenues from energy efficiency activity, most of which would probably not happen (however

'economically rational') without incentives and the SEEP programme. This is less straightforward in Scotland than other European countries, given the structure of tax collection in the UK (e.g. reduced council tax will impact a council's financial position, but the VAT and income tax generated by the energy efficiency work will be collected by the UK government). Nonetheless, the overall tax implications of energy efficiency support should be considered and factored in to discussions with UK Government.

Funding and financing structures and eligibility criteria are a strong determinant of how programmes are designed and targeted. The package of grants and loans should therefore be set out at an early stage in the programme, and should be long-term and stable to enable planning of local delivery programmes. This enables LHEES delivery plans to be designed around the funding and financing approaches.

Increased public funding will also be required to support programme delivery - programme management, public engagement and advice provision will be resource intensive and these costs should be factored in alongside costs for grants and loans to support physical measures. This will be needed at the local programme delivery, but also at the national level (i.e. Scottish Government or a new national energy body) to support funding allocation and overall management processes.

Grant funding should be targeted on those least able to pay. For housing this should be based on the revised Scottish definition of households in fuel poverty. For SMEs and small private landlords, use of fiscal incentives may be more manageable, based for example on business rate reductions or for small landlords a tax allowance set against spending on energy performance upgrades.

Budget required to support the scale of SEEP

SEEP has a budget of £0.5 billion over about 4 years (2017-2021) or about £125 million annually. The consultation suggests SEEP could involve over £10billion of investment in energy efficiency. This is similar to the £10.7 billion estimate from the Existing Homes Alliance to bring "the vast majority of homes in Scotland to a rating of C by 2025 - "The total investment required is in the order of £10.7bn over ten years, with approximately £4.5bn provided by the public sector and £6.2bn by the private sector." (Existing Homes Alliance Scotland, 2016).

Below we will outline a hypothetical scenario for how SEEP funds could be used

1. Solely used to pay the interest on loans

Currently around 11% of HEEPS funding is used to subsidise loans to 0% interest (SPICe, 2016). The following scenario imagines that the funds for SEEP are used entirely to subsidise the interest on loans and to create 0% loans. There are substantial variables involved with working out what the cost of providing low interest or 0% interest loans for energy efficiency. For example, where the money being loaned is sourced i.e. taxation, government borrowing etc. and administrative costs. Below we do not include administrative costs or make any assumptions as to where the funding for providing loans for energy efficiency would come from, we simply demonstrate the cost of covering various rates of interest on hypothetical loans of £10,000 over 10 years.

Table 1: Illustrative calculation of the resulting investment in retrofit from £500 million, used solely to pay interest on loans of £10,000 with a 10 year repayment plan, for various rates of interest.

Scenario 2021: up to end of SEEP round 1	Loan example	Interest	Total interest per loan	Number of loans from £500 million	Total investment in retrofit
£500 million: used solely to pay interest on loans	£10,000, 10 year repayment	2%	£1,042	479,846	£4.8 billion
		4%	£2,149	232,666	£2.3 billion
		6%	£3,322	150,511	£1.5 billion
		8%	£4,559	109,673	£1.1 billion

Alternatively if £10 billion was borrowed to be loaned out to home owners to cover expected cost of retrofit…

Table 2: Illustrative calculation of the cost of interest payable on a loan of £10 billion over a 10 year period

Borrowed		Period	Total interest
£10 billion	2%	10 years	£1.04 billion
	4%		£2.15 billion
	6%		£3.32 billion
	8%		£4.56 billion

If the same amount of SEEP funding i.e. £500 million was made available for the period 2021-2025 we could envisage the same amount of loans to be covered by a second round of SEEP. Only the 2% interest scenario gets close to the £10 billion target for investment in retrofit by 2025, every other falls well short.

This scenario involves no grant funding only loan subsidisation. Grant funding is a fundamental part of energy efficiency targets, in order to assist those less able to pay (and address fuel poverty) but also to encourage those able to pay to retrofit, something that has proved historically more difficult than envisioned. If more of the SEEP funds were assigned to grants or other schemes less would be available to subsidise loans to lever private investment in pursuit of the £10 billion figures.

The above calculations are simplifications, as they do not take account of loans paid off more quickly and thus with lower interest, but there is also the possibility of loans taking longer to repay and having higher interest. Also all loaned funds will not be borrowed at one time as is indicated here, but this is unlikely to have much effect on the level of interest to be covered, all other things being equal. Finally, Scotland also receives ECO funding and so there would be extra funds for grants from this.

There are two points from the above simplified calculations.

1. Overall funding: If £10billion investment by 2025 to achieve retrofit targets of "the vast majority of homes being C rated" is the ambition, it seems likely that higher levels of government funding than are currently on offer will be necessary.
2. Interest and borrowing: The source of funding for loaned monies is extremely important. If these funds are to be raised by government and not borrowed then the rate of interest is not relevant. If they are to be borrowed then it is important to consider how this borrowing is structured. There are extremely valuable lessons to be learned from the case of the Green Deal, where "failure of their preferred private financing model was the critical issue prompting the end of the policy"(Rosenow & Eyre, 2016). The Green deal also shows us that the offer of a loan with an unattractive interest rate will not be popular with private households, and will also reduce the number of measures that are cost-effective. A 0% loan is an extremely desirable policy instrument for reasons of home owner buy-in and making measures more economically attractive. See Rosenow and Eyre (2016) for more on how not to design a loan scheme for energy efficiency retrofit. The Pay As You Save or energy bill repayment mechanism from the Green Deal is one potentially useful feature of the Green Deal and if connected with the right loan design could be still very useful.

Reference:

Rosenow, J., & Eyre, N. (2016). A post-mortem of the Green Deal: Austerity, energy efficiency and failure in British energy policy. *Energy Research and Social Science*, *21*, 141–144.

9. What is needed to encourage private investment in energy efficiency and heat decarbonisation, including the take-up of loans by a wider range of owners and occupiers?

Encouraging private investment

The timescales and policy stability associated with any financing policy are crucial. Our early findings from the evaluation of the SEEP phase 1 pilot projects have shown that the current short-term funding timescales and inflexible funding rules have led to a focus on short-term projects that are considered deliverable in the timescales. This has prevented a wider strategic approach to project prioritisation, or seeking opportunities to lever in private investment.

Both grant funding and loan options should be set up with a long-term timescale, to allow for development of larger projects such as heat networks, or to involve hard to engage building owners (e.g. commercial sector or private landlords).

Private finance for heat network infrastructure will be made available at an affordable rate only if there is perceived to be long term commitment by government to a regulatory framework which will secure revenues from sale of heat; this in turn needs to be matched by quality, price and service standards for customers (see for example our review of regulatory options for district heating R Bush, D Hawkey and J Webb (2016) *Regulatory options for district heating in Scotland*. Report to Scottish Government Working Group; Hanna R., Parrish B., Gross R. (2016) UKERC Technology and Policy Assessment Best practice in heat decarbonisation policy: A review of the international experience of policies to

promote the uptake of low-carbon heat supply draft).

Encouraging take up of loans by building owners

Loans for building owners need to be made both attractive and hard to avoid. In the domestic sector, government agencies could work with mortgage and home loan providers, estate agents and lawyers, as well as building and heating trades, to make opportunities, requirements and financial terms unavoidably present during key transactions. An element of subsidy could be made available for prompt action to meet higher than current standards for energy performance upgrades, using tax or property transaction incentives or grants to reduce high upfront capital costs. Such subsidies can be replaced over time by affordable loans (see for example Webb, J. 2016). The generosity of these support mechanisms could be linked to a schedule of voluntary standards as outlined above.

In the social housing sector, there may be potential to learn from the Dutch Energiesprong (Energy Leap) area-based model for upgrading energy performance. This approach could be developed for specific types of Scottish housing and offers a model for cost-effective cross-sector collaboration with significant economic, environmental and welfare co-benefits (Pye and Dobbins, 2015).

In the commercial sector, loans will only be taken up if there is also a strong and consistent regulatory framework with an accompanying narrative which makes low energy, low carbon buildings and heat supply a high-visibility matter, focusing on 'what people and organisations want' from building and energy services, rather than a supply-side focus on modelled heat technology and building efficiency alone (Webb, 2016). This narrative needs to be backed up by political leadership and high visibility, attractive demonstration projects in public buildings.

Work on behavioural economics/psychology have been around for many years – see (Tversky & Kahneman, 1981). Their lessons on cognitive biases has in recent years become much more popular in UK policy circles, giving rise to the use of 'nudge' theories and the Behavioural Insights team in Whitehall. One lesson from behavioural economics that is relevant to retrofit policy is that of loss aversion. The rationale of loss aversion shows us that generally people tend to dislike losses more than they like gains. See Frederiks et al for a comprehensive description of how behavioural psychology may relate to retrofit policy (Frederiks, Stenner, & Hobman, 2015).

An example from this paper is

- The message "You are currently losing £20 per billing quarter by not switching off your lights' is likely to be more motivating than stating, 'You could save £20 per quarter by turning off your lights"

Transposed to retrofit funding support schemes, someone about to move into a new home may be more attracted to retrofit by the offer of a

- 0% loan and two years council tax exemption

Rather than

- 0% loan and a grant (equivalent to two years council tax exemption).

Note: Any such scheme would need to carefully consider what the most administratively efficient way of adjusting a households losses would be, i.e. council tax exemptions would need to see the relevant council reimbursed with potentially additional administrative burden. A reduction in income tax may be administratively more attractive (easier) but this would lose the potentially important psychological connection between reduced council tax (a tax on where you live) and renovating where you live.

Energy prices and tax

To the extent that financial calculus of energy efficiency decision making is sensitive to energy prices, higher energy prices would encourage more investment in energy efficiency. VAT on domestic fuel supplies is currently at 5%, which can be interpreted as a subsidy where the prevailing VAT rate is 20%. VAT on energy is a difficult issue, given the importance of fuel poverty to Scottish policy. However, low energy prices are low for everyone, and there is a case for higher energy taxes, both to incentivise energy efficiency and (if taxes are hypothecated) to fund it. VAT on fuel is currently reserved to the UK government, but this does not mean Scottish Government is unable to present a case for higher energy taxes to the rest of the UK.

References:

Frederiks, E. R., Stenner, K., & Hobman, E. V. (2015). Household energy use : Applying behavioural economics to understand consumer decision-making and behaviour. *Renewable and Sustainable Energy Reviews*, *41*, 1385–1394. doi:10.1016/j.rser.2014.09.026

Pye S and Dobbins, A 2015 *Energy poverty and vulnerable consumers in the energy sector across the EU: analysis of policies and measures*, www.insightenergy.org

Tversky, A., & Kahneman, D. (1981). The Framing of Decisions and the Psychology of Choice. *Science*, *211*(4481), 453–458.

Webb, J. 2016 *Heat and Energy Efficiency: Making Effective Policy*, Advisory Group Report for the UK Committee on Climate Change https://www.theccc.org.uk/publication/heat-and-energy-efficiency-advisory-group-report-making-effective-policy/)

10. Of the current sources of finance which are currently available for energy efficiency and lower carbon heat supply, which are working well and which are not? Are there successful examples of attracting private sector finance to support energy efficiency improvements that could be explored? Are there any others which should be developed or made available?

The German KfW bank is the clearest example of mobilising private capital. In contrast with the UK's Green Investment Bank, KfW is able to borrow in financial markets. Its low interest energy efficiency loans are made possible by subsidy from the state. In 2013, €1.4bn in subsidy was used to mobilise over €40bn investment in domestic and industrial energy efficiency (Kuckshinrichs, et al., 2015)

Within the domestic energy market, perceptions that the costs of energy are driven by excessive profit making are common, whether well founded or not. The returns afforded to private sector finance for investment in energy efficiency are likely to be a controversial issue. UK experience of high interest rates on Green Deal finance demonstrates 'the Golden Rule' was not sufficient to overcome households' aversion to taking on relatively high interest debt. To bring the costs of private finance down to a level attractive to households would require pooling of risk across a large number of loans, and state underwriting. Without the latter interest rates would not beat mortgage rates which are already available to households, and which do not in themselves incentivise energy efficiency. It is difficult to see how private finance could be mobilised for domestic energy efficiency other than via a state institution. Furthermore, if public borrowing is the route to bringing private finance into energy efficiency, it is difficult to see an advantage in keeping this separate from other areas of public borrowing and lending or spending, again in order to pool risk. (The KfW bank, in addition to energy efficiency, finances SMEs, imports and exports and development aid.)

References:

Kuckshinrichs, W., Többen, J., Hansen, P. (2015) Wirkungen Der KfW-Programme 'Energieeffizient Bauen', 'Energieeffizient Sanieren' und 'Energetische Stadtsanierung – Energieeffizient Sanieren (IKK/IKU)' auf Öffentliche Haushalte Im Förderjahr 2013, Forschungszentrum Jülich, available: https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-alle-Evaluationen/KfW-Studie-FJ-2013_07-Mai_1-(2).pdf

Provision of advice, information and consumer protection

11. How do we ensure that householders and owners are well advised and supported in making decisions on how to improve the energy efficiency of their building and install lower carbon heat supply through SEEP?

Advice and support for the non-domestic sector

Early lessons from the phase 1 SEEP pilot projects showed that there was limited experience within local authorities of delivering programmes that targeted the commercial sector. Instead, SEEP pilots in the non-domestic sector largely focused on local authority-owned buildings such as schools, community centres, etc.

As a recent report for the Committee on Climate Change (Mallaburn, 2016) highlighted decisions to make investment in energy efficiency and low carbon heat will not be made solely on a financial rationale. The issue of energy must become salient to an organisation before options and financial paybacks will even be considered. Otherwise it is "a marginal, invisible, non-core issue delegated down the operational hierarchy" (p7, Mallaburn, 2016).

There is still limited understanding of what drives salience, and how salience drivers vary between different types of organisations. This is a key area where advice and support programmes will need to be evaluated and adapted over the development and delivery of SEEP.

An example of developing good practice is the Investor Confidence Project Europe http://europe.eeperformance.org/

There are different sources of information for different building types. When thinking about trusted sources of advice, it is important to consider the tradespeople and installers and that enter homes on a daily basis. These groups have been identified as 'trusted messengers' for the provision of information to householders. They can develop long-standing, trusted customer relationships; they are often perceived as experts by those they advise and; they are often onsite during potential 'trigger points' (e.g. when a householder is considering some form of retrofit) (Killip, 2013, Bowden et al., 2012, DECC, 2014). So it's important to consider different actors across the supply chain that could have a role in advising and supporting decision making with regard to energy efficient retrofitting.

References

Killip, G. (2013). Products, practices and processes: exploring the innovation potential for low-carbon housing refurbishment among small and medium-sized enterprises (SMEs) in the UK construction industry. *Energy Policy*, *62*, 522–530;

Bowden, F., Brass, C., Watson, B., Mitrovic, D., Tompkins, J., Zygmunt, J., & Jordan, D. (2012). *Plug-It: Final Report to the Department for Environment Food and Rural Affairs* (pp. 1–104). London: SEED Foundation, Policy Studies Institute and Waterwise, Defra.;

DECC. (2014). Advice on how to use heating controls: Evaluation of a trial in Newcastle. Retrieved 2014, from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/349855/decc_heating_controls_report.pdf

Mallaburn, Peter (Energy Institute, U. C. L. (2016). A new approach to non-domestic energy efficiency policy - A report for the Committee on Climate Change. London, UK. Retrieved from https://www.theccc.org.uk/publication/a-new-approach-to-non-domestic-energy-efficiency/

12. Are the current mechanisms for providing advice sufficient? What changes, if any, do you think are required?

The use of well-established national advice networks (such as Home Energy Scotland and Resource Efficient Scotland) is valuable, but it will be important to ensure that clear and consistent information is continued throughout the supply chain, right down to the individual tradespeople and installers identified as 'trusted messengers'. These groups can be subject to different training structures and experience on-the-ground, leading to varied information being given to householders (Wade et al., 2017). It would be useful to consider the development of suitable tools (for example, conversation prompts, householder questionnaires) that can support the delivery of consistent messaging from these groups – see Bowden et al.[4] for an example of developing such tools.

Reference:

Wade, F., Shipworth, M. & Hitchings, R. 2017. How installers select and explain domestic heating controls. Building Research & Information, 45(4), pp.371-383.

13. What are the opportunities to link SEEP delivery with other initiatives, including the UK Government's smart meter rollout, so that we maximise the benefits for the people of Scotland?

Consumer protection

14. How can SEEP be designed and promoted to build consumer confidence (as a trusted 'brand')? What are the risks and opportunities associated with particular approaches?

We agree that the long-term branding of SEEP is important. We believe that over time this should come to be seen as a trusted public programme. There must widespread awareness of it across the sectors, with clear articulation of the roles of different actors in delivery.

The Committee on Climate Change review of international experience in delivering domestic energy efficiency programmes highlights the most successful programmes have "a strong consumer focus in their design and implementation" (Committee on Climate Change, 2016). The programmes made use of holistic policy packages that address all parts of the renovation process, designing information and advice provision alongside implementing energy and CO_2 taxes, financial incentives, access to capital and minimum standards. The programmes focused on minimising hassle and complexity of undertaking an upgrade with a single source of information for building owners, brand recognition and targeting customers based on identified drivers.

The programme design must recognise that concerns about profiteering are acute in energy. The high finance costs of the Green Deal contributed to its failure. Any use of private finance, particularly for energy efficiency in the domestic sector needs to be treated with care to avoid target recipients resisting what they perceive to be unfair profiteering from their energy needs. One contribution to creating this trusted brand should be independence between the expert advisors making recommendations for changes to buildings, and the firms and contractors who stand to make profit from the sales and installations.

The importance of a single source of information throughout the customer journey was supported by experiences within the phase 1 SEEP pilots. Local authorities acting as a point of contact for householders reported that this was an important success factor because it ensured there was a trusted organization available throughout the process, which was not seeking to make profit. The officer in this role was able to help people overcome barriers to ensure a renovation could take place e.g. liaising with contractors to deal with issues as they arose.

References:

Comittee on Climate Change, (UK). (2016). *Annex 3 - Best practice in residential energy efficiency policy : A review of international experience*. London, UK. Retrieved from https://www.theccc.org.uk/publication/next-steps-for-uk-heat-policy/

15. Is there a tried and trusted form of consumer redress that should be adopted or, if not, what should such a mechanism look like?

Sweden uses a "Heat Pump Court" to weed out bad practice in heat pump installation (Delta Energy and Environment, 2013) In particular, the court focuses on cases where a heat pump does not perform as promised by the installer. Judgements of the court are made public and include the manufacturer of the heat pump. Manufacturers thus have an additional incentive to ensure installers are qualified. The model could be extended to energy efficiency more broadly, particularly if multi-measure 'whole house' packages are being promoted.

Reference:

Delta Energy and Environment (2013) Policy Measures for Heat Pump Market Growth, Report for Danish Energy Agency, available: http://www.ens.dk/sites/ens.dk/files/forbrug-besparelser/byggeriets-energiforbrug/varmepumper/policy_measures_for_heat_pump_market.pdf [accessed 7 Mar 2016]

16. How should SEEP look to integrate the findings of the Each Home Counts Review – e.g. could it be used a basis for developing a consumer protection framework for SEEP?

The work to develop the redress measure referred to in the previous question has commenced with the work led by Peter Bonfield 2016 *Each Home Counts – a review of consumer advice, protection, standards and enforcement* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/578749/Each_Home_Counts__December_2016_.pdf

The development of SEEP should seek to build on these proposals, adapting them to the Scottish context and engaging with the industry to ensure high standards of practice. Creating trust between property owners and the energy efficiency supply chain will depend on secure performance guarantees and redress.

How to establish and sustain local supply chains and trusted delivery agents

17. How can local supply chains be expanded and up-skilled to ensure that maximum economic benefit and job creation is secured across all of Scotland?
18. How can communities best benefit from the expected job creation?
19. What provision could be made at a national level to ensure companies increase the capacity of the supply chain across all of Scotland to support local delivery of SEEP, particularly in the rural and remote areas?

At the national level, how to spread appropriate information about SEEP throughout the whole of the supply chain needs to be considered. This includes not only those responsible for the actual installation of SEEP measures, but also those involved in product development and sale. Tradespeople, particularly those working on a self-employed basis or in smaller

organisations can have very close links with their local supply chains, meaning that the supply chain can have an influential role – for example heating engineers establish strong connections with a few plumbers' merchants (Wade, et al., 2016), and they are likely to visit them almost everyday for essential tools and equipment to perform their work. In this role, the merchant can influence the types of product installed, making it essential for salespeople, merchants etc. to be provided with clear and consistent information about SEEP and how different people might contribute to its delivery.

Reference:
Wade, F., Shipworth, M. & Hitchings, R. 2016. Influencing the central heating technologies installed in homes: the role of social capital in supply chain networks. Energy Policy, 95, pp.52-60.

20. What do companies need to do to increase their skills base to deliver a programme of this nature?

Skills for renewable heat technologies need to include professionals involved in maintenance and troubleshooting of heating systems. E.g. The Shetland Islands Council phase 1 SEEP pilot project demonstrates the importance of maintenance processes and relevant training in district heating networks for building engineers who deal with issues as they arise. The council project found that their 15-year old system was operating less efficiently because people did not know about maintenance requirements and engineers dealing with issues were not necessarily trained in how to adjust the system.

Further, actors involved in installation and advice need to have a consistent understanding of the retrofitting process and how this might influence operation of a property. For example, if a new heating system is to be installed at the same time as additional insulation – the installing workforce needs to be aware of the modified thermal requirements of the property and adjust the operating information given to householders as a result. This might help in minimizing rebound effects that can occur after retrofitting.

The nature of programme delivery

21. What roles should national and local bodies play respectively in delivering SEEP and how can national and local schemes best be designed to work together towards meeting the Programme's objectives?

Local delivery in the domestic sector
Domestic programmes benefit from local delivery and local coordination. In the domestic sector, local authorities are already accustomed to taking on a role in delivering energy programmes targeted beyond their own building stock. Local authority officers involved in delivering SEEP pilot projects emphasized the importance of a local, trusted contact to support householders through the installation process and to deal with problems as they arise (Bush et al., 2017).

Many local authorities already have developed capacities and processes for delivering the domestic aspects of an integrated energy efficiency programme. It makes sense to develop

programmes by expanding from existing domestic programmes, rather than dismantling them and shifting responsibility for delivery to a different body or scale.

Local coordination of expertise for delivery in the non-domestic sector
In the non-domestic sector, local authorities have traditionally restricted the focus of their energy efficiency programmes to their own building stock, or occasionally expanded to work with other public sector partners. Local authority delivery of non-domestic programmes would therefore require time for learning and capacity building within local authority teams to support delivery of these types of programmes.

We agree that there are some instances where national, sector specific programmes could offer advantages over local authority delivered programmes, e.g. targeting NHS estates, or large companies with multiple sites across Scotland such as supermarkets, or corporate landlords. However, there would always need some level of coordination at the local level to ensure that their activities support delivery of LHEES. The design of the national programme needs to allow time for local authorities to develop appropriate team structures and ways of working with partners at the local level alongside any national-level delivery initiatives.

Integrated delivery of domestic and non-domestic programmes?
There are relevant early lessons from the SEEP pilots, where there was a requirement for local authorities to design an integrated area-based programme across the domestic and non-domestic sectors. The integrated approach taken within the SEEP pilots was challenging because existing team structures had not been designed for this purpose and local authorities had to work flexibly across their existing specialisms to support this new approach to project design.

Although the pilots were designed to simultaneously target the domestic and non-domestic sectors, delivery was often separated out (either led by a separate local authority team from the domestic sector programme, or by the non-domestic organisation itself). This restricted some of the envisioned opportunities from this approach such as economies of scale shared procurement. Again, the national programme needs to allow time for local authorities to develop appropriate team structures and ways of working with partners to maximise opportunities of integrated programme delivery across the domestic and non-domestic sectors.

Similar issues have been found in both the Community Energy Programme in the 2000s and the Low Carbon Infrastructure Fund (in England, established 2009). Under both programmes, **funding and delivery timelines** did not reflect the time taken to develop complex multi-organisation district energy networks. As a result, the schemes developed tended to be restricted to within an single organisational boundary (e.g. council social housing only); there were fewer projects with more complex, multi-organisation connections (Hawkey, 2016). In Scotland however, relative success in the Community Energy Programme was partly attributed to a ‘cross-sector community energy network to facilitate funding applications’ (Webb, 2016, p143, Ch 7). This enabled mutual learning between district energy practitioners from across Scotland.

Challenges of coordination across different organisations, and across domestic and non-domestic, has led to 'lost opportunities' in UK district energy schemes. One example is the Wyndford district energy scheme in Glasgow. Cube Housing Association originally intended for the district energy scheme to include another Housing Associations neighbouring housing, a swimming pool, and potentially a university campus and a Tesco 'superstore' on the border of the Wyndford estate. The economies of scale arising from this integrated delivery of district energy however, proved too difficult to coordinate, and Cube HA proceeded alone (Webb et al, 2016).

Opportunities to work across local authority boundaries?
Delivery partners / contractors also have a significant and influential part of the delivery jigsaw. They often hold extensive expertise and experience from working across multiple local authority areas across many years. It could add value to involve delivery partners with energy planning expertise in programme development to gain from expertise, and support sharing of best practice across local authority boundaries.

Reference
Bush, R., Webb, J., Wakelin, J., Flynn, F., (2017) SEEP Phase 1 Pilots Interim Evaluation Report, *Report to Scottish Government*. http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP/SEEP/Phase-1

Hawkey, D. (2016) Ch 5 'Implementation of District Heating Policy in the UK', In: Hawkey et al., *Sustainable Urban Energy Policy*, Abingdon: Routledge

Webb et al, 2016, House, home and transforming energy in a cold climate, *Families, Relationships and Societies*, vol 5, no 3, 411–29, DOI: 10.1332/204674316X14758447787663).

Webb, J. (2016), p143, Ch 7 'Urban Energy Governance for Sustainable Heat in UK Cities', In: Hawkey et al., *Sustainable Urban Energy Policy*, Abingdon: Routledge

22. What are your views on the relative benefits of area-based schemes as against those targeted at particular sectors or tenures in delivering SEEP? What other targeting approaches might be effective?

For the domestic sector, we agree that the existing Home Energy Efficiency Programme Scotland: Area Based Scheme (HEEPS ABS) has been successful in many respects. The aesthetic improvements created by external wall insulation (EWI) are an important influence over the success of the programme alongside energy saving benefits. The visibility of EWI installed within this programme has resulted in many local authorities reporting waiting lists of householders wanting to receive measures. Upgrades to the tower blocks in Aberdeen also led to higher occupancy rates and reduced voids (Webb, 2015).

Many local authorities have staff and processes with responsibility for delivering their HEEPS ABS programme, and are coordinating it alongside council and housing association investment in social housing to meet the Energy Efficiency Standards for Social Housing (EESSH). The integration between these two programmes is a positive example of long-term

planning between different council teams and housing associations to maximise bulk buying opportunities and benefits of an area-based approach.

Engaging with the commercial sector is still a relative unknown for many local authorities. It is still too early to know when and where there are benefits approaching the sector with an area based programme. There may however, be important transferable lessons that can be learnt from Local Authority district heating networks which have commercial organisations connected. Notable examples include heat networks established by the City Councils of Manchester, Nottingham, Sheffield, and Southampton. In addition transferable lessons may be found from local authority led projects which have aimed to improve the energy efficiency of SMEs (drawing on ERDF funding, examples include programmes delivered by Leicester Energy Agency (part of Leicester City Council) http://www.energyagency.co.uk/, and Derby City Council http://www.derby.gov.uk/environment-and-planning/climate-change-and-energy-management/carbon-smart/).

References:

Webb, J. (2015) Improvising innovation in UK urban district heating: The convergence of social and environmental agendas in Aberdeen. *Energy Policy*, 78, 265–272, http://dx.doi.org/10.1016/j.enpol.2014.12.003).

23. How best can we align nationally set standards with local, area-based delivery?

We have set out a detailed approach to coordinating planning and delivery across local and national levels in Q1 of our response to the Scottish Government Consultation on Heat & Energy Efficiency Strategies, and Regulation of District Heating:

Webb J, Hawkey D, Bush R, and Tingey M (2017) *Heat & Energy Efficiency Strategies, and Regulation of District Heating Response to Consultation from the Heat and the City Research Team, University of Edinburgh*. Edinburgh: University of Edinburgh http://www.sociology.ed.ac.uk/research/grants_and_projects/current_projects/heat_and_the_city

The balance between local and national responsibilities

24. What should the overall balance be between national and local target setting? Should local authorities set local targets with the flexibility to determine whatever methods they want to meet the Programme vision? Or should there be a greater degree of setting the target(s) and delivery methods by national government?

We have set out a detailed approach to coordinating planning and delivery across local and national levels in Q1 of our response to the Scottish Government Consultation on Heat & Energy Efficiency Strategies, and Regulation of District Heating:

Webb J, Hawkey D, Bush R, and Tingey M (2017) *Heat & Energy Efficiency Strategies, and Regulation of District Heating Response to Consultation from the Heat and the City Research Team, University of Edinburgh*. Edinburgh: University of Edinburgh

http://www.sociology.ed.ac.uk/research/grants_and_projects/current_projects/heat_and_the_city

25. What would a good governance structure to oversee any framework of responsibilities between national and local government look like? What examples are you aware of within the UK or elsewhere?

Existing ways of working on energy efficiency, with short delivery timescales and narrow metrics for success, make it high-risk for local authorities to test out new and creative approaches. Creating space for projects to fail or to have flexibility on delivery timescales could encourage greater innovation (e.g. creating working groups of local authorities to work on particularly challenging issues helps to remove the risk for a single local authority of an approach not working).

Emerging findings from the Local Engagement in UK Energy Systems research (Webb, Hawkey and Tingey, *forthcoming*) indicates that local authority officers, from across the UK, perceive a 'stop start' set of energy policies (notably changes to ECO, and the Feed in Tariff, as well as withdrawal of the Code for Sustainable Homes in England). This makes it difficult to plan and deliver a range of local energy projects including domestic energy efficiency. Constant changes to UK policy thus makes it difficult for local development and implementation of energy initiatives. A consistent approach to SEEP policy should thus be implemented with clear long term leadership and direction from Scottish Government so that local authorities may plan local delivery accordingly.

Governance of ECO has been found to be challenging for local delivery of district energy. For example, in the Wyndford district energy network (Cube Housing Association, Glasgow), the Energy Company Obligation funding (at the time CESP), was crucial to financing the network. However, governance of ECO also created lengthy negotiation challenges, which was compounded with a subsequent rush to complete installation of the network in time for the CESP deadline (end of 2012). As a result, a 'command and control' approach was taken to the installation, and: "the time pressure contributed to difficulties in the chain of sub-contracting, resulting in some disruption and poor quality work to some of the flats, and the eventual dismissal of one of the sub-contractors" (McCrone, 2016).

Embedding a process for evaluation is also an important way to support constructive dialogue between national and local government around delivery of SEEP. (This is expanded on in more detail in the question on monitoring and review processes (Q 7.1)).

Opportunities for mutual learning, knowledge exchange and capacity building between local authority officers should be facilitated through some form of SEEP network. Notable examples of practitioner networks include the UK wide Local Authority District Energy Vanguards Network (http://www.heatandthecity.org.uk/dh_vanguards_network), and two Scotland specific networks: the Heat Network Partnership Local Authority District Heating Strategy Support Programme (http://www.districtheatingscotland.com/support/), and the Heat Network Partnership Practitioner Group (http://www.heatandthecity.org.uk/about/workshops/scottish_heat_networks_partnership_practitioner_group).

References

McCrone, 2016, p189, Ch 9 'Paying for Energy Understandings of home, well-being and affordable warmth', In: Hawkey et al., *Sustainable Urban Energy Policy*, Abingdon: Routledge

Monitoring and review processes

26. What should be included in a monitoring framework to ensure that the Programme is effectively monitored and evaluated?

It is critical to embed a process of evaluation and review into the programme to give space for genuine development and change where required. We think this is particularly important during the development phase of SEEP after it is launched in 2018 - but should continue beyond this as well. Social and organisational evaluation is critical, alongside technical monitoring.

The ambition set out by proposed targets for carbon emissions reductions for the domestic and service sectors set out in the draft Climate Change Plan means that SEEP, as the "cornerstone" policy for meeting these targets, will need to be at a scale incomparable to any previous energy efficiency programmes. Once the development and delivery phases of SEEP are underway from 2018 onwards, it is important to recognise that some policy measures first proposed under SEEP will need iteration and development, or even complete re-think.

Lessons from experiences of the demise of Green Deal at the UK level, have suggested that the political context around the Green deal meant that "failure was not politically conceivable" (Rosenow, J., & Eyre, N. (2016). A post mortem of the Green Deal: Austerity, energy efficiency, and failure in British energy policy. *Energy Research & Social Science*, *21*, 141–144. https://doi.org/10.1016/j.erss.2016.07.005). Embedding process of evaluation into the development and delivery phases of SEEP is one way to ensure that this does not happen to SEEP.

Delivering the SEEP pilot projects has shown the challenges of taking on new integrated delivery of energy efficiency. The evaluation team has played an intermediary role across the multiple pilots, enabling common challenges to be highlighted and best practice shared across local authorities and delivery partners.

Evaluating energy efficiency programmes is not currently done regularly when delivering local energy efficiency programmes. Developing capacities and understanding of how to carry out evaluation and data collection takes time. We recognise that evaluation is resource intensive, and requires significant staff time to collect evaluation data and analyse it. Items such as technical monitoring equipment can be expensive to buy. Evaluation of the local SEEP pilots has shown that data to inform monitoring indicators and evaluation can be collected whilst undertaking other necessary tasks, to minimise the resource requirements of data collection. However, it is important that this is built into programme design from an early stage to avoid unnecessary extra work.