Department for
Business, Energy
& Industrial Strategy

EVALUATION OF THE PUBLIC SECTOR ENERGY EFFICIENCY LOAN SCHEME

Interim Evaluation Report Appendices

July 2018

Department for Business, Energy & Industrial Strategy

Contents

Annex 1: High level and evaluation questions and overview of method 4
1.1 Evaluation questions 4
1.2 Overall approach to evaluation in phase 1 and phase 2 10
Quasi-experimental impact evaluation. 10
Qualitative data collection and analysis. 11
Quantitative data collection and analysis. 11
Insight from Salix finance. 12
Insight from BEIS 12
Cost effectiveness assessment 12
Evidence synthesis and analysis. 12
Annex 2: Description of Theory of Change 14
Annex 3: Detailed Scheme activity summary 18
3.1 A summary analysis of the Salix project data 18
3.2 Organisation classification/data by organisation type 20
3.3 Saturation Information 22
Annex 4: Quasi-experimental impact assessment methodology 24
4.1 Introduction 24
4.2 Dataset matching 24
4.3 Synthetic Control Method (SCM) 25
4.4 Advantages and Limitations of Synthetic Control Method (SCM) 26
4.5 Application of the SCM to projects in maintained primary schools 27
4.6 Data matching and data quality assurance 29
4.7 Results for lighting projects 29
4.8 Results for insulation projects 33

Department for Business, Energy & Industrial Strategy

4.9 Results for all other projects affecting natural gas use 35
4.10 Next steps 38
Further analysis of maintained schools 38
Assessing the impacts of other projects 39
Annex 5: Qualitative research method 41
5.1 Approach 41
5.2 Sampling 41
5.3 Limitations / considerations 42
5.4 Participant Recruitment Process 42
5.5 Non-participant recruitment process 43
Sample source 43
Process 44
5.6 Participant Topic Guide 45
5.7 Non-Participant Topic Guide 52

Department for Business, Energy & Industrial Strategy

Annex 1: High level and evaluation questions and overview of method

1.1 Evaluation questions

Table 1below provides a more detailed summary of the high level and detailed evaluation questions, which support the aims and objectives of the evaluation as predefined in the project tender. It also points the reader to the relevant section of the report where each evaluation question is covered.

Table 1: A summary of evaluation questions and reference to coverage within the report

Ref	Question	Scope and coverage within report
HLQ1	What have been the outcomes of the scheme before and after the uplift in funding in 2015?	Section 3. Quantitative exploration of outcomes pre-uplift through QEA pilot. Qualitative exploration of respondent perceptions of outcomes (not disaggregated between pre and post uplift)
1.1	Have recipients of a loan experienced reductions in energy bills, greenhouse gas emissions and energy consumption in line with our expectations?	Section 3.2 QEA pilot report outputs. Qualitative exploration of respondent perceptions of outcomes in line with expectations
1.2	Do reductions in energy bills, greenhouse gas emissions and energy consumption differ by different scheme participants and different technologies?	Section 3. Qualitative exploration of respondent perceptions of outcomes across participant groups and technologies

Department for Business, Energy & Industrial Strategy

Ref	Question	Scope and coverage within report
1.3	What have been the co-benefits of the scheme?	Section 3.3 Qualitative exploration of respondent observation of co-benefits.
1.4	Have there been any unintended outcomes?	Section 3.3 Qualitative exploration of respondent observation of unintended outcomes
HLQ2	What is the contribution of the scheme to the observed outcomes?	Section 4. Quantitative exploration of outcomes pre-uplift through QEA pilot. Qualitative exploration of contribution of scheme to observed outcomes.
2.1	To what extent are the scheme's observed impacts additional to what would have otherwise happened?	Section 3.3. Interpretation of QEA outputs. Qualitative exploration of respondent perceptions of additionality, considering both participant and non-participant activities.
2.2	To what extent does additionality vary across different participants, technologies and funding methods and why?	Section 3.3. Qualitative exploration of variation of additionality across different participant groups.
HLQ3	What is the cost effectiveness of the scheme?	Not covered in this report
3.1	For participants, how do the costs of participating in the scheme compare with the overall benefits, and has this changed since the uplift in funding?	Not covered in this report
3.2	For the government, how do the costs of providing a loan	Not covered in this report

Ref	Question	Scope and coverage within report
	compare with the overall benefits?	
3.3	What is the cost-effectiveness of different technologies from the perspective of participants and government?	Not covered in this report
HLQ4	How effective and efficient has the delivery of the scheme been?	Sections 5 and 6 Qualitative exploration of Salix Finance and respondent views.
4.1	What is the rate of deployment of energy efficiency projects and technologies, what explains this and does this differ for different participants?	Section 2.2 reporting on scheme activity levels over the time period of the evaluation across funds, participant groups and technologies.
4.2	What types of organisations are participating in the scheme, and why? How does this compare to the types of organisations that the scheme is targeted at? What types of organisations are not participating in the scheme, and why?	Section 2 and 5. Describing who is participating in the scheme and why, based on quantitative scheme data and organisations (participants and non-participants) engaged through qualitative research.
4.3	What strategies have been used to segment, target and reach different participants, and how effective have these been?	Section 6.2 describing (qualitatively) the strategies Salix have taken to segment, target and market to potential participant organisations. Assessing (qualitatively) which strategies have been effective from the perspective of participants and the perspective of Salix and BEIS.
4.4	How have risks of insufficient take-up of energy efficiency projects been mitigated?	Section 6 describing (qualitatively) the strategies that Salix have used to make

Ref	Question	Scope and coverage within report
		sure all funding agreed with BEIS is distributed each year.
4.5	How are projects prioritised by the delivery body, and has this changed following the uplift in funding?	Section 6.1, describing (qualitatively) whether Salix prioritise certain types of energy efficiency projects over others, on what basis and how (i.e. how are these projects treated differently to those that are not prioritised).
4.6	Which elements of the scheme have different stakeholders (including participants) successfully engaged with and how?	Section 5, describing (qualitatively) which stakeholders are engaging with which activities in the scheme and how this is contributing to participants implementing projects which result in reductions in energy bills, greenhouse gas emissions and energy consumption.
4.7	For participants and non-participants, where are the barriers to take up of the public-sector energy efficiency loan scheme and why do these occur?	Section 5.3, describing (qualitatively) who (participants and non-participants) contacts Salix out of interest in using the scheme for an energy efficiency project and who does and does not take the funding forward for this project. Describing (qualitatively) the reasons why these projects are not taken forward with Salix funding.
4.8	Has offering two different funding mechanisms been effective? If so, who has it benefited, how and why? If not, why was it not effective?	Section 6.4, describing (qualitatively) whether it was beneficial for participants to be able to access either the Recycling Fund or the loan. Who has benefitted from this

Ref	Question	Scope and coverage within report
		choice (in terms of their ability to progress energy efficiency projects) and why. Who has not benefitted from this choice (in terms of their ability to progress energy efficiency projects) and why.
4.9	What is the role of match-funding in bringing about energy efficiency projects supported by the scheme?	Section 5.3.3 – Match Funding, analysing (qualitatively) the effect that match-funding has in bringing about energy efficiency projects supported by the scheme
4.10	What have been the participants' and non-participants perceptions and experiences of the hassle / hidden costs of taking up the loans, and how has this impacted on participation?	Section 5.3.2 – Hassle Factors and Hidden costs (and other related sections), describing (qualitatively) the perceptions of the hassle / resource costs of participating in the scheme. Describing (qualitatively) the experiences of the hassle / resource costs of participating in the scheme. Analysing (qualitatively) how these perceptions and experiences impact on scheme take-up.
4.11	Has the offer of different pay-back rates for different types of organisations had an impact on participation?	Section 4.3.1 – Payback rates, describing (qualitatively) views on different pay-back rates and analysing (qualitatively) the role that different pay back rates have on take-up of the scheme.
HLQ5	What is the wider learning from the evaluation for BEIS?	Section 7

Department for Business, Energy & Industrial Strategy

Ref	Question	Scope and coverage within report
5.1	What other mechanisms are being deployed and utilized to support the uptake of energy efficiency measures in the public sector outside of the scheme?	Section 7.2, describing and summarising the regulations, incentives and advice that scheme participants are using alongside the scheme and how they are being used.
5.2	What changes can be made to the scheme to address the barriers to the installation of energy efficiency measures among public sector organisations?	Section 7.3, describing and summarising the changes that could be made to how the scheme operates to help both scheme participants and non-participants take more steps to reduce energy bills, greenhouse gas emissions and energy consumption.
5.3	What strategies are most viable / cost-effective for Government to address the outstanding energy efficiency potential?	Section 7.4 analysing (qualitatively) the changes that could be made to how the scheme operates to help both scheme participants and non-participants take more steps to reduce energy bills, greenhouse gas emissions and energy consumption in terms of their ability to deliver these reductions cost effectively. Analysing (qualitatively) the changes that could be made to how the scheme interacts with regulations, incentives and advice to help both scheme participants and non-participants take more steps to reduce energy bills, greenhouse gas emissions and energy consumption in terms of their ability to deliver these reductions cost effectively.

Ref	Question	Scope and coverage within report
5.4	What role does the provision of zero-cost finance have in tapping into the outstanding energy efficiency potential?	Section 7.1 analysing (qualitatively) the role of zero cost finance alongside the regulations, incentives and advice that scheme participants and non-participants are using to help them take more steps to reduce energy bills, greenhouse gas emissions and energy consumption in terms of their ability to deliver these reductions cost effectively.
5.5	Is there any learning that can be applied to other related policies (e.g. in energy efficiency, loan schemes)?	Section 7.5 describing and explaining how any conclusions drawn from this evaluation (i.e. answering the evaluation questions) might be applicable to other existing or future Government administered loan schemes.

1.2 Overall approach to evaluation in phase 1 and phase 2

Quasi-experimental impact evaluation.

In order to deliver “niche understanding” of how impacts have manifested themselves in different organisations and across different energy measures, the Synthetic Control Method (SCM) has been implemented as the default quasi-experimental evaluation methodology to assess the impact of the public-sector energy efficiency loan scheme. It is a relatively innovative methodology, which is particularly suited to this evaluation given it is a relatively small sample and the difficulty in identifying a targeted control group for those supported by the scheme (the ‘treated’ group). The SCM synthetically creates a control group by building the weighted average of non-treated units that best reproduce characteristics of the treated unit before treatment started (i.e. before they were supported by the scheme).

In phase 1, the quasi-experimental impact evaluation was focused on schools to test the approach. In phase 2, this will be extended to all participant types. Control groups will be built based on the characteristics of the applicant groups as recorded in the DEC database and the databases held by organisations such as NHS, HEFCE (Higher Education Funding Council for England), the Local Government Association (LGA) etc. The analysis would consider energy consumption data; carbon emissions and bill savings will be modelled from the energy consumption data using agreed conversion factors.

Qualitative data collection and analysis.

The aim of the qualitative interviews in Phase 1 was to capture the full range of views and experiences of the scheme. The qualitative interviews proposed as part of Phase 2 will provide an opportunity to build depth of understanding in particular areas / amongst particular types of participants and have therefore been considered in response to the findings from Phase 1.

Phase 1 included 80 interviews with a purposive sample of 55 scheme participants and 25 non-participants, representing the range of organisation types targeted by the scheme. Interviews were conducted by telephone using topic guides organised around key themes, with specific questions for discussion as well as a series of prompts and probes.

Quantitative data collection and analysis.

In phase 2 of the evaluation, a quantitative telephone survey of participants and non-participants is planned to collect data to feed into the other elements of the evaluation, namely:

- The impact evaluation – through collecting data on perceptions of energy consumption and energy bills over the past few years and, for participants, data to inform an assessment of attribution
- The process evaluation – through exploring experiences of participating with the schemes or reasons why they haven't participated and details of organisational contexts
- The economic evaluation – through collecting data from participants on the different costs associated with participation.

The survey will employ a stratified random sampling approach on the basis of scheme participation (whether or not an organisation has participated in the scheme) and type of organisation. Approximately 600 interviews will be conducted; 50/50 split across participants and non-participants. Scheme participants will be selected at random from the administrative data provided by Salix. Non-participants will be drawn from the control group formed for the quasi-experimental impact evaluation.

Insight from Salix finance.

Along with details of who have been supported through the scheme (including the levels of finance provided, and for which projects), Salix can provide information about how the scheme has developed and how the scheme currently works. Insight will be captured both in response to written questions and through qualitative interviews with Salix staff; two interviews were conducted in phase 1.

Insight from BEIS

BEIS are able to provide background information to inform wider learning from the evaluation. This includes insight from their consultation on cutting energy bills and carbon emissions in the public and higher education sectors as well as insight from relevant previous and current research and evaluation studies. Relevant reports will be reviewed to inform the evaluation.

Cost effectiveness assessment

The cost effectiveness assessment is intended to cover:

- Cost effectiveness across scheme aims
- Cost effectiveness for scheme participants and Government
- The comparative cost effectiveness of different technologies deployed, both for beneficiaries and for Government.

This work element will draw on primary data collection from other strands of this evaluation as well as secondary sources to inform cost effectiveness calculations during phase 2.

Evidence synthesis and analysis.

We will use an analysis framework based on the ToC to collate and co-ordinate the findings from each work element in each phase. During each phase, the process of synthesis will involve: (i) a structured workshop between the lead analysts for each

workstream (with contributions from other team members as appropriate) to draw out key themes and issues and (ii) a systematic review of all available evidence against the analysis framework.

Department for
Business, Energy
& Industrial Strategy

Annex 2: Description of Theory of Change

The public-sector energy efficiency loan scheme ("the scheme"; also known as Salix) helps the public sector (including higher / further education organisations) to install energy efficiency measures by providing access to affordable finance. The scheme helps to deliver the following high-level policy goals:

1. A contribution to meeting the UK's carbon budgets and emissions reduction targets

2. More cost effective public services

3. Improved energy security and resilience.

The public-sector energy efficiency loan scheme Theory of Change (ToC) is a conceptual model which describes how the scheme is expected to work and the short, medium and longer-term outcomes that it is expected to generate (Figure 1). 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 the model describes:

1. **Scheme context**: in this instance context describes both the issues which informed the establishment of the scheme (i.e. the reason for the scheme), Scheme requirements (as determined by BEIS) and external contexts (factors likely to impact upon the operation of the scheme in some way).

2. **Scheme inputs:** activities and resources which enable the scheme to operate are described which are concerned with target users of the Scheme becoming aware of, understanding and being receptive to the Scheme – any of which may be supported by Salix staff, contracted consultants and consultants in the wider market.

3. **Interim outcomes:** these outcomes represent the initial engagement of applicants with the Scheme and the early practical steps and decision-making processes. For example, users of the Scheme become applicant

organisations, identify projects which meet the criteria for the Scheme, decide to pursue the finance and develop projects and funding applications. For the purposes of the ToC, interim outcomes conclude with the installation of Schemes. Once funding has been allocated by Salix, applicant organisations implement energy efficiency projects using the finance.

4. **Shorter term outcomes:** These include the immediate outcomes that are expected to be generated as a result of energy efficiency measures being installed. These include the generation of financial and carbon savings, but also less easily measurable outcomes including improvements in organisational capability and confidence (in relation to energy efficiency).

5. **Longer term outcomes:** describe the transitioning of applicant organisations to organisations that are more energy and carbon efficient and which ultimately deliver improved public services.

6. **Policy goals:** these describe the ultimate aims of the scheme which, in this case, include more cost effective public services, public sector contributing to carbon reduction targets and improved energy security and resilience.

The evaluation questions and supplementary research questions have been designed to explore and test this initial ToC.

To support this, a ToC workbook has been developed for the evaluation. Its main role is to provide more detail (than can be captured diagrammatically) on key elements of the diagram, in order to help ensure that the evaluation team, and BEIS, share a common understanding of the Theory. In particular, the log captures detail on:

1. **Assumptions**. In practice, schemes seldom run exactly as expected or intended. The ToC defines the assumptions on which the successful operation of the scheme is predicated – defining the assumptions is sometimes described as the process of putting the theory into a ToC. And testing these assumptions is a key element of this form of ToC led evaluation.

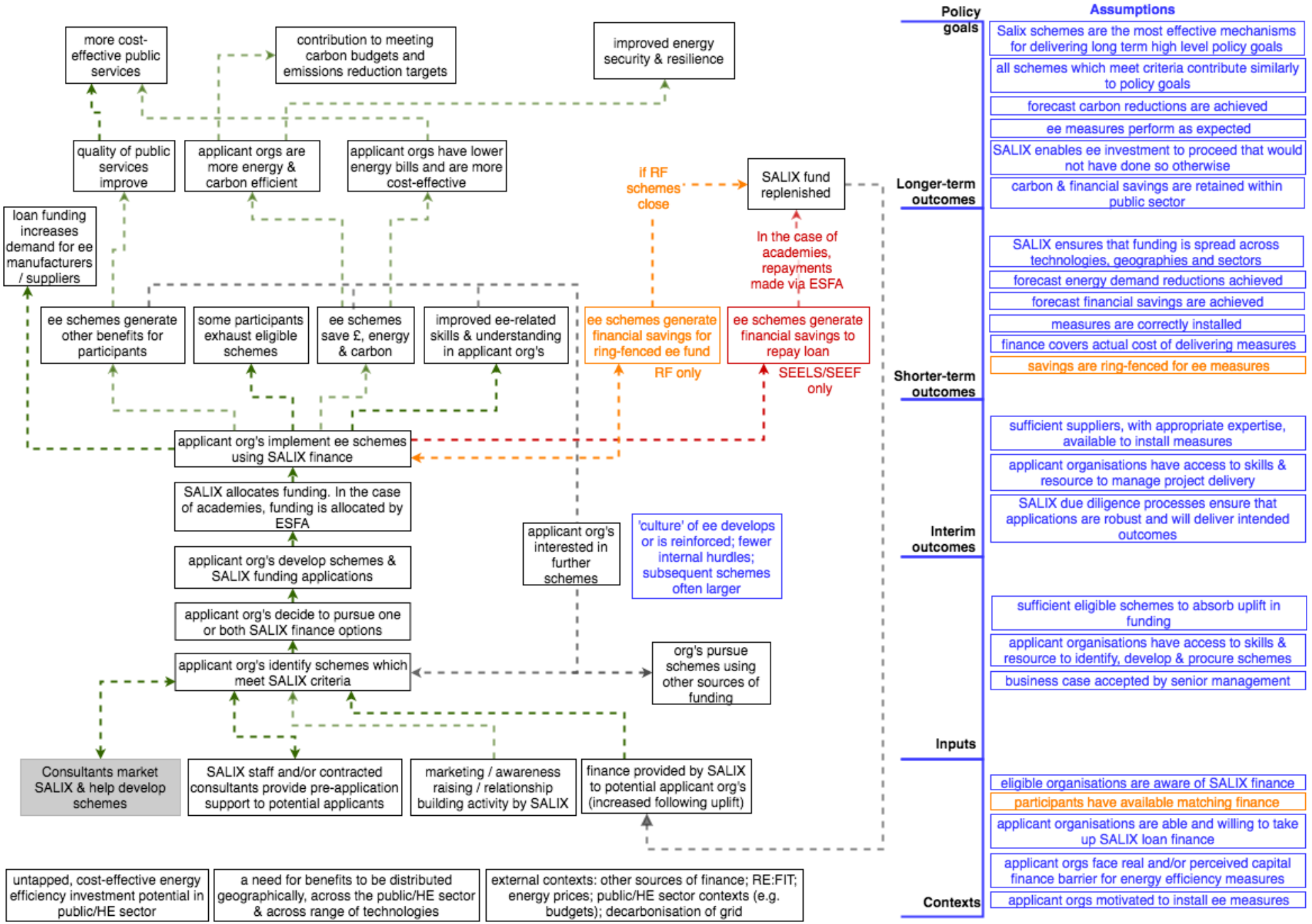
2. **External factors.** The social, cultural, economic and political factors, laws, regulations that influence change along the major pathways of the ToC i.e. factors that affect whether one result can lead to the next.

Department for
Business, Energy
& Industrial Strategy

The workbook provides an opportunity to log initial thoughts regarding the implications of the ToC for the research. It also allows for the inclusion of more general notes and observations. Through the provision of these functions the workbook acts as a log of the evaluation teams thinking and helps to ensure that emergent thinking is recorded, and can be tracked, over the course of the evaluation.

It is anticipated that the ToC will evolve over the course of the study, summarising the growing understanding of how the public-sector energy efficiency loan scheme is achieving, or failing to achieve, its objectives. There will be formal reviews of the ToC (in light of the emerging evidence) at the conclusion of Phases 1 and 2 of the evaluation. At these points, we will revise the ToC in the light of findings.

Figure 1: Theory of Change for the public sector energy efficiency loan scheme



Department for Business, Energy & Industrial Strategy

Annex 3: Detailed Scheme activity summary

3.1 A summary analysis of the Salix project data

This annex summarises the findings from the scheme data, providing an understanding of the characteristics of projects and funds between 2013-14 and 2016-17.

Table 2: Summary of all projects, SEELS projects and RF projects[1]

	All	SEELS	RF
Total No. of projects in dataset	3470	1102	2368
Total No. of organisations in dataset	564	490	119
Mean funding per organisation	£417,805.11	£375,852.22	£432,196.80
Mean projects per organisation	6.15	42.00	19.90
Maximum funding per organisation	£23,572,699.28	£22,694,170.96	£2,097,232.89
Minimum funding per organisation	£2,583.00	£46,500.00	£10,835.00
Median funding per organisation	£61,674.80	£490.00	£323,258.71
Maximum projects per organisation	108	4.493877551	101
Minimum projects per organisation	1	1	1
Median projects per organisation	1	1	14

There is a total of 3,470 projects in the dataset, spread across 564 organisations. Many organisations - 324 in total - have had just one project. The organisation that

1 Some organisations have received both fund types, and so appear in both summaries - hence the number of organisations (490+119) being greater than 564

has received more than £23m in funding is an outlier – the second highest recipient has received £8m. Fifty-two organisations have received more than £1m.

There are a greater number of projects that have used the Recycling Fund, however the Recycling Fund is used by far fewer organisations. Of the 119 organisations that have received Recycling Funds, 108 are either HEIs (54) or Local Authorities (58). Of the 490 organisations that received the Loans fund, 334 had just one project.

Table 3 breaks down the projects down by the year in which they were funded.

Table 3: Summary of organisations and projects funded in 2013/14, 2014/15, 2015/16, 2016/17[2]

	2013-14	2014-15	2015-16	2016-17
Total No. of projects in dataset	1036	904	855	675
Total No. of organisations in dataset	241	228	226	230
Mean funding per organisation (£)	174,209	231,510	314,276	303,682
Mean projects per organisation	4.30	3.96	3.78	2.93
Maximum funding per organisation (£)	6,431,431	3,321,000	11,076,381	10,528,124
Minimum funding per organisation (£)	1,676	2,686	2,473	1,358
Median funding per organisation (£)	65,796	78,223	78,307	47,924
Maximum projects per organisation	42	29	34	30
Minimum projects per organisation	1	1	1	1
Median projects per organisation	2	2	2	1

2 Some organisations have received funds in more than one year, and so appear in more than one summary – hence the number of organisations (241+228+226+230) being greater than 564

Although the number of organisations receiving funding each year is stable, the number of projects funded each year decreases steadily across the four years by more than a third, from 1,036 to 675.

3.2 Organisation classification/data by organisation type

In the scheme data, there were ten organisation types. The single organisation classified as 'Other' has been re-classified to the Local Authorities organisation type, as they are owned and operated by a Local Authority. The nine organisations classified as 'Schools' were re-classified as either being academies or maintained schools using Ofsted data. Additional data cleaning was also carried out – several projects were classified as 'Local Authorities', but the details clearly identified the project actually taking place in schools; these projects were re-classified as 'Local Authorities for Schools'. Equally, there were several projects classified as 'Maintained Schools' but were managed by the Local Authority; these projects were re-classified as being 'Local Authorities for Schools'.

Table 24 breaks the data down by organisation type. The number of projects implemented by local authorities and HEI's is two-thirds of the total (2,318 of 3,470), despite being just 30% of the total number of organisations. The 79 HEI's are almost exclusively universities (and therefore represent a large proportion of the total population of universities in the UK). Just under a third of local authorities have received the fund (94 from 353). This is not the case for academies (70 organisations from more than 5,000), maintained schools (241 organisations from more than 16,000) and the NHS (29 organisations from almost 500).

Department for Business, Energy & Industrial Strategy

Table 2: Summary of projects implemented by organisation type

	Academy	Emergency	FEI	HEI	Local Authority	LA for Schools	Maintained Schools	NHS
Total No. of projects in dataset	126	17	123	1369	949	468	273	145
Total No. of organisations in dataset	70	4	57	79	94	39	226	29
Mean funding per organisation £	65,356	82,500	133,146	728,054	1,243,515	221,222	40,349	1,068,77
Mean projects per organisation	1.8	4.25	2.16	17.33	10.1	12	1.21	5
Maximum funding per organisation £	645,143	238,320	810,800	7,233,239	22,711,01	861,658	639,737	5,798,578
Minimum funding per organisation £	3,747	18,000	3,230	13,707	3,000	3,400	2,583	30,000
Median funding per organisation £	41,189	36,841	73,113	449,584	236,313	119,922	20,691	473,458
Maximum projects per organisation	23	9	20	108	78	49	14	33
Minimum projects per organisation	1	1	1	1	1	1	1	1
Median projects per organisation	1	3.5	1	10	5	5	1	2

Department for Business, Energy & Industrial Strategy

3.3 Saturation Information

Figure 4 in chapter 2 details the levels of saturation by organisation type. Table 5Table 3 shows the source of population data for participating organisations for May 2018.

Table 3: Source of population data for organisations participating in the public sector energy efficiency loan scheme

Participant Group	Database name / date	Data Source
Academy Schools	Main tables: SR64/2017 (2017); accessed June 2018	https://www.gov.uk/government/statistics/education-and-training-statistics-for-the-uk-2017
Emergency Services	NHS statistics, facts and figures (2017); accessed June 2018. Police workforce, England and Wales, 31 March 2013 (2013), accessed June 2018. Fire and rescue authorities operational statistics (2017), accessed June 2018.	http://www.nhsconfed.org/resources/key-statistics-on-the-nhs https://www.gov.uk/government/publications/police-workforce-england-and-wales-31-march-2013/police-workforce-england-and-wales-31-march-2013https://www.gov.uk/government/collections/fire-and-rescue-authorities-operational-statistics
FEI	College Key Facts (2018), accessed June 2018	https://www.aoc.co.uk/about-colleges/research-and-stats/key-further-education-statistics
HEI	OfS Register (accessed June 2018)	https://www.officeforstudents.org.uk/advice-and-guidance/the-register/the-ofs-register/
LA	Local Government Facts and Figures (2017), accessed June 2018.	https://www.lgiu.org.uk/local-government-facts-and-figures/#how-many-councils-are-there

Department for Business, Energy & Industrial Strategy

Participant Group	Database name / date	Data Source
Maintained Schools	Main tables: SR64/2017 (2017); accessed June 2018	https://www.gov.uk/government/statistics/education-and-training-statistics-for-the-uk-2017
NHS	NHS statistics, facts and figures (2017); accessed June 2018.	http://www.nhsconfed.org/resources/key-statistics-on-the-nhs

Department for Business, Energy & Industrial Strategy

Annex 4: Quasi-experimental impact assessment methodology

4.1 Introduction

A quasi-experimental approach, the Synthetic Control Method (SCM), has been used to assess the impact of the scheme on several projects implemented in maintained primary schools in 2013-14 as a pilot of the approach.

This Annex describes the methodology and results in more detail than the main report. It starts with a brief description of the dataset matching required to conduct the quasi-experimental analysis. It then focuses on the Synthetic Control Method (SCM), by providing a concise summary of the methodology, a brief description of advantages and disadvantages of this approach and a discussion of how it was implemented for primary schools. After discussing data quality assurance, results are presented for lighting projects, insulation projects, and all other projects affecting natural gas consumption. Finally, the next steps for the implementation of quasi-experimental assessment are outlined.

4.2 Dataset matching

In order to analyse consumption data, these need to be obtained by matching scheme participants to energy consumption data on the basis of the Unique Property Reference Number (UPRN). This requires 4 steps:

Step 1 – Match applicant details to school database. Participants are matched to datasets containing information on all units belonging to a specific organisation type. As an example, in the case of maintained schools, the Department of Education school database was used to identify information on school capacity, phase of education, urban or rural location of the school etc. Only one maintained school was dropped through this matching step, therefore reducing the sample from 174 to 173 unique schools that applied for funding through the scheme in 2013-14 and 2014-15.

Step 2 – Match applicant details to UPRNs. An address matching process was implemented to link participants to Unique Property Reference Numbers (UPRNs). A

computer code was specifically developed for running this process with the scheme addresses. In the case of maintained schools that applied for funding through the scheme in 2013-14 and 2014-15, the use of manual intervention when the code failed ensured a success rate of 100%, therefore providing UPRNs for 173 unique schools.

Step 3 – Match UPRNs to raw meter data. UPRNs were matched to raw meter data held by the Department of Business, Energy and Industrial Strategy. In the case of schools that applied for funding through the scheme in 2013-14 and 2014-15, this step resulted in 115 matches and 58 failed matches.

Step 4 – Match applicant details to DECs. Participants were matched to the Display Energy Certificates (DECs) database to recover information on the property such as size (in square meters), fuel used for heating, electricity and heating rating, etc. In the case of maintained schools that applied for funding through the scheme in 2013-14 and 2014-15, this step resulted in 105 matches and 10 failed matches.

4.3 Synthetic Control Method (SCM)

The SCM is a methodology typically used to assess policy impact at the 'macro' level, i.e. using aggregated data normally grouped based on the unit affected by the policy such as a geographical area. However, more recently, SCM has been applied at a more micro level, to multiple treatment units[3,4,5]. The advantages of the SCM are discussed below.

A number of steps are involved in the implementation of the SCM:

1. Identify the donor pool. The donor pool contains units which could be used to synthesise the control unit using 'characteristics' of the treated units (e.g. whether the building is located in an urban or rural area, in the case of schools).

3 Acemoglu, Johnson, Kermani, Kwak and Mitton (2016) The value of connections in turbulent times: Evidence from the United States, Journal of Financial Economics, 121, 368–391

4 Xu (2017) Generalized Synthetic Control Method: Causal Inference with Interactive Fixed Effects Models, Political Analysis, 25, pp. 57–76.

5 Kreif, Grieve, Hangartner, Turner, Nikolova And Sutton (2016) Examination of The Synthetic Control Method for Evaluating Health Policies with Multiple Treated Units, Health Economics, 25, pp. 1514–1528

2. Variables are then identified to select which members in the donor pool should be used to synthesise the control unit, using variables affecting energy consumption (e.g. floor area).

3. Control units are synthesised by replicating (as close as possible) the pre-treatment values of the variable of interest in the treated unit. The variables used in the process of synthesising the control unit are selected on the basis of the Root Mean Square Prediction Error (RMSPE).

4. Placebo tests are implemented in place of ordinary confidence intervals to assess the statistical significance of the estimates. In placebo tests, each member of the donor pool is taken in turn as a 'pretend' treated unit. Comparison of the difference between the value of the outcome in the treated unit and its synthetic control and between each placebo unit and its synthetic control are used to assess confidence in the analysis through the creation of pseudo p-values, generated by comparing the estimated savings in the treated unit to the distribution of savings obtained when pretending that each member of the pool was being treated.

A judgement on the confidence of the additionality of the estimates delivered by the SCM can be formed through the placebo analysis. A large pseudo p-value suggests that the estimated impact could be due to chance. Measures which might have been funded regardless of the scheme are likely to produce relatively high pseudo p-values. On the other hand, additional measures funded by the scheme are expected to display relatively low pseudo p-values.

4.4 Advantages and Limitations of Synthetic Control Method (SCM)

The SCM enables quasi-experimental analysis of each single project, through construction of a comparable non-participant organisation, i.e. a synthetic control unit, replicating the pre-intervention energy use of the unit where a project is implemented. By doing so, this quasi-experimental impact evaluation approach can distinguish between the impact of different technologies in different organisations.

The SCM is considered an appropriate methodology for the quasi-experimental evaluation of the scheme as it can account for diversity in the type of scheme participant and in the type of measure funded by the scheme. In fact, its

implementation is not impaired by the consequent small size of viable groupings of ‘projects’.

Different organisation types participating in the scheme may operate in different ways and different technology types may affect energy use in different ways. Furthermore, the impact of the same type of technology installed in the same type of organisation may differ according to the characteristics of the project or of the participant organisation, all factors warranting a unit-by-unit analysis. Another advantage of the SCM is that this approach does not require the existence of control units, as they are created (synthetized) by recombining information from units not affected by the policy.

One of the limitations of the SCM is the inability to conduct traditional statistical tests on the significance of the treatment effect (difference between the treated and control unit) and related confidence intervals. It is unclear whether relying on standard statistical inference, as is the case in other quasi-experimental methods, is advisable when analysing small samples, in the absence of randomisation, and when probabilistic sampling is not employed to select sample units. Units can however be grouped, therefore implementing panel analysis as an additional approach.

In a ‘business as usual’ scenario, energy consumption can be modelled based on the pattern of previous energy consumption. Estimated impact through the SCM is the variation compared to this model after the project has been implemented (the treatment). The impact estimated through the SCM, however, could under-estimate the savings attributed to the policy, if control units have implemented energy efficient measures in the post-treatment period at a rate higher than the rate observed in the pre-treatment period. On the other hand, the impact estimated through the SCM could overestimate the savings attributed to the policy, if treated units have implemented energy efficient measures with funding from other sources in the post-treatment period, including their own resources. The possible scale of this matter, which is common to any quasi-experimental methodology, will be investigated by using the quantitative survey and the qualitative research.

4.5 Application of the SCM to projects in maintained primary schools

Before discussing the results, the specific steps required to implement the SCM on projects in maintained primary schools are described.

Maintained school projects were identified from the scheme administration data, which included maintained school projects where Local Authorities had applied, as well as, maintained school applicants themselves. This was to ensure Local Authorities were not incorrectly identified as 'non-participants'[6].

In order to select the units for the donor pool (step 1), maintained schools implementing projects under the scheme were assessed with regard to 1) the presence of a trust, 2) Ofsted rating and 3) urban or rural location. Schools from the EduBase Public Portal[7] were selected for the donor pool so that any of the combinations of the characteristics identified in participants were represented in the donor pool. These factors were selected based on the variables contained in EduBase, as they were thought to influence the way schools respond to the introduction of the scheme.[8] Two further constraints were imposed so that members of the donor pool had to match applicants with regard to the phase of education and the main fuel used for heating.[9]

Variables were then identified to select which members in the donor pool would be used to synthesise the control unit (step 2). Variables describing the building where energy is consumed were used, such as 1) annual electrical or thermal fuel usage, 2) operational ratings, 3) total floor area found in the Display Energy Certificates (DECs) and 4) whether air conditioning is present. In addition, variables describing the organisation applying for the scheme were used, such as 1) school capacity, 2) whether it is located in an urban or rural environment, 3) whether it is part of a trust, 4) whether it is graded as 'good' or 'outstanding' by Ofsted, and 5) whether the school has a nursery.

The impact on gas and power consumption has been estimated separately. For each, the change in energy consumption in 2013, 2014 and 2015 were explored. Although projects were funded in 2013/14, it is not known exactly when they were implemented. In most cases, analysis is based on the assumption that any impact of the project(s) would be observed in 2014 and 2015. However, in some cases a

6 For the purposes of the evaluation, any re-categorisation done as part of the quasi-experimental impact evaluation will be replicated in other elements of the method – to ensure consistency in reporting.

7 This has been accessed through http://www.education.gov.uk/edubase/home.xhtml

8 As an example, a school that is part of a trust might find it easier to apply for the Public Sector Energy Efficiency Loan Scheme as the trust can provide school members with the necessary support to go through the process.

9 This implies that the donor pool will contain only primary schools with gas a primary heating fuel if the school being treated is a primary school using gas for heating.

change in the pattern of consumption was observed in 2013 – data from 2013 has been included for these cases.

4.6 Data matching and data quality assurance

In 2013/14 and 2014/15, 129 projects were implemented by maintained primary schools for which we were able to match participants through the Department of Education school database, the DEC database and the meter consumption database held by BEIS. 82 of these projects affected power use, while 47 affected natural gas.

Annual meter reading data were assessed to ensure they related to the fuel type affected by the project (i.e. if a school implemented a lighting project, data were required for the school's electricity meter) and that the quality of the data was sufficient for use in the impact assessment. Checks were made by visualising data in order to identify (a) step change patterns, (b) V-spike patterns, (c) inverted V-spike patterns, or (d) a combination of V-spike and inverted V-spike patterns occurring before the project was implemented. Step-change patterns were deemed plausible if they occurred once, on the basis that this may indicate a change in the characteristics of the school, i.e. adding floor area. Organisations having more than one step change in the data, however, were discarded as frequent step-changes may indicate issues with the data, rather than changes in the organisation. V-spike patterns were deemed implausible if one-year decreases in consumption were higher than 33% of the consumption in the previous year. Equally, an inverted V-spike was deemed implausible if one-year increases in consumption were higher than 33% of the consumption in the previous year. In both cases, data were interpolated for the year in which consumption dropped or increased significantly. Some data showed an inverted V-spike occurring after a V-spike, likely indicating estimated and corrected readings. As this required correcting data for two consecutive years, these organisations were removed rather than interpolated, as it was not always clear which amount of consumption had been wrongly assigned to which specific year.

4.7 Results for lighting projects

Lighting projects are the most common type of project implemented in participant maintained primary schools. Energy consumption data was analysed for 19 projects implemented in 2013-14 (based on data availability). Based on a visual inspection of consumption data, for 4 of the 19 lighting projects implemented in participant

maintained primary schools in 2013-14, the implementation of the project was deemed to take place in 2013, and therefore this report discusses impact occurring in three years, whereas for the remaining 15 projects, the implementation of the project is deemed to take place in 2014, and therefore this report discusses impact for two years (2014 and 2015) only.

For each project, Table 46 presents estimated changes, in KWh and as a percentage of average consumption in the five years before the project was implemented.

42 data points[10] were analysed, a reduction in electricity consumption (range 3% - 57%) was estimated in about three-quarters of the cases (30) in the years after project implementation[11]. For these, statistical significance was explored, with estimated impact being statistically significant in 22 out of 30 instances of reductions in energy consumption at the 10% significance level or lower[12]. This provides evidence of the additionality of lighting projects affecting power consumption for these 22 instances.

In a number of instances estimated savings are relatively stable across years, especially when all annual estimates have relatively low pseudo p-values, as can be seen in Table 46 in the case of unit 3, 5, 7, 9 and 10. This might be a sign of the synthetic control unit rightly mirroring the pre-treatment consumption patterns of the treated unit.

10 42 data points, from the 19 projects across 2 or 3 years' worth of data (depending on data availability).

11 As the increase in energy consumption tends to occur (in 8 cases out of 12) in the first year after the project has been implemented, this could suggest incorrect assumptions about the year in which the project was implemented (relative to when the funding was awarded).

12 As discussed in the methodological section, placebo analysis is implemented only for those cases where we estimate a negative impact of the projects funded by Salix.

Table 4: Estimated changes in electricity consumption with associated p-values

ID from QEA pilot	2013			2014			2015		
	KWh	%	p-value	KWh	%	p-value	KWh	%	p-value
1				-7,592	-4.7%	0.47	-41,414	-25.6%	0.07
2				15,626	7.1%		107,557	48.7%	
3				-36,358	-34.7%	0.02	-29,988	-28.6%	0.03
4				9,853	6.3%		-31,477	-20.0%	0.49
5				-36,359	-23.9%	0.03	-57,364	-37.8%	0.01
6				467	0.8%		-2,115	-3.7%	0.81
7				-19,191	-36.6%	0.03	-16,824	-32.0%	0.07
8				-14,314	-38.6%	0.14	-1,115	-3.0%	0.81
9				-11,492	-22.2%	0.07	-9,041	-17.5%	0.09
10				-10,767	-27.7%	0.01	-13,711	-35.3%	0.01
11				1,228	3.3%		-6,184	-16.8%	0.05
12				-6,038	-9.7%	0.29	159	0.3%	
13				9,911	17.3%		11,988	20.9%	
14				1,854	1.5%		-36,925	-29.0%	0.44
15				823	0.9%		-16,808	-19.2%	0.06
16	-15,875	-31.5%	0.09	-19,311	-38.3%	0.05	-15,859	-31.4%	0.1
17	4,989	5.9%		-21,686	-25.7%	0.14	-28,853	-57.4%	0.1
18	-11,925	-20.9%	0.01	-10,716	-18.8%	0.01	-15,389	-26.9%	0.01
19	-16,666	-19.6%	0.05	-34,246	-40.2%	0.01	5,828	6.8%	

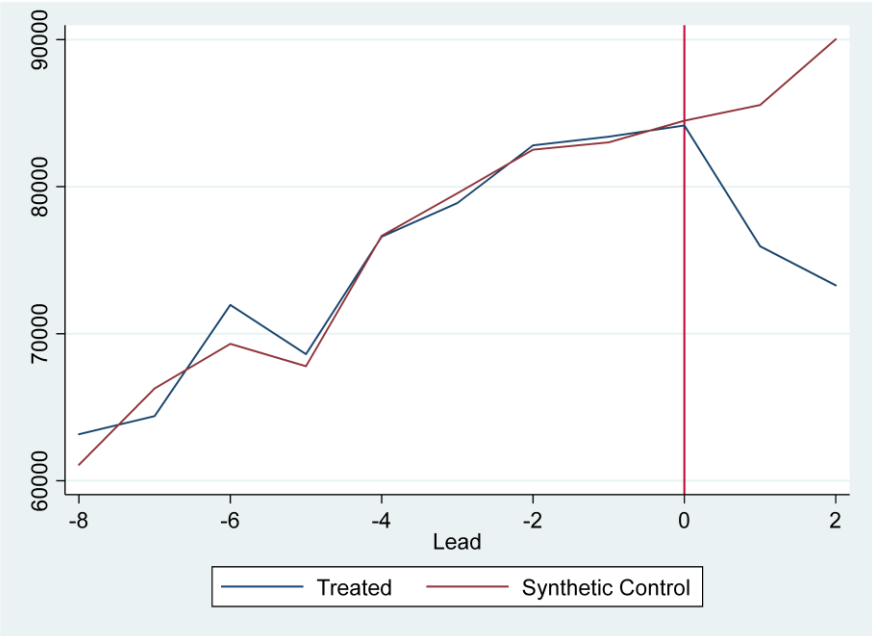
In some instances, the estimated impact of the scheme is considerably large, e.g. a reduction of about 40,000 kWh for unit 1 in 2015, an average reduction of about 33,000 kWh in unit 3 or an average reduction of about 46,000 kWh for unit 5. A visual comparison between these estimated savings and predicted project savings from the scheme dataset provided by Salix suggested the credibility of the estimates.

Table 7: Comparison of estimated savings in scheme administrator's database and those estimated in the QEA pilot

ID from QEA pilot	Modelled savings from scheme dataset (kWh)	Estimated savings from QEA pilot (kWh)
1	114,221	41,414
3	57,695	33,173
4	37,581	31,477
5	28,969	46,862
6	26,033	2,115

The panel analysis (Figure below) shows the anticipated trajectory for energy consumption (the synthetic control line). The actual trajectory for treated units is very different after the vertical red line (i.e. the year when the project is implemented). This is another way in which the analysis can be used to demonstrate the additional impact of the scheme.

Figure 2: Power use in the average treated unit and related synthetic control



4.8 Results for insulation projects

Insulation projects are the most common type of projects affecting consumption of natural gas in participant maintained primary schools; 10 projects were analysed. Based on a visual inspection of the data, in 8 of the 10 insulation projects in participant maintained primary schools in 2013-14, implementation is deemed to occur in 2014 so that this report discusses impact occurring in two years (2014 and 2015), while the remaining two projects are deemed to take place in 2013 so that this report discusses impact occurring in three years (2013, 2014 and 2015).

For each project, Table 8 presents estimated changes, in KWh and as percentage of average consumption in the five years before the project was implemented, and related p-values when a reduction in consumption was estimated. Looking at specific data points, a reduction in gas consumption is estimated in about 70% of the cases analysed, but less confidence can be placed upon these results, compared to the lighting projects discussed above, as estimated savings are statistically significant at the 20% significance level in three instances only. As a result, conclusions on the additionality of insulation projects affecting gas consumption in participant maintained primary schools cannot be drawn.

This might be due to a number of reasons. Firstly, estimated impacts of the projects are relatively modest, with even the three with the highest impact (units 24, 21 and 29) representing a reduction of about 15% compared to pre-intervention levels of consumption. In fact, reductions observed in 2014 are, in most cases, comparable to other drops observed in the pre-treatment period, a considerable factor in delivering low pseudo p-values. Secondly, this could be due to rebound effects, with schools taking advantage of reduced bills to increase consumption, especially after savings in the first year after the project was implemented manifested themselves (as confirmed by the estimated reductions being considerably higher in 2014 than in 2015). Thirdly, the rebounding pattern might also be related to temperature patterns, as winter 2014 was about 1.5 Celsius warmer than winter 2015[13]. If the synthetic control and the treated units are exposed to similar temperature patterns, the impact of temperature in the treated unit would be replicated in the synthetic control but this would not be

13 This can be computed by comparing data presented in https://www.metoffice.gov.uk/climate/uk/summaries/2014/winter and https://www.metoffice.gov.uk/climate/uk/summaries/2015/winter

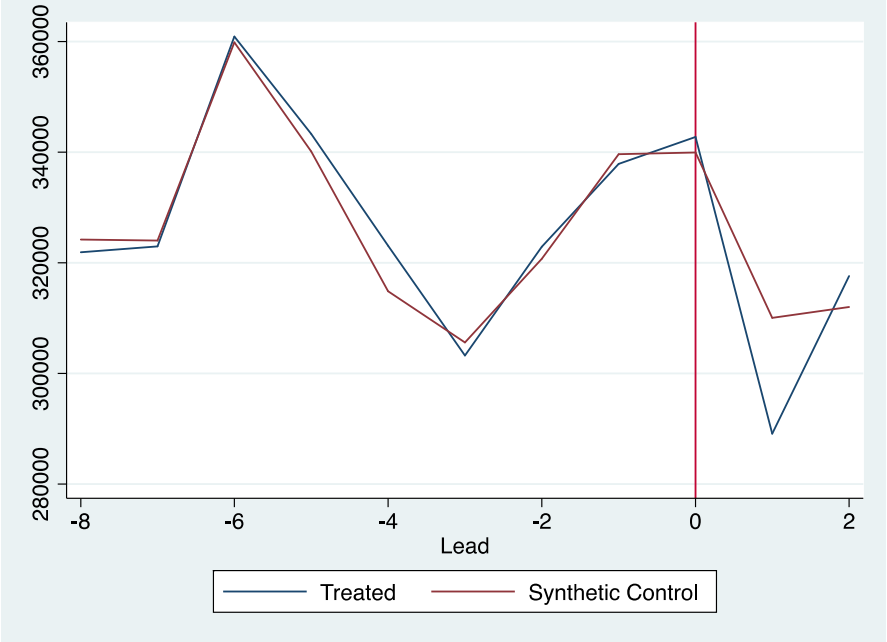
the case if the synthetic control and the treated units are exposed to different temperature patterns, perhaps due to the schools being in different locations.

Table 5: Estimated changes in gas consumption with associated p-values

ID	2013			2014			2015		
	KWh	%	p-value	KWh	%	p-value	KWh	%	p-value
20				4,246	0.9%		9,758	2.0%	
21				-43,830	-17.2%	0.12	20,905	8.2%	
22				-11,453	-8.3%	0.56	2,124	1.5%	
23				-62,435	-13.2%	0.18	-8,554	-1.8%	0.78
24				-112,651	-15.5%	0.12	3,748	0.5%	
25				-20,394	-6.8%	0.34	-19,421	-6.5%	0.47
26				-1,870	-4.6%	0.78	-1,255	-3.1%	0.84
27				-7,459	-5.0%	0.38	-9,598	-6.4%	0.42
28	-6,302	-6.9%	0.67	741	0.8%		5,520	6.1%	
29	-37,396	-16.6%	0.35	-22,325	-9.9%	0.57	-16,006	-7.1%	0.68

The panel analysis (Figure 2) shows the anticipated trajectory for energy consumption (the synthetic control line). The actual trajectory for treated units is similar after the vertical red line (i.e. the year when the project is implemented).

Figure 2: Natural gas use in the average treated unit and related synthetic control



4.9 Results for all other projects affecting natural gas use

In addition to insulation, the scheme funded an array of different projects affecting gas consumption (sometimes also including an insulation component) in maintained schools in 2013/14. 8 projects were analysed. Based on a visual inspection of consumption data, 6 of the 8 projects affecting natural gas in maintained primary schools in 2013-14 are deemed to have been implemented in 2014 so that this report discusses impact occurring in two years (2014 and 2015), while the remaining two projects are deemed to have been implemented in 2013 so that this report discusses impact occurring in three years (2013, 2014 and 2015).

Table9 presents estimated changes for each project, in KWh and as a percentage of average consumption in the five years before the project was implemented, and related p-values when a reduction in consumption was estimated.

Based on an analysis of each data point, a reduction in gas consumption is estimated in about 60% of cases. As is the case for insulation projects, less confidence can be put on these results, compared to lighting projects. In only three instances, estimated savings are statistically significant at the 15% significance level.

The instability in the estimated effect of projects observed in the case of insulation projects, can also be seen in the case of projects implementing measures aimed at reducing natural gas. Again, the estimated impacts of the projects are relatively modest, in percentage of pre-treatment consumption. In fact, the drop observed in 2014 is in most cases comparable to drops observed in the pre-treatment period. In some cases, no change in consumption after the implementation of the project is apparent from the plot of the data.

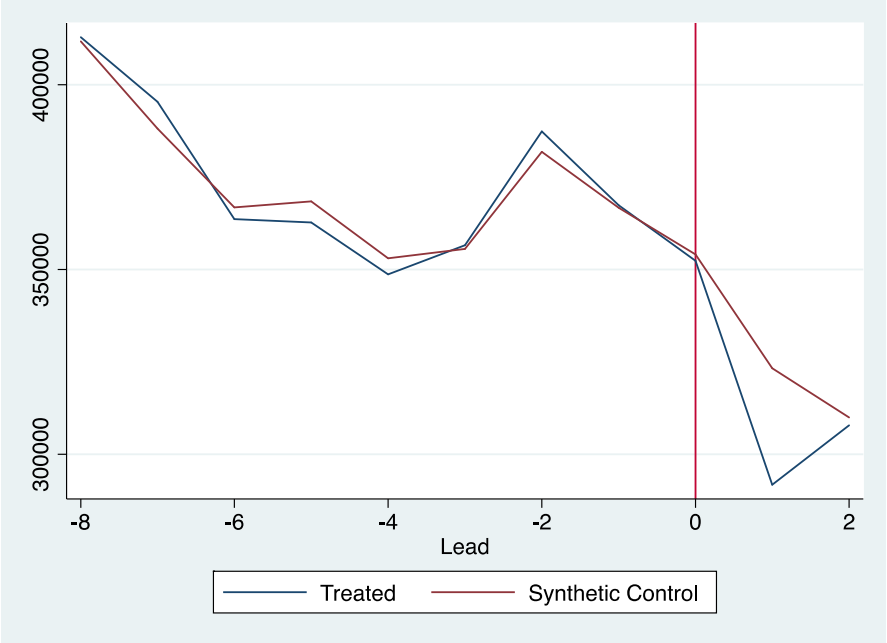
Table 9: Estimated changes in gas consumption with associated p-values

ID	2013			2014			2015		
	KWh	%	p-value	KWh	%	p-value	KWh	%	p-value
30				-41,514	-8.8%	0.73	22,606	4.8%	
31				3,485	0.8%		-34,324	-8.1%	0.52
32				23,525	5.7%		8,050	2.0%	
33				17,689	13.5%		19,402	14.8%	
34				-11,790	-28.8%	0.26	-25,275	-61.8%	0.1
35				-62,859	-26.4%	0.07	-11,228	-4.7%	0.44
36	-193,070	-33.3%	0.13	-96,484	-16.6%	0.29	-38,089	-6.6%	0.57
37	-23,225	-4.9%	0.32	68,283	14.4%		17,725	3.7%	

With regard to the panel analysis,

Figure 3 shows the difference between the consumption pattern in the average treated and control units with only the former affected by a V-pattern. In the figure, the vertical red line indicates the project implementation year.

Figure 3: Natural gas use in the average treated unit and related synthetic control, implemented for seven schools



4.10 Next steps

Further analysis of maintained schools

This application of the SCM on projects implemented in maintained primary schools delivered insights on the additionality of reductions in energy consumption occurring in calendar years 2013, 2014 and 2015, originating from lighting projects funded in the financial year 2013/14. However, the findings aren't so clear for gas projects.

With respect to projects affecting gas, the extent to which the effects of temperature on the consumption of natural gas are accounted for in the analysis needs to be investigated further before conclusions can be drawn. First of all, schools will be geo-referenced, so that a time series of average temperature will be built to assess impact on consumption. If this approach does not work, only 'local' schools will be used to build the synthetic control unit for a specific school, with 'local' defined in terms of the NUTS2 regions. It is hoped that this will more closely control for temperature variations. Alternatively, the number of treated units in the panel analysis could be increased by pooling across treatment years, (i.e. adding units

treated in 2014-2015 to those included here) or considering academies and maintained schools in the same panel.

If these options do not deliver clear indications on the additionality of the impact of projects targeting gas, and if the bouncing back of consumption in 2015 is still present, increased consumption due to rebound effect could be explored through other elements of the evaluation; the quantitative survey and the qualitative research. If the rebound effect is confirmed, additionality of the impact would need to be reframed by bearing in mind increased comfort.

Assessing the impacts of other projects

The results of the pilot have provided sufficient confidence to expand implementation of the SCM for the assessment of the scheme on projects implemented by other types of organisation as well as identifying the risks in implementing this approach. The final methodology for the impact evaluation will be influenced by an assessment of the expanded application of the SCM and our ability to identify energy consumption data for all scheme participants[14]. It will also be informed by other elements of the evaluation (e.g. the quantitative survey).

Prior to this investigation, our intention is that the implementation of the SCM for all other participant types will be similar to the steps outlined here for maintained primary schools. In the first instance, the units that will form part of the donor pool will be selected on the basis of the information contained in the DEC database about the building where the project takes place, i.e. property type and floor area, and the size of the institution the building belongs to, e.g. budget and members of staff for further education institutes, higher education institutes and LAs. This is to ensure that selected members of the donor pool replicate any of the combinations of the characteristics found in the treated units. As with schools, members of the donor pool will also be selected so that members of the donor pool match treated units with regard to the main fuel used for heating.

As a second step in the implementation of the SCM, the following variables will be used to synthesise the control unit 1) annual electrical or thermal fuel usage, 2) operational ratings, 3) total floor area, 4) whether air conditioning is present and 5) a proxy of the size of the organisation implementing the project based on budget or number of employees alongside energy consumption observed before the

14 This is anticipated to be challenging for organisations with multiple buildings e.g. universities

implementation of the project. The decision for which variables to use in the process of synthesising the control unit will be assessed on the basis of the Root Mean Square Prediction Error (RMSPE). Again, as energy consumption is expressed in calendar years while projects are grouped in fiscal years, selection of the treatment year will be based on visual inspection of the data. Finally, placebo analysis will be implemented in the way described in this pilot.

Department for Business, Energy & Industrial Strategy

Annex 5: Qualitative research method

5.1 Approach

The aim of the qualitative interviews in phase 1 was to capture the full range of views and experiences of the scheme.

Telephone interviews were used as a means of conducting the interviews. This method was chosen to maximise participation from busy respondents and help reduce the participant burden.

The topic guides were semi-structured, organised around key themes, with specific questions for discussion as well as a series of prompts and probes. Separate topic guides were designed for participants and non-participants. The length of the interviews was approximately 45 minutes for participants and 30 minutes for non-participants.

The topic guide was reviewed after the first few interviews, but no revisions were deemed necessary.

All interviews were digitally recorded and transcribed.

5.2 Sampling

The key principles underlying the proposed sampling plan for the qualitative interviews in Phase 1 were:

1. That sample selection would be purposive, with the aim of eliciting a variety of organisational views and experiences within each type of participant

2. To ensure – as far as possible – that the sample is representative of the diversity of the sample populations

3. To conduct a minimum of five interviews within each sub-group to be confident that the sample numbers give a representative view of the diversity of experiences for each group.

With this in mind, the proposed distribution was informed by:

1. The distribution of projects 2013 – 17 as provided by BEIS in supplementary information at the tender stage of the project (this was used as a proxy for the distribution of clients prior to this information being provided by Salix)

2. Project information as provided by Salix for projects funded 2014 - 15 and 2016 – 17 for the purposes of assessing the feasibility of the impact assessment (this helped to understand the distribution between the Recycling Fund and Loans prior to this information being provided by Salix)

3. Information on the population of each type of organisation sourced by Databuild

4. Findings from the scoping phase of the evaluation – the implications of which were discussed with BEIS on 21st November and Salix on 28th November.

5.3 Limitations / considerations

Given the size of the sample and the proposed distribution of the sample it should be noted that it was not always possible to draw out differences within sub-groups (and the reasons underlying those differences). For example, we could determine whether there were differences in the experiences of academies and what those differences are but were not always able to determine the underlying reason(s) for those differences.

A further consideration is that the sample of non-participants may have contained participants of the scheme prior to 2013 i.e. non-participants refers to non-participants of the scheme 2013-2017.

5.4 Participant Recruitment Process

The following process was used in recruitment:

- An initial email form was sent to potential respondents. This

  – explained the project and requested their participation in the interview

  – provided contact details for the BEIS Evaluation Manager and Databuild Project Manager (in case respondents had queries about the project).

- We emailed three times the intended sample size for the qualitative interviews, in order to secure the intended number of interviews.

- Where potential respondents sent a returned email agreeing to participate in an interview, this was followed up by email and/or telephone as appropriate to schedule interviews.

- Where potential respondents emailed back declining to participate in an interview, it was up to the discretion of the recruiter to decide whether to further communicate with these individuals to persuade them to take part or remove them from the list of contacts (dependent on the reason for their response) - recording reasons for either decision.

- Potential respondents who do not reply to the email were contacted by telephone and/or email to encourage their participation in an interview. Contact was made up to five times.

- Scheduled interviews were updated in a live shared spreadsheet shared by the recruiter with all interviewers.

- Calendar appointments between the interviewer and respondent were sent to ensure the time for the call was fixed in diaries, and the contact details (email, telephone, name) of the respondents and the interviewer were mutually available. Calendar appointments contained details of the finance they have had through the scheme i.e. number of projects, nature of projects and level of finance.

5.5 Non-participant recruitment process

Sample source

We sourced lists of contacts from the groups below and identified 25 potential organisations that did not appear on the list of participants from Salix in each group to invite them to participate in the interview:

Group	Sample source
NHS	NHS_Trusts_and_CCG_organisations_in_England_by_name__code_and_type_-_July_2016

Department for Business, Energy & Industrial Strategy

Further Education Institutes	The HEFCE (Higher Education Funding Council for England) Register - http://www.hefce.ac.uk/reg/register/
Maintain schools - primary	Department for Education - https://www.gov.uk/government/publications/schools-in-england
Maintain schools - secondary	Department for Education - https://www.gov.uk/government/publications/schools-in-england
Local Authorities	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/491463/List_of_councils_in_England.pdf

Process

- The recruiter contacted the general switchboard / number available from our database to ask for a name and email for the person responsible for energy management in the organisation / on site – for example, an energy manager, facilities manager.

- An initial email was sent to 75 potential respondents. This email:

  - explained the project and requested their participation in the interview

  - provided contact details for BEIS Evaluation Manager and Databuild Project Manager (in case respondents had queries about the project).

- Where potential respondents sent a returned email agreeing to participate in an interview, this was followed up by email and/or telephone as appropriate to schedule interviews.

- Where potential respondents emailed back declining to participate in an interview, it was up to the discretion of the recruiter to decide whether to further communicate with these individuals to persuade them to take part or remove them from the list of contacts (dependent on the reason for their response) - recording reasons for either decision.

- Potential respondents who did not reply to the email were contacted by telephone and/or email to encourage their participation in an interview. Contact was made up to five times.

- Scheduled interviews were updated in a live shared spreadsheet shared by the recruiter with all interviewers.

- Calendar appointments between the interviewer and respondent were sent to ensure the time for the call was fixed in diaries, and the contact details (email, telephone, name) of the respondents and the interviewer are mutually available. Calendar appointments contained details of the finance they have had through the scheme i.e. number of projects, nature of projects and level of finance.

5.6 Participant Topic Guide

Interviewer Guidance

- Before the interview please check scheme(s) details. These should have been provided during the interview booking process.

Introduction

Aim: To introduce the research, ensure the interviewee is aware of, and set the context for, the proceeding discussion

Overview:

- Introduce yourself and CAG Consultants/Databuild [very brief]

- State that the evaluation has been commissioned by BEIS

- Thank interviewee for making time to speak today

Introduce the study:

- Overall objective of the study is to research the impacts of the public sector energy efficiency loan scheme on energy efficiency activity within public sector organisations and the university sector

- Main purpose of the interview is to understand their experience of dealing with energy efficiency and to explore their experience of the loan scheme

- The findings will inform future government policy on energy efficiency

Department for
Business, Energy
& Industrial Strategy

Talk through key points about the interview:

- Length of interview - up to 50 minutes
- Any data used from the interview will be anonymised (neither the interviewee nor the organisation will be identifiable to BEIS) in our reporting of the findings
- Interview data will be stored securely in accordance with the Data Protection Act
- Note that we would like to record the interview and explain that the recording, transcription and notes will not be shared outside of the research consortium. BEIS will not have access to them
- Check that they consent to you recording the interview [if they don't, still go ahead with interview, just take notes]

Ask if interviewee has any questions before you start

Organisational Contexts

Aim: *The aim of these opening questions is to establish key organisational contexts for this organisation.*

- Please confirm the name of your organisation
  - If not obvious from the name, check the type of organisation (local authority, university, school etc)
- What is your role in the organisation and to what extent do you become involved in energy matters?
  - Probe to determine:
    - Their experience and expertise in relation to energy
    - The level and scope of their responsibility for energy matters e.g. number of sites / buildings they deal with / types of activity they are responsible for

    - Whether they deal with energy directly or via others (consultants / junior staff / external support)?
- What experience does your organisation have of undertaking work on energy efficiency?

  – Probe to determine how long they have been active and to get examples of the types of schemes they have experience of working on.

- What are your organisation's main reasons for undertaking energy efficiency projects?

  – If necessary, probe for:

    - Financial savings
    - Carbon savings
    - Reputational benefits
    - Other non-financial benefits, e.g. improved lighting quality / improved thermal comfort etc.

  – Probe to establish if different types of decision maker / influencer have different objectives or priorities.

- (IF organisation has prior experience of energy efficiency) How do you usually finance your work on energy efficiency?

  – Probe for use of:

    - Internal funding
    - External funding
    - Salix (loan or recycling fund)
    - Other loan funds
    - Other sources of funding / finance

  – Probe also to establish the factors that inform their choice of funding

Decision Making

Aim: to understand what the drivers for the organisations participation in the scheme were and what informed their decision making

Department for
Business, Energy
& Industrial Strategy

Introduction: *Only ask if this information has not been supplied through the recruitment process. Otherwise use as a confirmatory question. I.e. check the accuracy of the information you have been provided with.*

- Confirm that they have received scheme funding and the type of funding, i.e. loan or recycling fund scheme.
  - Establish when the loan / recycling fund was secured. NB the respondent may have secured multiple loans.
- We would like to understand the extent to which you drawn on Salix funding schemes and the types of activity you have used funding for. Can you briefly indicate:
  - The number of successful loan applications you have made;
  - The value of applications;
  - The number of projects you have used funding for; and
  - The types of project you have undertaken.

  If this question is asked the interviewer should avoid getting involved in too much detail, particularly in relation to projects where it is suggested you just seek some headline information (top 5) rather than an exhaustive list.
- How did you become aware of Salix Finance and the loan / recycling scheme?
  - Probe to see if became aware of the scheme via a single route or multiple.
- What factors informed your choice of scheme?
  - We wish to understand why they opted for one type of scheme (i.e. the loan scheme as opposed to the recycling fund scheme) as opposed to the other.
- Who made the final decision regarding your application to Salix?
  - We wish to understand where authority for making such decisions lies in the applicants organisation.

- Who else (if anyone) was involved in the decision making process?
- Why did you choose to apply for funding from Salix?
  - It is likely that respondents will suggest that the low cost of Salix Finance is what made it attractive to them, but we would like to understand if there were other factors that made them prefer to use Salix rather than alternatives. For example:
    - Relative complexity in comparison to alternative options
    - Ease of access
    - Preference to use public sector over private sector finance.
    - Support provided by Salix
- Did you consider other, non-scheme, forms of funding or financing mechanism to fund your energy efficiency activity?
  - Probe to establish awareness / experience, of alternative sources of finance (private and public) and of mechanisms such as Energy Performance Contracting.
- Do you think you would you still have looked to undertake work on energy efficiency if you had not been able to access the scheme?
  - If YES probe as to how and what type of funding they would have used and what, if any, impact this might have had. E.g. whether work might have proceeded at a different scale or pace.

    (IF using the recycling fund)

    - Where did the match funding come from?
    - How simple was it to set up a recycling fund?
    - Have you experienced any challenges in running the fund?
  - Probe for views on match funding. E.g.
    - How easy or otherwise it was to secure
    - How easy it was to maintain the fund
    - Any issues from the perspective of the finance department

- Suggestions for improvement (could include changes to Salix requirements)

What types of activity has funding been used for?

- How did you identify your projects?
  - We are particularly interested in understanding whether projects form part of a strategic plan (energy / carbon reduction plan, or other) or are 'stand alone' projects. Probe for:
    - Use of energy audits
    - Existence of a pipeline of projects
    - Projects identified via refurbishment programmes
    - Assisted by external organisations
    - Choice being determined by personal preference or received wisdom.

      IF opportunities identified by external actors (e.g. consultants, NGOs etc) please identify and seek an explanation of how they became involved and what their role was.

- What were your expectations of the projects that you have undertaken, in terms of expected energy / financial benefits, and how successful were you in delivering them?
  - Probe to establish if scheme achieved estimated benefits (in terms of energy reduction / cost saving.) IF scheme did not deliver expected benefits probe regarding extent of shortfall and reasons why.
- Did your scheme deliver any other types of benefit to your organisation?
  - Probe for benefits other than financial / energy savings / carbon. For example: improved customer experience; improved working environment; health / well being impacts; improved learning environment; improved public / customer experience or perception. IF other benefits identified look to establish:
    - What such benefits are
    - Who experiences them
    - Who values them
    - Whether any attempt has been made to quantify benefits

- NB organisations might also generate co-benefits as a result of scheme funding being used to pay for enabling work. I.e. activity undertaken to allow for the installation of an energy efficiency measure.

Experience of the scheme

- What has gone well (or less well) during your project? We are interested both in your experience of the application process and project implementation.
  - Probe for different stages in the funding process:
    - Application process (applications over 100k value will have had to complete a business case template in addition to other administrative requirements)
    - Project administration
    - Engagement with Salix Finance
    - Procurement
    - Installation
    - Post installation (reliability / maintenance issues etc)
    - Overall timeliness of the project (did it run to schedule)
  - Probe for views on payback times and whether they had problems finding projects that met the payback criteria (5 years except for schools where it is 8).
  - Probe to see if any proposed types of technology were rejected. If YES ask what they were and why they were rejected.
- Did Salix provide you with any support in the development of your project? If YES please expand on what was supplied and how useful or otherwise this was.
  - We are mainly interested in understanding whether or not Salix provided any practical technical support to assist them with identifying projects, quantification of benefits etc. I.e. not just support with queries regarding scheme administration.
- Other than staff time did you incur any other costs as a result of participating in the scheme?

  - Probe for 'hassle' factor as well as costs such as need for consultancy etc. IF hassle factors identified probe to establish extent to which they were a problem and whether they had been anticipated.

- How might the scheme be improved to reduce the cost (or other forms of burden) of participation for your organisation?

- Has participation in the scheme enhanced you and / or your organisations skills, expertise and confidence in dealing with energy efficiency.

  - Allow interviewee to respond then (if it has not already come up) probe to see whether they participate in Salix meetings, webinars and workshops and or other forms of Salix run activity and if so whether, and if so how, this has been of value to them.

Interview close and thank you

- Ask if interviewee would like to say anything else about energy efficiency, the scheme or Salix?

- Check permission to recontact them if needed.

- Thank the participant for their time. Reiterate that their anonymity will protected in our reporting. Tell them they are welcome to contact members of the study team to ask questions at a later date if they wish

END INTERVIEW

5.7 Non-Participant Topic Guide

Guidance

Aim: To introduce the research, ensure the interviewee is aware of and set the context for the proceeding discussion

Overview:

- Introduce yourself and CAG Consultants/Databuild [very brief]

- State that the evaluation has been commissioned by BEIS

- Thank interviewee for making time to speak today

Department for Business, Energy & Industrial Strategy

Introduce the study:

- Overall objective of the study is to research the impact of the energy efficiency loan scheme on energy efficiency activity within public sector organisations
- Main purpose of the interview is to understand their experience with energy efficiency and explore why they have NOT used scheme funding since 2013
- Findings will inform future government policy on energy efficiency

Talk through key points about the interview:

- Length of interview [30- 35 minutes]
- Any data used from the interview will be anonymised (neither the interviewee nor the organisation will be identifiable to BEIS) in our reporting of the findings
- Interview data will be stored securely in accordance with the Data Protection Act
- Note that we would like to record the interview and explain that the recording, transcription and notes will not be shared outside of the research consortium (BEIS will not have access to them
- Check that they consent to you recording the interview [if they don't, still go ahead with interview, just take notes]

Ask if interviewee has any questions before you start

Organisational Contexts

- Confirm the nature of the organisation (e.g. secondary school)
  - Probe for details on how many sites organisation has and how many staff
- Establish the interviewee's role in the organisation
  - Probe to determine:
    - Their experience and expertise in relation to energy efficiency.
    - Whether they deal with energy directly or via others

- What experience does your organisation have of undertaking work on energy efficiency?

Energy efficiency context

- How important is energy as a strategic issue for your organisation?
  - Probe: The reasons behind the strategic importance attached to energy use (e.g. cost, reputation, regulatory compliance, other (including co-benefits such as improved working conditions etc) - over short, medium and long-term).
- Could you briefly summarise any progress that your organisation has undertaken on energy efficiency?
  - Probe for what they have and have not done on energy efficiency. For example, have they:
    - Appointed someone to lead on energy management (a dedicated role?)
    - Developed an energy efficiency or carbon reduction plan?
    - Set targets for carbon reduction?
    - Done any behavioural change work with staff?
    - Installed energy efficient lighting?
    - Invested in other energy efficient measures (e.g. insulation, HVAC, Building management systems, boilers)?
- How do you generally identify energy efficiency projects?
  - Probe for:
    - Use of energy audits
    - Inclusion in general refurbishment programmes (i.e. equipment is replaced as part of general refurbishment programmes)
- How do you generally finance any energy efficiency investments?
  - Probe for:
    - Internal funding
    - External funding
    - Other loan funds
    - Other sources of funding

    - Other types of EE finance scheme, e.g. EPC
- What payback do you generally seek on energy efficiency investments?

- What are your organisation's main reasons for undertaking energy efficiency projects (if any)?

  – Probe for relative importance of:

    - Bill savings
    - Reputational benefits
    - Co-benefits (e.g. improved quality of lighting; reduced maintenance costs)
    - Energy efficiency being a side benefit from wider renovation projects
    - Other benefits
- What are the barriers, if any, that make it difficult to progress energy efficiency projects within your organisation?

  – Probe for:

    - Lack of strategic priority
    - Access to capital
    - Easy wins already completed
    - Competing priorities
    - Lack of staff time to progress
    - Lack of staff knowledge
    - Budget cuts
    - Operational constraints on implementing projects
    - Other
  – Probe for any recent changes to these barriers.

Knowledge and Awareness of Salix Finance

Aim: to understand how far they are aware of Salix and why they did not apply/progress Salix applications

- Are you aware of the public sector energy efficiency loan [and revolving loan scheme]?

  – Probe awareness and understanding of both types of scheme.

Department for Business, Energy & Industrial Strategy

- How did you become aware of Salix Finance and the loan / recycling scheme?
  - Probe to see if heard of Salix via an event, including industry events.
- Have you or your organisation considered making a bid to Salix Finance?
  - Probe to understand what sort of project was considered.
- If you or your colleagues got some way towards applying for Salix funding, why did you not progress this?
  - Probe for:
    - Internal barriers (lack of capacity / expertise/ lack of internal buy in)
    - Barriers associated with the scheme itself
    - Ability to proceed without Salix (e.g. via other forms of funding)
- Did you or your colleagues progress the identified energy efficiency projects by other means?
  - Probe for how funded / managed
- What would need to change in order for your organisation to make an application to Salix?
- Are there any other policy changes that could be made to address the barriers to installation of energy efficiency measures within organisations like yours?

Interview close and thank you

- Ask if interviewee would like to say anything else about energy efficiency or Salix?
- Check permission to recontact them if needed.
- Thank the participant for their time. Reiterate that their anonymity will protected in our reporting. Tell them they are welcome to contact members of the study team to ask questions at a later date if they wish.

END INTERVIEW

Department for
Business, Energy
& Industrial Strategy

© Crown copyright 2017

This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated. To view this licence, visit nationalarchives.gov.uk/doc/open-government-licence/version/3 or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email: psi@nationalarchives.gsi.gov.uk.Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.

This publication available from www.gov.uk/beis

Contact us if you have any enquiries about this publication, including requests for alternative formats, at:

Department for Business, Energy and Industrial Strategy
1 Victoria Street
London SW1H 0ET
Tel: 020 7215 5000

Email: enquiries@bis.gsi.gov.uk