Department for
Business, Energy
& Industrial Strategy

Evaluation of the Public Sector Energy Efficiency loan scheme

Synthesis Report

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Executive Summary

Introduction and evaluation methodology

This report presents findings from the evaluation of the Public Sector Energy Efficiency Loan Scheme (the scheme), delivered by Salix Finance Ltd (Salix). The scheme provides interest free loans to public sector bodies to support the installation of energy efficiency measures, thereby reducing energy consumption, greenhouse gas emissions and energy bills, contributing to meeting targets outlined in the Clean Growth Strategy (2017). The scheme is available to Local Authorities (LAs), NHS / Foundation Trusts, schools (including academies), further and higher education institutions (FEIs and HEIs) and provides two funding models;

1. The Salix Energy Efficiency Loans Scheme (SEELS): Interest-free loans to fund the installation of an energy efficiency measure that is repaid within five (or eight for schools) years through the savings incurred to energy bills.
2. The Recycling Fund (RF): A ring-fenced, interest-free loan that is match funded by the participating organisation. Once loan funds are repaid, they are then recycled to fund other energy efficiency installations within the organisation. RF has been closed to new participants since 2011 although it still continues for organisations participating beforehand.

In the 2015 Spending Review (SR15), HM Treasury (HMT) approved a £255.3 million funding uplift for the scheme in England, spread over five financial years (2016/17 – 2020/21).

The evaluation covers activities between financial years 2013 / 2014 – 2016 / 2017, aiming to answer the following high-level questions[1]:

1. What have been the outcomes of the scheme before and after the uplift in funding in 2016?
2. What is the contribution of the scheme to the observed outcomes?
3. What is the cost effectiveness of the scheme?
4. How effective and efficient has the delivery of the scheme been?
5. What is the wider learning from the evaluation for BEIS?

The approach to this evaluation was theory-based, using a theory of change (ToC) to inform the design and focus of the evaluation. The evaluation employed a phased, mixed-methods approach to answer the evaluation questions, which included scoping and method development, ToC development and review, quasi-experimental impact assessment (QEA), qualitative and quantitative research with scheme participants and non-participants, and a cost effectiveness assessment.

[1] These were supported by 30 sub-questions, detailed in the Technical Annex.

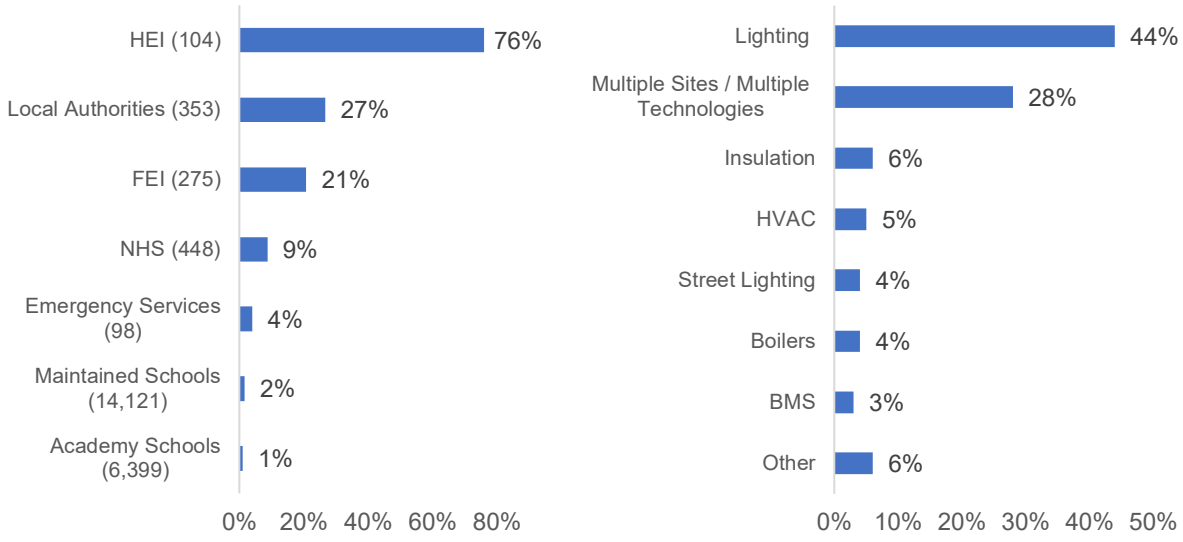
Scheme engagement, design and delivery

Scheme activity: Between financial years 2013/14 and 2016/17, 3,470 projects have been funded by the scheme across 564 organisations, with a total spend of £235m (RF £51m, SEELS £184m). Within this, a sub-set of organisations have used the scheme extensively[2], whereas 324 (57%) organisations have implemented just one project. Whilst the number of participating organisations annually remains relatively constant, there is a trend towards delivering fewer but larger projects[3]. Furthermore, participation varies considerably by organisation type, which is broadly skewed towards organisations with larger estates (Figure 1). These trends were described to be influenced by a range of factors, including the funding uplift; scheme design which encourages working with existing participants with greater potential to act, as well as overcoming initial barriers, such as convincing senior decision makers, which ease after having proven the case for action.

By far the most popular technology is lighting (the 'multiple technologies' category is also dominated by lighting[4]. This contrasts with other BEIS research that suggests cost effective energy efficiency potential is available from a broader range of measures, including space heating and building fabric measures[5]. The qualitative research showed that the dominance of lighting reflects the perception of these projects as being straightforward to deliver, low risk, with good payback, and producing co-benefits (for example, lower maintenance and improved productivity). For some participants this made for a more compelling business case. By contrast, several participants noted issues in designing, procuring and delivering non-lighting projects in a timely fashion.

[2] 15 organisations have completed more than 50 projects each and 116 have done more than 10 projects each.
[3] Participating organisations varies annually between 226 and 241. The number of projects funded decreases by 35% (1036 projects in 2013/14, 675 projects in 2016/17). Average funding per organisation increases by 75% (£174k in 2013/14, £304k in 2016/17).
[4] Analysis of scheme application forms showed that 28% were categorised as 'Multiple Technologies'. This is the descriptive term used by Salix in their administration data. From a 'free text' description of the project, it is sometimes possible to determine which technologies have been installed. This is generally a mix of the technology types presented here – although they predominantly include lighting.
[5] BEIS (2016) Building Energy Efficiency Survey, Overarching report. Table 4.4, page 87.

Figure 1: Proportion of projects by organisation (N=21,798*) and technology type (n=3,470) 2012/13 – 2016/17 (%) SEELS and RF



* = Figures in parentheses within the chart are population figures for each organisation type.

SEELS caters to a broad range of participants (247 schools; 70 academies; 56 FEIs, 24 NHS, 36 LAs; 25 HEIs and 2 Emergency Services have taken up the scheme) , whereas the RF is dominated by HEIs and LAs (27 and 48 have taken up the scheme respectively along with 4 NHS and 2 Emergency Services).

SEELS has relatively low levels of repeat activity (2.2 projects per organisation), whereas the RF is dominated by HEIs and LAs and is characterised by high levels of repeat activity (>20 projects per organisation). The 'use it or lose it' aspect of the RF meant that those with access to it prioritised RF activity first, before moving onto SEELs for other, often larger-scale projects if needed. SEELS was appreciated for its relative simplicity, although it was less likely to encourage further activity over time.

There are a range of reasons for and barriers to participation, which broadly split into financial and non-financial issues.

Financial drivers included a desire to achieve energy bill savings, seeing the scheme as an attractive source of finance, the lack of interest attached to loans and also the ability to use scheme funding to leverage other finance, thereby improving the business case for a larger project. Non-financial drivers included using the scheme to help deliver energy efficiency elements of planned refurbishment, delivering carbon savings and the ability to demonstrate leadership through implementing projects. Furthermore, trust in the scheme due to its government backing and co-benefits, such as improved engagement with energy efficiency and enhanced productivity were also considered important.

Regarding barriers, some organisations were hard to convince to take on 'on-balance sheet' debt, particularly if they were financially constrained. This was particularly an issue for the NHS and FEIs, which both had sector-specific rules or performance monitoring which discouraged loans. Non-financial barriers included procurement challenges, estate changes

and/or rationalisation and capacity and skills constraints, the latter of which was more predominant amongst interviewed non-participants and schools. Finally, lack of awareness was identified as an issue amongst non-participants as 40% of those interviewed were not previously aware of the scheme.

Outside of the scheme, energy efficiency projects had been implemented by over half of both scheme participants (56%) and non-participants (53%). However, the scale of projects deployed appeared considerably smaller than scheme funded activities[6]. By far the most commonly referred to source of alternative finance was internal capital funds, followed, to a lesser extent by Public Works Loan Board (LAs only), grants and Energy Performance Contracts (EPCs[7]). Whilst most interviewees were aware of EPCs, only a few had used, or seriously considered them (mainly within the NHS).

Scheme delivery and experience: Salix Finance employs sector and regional teams, with Client Support Officers (CSOs) who are assigned participant organisations to develop and deliver projects with, supported by a technical and financial team who review project applications and funding. As described above, the model of delivery aims to prioritise delivery of large-scale, cost-effective projects, whilst ensuring equitable access by running specific sector-based funds, for example for schools and academies. The effectiveness of this delivery model was supported by participants who regarded senior management and finance staff as important gatekeepers to project delivery and viewed assistance provided by Salix to engage these stakeholders as helping to progress (often larger) projects.

Most participants described having good experiences working with the scheme and generally regarded Salix Finance as scheme managers positively. Participants particularly appreciated the CSO delivery model, describing that having key, named contacts who understood their work helped them progress, what was often described as highly context-specific, energy efficiency opportunities. The assurance function provided by assessing application projects was also valued, on the basis it provided confidence to proceed, particularly amongst organisations with less energy efficiency delivery experience. The project application process was broadly seen as being straightforward and rigorous, but not perceived to be unnecessarily challenging.

Meeting loan repayment periods, particularly for standalone ‘invest to save’ energy efficiency projects was described as a key financial barrier. Calling for longer repayment periods was a key theme, particularly amongst those who had completed many scheme projects. Many described that as it became more challenging to meet repayment criteria they were ‘topping up’ business cases with their own funding to meet eligibility requirements.

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[6] For example, approximately two-thirds of participants and non-participants had implemented fewer than five projects outside of the scheme.

[7] An energy performance contract is a contract under which energy efficiency measures are: provided; verified and monitored; and paid for by reference to a contractually agreed level of energy efficiency improvement or other agreed criterion such as financial savings. EPC delivery contractors are commonly referred to as Energy Services Companies (ESCOs).

Outcomes, scheme contribution and cost effectiveness

To assess scheme outcomes, this study has deployed a mix of methods to cover the range of sectors and projects within the scheme. The QEA looked at impacts for HEI & FEIs, LAs, primary and secondary schools and the outcomes from these organisations comprise the total energy savings reported below[8]. Alternative methods were used to assess outcomes for NHS and Emergency Services as well as from street lighting projects.

The QEA found consistent evidence for the scheme delivering reductions in energy consumption, energy bills and greenhouse gas emissions over and above those seen for comparison organisations. The total annual energy savings attributed to projects delivered by funding in 2013-17 ranged between 157 and 343 GWh. The lower bound is the total excluding savings from electricity projects implemented in HEI-FEI and the higher bound includes them[9] (see Table 4 and 5 in section 3.1, Observed outcomes and scheme contribution for further details). This lower figure is believed to be a conservative assessment of the total impacts of the scheme. First, it excludes non-statistically significant but otherwise credible HEI & FEI electricity savings (186 GWh). Second, it also excludes the energy savings from street lighting, NHS and Emergency Services projects, which, as described below, can be evidenced as having valid positive outcomes.

At the beginning of the research, approximate total expected savings were discussed with BEIS, with which these figures were expected to be compared. However, as the methodology developed and limitations arose, it became apparent that the QEA figures were not comparable to these estimates. This is primarily because they do not include NHS, emergency services or streetlighting projects, so they cannot be compared like-for-like.

Scheme contribution: Because of the use of comparison groups in the QEA we can have confidence that the scheme has fully contributed to these observed outcomes and are additional to what would otherwise have occurred. Furthermore, evidence from the qualitative and quantitative research also suggests the scheme strongly contributed to observed outcomes. Interviewees stated 77% of projects would not have occurred at all in the absence of the scheme (81% for RF, 69% SEELS), with a further 19% stating projects would have occurred but at a smaller scale and slower pace[10]. When further questioned to better understand what would have happened otherwise, 75% reported that without the funding they would have done nothing although this varied by fund type (RF 90%, SEELS 37%).

Street lighting: Street lighting projects represent £99.8m (42%) of total funding and an alternative method was used to assess the impact of these projects using scheme application data based billing calculations[11]. Utilising these figures, total savings from street lighting for

[8] The analysis focuses on a sample of 294 projects, for which QEA was possible (out of 3,470).
[9] This range is presented because the savings arising from the electricity projects implemented in HEI-FEI are not statistically significant; they are only at the 85% confidence level. However, they are stable across funding periods, therefore giving some credibility to the estimate, but not total confidence. This is explained further in section 3.1 and the annex to this report.
[10] 1% of projects reported that they would have gone ahead anyway and were therefore not attributable
[11] These projects were not included in the QEA as energy consumption data for billing purposes was available.

projects delivered between 2013 and 2017 are estimated to be 137 GWh. Almost all street lighting participants stated that these projects met their expectations in terms of energy and associated bill savings (95% met[12]) and reported that the scheme contributed strongly to outcomes.

NHS and Emergency Services: NHS and Emergency Services represent £31m (13%) of funding and were not included in the QEA because of the sample sizes involved. However, the evidence from the quantitative and qualitative research showed that these projects were regarded as meeting expectations for energy and associated bill savings (85%[13]), with the scheme contributing strongly to outcomes[14].

Co-benefits and unintended outcomes

Whilst few scheme participants reported undertaking specific energy monitoring and verification (M&V) activities, most participants (90%) stated the scheme met their expectations in terms of energy and associated bill savings. Participants also reported experiencing a range of co-benefits and unintended outcomes. These included:

- Improved engagement with energy efficiency; for example, 71% of participants reported an improvement in senior management engagement in energy efficiency as a result of participation
- Enhanced productivity; most participants reported improved visitor/customer/user experience (79%), equipment performance (77%) and reputational benefits (59%).
- Improved health and well-being; including reported improved indoor air quality (9%)
- rebound effects; including improved occupant comfort (derived from increasing internal temperatures)

Whilst it was beyond the scope of this work to specifically quantify these additional benefits, evidence from the quantitative and qualitative research indicated that in many cases these benefits were significant and often key drivers for participating in the scheme.

Cost effectiveness

The cost benefit analysis draws together findings from various data sources, including scheme activity data from Salix, participant responses to the quantitative survey and the QEA. These findings have been used to model the total costs and benefits of scheme delivery and produce benefit cost ratios.

The total costs and benefits across all participants are broken down in Table 1, showing the discounted costs and benefits. The overall benefit cost ratio for participants based on this analysis is 2 : 1, meaning £2 of benefits has been generated for participants for every £1 invested. The overall BCR for society is 2.3 : 1, meaning £2.30 of societal benefits has been generated for every £1 of societal cost.

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[12] 1% not met, 4% were unsure.
[13] 5% not met, 8% were unsure.
[14] All NHS and Emergency Services interviewees reported that either projects would not have happened (44%), or would have occurred at a smaller scale or slower pace in the absence of the scheme (56%).

Table 1: Discounted Summary Costs and Benefits for Participants and Society[15]

	Projected Installation Lifetime Value (£m) for Participants	Projected Installation Lifetime Value (£m) for Society
Total Costs	£68.5	£69.4
Total Benefits	£136.3	£159.5
Projected Lifetime Benefit Cost Ratio	2 : 1	2.3 : 1

However, it is important to note that the benefit values are primarily driven by energy savings estimates derived from the QEA. Consequently, the conservatism inherent in the QEA results carries through to this analysis. There is also large confidence interval around these mean energy savings estimates. Sensitivity analysis using the upper and lower confidence intervals suggests the actual BCR could range from 0.7 : 1 to 3.6 : 1 for participants and 0.7 : 1 to 4.3 : 1 for society. We can be 90% confident the actual BCRs lie within these ranges.

i. **Cost effectiveness by organisation type:** The discounted participant and society costs and benefits have been broken down in the table below by each of the four organisation types covered in the QEA analysis.

Table 2: Discounted Costs and Benefits for Participants and Society by Organisation Type

Organisation Type	**For Participants**	**For Society**
	Projected Lifetime BCR	**Projected Lifetime BCR**
Primary school	0.8 : 1	0.8 : 1
Secondary school	0.7 : 1	0.8 : 1
Higher and further education institutes (Gas Only)	1.3 : 1	2.6 : 1
Local Authority	2.8 : 1	3.1 : 1

Across the four organisation types, there is a range in the benefit cost ratios ranging from 0.7 : 1 for participants for secondary school investments, up to 2.8 : 1 for LAs. The low BCR for schools appears to be driven by two key factors; 1) schools experience higher costs relative to savings (compared to LAs for example)[16] and 2) some schools do not appear to be achieving the savings forecasted, which is an issue not reported in other sectors. This is explored in further detail in section 3.3.1 (Cost effectiveness by organisation type) of this report.

[15] Costs and benefits represent weighted average subsector costs and benefits that have been scaled up to total population level estimates in line with the proportion of the population covered by each subsector.
[16] We have ignored the HE/FE figures as they don't include the electricity figures, which is not a like for like comparison.

Cost effectiveness of different technologies: The inability to disaggregate the QEA by technology type[17] has meant that robust evidence of energy savings by different technologies has not been possible. However, it has been possible to analyse the costs and benefits by fuel type, which broadly showed that for participants, projects focused only on electricity savings generate greater benefits for the same cost (projected lifetime BCR for electricity supporting projects was 2.7 : 1 vs. 1.1 : 1 for gas). This largely reflects that the value of electricity bill savings per kWh saved is substantially greater than for gas[18].

Cost effectiveness of street lighting: The cost effectiveness of street lighting was calculated using the scheme application data based billing calculations described above. Projected lifetime BCRs for participants and society were estimated at 1.4 : 1 and 1.3 : 1 respectively, indicating that street lighting projects offer value for money, particularly for participants.

Wider lessons from the evaluation

Suggested changes to the existing scheme

While the scheme is highly regarded in the main, those participating in the research were asked for their suggestions to improve the scheme, which are described below. In addition, Chapter 4 uses the evidence gathered during the evaluation on factors for consideration in the design and delivery of a larger scheme.

Changes to repayment periods: Some participants suggested an extension of the loan repayment criteria would help business cases for action, commonly suggesting moving from 5 to 8-10 years. A few also suggested specifying repayment periods by technology to encourage take-up among currently less popular technologies.

Procurement and frameworks: It was suggested the scheme could consider establishing new framework contracts, and/or working more closely with existing frameworks (e.g. RE:FIT) to help overcome barriers and speed up procurement. Such activity could have a focus on supporting smaller organisations or sites, as procurement barriers were more commonly experienced by them (e.g. schools).

Additional advice and support: It was also suggested the scheme should provide additional advice and support, notably to help identify projects and help to make the case for them, particularly for non-lighting measures, many of which are seen as more challenging to operationalise.

Identifying and targeting non-participants: Focusing explicitly on the most cost-effective non-lighting energy efficiency measures would help expand the scheme. For example, measures to improve building instrumentation and controls, space heating and building fabric.

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[17] This is principally due to the unit of analysis of scheme data being buildings, as opposed to individual technologies. Many buildings, as well as projects have multiple projects and technologies implemented, which prevents disaggregating the analysis by technology type.
[18] Projected lifetime BCRs for society for electricity supporting projects was 1.0 : 1 and 1.2 : 1 for gas.

There could also be a case for additional support to improve the take-up of newer, more innovative measures, for example servers and IT equipment, battery storage and other measures of interest, which are currently likely to be taken up less due to the risk averse approach taken by many organisations.

Design and delivery of financial mechanisms to help address outstanding energy efficiency potential

The following aspects were identified as being important in the design and delivery of financial mechanisms to help address outstanding energy efficiency potential.

0% interest: The interest free aspect of the finance was highlighted as crucial, from a cost effectiveness perspective, and perhaps more importantly, psychologically as it was perceived to make the scheme considerably easier to 'sell', for example to senior management and finance teams.

On balance sheet debt: Some organisations are likely to be more difficult to convince to take on 'on-balance sheet' debt, particularly if they were financially constrained or affected by sector specific rules (as was the case for NHS and FEIs within this evaluation). EPCs were identified as a possible alternative financial mechanism but were viewed with suspicion by some who had considered them.

Government backing and ease of use: The Government backed nature of the scheme was also considered to be crucial to ensuring trust in the scheme as well as the ease of use 'low hassle' nature of the scheme discussed by participants.

'Use it or lose it': The 'use it or lose it' aspect of the recycling fund, appears to encourage considerably greater levels of activity compared to SEELS.

Design and delivery of energy efficiency policy

The following features were considered important in the context of broader design and delivery of energy efficiency policy.

Simplicity and stability: The relative simplicity of the scheme, as well as its stability of delivery over time appears to have been crucial to its success. The positive reputation of Salix as scheme managers appears to be associated with this. Furthermore, Salix finance and some participants described that the relative certainty of funding in future years provided by the 2015 funding uplift provided them with greater confidence to work more strategically.

Flexibility: The targeted and flexible nature of support offered by scheme managers appeared helpful, particularly when working with large and more experienced participants. Participants noted that Salix CSOs and other staff would proactively help with making the case for projects to go ahead, for example, engaging with finance staff on particularly large projects was considered important in getting agreement for more ambitious or complex projects.

Introduction and methodology

Scheme introduction

The Public Sector Energy Efficiency Loans Scheme ('the scheme') provides interest free loans to public sector bodies[19] including Local Authorities (LA), National Health Service (NHS) / Foundation Trusts, Emergency Services, schools, further and higher education institutions (FEIs and HEIs respectively) to support the installation of energy efficiency measures.

The scheme exists to provide access to finance, a well-known organisational barrier to improving energy efficiency, and underpins other policies to support the public sector in meeting carbon targets. The scheme is currently delivered by Salix Finance Ltd. (Salix)[20]. The scheme in England[21] funds cost-effective single or multiple-measure projects from a list of over 100 approved technologies.

The scheme includes two forms of funding:

1. The Salix Energy Efficiency Loans Scheme (SEELS): Interest-free loans to fund the installation of an energy efficiency measure that is repaid within five (or eight for schools) years through the savings incurred to energy bills.
2. The Recycling Fund (RF): A ring-fenced, interest-free loan that is match funded by the participating organisation. Once loan funds are repaid, they are then recycled to fund other energy efficiency installations within the organisation. RF has been closed to new participants since 2011 although it still continues for organisations participating beforehand.

In the 2015 Spending Review (SR15), HM Treasury (HMT) approved a £255.3 million funding uplift for the SEELS scheme in England, spread over five financial years (2016/17 – 2020/21). This is in addition to £130 million capital investment in the scheme since 2004. The funding increase was not associated with, or conditional on, any significant changes to the policy. However, there was a requirement by HMT for an evaluation of the scheme, to provide an assessment of impact of the scheme before and after the uplift in funding, to inform future scheme design and investment decisions, and assess the scheme's cost effectiveness.

Evaluation context, objectives and questions

The Department for Business, Energy and Industrial Strategy (BEIS) commissioned a consortium of independent research organisations to conduct the evaluation of the scheme.

[19] Excluding central government departments due to financial regulations.
[20] https://www.salixfinance.co.uk/
[21] Whilst Salix Finance operates across Great Britain, BEIS fund the scheme in England, which forms the scope of this evaluation.

The project was led by Winning Moves, working in partnership with CAG Consultants, University College London, and Hatch Regeneris.

The evaluation covers activities between financial years 2012 / 2013 and 2016 / 2017 and was undertaken between August 2017 and September 2019. The evaluation comprised a range of interrelated research activities (workstreams) designed and delivered to answer the evaluation objectives and questions. The approach to this evaluation was theory-based, using a theory of change (ToC, see section 1.5, Scheme development and theory of change) to inform the design and focus of the evaluation. The workstreams comprised scoping activities, quasi-experimental analysis of impact data, two phases of qualitative research and a quantitative survey with scheme participants and non-participants.

There were four main evaluation objectives:

1. Develop a robust assessment of net scheme impacts in relation to the scheme's primary intended impacts and the modelled benefits (i.e. reductions in energy consumption, energy bills and carbon emissions). In assessing the overall impact, the evaluation was expected to determine whether and to what extent impact differs for the different energy efficiency measures that can be installed and whether impact has changed following the funding uplift.
2. Improve understanding of how the scheme's processes operate in practice and identify successes and barriers in the scheme's implementation from the viewpoints of different stakeholders. Stakeholders include participants, non-participants, the delivery body and relevant stakeholders from BEIS.
3. Assess the cost-effectiveness of the scheme overall and the cost-effectiveness of different energy efficiency measures, for participants and the government.
4. Produce learning from the loan scheme that is of wider benefit and use within BEIS and in other organisations, such as the Devolved Administrations of Scotland, Wales and Northern Ireland who fund public sector energy efficiency loan schemes in their respective countries.

To meet these objectives, five high level questions for the evaluation were set by BEIS:

1. What have been the outcomes of the scheme before and after the uplift in funding in 2016?
2. What is the contribution of the scheme to the observed outcomes?
3. What is the cost effectiveness of the scheme?
4. How effective and efficient has the delivery of the scheme been?
5. What is the wider learning from the evaluation for BEIS?

These were supported by 30 sub-questions, detailed in the Technical Annex.

The purpose of this report is to provide a synthesis of the evidence derived from each of the evaluation workstreams and provide summary answers to each of the evaluation objectives and questions. Further detail of workstream evidence upon which outputs have been drawn are provided in the Technical Annex.

1.1 Evaluation methodology

Scoping and method development work, including development of the ToC, took place between August 2017 and January 2018. The first phase, which ran between December 2017 and March 2018 included 81 qualitative in-depth interviews with scheme participants, non-participants and Salix Finance representatives; and a Quasi Experimental Analysis (QEA) as a potential methodology for impact assessment. An interim report presenting phase 1 findings was published in July 2018.[22]

Phase 1 informed phase 2, which included QEA on the energy consumption of scheme participants including schools, LAs, HEIs and FEIs[23], using Difference in difference (DiD) with propensity score matching; 47 qualitative in-depth interviews with LA, FEI and NHS sectors, focused on exploring SEELS with both operational and finance managers; 481 quantitative interviews with scheme participants (248) and non-participants (233) across all eligible organisation types[24]; and a cost benefit analysis[25], drawing information from scheme activity data[26], the QEA and quantitative interviews.

Finally, a synthesis was conducted through an iterative process with the consortium and BEIS to work through limitations and areas of conflicting evidence and was subject to peer review and challenge from the consortium (and BEIS) to shape the narrative from the key findings.

Finalisation of this report was delayed to ensure new methodology guidance on the cost benefit analysis could be applied.

Further detail on the evaluation methodology is provided in the evaluation technical methods annex, available alongside this report.

1.2 Key limitations

The key limitations raised throughout the evaluation are summarised below and the technical annex contains further detail on these and other limitations

Limitations with the QEA

A number of challenges should be borne in mind when considering the data and implications of the QEA. QEA was feasible for HEI & FEIs, LAs, primary and secondary schools and the outcomes from these organisations comprise the total energy savings reported. Alternative

[22] BEIS (2018) Evaluation of the Public Sector Energy Efficiency Loans Scheme: Interim Evaluation report.
[23] As introduced above, NHS and emergency services organisations also participate in the scheme, but not in sufficient numbers to support sample sizes necessary for viable QEA analysis to be undertaken. FEIs and HEIs were also grouped to form a suitable sample size for the analysis.
[24] Analysis was conducted to test for statistical significance and any statistically significant findings are indicated.
[25] A cost benefit analysis was selected as the methodology for assessing the cost effectiveness of the scheme
[26] Provided by Salix Finance. One database was provided for each SEELs and RF setting out project level data (project name and applicant organisation name for each project along with predicted savings) and technology level data (the component technology types and predicted savings for each project).

methods were used to assess outcomes for NHS and Emergency Services as well as from street lighting projects. However, although these and other mitigating steps have been taken where feasible, a number of limitations with the analysis remain.

Small sample size available for analysis. Some aspects of the scheme were excluded from the QEA. The low population numbers (which prevented meaningful analysis) has meant that the four Emergency Services organisations and 29 NHS organisations receiving funding in the period covered by the evaluation were excluded from the QEA. Street lighting projects were also excluded from the QEA because the BEIS energy consumption dataset used for the QEA analysis does not include street lighting meters[27].

Issues with data matching further reduced the sample size available for analysis; these issues were principally influenced by challenges in matching addresses to meter data. The Salix administration data that was accessible for the purposes of this evaluation contains details of the applicant headquarters, which is usually different to the buildings where the projects were implemented. This made it difficult to match the projects to the meter data required to measure impact. Although steps were taken to address this by collecting additional address data from participants, this was not achieved for all participants. As a result, the analysis focused on a sample of 294 projects, for which QEA was possible out of a total of 3,470.

Inability to disaggregate impact by technology and fund. As a result of the relatively small sample used in the QEA and the fact that the unit of analysis is a building (in which more than one project may have been implemented) detailed analysis of the scheme, for example based on the technology implemented or the fund used (Loans or SEELS), has not been feasible. To provide some insight into the impact of technology, analysis has been conducted by meter types (e.g. electricity, gas) and lighting vs. non-lighting projects. Furthermore, outside of the QEA, street lighting was analysed using applicant estimated energy savings.

Inability to evaluate the impact of the scheme pre-and post-uplift. Scheme data available for the evaluation was limited to financial years 2013/14 to 2016/17. In addition, the data available for the QEA included a (circa 18 month) lag in meter data availability. As a result, the influence of the £255.3 million uplift (introduced in 2016/17) on energy consumption could not be investigated.

Limitations with the CBA

The QEA workstream is the primary data source for analysis of scheme benefits derived from energy savings and therefore limitations from the QEA were inherited in the cost benefit analysis. As the QEA energy savings data were not broken down by technology type, fund type (SEELS or Recycling Fund) or timescale (pre or post uplift) this limited the granularity of the CBA that could be achieved.

[27] Typically, in analysis to understand the energy consumption of street lighting, an average rate is used.

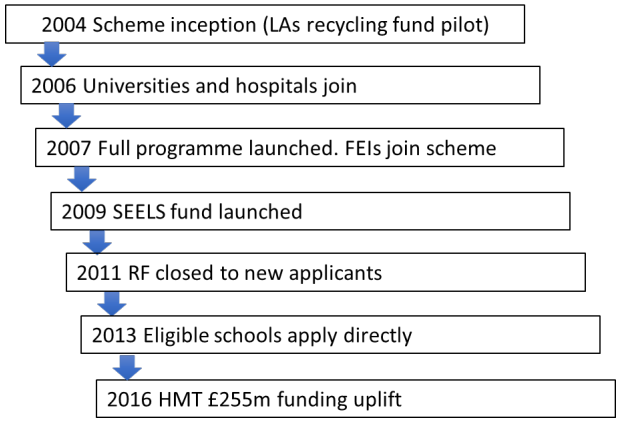
Limitations with primary research (qualitative and quantitative)

There is a possibility of self-selection bias in interviewee findings from both the qualitative and quantitative research. This is principally expected to be an issue with non-participants, on the basis that those with more interest in energy efficiency could have been more likely to participate. This was mitigated for by purposively sampling target numbers of participant groups and persistence in recruitment, giving target respondents good and equal opportunities to respond.

1.3 Scheme development and theory of change (ToC)

The scheme started as a pilot in 2004 with a number of LAs testing the RF, the pilot was then broadened to include HEI, NHS and Emergency Services in 2006. In 2007, the full scheme was launched for these groups and in 2009 the SEELS scheme was launched. Figure 2 provides significant scheme changes since the scheme's inception.

Figure 2: Timeline of scheme developments



At the time of the evaluation, over 100 eligible technologies were supported by the scheme including lighting (and also street lighting), insulation, heating ventilation and air conditioning (HVAC), boilers and building management systems (BMS)[28]. While the scheme focuses on these 'proven' energy efficiency technologies, it is possible for customers to propose new technologies for funding. In these cases, Salix Finance undertake an assessment of the technology and add it to the eligible list if there is a strong enough evidence base.

Figure 3 shows the final theory of change (ToC), which was developed, reviewed and refined during the evaluation. The ToC is a conceptual model which describes how the scheme is expected to work and bring about desired outcomes and impacts. The ToC is laid out in a hierarchical fashion, but in practice there are multiple feedback loops, and these are acknowledged in the diagram. More specifically it describes scheme:

[28] The full list of eligible technologies is available on the Salix Finance website: https://www.salixfinance.co.uk/knowledge-share/eligible-technologies

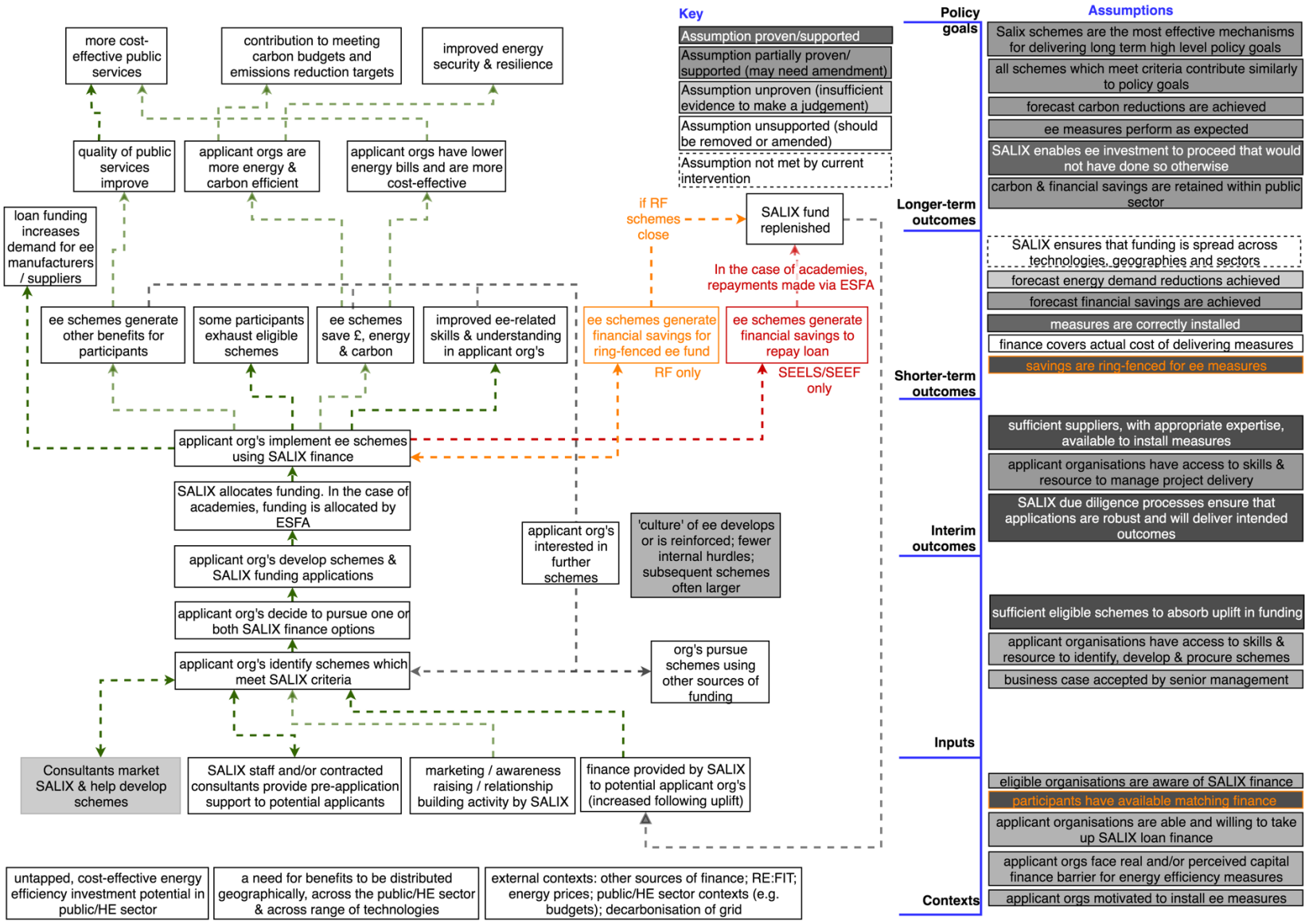
- Contexts, such as the presence of untapped, cost effective energy efficiency potential, alternative existing sources of finance and a need for benefits to be distributed across the sector and across technologies
- Inputs, such as scheme funding and loans, Salix staff support and awareness raising
- Activities and interim outcomes, for example, eligible organisations identify projects which meet scheme criteria and loan repayment thresholds[29] apply. Salix reviews applications and allocates funding[30] and applicants implement projects, which generate financial savings. For SEELS, savings can be used to repay the loan and in the case of RF are ring-fenced into a 'recycling fund' to enable funding of further projects in future.
- Shorter-term outcomes, including schemes saving money, energy and carbon, improved energy efficiency related skills and understanding within participating organisations and co-benefits (see section 3.2, Co-benefits and unintended outcomes).
- Longer-term outcomes such as improved energy, carbon and cost efficiency, leading to more cost-effective public services, contributing to meeting emissions reduction targets and improved energy security and resilience.

The ToC also includes key assumptions which are thought to have critical bearing on outcomes and impacts. The ToC underpinned the evaluation, and the evaluation questions and supplementary research questions were designed to explore and test it, in particular gathering evidence to test the identified assumptions. Further details of the ToC, its key assumptions and how these changed as a result of the evidence gathered during the evaluation is provided in the Technical Annex and the conclusions drawn from the final review of the ToC assumptions are outlined in Table 12 in the annex of this document.

[29] Scheme loan repayment periods for SEELS is 5 years for all organisation types apart from schools, where it is 8 years (owing to reduced occupancy due to term times). For the Recycling Fund, the scheme repayment period is also 5 years, although Salix has enabled these participants to extend the repayment criteria of the match funded proportion of the costs.

[30] In the case of academies, allocation of funding is undertaken by the Education and Skills Funding Agency (ESFA).

Figure 3: Public Sector Energy Efficiency Loan Scheme Evaluation Theory of Change



1.4 Report structure

The structure of the rest of this report with reference to the evaluation high level questions is as follows:

- Effectiveness of scheme design and delivery (elements of HLQ4);
- Outcomes, scheme contribution and cost effectiveness (HLQs 1, 2 and 3);
- Wider lessons from the evaluation (HLQ5).

Further detail describing coverage of the evaluation questions is provided in the Technical Annex.

4 Effectiveness of scheme design and delivery

4.1 Scheme design and delivery

The scheme has been administered since its inception by Salix Finance Ltd, an independent, not-for-profit publicly funded company headquartered in London. Delivery is targeted on annual financial spend[31] (i.e. loans distributed) and Salix employs sector and regional teams targeting LAs, HEIs, FEIs, NHS and Foundation Trusts, Maintained schools and Academies. Delivery teams are supported by a central finance team and technical services team who conduct the assessment of business cases for approving funding, including assessing applications and providing approvals for new technologies.

Salix manage their operations to ensure that they spend the funding allocated to them by BEIS each year. They actively manage the targets they set internally for each sector team to realise this:

> *"We say, "Okay. NHS team. We think that based on what you've said, a good target might be £25m." Then, what we are doing is, we are revising that target every month, and measuring performance against that target, in order that we meet the spend that was erected by government."*
>
> (Salix Finance Ltd)

Salix described that they deploy an operating model which delivers projects as cost effectively as possible. This involves prioritising working closely with existing participants who they know have potential to identify and progress more and larger projects over time. Delivery supports this by operating a principally 'one-to-one' delivery model, deploying client support officers (CSOs) to work with specific participants over time to support applications, project progression and overcome barriers to delivery where possible. In order to ensure access for other participants, Salix described that they run specific sector-based funds, for example for schools. The funding uplift resulting from the 2015 spending review was described as having provided greater long-term certainty and scale, which enabled Salix to work more strategically with participants, enabling them to deliver larger scale projects.

Salix also described that limited marketing activities are undertaken, working with and through partners (such as organisations representing the organisations types targeted by the scheme) where possible to minimise costs.

The design and delivery of the Scheme did not change post uplift.

---

[31] Financial spend is managed using a forecasting pipeline, with a carry-over facility to manage funding across financial years.

These aspects of scheme design and delivery appeared to strongly influence findings described in forthcoming sections, for example:

- scheme activity; such as delivering larger projects with fewer participants over time, described further in section 2.2 (Scheme activity)
- scheme engagement and experience; such as scheme awareness and experience, described further in section 2.3 (scheme engagement) and section 2.6 (scheme experience).

4.2 Scheme activity

Table 3: Scheme activity (SEELS and RF) 2013-17

Year	Scheme activity in 2013-14	Scheme activity in 2014-15	Scheme activity in 2015-16	Scheme activity in 2016-17
Number of projects	1,036	904	855	675
Number of organisations	241	228	226	230
Mean funding per organisation (£)	£174,209	£231,510	£314,276	£303,682
Median funding per organisation (£)	£65,796	£78,222	£78,307	£47,924
Mean projects per organisation	4.3	3.9	3.7	2.9
Median projects per organisation	2	2	2	1

Scheme activity data was analysed to gain an understanding of scheme activity between 2013/14 and 2016/17 (with further analyses provided in the Technical Annex).Over the four financial years 2013-17, 3,470 projects have been funded by the scheme across 564 organisations, with a total spend of £235m. This splits into RF £51m (before the scheme closed to new participants in 2016-17) and SEELS £184m. There was a slight increase in spending in 2016-17, but the funding uplift was fully realised from 2017-18.

41% of those who have participated in the scheme are maintained schools, 17% LAs, 14% HEIs, 12% academies, 10% FEIs, 5% from the NHS and 1% are in the emergency services. In general, all regions are participating in the scheme; 18% of participant organisations are located in Greater London, 15% in the South East; 7 – 12% in each of the other regions, and 5% in North East.

Within this, a sub-set of organisations, often with large estates, have used the scheme extensively (fifteen organisations have implemented over 50 projects each; 116 over 10 each), whereas 57% (324) organisations, often with smaller estates, have implemented just one project.

RF was used by 119 organisations, mainly comprising HEI and LAs and is characterised by high levels of repeat activity, averaging 20 projects per organisation. SEELS was used by 490 organisations and has catered to a broader audience, but with much lower levels of repeat activity (2.2 projects per organisation). In total, 1,102 projects have been funded by SEELS and 2,368 by RF.

There are clear, and distinct, patterns in the scheme activity data, which also came through in the primary research workstreams, about how and why the scheme is used and how this has evolved over time.

Part of wider refurbishment activity vs. standalone energy efficiency projects: Participating organisations stated they either used the scheme to fully-fund standalone energy efficiency projects, or to finance the energy efficiency element of a larger project, which usually formed part of a broader refurbishment cycle. The qualitative research indicated that the former appeared to be heavily dominated by lighting, whereas the latter could include a broader range of other technologies, as well as, or separate to lighting.

"Identified just when doing the refurbishment of the building."
Participant, NHS

Larger but fewer projects: Although the number of organisations receiving funding each year has been stable, the number of projects funded each year has decreased steadily across the four financial years by more than a third, with 1,036 in 2013-14; 904 in 2014-15; 855 in 2015-16 and 675 in 2016-17[32]. However, the mean funding per organisation has increased, meaning use of the scheme has changed over time to fund increasingly larger projects. In the qualitative research, participants (particularly from LAs, HEIs and NHS) corroborated this trend, stating that they tended to start small. However, when they had overcome initial barriers (section 2.3, Scheme engagement) and it was clear that projects 'worked' for their organisation, they tended to work more closely with Salix to identify and design larger projects, increasingly incorporating the scheme as a principle source of finance for energy efficiency over time. Alongside this, Salix described that the 2015 funding uplift enabled the scheme to take a more strategic approach to delivery, for example providing not only greater scale, but

[32] For context, scheme activity in 2017-18 was similar to 2016-17; 650 projects were funded across 256 organisations with a mean funding of £334,016 per organisation

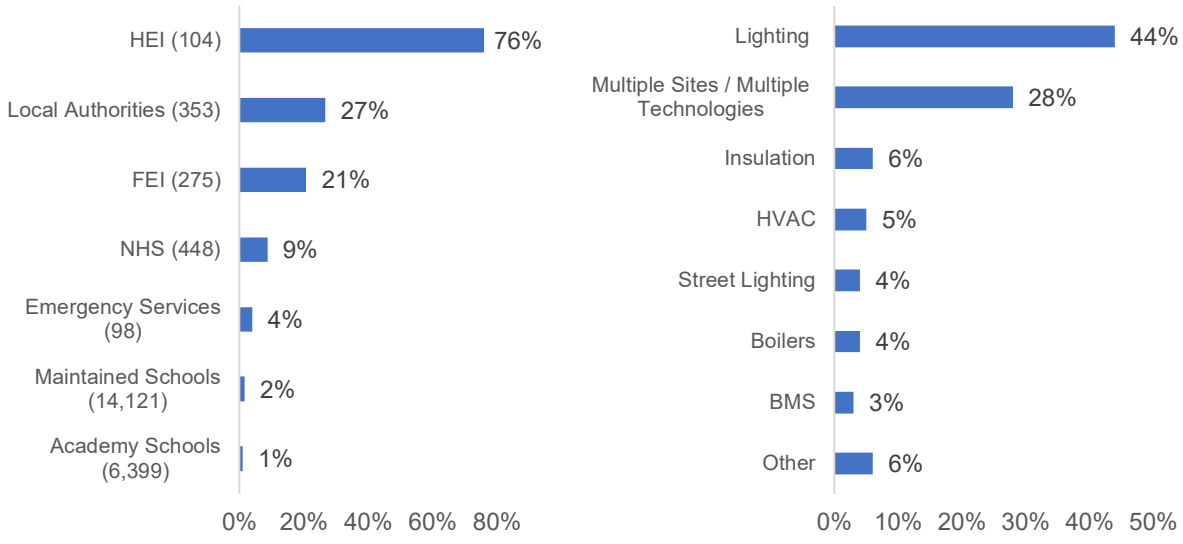
also certainty across financial years, which enabled Salix to support larger and more ambitious projects.

Under/over representation of technologies and organisation types

As shown in Figure 4, by far the most popular technology is lighting projects, followed by 'multiple' projects, (most of which include a large proportion of lighting[33]), which is mainly down to participants perceptions of lighting delivering a range of benefits and low risks (discussed further in section 2.3, Scheme engagement). This mix of project types (which is similar in 2017-18; where lighting continues to dominate) contrasts with cost-effective energy efficiency potential, identified through other BEIS research[34]. This research sets out that, in addition to lighting, greater potential is available through other measures including space heating and building fabric measures.

Whilst LED lighting has been around in different forms for several decades, factors such as the high capital cost and harsh colouring made it unattractive to purchasers. In approximately 2014/15 a tipping point was reached where cost reductions in LED lights were achieved alongside improvements in light quality, making them amongst the most cost effective energy efficiency measure available to building owners. This resulted in a rapid increase in installation across both the public and private sector. The dominance of LED lighting in Salix applications since 2014/15 can be seen as a reflection this broader trend, rather than as a result of Salix promoting one technology over another.

Figure 4 Proportion of projects by technology type and organisation type 2012/13 – 2016/17 (%) SEELS and RF



[33] 'Multiple Technologies' is the descriptive term used by Salix in their administration data. From a 'free text' description of the project, it is sometimes possible to determine which technologies have been installed. This is generally a mix of the technology types presented here – often including lighting.
[34] BEIS (2016) Building Energy Efficiency Survey, Overarching report. Table 4.4, page 87.

Figure 6 shows clear differences in participation rates between different organisation types, with a bias towards organisations with large estates.

For example, more than three quarters of HEIs have taken up the scheme, and between 20% and 30% of FEI and LAs. By contrast, the proportion of take up by smaller (but considerably more numerous) organisations such as schools is low at less than 3%.

4.3 Scheme engagement

Projects funded through the scheme were generally initiated and 'led' by operational staff, such as energy or facilities managers. Finance staff involvement varied, but were discussed as important gatekeepers to project delivery in terms of agreeing to take on loans as well as sources of match funding where needed.

Scheme engagement

Organisational engagement: Salix has built relationships with operational staff in participant organisations. Salix engages strongly with participants with large estates who continually use the scheme. For these participants, as well as engaging with operational staff, they will engage with finance teams to help convince them and other internal stakeholders of the merits of, particularly large, projects.

The model of engagement is different for schools, for example, maintained schools are often represented by their LA and their LA representative works with them to identify projects and apply to the scheme, as opposed to the school working directly with Salix. However, schools are able to apply directly. A few schools noted they had moved towards doing this as they found it easier and more effective, than working through the LA as a 'middle man'. On the other hand, several LAs who represent schools thought it would be beyond the capacity of most schools to apply and that, as LAs, they can derive economies of scale through project aggregation across sites. This suggests having both models of engagement for schools was useful.

However, whilst Salix has built relationships with operational staff in participant organisations, there also appears to be opportunities where the scheme could do more if further funding were available. For example, 40% of organisations engaging in the quantitative survey had not previously heard of the scheme. A few schools noted that they had heard of Salix through the National Association of School Business Managers, but otherwise, there appeared to be lack of engagement amongst schools, primarily through lack of awareness.

Technologies: Exploration with participants revealed a range of reasons for the popularity of lighting, including the fact it is relatively 'straightforward' to deliver, offers good pay-back and considered low risk, all of which help make a clear case for going ahead. Lighting also appeared to tap into a priority for decisions makers to ensure the maintenance or enhancement of service provision (i.e. better quality lighting), which in some cases may have been a more compelling proposition than cost savings alone (see section 3.2 for further details on co-benefits). By contrast, several participants interviewed noted issues in designing,

procuring and delivering non-lighting projects due to perceived supply chain constraints and broader risks involved with more innovative projects.

> *"If it is a mature technology, LED lighting for example, I would be more comfortable now using Salix for that type of project, rather than perhaps for something that's more innovative but could still have a very large potential carbon payback, because there's much more risk around programme and delivery with that sort of innovation."*
>
> Participant, HEI

One participant who had completed many projects reported they were finding it more difficult to identify suitable projects (for funding) as those that remained to them were more marginal and required greater investment to identify and investigate.

> *"That particular issue is troublesome because in most cases that's when you then require expert advice consultancy, and measures. When you factor those costs into the project's cost, it makes the projects non-viable."*
>
> Participant, FEI

However, the tendency towards lighting projects being funded over other eligible measure types suggests an area where the scheme could do more.

4.4 Reasons for and barriers to participation

There are a range of characteristics which appeared to underlie participation and activity trends observed in the scheme. Many drivers and barriers for energy efficiency action have been described in previous BEIS research and evaluations and elsewhere, so the issues explored below are discussed within the specific context of participation in the scheme.

Reasons for and barriers to participation split broadly into interrelated financial and non-financial issues.

Financial drivers included:

Reasons for participation

- *Energy bill savings*: The incentive to derive bill savings was a clear driver, particularly within the context of, often larger, organisations with staff or teams dedicated to energy management. In these organisations achieving savings was a clear part of the job of operational staff and may also have budget implications (i.e. freeing up resources for other activities).
- *Viable source of finance*: Many participants and non-participants stated that viable sources of finance for energy efficiency were few and far between, so where the type of finance offered by the scheme was conducive it was often seen as playing a key part of their strategy to improve energy efficiency.
- *'Interest free'*: The fact that the loan was interest free, was a key driver for participants. It was suggested this appealed not only from a pure economics perspective, but also and perhaps more importantly, from the perspective of being able to 'sell' business

cases to organisational decision makers. If a low-interest rate was applied to scheme loan funds, 15% of participants stated they would still use the scheme, while 60% would look elsewhere, but still may use the scheme and 16% stated they would not use it again (9% were unsure).

"Easier to sell it to the board as it is interest free"

Participant, NHS

"It's interest free therefore we know exactly how much we are paying back, which makes it easy and much clearer for the accountancy aspect of thing"

Participant, LA

- *Leveraging other funding*: Furthermore, many participants said the scheme enabled them to leverage other funding, described further in section 2.5 (Mechanisms deployed outside of the scheme).

Non-financial drivers included:

- *Planned refurbishment*: As described above (section 2.1, Scheme design and delivery), many participants discussed how they used the scheme in a 'strategically opportunistic' manner, by which they tied scheme take-up into refurbishment cycles and used it to help pay for refurbishment to be more energy efficient.
- *Delivering carbon savings and demonstrating leadership*: Delivering carbon savings was a driver for some participants, several of whom noted that as publicly funded organisations they needed to demonstrate leadership on tackling climate change. Some participants noted that their organisation set carbon emissions reduction targets, and the scheme was a key contributor in helping them make progress towards the targets.

"We have a carbon management plan, we embarked on that programme with the Carbon Trust in 2009, it was part of that reason that we've gone down this route with Salix. We had a vision of saving carbon, saving energy, and saving money. Since 2009 it's been switched around where we're more focussed on saving money by saving energy, and then saving carbon comes along with it."

Participant, LA

"We are undertaking this work with Salix because … we need to make investments on energy if we want to meet our target, and so far, we have"

Participant, school

- *Government trust*: The Government backing of the scheme engendered trust amongst participants, supporting its reputation as a viable and sensible scheme to turn to. Whilst not necessarily a driver in of itself, it was purported as playing a key supporting role. As discussed further in section 2.5 (Mechanisms deployed outside of the scheme), this was believed to be important within a broader context of being targeted by other schemes which were not entirely trusted.

- *Co-benefits*: Finally, co-benefits were identified as a driver for several participants, particularly for some technologies, notably lighting. This is discussed further in section 3.2 (Co-benefits and unintended outcomes).

Barriers to participation

Financial barriers included:

- *Loan repayment periods*: Meeting loan repayment periods was noted as a significant barrier, particularly for standalone 'invest to save' energy efficiency projects. This was the frequently chosen option amongst survey respondents, when asked about what would need to be changed for their organisation to participate further in future (34% for participants, 32% for non-participants).
- *Organisational stance on 'on-balance sheet' debt*: Some organisations noted their organisation was either not able to, or was very hard to, convince to take on debt on their balance sheets. This issue appeared to be particularly pronounced for the NHS and FEIs. NHS organisations that are in financial difficulty are required to obtain approval in order to borrow money; furthermore several mentioned they are affected by the Department of Health's Capital Departmental Expenditure Limit (CDEL), which limits capital project spending. Several FEIs stated they are sensitive to loans as it negatively affects a sector specific financial scoring system and a poor score may trigger an intervention from the FE Commissioners Office.

  "Some finance directors like the ability to take out interest free loans, and some don't because they have issues on the future repayments. So, I've had both mixed views from finance directors on the benefits of the loan agreements."

  Participant, HEI

Finally, within the context of public sector spending cuts, a range of other barriers were suggested, including competition for match funding (where this was needed) and more general resistance from finance departments (particularly amongst those who were not or less aware of the scheme).

Non-financial barriers included:

- *Procurement issues*: Procurement issues, such as finding appropriate and cost-effective contractors was an issue experienced particularly amongst schools, but also some others who were either smaller estates / single building organisations and / or had less experience of delivering energy efficiency projects.

  "We've got the money, we know the project, we know the details, but getting through public sector procurement and out the other side, getting the right thing is often very difficult."

  Participant, LA

  "It just needs to be made easier, so people know where to go … a lot of the information is so technical it's easy to be blinded and swamped in information, and not really understand what they're offering."

Participant, school

- *Capacity and skills constraints*: Capacity and skills were recognised by many as an issue, particularly amongst non-participants, with public sector funding cuts claimed to have affected those responsible for energy disproportionately (often on the basis they were not seen as 'front-line' activities). For smaller organisations such as schools, where energy management often forms a (sometimes small) part of one person's role, lack of attention due to other priorities appeared especially pronounced.

  "In some cases, they were just overwhelmed with other issues and this was just one more thing they didn't feel they could take up."

  Participant, school

A lack of capacity was also cited by operational staff as an issue for senior decision makers, finance teams and/or other departments (e.g. facilities management) who could block progress or make decisions slowly as a result.

- *Estate changes and/or rationalisation*: Many participants and non-participants noted their estate portfolios changed considerably over time due to organisational changes such as occupying or leaving sites. Uncertainties regarding estate reorganisation also led to some organisations, in particular FEI and LAs feeling unable to make commitments to energy efficiency investments that pay back over multiple years. Separately, this also was a key issue raised in observed lack of efforts to explicitly monitor and verify (M&V) savings delivered by projects, discussed in section 3, (Outcomes, scheme contribution and cost effectiveness).
- *Lack of awareness*: Finally, the most notable barrier amongst non-participants was lack of awareness. Almost 40% of surveyed non-participants had not heard of Salix before the interview, although this varied by organisation type[35]. Within this group a considerable proportion (59%) were interested in receiving updates from Salix Finance, indicating interest in learning more about the scheme.
- *Eligible technologies*: Finally, some interviewees wished for additional technologies to be added to the scheme (25% of participants and 17% of non-participants). Examples of new technologies of interest included battery storage and renewables.

4.5 Mechanisms deployed outside of the scheme

Energy efficiency projects not funded through the scheme had been implemented by over half of both scheme participants (56%) and non-participants (53%). However, the number and size of projects deployed appeared considerably smaller than scheme funded activities[36]. By far the most commonly referred to source of alternative finance was internal capital funds, followed, to

[35] At the beginning of the call with scheme non-participants, respondents were asked if they had heard of Salix before they were called. For 38% of scheme non-participants, the call was the first time they had heard about Salix. For maintained schools, this figure was 61% whereas it was lower for academy schools (23%) and NHS (21%). Other figures include Emergency Services (50%), FEI (43%), LAs (33%).
[36] For example, approximately two-thirds of participants and non-participants had implemented fewer than five projects outside of the scheme.

a lesser extent by Public Works Loan Board (LAs only), grants and Energy Performance Contracts (EPCs[37]).

Some interviewees said they routinely blend different forms of finance for larger schemes, but some expressed a preference for avoiding this where possible as it reportedly creates an additional administrative burden.

With the exception of internal capital, non-scheme finance was commonly only considered if scheme finance was not available or conducive to their organisation's situation (see section 2.3, Scheme engagement). Furthermore, several participants reported blending non-scheme finance with scheme finance, for a range of reasons, including:

- 'Topping up' funding to meet loan repayment criteria (see section 2.6, Scheme experience)
- Leveraging scheme finance, for example as 'match' funding to increase scale and to improve overall rates of return, leveraging the interest free aspect of the scheme (see section 4.3, Design and delivery of a larger scheme).

Perhaps unsurprisingly, outside of the scheme, grants were preferred to loans. Aside from the benefit of grants not requiring repayments, some interviewees also noted it avoided the barrier to loans experienced by the FE and NHS sectors (see section 2.3, Scheme engagement).

Whilst most interviewees were aware of EPCs, only a few had used, or seriously considered them (mainly within the NHS). EPCs were viewed with suspicion by some interviewees who had considered them, with concerns over whether they offered value for money being a key issue.

> *"It started off investigating an Energy Performance Contract, but that all fell apart because we weren't convinced by the value for money of that approach."*
>
> Participant, NHS Finance Manager

4.6 Scheme experience

The experience of those engaging with the scheme tended to be positive, which appeared to be consistent both before and after the funding uplift. Furthermore, Salix Finance, as scheme managers were highly-regarded by most. Participants particularly praised the CSO delivery model, describing how having known contacts who understood them and their work helped them take action. Many participants described energy efficiency opportunities as specific to their local context, so having scheme staff who could understand and respond to this helped them overcome barriers to action.

[37] An energy performance contract is a contract under which energy efficiency measures are: provided; verified and monitored; and paid for by reference to a contractually agreed level of energy efficiency improvement or other agreed criterion such as financial savings. EPC delivery contractors are commonly referred to as Energy Services Companies (ESCOs).

"I have absolutely no issues at all with Salix. Salix were brilliant from start to finish, we built up quite a good relationship with Salix throughout the process and we've had quite a few conversations since."

Participant, FEI

The assurance function provided by scheme managers when reviewing applications was valued, on the basis it provided confidence to proceed (i.e. they had a 3rd party reviewing business case proposals brought to them, often by energy consultants and contractors). This appeared to be particularly valued amongst schools and organisations with capacity and skills constraints.

"So for example, in the energy efficiency industry unfortunately there's a lot of people selling snake oil as it were, so they say it will save you money and they provide case studies, their techniques are quite sophisticated in terms of convincing people to pay money for something that won't necessarily work; but by having Salix and their technical team, and their technical support team behind projects, by them agreeing a project or by them not agreeing a project, it provides a safety net I think."

Participant, LA

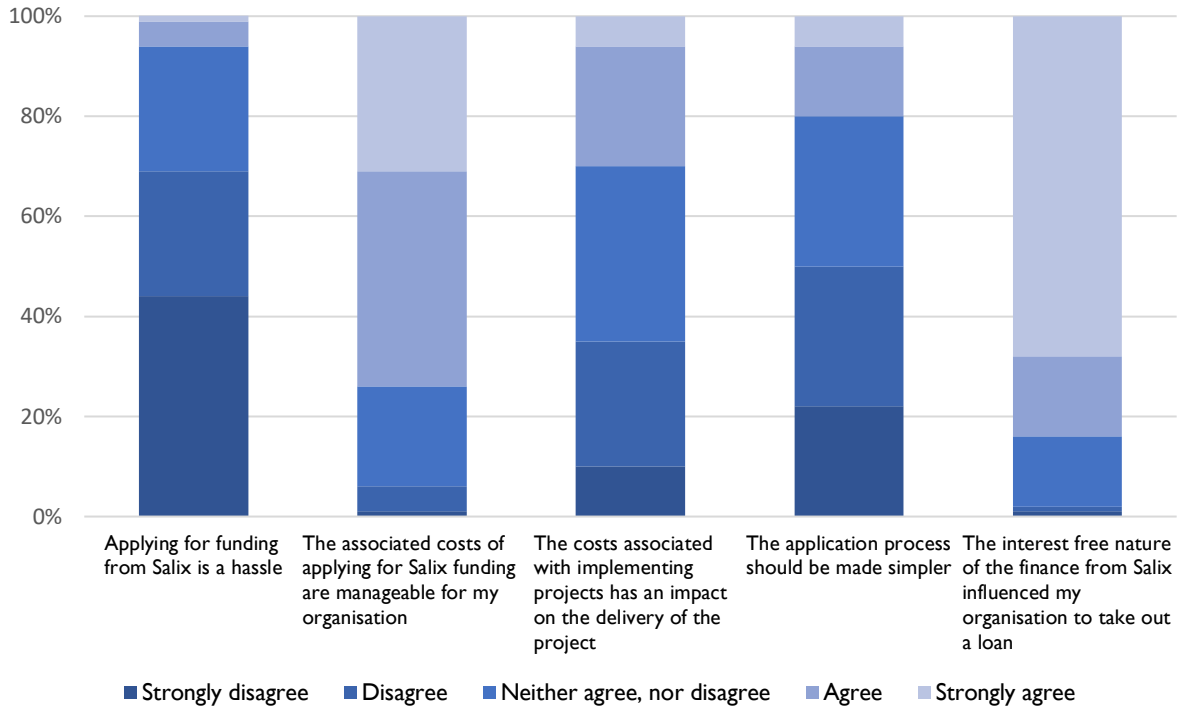
"It's quite nice having somebody looking over your figures and spotting the mistakes, putting you right. Or, even challenging it to make you think am I really doing the right thing here?"

Participant, School

Activities such as regional events were perceived to add value both from a content and a networking perspective, although a few participants reported some events were not always as well attended as they could be. Case studies, detailing activities and experiences of projects undertaken by similar organisations were described as very useful in helping 'demystify' activities. Where case studies were presented at events it also provided opportunities to ask questions which further helped.

The project application process was broadly seen as being straightforward and rigorous, but not unnecessarily challenging (Figure 5).

Figure 5. Frequencies of responses to statements about applying for and implementing energy efficiency projects (scheme participants)



Base: Applying for funding from Salix is a hassle, the associated costs of applying for Salix funding are manageable for my organisation, the costs associated with implementing projects has an impact on the delivery of the project, the application process should be made simpler (596); the interest free nature of the finance from Salix influenced my organisation to take out a loan (521)

> *"The [Company] team have been very supportive. The process is seamless in the sense that once you know what to do, all the information is there, the model to improve whether your project is going to be within the payback period [loan repayment period], and hence compliant, and hence get funding, is straightforward."*
>
> Participant, FEI

> *"You've got vision of all your project online on SERS[38], loads of knowledge slides and help sheets, case studies on the web page, a really good website for sharing ideas".*
>
> Participant, school

A few difficulties with scheme processes were described, although these appeared to be relatively minor. Issues included needing to apply separately for individual projects, 'hassle' associated with audit requirements and also difficulties in negotiating time extensions where project delivery was delayed.

[38] SERS refers to the online system Salix uses for applicants to apply and progress projects. https://sers.salixfinance.co.uk/Sun/(S(v5uidoaxj3b54545tkio5p55))/login.aspx

Finally, a few non-participants (both operational and finance staff) believed there was an administrative burden associated with the scheme. However, this contrasted with the views of scheme participants who reported positive experiences with the scheme. In particular, after having gotten over an initial learning curve to understand the process, participants understood the systems well, so it did not take up undue time or hassle to apply; something which was of benefit to repeat scheme users.

4.7 Funding mechanisms and loan repayment periods

SEELS and RF

The RF was concentrated in appeal; only four organisation types can access the fund, of which the vast majority (94%) were HEIs or LAs[39]. According to eligible participants, the main reason for not using the RF was due to the match funding requirements, which precluded those without access to considerable internal funding. A few participants also described the RF as more complex to set up, particularly from a finance department perspective[40].

Many RF participants reported they felt pressure to use up the fund once it was received, as otherwise they would lose it. In this respect it had driven them to actively seek out new and more projects over time than they otherwise would have done. This is reflected both in activity data (RF participants have on average done >20 projects, vs. 2.2 for SEELS) and in responses with regards to scheme contribution (see section 3.1, Observed outcome and scheme contribution, for further details). Some participants noted that they found the 'use it or lose it' nature of the fund particularly helpful from the perspective of getting attention and focus to deliver work.

> *"It's certainly kept the momentum going, because the way the fund works you've got to use it, otherwise if you don't use it they will take it back."*
>
> Participant, LA

Furthermore, mainly for these reasons, where participants used both SEELs and RF, they stated they prioritised RF first, and then moved on to using SEELS, often for larger projects (e.g. street lighting for LAs).

Almost all RF participants also used SEELS, and some participants noted that they appreciated the flexibility they had in using one, the other or a combination of the two helping them tailor energy efficiency projects according to their needs.

The SEELS fund appealed to a broad audience, in particular those who do not have access to any match funding (e.g. internal funds or that sourced from elsewhere). The simplicity of the SEELS fund, both conceptually and in terms of scheme application and delivery, was seen as

[39] The remaining participants are NHS (4%) and Emergency Services (2%).
[40] Noting that RF has been closed to new applicants since 2011, and there is limited awareness of it outside of existing RF participants.

a key benefit. On the other hand, as described above, it was much less likely to encourage repeat activity with participants.

Loan repayment periods

Several participants (both operational staff and finance managers within participating organisations) called for longer loan repayment periods. This message was particularly strong from participants who had undertaken many projects and were now reportedly struggling to identify new projects which met loan repayment periods.

> *"They are quite rigid around the 5-year payback [loan repayment period]."*
>
> Participant, FEI

Furthermore, amongst non-participants, some NHS respondents reported their organisation would only accept schemes with a 2-3 year payback period (FE suggested 2-5 years, LAs 3-7 years), suggesting lack of projects with these levels of payback could also be reasons for lack of take-up.

However, some participants did not perceive loan repayment periods to be restrictive. They appreciated there was some flexibility built into the system, for example, the ability to include costs (including ancillary measures) up to the loan repayment limits.

Notwithstanding this, there was some inconsistency found with regards to understanding of actual loan repayment periods, particularly regarding the RF, where the match funded portion of the finance had recently been extended.

Several participants from the qualitative research discussed how loan repayment periods were becoming much more of an issue and that they were having to use internal funding to 'top-up' business cases and get the go-ahead for projects. This 'top-up' funding was reported to be needed mainly to deliver ancillary works, which was more of an issue for some measures, such as those which are more integrated into building fabric. Finally, a related point was made by a few participants, who reported a risk of purchasing lower cost, but poorer quality kit (e.g. lighting) in order to meet loan repayment periods.

> *"The projects that I am looking at now are generally greater than a six-year [loan repayment] payback, so it's not always easy to get agreement from payments to match it."*
>
> Participant, HEI

5 Outcomes, scheme contribution and cost effectiveness

5.1 Observed outcomes and scheme contribution

To assess scheme outcomes, this study has deployed a mix of methods to cover the range of sectors and projects within the scheme. QEA was feasible for HEI & FEIs (combined as a group), LAs, and primary and secondary schools, and the impact from these organisations comprise the total energy savings outcomes reported below. The analysis focuses on a sample of 294 projects (out of 3,470), for which QEA was possible (see section 1.3 evaluation methodology, for more details about the methodology). Alternative methods were used to assess outcomes for NHS and Emergency Services, and street lighting projects which are both reported separately (sections 3.1.2, Street lighting and 3.1.3, NHS and Emergency Services).

The QEA found consistent evidence for the scheme delivering reductions in energy consumption, energy bills and greenhouse gas emissions in those organisations that implemented projects funded by the scheme.

Shown in Table 4, the total annual energy savings attributed to projects delivered by funding in 2013-17[41] ranged between 157 and 343 GWh. The lower bound is the total excluding savings from electricity projects implemented in HEI-FEI and the higher bound (in parentheses) includes them[42].

Table 4: Scheme annual energy savings 2013-17[43,44]

Organisation type	Total Annual Electricity Savings (GWh)	Total Annual Gas Savings (GWh)	Total Annual Energy Savings (GWh)
LAs	49***	36*	85
Primary schools	4***	2**	6
Secondary schools	4**	5*	9

[41] The data included within the analysis was based on 2013-16 data but were then grossed up to including 2017 activity data, hence Table 3 covers the period 2013-17.
[42] This range is presented because the savings arising from the electricity projects implemented in HEI-FEI are not statistically significant; they are only at the 85% confidence level. However, they are stable across funding periods, therefore giving some credibility to the estimate, but not total confidence. This is explained further in the annex to this report .
[43] * indicates statistical confidence levels the results meet. * = 90%, ** = 95% and *** = 99% confidence levels.
[44] Corresponding energy bill and greenhouse gas savings associated with these figures are presented in the annex.

Higher and further education institutes	0 (186)	57*	57 (243)
Total	57 (243)	100	157 (343)

The table shows the estimated average annual electricity and gas consumption savings attributed to projects funded by the scheme in 2013-16 across organisation types. For HEI-FEIs, figures are reported both including (in parenthesis) and excluding an electricity savings estimate that is not statistically significant (~85% confidence) but otherwise credible.

The lower figure is believed to be a conservative assessment of the total impacts of the scheme for two reasons. First, it excludes non-statistically significant but otherwise credible HEI & FEI electricity savings (186 GWh). Second, it also excludes the energy savings from street lighting, NHS and Emergency Services projects, which is described separately below.

Table 5: Average annual electricity and gas consumption savings 2013-16

Organisation Type	Average Annual Electricity Savings (%)	Average Annual Gas Savings (%)
LAs	5%*	17%*
Primary schools[45]	11%***	4%**
Secondary schools	5%**	8%*
Higher and further education institutes	0% (6%)	9%*

The table shows the estimated average annual electricity and gas consumption savings attributed to projects funded by the scheme in 2013-16 across organisation types, as percentage of average consumption before the implementation of the projects. The estimate of the electricity savings in HEI-FEI is not statistically significant.

Table 4 shows that absolute impacts vary considerably by organisation type, but this is mainly driven by issues such as participation rates and organisation size (section 2.1, Scheme design and delivery), as savings by organisation type as a percentage of their total consumption, shown in Table 5 is reasonably similar across organisation types (5-17% of annual consumption).

As described in section 1.4 (Key limitations), the extent to which it was possible to disaggregate outcomes by technology type was limited. However, as shown in Table 4, differences can be observed between gas and electricity influencing technologies, with gas having greater absolute savings over electricity (100 vs 57 GWh), and slightly larger savings as

[45] The finding presented for average annual electricity savings in Primary schools was calculated using DiD-PSM. The Synthetic Control Method was also used to confirm this finding, which is explained further in the results section of the main report.

a proportion of annual consumption (4-17% vs, 5-11%). Gas influencing projects are broadly dominated by heating projects although proportionately greater savings were derived from projects delivering ventilation or other projects. However, it should also be considered that if HEI&FEI electricity savings were included in the totals, electricity savings would be considerably higher than gas (243 vs 100 GWh).

As described in section 1.4 (Key limitations), due to data limitations it was not possible to disaggregate this data to explicitly assess impact pre-and-post the funding uplift. However, activity data shows an increase in financial spend post-uplift[46], which suggests, assuming relative consumption stays the same, there is likely to be a significant increase in impacts post-uplift.

A direct comparison between the savings made through the RF and SEELS funds has not been made, because the underlying mix of buildings and clients are different. The RF require the client organisations to actively manage multiple investments in energy efficiency on their estate over many years. This meant that they were only taken on by those organisations with a large portfolio of buildings, and an estates management team that had senior support for long term investment plans. SEELS funding is accessible to public sector organisations of all sizes, including those with very small estates and limited potential for multiple projects beyond simple heating and lighting upgrades.

5.1.1 Street lighting

Street lighting projects represent approximately 40% of total funding by value and 4% of projects by number. They were undertaken primarily by LAs (79%) and HEIs (23%). An alternative method was used to assess the impact of these projects using scheme application data based billing calculations[47]. Utilising these figures, total savings from street lighting for projects delivered between 2013 and 2017 are estimated to be at least 118 GWh.

Unlike the QEA, these figures do not include an assessment of additionality (see section 3.1.3 Meeting expectations and scheme contribution), however the qualitative research and the quantitative survey indicated the scheme contributed strongly to observed outcomes. For example, most scheme participants who undertook street lighting projects reported they were able to detect changes in energy consumption resulting from projects (71%) and almost all stated the scheme met their expectations in terms of energy and associated bill savings (95% met, 1% not met, 4% were unsure). In addition. interviewees stated 72% of street lighting projects would not have occurred at all in the absence of the scheme, with a further 26% stating projects would have occurred but at a smaller scale and slower pace.

> *"It was for all street lighting in the county. As the county was adapting streets, these [street lights] were upgraded with Salix. Salix is the driver."*
>
> Participant, LA

[46] Calculated by the average total annual financial spend across 2013/14-15/16 vs. 2016/17 and 2017/18.
[47] These projects were not included in the QEA as energy consumption data for billing purposes was available.

5.1.2 NHS and Emergency Services

NHS and Emergency Services organisations represent £31m (13%) of funding and were not included in the QEA because of the sample sizes involved. Looking at evidence from the quantitative and qualitative research, most NHS and Emergency Services participants stated the scheme met their expectations in terms of energy and associated bill savings (85%[48] vs 90% for all organisations) and most (77%, vs. 92% for all organisations) believed savings were sufficient to cover loan repayments.

Exploring the contribution of the scheme, all NHS and Emergency Services participant interviewees stated the scheme contributed strongly to outcomes. Notwithstanding this, there was a difference in the split of attribution, as 44% of projects (vs, 80% of all projects) were stated to not have happened in the absence of the scheme, and 56% (vs 19% of all projects) were stated to have occurred but at a smaller scale and slower pace. Insights from the qualitative research indicated this could be due to NHS and Emergency services having a greater propensity to integrate projects funded by the scheme as an, often small, part of wider existing refurbishment activities, as opposed to using the scheme extensively for standalone energy efficiency projects.

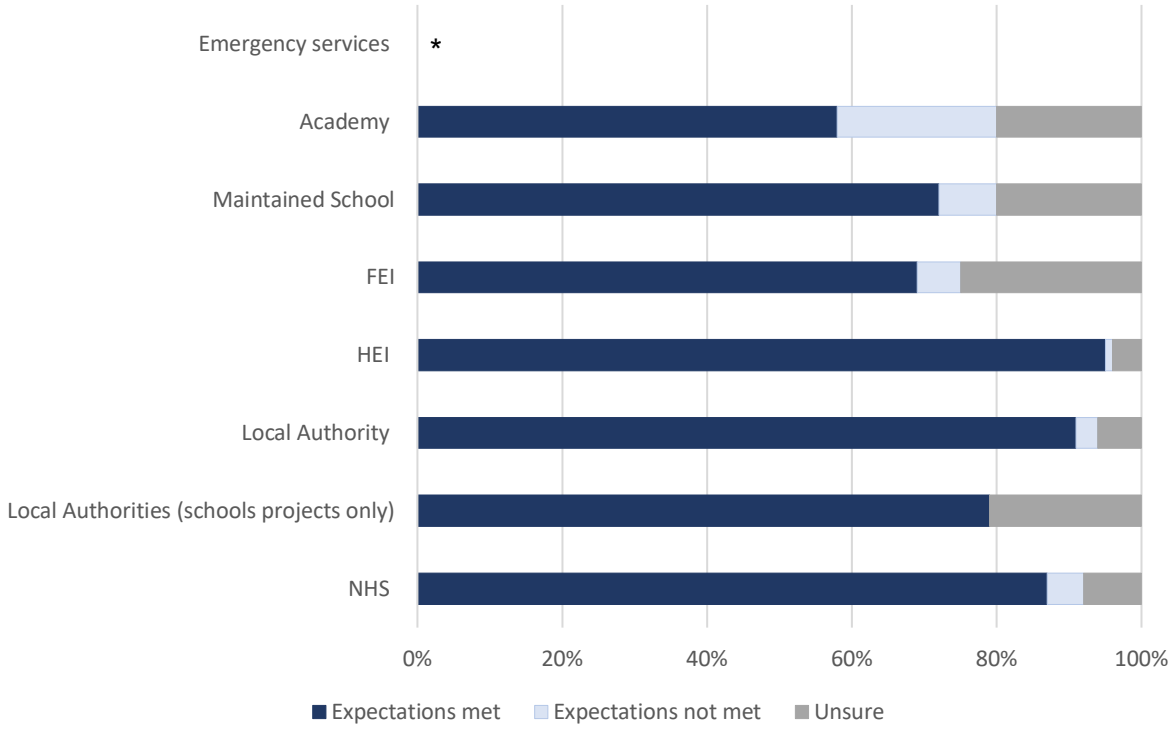
Considering these insights, while it is not possible to explicitly estimate the outcomes for NHS and emergency services, there is no evidence to indicate they would be expected to differ significantly from other organisation types.

5.1.3 Meeting expectations and scheme contribution

Most participants (90%) stated that the scheme met their expectations in terms of energy and associated bill savings (7% were unsure and 3% felt they had not met expectations[49]), with some variation by organisation type, shown in Figure 8.

[48] 5% not met, 8% were unsure.
[49] However, of this 10%, most (92%) did believe that the savings were sufficient to cover loan repayments

Figure 6. Projects delivering cost reductions in line with expectations by organisation type



Base: Emergency services (7), Academy (96), Maintained School (261), FEI (83), HEI (1,185), Local Authority (967), Local Authorities (schools projects only) (38), NHS (82); * Base size too small.

These expectations were likely to be based on applicant energy savings assessments, upon which loans were agreed. Very few participants reported undertaking specific monitoring and verification (M&V), on the basis of its complexity and costs, which limited their ability to verify savings. However, due to their involvement with billing, many described that they would 'know' if performance deviated considerably from expectations.

> *"If I'm being frank, we don't undertake significant measurement and verification of our projects. We know our energy costs are going down, and we have seen that happen, we haven't undertaken specific measurement and verification of our project. It's quite time consuming and expensive, when we know that these sorts of things work."*
>
> Participant, LA

Scheme contribution: Because of the use of comparison groups in the QEA we can have confidence that the scheme has fully contributed to these observed outcomes and are additional to what would otherwise have occurred (see section 1, Introduction and methodology, for details).

Furthermore, evidence from the qualitative and quantitative research also suggests the scheme strongly contributed to observed outcomes. Interviewees stated 77% of projects would not have occurred at all in the absence of the scheme (81% for RF, 69% SEELS), with a

further 19% stating projects would have occurred but at a smaller scale and slower pace[50]. When further questioned to better understand what would have happened otherwise, 75% reported that without the funding they would have done nothing although this varied by fund type (RF 90%, SEELS 37%).

> *"Those projects we've undertaken, I can't say we wouldn't have done them without the Salix funding, but we probably wouldn't have done all of them, and certainly not at the pace we've delivered them at, and there would have been a considerably steeper hill to climb internally to get them approved."*
>
> Participant, NHS Finance Manager

5.2 Co-benefits and unintended outcomes

In addition to energy savings, scheme participants reported experiencing a range of co-benefits and unintended outcomes. These included engagement with energy efficiency, enhanced productivity, health and wellbeing and rebound effects. Although, these benefits were not quantified by participants in interviews, the main insights relating to them, and their prevalence are discussed below.

Improved engagement with energy efficiency took a range of forms, with participants stating improvements in senior management engagement (70%), energy management practice (67%), staff and student engagement[51] (54% and 35% respectively).

> *"… and has yes enhanced our competence, because it did raise our awareness quite significantly, and make it second nature for us to look for energy savings other than just pure cost, but it gave us the experience of working through energy savings methodologies, before* proceeding, "
>
> Participant, FEI

> *"It did help us reputationally, because we did demonstrate that we were very active in the green space, if I can put it that way, so yes, it did help our reputation."*
>
> Participant , FEI

Enhanced productivity took the form of improved occupant experience (79%), better equipment performance (75%) and reputational benefits (55%). Qualitatively, LED lighting was associated with many of these benefits, with examples of improved lighting quality leading to a perception of improved occupant productivity as well as less time and money needing to be spent on maintenance, thereby freeing up resources for other activities.

[50] 1% of projects reported that they would have gone ahead anyway and were therefore not attributable
[51] Asked of schools, FEI and HEI organisations.

Health and well-being improvements were less pronounced but included improved indoor air quality (8%), for example from heating and insulation projects and safety (cited by some participants), for example from improved lighting quality.

> *"It's much brighter! The lighting area is much-much better, and it has been commented on numerous times. We were getting a lot of complaints about headaches; the old lights flicker so health-wise we've had a huge improvement with things like that."*
>
> Participant, FEI

Rebound effects relate to cases where energy efficiency measures lead to changed behaviours in energy use such as heating buildings more, known as 'comfort taking'. Some participants reported increased comfort as a result of undertaking projects.

Very few examples of negative unintended outcomes were identified. The most prevalent of these was finding participants who were stated they needed to 'top-up' projects with their own funds in order to meet loan repayment periods (see section 2.6, Scheme experience, for further details). This included several RF participants who were concerned they would at some point have to stop their funds due to lack of availability of projects which meet the scheme rules. However, this view had recently changed as RF clients can now choose to repay their own capital (match funds) over a longer repayment period.

Finally, a few minor issues mainly affecting schools, were reported which included equipment controls, such as overly bright lighting installations and motion-sensor controls, which precluded manual a manual override to turn off lighting immediately, for example at the end of the day.

5.3 Cost effectiveness

The cost benefit analysis draws together findings from various data sources, including scheme activity data from Salix, participant responses to the quantitative survey and the QEA. These findings have been used to model the total costs and benefits of scheme delivery and produce benefit cost ratios (BCR).

The analysis of participant costs and benefits focuses on the sample of 294 projects, which formed the sample group for the QEA analysis, for which detailed energy savings data is available. Equivalent cost data for these projects has been drawn from Salix application data and the participant survey workstream of this evaluation.

It covers the costs and benefits associated with investing in energy efficiency measures through the scheme from the perspective of participants and society. It also includes further analysis to explore specific aspects of interest such as organisation and fuel type.

Table 6 shows the overall participant BCR is 2 : 1, meaning that £2 of benefits has been generated for participants for every £1 they invested.

Table 7 shows the overall BCR for society is 2.3 : 1, meaning that £2.30 of societal benefits has been generated for every £1 of societal cost.

There is some variation between the data as the costs and benefits for participants are presented without applying any deadweight (i.e. regardless of whether or not they would have gone ahead with the scheme without Salix funding). The costs and benefits for society are presented after applying deadweight (of 11.7%).

The benefit values are primarily driven by energy savings estimates derived from the QEA which includes large confidence intervals (see section 3.1 Observed outcomes and scheme contribution for further details). Sensitivity analysis using the upper and lower confidence intervals suggests the actual BCR could range from 0.7 : 1 to 3.6 : 1 for participants and 0.7 : 1 to 4.3 : 1 for society. We can be 90% confident the actual BCRs lie within these ranges.

Table 6: Discounted Costs and Benefits for Participants

	Projected Installation Lifetime Value (£m)
Costs	
Loan repayments made	£46.01
Other Capital Investment (match for the Salix loans)	£15.42
Hassle Costs	£7.11
Total Costs	**£68.53**
Benefits	
Energy Bill Savings	£136.33
Total Benefits	**£136.33**
Projected Lifetime Benefit Cost Ratio	2 : 1

Table 7: Discounted Costs and Benefits for Society

	Projected Installation Lifetime Value (£m)
Costs	
Total Value of Capital Invested	£61.31
Hassle Costs to Participants	£6.28
Salix Administration Costs	£1.85
Total Costs	**£69.43**
Benefits	
Value of GHG Emission Reductions	£81.43
Value of Change in Energy Use	£74.97
Value of Air Quality Enhancement	£3.09
Total Benefits	**£159.49**
Projected Lifetime Benefit Cost Ratio	2.3 : 1

As a result of the value of costs and benefits being similar for participants and society, the BCR for participants is similar to the BCR for society.

On the basis of this estimate, the original value expectations of government for society (as understood through discussions with BEIS) have at least been met (although a like for like comparison is not made as estimates have been based on different values from different versions of the Green Book). However, as described above (section 3.1, Observed outcomes

and scheme contribution), the QEA impact figures upon which the benefits are primarily based are believed to be a conservative assessment. Furthermore, the outputs do not include co-benefits described in section 3.2 (co-benefits and unintended outcomes).

Finally, it should be noted that whilst the value of greenhouse gas emissions reflects the current position regarding their importance, the value of energy bill savings reflects the position prior to the large increase in energy bill costs seen in 2021/22.

5.3.1 Cost effectiveness by organisation type

The discounted participant and societal costs and benefits have been broken down by organisation type in Table 8.

Table 8: Discounted costs and benefits for participants and society by organisation type

Organisation Type	For Participants	For Society
	Projected Lifetime BCR	Projected Lifetime BCR
Primary school	0.8 : 1	0.8 : 1
Secondary school	0.7 : 1	0.8 : 1
Higher and further education institutes	1.3 : 1	2.6 : 1
Local Authority	2.8 : 1	3.1 : 1

Across the four organisation types, the participant BCRs vary between 0.7 : 1 for secondary school investments, and 2.8 : 1 for LAs. The main factors from the CBA modelling which help to explain this difference are:

- The energy saved per year per £1 of loan invested, which ranges from 0.4kWh for primary school projects and 0.5kWh for secondary school projects, up to 2.0kWh for local authority projects and 4.4kWh (gas only) for higher and further education institutes.
- Lifetime of technologies installed, with longer lifetimes of technology leading to greater energy savings. This ranges from 14.1 years on average in secondary schools and 17.0 years in primary schools, up to 18.3 years in LAs.

The low BCR values for schools have been investigated further. The context for schools' participation in the public sector energy efficiency loan scheme is different to other organisation types on a number of counts:

- SEELS and RF are not the typical route for schools to access funding from Salix. There is a specific, popular, separate Salix schools fund (which is part of a broader Department of Education programme) where most Salix schools investment is undertaken[52].
- Academies have access to separate Salix funding streams (ACMF, SEEF and CIF) and this is now the only route for academies (academies who participated in SEELS did so during 2013-14 in the main)[53].

[52] This programme was out of scope of the evaluation.
[53] It is possible the counterfactual for the QEA for schools includes the effect of these other Salix funding streams. For example, as of May 2016, 615 academies had participated in the Salix Academies Programme.

There appear to be two factors driving the low BCR for schools, of which the second is believed to have a greater influence:

1. Schools experience higher costs relative to savings (compared to LAs for example)[54]. This is likely to be due to:
    a. Scale, whereby smaller projects in schools are likely to have higher fixed costs
    b. Costs can be higher as schools rely more heavily on bought in expertise (consultants) to devise projects.
    c. Schools having difficulty in procuring quality technology at a good price. Some in-depth interview participants reported that loan repayment restrictions encouraged use of cheap materials and schools struggling to identify lighting schemes which meet the repayment criteria (not a notable challenge for other organization types).
    d. Schools struggling to keep costs low for other reasons. For example, lower occupancy rates (recognized by Salix in the 8-year loan repayment period for schools), age/efficiency of technologies being replaced, higher costs related to ancillary measures (e.g. asbestos).
2. Some schools do not appear to be achieving the savings forecast.

The QEA indicates achieved school savings are considerably lower than the savings estimated by applicants when agreeing business cases for loans with Salix. Comparing QEA savings, school applicant estimated savings are approximately 40% lower in comparison to LAs[55]. Based on the sample of projects included in the QEA, LAs are achieving 84% of the estimated lifetime financial bill savings recorded by Salix Finance, primary schools 28% and secondary schools 29%.

Nearly 90% of all scheme participants reported the projects they had implemented with funding from the scheme had delivered cost reductions in line with their expectations, with under 3% reporting they had not been met (the remainder were unsure). This varied by organisation type - with 95% reporting expectations being met at HEIs, whereas this was lower at around 60-70% for academy schools and maintained schools.

Some of this uncertainty within the schools' sector may be down to lack of expertise amongst those responsible for delivering projects whereby participants are less confident in whether savings are occurring. However, the qualitative work also identified several examples of projects which appeared to have delivery issues, likely to influence savings (e.g. contractor issues, additional maintenance costs due to new TRVs etc.). This was not observed amongst any of the other sectors interviewed, despite prompting. For example, one multi-academy trust had a school lighting project in which new LED lights had been 'retrofitted' into old fittings, apparently to keep within loan repayment limits. There had been problems with lights blowing and all the lights eventually had to be replaced. For this reason, this respondent estimated only 60% of projects achieved the anticipated cost savings and energy reductions.

[54] For this comparison we have excluded HEI & FEI figures as they don't include the electricity figures.
[55] For LAs, QEA savings are 16% lower than applicant estimated savings, whereas primary and secondary schools are 72 and 71% lower respectively.

"I'd say about 60 percent. [..] Well, I've had to strike one off completely, as I've said I've ripped all the lights out and replaced them, so that accounts for a big portion of [the other 40%]. So overall 60 percent, which given the length of time and how long ago that was, it's not a bad return really."

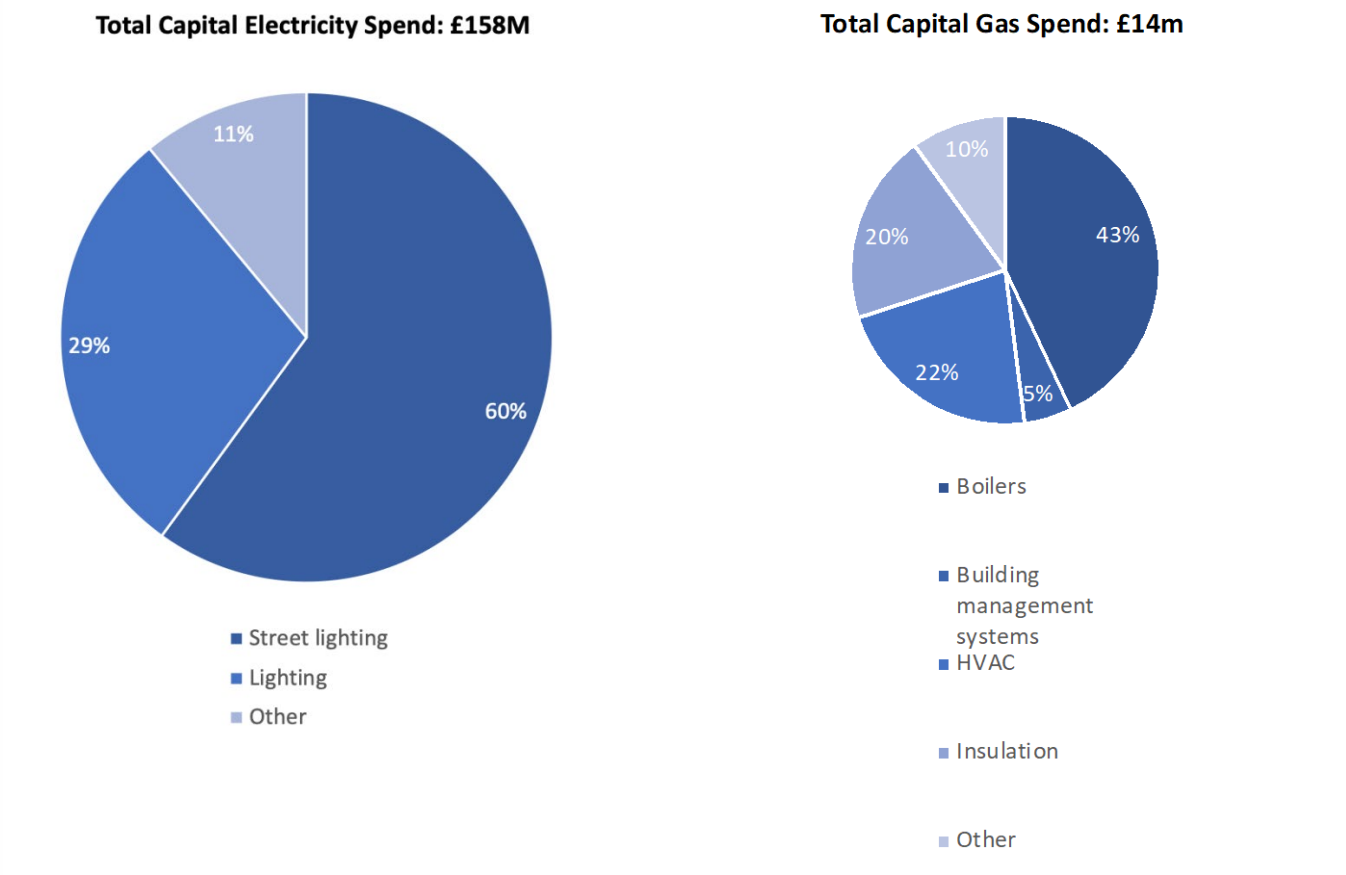
Participant, school (Multi-academy trust)

Notwithstanding the above, schools are a relatively newer participating sector, so it may be that impacts will increase after the sector has had more time to develop the skills and capacity needed to deliver impactful projects.

5.3.2 Cost effectiveness by fuel type

Amongst funded projects, projects predominantly supporting electricity savings were dominated by lighting and projects predominantly supporting gas savings were dominated by boilers.

Figure 7: Sum of Total Salix Capital Spend for Electricity and Gas, divided by technologies[56]



[56] Figure 2 shows the capital spend for projects where the energy type was explicitly labelled as 'Electricity' or 'Gas' in the dataset available. Where the energy type was given as 'Both' (21%) or was not known (<1%) these have been excluded.

Base: Electricity - Street Lighting (169), Lighting (1941), Other (235), Other named technologies (187); Gas – Boilers (131), Building Management Systems (48), HVAC (87), Insulation (264), Other (51).

*For electricity, 'Other' was a discrete answer option separate from other listed options, whereas 'Other named technologies' is the combination of the least represented response categories (Motors (49), HVAC (57), Building Management Systems (35), IT (20), Insulation (5), Lab Upgrades (19) and Boilers (2)).

The discounted costs and benefits for participants and society have been broken down in Tables 9 and 10, which indicate that projects focused only on electricity savings generate greater benefits for the same cost.

Table 9: Discounted Costs and Benefits for Participants by Energy Type

Organisation Type	Projected Lifetime Costs (£m)	Projected Lifetime Benefits (£m)	Projected Lifetime BCR
Projects Supporting Electricity Savings Only	£38.98	£105.45	2.7 : 1
Projects Supporting Gas Savings Only	£29.55	£30.88	1. : 1

Table 10: Discounted Costs and Benefits for Society by Energy Type

Organisation Type	Projected Lifetime Costs (£m)	Projected Lifetime Benefits (£m)	Projected Lifetime BCR
Projects Supporting Electricity Savings Only	£40.85	£101.43	2.5 : 1
Projects Supporting Gas Savings Only	£28.58	£58.06	2 : 1

5.3.3 Cost effectiveness of street lighting

We lack post-implementation data for street-lighting projects as most are unmetered. However, as applicant energy savings estimates are considered robust for street lighting (as they are based on those used for billing purposes when lightbulb types are switched), cost effectiveness analysis using these figures has been conducted.

Table 11: Discounted Costs and Benefits for Participants and Society – street lighting only

Technology Type	Projected Lifetime Costs (£m)	Projected Lifetime Benefits (£m)	Projected Lifetime BCR
Street lighting (participants)	£147.67	£202.23	1.4 : 1
Street lighting (society)	£146.79	£195.18	1.3 : 1

With participant and societal BCRs of 1.4 and 1.3 respectively (compared to 2 and 2.3 on average respectively for QEA assessed projects) street lighting projects would appear to offer lower value for money, particularly for society. However, they are relatively quick and straightforward to implement.

6 Wider lessons from the evaluation

This section explores wider lessons derived from the evaluation, considering changes which could be made to help improve the scheme in its current form and aspects to consider if the scheme were to be increased in scale. Furthermore, insights of relevance to broader policy are considered, focusing on design and delivery of financial mechanisms and broader energy efficiency policy.

6.1 Changes to the existing scheme

As described in section 2.3 (Scheme engagement) in the main, the scheme is highly regarded amongst participants (including both operational staff and finance managers within participant organisations) and other stakeholders[57]. However, the research asked participants for their suggestions on what could be improved in the scheme.

Extensions to loan repayment periods

As noted in section 2.6 (Scheme experience), a number of operational and finance managers (all sectors, participants), more so those who used the scheme extensively, suggested an extension of the loan repayment criteria would be useful. This was primarily to mitigate or avoid the need to use match funding to make business cases work and to increase the range of projects they could fund through the scheme. Suggestions for how long repayment periods should be extended by varied but moving from 5 to 8-10 years was commonly suggested.

A few also suggested technology specific loan repayment rates would be helpful, recognising that particularly non-lighting measures often have either a more marginal business case and/or requirements for extensive ancillary works.

> *"I think it would be better if the payback [loan repayment] periods were variable, depending on the technology being used. So, for example, five years for LED lighting is fine, because you get a five-year guarantee, generally, with the lamps and everything. A boiler installation, I'd hope it would last more like ten years, because it's that much more expensive in the first place, it would be easier... But more projects would be accessible, if you like, with a longer payback on ones that have a long life."*
>
> Participant FE, Finance Manager

Considering lighting measures appear overrepresented in comparison to identified energy efficiency potential (section 2.3, Scheme engagement), technology-specific loan repayment

[57] Including sector trade associations.

rates could be one mechanism which may support further take up of non-lighting cost effective measures.

Awareness raising

It was suggested the scheme could play an increased role in raising awareness of the benefits of energy efficiency projects amongst senior decision-makers and finance teams within public sector organisations. Furthermore, awareness raising targeted among other actors including school business managers, estate managers and asset managers was also suggested. This would help operational managers overcome internal barriers to action (see section 2.3, Scheme engagement) by helping convince the range of involved stakeholders of the case for action.

> *"I don't know whether they were touting stuff, or emailing such public sector organisations, so what they're doing, and what they're capable of doing, and what they cover, I'm not sure. I'm not privy to anything. As a finance department, I don't see anything come through to me."*

Participant, FEI, Finance Manager

Procurement and frameworks

It was suggested the scheme could consider establishing new framework contracts, and/or working more closely with existing frameworks (e.g. RE:FIT) to help overcome barriers and speed up procurement. Such activity could have a focus on supporting smaller organisations or sites, where procurement barriers were more commonly experienced (e.g. schools).

Another similar suggestion included the scheme getting involved in supporting project aggregation for some measures, in particular lighting. This would increase purchasing power. It was also suggested that lists of recommended manufacturers and products could be provided as part of the scheme, which could help support procurement, but also mitigate risks of procuring low cost, but sub-standard products.

> *"What would make sense would be, rather than going as eight individual colleges, is there not an option for all eight to go in as one great big bid and benefit from going as a bigger project?"*

Participant, FEI

Additional advice and support

It was suggested the scheme should provide additional advice and support, notably to help identify projects and help to make the case for them. Suggestions included developing more case studies and promoting them more widely, for example through regular newsletters or trade publications. It was also suggested that scheme representatives could undertake site visits to assist in identifying and making the case for projects, noting other schemes such as RE:FIT, which do this.

"There's definitely potential that we'd use it in future. I think what we really need is like we used to have access to: an organisation who provides free advice… If Salix would come out and give organisations, let's say, one free energy survey or free advice on what we could do, like assistance in applying would be good."

Non-participant, LA

Suggestions for additional support largely focused on helping support take up of measures which are more challenging to operationalise.

"The honest answer is we don't know, we know that we have because by definition if you insulate something, you're going to use less energy, but how on earth do you quantify that specifically to that area of the site? The honest answer is, you can't."

Participant, school

6.2 Design and delivery of a larger scheme

Based on current activity levels, scheme engagement and identified outstanding energy efficiency potential (sections 2.1, Scheme design and delivery and 2.3, Scheme engagement), it appears there is scope for expanding the scheme. We considered the following aspects important to consider in the design and delivery of a larger scheme.

Identifying and targeting non-participants

As described in section 2.3 (Scheme engagement), 40% of non-participants interviewed in the quantitative survey had not heard of the scheme previously. There is an opportunity to target these, in particular those with large estates such as LAs, FEIs and Emergency Services[58]. Whilst the current scheme's 'key account management' delivery model works for many; this is heavily reliant on organisations having someone with clear responsibility for energy management and the capacity and skills to deliver on this responsibility. Considering capacity and skills barriers may be more prevalent amongst non-participants (compounded by reported staff cuts in these areas (section 2.3, Scheme engagement)) alternative delivery models may be required to extract potential within these groups.

It was beyond the scope of this work to consider these in detail, but suggestions for exploration include explicitly targeting finance departments as well as targeting other stakeholders, for example teaching staff (in FEI, HEI and schools) and focusing more prominently on the non-energy benefits of measures discussed in section 3.2 (co-benefits and unintended outcomes) This could be encapsulated within an overall marketing strategy, aiming to secure greater take-up from those not currently participating.

[58] 33% of LAs, 43% of FEIs and 50% of Emergency Services non-participants who were interviewed had not heard of the scheme.

Further to this, focusing explicitly on the most cost-effective non-lighting energy efficiency measures would help expand the scheme (section 4.1, Changes to the existing scheme). For example, measures to improve building instrumentation and controls, space heating and building fabric[59]. There could also be a case for additional support to improve the take-up of newer, more innovative measures, for example servers and IT equipment, battery storage and other measures of interest, which are currently likely to be taken up less due to the risk averse approach taken by many organisations (section 2.3, Scheme engagement). Support for helping more 'large-scale' projects, which usually involve a range of sources of finance may be helpful, for example advising on where and how scheme funding can be leveraged to greatest effect.

Finally, devising mechanisms to address sector-specific accounting and financial regulation challenges, seen particularly in the NHS and FE sectors could overcome these barriers (section 2.3, Scheme engagement).

6.3 Design and delivery of financial mechanisms to help address outstanding energy efficiency potential

More broadly, the following aspects were identified as being important in the design and delivery of financial mechanisms to help address outstanding energy efficiency potential.

As discussed in section 2.3 (Scheme engagement), the interest free aspect of the finance was highlighted by many participants. The Government backed nature of the scheme was also considered to be crucial to ensuring trust in the scheme as well as the ease of use 'low hassle' nature of the scheme discussed by participants.

Some organisations are more difficult to convince to take on 'on-balance sheet' debt, particularly if they were financially constrained or affected by sector specific rules (as was the case for NHS and FEIs within this evaluation). EPCs were identified as a possible alternative financial mechanism but were viewed with suspicion by some who had considered them, with concerns over whether they offered value for money being a key issue (see section 2.5, Mechanisms deployed outside of the scheme for further details).

Finally, the 'use it or lose it' aspect of the recycling fund (see section 2.7, Funding mechanisms and loan repayment periods), appeared to encourage considerably greater levels of activity compared to SEELS. When discussed with participants, it appears this is likely to be associated with 'loss aversion' behaviours reported in cognitive psychology and decision theory[60].

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[59] These measure suggestions were informed by in-depth interviews, as well as cost effective measures potential identified in the Building Energy Efficiency Survey (BEIS, 2016). https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/565748/BEES_overarching_report_FINAL.pdf

[60] Kahneman, Daniel; Tversky, Amos (1979). "Prospect Theory: An Analysis of Decision under Risk" (PDF). Econometrica. 47 (2): 263–291.

6.4 Design and delivery of energy efficiency policy

Considering the evaluation evidence, we considered the following features as important in the context of broader design and delivery of energy efficiency policy.

Firstly, the relative simplicity of the scheme, as well as its stability of delivery (key features of the scheme have remained unchanged since its inception) appears to have been crucial. The positive reputation of Salix as scheme managers (section 2.3, Scheme engagement) appears to be associated with this. For example, several participants reported considerable time and effort to get the first one or two projects agreed and completed. However, once the approach had been 'proven' it was much easier to deliver follow on projects, which for many had then become a core feature of activities undertaken to reduce energy bills and improve their estates.

Secondly, Salix scheme managers discussed how the relative certainty of funding in future years provided by the 2015 funding uplift provided them with greater confidence to work more strategically. This involved working closely with participants to devise and deliver larger, more complex projects which could span financial years.

Thirdly, the targeted and flexible nature of support offered by scheme managers appeared helpful, particularly when working with large and more experienced participants. Participants noted that Salix CSOs and other staff would proactively help with making the case for projects to go ahead, for example, engaging with finance staff on particularly large projects was considered important in getting agreement for more ambitious or complex projects.

Finally, some other facets of energy efficiency policy were noted as being important for successful delivery:

- The existing landscape of regulations, policies and incentives at the time of the research were broadly seen as being supportive, but not necessarily incentivising greater take-up of energy efficiency measures. Notably several organisations still referred to Carbon Trust Carbon Management Plans and associated carbon targets even though the scheme has long been closed (section 2.3, Scheme engagement).
- Increasingly constrained access to finance was an issue, particularly for obtaining match funding projects (section 2.6, Scheme experience).
- Lack of expertise and capacity for smaller organisations (particularly schools) were seen as a key issue influencing activity.
- There was limited evidence of the use of energy performance contracts (EPCs) as well as limited interest in doing so, with some expressing considerable suspicion of them, largely due to concerns that some or all of scheme benefits (i.e. cost savings) would be lost.

Annex

Table 12 Final review of the assumptions in the Public Sector Energy Efficiency Loan Scheme Theory of Change

Assumption	Description	Assessment of assumption	Proposed final version of assumption	Evidence for categorisation
Salix schemes are the most effective mechanisms for delivering long-term high-level policy goals.	Two questions emerged from the literature review and stakeholder interviews: - Whether or not Salix Finance is used strategically, e.g. do applicants use it to implement measures in a carbon management plan, or is it being used in an ad-hoc fashion? - By focusing on relatively quick wins does Salix finance undermine more whole building approaches. For example, do organisations which have installed most/all 'quick win' measures then reduce their attractiveness to EPC suppliers?	Salix is an effective mechanism, but the research does not provide sufficient insight to allow us to support the view that it is the most effective mechanism, particularly in relation to delivering long term goals, and therefore it is suggested that the assumption be amended. Assumption partially proven /supported. Recommended that the assumption be amended.	Salix schemes are an effective mechanism for delivering long-term high-level policy goals.	The SEELS scheme appears to be an effective mechanism for encouraging work on EE and low carbon energy initiatives. For schools it is really the only mechanism for delivering long-term high-level policy goals. In other sectors there are, or at least have been alternatives, e.g. PWLB for local authorities, but there is some evidence to suggest that in the NHS and FE sector alternative source of funding less available than in the past, something which emphasises the potential importance of SEELS The scheme is used in differing ways to suit organisational circumstance. This is testament to its flexibility, but some organisations may not progress beyond a single scheme and few reported it use in

Assumption	Description	Assessment of assumption	Proposed final version of assumption	Evidence for categorisation
				funding strategic, i.e. whole system, energy initiatives. The establishment of an EPC may lead to more whole system approaches, but there is evidence of mistrust of EPCs and appears to be limited market penetration. In contrast Salix is highly popular.
All schemes which meet criteria contribute similarly to policy goals.	These include: - more cost-effective public services - contribution to meeting carbon budgets and emissions reduction targets - improved energy security and resilience	The evaluation does not support the assumption that scheme contribute similarly to all policy goals. Assumption partially proven /supported. Recommended that the assumption be amended.	All schemes which meet criteria contribute to policy goals, but this varies by sector.	The quasi-experimental work indicates that the schemes have delivered energy efficiency reductions, although its effectiveness varies by sector. This evidence is taken as supporting the assumptions that the scheme results in financial savings and carbon emissions reductions. This being the case the evaluation supports the assumption that it contributes to the public policy goals of 'more cost-effective public services" and 'contribution to meeting carbon budgets and emissions reduction targets'. In reducing energy use the scheme could be said to be contributing to energy security and resilience (by default). In addition, there is some limited evidence that some types of

Assumption	Description	Assessment of assumption	Proposed final version of assumption	Evidence for categorisation
				supported work are delivering energy security and resilience, e.g. CHP plant for NHS sites.
Forecast carbon reductions are achieved.	Effectiveness of the schemes to achieve carbon reduction policy goals may be affected by: - grid decarbonisation (particularly of electricity grid) - inaccurate forecasting - poor specification / installation / performance of installed equipment - rebound effects.	The evaluation supports the view that forecast reductions are achieved in some sectors, but not all. Assumption partially proven / supported. Recommended that the assumption be amended.	Forecast carbon reductions are achieved in line with participants expectations, but actual reductions have not been verified.	Most participants reported that the scheme delivers in line with their expectations (expectations they themselves set when project applications are submitted). However, the research identified very little evidence of organisations undertaking energy consumption monitoring and therefore individual organisations were generally unable to prove that forecast reductions are being delivered. Support for the assumption was however generated through quasi-experimental work which indicates that the schemes have delivered energy efficiency reductions, although its effectiveness varies by sector. In particular, the cost benefit assessment suggests that there is variation between organisation types in terms of the effectiveness of the scheme. The CBA analysis indicates that projects in schools

Assumption	Description	Assessment of assumption	Proposed final version of assumption	Evidence for categorisation
				deliver less benefits than schemes in other sectors.
Energy efficiency measures perform as expected	Relies on accuracy of initial M+V; equipment performing in line with manufacturer claims; equipment operating efficiently.	Assumption partially proven /supported. Recommended that the assumption be amended.	Energy efficiency measures installed correctly and perform as expected in most cases. .	Most participants - in the quantitative research - reported that the measures they had installed were operating in line with their expectations. This was, however, a subjective view and unsupported by M+V exercises. The qualitative research does, however, provide evidence to suggest that most schemes do not appear to suffer from problems associated with poor installation. As indicated above, the cost benefit assessment suggests that there is variation between organisation types in terms of the effectiveness of the scheme. The reasons for this have being explored - quality of equipment (performance of installed equipment) appears to be playing a role in the school's sector.

Assumption	Description	Assessment of assumption	Proposed final version of assumption	Evidence for categorisation
Salix finance enables EE investment to proceed that would not have done so otherwise.	Key word is 'enables'. I.e. has the availability of Salix finance enabled the organisation to undertake work that it would not have been able to do so otherwise.	Assumption proven /supported	Salix finance enables EE investment to proceed that would not have done so otherwise.	The qualitative work supports the contention that Salix enables beneficiaries to undertake work that would not otherwise have been done. In some cases, it is the only, or primary, source of funding, in others it enables greater scale and pace. The quantitative survey also supports this for ≈80% of projects, respondents reported that the projects would not have happened in the absence of the scheme. 75% said would have done nothing (90% RF vs. 37% SEELS). SEELS projects – respondents often said the project would have been delayed (28%).
Carbon and financial savings are retained by public sector	Assumption is that the benefits of EE schemes are achieved by the applicant bodies.	Assumption partially proven /supported. Recommended that the assumption be amended.	Carbon and financial savings re retained by the public sector (except where EPCs and PFI arrangements apply).	The evidence - from the qualitative interviews - suggests that this assumption holds EXCEPT where organisations use EPCs or where activity takes places on sites where PFI arrangements apply (mainly NHS in both cases).

Assumption	Description	Assessment of assumption	Proposed final version of assumption	Evidence for categorisation
Salix finance ensures that funding is spread across technologies, geographies and sectors	BEIS requires that Salix spread funding to avoid favouring specific forms of technology, sector or geographic areas.	Assumption unsupported (should be removed or amended).	Salix finance ensures that funding is spread across technologies, geographies and sectors	Data relating to the types of technology installed clearly show that the scheme is mainly used to support the installation of a narrow range of technologies (particularly lighting) and that funding is spread unevenly across sectors and national geographies.
Forecast energy demand reductions achieved	Emphasis is on accuracy of forecasting although there may be other reasons for a failure to achieve forecast reductions including poor specification, poor installation; problems with maintenance; rebound effects; increase/reduction in energy costs and whether or not effective due diligence was applied by Salix during the application process.	The evaluation supports the view that forecast reductions are achieved in some sectors, but that there is significant variation across sectors. Assumption partially proven /supported. Recommended that the assumption be amended.	Forecast energy demand reductions are achieved in most cases and sectors (not schools).	For most participants, the scheme delivers in line with their expectations, but these are based on estimates and unsupported by M&E. Support for the assumption was however generated through the quasi-experimental work which indicates that the schemes have delivered energy efficiency reductions, although its effectiveness varies by sector. In particular, the cost benefit assessment suggests that there is variation between organisation types in terms of the effectiveness of the scheme. The CBA analysis indicates that projects in schools deliver less benefits than schemes in other sectors.

Assumption	Description	Assessment of assumption	Proposed final version of assumption	Evidence for categorisation
Forecast financial savings are achieved	Emphasis is on accuracy of forecasting although there may be other reasons for a failure to achieve forecast savings. Including: poor specification; poor installation; problems with maintenance; rebound effects; changes in energy prices; and whether or not effective due diligence was applied by Salix during the application process.	Assumption partially proven /supported. Recommended that the assumption be amended.	Expected financial savings are achieved in most case and sectors (unclear re schools).	From quantitative survey: Respondents were asked whether the project delivered in line with their expectations with regards to cost reductions, with 89% reporting that the project had met their expectations. Of those remaining, 8% were unsure, with just 3% reporting that they had not been met. The qualitative evidence supports the findings of the quantitative survey but in the majority of cases participants were unable to substantiate their view with M&E evidence. Support for the assumption was however generated through the quasi-experimental work which indicates that the schemes have delivered energy efficiency reductions, although its effectiveness varies by sector. In particular, the cost benefit assessment suggests that there is variation between organisation types in terms of the effectiveness of the scheme. The CBA analysis indicates that projects in schools deliver less benefits than schemes in other sectors.

Assumption	Description	Assessment of assumption	Proposed final version of assumption	Evidence for categorisation
Measures are correctly installed	Intended outcomes likely to be largely dependent upon equipment being correctly installed. Links to the assumption regarding performance.	Assumption proven /supported	Measures are correctly installed	The qualitative work identified a few occasions when there were issues with installations, but these were isolated occasions and remedial action was or had been taken to address the matter. There was a large variation in cost benefit ratio by organisation type. Whilst there was no suggestion that incorrect installation of measures was a cause of this, equally, there is no evidence that this wasn't a contributory factor.
Finance covers actual cost of delivering measures.	The assumption is that the estimated costs of a scheme are wholly covered by the value of the loan (50% covered in the case of the recycling Fund) and that applicant bodies can include costs for project management and ancillary (enabling) activity in their bids.	Assumption unsupported (should be removed or amended).	Finance often insufficient to cover actual cost of delivering measures	Findings from the qualitative work indicate that scheme participants are routinely required to use some level of match funding to ensure that schemes comply with Salix payback criteria. In the quant survey - for 50% of participants and 45% of non-participants, additional costs associated with the project was a barrier to further participation in the scheme.

Assumption	Description	Assessment of assumption	Proposed final version of assumption	Evidence for categorisation
For recycling fund. Savings are ring fenced for energy efficiency measures.		Assumption proven /supported	For recycling fund. Savings are ring fenced for energy efficiency measures.	This issue was not addressed in the phase 2 research, but the assumption is supported by phase 1 findings.
Sufficient suppliers, with appropriate expertise, available to install measures.		Assumption proven /supported	Sufficient suppliers, with appropriate expertise, available to install measures.	This issue was not addressed in the phase 2 research, but the assumption is supported by Phase 1 findings.
Applicant organisations have access to the skills and resource to manage projects.	This assumption relates to applicant organisations ability to manage schemes during the project delivery phase.	Assumption partially proven /supported. Recommended that the assumption be amended.	Applicant organisations have access to the skills and resource to manage projects (this is not always true for schools).	This issue was not addressed in the phase 2 research, but the assumption is supported by Phase 1 findings, except in the case of schools.
Salix due diligence processes ensure that applications are robust and	It is understood that Salix provide pre-application support to potential applicants to 'quality assure' potential schemes.	Assumption proven /supported	Salix due diligence processes ensure that applications are robust and deliver forecast outcomes.	This issue was not directly addressed in the phase 2 research, but details of due diligence processes were shared as part of the QA of the CBA analysis. Based on the

Assumption	Description	Assessment of assumption	Proposed final version of assumption	Evidence for categorisation
deliver forecast outcomes.				insight this exercise generated the assumption is felt to hold.
Sufficient eligible schemes to absorb the uplift in funding	This issue was not addressed in the phase 2 research. but the qualitative work identified the possibility that it might not in the near future.	Assumption proven /supported	Sufficient eligible schemes to absorb the uplift in funding.	This issue was not addressed in the phase 2 research, but the qualitative work identified the possibility that it might not in the near future.
Applicant organisations have access to skills and capacity to identify, develop and procure schemes.		Assumption partially proven /supported. Recommended that the assumption be amended.	Applicant organisations have access to skills and capacity to identify, develop and procure schemes (this is not always true for schools).	This issue was not addressed in the phase 2 research, but the assumption is supported by phase 1 findings, except in the case of schools.
Business case accepted by senior management	Assumed that in most, if not all, cases those involved in the development of proposed schemes will need to secure approval to proceed.	Assumption partially proven /supported. Recommended that the assumption be amended.	Senior management approval required for business case.	Assumption holds for SEELS (i.e. schemes only proceed with the agreement of senior management, generally finance managers).

Assumption	Description	Assessment of assumption	Proposed final version of assumption	Evidence for categorisation
Eligible organisations are aware of Salix finance		Assumption partially proven /supported. Recommended that the assumption be amended.	There are high levels of awareness of Salix finance amongst operational staff within the public sector market	Awareness of Salix schemes is generally good but both Phases of the qualitative research identified organisations and individuals that were unaware of the scheme. The appears to be less awareness within the schools and FE sectors. N.B. awareness is higher amongst operational managers In the quantitative survey, at the beginning of the call with scheme non-participants, respondents were asked if they had heard of Salix before they were called. For 38% of scheme non-participants, the call was the first time they had heard about Salix. Unawareness varies by organisation type from 21% for NHS to 61% for maintained schools.
For recycling fund match finance is available from participants.		Assumption proven /supported	For recycling fund match finance is available from participants.	This issue was not addressed in the phase 2 research, but the assumption is supported by phase 1 findings.
Applicant organisations are	Able means that there are no known barriers (actual /	Assumption partially proven /supported.	Where aware, most potential applicants are	In the quantitative survey, when asked what prevents or might prevent their participation

Assumption	Description	Assessment of assumption	Proposed final version of assumption	Evidence for categorisation
able and willing to take up Salix loan finance.	perceptual) preventing the organisations from applying. Willing means that the applicant organisation views the nature and terms and conditions of Salix finance to be acceptable.	Recommended that the assumption be amended.	able and willing to take up Salix loans. Some sectors face greater barriers (schools) and financial barriers are growing for others (NHS, FE).	in the scheme in the future, non-participants often selected 'Additional costs associated with projects', 'Employee time available to oversee projects' or 'Salix rules regarding payback timescales'.
Applicant organisations face capital finance barrier for energy efficiency measures	Barriers might be absolute, i.e. no funding available, or relative, i.e. funding available but preference given to it being used for other purposes.	Assumption partially proven /supported. Recommended that the assumption be amended.	Applicant organisations regularly face capital finance barriers for energy efficiency measures	The qualitative research found that in the main organisations reported experiencing some level of financial barrier, but there were some exceptions. Non-participant organisations sampled in the quant survey were able to fund energy efficiency outside of the scheme - using both internal and / or external funds. No evidence that these opportunities would not be available, to at least some extent, for participants.
Applicants organisations motivated to install EE measures	This assumption suggests that applicant organisations wish to take action on energy efficiency BUT there may be several reasons for this including:	Assumption partially proven /supported. Recommended that the assumption be amended.	Applicants organisations motivated to install EE measures, but drivers differ in line	In the quantitative survey, the most frequently given reason for participants to take out their first loan through the public sector energy efficiency loan scheme was to reduce energy consumption (27%). This was

Assumption	Description	Assessment of assumption	Proposed final version of assumption	Evidence for categorisation
	financial benefits; carbon reduction; co-benefits (e.g. improved working environment)		with organisational priorities.	also identified as key driver within the qualitative research but organisations may have multiple drivers (cost reduction, carbon reduction, CSR) and different parts of the organisation may prioritise one over others.
Culture of EE develops, repeat schemes face fewer hurdles are more ambitious and larger.	This assumption assumes that organisations who benefit from Salix are more likely to make repeat bids as they become: more familiar with the scheme; EE project development; more confident that benefits will be achieved.	Assumption partially proven /supported. Recommended that the assumption be amended.	Energy efficiency activity becomes normalised in some organisations.	The 'use it or lose it' feature of the RF scheme encourages repeat schemes. Over time these are more ambitious and larger as the more straightforward project opportunities are exhausted. Participant organisations are assigned to CSOs within Salix who help identify projects and then encourage and support applications. This results in repeat schemes. Also results in more ambitious and larger projects as CSOs seek to identify projects to reach targets. Certainty of project funding brought about by the uplift has resulted in Salix CSOs working with participants in a more strategic manner; this has resulted in repeat schemes e.g. where street lighting projects are broken

Assumption	Description	Assessment of assumption	Proposed final version of assumption	Evidence for categorisation
				down into tranches of work across different financial years. There is evidence of repeat schemes facing fewer hurdles, being more ambitious and larger - but little evidence of a culture of EE developing i.e. there is little to suggest that if you took the scheme away, efforts to deliver EE would persist.

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