Energy Plus
Energy Efficiency in Social Housing

CASEreport 89

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Choosing objectives: Fuel poverty[1] objectives and energy efficiency objectives complement each other but compete for priority and resources. Are we getting the balance right, and have we a set the right targets?

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Planning cost effectively: Grants, SAP ratings, planned maintenance programmes, tenant pressure, and partial or inadequate stock condition data all feed into operational planning to deliver objectives – as does external and consultancy advice. But do we really have the right information and planning tools to weigh up capital and revenue costs (including costs of changing tenant behaviour), economies of scale, monitoring and feedback information about actual benefits being delivered, and the emerging market in skills and products? This becomes more important as we move from the low hanging fruit to the more difficult challenges.

Emerging Findings

Objectives

- Landlords have different drivers for implementing retrofit works including reducing fuel poverty, cutting carbon emissions, improving SAP ratings, upgrading existing poor quality stock. However, associations also have to be able to secure a financial return on their investment.

- Tenant behaviour change is growing in importance as landlords realise that technical "hardware" is only part of the story. Behaviour change forms a critical part of energy saving measures making more knowledge exchange essential. Offering tenants ongoing, high quality and easy to understand advice is critical. This also applies to frontline staff.

Sharing what works

- Financing upgrading works is challenging and the costs and benefits need to be more clearly spelt out through the establishment of a solid evidence base that associations can refer to.

- Full and solid data are invaluable. But stock surveys and programme planning for energy saving is complicated and difficult and there is a high cost to collecting it.

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[1] Fuel poverty in England is measured by the Low Income High Costs (LIHC) definition, which considers a household to be in fuel poverty if:

- they have required fuel costs that are above average (the national median level)
- they were they to spend that amount they would be left with a residual income below the official poverty line

The key drivers behind fuel poverty are:

- The energy efficiency of the property (and therefore, the energy required to heat and power the home)
- The cost of energy
- Household income

- Landlords need some commonly used criteria for deciding which route to follow and which case studies to rely on. Social landlords are developing and carrying out detailed reviews. These findings need to be transparent on their methodology and the robustness of the data, and offer guidance on materials, costs and impacts.

- Combining case study experience, technical reviews and current guidelines into an easy-to-use assessment system is the next step.

- There is an urgent need to share the path breaking work being done by landlords and more training in basic energy saving for frontline staff and tenants. This should also include sharing findings on understanding and reinforcing tenant behaviour. An information and case study hub which social landlords can use to share their experience and advice would be invaluable.

Planning cost effectively

- Many landlords are keen to do something about energy saving. Some are doing ground-breaking work. However, many are struggling to prioritise this area in the current climate of resource constraints. This partly reflects the resources the organisation is able, or has decided, to devote to energy saving. Helping more landlords to prioritise energy saving through financial and technical support is urgent.

- The way energy saving works are planned and paid for varies greatly. Securing special grants, funding energy saving out of mainstream budgets, adding energy saving measures to planned maintenance programmes, deciding to prioritise “worst first” to help those worst affected are all possible. But it takes a clear commitment from both the social landlords *and* the government to make programmes financially viable.

- Energy saving is a specialised field. Associations appear to benefit most when retrofits are a part of, and integrated into the organisation’s larger internal planning and development process. A clear signal of support from senior management and the board is vital.

Introduction

Energy Plus is a knowledge exchange programme run by LSE Housing and Communities. It aims to help social landlords and tenants find ways to reduce energy use in homes to tackle fuel poverty and rising bills and combat arrears. Some social landlords are doing innovative projects, sharing networks have been set up, and there are some emerging common practices not least through active commercial consultancies. Nevertheless there is a continuing need for better evidenced standards and evaluation frameworks where different techniques and strategic approaches can be easily, continuously, and systematically shared – and avoid some "not invented here" issues.

Energy saving is now critical. Energy shortages, accessing affordable warmth and reducing the 'heat or eat' dilemma many tenants face, provide a real incentive for Energy Plus. We want to develop a strong, knowledge exchange network among larger and smaller social landlords across the country to share best practise, learn from mistakes and develop partnerships.

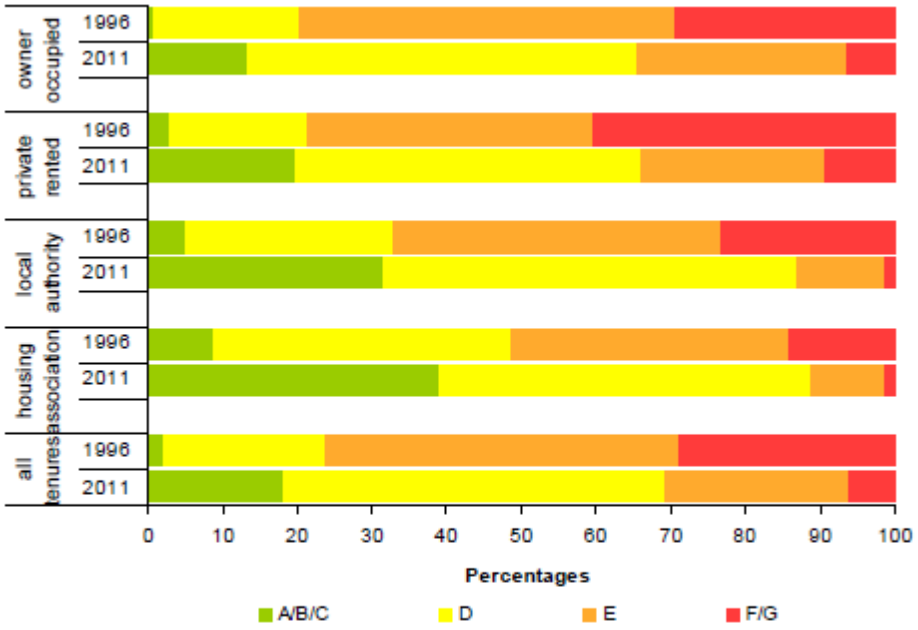
As part the Energy Plus programme, we carried out a research project looking at how some social landlords are tackling energy saving and fuel poverty in their organisations. We spoke to a range of social landlords to gather detailed information about what makes a real difference in energy efficiency, what factors contribute to retrofitting the physical stock and how this impacts tenants' energy bills and well-being. This information will feed into our wider Energy Plus and Housing Plus programmes as a practical source of evidence. Our aim is to produce an *Agenda for Energy Plus* or "how to…" for social landlords in energy saving techniques.

Energy saving is a specialised field, but many landlords are keen to do something about it – though sometimes it is not clear how best to plan, which works will deliver most benefits, and how to get tenants on board. Some associations are doing ground-breaking work, but many are struggling to prioritise this area in the current climate of resource constraints. Others are hesitant to get too engaged with the opportunities and risks.

This report brings together information gathered from interviews with 13 housing associations on their approach to energy savings measures. A list of the associations and some basic details about their stock are at annex 1. The interviews were conducted by LSE Housing and Communities researchers during April to July 2014, following a semi structured questionnaire. The report also draws on documentation and evidence provided by the associations in the course of the interviews.

Overall the national picture shows that since 1999 there has been a major improvement in the overall performance of homes in terms of energy ratings across all tenures (Figure 1), with the best performance now in the social housing sector (Figure 2).

Figure 1: Social housing SAP ratings compared to other tenures



Base: all dwellings
Note: underlying data are presented in Annex Table 21

Sources: 1996 English House Condition Survey; 2012 English Housing Survey, dwelling sample

Figure 2: Improved social housing SAP ratings since 1996

Tenure	Mean SAP
Owner occupation	57
Private rented	58
Social rented	65
All dwellings	59

Source: English Housing Survey 2012-13

Approaches to energy efficiency differ in relation to geography, stock type, mix, age and concentration, including local planning constraints. For example, many older London homes present complex problems, particularly properties with solid walls and properties located in conservation areas. Here even simple improvements like replacement of windows double glazed alternatives as part of planned maintenance can fall foul of conservation planning restrictions. Wall insulation, for example, may be impossible to achieve using external cladding and requiring internal cladding instead can be expensive, create unacceptable reductions in the usable internal space, and be unacceptable to tenants. In contrast in some mixed tenure estates where housing association properties are pepper-potted there may be opportunities to develop wider neighbourhood improvement plans involving private owners.

This report explores the issues involved in planning and delivering cost effective improvements aimed at reducing fuel poverty, reducing carbon emissions and improving association stock. The first section briefly outlines the types of underlying drivers and strategies associations are developing. We then look at the different ways in which associations assess their stock and plan environmental improvement works. Assessment

approaches such as the (proprietary) stock analysis and improvement options tool "CROHM[2]" are now in common use, but not everywhere, and even the question of using SAP ratings as a basic tool for prioritising works is not universally accepted. We then look at the parallel and equally important issue about working with tenants to help them both live in warm homes and reduce the risks of fuel poverty – and this people centred work needs to inform the property focused activities dealt with in the first parts of the report.

Helping more landlords to prioritise energy saving is urgent. It is crucial to get the right advice in order to ensure associations can maximize the retrofit works to their full potential.

[2] Carbon Reduction Options for Housing Managers – a consultancy service available to housing associations

1. Key drivers of RSL engagement with the Energy agenda

Overview: Why social landlords develop programmes of energy savings.
Carbon saving and sustainability objectives are important, as is the problem of fuel poverty - strategic choices must be made about the competing balance of investment and effort on each. The previous push driver of Decent Homes and pull driver of CESP/CERT also highlighted opportunities. Most associations interviewed had energy aims, some couched in quantitative terms such as overall SAP ratings or carbon emission reductions. Many associations viewed the issue as one requiring communication and engagement of all staff, across the organisation. The improvements often covered the associations own offices and delivery chains as well as their housing stock, and staff are key players in delivering these aims.

Strategic objectives

We asked the associations about why they had decided to take steps to engage more fully with the energy agenda and what the aims of their engagement were. For four of the associations this was a fairly new area of priority, with two of them only recently being in the position of drafting or agreeing clear strategic priorities. The most prominent drivers were addressing fuel poverty (8 cases) and addressing carbon and sustainability objectives (7), although four further associations also specifically said it was part of their wider social role and in line with their overall social values and CSR approach. All associations noted that there was a business case to be made for carrying out retrofit works.

Although focused on the benefits to tenants, only three associations set out that explicit tenant pressure or demands had led it to develop its strategies. Eleven associations have specific sustainability strategies (two in draft) and two others have specific business plan objectives in the area. Most indicated board level agreement for the approach, although for some associations this was a much stronger and specific level of support and direction setting than in others. One has these activities as part of its “Planet Smart” strategy which includes a range of initiatives including fuel poverty, health, carbon footprint, fleet and transport, design and retrofit initiatives aimed at making the association carbon neutral. Other associations had developed or were developing “affordable warmth” strategies of various kinds.

All associations noted the need to undertake stock improvements to improve the quality and environmental performance of their stock. In addition, just under half the associations mentioned the previous positive impact the Decent Homes programme had in incentivising improvements, and also in providing a better overall knowledge of the quality and characteristics of their stock. Building on this momentum in relation to energy efficiency was consequently seen as possible and important. There were no specific legislative or high level target drivers cited that were perceived as similar in nature to the Decent Homes framework. Nevertheless many used stock condition surveys to gain an understanding of what works could most effectively be done to address fuel poverty, as set out below. A number of associations set targets for the overall SAP ratings of their stock, or segments of their stock, but these were vary varied between the different associations and type of stock. This is not surprising since some associations have parts of their stock where the investment cost to increase the SAP rating delivers a very low rate of return per pound – for example some

London solid wall properties in conservation areas. Specific work to unpack this may be necessary (and see, for example, the "Futurefit" box below).

In contrast only one association raised the issue of higher stock valuations as being either a consequence of or a driver for action. There seemed to be no direct read across the associations to improving the asset value of the properties, suggesting that these improvements either did not increase the underlying value, or were not seen to increase it by the formal valuations procedures. For one association operating in the north, competition with the private rented sector – who offered rental properties at similar rents to social housing providers – meant that they were being forced to improve insulation and reduce fuel costs to prevent tenants from leaving their social homes to move to a better insulated private property.

Defining programme aims

Associations mentioned a range of different long term targets, including average or minimum SAP and EPC ratings, carbon reduction totals and whole association carbon neutrality, as set out in Figure 3. More details underpin these aims, and different means are used to monitor and evaluate progress.

Figure 3: Associations' long term aims

R	Assume benefits based on FutureFit evidence, following completion of retrofit works, but no other monitoring and no SAP or EPC targets
B	"Planet Smart" to make the whole association carbon neutral
F	Under review, to develop a "home energy standard"
T	No-one in a home below D rating by 2020
Y	Reduce carbon 80% by 2020, but no SAP targets
S	All homes SAP 65 "aspirational"
X	CO^2 reduced 30%, 75 SAP for all, reduced energy costs
C	Warm Home Standard, and by 2020 all homes min. EPC of C; also target 25kwh/m^2/a for retrofit; 80% carbon reduction by 2050
M	"Warmer Homes Strategy"
K	De-carbonise K energy supply; lower fuel poverty; 30% less carbon emissions by 2025, 60% by 2015
N	SAP 70 by 2020

Getting the right people engaged

Good leadership and vision were clearly important to making good progress in energy efficiency. For five of the associations it was the chief executive and board who drove the focus on the green agenda, seeing it as a key element of their social values and responsibility; and in nine cases the associations had actively recruited known experts from other associations or environmental agencies to head up and stimulate a more active programme of work. Having someone with a clear vision who was already experienced and able to navigate the complexities of the organisation appeared to be essential, provided this was backed up by support from the CEO and board. Gaining the support of other parts of the organisation was also important. In three cases demonstration pilots had been used as a means of convincing other professional colleagues that the agenda was important in

delivering benefits for tenants, the association and the wider community. Five associations had extensive staff training and awareness programmes which showed a wider range of staff that their role could assist in the process of environmental improvements to properties, and also to the organisation's own use of energy. This engagement process was seen as similar to the work being done with tenants, in that staff often saw little relevance of the green agenda to their own work, and the opportunities and benefits they could bring to their association.

Concluding remarks

Stock condition, energy reduction and climate change concerns, tenant warmth, and fuel poverty all form part of the objectives mentioned by associations. While action and investment to address each of these will have implications for the others, they are by no means identical and can indeed make competing demands for investment of both capital (in the buildings) and revenue (in working with tenants to ensure they gain most from the capital works). There are also important and sometimes difficult judgements to be made about the value of costly capital investment in very low efficiency but difficult to insulate properties. The different ages, construction types, geographical location and orientation (towards the sun or wind) of properties, and the differences in neighbourhoods, communities, and resident groups also vary between associations, and affect the choices they make. We therefore turn next to how work is prioritized and planned.

2. Assessing need and planning programmes of work

Overview: Approaches
Associations are taking a range of approaches to the linked tasks of developing a more detailed knowledge of the energy performance of their stock, and planning programmes of work to deliver the quickest, most effective and most cost effective improvements. Most had some form of stock survey, but in varying degrees of detail and generality. Full and solid stock data are invaluable but there is a high cost to collecting it. Some associations had monitored and evaluated improvement pilots specific to "typologies" of their own stock, and used this to scope options. Others provided more general information to in-house or private experts to produce costed options. All had taken advantage of previous grants to undertake basic roof and wall insulation, boiler replacement and glazing works; and some had exploited incentives for solar power and district heating. Financing upgrading works is challenging and often expensive, and the costs and benefits need to be clearly spelt out. Overall there was a range of aims and approaches, where only some elements (like stock surveys) were shared by all, and even then to varying degrees.

The approach to programme planning was less uniform, with some targeting "worst first", some integrating works with planned maintenance programmes, and some allowing the type of programmes to be determined based on grant funding opportunities. A small number of associations married information on tenants who were most vulnerable to fuel poverty into their planning processes.

Assessing existing SAP ratings across the stock

Generally associations used SAP ratings as a key measure of energy efficiency. Reported mean SAP/EPC ratings across associations stock, where obtained, were generally higher than the social housing average of 65, as in Figure 4. These ratings can vary greatly between property types, and the means can be skewed by very low rated hard-to-heat older properties, and by high rated new build properties.

Figure 4: Mean SAP/EPC across association stock (where obtained)

Association	Mean SAP/EPC
F	69.7
G	78
T	67 (partial stock)
Y	71
S	67
C	Mainly within D-C
K	63
Q	70 (partial)
M	Most homes within D-C range
N	66.8

All the associations have taken steps to obtain, improve and update their knowledge of the energy efficiency rating of their stock, using a range of tools. The main issue here was how to go beyond basic "sampling and cloning" approaches to estimating SAP values across the stock

and move to a richer and more detailed understanding of the energy efficiency problems and opportunities in the different types of stock. Sample surveys of property types were sometimes augmented by systematic and continuing updating of more detailed information – for example as part of voids or other major maintenance works, or as part of a systematic survey process. Five now have very detailed stock information, with one for example, having information on 20k out of its 28k dwellings. Three stated they had developed a system of "archetypes" of properties which involved some more detailed analysis of each of these property types to develop more information on which to base modelling; another developed a "Carbon Monitoring Tool" with the National Energy Foundation; and another used "heat maps" to identify priority areas across its mainly estate based stock. We consider later how information about the collection and use of this type of information might be more easily shared, as well as specific details.

Assessing options for improvement works

The subsequent approach to modelling this stock information in order to assess options for improvements also varies. Two associations undertook more in-depth and structured approaches to investigating and understanding options for their own stock. One, following stock inspections and the development of archetypes, undertook a two year (2010-12) "FutureFit" exercise to identify actual costs and savings through a robust monitoring and evaluation process, including the engagement of residents and stakeholders in design, prioritisation and evaluation (Box 1).

Box 1: Affinity Sutton's FutureFit programme

In 2010 energy retrofit was becoming prominent on the political agenda and Affinity Sutton understood that a pay-as-you-save scheme was going to be introduced in some form or another. Research uncovered one-off studies about residents making changes to their home and reaching a high carbon saving, and lots of desk top studies, but no industry learning and actual practice about it.

Aims:

- Understand the practical implications of delivering large scale programmes of retrofit.
- Identify actual costs and actual energy savings through robust monitoring and evaluation
- Develop best practice and guidance on the delivery and funding of retrofitted carbon reduction
- Involve stakeholders in the design, evaluation and prioritisation of retrofit solutions.

Retrofit project:

- Phase 1 April 2010-May 2011 preparation and installation of works
- Phase 2 May 2011-June 2012 monitoring and evaluation of works and lifestyle advice

FutureFit retrofitted 102 properties using three different budgets rather than focussing rigidly on carbon reduction targets. They based their property selection on 22 common physical (not demographic) archetypes—homes that represent the housing stock and, when broadly compared to the English House Condition Survey, 75% of the wider housing

sector. 95% of the properties identified for FutureFit were occupied. All of the FutureFit homes came under one of the 22 archetypes; these were defined not by energy characteristic but by aspects of the properties themselves, as follows:

- Built form (mid-terraced or end-terraced)
- Wall construction (cavity, solid, system built or timber frame)
- Age (age bandings between 1900 and 2002
- Property type (flat, house, maisonette)

Property types AS had to first identify which properties needed which works. The energy assessment tool normally used for existing homes, Reduced Data Standard Assessment Procedure (RdSAP), did not capture or analyse sufficient information for the project's aims. The full SAP system was therefore applied, which is normally used for new build properties to check compliance with government standards. This allowed much more detailed information about the home to be collected and was carried out for a representative selection of properties. They used the information from these in conjunction with a cost model to create three target packages for each archetype. These low and medium packages are comparable with the Green Deal funding figures.

Retrofitting: To refine the packages further, extended surveys were completed at every property and a works selector flowchart was used to map out where changes should be made to the target packages. The energy hierarchy was followed at all stages—looking at improving the fabric of the building first, followed by heating and hot water systems and finally the potential for low and zero-carbon technologies, all aimed at achieving the greatest possible SAP point improvement. All properties (the majority of which were "Low" cost (£6,500) packages) had air tightness works and ventilation fitted, and sometimes a new boiler if it did not need other sort of fabric improvements. "Medium" (£10,000) included new windows or doors if needed and a few "High" (£25,000) cost examples included wall installation, floor installation, PVs.

Resident volunteers: Anyone could participate as long as they lived in the right kind of home. The 102 properties were split into three groups. Some received lifestyle advice over a season, others received lifestyle advice and retrofit works and others received the retrofit works.

Monitoring and outcomes: The works were closely monitored to see how much energy could be saved for each type of intervention. One of the big findings from FutureFit was the discrepancy between what the modelling suggested would be the beneficial change in SAP compared to the lower actual results. They also found that the majority of benefits came from the low cost package including wall and loft installation, double glazing, and a new boiler where needed. It was concluded that the most cost effective option was to focus on these low cost packages and not target higher average SAP ratings – indeed not to monitor SAP in detail at all but focus on delivery of these now evidenced effective remedies. From a policy perspective, FutureFit also helped Affinity Sutton understand the Green Deal better with the conclusion that they could not work with the Green Deal.

Gentoo Group has undertaken a similar exercise, but with a more explicit focus on costs to tenants, as set out in Box 2.

Box 2: Gentoo's Retrofit Reality Research

Gentoo Group have published a series of reports over the past years, dealing with different aspects of retrofit and focusing on identifying tangible benefits which can be established from close monitoring of actual projects.

Retrofit Reality started from the baseline of the 180,000 tonnes of CO^2 which Gentoo's homes produced each year with associated fuel costs to tenants of around £30m. The aim of the project was to look at options for reducing both of these figures, through installing 139 homes with various products and looking at

- how difficult they were to install,
- how easy they were to use,
- what benefits they brought to residents, and
- what type of maintenance they required.

The properties to be improved had average SAP ratings of 55. Products fitted included double glazed windows, energy efficient showers, double glazing, wall insulation, and solar hot water systems.

The Findings showed that less energy and less money in fuel bills were saved than expected. Tenants were using less energy than expected, but also paying higher than expected tariffs for energy – although overall 12% savings in costs were realised. Tenants were also not always using equipment like heating systems efficiently. Many practical lessons were also learned including about the limited available space to put new hot water cylinders and PV cells, the amount of plumbing needed, the benefits of more light entering the room and the use of low E coatings to do this while retaining heat, and the importance of good communication between contractors and tenants during the work.

Other associations have obtained estimates and local evidence of the costs and benefits of specific types of intervention based on a range of evidence applied to their own properties such as:

- specific pilot activities;
- drawing on considerable experience particularly in the central division of its group;
- a 200-property pilot including some more detailed work involving differing levels of improvements and monitoring of savings to fuel bills;
- a demonstration refit house and work towards 12 others

The message emerging from these activities is that there is a need for both a greater sharing of lessons learned, and also for continuing structured pilot work by associations to understand the best options for the wide range of properties and problems which exist within the social housing stock as a whole. There is also a need to understand more about balancing the wishes of tenants to be able to adequately heat their homes with other drivers of energy consumption and misunderstandings about how to optimise warmth while minimising cost.

Programme Planning

General approaches

The way energy saving works are planned and paid for varies greatly. Securing special grants, funding energy saving out of mainstream budgets, adding energy saving measures to planned maintenance programmes, deciding to prioritise "worst first" to help those worst affected are all possible and often work in tandem with one another. It takes time and commitment to make programmes work.

The costs of delivering retrofit can vary greatly based on how the overall programmes of works can be integrated to other maintenance and improvement activity simultaneously underway in the association, as well as external factors like the availability of grants. We explored in our interviews how associations planned programmes of work, and found that the mix of works done often correspond to availability of grants, target the least energy efficient properties, or are included as part of longer term stock maintenance programmes. Again, there is a considerable mix of approaches.

Most associations mentioned the positive impact of the Decent Homes programme in delivering a range of basic improvements which had greatly contributed to increasing the overall energy efficiency of the stock, although much remained to be done. Seven of the associations explicitly mentioned the importance of using the SAP data in conjunction with their planned maintenance programme to target these additional works – either in terms of giving additional priority to bring forward properties where energy retrofit would also be possible at the same time as other works, or by adding energy works to any intervention which offered the opportunity to undertake related activities due to workers being on site. One association's approach was to conduct a thorough review of all its programmes of long-term planning for kitchen, bathroom, window and other replacements to ensure that every opportunity was exploited to add in environmental works. This approach suggests that by being careful in how the specification is drawn up and ensuring that high energy efficiency materials and processes are included, these energy goals can be delivered at minimal marginal cost. But for this to happen, it is essential that the different departments within an association communicate and work together to meet the twin goals of general maintenance improvements through energy efficiency measures. Two associations used explicit matching of information they had about fuel poverty amongst their tenants and used this as an important criterion to prioritise the choice of works to be done.

Four associations had obtained a "CROHM" analysis from the Parity Projects consultancy, and one is doing a more focused follow up study. This is a tool which analyses the association's available data to establish how its specific objectives can most cost-effectively be achieved through retrofit and varies according to the longer term "target" chosen (SAP rating, fuel poverty, etc.). One association used this as part of the planning to move from little engagement in the energy efficiency agenda to developing a longer term policy. They found that this had prevented the association from simply doing reactive works on the "low hanging fruit" of easy insulation works. This allowed a longer term programme/strategy to be planned which was more focused on addressing the worst properties and the most fuel poor tenants. Two other associations had obtained similar consultancy advice on their programmes from different sources.

Impact of CERT, CSEP, ECO and Green Deal[3]

All associations were alert to the opportunities offered by the previous grant programmes (CERT, CESP) and in the past had used these as key enablers of works since many schemes had depended on the availability of complementary grant funding. Three associations had up to this point been almost entirely reliant on these grants to guide and prioritise their planning of energy works, although the new ECO and Green Deal arrangements had meant this approach needed to be amended.

CERT and CESP were programmes which had been widely used by many English social housing organisations. CERT was introduced in April 2008 and was the third in a series of legal obligations on the major gas and electricity suppliers dating back to 2002. Its original objectives included improving energy efficiency and promoting the use of renewable forms of energy, but from 2010 it was refocused on supporting greater installation of insulation. As the table below shows, overall there was a major investment in loft insulation, window glazing, shower regulators, and initially halogens and compact fluorescent lamps (CFLs), which were removed from the programme mid-way due to concerns about the robustness of savings being claimed. Of the 3.9m households who received professionally-installed loft insulation, and the 2.6m who received cavity wall insulation, 25% were social housing tenants, which is disproportionately high compared to the 17% of households in social renting. The 2013 Ofgem report on CERT[4] [5] provides figures on its uptake and is summarised in Figure 5.

CESP was a three-year obligation on major energy suppliers and generators to offer free or low cost energy efficiency measures in certain low income areas, ending in December 2012. It had the primary objective of helping families to permanently cut their energy bills. In addition, CESP was intended to promote area-based and whole house approaches, getting away from the one off loft insulation or cavity wall insulation pattern of CERT, and to treat hard to treat homes, especially those with solid walls[6]. It proved administratively burdensome and hard to deliver, although eventually delivered improvements to 150,000 properties in low income areas, saving 16.4 million lifetime tonnes of carbon dioxide.

[3] the Carbon Emissions Reduction Target, the Community Energy Savings Programme, and the Energy Companies Obligation, all government schemes to stimulate energy efficiency (the first two being now closed)
[4] Ofgem *The final report of the Carbon Emissions Reduction Target (CERT) 2008-2012* May 2013
[5] *Carbon Emissions Reduction Target (CERT)* House of Commons Library Standard Note: SN/SC/06196
[6] see House of Commons Library *Community Energy Savings Programme* Standard Note 06197

Figure 5: Measures installed under CERT in GB

Number of measures installed under CERT

Measure	Number installed by group (thousands) Priority group	*o/w super priority*	Non-priority	Total
Cavity wall insulation	1,260	*238*	1,309	**2,569**
Professional loft insulation	2,334	*532*	1,564	**3,897**
DIY loft insulation (m^2)	18,008	*0*	94,843	**112,851**
Solid wall insulation	44	*8*	15	**59**
Draught proofing	14	*0*	10	**24**
Window glazing (m^2)	113	*0*	34,478	**34,590**
Hot water tank jackets	87	*24*	349	**437**
Radiator panels (m^2)	6	*3*	254	**260**
Flat roof insulation	0	*0*	0	**1**
Fuel switching	52	*11*	57	**109**
Shower regulators	1,526	*42*	8,128	**9,653**
Replacement boilers	22	*7*	10	**32**
Heating controls installed	545	*1*	910	**1,454**
Communal heating	0	*0*	0	**0**
CFLs	121,489	*0*	182,463	**303,953**
Other lighting	111	*0*	903	**1,014**
LEDs	1	*0*	1	**1**
Energy Efficient cold and wet appliances	851	*0*	3,580	**4,432**
Standby savers	2,399	*57*	2,528	**4,927**
TVs	10,336	*0*	20,146	**30,483**
Ground Source heat pump	1	*0*	3	**4**
Air Source heat pump	1	*1*	2	**3**
Solar Water Heating (m^2)	0	*0*	1	**1**
Small scale CHP	0	*0*	0	**0**
Solar PV	0	*0*	0	**0**
Large scale CHP	1	*0*	0	**1**
Small biomass boiler connections	0	*0*	0	**0**
Real time displays	761	*59*	2,239	**3,000**

CFLs -total subject to review of estimated number actually installed

Source: The final report of the Carbon Emissions Reduction Target (CERT) 2008-2012, Ofgem

Many associations spoke about the problems encountered in relation to the current ECO funding framework. In line with associations generally, many had been developing schemes which fell through at the point of the changes to the scheme and reduction of the Carbon Emissions Reduction Obligation (CERO) targets to be achieved. In one case an association was left to pay all the legal and consultancy fees for an abandoned £4m project, and in another a similar problem for another association who had to cut back heavily on a previously planned £1.8m scheme. Further problems were experienced where ECO providers wanted to specify named contractors whose costs exceeded those charged by the association's own contractors – meaning the value of the grant was diminished or lost. This reflected a finding in Affinity Sutton's Retrofit study that some suppliers operating under the Low Carbon Building Programme framework, and hence able to get 50% grant support, provided worse value for money than other more expert contractors who were not eligible for this funding. The general point here, mentioned by three associations, was the previous conflict between the interests

of energy companies in pushing to fulfil their obligations through the grants regime, had the potential to conflict with the more long term interests of association in choosing the best schemes to prioritise. Grant funding was an essential and invaluable resource and means to stimulate activity, but should not be allowed (though in some cases it currently does) to undermine more considered long term planning and prioritising. One association stressed that an over-reliance on grant programmes, and their start-stop nature, has led many associations leave their energy efficiency work planning outside their normal stock investment programmes, and as a result these energy works have been seen as an ad on, not a core part of essential stock improvements for the future. In addition almost all associations agreed that grant funding should be facilitated through the government, not be done through incentives to energy companies.

Severe problems were experienced due to the changing regimes and lack of certainty. Many associations wanted to put in place long-term – up to 5 year – plans for the systematic improvement of priority homes for energy savings works, but found this extremely difficult due to the uncertain grants position. Losing a grant could mean that the association would either have to fund the works themselves, or stop the project. New grant priorities would mean they could be better placed focusing on a different set of properties. Crucially some associations no longer choose to include potential grants in their business plans because of how unreliable the funding streams had become. Instead in the event a grant was awarded associations would then use the funding to do additional work to what was originally stipulated in the business plan. This was very different from the CSEP/CERT period.

ERDF was mentioned by one association as another funding stream. This has been used for several schemes in the UK, on different tenures, but did not figure prominently in this study.

Questions on Green Deal similarly produced a lukewarm reception. Overall the general perception among the associations we interviewed was that the Green Deal was not designed for or applicable to how social housing landlords operate. Associations did not feel it was right to saddle already cash-strapped tenants with additional costs to retrofit their homes. One association had produced an assessment of Green Deal as part of its 2012 report, which has been widely discussed and disseminated. This concluded that

- retrofit measures cost more in reality than anticipated ;
- considerable investment in staff and resident training was required to deliver results;
- Green Deal funding was inadequate to deliver the intended outcomes;
- there was little current demand amongst residents to participate, particularly if they had to contribute financially.

Another association also undertook a Green Deal pilot scheme, which explicitly considered the question of tenants' willingness to pay for energy efficiency improvements, and what improvements were most preferred. More residents were willing to take part than the results of the previous study would have suggested, with 88% saying they would be willing to pay towards improvements in the expectation of saving money on fuel, with boilers, solar heating, double glazing and energy efficient showers being the most popular. A number of tenants were moved onto schemes where they paid just over £1 a week towards improvements which had been made, although this charge was removed when the recent Welfare Reform changes

began to be implemented. These two associations are working together to develop and propose ways in which the Green Deal can be made to work.

Two further associations are doing planning exercises in partnership with British Gas involving their own properties and private properties pepper-potted through their stock. The savings brought by economies of scale and the marginal cost to the private owners of being included in the programme, alongside the wider community benefits, meant this was a promising new approach to wider promotion of energy efficiency and community awareness and commitment to the agenda.

Concluding remarks

- Landlords have different priorities; including reducing fuel poverty, cutting carbon emissions, improving SAP ratings, upgrading existing poor quality stock.
- Strategic direction from the board and chief officers is essential, as is the recruitment of experienced experts to lead the programme and the engagement of all staff in understanding their role in energy saving
- Knowledge of the stock is an essential starting point, with sufficiently robust “typologies” of the major stock types and good procedures in place to ensure a continuous rolling update and extension of property records to include additional and up-to-date information from all available sources. But this data can be expensive to collect and maintain, so good sampling and “typologies” methods are essential, as is a system of automatic and continuous updating
- As part of strategic priorities associations need to have specific operational long term goals in terms of target mean or minimum SAP ratings, carbon emission reductions, fuel poverty reductions, or similar objectives against which to judge programme options.
- Several tools and consultancies providing advice now exist to assist associations in systematically making best use of their stock condition data to develop options for action. This helps avoid reactive actions in response to immediate opportunities or incentives, and allow those to be more effectively integrated to a longer term strategy
- Clear benefits are available from overlapping planned and cyclical maintenance schedules with energy efficiency options. The additional use of data about fuel poor tenants and neighbourhoods is also helpful in setting priorities.
- Landlords need clearer guidelines on an agreed baseline and how to plan and deliver, or easy-to-apply steps. Systematic information from structured pilots providing robust evidence of the potential savings in energy and money as a consequence of works on specific types of property is essential. Pilots need to be monitored over the medium term, have elements of formal comparative control cases where different or new work is done, and involve the tenants as key partners and sources of monitoring information. Associations need to ensure that any information of this type is either specifically relevant to their own different stock types, or tested by their own investigations. They should assume that at present it is difficult to find information that will provide them with robust estimates of the cost benefits of works, and that published general and standardised information will not be sufficient or accurate (though this is improving as more structured pilots are delivered)
- There are continuing uncertainties around ECO and the Green Deal. The changes made to the ECO timescales caused massive problems for landlords and damaged what was a strongly growing market. The Green Deal has been revised several times to simplify and

create better incentives. However, it still does not help low-income tenants with their energy bills, and is effectively regressive taxation with the low-income tenants funding the improvements to their own homes. Many social landlords are working hard to find solutions to these problems.

- The social housing sector is in a unique position to have a great impact on reducing carbon emissions. They own and operate a large portion of the housing stock in the UK. They have the tools and the ability to undertake large scale retrofits and thus tap the potential to reduce carbon emissions and reduce fuel poverty at the same time.

3. Works done

Overview: Main activities
Many of the associations had already undertaken extensive works to harvest the "low hanging fruit" of insulation and more efficient heating. Few had undertaken systematic monitoring of the outcomes of these works either in terms of reduced fuel poverty or estimates of actual carbon emissions. Some assumed savings based on standard tables; others based estimates on their own pilot project results. It was often suggested that tenants heated their homes to more comfortable temperatures when insulation was in place; and associations sometimes had specific teams to provide advice to tenants on more effective use of heating – such as by better use of timers, thermostats, or simply shutting doors to empty rooms. Some had undertaken more complex and experimental works like solar heating or air recycling, where maintenance problems, or tenant opposition were more common.

Associations were asked about work already done and its impact. Although some detailed quantitative data was obtained in some cases, this was not comprehensive. Nevertheless some clear and useful patterns of activity became clear. Figure 6 gives an overview of the main types of works done by associations who provided details of this:

Figure 6: Types of work done already

Measure	Associations mentioning	Comments
Boilers and heating systems/controls	12	Many had rolling programmes of replacement of boilers with low EPC ratings
Loft Insulation	All	Major activity over past years, with considerable coverage
Cavity Wall insulation	12	Many had rolling programmes and two had done almost all
Double glazing	12	Three had almost all stock already done; most had rolling programmes
External wall cladding	9	These were less common and less extensive; older London properties had problems with obtaining planning permission; internal cladding unpopular as loses room space
Solar/PV	6	Issues about roof space, roofs not facing south, extent of plumbing needing installed. Also maintenance issues, but some good results, and issues of needing to secure lender consent, even for self-funded schemes
Air circulation /ventilation	5	Source of some problems with tenants in using these
Other		This includes two with district heating/biomass systems, two with heat pump systems

The standard works of loft and cavity wall insulation, boiler replacement and better heating controls, and double glazing were extensively used. These are clearly the most important and

effective ways to reduce energy consumption (with some exceptions for more difficult properties) and have underpinned the historic pattern of grants and incentives. There was less activity around use of solar energy and PV, not least due to the reduction in subsidy for these works making them unattractive or uneconomic, but also because of difficulties in identifying properties with south facing roofs and finding enough strong roof space to install all the needed elements of the heating package. There can also be difficulties getting consents from organisations providing financing for associations, even where the works are self-financing. More efficient showers were amongst the measures complementing hot water system improvements in one association, who found their major benefit was where there was previously only the option of filling a bath. Overall it was clear that the "easy wins" had already been achieved and the next stage was likely to require more expensive works which would need to be more carefully planned, targeted, and introduced to tenants. This is now at the heart of the discussion and analysis – having in many cases (but not all) picked the low hanging fruit, how does the sector move on to deliver increasing energy savings and reductions of tenants' fuel costs in a cost effective way? And as part of this analysis and debate, to what extent can faster progress be made by a more active focus on working with tenants to reduce consumption, as a less capital intensive way of making faster progress?

Monitoring and assessing the cost benefits of measures

There was a wide divergence of approaches in monitoring and assessing the cost benefits of measures. Two associations have published reports on highly structured, monitored and costed experimental programmes to show the cost benefits, advantages and problems for specific approaches and types of improvement. These studies have provided detailed information about the costs, benefits, problems and tenant attitudes to improvements on the basis of the specific properties within the various pilot studies done.

Others had a long history of environmental activity, from which they had developed expertise and a depth of understanding of effective approaches; some had undertaken small pilots, and projects to improve the quality of its evaluation of the impact of measures.

Some associations draw on the standard guidance from tools such as CROHM. These suggest that certain type of improvements (e.g. cavity wall insulation) deliver an increase of 1 SAP point for each £100 of investment, and others (such as upgraded boilers) deliver an increase of 1 SAP point for each £100-500 of investment – which when applied to a stock condition survey of the current state of properties could produce alternative programmes of investment costs and likely outcomes.

Several of the associations mentioned the difficulties of obtaining reliable information both about stock condition, and about the impact of energy efficiency works. Eight associations indicated that apart from small experimental schemes, they had no effective mechanisms for monitoring the more general impact of energy saving works already done. Several had tried to get information from tenants about electricity consumption, which had proved difficult even with incentives. Two had tried to obtain information from energy providers about consumption but none had succeeded in getting satisfactory information. One, on the other hand, had an active process of getting information about some of their residents' meter readings, as well as remotely obtained information about a PV scheme, and another runs a series of structured research projects involving panels of willing residents who submit data

regularly to their research partners. The introduction of smart meters may help here, although there will continue to be issues about data confidentiality and multiple suppliers which mean this is unlikely to be a panacea. Other remote sensors could, however, perhaps be deployed. This is an area where we need to devise means of more systematically and effectively gathering pre and post works information, including information about tenant behaviour.

One successful evaluation project did not involve major works at all and reached around 20,000 homes. The "EnergySave" programme involved a visit from an energy expert who talked about how residents could change the way they managed their energy bills and how to make savings. The programme also encouraged them to submit energy readings regularly in order to take advantage of a more personalised analysis of their energy use and continuing advice. Areas of high deprivation and at most risk of fuel poverty were particularly targeted, including 33% who said they had difficulty paying their bills. As a result over 94% made some changes to their behaviour (like turning off radiators in unused rooms) or began to use energy saving devices (like energy saving light bulbs), with higher levels of engagement from more "fuel poor" residents (compared to other residents in the sample). A sample of 235 residents who had returned at least three readings was used to estimate the possible savings over 2 years which came to £416 per resident (for an investment of £92.55 per household), with a saving of 1,274kg of CO^2 and 4,573kWh per resident.

Maintenance and repair issues

Maintenance and repair issues were not much commented on by the people we interviewed, although a few common themes emerged surrounding some of the more complex devices fitted, for example:

- PV panels had a range of problems, requiring regular maintenance, including being moved.
- Some non-standard boilers or lights required replacement parts which were not easily available in the UK; and in some cases tenants had to change air filters which they seldom did.
- Some PV systems were connected to the plumbing and electrical systems in a manner that a simple repair to a boiler or another part of the heating system required that the PV be reconnected which was not always done.
- One biomass heating system had major problems and all documentation was in German – the system was eventually abandoned
- One association had installed Swedish heat pumps into 200 flats only to discover that they were designed for a different size and type of flat and consumed unacceptable amounts of energy.
- The most common reported problems were with ventilation systems, with five associations noting significant difficulties following work, often with tenants turning the systems off, ignoring instructions on their use, or having problems of damp or mould as a result of not using it fully or properly.

Overall these were not unexpected consequences of dealing with some more novel and cutting edge technologies, and did not affect the basic insulation, double glazing and boiler replacement work. However, as associations move to the more complex areas of further improvement these problems may increase. This highlights the additional need to get tenants

engaged with improvements in the right way to gain the benefits; and to have some procurement and works specification staff with technical expertise in energy products and who can work closely with manufacturers and others to ensure that products being sourced in a rapidly changing and improving market are appropriate, fully tested and evaluated, and value for money.

4. Tenant engagement and support

Overview: Different approaches adopted
Behaviour change is growing in importance as landlords realise that technical "hardware" is only part of the story. The importance of tenant engagement was stressed by all the associations, not least as it is often essential that tenants understand how to use their heating and other environmental controls in order to heat their homes adequately and reduce fuel costs. There is an increasing amount of work which recognises the importance of good communication with tenants coupled with an understanding of their attitudes and behaviour. Some associations have undertaken specific work on this, including having dedicated teams working with tenants to advise them on how to get the most benefit from the works completed. But for associations to get the message across that real change in behaviour can be realised requires repeat visits to check on progress, clarify and reinforce the key messages. Simply handing out leaflets does not change behaviour. There is a growing recognition that working with tenants is a continuous process requiring many different approaches which together reinforce the messages in different ways. This is both the hardest and often expensive but most important element of energy saving work. It is also one where clear evidence on good practice is still under-developed. The demography and baseline tenant behaviour needs to be understood before any works are planned.

Tenant engagement and support was uncovered by evidence from the studies referred to above that works undertaken seldom deliver the expected results, but rather deliver lower levels of energy savings and cost savings for tenants. This is a problem for two main reasons – first, it is the responsibility of social landlords to provide well insulated homes, which can require tenants to cooperation in getting works done; and second because tenants themselves need clear instructions and assistance in understanding how to use the heating controls, ventilation systems, recycling facilities, and other tools to help improve their quality of life and reduce their fuel and other costs. Wider engagement of tenants in environmental programmes is also important, but different.

Previous studies of fuel poverty and winter deaths show that fuel-poor households react by reducing their heating and overall use of energy. This is confirmed by the evidence from these associations that in many households there was a lower level of energy use than expected, which reduces the extent of energy and fuel cost savings in some estimation models. This is also partly a matter of smaller households than anticipated – SAP assumes a household size of 2.5 whereas in the sample used in one study one or two person households were common (reflecting the generally lower household size in social housing). SAP also assumes that people do not live in their houses during the day – but many retired or unemployed social housing tenants do. It also assumes that tenants use the new systems to maximum advantage, which again is often not the case for social housing tenants particularly in relation to use of the heating timers and thermostats. These factors mean that both the assumed base line usage, and actual usage after improvement works, may differ for social tenants from the wider national (SAP or DECC) assumptions about typical savings.

The extent to which tenants engage with the green agenda, and their willingness to get involved in exploiting the opportunities of the improvements and the monitoring of the outcomes, varies between associations. One association found it comparatively easy to get

into discussions with residents during its EnergySave programme, reaching over 20,000 since 2012, although they reported they were less likely to be let in by less well-off residents, people living in detached houses, and pensioners (although in the end the biggest beneficiaries and most enthusiastic participants were the worse off households). Similarly another association got 80% participation in its Green Deal pilot in Sunderland. On the other hand one found a low take up on its kitchen and bathroom project, and very little on its internal wall insulation programme (due to reducing available space). Another found it almost impossible to get its tenants to supply energy readings to monitor improvements despite incentives and imaginative "competitions" to stimulate interest. And another found it difficult to get people to engage with its pilot, suffered a 24% dropout from those who initially agreed to take part, and had to continually work with tenants to keep them involved.

We asked associations about how they engaged tenants, and what worked. Many associations stressed that the appetite for wider engagement in the "save the planet" agenda is a weaker incentive than illustrating the direct personal financial benefit as a source for motivating behaviour change. It was stressed that any discussion of behaviour had to be couched in the potential financial savings to the tenant. It was the driver for tenant engagement in one association who set up their Energy Efficiency Advice Service to provide both face-to-face and telephone advice on saving money, including doing a full check on energy providers, use of appliances and other measures. This also involved work with schools to target children in explaining energy efficiency, and using the association's welfare reform team to make referrals. They estimate saving of at least £250k for tenants in the last 18 months.

Another association developed a specific programme of visits to each home where the tenants were talked through the important points of how the systems work and what they should do. This was followed up with a short report to the tenant with five "top tips" and an illustration of the likely cost savings if these are done. The tips can be as simple as "keep the bedroom doors shut". They then return after a few months to check what has happened, including seeking information on past and current energy bills. These visits are backed up by a series of more general events including an energy saving video, an internet news item on their website around energy saving, and leaflets. 857 people were reached over the year to April 2014, and follow up research shows a high level of people feeling that they now had more control over their heating and bills, a median annual fuel cost saving of £165, and an 80% satisfaction with the service. This was judged a cost effective investment by the team.

Another association had a similar, if less structured, programme based on the belief that "you cannot beat the good old fashioned door knocking and cold calling" – albeit backed up with more fun events and family days, based around financial benefits to tenants.

One association initiated a sustainability forum and resident champions programme. These champions are trusted community figures who are given specific training and asked to take the messages, and specific information materials, to other residents. Another association followed a similar line with its "Street Champions" programme which is a highly structured approach to engaging volunteers and using whatever time, skills and abilities they have to take increasingly active roles in engaging their community with the "Planet Smart" agenda "over the garden fence". Training is provided, and there is a system of increasing rewards for

work done, including loyalty schemes, rent discounts, driving lessons in the fleet of electric cars, job training, "or simply a smile from knowing they have helped someone". This programme is being tested in parallel with a similar programme to embed the ECO/Green Deal message. It partly stems from the calculation that in previous retrofit programmes the association had to spend around £180 per resident to get buy-in to install energy efficiency measures. Using a different approach, writing up and sharing case studies which are aimed at helping other residents understand the benefits of retrofit is part of the work of the Resident Liaison Officers' task in another association.

Difficulties in gaining agreement to proceed with physical improvements prompted a three pronged approach in one association, with roadshows, events, providing simple tips on changing energy suppliers, and explanations of the benefits. Sending generic letters did not work, and its current approach involves similar messages being delivered by the contractor, the housing officer, and the poverty services staff all of whom talk to the tenants about what will happen, and then what has happened. They have also designed spreadsheets which are given to tenants to monitor consumption.

Others combine discussions about energy with wider engagement and consultation plans, using existing and known channels. One association involves volunteer residents in their more structured research programmes where the residents involved also receive advice on their levels of energy use. Another picks up issues on their general call centre number and refers them on to more specialist advisors, but do not have an in house team or specific initiatives. One association, by contrast, is undertaking some specialist work on customer behaviour and segmentation aimed at understanding more deeply the attitudes and motivations of different customer groups, with a view to planning customer journeys and finding the best ways to communicate with each group. This complements its current videos, visits, and e-learning modules.

Concluding remarks

In summary, there were different perceptions about how to change resident behaviour, and a lack of consistent and clear good practice. Some thought it was through an emphasis on potential savings achieved versus stressing the comfort (savings achieved seemed to win out). Gimmicks like fantasy football type games to get residents to provide their meter data only worked if residents were paid to provide the information. But simply providing leaflets or newsletters was universally agreed as not a solution. It seems that what did work was a very intensive, long-term, multi-pronged approach to engaging with residents involving:

- Engaging intensely with resident pre- during- and post-retrofits. Having contractors and developers working with the association to explain what was being done to their property proved helpful.
- Having staff available to explain, either through a call centre or through on-site visits, all aspects of energy changes made to their flats, their energy usage generally, energy providers and which is the right provider or billing solution for the resident and similar practical information is essential. Several associations have incorporated this green element into site visits from the welfare teams or other teams who regularly visit residents so that issues can be addressed whenever and not just by a "green advisor".
- Festivals, fun days, demonstrations, distributing leaflets call all work so long as it is in conjunction with above. This includes case studies being distributed and/or having

those residents who have already had retrofit work done explaining the benefits to other residents. But just any one of these alone tends not to have long-term effects on behaviour.

5. Information exchange

Overview: Guides and examples
There are many case studies, technical evaluations of energy efficient products, and working groups who meet to exchange information and intelligence around effective energy efficiency measures. Nevertheless associations almost unanimously indicated there is an unmet need for a more interactive and integrated information hub which looks at lessons learned, effective strategies and tools which work effectively to marry the technical improvements with tenant behaviour. This hub could also provide product information in addition to approaches to more systematic evaluation and cost benefit analyses.

There is a considerable amount of information available around the green agenda, and many groups are working on sharing this. These include various initiatives by the National Housing Federation (including the "Count us In" project and its regular meetings, as well as its Environment Newsletter and regular briefings); Sustainable Homes; Chartered Institute of Housing initiatives and awards, and other award competitions; regional exchange and practice groups; BRE and other government and arm's length advice and information agencies. Nevertheless when asked, all bar one of the associations suggested there was a need for additional information sharing and good practice discussions. The issues suggested included:

- meta-analysis of case studies – it was felt that there were a large number of overlapping case studies but no overarching meta-analysis to pull together and evaluate the results;
- reviews of products and programme approaches which bring together the technical elements with resident behaviour and fuel poverty elements to provide a more rounded analysis of options;
- information and advice on how better monitoring of outcomes and impacts can be more easily undertaken and compared;
- support for practical initiatives like a library of instruction manuals for boilers and other technical improvements that could be easily downloaded (and translated versions where needed);
- more workshops to share good practice;
- regular headline newsletter on best practice, and latest projects case studies;
- more technical and case study information on what does not work, in addition to what works well;
- more guidance and sharing around health impacts and other wider social impacts of the energy works;
- sharing what does not work;
- clear, simple, and persuasive model papers to present some of the key programmes to sceptical housing association boards and senior staff

Five associations noted that some of this could be provided by some form of "Hub" or "energy Wiki" where practitioners could easily share and co-create content in a flexible and immediate way. The field is changing so quickly that rapid interactive websites could prove an efficient and effective way to update and maintain an active dialogue.

Concluding remarks

Landlords need some commonly used criteria for deciding which route to follow and which case studies to rely on. Social landlords are developing and carrying out detailed reviews. These findings need to be validated by independent experts in order to offer guidance materials, methods, costs and impacts. Combining case study experience, technical reviews and current guidelines into an easy-to-use assessment system is the next step.

Many of the landlords we spoke to are doing path-breaking work, but there is an urgent need for more shared information and better training in basic energy saving for frontline staff and tenants. An information and case study hub which social landlords can use to share their experience and advice would also be invaluable.

Annex 1: Associations interviewed

	Area of operation	Social housing homes	Type, if ex-LA
Affinity Sutton	England	56,000	
Gentoo	Mainly N. England	30,000	
Guinness Partnership	England	60,000	
Hackney Homes	Hackney	32,000	Stock Transfer
L&Q	London and SE	70,000	
Liverpool Mutual Homes	Liverpool	15,000	Stock Transfer
Notting Hill	London	28,000	
Octavia	London	4,000	
Orbit	Midlands, E. & SE England	37,000	
Peabody	London	27,000	
Places for people	England, plus some Scotland	60,000	
Sovereign	Oxford, Berkshire & South West	28,000	
Trident	W Midlands & Derbyshire	3,500	

Annex 2: Energy Plus Roundtable

LSE Housing and Communities ran a morning roundtable event at LSE on Wednesday 26th November to discuss the issues that arose from this research and other current topics with 32 experts in the field.

1. Outline and agenda

Session 1 – Energy Plus, fuel poverty and why this agenda is important

- Welcome and introduction to Energy Plus
  John Hills, Director of CASE and Professor of Social Policy at LSE
- Why and how the government have developed a new definition of fuel poverty, how this is changing policy and how it is being applied in practice
  Gareth Baynham-Hughes, Deputy Director - Fuel Poverty, DECC
- Why energy saving matters to social landlords, and why getting it right is challenging
  Andrew Dench
- Short summary of findings from the research
  Bert Provan,
- Discussion led by John Hills

Session 2 – Panel discussion with:

- How do we balance competing aims around fuel poverty (tenants) and stock improvement (buildings)?
- How can we better share information about what works and (crucially) what doesn't?
- How can we plan investments to integrate energy efficiency with planned maintenance, available resources and tenant support?
  - *Noel Brosnan, Octavia*
  - *Alex Willey, Affinity Sutton*
  - *Graeme Maughan, Peabody (TBC)*
  - *James Traynor, ECD Architects*

2. Headline Themes from Energy Plus Roundtable Event: Thursday December 4, 2014

Main Headlines:

- It is vital for housing associations to understand their stock. What are the benchmarks, drivers and targets for both specific buildings and the stock on a whole? One size retrofit does not fit all.

- There is a constant need for high quality data. Currently there is too little high quality data and as a result housing associations are not able to accurately capture the scope of their stock and set accurate benchmarks that enables outcomes to be measured.

- There has to be a business case for housing associations to energy retrofit their stock.

- Experiences, resources, skills exist but this needs to be shared more widely among housing associations. There is especially a need to share detailed, technical evidence, and also information about failed projects as well as successful ones.

- Information within housing associations needs to be shared upwards to boards and senior management and outwards to other departments, such as development, maintenance and resident services.

- There can be competing approaches between advocates of demolition and new build compared to those who promote renovation and retrofitting. Retrofitting can create high quality housing; it reduces displacement of current tenants; and has a much lower carbon footprint, not least from avoidingthe embodied carbon costs of new build.

- There is a need to join up the benefits of energy efficiency retrofits with other parts of government, especially the Department for Communities and Local Government (DCLG) and the Department of Health.

Key General Points

- According to the Department of Energy & Climate Change (DECC), **accurate measurement of fuel poverty is vital**. But no single measurement indicator is perfect. Experience has demonstrated that using a broader set of fuel poverty indicators has changed how the problem of fuel poverty is understood.

    - According to DECC, indicators do matter because it is important to be able to draw on evidence, including **identifying those individuals and families who are the most susceptible to living in fuel poverty**. DECC suggests that a 'vulnerability' indicator would allow housing associations to establish who is most fuel poor and who is susceptible to being fuel poor.
    - However there are **challenges with targeting the fuel poor first**. It can be difficult for housing associations to identify *who* is fuel poor, and unlike buildings tenants incomes can change rapidly, moving them into or out of fuel poverty.

- Fuel poverty is a part of a wider agenda to address energy efficiency needs. It is one of many important drivers for housing associations spending money to energy retrofit their stock. It is a great issue around which to galvanize support, but **housing associations should not focus only on this target because it is not necessarily the best method for allocation of resources**. Ultimately energy efficiency is about the wider condition of the housing association's (indeed the country's) whole stock and thus it is a question of how best to pay for the changes to the stock on a whole—not just addressing those who are fuel poor.

- There is tension between those who suggest taking an **area-based approach to energy retrofits versus targeting those buildings who house the fuel poorest first**. An area-based approach focuses on targeting the worst SAP ratings and/or taking all buildings into consideration irrespective of whether fuel poorest residents live in those buildings. With the new definition of fuel poverty, there is pressure to address the fuel poorest first. But this risks not tackling the worst stock in the most cost efficient way.

- We need to **make the case for why investments in energy retrofits are ultimately cost-effective**. This means linking investments in energy retrofits to better health outcomes. Here the discussion needs to focus not only on the savings to the resident and the housing association but to the NHS as well by using cost effective evidence for why investing in energy retrofits makes good financial sense.

  - **Public health is not a big enough part of this discourse**. Joining up housing with larger issues at the local level can help galvanize more support for energy efficiency agenda. There is currently not enough engagement with public health agencies to develop this key strand of planning and funding retrofit. There are similar problems in targeting tenants with specific health needs as there are with targeting the fuel poor – i.e. they may move, and that this approach may not be the most cost-effective technical way to treating the stock as a whole. If, for example, evidence suggests that internal wall installation will result in an increased life expectancy, then this information can be used when seeking funding from health related funding bodies – it opens up the source for potential funding opportunities.

- The Department of Energy & Climate Change (DECC) has set a **new target for 2030** – to get a minimum number of homes to band C by 2030. DECC is in the process of developing a more detailed strategy. They want to **highlight how using new insight into measurement, cost effectiveness will result in progress made in energy efficiency**. But they acknowledge that **new funding commitments will be needed for such an initiative**.

- A challenge with local authorities is that **increasing fiscal pressure reduces their ability to fund retrofitting, which is an excellent long term strategy but is competing with increasingly urgent short term unfunded priorities and unfunded statutory services**. Retrofitted buildings lack the 'wow' factor and the quick return on satisfaction of new builds. It is crucial that local authorities keep making the case for the wider health, social and poverty reduction benefits of energy retrofit in the social housing stock.

- **Passive measures are perceived as 'good' workable ideas, but 'gizmos' are perceived as much more difficult** because they are costly and hard for residents to work with and adjust to. These are the strategic challenges.

- The efficiency of retrofit technology will increase significantly (as is already the case) while the price to acquire that technology will go down (as is already the case). **So how do social landlords make investment decisions in this rapidly changing retrofit market**? Should they invest now or does it wait and invest in five years when the technology costs are less and equally the technology is more advanced? Economic decisions are having to be made without perfect information.

  - It is important to **bring in the private sector**—a potential business opportunity that is currently going untapped?

- It is time to revisit the Decent Homes standard. This needs to be reviewed in order to open up funding for energy efficiency retrofits. Currently the Decent Homes standard focuses on, for example, installing a new kitchen, but not whether that kitchen is energy efficient. If energy efficiency is not a part of the Decent Homes standard, then it is questionable whether the installations made result in 'decent homes'. **The Decent Homes standard needs to be smarter in its policy design – to join-up, for example, a Decent Homes standard with energy efficiency outcomes**.

  - The government has a role to play, but is currently massively behind the game. Social landlords need to work with government in terms of the supply chain, cost of retrofits, training and building regulations that do not inhibit rather than help solve the energy efficiency problem.

- **Tenant behaviour is a key element of energy saving**. Social landlords want residents to heat their homes adequately while not wasting energy (e.g. through bad windows, lack of insulation, etc.).

  - What is post-retrofit wasteful behaviour exactly; what is over-heating or wasteful energy use? Or what is 'normal' energy-use behaviour? What does an average heated home look like in terms of energy use and cost? We need to **understand tenants' needs and attitudes** rather than assuming we can change them to fit our insulation models. These are the issues that need to be made clear to the tenants.

  - At what point should **residents be involved** in the decision making process?

  - There is a tension between the focus being on the 'hard' (physical) changes made to buildings versus the 'soft' (behavioural) changes. It is not just about the repair to the buildings, rather **energy efficiency must become a part of the everyday planned maintenance and development of the housing association as well as a part of the residents' lifestyle**.

3. Energy Plus roundtable delegate list

Name		Position	Organisation
David	Adams	Head of Retrofit	Wilmott Dixon
Daniel	Archard	Sustainability Officer	Notting Hill Housing Trust
Gareth	Baynham-Hughes	Deputy Director - Fuel Poverty	Department of Energy and Climate Change
Liz	Bell	Behavioural Change Expert	L&Q
Anne-Marie	Brady	Researcher	LSE Housing and Communities
Jonathon	Brearley	Director	Brearley Economics
Noel	Brosnan	Director of Asset Management	Octavia
Andrew	Burke	Sustainable Environments	National Housing Federation
Shaun	Carr	Assets Director - Property	Sanctuary Group
Helen	Coates	Energy and Green Strategy	Circle
Simon	Cran-McGreehin	Energy Research Partnership	Energy Research Partnership
Andrew	Dench	Head of Strategy and Customer Engagement	Guinness
Susan	Duttaroy		Orbit
Hessel	F de Boer	Customer Board Member	Salix Homes
John	Hills	Director	Centre for Analysis of Social Exclusion
Bevan	Jones	Sustainability Manager	Catalyst Housing Group
Mark	Lewis	Senior Contracts Manager	Sovereign Housing Association
Jenny	Love	Consultant	Element Energy
Adam	Masters	Sustainability Manager	Guinness
Alison	Mathias	Manager - Existing Stock	Homes and Communities Agency
Graeme	Maughan	Sustainability Manager	Peabody
Bert	Provan	Senior Researcher	LSE Housing and Communities
Neil	Sephton	Green Living Senior Advisor	First Wessex
Nicola	Serle	Research Projects Co-ordinator	LSE Housing and Communities
Russell	Smith	Managing Director	Parity Projects
John	Stapleton	Head of External Affairs	Sustainable Homes
Leonie	Storer	Head of Property Services	Trident Social Investment Group
John	Swinney	Business Development Director	Carillion Services
James	Traynor	Director	ECD architects
Derek	Watters	Sustainable Development Manager	Places for People
Martin	Wheatley		Independent consultant
Rhoda	Wilkinson	Strategic Affordable Warmth Manager	Riverside
Alexandra	Willey	Head of Asset Sustainability	Affinity Sutton
Dimitri	Zenghelis	Co-Head Climate Policy	Grantham Research Institute