Department of Energy & Climate Change

Evaluation of the Carbon Emissions Reduction Target and Community Energy Saving Programme: Executive Summary

Research undertaken for DECC by Ipsos MORI, CAG Consultants, UCL and Energy Saving Trust

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Executive Summary

1. Background and introduction

This report sets out the findings from an independent evaluation of the Carbon Emissions Reduction Target (CERT) and the Community Energy Savings Programme (CESP). The research was commissioned by the Department of Energy and Climate Change (DECC) and undertaken by a consortium of Ipsos MORI, CAG Consultants, University College London and Energy Saving Trust. This is an executive summary version of the full report. The full report (also being published alongside this version) should be read for the full detail behind the evaluation, and for an appreciation of the detailed findings.

1.1 Research Purpose

The aim of the evaluation was to determine whether CERT and CESP met their objectives, outlined in this report, and to provide evidence to inform future energy efficiency policy design and implementation. This report sets out the key findings and conclusions of the evaluation which broadly fell into three research streams, as indicated by Table E1.

Table E1: Research streams undertaken as part of the CERT and CESP evaluation

Research stream	Purpose
Process research stream	Explore the mechanics of the programmes – the 'how' part – that enable outputs to be achieved. This explored how the scheme was administered, managed, delivered and also experienced by those that were impacted by it.
Householder experience research stream	Understand householders' experiences of the two programmes, identify the drivers and barriers to participation, and understand the impact of CERT and CESP measures on thermal comfort, affordability of energy and on householders' attitudes and behaviours in relation to energy efficiency.
Energy company cost analysis research stream	Establish estimates of the total resource costs incurred as a consequence of the two obligations, how these changed over time and, where possible, what implications the costs associated with the programmes have for future energy efficiency policy design.

This report is based on a range of evidence gathered through the evaluation, completed between May and December 2013. A range of individuals and organisations were consulted as part of this evaluation, including Government, the regulator, the obligated parties, trade and sector associations, the supply chain, local authorities, housing associations, community organisations, recipients of the energy efficiency measures and those who declined to take part. Full details of the research approach are presented in section 2.2 of the full report, also published alongside this summary report. There are a number of limitations which should be acknowledged and considered when reading the findings of this evaluation. These are set out in section 2.3 of the full report.

1.2 Note on comparisons with other energy efficiency obligation schemes

It should be noted that some of the costs and benefits reported within the evaluation are not directly comparable with those that have been estimated or reported in previous obligations, such as the Energy Efficiency Commitment, nor their successor, the Energy Company Obligation.

By way of example, the carbon saving targets set under CERT and CESP are different from those under ECO. This is because of an updated evidence base on energy efficiency measures, which is mainly due to reductions in:

a. the assumed theoretical lifetime energy savings associated with each individual measure (that is, energy savings under laboratory test conditions): and

b. the reduction in estimated energy savings once the measures are installed (for example, by applying 'in use factors' to the savings – to take into account underperformance once measures are installed in the home - as opposed to under laboratory conditions). The scores for loft insulation were also adjusted to take into account that some parts of some lofts are untreatable as they are inaccessible.

The eligible measures under ECO were also more restricted than those under CERT and CESP, with ECO also focussing on hard to treat cavity and solid wall insulation. The carbon targets under ECO were therefore lower to reflect the fact that these harder to treat measures may require larger subsidies from obligated suppliers.

The evaluation of EEC can be found on the internet[1]. Data on the Energy Combination Obligation are published by the Department of Energy and Climate Change, and can be found on the Government website[2].

1.3 Glossary of terminology used in the report

A number of terms are used in this report, some of which are derived specifically for the purposes of this report, which the reader may not be familiar with. A full glossary of terms used is included below.

Adjusted CO_2 savings: Lifetime savings of carbon dioxide including uplifts. *Also see: Unadjusted CO_2 savings.*

Bonus: Incentives that were used to encourage delivery of certain measures or the way in which the measures were delivered (such as increasing the density of measures delivered in local areas or within individual homes). Incentives were in the form of increases to the carbon saving attributed to the measures delivered. *Also see: Uplift.*

Carbon / CO_2 savings: Lifetime savings of carbon dioxide attributable to the measures installed through the programmes

CERT - Carbon Emissions Reduction Target: Legislative driver for improving the energy efficiency of existing households in Great Britain and contributed to the UK's legally binding

[1] For example, the evaluation of EEC 2 can be found here: http://s3.amazonaws.com/zanran_storage/www.defra.gov.uk/ContentPages/4234041.pdf

[2] https://www.gov.uk/government/collections/green-deal-and-energy-company-obligation-eco-statistics

emissions reduction commitments. Ran April 2008 to December 2012. *Please refer to Chapter 2 for further details.*

CERT customer: An individual/household who installed an energy efficiency measure under CERT. *Please refer to the appendices for the exact definition used in the customer survey element of this evaluation.*

CERT non-customer: An individual/household who had not installed an energy efficiency measure under CERT. This may mean the individual/household had installed measures that could not be assigned to CERT; that the individual/household had installed measures at another point in time (either before or after CERT); or that the individual/household has not installed any measures.

CESP - Community Energy Saving Programme: Policy to improve domestic energy efficiency in Great Britain's most deprived areas, which ran between October 2009 and December 2012. *Please refer to Chapter 2 for further details.*

CESP customer: An individual/household who installed an energy efficiency measure under CESP. *Please refer to the appendices for the exact definition used in the customer survey element of this evaluation.*

CESP non-customer: An individual/household who had not installed an energy efficiency measure under CESP. This may mean the individual/household had installed measures that could not be assigned to CESP; that the individual/household had installed measures at another point in time (either before or after CESP); or that the individual/household has not installed any measures.

CFL - Compact Fluorescent Lamps: A type of low energy lighting.

CWI - Cavity Wall Insulation: Energy efficiency measure that fills cavity walls (the gap between external walls) in a property with insulation. Most properties built after 1920 have cavity walls.

ECO – Energy Company Obligation: The energy efficiency programme that was introduced into Great Britain in 2013, which replaces CERT and CESP.

EEC - Energy Efficiency Commitment: The obligation that preceded CERT. The first scheme (EEC1) ran from 2002 to 2005 and the second (EEC2) ran from 2005 to 2008.

EWI - External Wall Insulation: Energy efficiency measure where insulation is fitted to external solid walls of a property, with the insulation then covered with either render or cladding to protect it. Most properties built before 1920 have solid walls.

IWI - Internal Wall Insulation: Energy efficiency measure where insulation is fitted to the internal solid walls of a property. Most properties built before 1920 have solid walls.

IO - Insulation Obligation: An obligation introduced under amendments to CERT in 2009 and 2010 that required a proportion of the carbon emissions reduction target to be delivered via insulation measures**.** *Please refer to Chapter 2 for further details.*

Mt of CO_2: - Million tonnes of carbon dioxide

NPG - Non Priority Group: Measure used by DECC to determine those who are not classed as vulnerable households under the Priority Group measure. *Also see: PG – Priority Group.*

PG - Priority Group: Measure used by DECC to determine vulnerable households under CERT. It refers to households where particular benefits are claimed and/or a household member is 70 years old or above. *Please refer to the appendices for the exact DECC definition and the definition used in the customer survey element of this evaluation.*

PRS: Private Rented Sector

SPG - Super Priority Group: Measure used by DECC to determine vulnerable households under CERT; this group was a subset of the Priority Group used in CERT. It was introduced in the CERT Extension and aimed to identify the most vulnerable by including households where specific benefits were claimed. *Please refer to the appendices for the exact DECC definition and the definition used in the customer survey element of this evaluation*

SWI: Solid Wall Insulation: energy efficiency measure where insulation is fitted to solid walls, either on internal or external walls. Most properties built before 1920 have solid walls. *Also see: EWI - External Wall Insulation; IWI - Internal Wall Insulation.*

Unadjusted CO_2 savings: Lifetime savings of carbon dioxide before uplifts

Uplift: An increase in the carbon saving delivered when bonus criteria was met.

VOC - Volatile Organic Compounds: Compounds that have a high vapour pressure and low water solubility.

Warm Home Discount (WHD): The Warm Home Discount (WHD) scheme came into operation on 1 April 2011 and requires domestic energy suppliers to provide approximately £1.13 billion of direct and indirect support arrangements to fuel poor customers over four years.

1.4 Background to CERT and CESP

The government introduced a range of policies to reduce the United Kingdom's greenhouse gas emissions by 80% by 2050. CERT and CESP were the two main initiatives put in place to improve energy efficiency within domestic households in Great Britain. CESP was designed to improve domestic energy efficiency in the most deprived geographical areas across Great Britain, while CERT made energy efficiency measures available to all consumers[1] (but also required a proportion of reductions to come from low-income households (i.e. the Priority Group)). CESP was also designed to experiment with alternative models of delivery of energy efficiency measures.

[1]Ofgem e-serve, The final report of the community energy saving programme (CESP) 2009-2012

2. Delivery of the obligations against the targets

2.1 CERT

The six CERT energy companies achieved 296.9 Mt of CO_2 savings by the end of 31 December 2012, equivalent to 101.3% of the overall CERT target of 293 Mt CO_2.[3] Two energy companies did not reach their targets, though only one obligated party's sub-target obligation significantly underperformed. Returns provided by suppliers as part of this evaluation suggested that a total of 294 Mt CO_2 savings (including uplifts and bonuses) were achieved by obligated parties.

In delivering the CERT obligations, the energy companies installed a number of measures – insulation, lighting, heating, micro-generation and Combined Heat and Power (CHP), behavioural measures (e.g. Real-Time displays), demonstration actions and household appliances. Insulation measures (including the IO) contributed the greatest proportion (66%) of carbon savings over the years of CERT.[4] The delivery of the measures varied by region, with just over 10% of all domestic properties in London receiving a CERT measure during the course of the programme to over 25% in the North West.[5] Almost one in five (19%) of all domestic properties in Great Britain received a CERT measure over the course of the programme.[6]

2.2 CESP

By the end of CESP on 31st December 2012, CESP energy companies (both suppliers and generators) had achieved 16.31 Mt CO_2, equivalent to meeting 84.7% of the overall target of 19.25 Mt CO_2. Three (out of six) energy suppliers and three (out of four) generators failed to meet their obligation.[7] Returns provided by suppliers as part of this evaluation, however, suggested that a total of 20.2m Mt CO_2 savings (including uplifts and bonuses) were achieved by obligated parties; around 4 Mt of CO_2 savings were achieved in 2013 as mitigating activity (around 21% of the total CO_2 saved).

Of the measures installed under CESP 49% were insulation measures, 39% were heating measures. The most prevalent were external SWI (26%), heating controls (20%) and replacement boilers (15%). External wall insulation contributed to the majority of unadjusted CO_2 saved (49%), followed by fuel switching (12%) and replacement boilers (9%). The composition of measures delivered did not substantially change over the duration of the scheme.

The majority of measures were delivered through 491 individual schemes[8], many of which were delivered through social housing providers working in partnership with private households. The North West of England, Scotland and Wales saw the greatest number of schemes. There was greater regional variation of delivery than occurred for CERT - in terms of eligible areas -

[3] Ofgem final report
[4] Source; Ofgem e-serve, The Final report of community Energy saving programme (CERT), 2008-2012
[5] It should be noted that these figures are not precise[5] but provide a good indication of the regional distribution of CERT measures. Data is taken from EST's HEED. CERT data includes installations to the end of the scheme (31/12/2012). Some data (for example mitigation) is missing - the cumulative Data Gap for CERT (Standard Measures) is currently estimated to be 6.9%. Further information can be found on the EST website.
[6] http://www.energysavingtrust.org.uk/Organisations/Government-and-local-programmes/Programmes-we-deliver/Homes-Energy-Efficiency-Database/CERT-reports-from-HEED
[7] The final report on CESP, Ofgem, May 2013
[8] As reported in Ofgem's final report on CESP, May 2013. It should be noted this excludes schemes delivered as part of mitigation activity.

ranging from under 25% of eligible areas in London to over 70% in both the East Midlands and Wales.

3. Approaches to delivering the obligation

3.1 Initial objectives

Energy suppliers' main objectives for delivering their carbon reduction obligations under CERT and CESP were broadly similar; though emphasis varied by each supplier. All reported that meeting the obligation was their first priority, followed by doing so cost-effectively to minimize the costs passed through to customers. Some suppliers considered 'adding value' to customers by providing them energy saving measures and advice as an objective. One supplier also mentioned maintaining their reputation as important, with one also referring to developing their own energy services business as an objective (the interim evaluation found this was an objective for a number under CESP).

The situation for the four independent generators obligated under CESP was markedly different. They felt their inclusion had been inappropriate as they had no previous experience of energy company obligations, no experience of delivering domestic energy efficiency schemes, no existing relationships with domestic customers and limited in-house resources. Like the suppliers, their initial objective was to comply with the obligation, but they also focused on learning about the nature of the obligations and how to approach the delivery of domestic energy efficiency projects.

3.2 Approaches to delivering CERT

The approach taken by the suppliers to delivering their obligations evolved over time and can be broadly split into three phases.

1. Pre-CERT Extension (2008-10): Wide range of measures delivered and 'measure-mixes'. The flexibility and choice meant suppliers chose differing measure-mixes and delivery routes; some balanced their delivery of measures, whereas others focused heavily on particular measure types.
2. CERT Extension (first half): Each supplier had to adjust delivery approach, particularly due to restrictions on lighting measures and the addition of an insulation obligation and Super Priority Group (SPG) obligation. The focus of delivery shifted heavily to professionally-installed insulation measures and to combining previous strategies by delivering the SPG obligation through IO measures. All suppliers had to adjust their delivery approaches, some significantly.
3. CERT Extension – final months: SPG obligation proved particularly challenging, so the focus was on meeting this obligation, mostly through professionally-installed insulation.

3.3 Approaches to delivering CESP

For energy suppliers, CESP was quite different to CERT in terms of the measures, scoring system and type of projects involved. For the independent generators, CESP was of course completely new. As for many parties this was such a 'new' scheme type, most parties initial approaches were heavily influenced by the CESP Impact Assessment (DECC, 2009), which provided a starting point for informing their delivery and pricing strategies.

Different strategies were used by the energy suppliers for delivering their CESP schemes. Some envisaged taking a more 'hands on' approach to project management and delivery, particularly those with their own energy services arm. Others took more of a funding-only approach (i.e. funding local authorities, housing associations and third-party delivery agencies)

to manage and deliver schemes. However, regardless of the initial strategy, delivery proved challenging and suppliers found they had to be pragmatic in delivering their obligation to ensure it was met.

Independent generators outsourced their obligation by either contracting it out to a third-party delivery agency or trading a proportion of the obligation to another obligated party.

4. Delivery of CERT and CESP schemes[9]

4.1 Area-based delivery

4.1.1 Benefits of area-based approaches (CERT and CESP)

Previous studies have found that area-based schemes brought significant benefits in terms of take-up and cost-effective delivery of professionally installed insulation: intensive marketing and engagement activities in a local area achieved good take-up, with local authorities playing a central role in building trust and awareness; and geographical concentration delivering operational efficiencies in both surveying and installation. A significant number of stakeholders interviewed identified these benefits also, as well as additionally identifying benefits in terms of effective marketing (e.g. word of mouth) and delivery efficiencies (e.g. minimising waiting periods).

4.1.2 Benefits of area-based approaches (CERT)

CERT involved a significant amount of area-based delivery, primarily for loft and cavity wall insulation. Organisations promoted a multi-agency, area-based approach to CERT delivery, often driven by fuel poverty objectives. These approaches often involved intensive marketing of energy efficiency offers, endorsed by the local authority to particular areas identified as being at risk of fuel poverty. Most stakeholders felt that local authority buy-in was essential, but a small number highlighted that some motives conflicted with the programme focus (e.g. focusing on political and economic, rather than environmental, dimensions).

4.1.3 Benefits of area-based approaches (CESP)

The CESP programme further incentivised area-based approaches by using area bonuses and ensuring schemes had to be delivered in specific low income areas; the majority of stakeholders felt that CESP had succeeded in achieving this. However, schemes often did not achieve the density and take-up rates envisaged in the original CESP Impact Assessment.

There were some criticisms of the design, however; the Index of Multiple Deprivation was not considered by some to be effective in identifying areas of concentrated fuel poverty; and the area-based approach involved a trade-off between cost-effectiveness of delivery and the inclusion of households who are not fuel poor. Additionally, stakeholders commented CESP boundaries often did not follow natural community boundaries, which could cause householder and community tension – some schemes offered measures beyond the LSOA boundaries to address this problem.

The increased carbon savings provided by the area bonus did help encourage focused delivery but stakeholders report that they could be difficult to achieve, particularly if in an area housing types were varied, there was a significant proportion of private households, and where several CESP schemes were targeting the same area.

Many stakeholders commented that the high visibility of CESP measures (particularly External Wall Insulation, EWI) helped strengthen the success of area-based marketing.

[9] The focus of this report was on domestic retrofit projects, rather than retail schemes (lighting, appliances retail etc.) or other types of scheme also found in CERT.

4.2 Hard to treat homes

4.2.1 Targeting hard to treat homes

The interim evaluation of CERT found that it had successfully driven cost-effective delivery of relatively low-cost energy efficiency measures (especially loft and cavity wall insulation). A moderate amount of SWI was delivered to hard-to-treat homes under CERT (58,916 measures (Ofgem, 2013a)), which is likely to have been driven by the PG Flexibility Option. Nonetheless, many stakeholders felt that this did not provide adequate incentives for more costly measures, which were, on the whole, less cost-effective to fund in terms of their carbon scores, compared to measures like loft and cavity wall insulation.

CESP was designed to incentivise SWI for hard to treat homes, to complement CERT and to build the supply chain for SWI. It was successful in generating greater volumes of SWI (75,255 EWI measures and 5,002 IWI measures (Ofgem, 2013b)) in proportion to the overall size of the scheme.

4.2.2 Whole house approaches

CESP was also designed to encourage whole house treatments. Many stakeholders found that there were drawbacks to the scheme design which discouraged effective whole house treatments, with solutions often only involving one or two of the measures required. However, the evaluation evidence revealed a number of instances where other sources of income were used to deliver more complete package of works to homes (e.g. housing association funds and the Feed-in Tariff).

4.2.3 Customer engagement[10]

The evidence from the stakeholder interviews is that there is no single 'right way' to carry out customer engagement, with many reporting that a combination of different engagement methods was normally required, tailored to the specific needs of the area or target customers. Table E2 sets out the factors that were commonly cited as important elements of the engagement process.

[10] This section looks at general lessons and experiences from the evaluation on engaging customers. The sections that follow explore the specific issues in targeting vulnerable customers and private tenure households.

Table E2: Important elements of the customer engagement process.

Method	Detail
Area-based marketing**:**	Engagement under CESP was undertaken at an area-level by default. However, many stakeholders also felt that local schemes worked well for increasing take up under CERT, as it enabled the involvement of local organisations with good relationships with householders. Area-based marketing resulted in two key peer-to-peer marketing routes: word of mouth and a tangible demonstration of the benefits.
Partnerships with local agencies	A number of stakeholders highlighted the importance of involving local organisations (e.g. community groups, tenant groups, locally established not-for-profits) to enhance customer engagement and take up, particularly where the scheme was badged by the local authority or other local organisations.
Door-knocking	Stakeholders highlighted the importance of a door-to-door delivery approach in both CERT and CESP. However, the effectiveness of this method appeared to depend on the degree to which it was employed with other methods. Where this was carried out with the endorsement and support of the local authority, for example, this added to the effectiveness of the engagement.
Direct marketing mail outs	Direct marketing mail outs were a common engagement route employed under CERT and CESP. This tended to be strengthened through targeting (i.e. using housing databases to target suitable properties) and branding by the local authority or other trusted local organisations.
Telephone advice services	The existence of a local telephone advice or call service was regarded as important by some stakeholders, particularly when using a Freephone number and managed by a trusted independent organization.
Demonstration homes	In CESP schemes in particular, demonstration homes were used to help secure resident buy-in.
Messaging	A small number of the stakeholders emphasised that the messaging in communications to customers was an important consideration. For instance, focusing on money saving, comfort and warmth, rather than carbon, or focusing on the aesthetic improvement external measures would bring.

4.3 Targeting vulnerable customers

4.3.1 Common themes across CERT and CESP

Both programmes aimed to help vulnerable households or low income households – though neither defined what a ‘vulnerable customer’ was. Under CERT, the PG and SPG sub-groups, were to some extent used as a proxy for vulnerable customers and under CESP, ‘low income households’ were targeted by focusing the programme on areas with high concentration of low income households.

The extent to which CERT, and to a lesser extent CESP, benefited the fuel poor is complicated by proposed revisions to the definition of fuel poverty in England, difficulties in identifying those who are fuel poor, and reluctance of individuals to self-identify themselves as being fuel poor.

However, intensive area-based approaches have been considered effective at reaching the fuel poor and a number of stakeholders interviewed supported this view.

The evaluation evidence suggests that personalised approaches and visits, including support from third sector organisations, have been found to be more appropriate to engaging vulnerable households than phone lines, leaflets and advice at the door. Stakeholders in both CERT and CESP areas tended to use a variety of methods to find and engage vulnerable customers: using intermediary organisations; managers or liaison officers on the ground; using referrals from local authorities and health services; running advice services embedded in communities; or offering benefit checks as part of packages to households.

4.3.2 CERT Extension

The CERT Extension introduced a sub-obligation, the SPG, comprising people on specific benefits. However, nearly all stakeholders agreed that there were major problems in finding enough SPG customers to enable the energy suppliers to meet their targets, which was exacerbated by lack of access to benefits data held by DWP. A number of strategies were utilised, all that added to delivery costs: offering measures free of charge or with an incentive to SPG customers; intensive surveying and door-knocking; networking; referrals through intermediaries in the community; purchasing SPG leads from lead generation companies; and employing staff to check identification, retrospectively. Stakeholders felt this issue was compounded as SPG customers lacked motivation to identify themselves (particularly since CERT offers to PG customers were usually already free) and was felt to be intrusive.

4.3.3 Vulnerable customers reached by CERT

The national survey of CERT customers found that CERT customers tended to be of a higher social grade, on higher incomes and less likely to state their household financial situation as poor, than non-customers - indicating that CERT reached many households that would probably not be considered ‘vulnerable’. The survey also shows that SPG-eligible households were under-represented. This is to be expected; attributing SPG status is compromised by a respondent reluctance or inability to provide information, and these individuals (who by definition are vulnerable) potentially being reluctant to respond to a survey. However, even given this, the other evaluation evidence suggests that SPG were challenging to reach.

4.3.4 Vulnerable customers reached by CESP

It is difficult to assess whether CESP was an effective programme for targeting vulnerable customers as no monitoring took place of household demographics. No considerations about identifying SPG customers were incorporated into the scheme design, since this sub-obligation did not apply to CESP. However, the previous CESP evaluation found incidences of fuel poverty in CESP-eligible areas were higher than in other areas and the deprivation eligibility criteria (albeit at a neighbourhood, and not address, level) did target activity in areas of higher deprivation.

4.4 Targeting private tenure households

4.4.1 Common themes across CERT and CESP

There were some common barriers to delivery of CERT and CESP in private tenure property, including:

- Wide variations in the quality and quantity of private sector housing stock data held by local authorities;

- Private sector households were considered to be often more sceptical of free offers; and
- Challenges were encountered in the Private Rented Sector (PRS), owing to the number of actors involved (more so in CERT, than CESP).

4.4.2 CERT

CERT was widely, but not exclusively, delivered to private tenure households (90% of those surveyed in the national survey were owner-occupiers, and EST's Home Analytics database[11] indicated the same proportion (89%)). However, the evidence also indicated that within private tenure the PRS was under-represented which faced additional challenges (largely pragmatic and organisational ones) in arranging and finalising installation.

4.4.3 CESP

Many schemes started with a core of social housing and then extended the offer out to private households within the area. The visibility of EWI aided marketing to private households. Reports, EST data and the evaluation stakeholder evidence, suggested that spill over to the private sector was incentivised by the area bonus. Moreover, stakeholders felt wide take up of EWI by private householders was dependent on highly-subsidised offers – particularly towards the end of CESP when carbon prices rose.

4.5 Partnership working

For many stakeholders, effective, "genuine", partnerships between energy companies and delivery partners was critical. Local partners provided a number of key strengths, while these partnerships also suffered from a number of limitations, as set out in Table E3.

[11] http://www.energysavingtrust.org.uk/Organisations/Government-and-local-programmes/Home-Analytics-housing-data-and-analysis

Table E3: Strengths and limitations of partnership working during CERT and CESP

	Strengths	Limitations
Local partners helped through	Local knowledge and good housing stock data	Inconsistency in the leadership skills and expertise amongst local partners
	Using their branding to build customers' trust	Conflicting objectives between obligated parties and local partners
	Taking a leading role in identifying suitable projects and delivering them	Resource provision by local partners strained under public expenditure cuts
	Offering important sources of advice for local residents	Deficit in some local authorities of the skills and expertise to effectively deliver schemes
	Broadening the scope and impact of CERT and CESP schemes, by enabling them to achieve wider outcomes beyond energy saving in the home	Programme timescales reduced ability to develop good partnership working
	Contributing resources to CERT and CESP schemes	The design of CERT, in particular, encouraged competition between the energy companies and their delivery partners to deliver measures to individual households

4.6 Other project delivery issues

4.6.1 Failure rates and installation quality

There was a mixed view across the stakeholders interviewed for this evaluation about the quality of installations and service provided to customers under CERT and CESP. Some felt that standards were high and that issues were minimal as a result. However, a number reported concerns about the quality, which was often attributed to pressures to keep prices low and deliver high volumes in a short timescale. Under both CERT and CESP, obligated parties were required to undertake technical monitoring on at least 5% of measures installed (just professionally-installed measures for CERT). Ofgem figures show that under CERT, 10.9% of monitored insulation measures failed (5.3% and 1.5% for heating and mircogeneration measures respectively), and failure rates for different measures under CESP ranged from 0% to 4.3%.

4.6.2 Installation – customer experiences

The overwhelming majority (89%) of CERT customers identified in the national survey who received professionally installed loft insulation or top-up loft insulation were satisfied with the way in which the workers carried out the installation. Customer satisfaction with the installation process was also generally high overall across CERT and CESP case study areas, but was significantly lower amongst CESP than CERT customers. Moreover, there was considerable variation in satisfaction by CESP case study area and by household characteristics; those with poorer health, living in the oldest properties, renting from housing associations (rather than

owner occupiers) were less satisfied. A similar pattern exists by satisfaction with level of disruption during installation.

A number of stakeholders reported concerns and issues regarding the selling, installation and quality of measures installed under CERT and CESP, these included: no BBA[12] accreditation for loft insulation; absence of long-term monitoring; cold-call pressure selling of CERT measures; inappropriate products and solutions offered or installed; minor reports of fraudulent behaviour – such as installers false reporting installations. The qualitative customer interviews indicated the types (not prevalence) of issues faced: external or internal damage to properties; lack of clearing up after installations around the property and surrounding neighbourhood; and returning to replace or add loft insulation after initial installations.

[12] British Board of Agrément (BBA) is the UK's major authority offering approval and inspection services to manufacturers and installers supplying the construction industry.

5. Impacts of the programmes on industry

The evaluation evidence and other secondary evidence suggest that CERT and CESP were key drivers in generating demand for domestic retrofit measures, particularly insulation. Moreover, it suggests that there was very little self-generated consumer demand during the lifetime of CESP, as very few private tenure householders paid anything for measures and that social housing tenants had little say in whether they received measures. The impact of the financial subsidy is less clear-cut for CERT. A majority of CERT customers in the national survey said they would have installed the measures they received, even if they had not received the subsidy. However, the qualitative interviews demonstrated customers were largely unaware about the level of discount they received and of the measure's real market value. As measures available under CERT are not likely to have been promoted as strongly without the programme, this level of interest in non-subsidised energy-efficiency measures should be treated with caution as it probably exaggerates the true extent of consumer demand.

5.1 CERT

Insulation measures accounted for just under two thirds of the total carbon savings achieved by energy companies. A number of supply chain stakeholders thought that without CERT, it was unlikely that there would have been much activity in the professionally-installed sector, resulting in unemployment and business closure. Indeed, as of January 2013, just under 30% of all GB installations of SWI, and just under 20% of all GB installations of CWI, were delivered through CERT.

A common criticism of CERT by stakeholders was the significant peaks and troughs in professionally-installed insulation activity throughout the programme's lifetime - often leading to higher than average installation prices during periods of high demand; such as the end of the CERT Extension period. The profile of activity was relatively variable over the lifetime of CERT, with fluctuations more marked for professionally-installed loft insulation than for CWI. The stakeholder evidence pointed towards three possible factors driving these fluctuations; seasonality (demand rose during winter months to combat cold weather and bill rises); scheme design (largely in relation to the announcement of the CERT extension); and delivery strategies of energy suppliers (although this was not supported by the energy supplier interviews).

Supply chain stakeholders reported that fluctuations raised a number of issues for the industry, including: labour management (e.g. great changes in workforce requirements over short periods), skills retention, business survival and cash flow. The fluctuations made it difficult for the industry to forward plan. As a result, some supply chain stakeholders argued that greater transparency about energy supplier progress would enable them to forward plan effectively.

Given the fluctuations of demand for insulation from the energy suppliers, a key challenge for the industry was ensuring capacity was in place. Overall, the industry appears to have been largely successful in meeting increases in demand. However, concerns were expressed that responding to demand fluctuations could have resulted in installations being compromised as a result of inexperienced, unskilled labour coming to the market.

5.1.1 Transition to ECO

Many stakeholders felt strongly that the transitional arrangements from CERT to ECO and the Green Deal had meant a "cliff edge" for the loft and cavity wall insulation industry, which had

expanded rapidly in 2012 to meet demand, but then saw activity levels fall rapidly in 2013.[13] Moreover, there were also concerns that CERT had helped a legacy of expectations amongst customers that measures, particularly loft insulation and cavity wall insulation, should be free or very low cost. A number of stakeholders reported that this made these measures difficult to promote under Green Deal and ECO.

5.2 CESP

CESP supported delivery of a range of insulation, heating, microgeneration and district heating measures. The most prominent measure was solid wall insulation (as of January 2013, just under 40% of all GB installations were delivered through CESP), followed by heating controls with a new heating system and replacement boilers (Ofgem, 2013b). Many stakeholders involved in the delivery of CESP thought that the scheme had helped to develop the external wall insulation industry, supporting an expansion of capacity, skills and expertise

As reported in the interim CESP evaluation, there was a slow start to activity in CESP, which resulted in a significant back-loading of activity towards the latter stages of the programme. The delay was due to a combination of factors including the complexity of the scoring system, delays in the scheme approval process, long timescales for scheme development and long project delivery timescales.

The industry did meet this capacity challenge, but there were consequences, with stakeholders reporting shortages in materials, particularly scaffolding, and a lack of appropriately skilled staff resulting in installation quality issues. More generally, the independent generators in particular experienced a wide variety in performance and reliability of contractors, with high quality contractors delivering to timescales, and others providing less tonnes than promised and at higher prices than agreed.

5.2.1 Transition

As under CERT, stakeholders reported that transitional arrangements from CESP to successor policies had negatively impacted on the industry, as supply chain companies scaled back the size of their operation as the levels of demand created under CESP were not maintained into 2013.

[13] No wider industry data could be found as part of this evaluation which presented a consistent measure of the scale of the industry over time with which to support this finding.

6. Impact of the programmes on individuals and communities[14]

6.1 Overall opinion on the programmes

Overall opinions of the programmes were encouraging, with most customers reporting positive experiences.

6.1.1 Satisfaction with home as a place to live

CESP customers were more satisfied with their home as a place to live after their local programmes ended, than those who were non-customers (31% vs. 14%). CERT customers were no more likely to be satisfied than non-customers, though were less likely to be dissatisfied with their home than non-customers (17% vs. 21%).

Nearly half (48%) of CESP customers who were more satisfied with their home credited this to *the energy efficiency measures* that were installed under the scheme, whereas only 8% of CERT customers did. However, as few customers were more satisfied with their home after the programme, this means that just 15% of all CESP (and 2% of all CERT) customers were both more satisfied with their home and attributed it to the energy efficiency measures.

Benefits of measures: While the measures rarely led to an improved satisfaction with home, there were still tangible benefits for recipients; seven in ten (69%) CERT and eight in ten (81%) CESP case study customers considered they had benefited a great deal or a fair amount from the measures installed. Just three per cent of CERT and CESP customers considered they had not benefited at all from the measures – though CERT customers were more likely to state they did not benefit very much from the measure than CESP customers (24% vs. 10%).

Advocacy of CESP Scheme: Of all customers approached to take part in their local CESP scheme, advocacy of the scheme was high. Overall, nearly six in ten (58%) of CESP customers approached to take part in their local scheme would speak highly of it; 13% who would be critical. Advocacy ranged between areas (45% to 68% would speak highly).

Advocacy of CERT measures: Nationally, over half (54%) of CERT customers would speak highly of the difference the measure has made to their home and only two per cent would be critical. More than six in ten (63%) CERT case study customers would speak highly of the difference the energy efficiency measures have made to their home, with just four per cent who would be critical. Again, this ranged between case study areas (from 52% to 72%).

6.2 Impact on households

6.2.1 Impact on heating behaviour.

The impact on heating behaviours is mixed and inconclusive. Anecdotal evidence from stakeholders and customers highlights some positive effects on energy efficiency behaviour but this was not found to be widespread. Unprompted, a majority of customers of the programmes indicated they had taken positive steps to reduce energy use. However, these differences were not significantly different from non-customers. There was some qualitative evidence of an increased level of control over heating of the home, particularly where new boilers and/or

[14] This chapter is based primarily on perceptions of survey respondents – both the national Omnibus and also the case study surveys and qualitative interviews. This is supported, where possible, by evidence from the stakeholder interviews. It should be noted that the impacts listed above are not isolated for specific measures installed, due to the low base sizes involved for different types of measure, and the difficulty of distinguishing impacts where customers received multiple installations.

heating systems were received (e.g. customers increasingly setting their thermostat at a lower temperature, heating their homes for shorter periods of time than they did previously or having grater control of their heating).

Although not a core element of the programmes, there is some evidence that a lack of customer understanding of, and potentially availability of information on, how to use the energy efficiency measures received, may undermine the potential carbon savings that could be experienced.

Improving thermal comfort: A majority of customers (72%) in the CERT national survey either strongly or tended to agree that their home feels warmer since they had energy efficiency measures installed. Moreover, CERT customers were also more likely to agree than those who installed non CERT measures (61%) – though this difference is likely to be a result of the types or combination of measures CERT customers received.

The impact in the case study areas was similarly positive, though more CESP than CERT customers (75% compared to 63%) agreed their home felt warmer since the measures were installed. The qualitative customer interviews raised some missed opportunities in terms of fully realizing the full potential of improving thermal comfort, such as the impact of EWI being tempered due to pre-existing single glazing doors and windows.

CERT and CESP case study areas: information received on heating the home more efficiently: The evidence from customers is that advice and information on how to get the most out of CERT and CESP measures was not always fully available or utilised – though the clarity and usefulness of such advice was appreciated. A minority of case study customers felt they received at least a fair amount of advice on both how to control their heating system (39% CERT, 31% CESP) and how to heat their home more efficiently (23% CERT, 22% CESP). However, a great majority of those who did receive such advice said they both understood it well and found it useful.

6.2.2 Impacts on heating bills

Most customers surveyed (70% of everyone in CERT areas and 64% in CESP areas) reported an increase in their bills when compared with the period before they received any measures, but it is not possible to isolate the contribution made to this by the CERT and CESP programmes. Just one in twenty (5%) in CERT, and one in eight (12%) in CESP, areas believed their winter bills had decreased. Seven per cent of all CERT and CESP customers say they experienced a decrease in their energy bills and attributed it to the energy efficiency measures installed.

National Energy Efficiency Data-Framework (NEED) data shows that recipients of these measures in 2011 did benefit from reduced energy use. Observed cumulative gas consumption savings delivered through a combination of CWI, loft insulation and a new boiler were measured to be 19.7% through NEED data, and individual gas consumption savings were as high as 14.2% for SWI.[15]

However, the qualitative research phase illustrated the difficulties that many respondents (both customers and non-customers) had with making an informed and accurate assessment of changes in their energy bills. The main reason that many had difficulties in doing so was attributed to ongoing rises in energy prices. Other factors such as using pre-payment meters, energy costs being included in service charges, changing on to different energy tariffs and the 'erratic' nature of the weather over the last couple of years were all cited as additional issues hampering customer's ability to comment on the impact of measures on energy bills.

[15] https://www.gov.uk/government/statistics/national-energy-efficiency-data-framework-need-report-summary-of-analysis-2014

However, while a backdrop of steadily increasing energy prices muddies the waters, the indications are that many – particularly CESP - customers have attained affordable thermal comfort as a result of the programmes. A significant proportion of CESP customers (almost half) have been lifted out of a position of being unable to afford satisfactory heating. While lower than CESP, around a quarter of CERT customers are in the same position. Consequently, the indications are that the programmes -particularly CESP - have helped low-income customers to reduce under-heating of their homes.

Beyond the quantitative surveys, there was also anecdotal evidence from case study stakeholder interviews that some customers did benefit from reductions in heating bills. Stakeholders reported that heating bill savings tended to be more significant for CESP than for CERT, owing to the number and nature of the measures installed.

Health impacts: The evidence on impacts of CERT and CESP measures on customers' health is mixed.[16] Around one in ten customers (across all three surveys) said their general health has been either a little or a lot better due to the energy efficiency measures installed, with no more than three per cent reporting their health to have worsened due to the measures installed. In terms of those self-reporting poor general health, an equal split of respondents believe their health has deteriorated (12%) or improved (13%) as a result of the measures – though many serious health conditions would not be improved by greater thermal comfort.

In general, impact on health may be underestimated (due to respondent awareness and recall, and that it is difficult to isolate the direct impact of measures amongst other factors). The depth interviews did highlight individual cases of significant improvement for customers with poorer health, where a warmer home enabled them to live more comfortably.

Impact on fuel poverty: The true extent of both CERT and CESP's impact on fuel poverty is very difficult to ascertain. Assessing the impact of CERT on low-income households and the fuel poor is hindered by the fact that there was no requirement to monitor the delivery of measures to these specific groups.[17] However, many stakeholders felt CERT helped reduce fuel bills and improve homes – though some stakeholders and other research concede that a whole house approach would be needed and that much CERT funding goes to households that do not require help and can afford measures themselves (results from the CERT national survey align with this assessment).

The impact of CESP on fuel poverty and low income groups is also difficult to assess due to the lack of socio-demographic information on customers. However, almost half of all CESP case study customers said they went from a position of struggling to afford their heating to being able to do so due to the measures. Moreover, over half of customers in three of the four case study areas had a gross annual household income of less than £16,000[18], suggesting that many on low incomes were reached by the programme.

6.2.3 Wider impacts on local communities

All the case studies and many national interviews generated evidence of significant regeneration impact of CESP schemes. The visual improvement, largely through external wall

[16] The questions record the health of the respondent, rather than the household as a whole.

[17] The introduction of the SPG in the CERT Extension – while not specifically targeting the fuel poor - went some way to addressing this, but this only applied to the latter half of the programme.

[18] It is difficult to comment on the fourth case study area as over half of customers refused to divulge information on their income. Even taking this into account, 36% of all customers in this area had an income of less than £16,000.

insulation, was reported to be one of the biggest benefits. CESP case study respondents (customers and non-customers) overwhelmingly agreed that 'the scheme has had a positive impact on my neighbourhood as a place to live', with over three quarters (77%) agreeing.

The impact of CERT on neighbourhoods was generally reported to be relatively limited, because the measures had no visible aesthetic impact on properties.

Stakeholders considered that visual improvements had knock-on-effects to the local economy (rising property prices and letting rates), increasing community pride and activity, reducing anti-social behaviour and improving school attendance. Moreover, in two case studies, CESP schemes had prevented housing from being demolished – extending the life of housing at a lower cost and with less disruption than the proposed regeneration programmes. Other analyses of the schemes suggest that they created social value in the form of energy bill savings, income for businesses, avoided health costs to society, increased government tax revenue and saved maintenance time. However, it is not possible within the confines of this evaluation to quantify such benefits which the schemes might have accrued. Most case studies reported that both CERT and CESP schemes had generated some local employment, although some stakeholders felt that this was relatively limited and short-term, particularly for CERT.

7. Cost of delivering the programmes

The cost calculations presented below are based on cost data submitted by all obligated parties. It is beyond the scope of this report to look into the methodology and/or accuracy underpinning the submissions on cost made by each obligated party.

7.1 CERT

The total cost – to the obligated parties – of delivering the CERT obligations are set out in Table E4.

Table E4: Estimated Total Costs Reported Incurred by Obligated Parties, CERT and CERT Extension, 2012/13 prices

Cost Element	CERT	CERT Extension	Total
Administration costs	£47.8m	£62.5m	£110.7m
Delivery Costs	£2,175m	£1,361m	£3,535m
Total	£2,222.8m (£2.2bn)	£1,423.5m (£1.4bn)	£3,645.7m (£3.6bn)
Costs anticipated in impact assessment	£3.4bn	£2.0bn	£5.4bn

Administration costs represented around three per cent of total costs to obligated parties (although this varied from one per cent to six per cent). The submissions received covered 88% of the total delivery costs reported by obligated parties. Assuming that the final supplier incurred administrative overheads in line with other parties, it is estimated that these costs totalled £107m across all suppliers in nominal terms (£111m in 2012/13 prices).

The overall costs of delivery were provided by all six obligated parties. Total delivery costs of £3.4bn were reported across the submissions (in nominal terms), covering 294 Mt CO_2 savings (this is closely aligned with the Ofgem reported figure of 296 Mt CO_2). These costs do not include the cost of carbon savings carried over from EEC (though carry-over is included in reported CO_2 savings, which would depress estimates of the cost of delivery in unit terms if they were included in price calculations). Again, using the HM Treasury GDP price deflator, it is estimated that these costs totalled £3.6bn in 2012/13 prices (£2.2bn for CERT, and £1.4bn for the CERT Extension). This is considerably lower than estimated in the original Impact Assessment, (estimated at £3.4bn for CERT, and £2.0bn for the CERT Extension).

Delivery costs rose in the latter phases of the scheme, while carbon savings remained relatively static. As set out in section 8.7 in the full report, this is driven both by a combination of factors, including a change in the mix of measures delivered, the introduction of further sub-obligations including the IO and the SPG in particular, in addition to there being some evidence that supply side constraints helped drive costs upwards.

It is estimated that, overall, CERT was delivered at an average cost to obligated parties of £13.17 per tonne of CO_2 saved in nominal terms (£13.79 in 2012/13 prices). The original CERT obligation was delivered at an estimated average cost of £11.60 per tonne of CO_2 saved (£12.44 in 2012/13 prices) and the CERT Extension at £15.00 per tonne of CO_2 saved (£15.08 in 2012/13 prices). This is compared to £18.4 for the CERT and CERT Extension Impact Assessments.

The prices secured by the individual obligated parties varied, but average prices were relatively stable between 2008 and 2011 (between £10 and £12 per tonne of CO_2 saved on average).

However, prices rose steadily following the introduction of the CERT Extension, from £8.30 at the beginning of 2011/12 to a peak of £21.00 at the end of quarter two 2012/13. The variance in the prices secured by obligated parties also increased substantially: although the average price fell to £15.20 per tonne of CO_2 in the final quarter, this reflected a range of £11.30 to £36.40 per tonne of CO_2 saved. This was partly due to changes in the measure mix (including a higher percentage of professionally installed measures), alongside aforementioned issues relating to the introduction of the SPG and supply side constraints.

7.1.1 Cost effectiveness of CERT

Based on the notional lifetime carbon savings reported, both CERT and the CERT Extension were delivered at a lower unit cost (cost per tonne of CO_2 saved) than originally estimated in the CERT impact assessments. It was also delivered more cost-effectively than CESP. In this sense, CERT did offer relatively cost-effective carbon reductions.

There was some evidence from the evaluation that the introduction of the SPG led to unnecessary deployment of resources in lead generation (finding or contacting households interested in installing measures) owing to difficulties in verifying SPG status of potential customers. The retrospective 'data-washing' exercise undertaken to identify customers that met the relevant SPG benefit criteria suggested that high proportions of measures installed for PG customers were in actuality delivered to SPG customers. As such, it is likely that the original CERT scheme was effective in reaching a proportion of this group at a substantially lower unit cost. The evidence would therefore suggest had data-washing been in available and in-use earlier in the scheme, the search and verification costs for meeting the SPG Obligation could have been lower.

It should also be noted that during the later stages of CERT there was considerable variation in cost effectiveness of delivery across suppliers. During the last quarter of the programme the highest prices per tonne of carbon saved were in excess of £35 per tonne; well in excess of twice the average price at that point in time and three times the level of the lowest. Due to the lack of any cost information for specific measures, or on the socio-demographic background of the recipients, it is not possible to make any judgements about the cost-effectiveness of different measures delivered under the programme, or on the extent to which delivering to different demographic groups impacted on costs.

There were a number of factors that drove costs of delivering CERT, including:

- **The design of the scheme:** The flexibility and non-prescriptive nature of the scheme at the beginning of CERT helped to drive competition and keep costs down. However, the CERT Extension removed some of this flexibility, focusing delivery on insulation measures more than other sectors. The short timescale and challenging targets of the Extension were also a factor in driving prices upwards;

- **Adjustment to Extension:** The CERT Extension also led to a 'set up and adjustment' period for some suppliers as they renegotiated contracts and revised their delivery approaches. This meant greater levels of activity were needed as the Extension progressed, raising demand and therefore prices;

- **Supply side constraints:** There was some limited evidence that supply side constraints in relation to CWI capacity may have affected prices under the CERT Extension;

- **Finding SPG customers:** The challenges of engaging SPG customers meant that search and verification costs added to the price of carbon for this group; and

- **Rush to deliver:** Installers sought to maximise their profits as demand rose from the suppliers, particularly given industry uncertainty about future support for the sector under Green Deal and ECO.

7.2 CESP

The total cost – to the obligated parties – of delivering the CESP obligations are set out in Table E5.

Table E5: Estimates of the costs incurred by obligated parties in the delivery of CESP

Cost Element	Costs (nominal prices)
Administration costs	£37.1m
Delivery costs	£665m
Total delivery costs	£702.1m
Costs anticipated in impact assessment	£332m (2012/13 prices)

Seven of the ten obligated parties provided costs of administration of CESP. These parties covered almost 70% of the carbon savings delivered under CESP[19], and reported total administrative costs of £25.3m (in nominal terms). Administrative costs represented six per cent of the overall cost of the programme (although this varied from one per cent to nine per cent across the obligated parties).

Assuming that administrative costs would also be incurred in line with overall carbon savings delivered, the administrative and management overhead associated with the schemes might be estimated at £37.1m. Insufficient numbers of obligated parties provided figures broken down on an annual basis to estimate these costs in real terms.

The total cost reported by obligated parties totalled £665m (in nominal prices). The scheme level data provided gives start and end dates for schemes, but does not describe how expenditure was incurred over time, so it is not possible to provide a robust picture of annual delivery costs (and for similar reasons, it is not possible to provide these costs in real terms). This total delivery cost is considerably higher than expected in the original CESP Impact Assessment (332m in 2012/13 prices, although for the reasons outlined above, these are not directly comparable).

The scheme overall was achieved at a price to obligated parties of £32.85 per tonne of CO_2 saved (estimated on the basis of reported start dates of schemes as this will provide the best estimate of the time at which prices and contracts were agreed)[20]. Prices rose substantially over time, from just under £20 per tonne of CO_2 saved to a peak of almost £50.00 per tonne (before falling again for mitigation measures). The spike in prices is not as pronounced as the spike in delivery, and this is likely due to the phasing and completion of schemes (peaks tended to be shown in the summer months, when weather patterns and temperatures were more amenable to the types of construction activity involved). The pattern was reflected in the information provided on trading of CESP obligations obtained through the data capture exercise. The obligated parties reported that the Impact Assessment price of £16.16 (in 2009 prices, as

[19] This is the percentage of total carbon savings reported to the evaluation team by the obligated parties (rather than figures that have been verified and validated by Ofgem).

[20] I.e. total costs divided by Mt of CO_2

originally reported in the CESP impact assessment) set initial expectations and acted as a guideline for initial price negotiations for schemes.

Overall, the evidence from the evaluation cost surveys and the qualitative interviews showed that contributions from the obligated parties to CESP measures ranged from 10% to over 100%. The contributions at the lower end tended to be early schemes, whilst the fully funded schemes tended to come later on in the programme. In some cases the obligated parties also funded additional works beyond the CESP measures and CESP measures sometimes formed much wider packages of regenerative works, benefiting from wider sources.

7.2.1 Cost effectiveness of CESP

In contrast to CERT, the costs incurred by obligated parties associated with the delivery of CESP were substantially higher than anticipated, and average cost per tonne of CO_2 were some 2.5 times higher than for CERT. This was partly driven by the bonus structure: the supply of schemes offering the high carbon uplifts required to attain the anticipated unit costs was not as strong as anticipated. However, the complexity and difficulty of the construction projects involved, and their long lead-in times, also likely inflated costs (and also led to aborted schemes). This might be somewhat expected, given the schemes focus on innovation and trialling new approaches.

There was also wide variation in costs per tonne of CO_2 (on a scheme level) between the different obligated parties; the most expensive scheme exceeded £100 per tonne. In addition, the decline in availability of alternative funding sources (primarily from Local Authorities) during the latter years of the programme also contributed to an increase in the cost to the obligated parties.

The lack of information on the delivery costs for specific measures, or detailed information about how the schemes were delivered, mean it is not possible to explain the high level of volatility of prices by scheme. However, a number of themes arose that help explain the drivers of costs.

Key price drivers under CESP included:

- **The scheme design:** As CESP was quite a different scheme to previous obligations, stakeholders reported that the Impact Assessment was important in determining initial delivery strategies and prices. CESP also involved a narrower scope than CERT (particularly pre-Extension) and therefore provided fewer opportunities for competition between energy saving sectors. The complex scoring system created uncertainty about the carbon scores that schemes would achieve (and therefore their worth) and added to the administrative and management costs. A relatively short delivery window (for the nature of the works required) also put pressure on prices.

- **Development costs:** Evidence from both the interim evaluation and this evaluation suggests that development costs for CESP were significantly higher than CERT. Negotiations with energy companies were often reported to last several months, and in some cases over a year.

- **Wider funding:** An initial expectation that local authority and housing associations would be able to contribute significant funds to schemes, but public spending cuts limited their ability to do so, driving up the price of carbon and the cost of schemes for the obligated parties;

- **Scarcity:** there was a paucity of cost-effective schemes (those that optimised the uplifts and bonuses available under CESP); and

- **Competitive auctioning:** as demand rose for schemes, many local authorities and housing associations sought to maximise the value they secured from the obligated parties.

8. Conclusions

This final section concludes with a summary of the successes and failures of the original CERT programme (2008-11), the CERT Extension (2011-12) and CESP. It also relates the findings of this evaluation to the original policy objectives of each programme (see appendix A1 for the programme objectives). It is important to note that the policy objectives did not set out completely clear expectations in terms of specific targets or milestones to be reached. The objectives were also not built into the design of the programmes through any formal monitoring mechanisms to assess progress in achieving them. For these reasons, assessing the extent to which they were reached is challenging. We have therefore provided a general assessment of the programme's achievements rather than considering each individual policy objective in turn.

8.1 CERT

8.1.1 Reducing domestic carbon emissions

In many ways, CERT was a successful vehicle for reducing household carbon emissions across Great Britain. The overall carbon targets were, broadly speaking, achieved. CERT delivered a high volume of carbon savings, with 296.9 Mt CO_2 being achieved, as reported by Ofgem, in excess of the 293 Mt CO_2 required by the obligation. This was, largely, due to the wide range of measures that were eligible under the programme.

These savings are based on the assumed lifetime carbon savings brought about by measures, and it is not possible to know at the time of writing whether these savings will be achieved in reality. There is no monitoring of the measures in-use, and some stakeholders expressed concerns that not all measures were leading to savings; the over-delivery of free CFLs being the most commonly cited reservation. Anecdotal evidence also indicates that the impact of some measures can be lessened by low consumer awareness of how best to use the measures, faulty installations and/or deficiencies in the existing energy efficiency of recipient's homes.

However, the assumed lifetime carbon savings set out in Ofgem's technical guidance did take into account comfort taking and other factors that would reduce the measures' potential savings. Ofgem also conducted a monitoring exercise on the CFL activity and reduced the carbon savings claimed by suppliers in accordance with the findings of this exercise.

Furthermore, by providing a suite of options and measures to the energy suppliers to deliver their obligations, consumers benefitted from activity and offers on energy across the home, including insulation, heating, appliances and lighting. This element of the design meant that CERT was an inclusive scheme, in that all homes in Great Britain had the potential to benefit from the programme. The aspiration to report on the number of measures delivered was also achieved, contributing to a greater understanding of the scale of energy efficiency measures across the domestic housing stock.

CERT had some success in overcoming barriers to take up of energy efficiency measures; while not an effective vehicle for promoting large-scale uptake of microgeneration, it successfully delivered high volumes of 'quick win' forms of insulation, such as loft and cavity insulation, and lighting (although stakeholders disagreed about whether the latter were effective in delivering carbon saving due to concerns about the extent to which light bulbs were used by consumers).

In terms of the Extension, the IO was successfully achieved and the extension raised levels of insulation considerably (particularly professional loft insulation).

8.1.2 Equity

In terms of CERT's equity, it was arguably more equitable than CESP, given that anyone across Great Britain could participate. However, CERT's incentive structure encouraged delivery of lowest-cost measures, which in turn resulted in an emphasis on easier to treat properties and properties in more accessible areas. This focus on the 'low hanging-fruit' left more challenging measures and/or barriers largely side-lined. Homes in less accessible areas, such as remote areas of Great Britain and dense urban areas (such as inner city London where access costs were higher) were less likely to benefit.

There was also under-representation of the social housing sector and PRS sector within CERT (roughly 90% of beneficiaries were in owner occupied households). There were some reports of reluctance from the energy suppliers to engage with the PRS, but the barriers to engagement with this sector (primarily in reaching landlords and negotiating the three-way nature of organising improvements between the tenant, landlord and installer) were certainly also a factor.

8.1.3 Costs of measures to consumers and impacts on fuel poverty

Costs of measures to consumers were kept relatively low (although potentially contributing to a legacy of inflated consumer expectations of the low cost of energy efficiency measures), and the PG and SPG obligations encouraged redistribution of the benefits to those most in need. Five of the six energy suppliers met their PG and SPG targets, suggesting that CERT did succeed in reaching a certain number of vulnerable households. It is likely that fewer suppliers would have met their SPG target without the retrospective 'data-washing' exercise with DWP. Engaging SPG customers proved particularly challenging for the energy suppliers. They were difficult to identify and engage with; personalised approaches involving locally-based, trusted organisations and community groups were more effective in reaching this group than generic marketing approaches. When they were reached, it was often difficult to obtain the evidence required to prove they fell into the SPG category; energy suppliers used cash and other incentives to help overcome this barrier.

The true extent of CERT's impact on fuel poverty is very difficult to ascertain, as already noted. The introduction of the SPG in the CERT Extension – while not specifically targeting the fuel poor - went some way to addressing the gap in information about the 'vulnerability' of customers, but not specifically about fuel poverty. This was also only applied to the latter part of the programme.

Most PG and SPG customers received insulation measures for free, with many NPG customers also not paying anything for measures. These findings indicate the relative success of the programme in delivering measures to those who could probably ill afford them in normal circumstances. However, the available evidence explored in this evaluation indicates that CERT beneficiaries were often not the neediest; they were more likely to be on higher incomes and less likely to be concerned about their household's financial situation. Financial motivations were the most common reason given by CERT customers for installing measures, but the impact of the subsidy they received is less clear. A relatively high proportion of customers claim that they would have gone ahead without the discount (although it should be noted that there is likely to be some over claim in this). For these reasons, it is questionable whether the additionality delivered by CERT was fully maximised. It is not possible however, to provide a quantitative assessment on additionality.

8.1.4 Cost effectiveness of CERT

Both CERT and the CERT Extension were delivered at a lower unit cost (cost per tonne of CO_2 saved) than originally anticipated in the impact assessment. It was also delivered more cost-effectively than CESP, and in comparison to expected ECO costs. However, the evaluation evidence suggests that the SPG was not a particularly cost-effective way to deliver the fuel poverty objective.

8.2 CESP

8.2.1 Reducing domestic carbon emissions and improving energy efficiency of housing stock

The carbon savings delivered under CESP were a fraction of those achieved under CERT, and the programme failed to achieve the overall carbon savings it originally set out to deliver. However, scale was not the primary focus of CESP and reports from stakeholders and also customers are that it did transform the housing stock of areas in which CESP activity was located. All of the case studies and many national interviews generated evidence of the significant regeneration impact of CESP schemes. The visual improvement of areas was particularly considered to be a success of the programme, and additional benefits have been cited including increased employment and protection of entire estates from demolition.

According to recent estimates, CESP also contributed significantly to the SWI industry during its lifetime. As of January 2013, approximately 39% of all measures installed in British homes were delivered through CESP. It should be noted that only three per cent of domestic solid wall properties were estimated to have been insulated by the beginning of 2013 (DECC, 2013), but the industry was clearly driven by the programmes.

8.2.2 Equity

In terms of the equity of CESP, the scheme set out to reach those in low income areas rather than take a broad brush approach as CERT did. No monitoring requirement of customer characteristics was built in to the programme, and it is not possible to conduct a national survey of CESP areas. For these reasons, it is difficult to ascertain the demographic ‘profile’ of CESP customers and therefore the degree to which they could be considered low income households. However, the case study surveys and anecdotal evidence from the qualitative interviews does suggest that relatively high proportions of customers were on low incomes and in difficult financial positions.

Unlike CERT, CESP was successful in incorporating a significant degree of social housing properties into the programme. It also reached the private sector (around a third of measures were in owner-occupied households), often through extension of subsidised measures initially targeted at social housing.

8.2.3 Costs of measures to consumers and impacts on fuel poverty

As with CERT, the lack of any customer monitoring data prevents an accurate assessment of CESP’s impact on fuel poverty. For the same reason, it is also difficult to judge the extent to which fuel bills were reduced (although this issue is tackled in a combined section for both CERT and CESP later in this chapter).

CESP did target disadvantaged areas through focusing schemes in the most deprived 10% of LSOAs across the country. However, those living in fuel poverty are not necessarily area (LSOA) based (data from the interim evaluation suggested that fewer than a quarter of

households in the bottom 10% of the IMD composite[21] in England were in fuel poverty – slightly above the national average of 18%). The obligated parties therefore had limited ability to target those in fuel poverty specifically, and had no requirement to monitor income levels of those they engaged with. This raises the question of whether this design might have been more difficult than a registry-drawn selection might have been, with the assistance of relevant Departments.

There were also problems encountered with delivering measures in rural areas, as well as London – as experienced with CERT – meaning that low-income populations in these areas were less likely to benefit.

8.2.4 Cost effectiveness of CESP

In contrast to CERT, the costs incurred by obligated parties associated with the delivery of CESP were substantially higher than anticipated, and average cost per tonne of CO_2 were some 2.5 times higher than for CERT. This was partly driven by the bonus structure: the supply of schemes offering the high carbon uplifts required to attain the anticipated unit costs was not as strong as anticipated. However, the complexity and difficulty of the construction projects involved, and their long lead-in times, also likely inflated costs (and also led to aborted schemes). This might be somewhat expected, given the schemes focus on innovation and trialling new approaches.

Costs per tonne of CO_2 delivered varied considerably by scheme and by obligated party. The lack of available information on the delivery costs for specific measures, or detailed information about how the schemes were delivered, mean it is not possible to explain the high level of volatility of prices by scheme.

Stakeholders also reported regional variations in cost-effectiveness, with schemes being most costly in rural areas, as well as London. The higher costs in these areas certainly contributed to the lower level of delivery in these areas.

8.2.5 Piloting new approaches

CESP did incentivise area-based delivery but not as intensively as hoped. There were barriers to delivering CESP measures in certain tenures - for private dwellings and to a larger extent the PRS - which hampered the ability to maximise localised delivery. The fact that LSOA boundaries often cut across communities (and even properties or blocks) made equitable delivery a challenge.

The area-based approach did help bring some benefits including promotion of the scheme by word of mouth, and cost-efficiencies in marketing and the practicalities of delivery. However, this impact on cost effectiveness was largely outweighed by the impact of the programme's complexity (e.g. the variety of build types and complexity of design).

Partnerships were important vehicles under CESP, as well as CERT, and there is some evidence that CESP encouraged effective partnership working. However, longer timescales and greater support, guidance and resources for key delivery partners might have strengthened these and made them more consistently effective and holistic.

[21]Note that the 2009 EHS data does not include the IMD income indicator used to determine CESP areas. The analysis used instead the IMD composite indicator. The income domain has a high weighting in the IMD composite indicator and is closely correlated with many of the other components (e.g. employment) so this should be a reasonable first proxy in the absence of the specific IMD income indicator used by CESP. Indeed, BRE analysis of 2005-07 EHS data using the IMD income indicator used in CESP showed not dissimilar results, finding that just over 20% of CESP targeted households were in fuel poverty, against a national average of 15%.

The emphasis on, and incentive structure to enable, whole-house delivery did encourage delivery of multiple measures. However, it could not truly be considered a 'whole-house' solution as not all measures required for a genuine whole-house solution were always eligible or available under CESP.

8.2.6 CESP Design

There are question marks over how appropriate it was to obligate the independent generators in the delivery of CESP; they had no previous experience of energy company obligations, no experience of delivering domestic energy efficiency schemes, no existing relationships with domestic customers and limited in-house resources. This may be reflected by the fact that three of the four independent generators failed to meet their targets.

Those involved in the delivery of CESP also raised the question of whether CESP was run as a pilot, as originally expected. While it trialled new approaches and encouraged innovation, the obligated parties were bound by the targets set under CESP and faced fines for failure to deliver against them.

8.3 Engaging customers – CERT and CESP

There are a number of issues related to customers, such as the impact on heating behaviour and thermal comfort, which do not differ markedly between the CERT and CESP programmes. The following section therefore takes a thematic approach, assessing each issue for both programmes, but identifying any differences where they exist.

8.4 Impact of measures on bills and affordable thermal comfort

The ability of this evaluation to determine the extent to which costs of delivery, incurred by the obligated parties, have been passed on to consumers is hampered, primarily, by two factors; firstly, the paucity of information on energy supplier pricing mechanisms in this respect, and secondly, the absence of baseline data on customer's bills. Most customers surveyed reported an increase in their bills when compared with the period before they received any measures, but it is not possible to isolate the contribution made to this by the CERT and CESP programmes.

Furthermore, increases in fuel prices over-shadow actual and/or perceived savings that might be attributed to the energy efficiency measures. However, the indications are that many - particularly CESP - customers have attained affordable thermal comfort as a result of the programmes. A significant proportion of CESP customers (almost half) have been lifted out of a position of being unable to afford satisfactory heating. While lower than CESP, around a quarter of CERT customers are in the same position. Consequently, the indications are that the programmes - particularly CESP - have helped low-income customers to reduce under-heating of their homes.

It should be noted that in some cases (certainly only a small minority) the existing thermal efficiency of the home has lessened or impeded the benefit of the measure received, and therefore the impact it might have had on customers' bills.

The programmes have had more of a noticeable impact on thermal comfort. Both CERT and CESP customers, on the whole, perceive that the measures installed have made their homes feel warmer. Moreover, CERT customers were also more likely than those installing non CERT measures to say their home now feels warmer with the measure (likely a function of the measures received, or combination of measures when added to existing ones).

8.5 Impact of measures on behavioural change

It is difficult to ascertain the impact that receipt of measures through the programmes may have had on delivering positive behavioural changes. This is because of the lack of baseline data to analyse changes over time; the wider context of changing energy prices and consumption and the general difficulty (due to social desirability bias) of accurately assessing positive behavioural change through self-reported measures alone. While many customers report reductions in their energy use, incidence of this is no higher than for non-customers.

Anecdotal evidence from stakeholders and customers highlights some positive effects on energy efficiency behaviour but this was not found to be widespread. There was some evidence of an increased level of control over heating of the home, particularly where new boilers and/or heating systems were received.

There is some evidence that a lack of customer understanding of, and potentially availability of information on, how to use the energy efficiency measures received, may undermine the potential carbon savings that could be experienced. This raises the question of whether, as part of the delivery mechanism, more appropriate training provided by qualified individuals, or an alternative method of disseminating the necessary advice, could be built in.

8.6 Scheme design

8.6.1 CERT

Table E6 summarises the key strengths and weaknesses of the design of the CERT scheme, as found in this evaluation. The strengths and weakness of the CERT Extension are considered in Table E7.

Table E6: The strengths of weaknesses of the design of CERT (2008-11)

Element of design	Strengths	Weaknesses
Flexibility	Flexible means of delivery: options through different sectors including insulation, lighting, microgeneration, appliances, behavioural measures, etc.	Flexibility led to unintended consequences, such as the 'over-distribution' of CFLs
CO_2 scoring system	Simple scoring system created certainty	A perception among some obligated parties that deemed carbon savings were an oversimplification
Delivering CO_2 savings	Supported high volumes of measures at lowest cost	No mechanism to distribute the carbon savings to the most vulnerable Hard-to-treat measures not promoted: primarily focused on 'low-hanging fruit'
Beneficiaries	Inclusive, wide scope: potential for most households to benefit	A lack of equity: hard-to-treat homes, private rented sector and less accessible areas all under-represented
Link to predecessor schemes	Evolution from previous supplier obligation helped to smooth transition	
Administration	Administrative systems simple	

8.6.2 CERT Extension

Table E7: The strengths of weaknesses of the design of the CERT Extension

Element of design	Strengths	Weaknesses
Scope	A more prescriptive set of options for delivery created greater certainty about outcomes	Narrower scope and limited flexibility contributed to increased costs and prices
Targeting the vulnerable	Targeted vulnerable customers	SPG evidential requirements challenging; SPG obligation not a cost-effective means of targeting the most in need
Supporting industry	Supported a growth in the insulation industry as a result of the IO	Succession planning post-CERT did not provide certainty about transition arrangements and hindered ability of industry to plan and develop longer-term
Timescale		Short delivery timescale and inelastic demand led to higher prices

8.6.3 CESP

Table E8 summarises the key strengths and weaknesses of the design of the CESP scheme, ass found in this evaluation.

Table E8: The strengths of weaknesses of the design of CESP

Element of design	Strengths	Weaknesses
Objectives and scoring	The objectives and principles of CESP were widely supported by stakeholders	A complex scoring system: promoted lack of certainty and increased the administrative burden of the scheme
Focus on measure types	Successfully promoted delivery of SWI and multiple measures	Not truly a 'whole-house' scheme as some key measures not eligible or applied
Timescale		Short delivery timescale and inelastic demand led to rising prices
Area based	Promoted area-based delivery	LSOAs and Data Zones cut across community boundaries
Partnerships	Promoted partnership working	But timescale and complexity hindered consistent development of effective partnerships
Pilot	Promoted as an opportunity to pilot new ways of delivery	Obligation not run as a pilot: flexibility not built into the design

8.7 Learning for future policy

This evaluation set out to provide evidence to inform future energy efficiency policy design. This section summarises the key findings and the author's opinions of their implications for the development of related policy.

Programme delivery

- Longer delivery timescales are required for the successful delivery of complex schemes, particularly where there is not a comparable precedent from which to learn.
- Due to the skills, enthusiasm and resources they provide, the role of Local Authorities is critical in successful delivery of area-based energy efficiency schemes.
- In designing domestic energy efficiency policy, consideration should be given to the reporting periods that obligated parties must abide by, and their possible impact on the profile of delivery and, consequently, the impact on industry.
- The degree to which obligated parties and delivery partners provide guidance to consumers on how to most effectively use energy efficiency measures they receive, can impact on the efficacy of those measures. The same is also true of the message delivered alongside the installation.

Policy design and administration

- Additional support and guidance may be required for independent generators if they are to be obligated to deliver 'pilot' programmes aimed at consumers.
- There is an important balance to aim for between simplicity of programme design and certainty of outcome.
- Where possible, transitional arrangements to replacement obligations should be established to minimise industry uncertainty.

Reaching the fuel poor and equity

- Where the target customer is not bound by a pre-defined geography, alternative approaches to those using defined boundaries may be required.
- Without a structure of incentives, delivery to different tenures may be uneven.
- Co-ordination between different Departments should be encouraged to help minimise administration (e.g. customer search) costs and streamline delivery.
- Monitoring of customer characteristics should be considered at the policy design stage to allow for an assessment of delivery to disadvantaged groups.

Evaluating and monitoring success

- Ex-post evaluations should be planned at the beginning of programmes to ensure the necessary structure is in place to assess performance of the policy.
- Ex-ante evaluations require clarity on the expectations for the programme and the development of a baseline against which to compare to the ex-post evaluation.

Long-term monitoring of the quality of energy efficiency measures would be required to ensure that carbon savings are as expected.

9. Appendices

A1: CERT and CESP policy objectives

Box A1. CERT objectives

The policy objectives of CERT were to:

- Reduce household carbon emissions by overcoming barriers to uptake of cost-effective energy efficiency measures, across all households in Great Britain;
- Promote the delivery of microgeneration and other measures for reducing the consumption of supplied energy, in addition to energy efficiency measures;
- Introduce new approaches for innovation and flexibility;
- Keep costs at a reasonable level (and thereby minimise the cost passed through to consumers);
- Maximise cost-effective carbon savings;
- Maintain equity and contribute to the delivery of our statutory fuel poverty objectives; by ensuring that low-income households benefit; and
- Collect and report on numbers of measures delivered.

Box A2. CESP objectives

In addition to the objectives set out in Box A1, CESP aimed to:

- Reduce the fuel bills of low income households across Great Britain;
- Improve the energy efficiency of the existing housing stock in order to reduce the UK's CO_2 emissions; and
- Pilot new approaches to delivering energy efficiency measures, including:
    - Area based street-by-street approach to delivery;
    - Partnerships;
    - Tackling hard to treat homes;
    - Whole house retrofits involving major measures; and
    - Targeting disadvantaged areas.

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A3: Case study selection

Qualitative and quantitative interviews were conducted in seven case study areas in England and Scotland to find out customer, non-customer, obligated party and delivery partner experiences of the programmes. The case studies were selected to reflect areas of varying levels of CERT or CESP activity. The other main criteria on which the selection of case study areas was based were:

- Predominant tenure type (social rented, private rented or home ownership)
- Area of the country
- Proportion of the local housing stock consisting of flats
- Proportion of households on the gas-grid

The aim of these criteria was to achieve a broad mix of different types of area and, by extension, a variety of approaches to implementing CERT and CESP measures.

The starting point for selecting the case study areas was the EST Home Analytics database; consisting of profile data and analysis on the housing stock of all 26 million homes in the UK at address-level. This was used to identify a 'long list' of potential case study areas based on the criteria outlined above.

This report refers to evidence collected from seven case study areas (A to G). However, for two case study areas (B and F), customer quantitative and qualitative research was not undertaken – only the stakeholder interviews were conducted. Both of these case studies were originally selected for inclusion in the project's scoping phase. However they were removed from the customer element of the research for the following reasons:

- Case Study B was removed due to budgetary constraints; and
- A CESP case study area in rural Wales (Case Study F) was also selected originally. However, sourcing the sample (an initial list of addresses that were targeted by the local CESP scheme) from local housing providers in time to complete fieldwork and enable findings to feed into the report was not possible and this area was therefore not included in the customer element of the research.

As such, evidence from case study areas B and F is presented in this report from the process evaluation, but not from the customer element of the research.