DEPARTMENT OF ENERGY & CLIMATE CHANGE

LOW CARBON BUILDING PROGRAMME

2006-2011

FINAL REPORT

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EXECUTIVE SUMMARY

Background

The Government is strongly committed to meeting 2020 EU targets to generate 15% of the UK's energy supplies from a renewable energy mix across the three main energy-using sectors: electricity generation, heating and transport For electricity and heat, this energy mix covers technologies such as large scale wind, tidal, hydro, solar, heat pump and biomass installations. Supplementing these larger scale technologies, we know that a significant amount of smaller scale onsite low carbon and renewable energy technologies at community and household level is also needed to hit the 15% target. The UK has low levels of renewable micro-technologies compared to other similar-sized economies in the EU.

Heating and powering homes produces more than a quarter of Britain's CO_2 emissions. So DECC are working to help create a low-carbon Britain, with energy supplies which are affordable, secure and sustainable.

The contribution from the household and community level is important. A 2008 Government survey into awareness and attitudes discovered that public support for renewables remains high. More information into research into public attitudes is set out at:

http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/planning/perception/perception.aspx

The development and deployment of Microgeneration technologies for the generation of heat and electricity from renewable sources is largely in its infancy in the UK. If Government are to achieve significant reductions in carbon, an infrastructure of manufacturing, supply, and installation technologies are needed. It is also recognised by Government that certain financial and planning barriers need to be overcome, standards for manufacturing and installation quality are required to give consumers confidence, skills are needs to support the industry and, initially, financial incentives are required to motivate industry and consumers.

In support of this, the Low Carbon Buildings Programme was initiated and was a major £137 million Government suite of grant programmes that ran from 2006 providing funds to householders, schools, charities, businesses, communities and other not-for-profit organisations for the acquisition and installation of a range of Microgeneration technologies.

Microgeneration technology capacities have been defined by the Microgeneration Certification Scheme (MCS) with the following limits: Electricity up to 50kW and

thermal up to 45kW. Most technology models installed under the LCBP programme have therefore been within these limits, although in special cases, where the scale of the technology has exceeded these microgen limits projects have been approved using the Energy Technology List or assessment by BRE on a case by case basis. For LCBP-2e the limits were raised to 300kW.

The purpose of this document is to report on the construction, execution and outcomes of the programme

LCBP Objectives:

The Programme was initiated by the Department of Trade and Industry (DTI) which became the Department for Business Enterprise and Regulatory Reform (BERR) before the formation of DECC in 2008.

The main LCBP programme objectives, as defined in the original Ministerial submission were:

- "to support a more holistic approach to reducing carbon emission from buildings by demonstrating combinations of both energy efficiency measures and microgeneration products in a single development "
- "to see demonstrated on a wider scale emerging microgeneration technologies (with a focus on building integrated technologies)"
- "to see microgeneration products costs reduce over the lifetime of the Programme against a 2005 baseline"
- "to raise awareness by linking demonstration projects to a wider Programme of activities including developing skills and project replication."

An independent evaluation[1] of the LCBP Programme against these objectives was conducted and is to be found on the DECC Website

How was LCBP Structured?

LCBP was essentially a Grant Programme where by individuals or organisations applied for grants to partially cover the cost of the equipment and its installation. This was to defined criteria and limits and depended on the technology type, the type of organisation and if the grant was for new-build or retro-fit situations. Grant Offers were made in writing (GOL's – Grant Offer Letters) which were, within defined time scales, redeemed on submission of proof of expenditure or cancelled as expired.

[1] *Low Carbon Building Evaluation Project, Ipsos-MORI, August 2011 published on DECC website : http://www.decc.gov.uk/assets/decc/11/funding-support/fund-opportunities/2414-evaluation-of-the-lcbp-research-report.PDF*

There were two Phases (both of which were extended in 2009).
Phase 1 of the Programme was initiated in April 2006 and was initially focussed on householders plus a number of community projects and some other larger major projects. This was managed on DECC's behalf by Energy Saving Trust (EST).
The Programme was expanded in early 2007 by the addition of Phase-2 which focussed on the non-domestic not-for-profit. This Phase was managed by Buildings Research Establishment
The following abbreviations have been used throughout this report to refer to the various phases and streams

The £137 million programme contained a £111 million 'Core' LCBP Programme':

- **LCBP-1**: Phase 1 householder stream, launched in May 2006 and administered by EST
- **LCBP-1c**: Phase 1 communities stream, launched in May 2006, administered by EST
- **LCBP-1(2a)**: Phase 1 Stream 2a with medium-scale projects, launched in October 2006, administered by EST
- **LCBP-1(2b)**: Phase 1 Stream 2b with large-scale projects, launched in November 2006, administered by EST
- **LCBP-1e**: Phase 1 householder extension, launched in July 2009, administered by EST
- **LCBP-2**: Phase 2 non-domestic stream, launched in 2007, administered by BRE
- **LCBP-2e**: Phase 2 non-domestic extension, launched in July 2009, administered by BRE

Additionally there were other funding Programmes and other sub-funding streams:

- A Clear Skies & Major PV Demonstration Programme Extension (£1.5 million)
- Administration and management (£8 million) – see page 19
- 4 Fuel Poverty programmes with the Welsh Assembly and three Regional Authorities, One North-East, Yorkshire First, East of England Development Authority (£3 million)
- Comprehensive monitoring and support for (originally) 23 large-scale new-build and 'retro-fit' projects (later reduced to 17 projects) which were used as major dissemination subjects (£5 million)

- Support for the provision of testing equipment for Wind Turbines (£0.75 million)
- Solar Thermal Hot Water field Trials (£0.175 million)
- Heat Pump evaluation programme (£0.12 million)
- Support and development of the Microgeneration Certification Scheme including discounts for suppliers seeking accreditation (£0.2 million)

LCBP closed to all new grant applications in May 2010 and all payments were intended to be completed by 31st March 2011 which was largely achieved.

How many Grants were provided and at what cost?

The final schedule of installations shows that 19,216 projects were funded at a cost of £91.37 million, this includes installations in a separate Fuel Poverty Stream.

What technologies were supported?

Microgeneration technology capacities have been defined by the Microgeneration Certification Scheme (MCS) with the following limits: Electricity up to 50kW and thermal up to 45kW. For LCBP-2 extension programme, the limits were raised to 300kW.

The technologies covered by the LCBP programme were;

Solar Voltaics (Solar PV)	0.5kWp to 50kWp
Solar Thermal (Solar Th)	Up to 300kWth
Ground-source Heat Pumps (GSHP)	Up to 300kWth
Air-source Heat Pumps (ASHP)	Up to 300kWth
Micro-hydro Generators	Up to 50kWp
Micro Wind Turbines	0.5 to 50kWp
Automated Wood Pellet Fed Heaters or Stoves	Up to 300kWth
Wood Fuelled Boiler Systems	Up to 300kwth

How much grant was available?

The value of grants available depended on the sector the applicant was in (householder, organisation etc), the technology chosen and or if the installation was for ‘new build’ or retro-fit. The maximum amount of grant that could be claimed was therefore variable and was not confined to a single technology per applicant.

For LCBP-1 householder Stream, the grant offer maximum per property was £15,000. This was reduced to £2,500 in May 2007 and this limit continued for householders under the extension programme LCBP-1e.

There was not only a difference between the initial programmes but also between the original programmes and their extensions, for example, under LCBP-2, the maximum grant was originally capped at £1,000,000 but was reduced in the extension programme to £200,000.

For LCBP-1, typically the LCBP grant represented 10 to 28% of the equipment and installation cost (an average of £1,314 per grant recipient) and for LCBP-2 this rose to between 47 and 50% (average £24,232 per grant recipient)

Where were grants available?

Grants in the main programme were available across the UK and no regional or national allocations were made, applications were basically handled on a first come, first served basis within the categories managed in the EST and BRE funding stream allocations.

During the period that grants were available through LCBP, other funding streams were available most notably through the Scottish Community and Householder Renewables Initiative ('SCHRI'), the 'ARBED' scheme in Wales and initiatives in Northern Ireland all of which served to depress demand for LCBP in those Nations.

Applicants in England were the main recipient of grants amounting to 16,058 grants with a value of £76.37 million

Grants under the Fuel Poverty streams were confined to the regional and national areas in which the Authority operated. The Regional Authority (RA) or National Authority (NA) determined how that money was dispersed and it was mainly used for social housing (£2.65 million)

For LCBP-1 (Householder stream) a condition of receiving a grant was that a minimum level of insulation was to be installed in the property before a grant was made. There was no such stipulation for LCBP-2 and The Fuel Poverty Stream also provided £351,000 to improve insulation in that sector.

Who got grants?

80% of all grants in the main programme paid were to 15,244 Householders and this accounted for 22.6% of the overall budget. However, the greater proportion of the budget, 66.7% equating to £60.97 million, went to the non-domestic, not-for-profit sector but which only amounted to 14.3% of the grants.

Within the domestic (Householder) main Grants programme (LCBP-1), the main grant recipients were owners of detached housing (houses and bungalows) which accounted for 11,114 (73%) grants worth £15.55 million (74.5%).

Additionally, of these, the majority of housing was 3, 4 or 5 bedroom indicating that the more affluent, larger housing groups were the major beneficiaries of domestic (householder) grants.

LCBP-1 also had a community funding stream (LCBP-1 community) and a medium and larger size project stream (LCBP-1stream 2a and LCBP-1 stream 2b) and LCBP-2 funded other non-domestic not-for-profit and community projects.

A good spread of recipients was achieved in these streams with the main recipients in these categories being Housing Associations/Trust (904 grants totalling £25.86 million), Schools (663 grants, £10.39 million), Local Authorities (499 grants, £11.86 million) and Charities (414 grants, £7.65 million)

How will the learning from the LCBP programme be disseminated?

A principle objective of the programme is that learning from it can be transmitted, not only to other DECC programmes but to planners, designers, academics and the general public. To this end, a number of major pieces of work have been prepared and placed in the public domain. These include; a set of publications designed to assist in the selection, design and operation of microgen equipment, a raft of case studies, a number of illustrative videos, a comprehensive dataset of the performance of 17 exemplar major projects and a specific set of advice from a retro-fit, multi-environment programmes based on experiences at RBG Kew.

Contents

Note: each section has its own index

SECTION 1

LCBP OVEREVIEW

Mike Gardiner - DECC

Section 1 Overall Programme – Contents

1.1 Programme History

2006

The Low Carbon Buildings Programme (LCBP) was launched in April 2006 and followed on from two previous grant programmes 'Clear Skies' and 'Major PV Demonstration Programme'. Initially a budget of £30 million was provided of which £1.5 million was made available to the Clear Skies and Major PV programmes to provide continuity until LCBP was fully up and running and £2.4 million was designated for management and administration costs. This initial programme was called LCBP-1 and was run by Energy Saving Trust (EST). A pre-requisite for this funding stream was that a minimum standard of insulation was in place before a grant was offered.

Funding was mainly for Householders however separate 'pots' were created to allow Communities, medium-sized projects and large-scale projects to 'tender' for funding. These were awarded on a competitive bidding process and were termed LCBP-1 community stream, LCBP-1 Stream 2a (up to £100k) and LCBP-1 Stream 2b (£100k to £1million). Carbon Trust were contracted for £5 million to support projects under LCBP-1 Stream 2b and to track the projects from design through to completion and operation giving actual performance measures against the design specifications.

In December 2006, LCBP-2 was launched with an initial budget of £50 million (Grants £48.68 million, management / admin £1.25 million and advertising £70k). This essentially broadened the Grant scheme for the non-domestic sector and not-for-profit sector. Grants were then available for churches, schools, community projects and other not-for-profit organisations where State Aid requirements were not compromised.

In December 2006, in response to high demand, monthly capping was introduced to LCBP-1 Householder stream to spread out the uptake of grants.

2007

When the Low Carbon Buildings Programme was launched in April 2006, the Government intended to review grant levels before 2007. After discussions with industry, it was agreed that the level of support for solar PV should be reduced.

The Programme closed at the beginning of April 2007 and was re-launched on 29th May 2007 with revised grant levels and grant offer validity periods for each technology.

For LCBP-1 householder Stream, the grant offer maximum per property was £15,000. This was reduced to £2,500 in May 2007 and this limit continued for householders under the extension programme LCBP-1e.

The grant available for solar photovoltaic systems was reduced from a maximum £3,000 per kWp to a maximum of £2,000 per kWp installed. This was to ensure that limited funds available were used to support as many household installations as possible. The overall maximum grant was also reduced from £15,000 to £2,500 per property. The LCBP-1 budgets were reorganised to match the demand and in response to the launch of LCBP-2. The Community stream reduced from £3.5 million to £1.75 million, Stream 2a reduced from £5.4 million to £2.55 million, LCBP-1 Stream 2b (reduced from £11.2 million to £9.6 million).

In November 2007 a further £6 million was made available to the LCBP-1 householder stream raising the grants 'pot' to £31.2 million and commensurate management / admin budget to £3.3 million.

2008

In November 2008, a further realignment of budgets within LCBP-1 was found necessary to meet demand. An over-allocation contingency was also written into the project, with associated management and administration costs.

Technology 'pots' were created within LCBP-2 to ensure that all technologies could benefit from the grant funding. Solar PV and Ground Source Heat Pumps (GSHP) were currently taking the bulk of the funding.

£3 million was taken from LCBP-1 Stream 2b and offered to 3 Regional Authorities (Yorkshire First, One North-East and East of England Authority) and the Welsh Assembly (WAG) to support Fuel Poverty initiatives in those areas. The funds were distributed in early 2009.

2009

The technology pots within LCBP-2 for Solar PV and GSHP ran out in March 2009 and grants were no longer available for those technologies.

In budget 2009/10, a further £45 million was made available to LCBP. Government procurement rules resulted in competitive tendering for these 'extension programmes' and these were subsequently awarded to EST (LCBP-1e) and BRE (LCBP-2e) with £10 million and £30 million budgets respectively.

It was decided that £5 million of this should be utilised to fulfil applications within LCBP-2 that had been halted when those technology pots were exhausted. This £5 million was offered under the original terms and conditions of LCBP-2. This managed by BRE under a 'Mini-Extension' programme and £80k was utilised for management and administration.

The programmes had different Terms & Conditions from the original programmes. In particular, the use of 'Framework' Suppliers for supply and installation of equipment was relaxed.

Originally products and installers were accepted where listed under the Clear Skies Programme, Major PV Demonstration Programme plus those listed under the Microgeneration Certification Scheme (MCS). The listings were reduced to MCS installers only as of 3rd April 2009 and MCS products only plus those products listed under the MCS Transitional Arrangement as of 1st January 2010. As MCS Standards developed, other certification processes were also acknowledged. This meant solar thermal equipment listed on the Solar Key Mark website also became eligible. Similarly, with the introduction of the 300kW thermal limit under LCBP-2e, products larger than 45kW and up to 300kW listed on the Enhanced Capital Allowances (ECA) Scheme also became eligible.

There was a difference between the initial programme and their extensions, for example, under LCBP-2, the maximum grant was originally capped at £1,000,000 but was reduced in the extension programme to £200,000. For LCBP-2e the limits were raised to 300kW.

Technology 'pots' were dropped.

In September 2009, £140k from LCBP-2e was utilised to support regional promotional and awareness events.

A further £1.175 million was added to the LCBP project and this was utilised for the Wind testing equipment project and heat pump trials.

LCBP-2 and LCBP-2e closed to all new applications for Solar PV to support other electrical technologies on 1st December 2009 to allow remaining funding to be spread over other technologies.

2010

All of LCBP streams closed to all applications for electrical technology on 3rd February 2010 to preserve funds to support the Renewable Heat Incentive proposed to be introduced 1st April 2011. The Feed-In Tariff for electrical Microgeneration was scheduled to commence 1st April 2010 and a the current application rate, it was estimated that all LCBP funding would have been utilised by March 2010.

Various adjustments to all LCBP budgets were made during the spring of 2010 to ensure that the budget was fully utilised across all sectors.

In March 2010, Treasury rules prevented all LCBP budgets from rolling forward to the next financial year and consequently a number of grant holders who were

seeking extensions to their Grant Offer Letter (GOL's) were denied and these grants, amounting to £3.009 million, were withdrawn.

In May 2010, all LCBP was closed to all new applications as the remaining unallocated £3 million funds were offered as part of DECC's savings in the major Government Spending Review. LCBP was closed on 24th May 2010.

2011

Final payments were made to grant offer letter recipients in April 2011 and all remaining offers withdrawn.

Large scale withdrawals were experienced amounting to £22.7 millions mainly due to applicants taking up the Feed-in Tariff in preference to LCBP grant.

External evaluation of LCBP commissioned. And published – see: http://www.decc.gov.uk/assets/decc/11/funding-support/fund-opportunities/2414-evaluation-of-the-lcbp-research-report.PDF

September 2011 – all administration and management ceases, audit, evaluation and reporting completed.

1.2 Overview of Programme Construction

Grant Process

Applications for grants were received by BRE and EST either electronically or by post (see sections 2 and 3 for details) and if the requests met the eligibility criteria, Grant Offer Letters (GOL's) were issued to the applicants to cover part of the capital cost of the equipment and installation costs. There were defined limits for the grant values available and for the validity period of the Grant Offer Letters.

Grant applicants then submitted evidence of project completions along with commissioning/completion certification which allowed them to 'cash in' their Grant Offers.

Consequently there was a delay between funding being 'committed' and 'spend' shown in the graph below

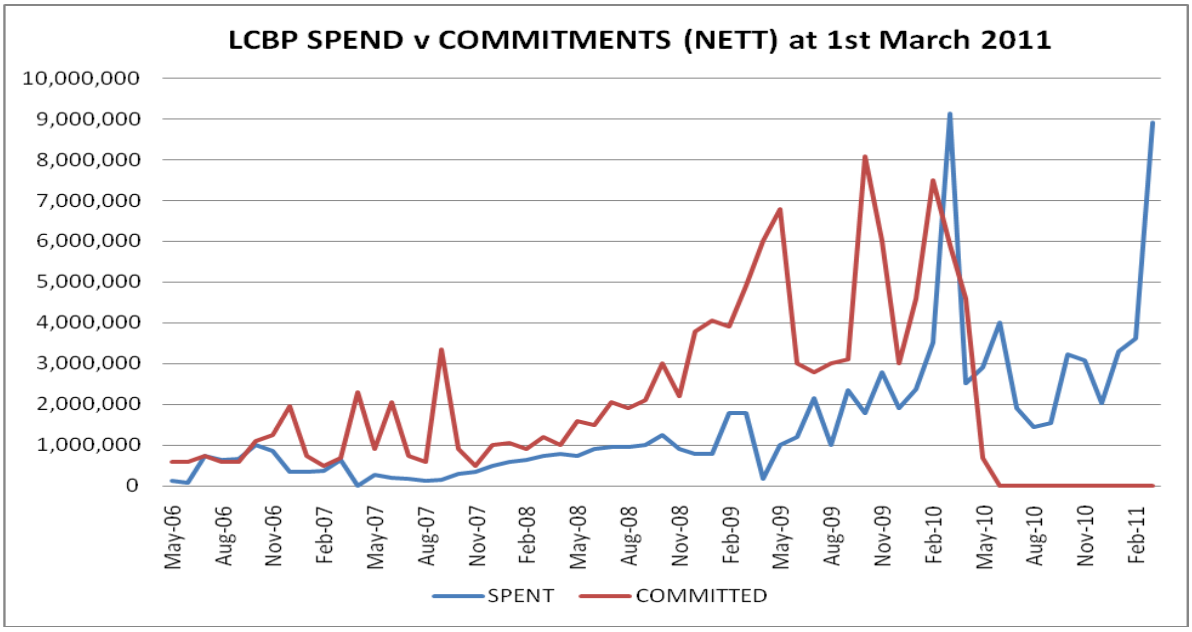


Figure 1 – Relationship between 'committed expenditure and actual; 'spend'

It should be noted that throughout the Programme, where cancellations, withdrawals or 'not-taken-up' (ntu's) were experienced, the funding was normally reallocated to new applicants. The drop-out rate was approximately 10% overall. This was the process up until the end of FY09/10 where the Programme was not able to carry over spend into the following financial year. This resulted in additional cancellations as no grant offer extensions were permitted if this took the grant payment requirements into the next financial year (£3.09 million).

The expenditure of the programme was severely hampered in its latter stages by a large number of LCBP-2 (non-domestic / not-for-profit organisations) failing to take up their grants. This amounted to approximately £22.7 million. This was principally experienced in the last months of the Programme as a result of:

- Foregoing the grant in favour of taking up the Feed In Tariff or proposed Renewable Heat Incentive.
- The economic situation where building and planning had been delayed on major refurbishments and new build projects thus the Grant Offer Letter validity ran out.

Additionally, as part of the Government's commitment to delivering £6bn of departmental spending cuts in 2010/1, the Low Carbon Buildings Programme (LCBP) was closed to new applications on 24th May 2010 resulting in £3 million being taken from the unallocated grants budget.

In summary, of the £137.18 million allocated to LCBP, eventually £105.16 was spent

	Budget Allocation £	Outcome £
CS/PV Legacy	1,500,000	0
Administration (BRE & EST)	8,076,750	7,722,568
Grants	118,323,250	88,895,803
Fuel Poverty	3,000,000	2,999,592
Low Carbon Community Challenge (LCCC)	100,000	100,000
Evaluation Costs	0	100,000
Carbon Trust Support	5,000,000	4,415,679
Microgeneration Evaluation & Testing	1,175,000	928,000
TOTAL SPENT AGAINST BUDGET	**137,175,000**	**105,161,642**
Cancellations due to EYF restrictions		3,009,000
Budget Cut (May 2010)		3,000,000
Non-Grant under spend		2,685,911
'Not-Taken-Up' (NTU) Grants		22,318,477
Total	**137,175,000**	**137,175,000**

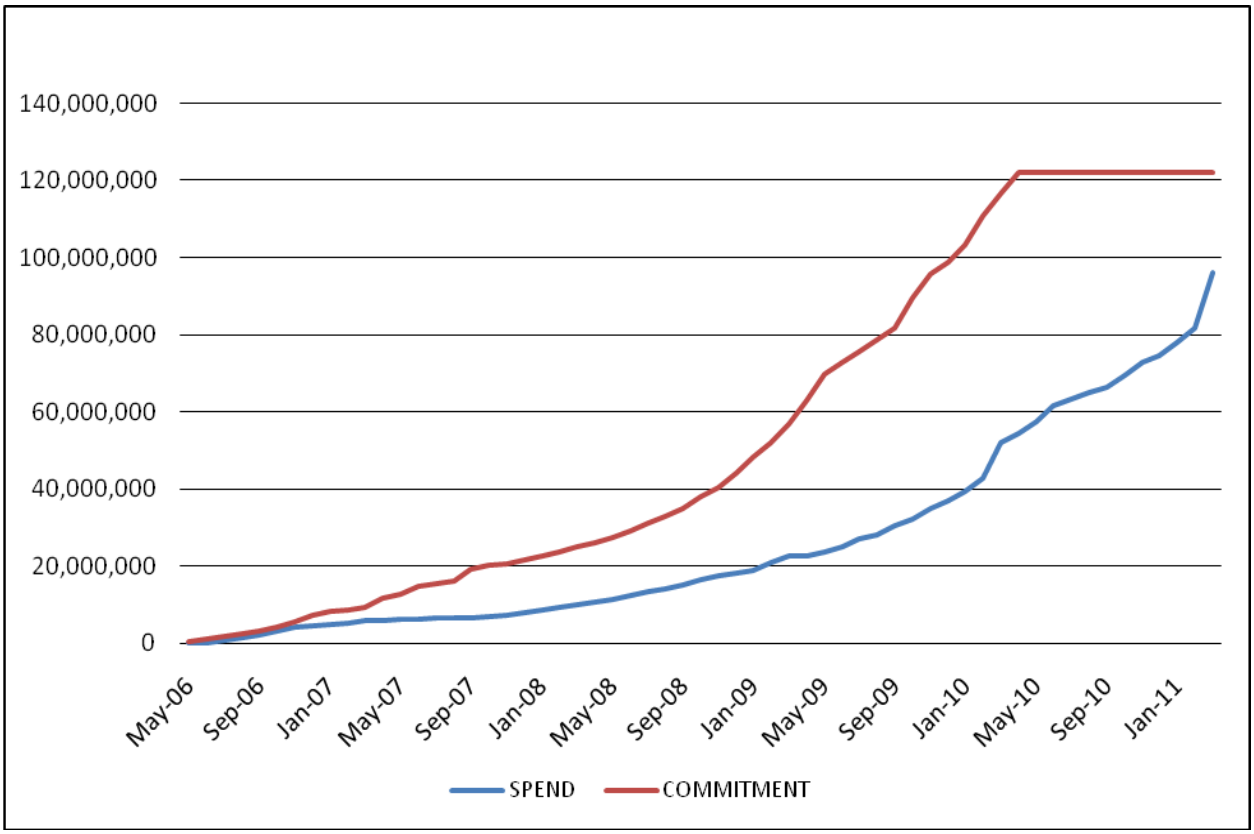


Figure 2 - overall difference between commitment and actual spend

The actual spending per annum is shown below, before which clearly shows that the 'spend' was mainly experienced in the last three years of the programme as the impetus of the programme gathered momentum and the effect of the delay between 'commitment' and 'spend' was realised.

£	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	TOTAL
LCBP-1 Grants	3,053,464	4,557,919	5,072,517	8,083,804	3,488,566	0	24,256,270
LCBP-1e Grants	0	0	0	1,416,900	2,270,712	0	3,687,612
Fuel Poverty	0	0	0	2,999,592	0	0	2,999,592
LCBP-1 Admin	920,903	1,116,502	798,083	856,343	604,188	0	4,296,019
LCBP-1e Admin	0	0	0	113,012	325,000	250,000	688,012
LCBP-2 Grants	0	1,451,099	7,283,157	19,394,583	7,800,302	0	35,929,141
LCBP-2e Grants	0		0	1,188,525	23,834,255	0	25,609,602
LCBP- 2 Admin	130,625	323,206	564,040	411,148	131,438	0	1,560,457
LCBP-2e Admin	0	0	0	479,288	548,792	150,000	1,178,080
Evaluation	0	0	0	0	0	100,000	100,000
Test Equipment & Hot Water	0	0	0	928,000	0	0	928,000
Carbon Trust	725,866	1,005,276	970,876	1,135,014	578,647	0	4,415,679
LCCC	0	0	0	100,000	0	0	100,000
TOTALS	**4,830,858**	**8,454,002**	**14,688,673**	**37,106,209**	**39,581,899**	**500,000**	**105,161,642**

Administration Costs

Within Government funding programmes, a benchmark of 6% administration and management charges is the usual target. Within the core grants programme, LCBP was achieving approximately 6.5% up until the last 3 months of the programme when cancellations and withdrawals of £22.7 million was experienced. Overall, a figure of 8.09 was achieved.

The breakdown is as follows:

	Value of Grants	All Admin Costs	% Admin Cost	Number of Grants	Cost/Grant £
LCBP-1 & 1e	27,943,882	4,984,031	15.14	15,491	321.74
LCBP-2 & 2e	60,951,921	2,738,537	2.25	2,749	996.19
Evaluation	0	100,000	0.10	0	0.00
ALL	**88,895,803**	**7,822,568**	**8.09**	**18,240**	**428.87**

This shows that the administration costs varied significantly between the two main phases of the Programme. the higher percentage administration costs for LCBP-1 & 1e (15% compared to 2% for LCBP -2 & 2e) is partly be due to the larger number of grant applications and commitments, but other factors also account for this difference including the complexity of the grant applications in LCBP-2 & 2e compared to LCBP-1 & 1e and the significantly higher requirement for final claim scrutiny and evaluation.

Accreditation

As previously stated, microgeneration technology capacities have been defined by the Microgeneration Certification Scheme (MCS) with the following limits: Electricity up to 50kW and thermal up to 45kW. Most technology models installed under the LCBP programme have therefore been within these limits, although special cases, where the scale of the technology has exceeded these microgen limits, installations have been approved using the Energy Technology List or assessment by BRE on a case by case basis. For LCBP-2e the limits were raised to 300kW.

Grants were only offered to applicants wishing to use products and installers registered on the DECC-approved listings which have evolved over the life of the programmes. Originally products and installers were accepted where listed under the Clear Skies Programme, Major PV Demonstration Programme plus those listed under the Microgeneration Certification Scheme (MCS). The listings were reduced to MCS installers only as of 3rd April 2009 and MCS products only plus those products listed under the MCS Transitional Arrangement as of 1st January 2010. As MCS Standards developed, other certification processes were also acknowledged. This meant solar thermal equipment listed on the Solar Key Mark website also became eligible. Similarly, with the introduction of the 300kW thermal limit under LCBP-2e, products larger than 45kW and up to 300kW listed on the Enhanced Capital Allowances (ECA) Scheme also became eligible.

A major conclusion of the LCBP Evaluation report is that LCBP has provided a significant amount of information to allow for the further development of the MCS scheme by stimulating manufacturers and installers to seek accreditation. This is providing a corner stone for the Government's Feed-in Tariff and Renewable Heat Incentive.

Operational Reports

The Energy Saving Trust, the Buildings Research Establishment and the Carbon Trust have included detailed statistics in their sections of this report. Below are aggregated statistics. The reader show note if the statistics refer to the 'core' grant programmes (LCBP-1, LCBP-1e, LCBP-2 or LCBP-2e and their parts) or to the total programme including the Fuel Poverty and other streams.

1.3 Summary Statistics

Summary of number of installations

LCBP allocated £112.3 million in the core grant programme and, disregarding the annual 10% 'churn', it its last financial year, FY10/11, as previously noted, approximately £22.7 million of grants were not taken up or cancelled.

The final schedule of installations shows that 19,001 grants equating to 19,216 individual installations were funded at a cost of £91.35 million, this includes installations in the Fuel Poverty Stream. Additionally the Fuel Poverty Stream provided an additional £0.35 million in grants for insulation which are not included in the figures below.

		VALUE OF GRANTS PAID £m		TOTAL GRANTS PAID	
		£m	%	No	%
LCBP-1 & 1e	Householders	20.67	22.62	15,244	80.23
LCBP-1	Community Projects	1.30	1.43	80	0.42
LCBP-1	Stream 2a (Medium Scale non-Domestic)	2.86	3.13	150	0.79
LCBP-1	Stream 2b (Large Scale non-Domestic)	2.92	3.20	17	0.09
LCBP-2 & 2e	Non-Domestic (Not for Profit)	60.95	66.73	2,749	14.47
Fuel Poverty	Domestic	2.65	2.90	761	4.01
Number	**TOTAL**	**91.35**	**100.00**	**19,001**	**100.00**

Grants = Grants to individuals or organisations however note that there may be more that one installation per grant where multiple technologies were installed.

	Number of Installations		Value of Grants	
	Number	%	Value £	%
Householders (Domestic)	16,005	83.31	23,316,341	25.5
Community, Not-For-Profit & Non-Domestic	3,207	16.69	68,036,114	74.5
TOTALS	**19,212**	**100.00**	**91,352,455**	**100.00**

Numbers of Installation by Technology (Including Fuel Poverty Stream)

	Number of Installations		Value of Grants	
	Number	%	Value £	%
Solar Thermal	8,611	44.8	15,053,942	16.5
Solar PV	5,866	30.5	45,499,771	49.8
Ground Source Heat Pump	1,573	8.2	18,838,490	20.6
Air Source Heat Pump	1,461	7.6	2,863,354	3.1
Wind Turbines	940	4.9	4,668,908	5.1
Wood Fuelled Boiler System	731	3.8	4,284,689	4.7
Biomass Room Heater/Stove (Auto Wood Pellet Feed)	21	0.1	52,874	0.1
Micro Hydro	9	0.1	101,801	0.1
TOTALS	**19,212**	**100**	**91,352,455**	**100**

Number of Grant Recipients by type of organisation (Excluding Fuel Poverty)

	NUMBER OF GRANTS						
	LCBP-1 & 1e	**LCBP-1 community**	**LCBP-1 Stream 2a**	**LCBP-1 Stream 2b**	**LCBP-2 & 2e**	**TOTAL**	**%**
Private Individuals (Householders)	15,244	0	0	0	0	**15,244**	83.53
Companies Limited by Guarantee	0	0	12	8	88	**108**	0.59
Environmental Trusts	0	0	4		3	**7**	0.04
Hospitals	0	0	0		7	**7**	0.04
Housing Associations / Trusts	0	7	9	1	883	**904**	4.95
Local Authorities	0	17	20	3	459	**499**	2.73
Local Community Projects	0	8	0		72	**82**	0.45
Religious Establishments	0	0	0		34	**34**	0.19
Colleges	0	0	1	2	17	**20**	0.11
Community Housing Projects	0	0	0		60	**60**	0.33
Community Services / Facilities	0	8	3		9	**22**	0.12
Parish Councils	0	0	0		2	**2**	0.01
Fire Service	0	0	0		14	**14**	0.08
Govt Departments & Agencies	0	0	3		31	**34**	0.19
Medical Centres	0	0	0		1	**1**	0.01
Others	0	0	0		9	**9**	0.05
Police	0	0	0		7	**7**	0.04
Sports Clubs	0	0	1		7	**8**	0.04
Registered Charities	0	22	2	1	386	**414**	2.27
Schools	0	16	18		628	**663**	3.63
Universities	0	0	0	2	32	**34**	0.19
SME's	0	0	77		0	**77**	0.42
TOTALS	**15,244**	**80**	**150**	**17**	**2,749**	**18,240**	**100.00**

Value of Grants by type of organisation (Excluding Fuel Poverty)

	VALUE OF GRANTS £ Million						
	LCBP-1 & 1e	**LCBP-1 community**	**LCBP-1 Stream 2a**	**LCBP-1 Stream 2b**	**LCBP-2 & 2e**	**TOTAL**	**%**
Private Individuals (Householders)	20.67	0.00	0.00	0.00	0.00	**20.67**	23.30
Companies Limited by Guarantee	0.00	0.00	0.29	1.63	0.89	**2.81**	3.17
Environmental Trusts	0.00	0.00	0.05	0.00	0.03	**0.08**	0.09
Hospitals	0.00	0.00	0.00	0.00	0.40	**0.40**	0.45
Housing Associations / Trusts	0.00	0.21	0.29	0.05	25.29	**25.84**	29.15
Local Authorities	0.00	0.32	0.80	0.55	10.20	**11.86**	13.37
Local Community Projects	0.00	0.13	0.00	0.00	0.99	**1.12**	1.26
Religious Establishments	0.00	0.00	0.00	0.00	0.64	**0.64**	0.72
Colleges	0.00	0.00	0.02	0.19	0.52	**0.73**	0.82
Community Housing Projects	0.00	0.00	0.00	0.00	0.85	**0.85**	0.95
Community Services / Facilities	0.00	0.11	0.05	0.00	0.13	**0.28**	0.32
Parish Councils	0.00	0.00	0.00	0.00	0.05	**0.05**	0.06
Fire Service	0.00	0.00	0.00	0.00	0.54	**0.54**	0.61
Govt Departments & Agencies	0.00	0.00	0.03	0.00	1.13	**1.16**	1.31
Medical Centres	0.00	0.00	0.00	0.00	0.02	**0.02**	0.03
Others	0.00	0.00	0.00	0.00	0.25	**0.25**	0.28
Police	0.00	0.00	0.00	0.00	0.21	**0.21**	0.23
Sports Clubs	0.00	0.00	0.01	0.00	0.15	**0.15**	0.17
Registered Charities	0.00	0.31	0.03	0.07	7.24	**7.65**	8.62
Schools	0.00	0.22	0.10	0.00	10.06	**10.39**	11.71
Universities	0.00	0.00	0.00	0.44	1.36	**1.80**	2.03
SME's	0.00	0.00	1.19	0.00	0.00	**1.19**	1.34
TOTALS	**20.67**	**1.30**	**2.86**	**2.92**	**60.95**	**88.70**	**100.00**

Number of Grants by Nation (Excluding Fuel Poverty)

GRANT RECIPIENTS (NUMBER) BY NATION							
	LCBP-1 & 1e	**LCBP-1**	**LCBP-1**	**LCBP-1**	**LCBP-2 & 2e**	**TOTALS**	**%**
	H'holders	**C'munities**	**Stream 2a**	**Stream 2b**	**Non-Dom**	**Number**	
England	13,469	70	123	14	2,382	16,058	88.0
Wales	1,070	3	10	2	186	1,271	7.0
Northern Ireland	587	7	7	1	47	649	3.6
Scotland	118	0	10	0	134	262	1.4
TOTALS	**15,244**	**80**	**150**	**17**	**2,749**	**18,240**	**100**

Note: Number of grants is smaller than number of installations as, in some cases, multiple technologies were installed.

Value of Grants by Nation (Excluding Fuel Poverty)

GRANT RECIPIENTS							
	LCBP-1 & 1e	LCBP-1	LCBP-1	LCBP-1	LCBP-2 & 2e	TOTALS	%
	H'holders	C'munities	2a	2b		Number	
England	18,592,152	1,174,594	2,547,162	2,399,384	51,660,064	76,373,355	86.1
Wales	1,258,265	26,270	84,963	331,327	5,448,215	7,149,041	8.1
Northern Ireland	498,690	101,222	68,649	193,366	893,538	1,755,464	2.0
Scotland	317,724	0	157,355	0	2,950,104	3,425,183	3.9
TOTALS	**20,666,831**	**1,302,086**	**2,858,129**	**2,924,077**	**60,951,921**	**88,703,043**	**100**

Number of Grants by English Region (Excluding Fuel Poverty)

GRANT RECIPIENTS (NUMBER) BY ENGLISH REGION							
	LCBP-1 & 1e	LCBP-1	LCBP-1	LCBP-1	LCBP-2 & 2 e	TOTALS	%
	H'holders	C'munities	2a	2b			
East Midlands	1,043	5	10	1	182	1,241	7.6
East England	1,800	5	18	0	209	2,032	8.8
London	657	7	11	3	301	979	12.6
North East	298	6	5	1	89	399	3.7
North West	556	8	5	1	237	807	9.9
South East	3,753	15	30	2	535	4,335	22.5
South West	3,514	12	27	3	470	4,026	19.7
West Midlands	939	2	8	1	231	1,181	9.7
Yorks & Humber	909	10	9	2	128	1,058	5.4
TOTALS	**13,469**	**70**	**123**	**14**	**2,382**	**16,058**	**100.0**

Value of Grants by English Region (Excluding Fuel Poverty)

VALUE OF GRANTS							
	LCBP-1 & 1e	LCBP-1	LCBP-1	LCBP-1	LCBP-2 & 2e	TOTALS	% Region
	H'holders	C'munities	2a	2b			
East Midlands	1.34	0.07	0.20	0.00	4.31	5.92	7.8
East England	2.38	0.08	0.31	0.14	4.43	7.34	9.6
London	1.15	0.13	0.34	0.47	8.34	10.43	13.7
North East	0.43	0.12	0.09	0.12	1.63	2.39	3.1
North West	0.89	0.13	0.07	0.19	5.11	6.39	8.4
South East	5.18	0.26	0.76	0.15	11.54	17.90	23.4
South West	4.66	0.14	0.46	0.62	8.48	14.35	18.8
West Midlands	1.27	0.06	0.12	0.11	4.07	5.62	7.4
Yorks & Humber	1.29	0.18	0.20	0.60	3.78	6.05	7.9
TOTALS	**18.59**	**1.17**	**2.55**	**2.40**	**51.68**	**76.39**	**100.0**

LCBP-1 Householder Stream – Number of Grants by Number of bedrooms

ALL LCBP-1 HOUSEHOLDERS - NUMBER BY DWELLING TYPE							
	NUMBER OF BEDROOMS						
	1	2	3	4	5	6 & 6+	Total
Detached Bungalow	35	440	1,046	570	78	14	2,183
Detached House	27	281	2,092	4,233	1,706	581	8,920
End-Terraced	3	63	221	121	30	9	447
Flat	9	25	8	5	1	0	48
Maisonette	3	12	10	3	2	0	30
Mid-Terraced	12	160	383	184	75	12	826
Semi-detached Bungalow	12	115	98	30	4	3	262
Semi-detached House	9	190	1,340	728	212	49	2,528
	110	**1,286**	**5,198**	**5,874**	**2,108**	**668**	**15,244**

Summary Householder Grants – Number of grants by number of bedrooms

Number of Bedrooms	**1**	**2**	**3**	**4**	**5**	**6 & 6+**	**Total**
Number of Grants	**110**	**1,286**	**5,198**	**5,874**	**2,108**	**668**	**15,244**

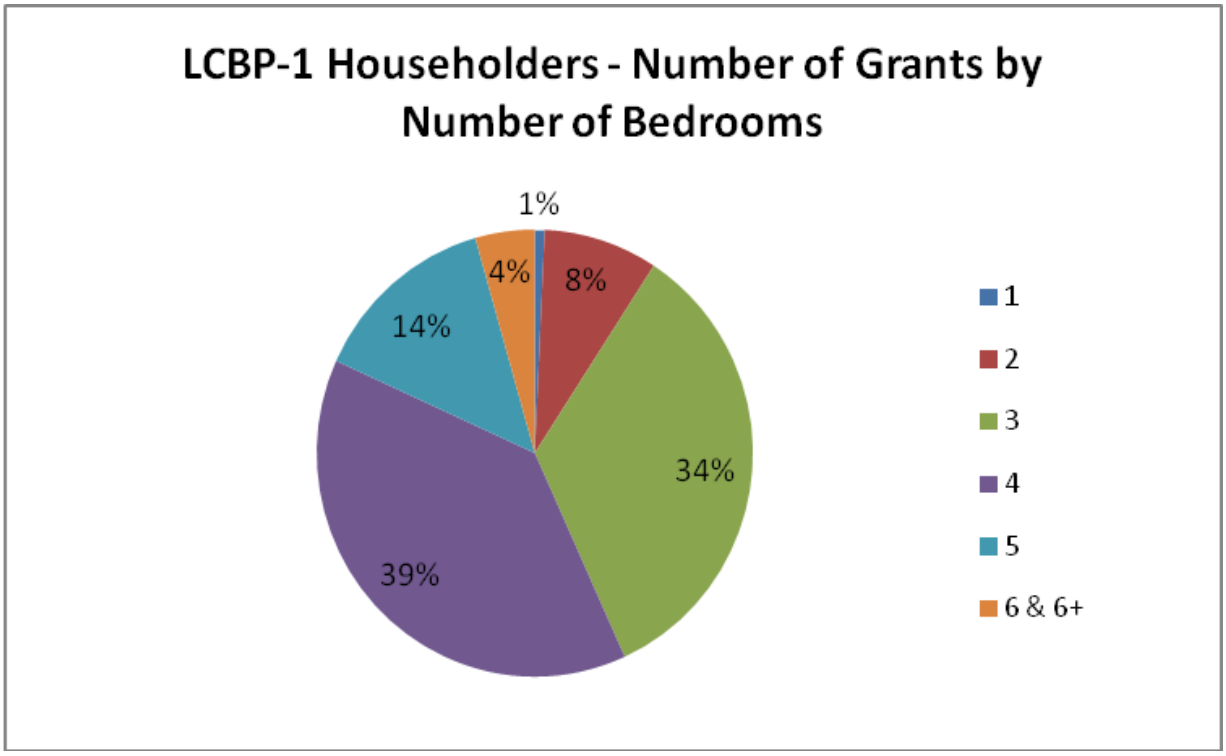


Figure 3 Number of Grants by number of bedrooms

Type of technology installed by Householders

Overall	Grants
Air-Source Heat Pumps (ASHP)	826
Biomass Boilers	14
Ground-Source Heat Pumps (GSHP)	843
Micro Hydro	7
Solar PV	4,428
Solar Thermal	7,761
Micro Wind Turbines	762
Wood-Fuelled Boilers	603
TOTAL	**15,244**

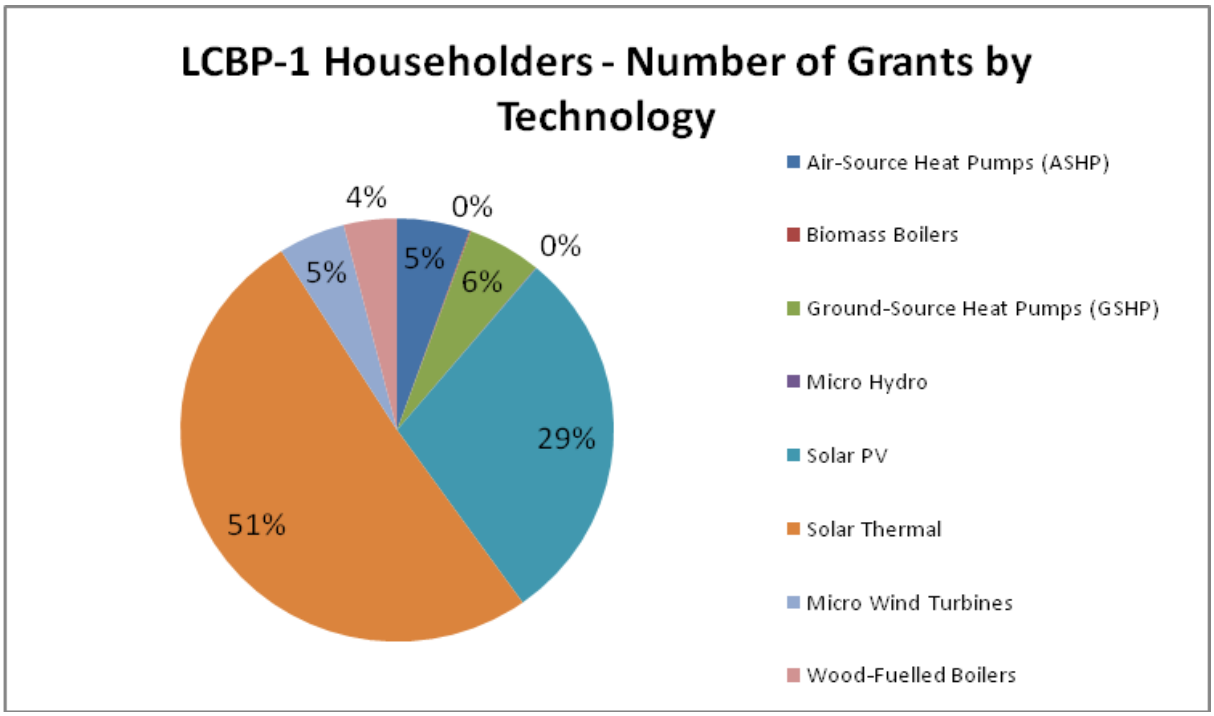


Figure 4 - Average Cost of Installation (Equipment cost and installation) and average grant paid

LCBP-1 (Householder streams) – Approximately 15,200 installations

Technology	Average Total Cost ex VAT	Average Grant Paid	Average % grant of costs	Average Cost per kW (electricity techs only)
Air Source Heat Pump	£7,788.01	£899.14	11.5	n/a
Pellet Stove	£3,914.77	£541.46	13.8	n/a
Ground Source Heat Pump	£11,253.39	£1,197.51	10.6	n/a
Small Scale Hydro	£32,613.32	£3,520.00	10.8	£4,867.66
Solar PV	£12,914.44	£3,588.23	27.8	£5,924.06
Solar Thermal Hot Water	£4,194.49	£399.79	9.5	n/a
Wind Turbine	£12,554.44	£2,285.24	18.2	£3,099.86
Wood Fuelled Boiler	£9,341.24	£1,477.51	15.8	n/a
Total	**£7,347.20**	**£1,314.36**	**11.5**	**n/a**

LCBP-2 (Non-domestic installations) – Approximately 3,000 installations

Technology	Average Total Cost ex VAT	Average Grant Paid	Average % grant of costs	average system size kW	Average Cost per kW
PV polycrystalline on roof	38,920	19,430	50.0	7.5	5,189.3
PV polycrystalline roof integrated	50,790	25,170	49.5	9.1	5,581.3
PV monocrystalline on roof	54,600	27,290	50.0	10.0	5,460.0
PV monocrystalline roof integrated	87,980	43,540	49.7	14.0	6,284.3
Wind Turbine	39,200	18,900	48.0	14.3	2,741.3
sub-total electricity	54,298	26,866	49.4	11.0	4,945.2
Solar Thermal	32,800	15,920	47.8	23.0	1,426.1
Ground Source Heat Pump	70,830	33,330	46.6	40.3	1,759.3
Air Source heat pumps	24,800	12,240	49.5	29.9	830.3
Biomass boilers	53,200	24,900	46.6	63.7	835.2
sub-total heat	45,408	21,598	47.6	39.2	1,158.1
Total	**49,853**	**24,232**	**48.5**	**25.1**	**1,986.7**

Data for LCBP-1& 1e and LCBP-2 & 2e grants, during the lifetime of the Programme, show slight trends in the cost of installation per kilowatt. Broadly speaking, installation costs appear to have fallen for solar PV, biomass and air source heat pumps but have increased for solar thermal and wind turbines.

The ECI report on the first two years of the LCBP commented that there are two elements in these installation costs: the cost of the products themselves and the costs of installing the products. The products costs form a greater proportion of

overall installations costs for more complex technologies (such as solar PV) than for simpler technologies (such as solar thermal).

The following charts present installation costs for each of the main technology types using average costs for each year of the Programme. All data has been revised to take account of inflation.

LCBP-1 & 1e - Householders

LCBP-1 & 1e (Householder only) ANNUAL AVERAGE COST £/KW @ 2010 PRICES						
YEAR	**2006**	**2007**	**2008**	**2009**	**2010**	**% Change**
Solar PV	6925	6,492	6,790	6,057	5,333	-23
Biomass Boiler	530	546	554	487	305	-42
Wood-Fuelled Boiler	1.33	0.80	0.43	0.43	0.50	-63
Ground Source Heat Pumps	1,041	1,035	1,260	1,214	1,241	19
Solar Thermal	2.71	2.63	2.86	3.27	3.00	11
Wind Turbines	2,399	3,276	3,435	4,064	4,148	74
Air Source Heat Pumps	n/a	n/a	949	775	737	11
Micro Hydro	n/a	n/a	n/a	n/a	n/a	n/a

LCBP-2 & 2e – Larger Non-Domestic

LCBP-2 & 2e (Larger non-domestic)- ANNUAL AVERAGE COST £/KW @ 2010 PRICES						
YEAR	**2006**	**2007**	**2008**	**2009**	**2010**	**% Change**
Solar PV	n/a	5,770	5,662	5,559	5,065	-12
Biomass Boiler	n/a	833	1,136	1,409	667	-20
Wood-Fuelled Boiler	n/a	n/a	n/a	n/a	n/a	n/a
Ground Source Heat Pumps	n/a	1,808	1,739	1,577	1,057	-42
Solar Thermal	n/a	1,531	1,645	1,705	1,620	6
Wind Turbines	n/a	5,476	5,217	5,840	6,115	12
Air Source Heat Pumps	n/a	n/a	n/a	n/a	n/a	n/a
Micro Hydro	n/a	n/a	n/a	n/a	n/a	n/a

SECTION 2

LCBP-1 and LCBP-1e

Helen White – Energy Saving Trust

Section 2 LCBP-1 & 1e - Contents

2.1 Executive Summary

The Low Carbon Buildings Programme (LCBP) was originally launched as a £30 million, 3 year programme funded by the Department of Energy and Climate Change (formerly the Department for Business Enterprise and Regulatory Reform, BERR, and formerly the Department of Trade and Industry, DTI). Over time, further funding was made available for the programme and it was also extended.

The programme was launched in April 2006 with four streams of funding.

- Stream 1 – Householders
- Stream 1 – Communities
- Stream 2a – Medium Scale
- Stream 2b – Large Scale

This became known as Phase 1 of the programme and was managed on DECC's behalf by the Energy Saving Trust following a competitive tender process. Phase 1 was later extended in 2009 and the Energy Saving Trust was again successful through competitive tender in securing the administration contract for the extension.

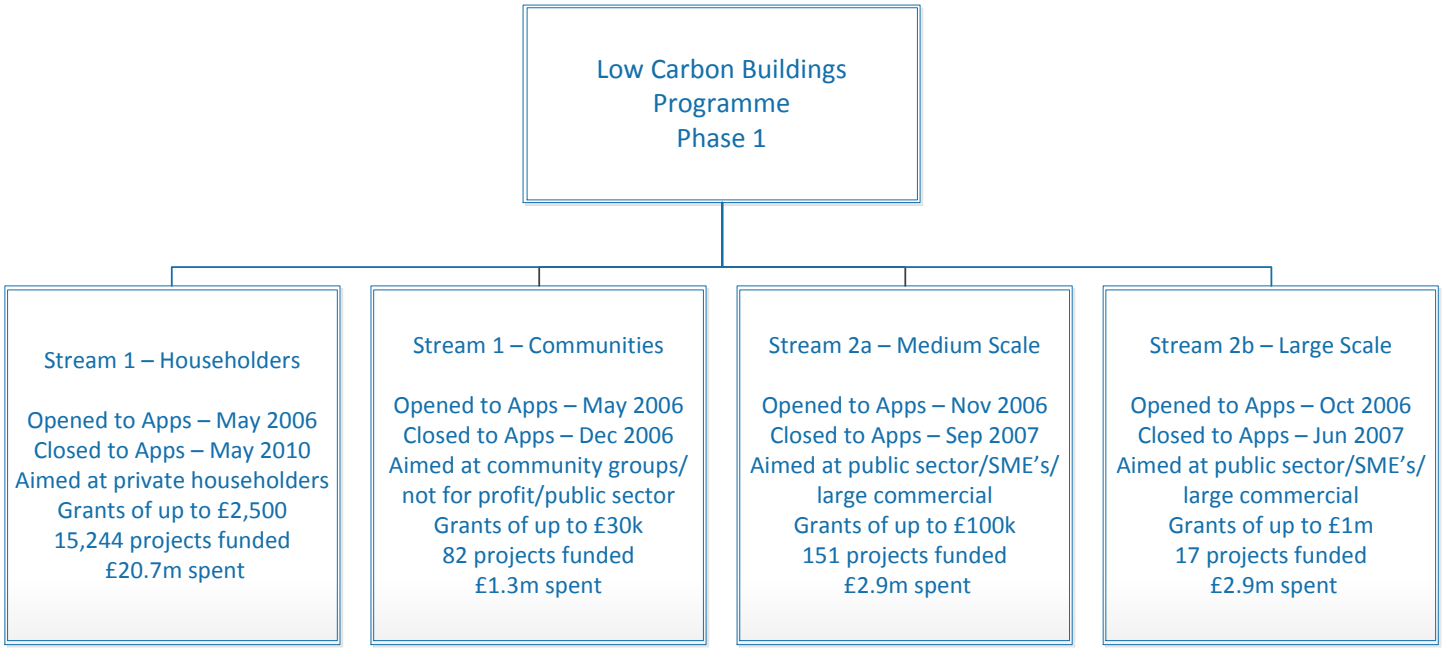
A second phase was launched in November 2006 with one funding stream open to Schools, Communities, Charities and other not-for-profit organisations. Phase 2 had a separate budget and was managed by the Buildings and Research Establishment (BRE).

This report concerns Phase 1 of the programme.

Over the life of Phase 1, the programme has supported over 15,000 installations across all technologies. Statistics on the number and value of grants paid can be found in the appendices to this report in section 11.

2.2 Introduction

Phase 1 of the Low Carbon Buildings Programme was launched in April 2006. It comprised of four funding streams each targeted at a different audience.



All streams supported the installation of the following technologies:

Automated Feed Pellet Stoves

Air Source Heat Pumps

Ground Source Heat Pumps

Wind Turbines

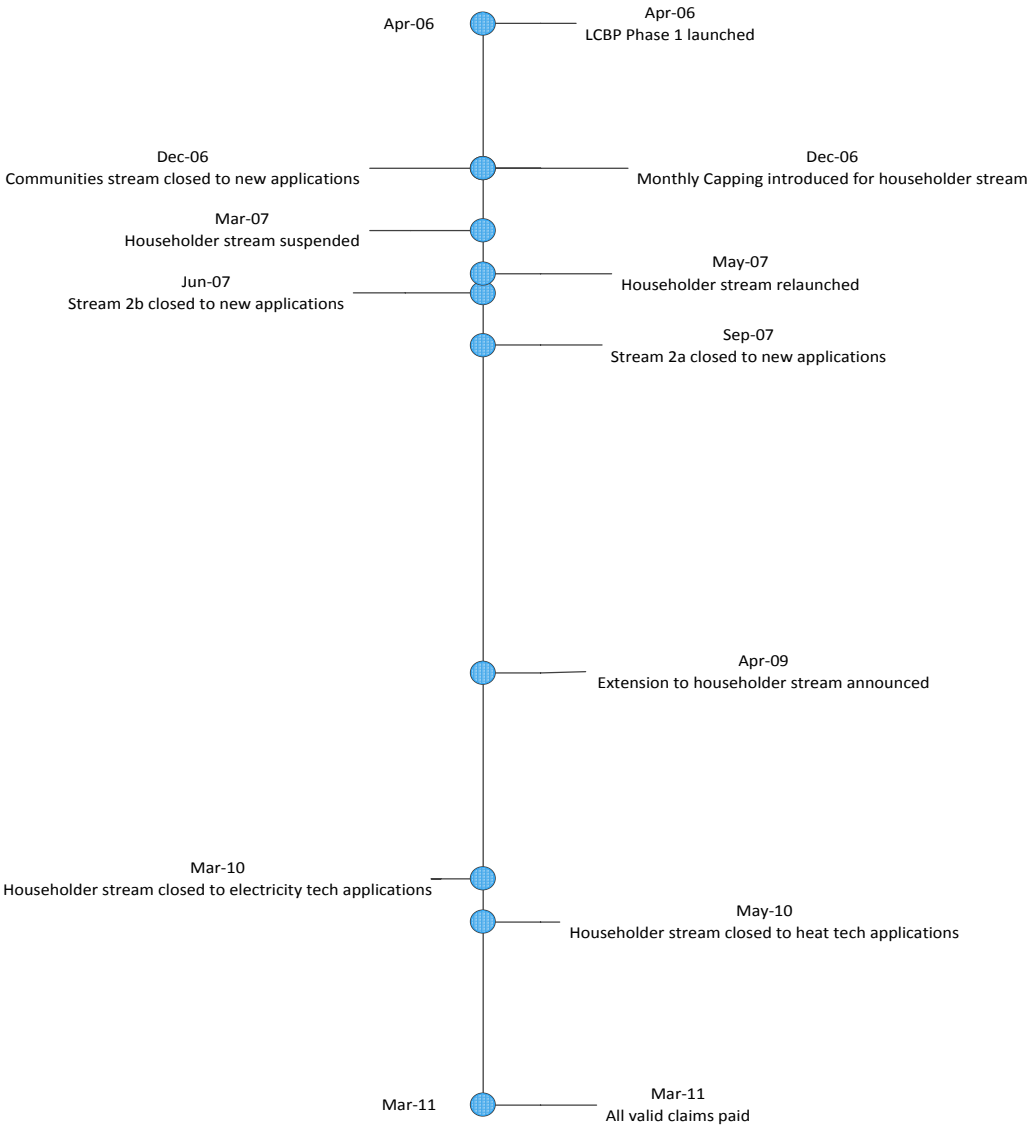
Solar Photovoltaics (PV)

Wood Fuelled Boilers

Small Scale Hydro

Solar Thermal Hot Water

The following timeline shows the key points of interest for Phase 1.



2.3 Programme Administration

Stream 1 – Householders

The householder stream under Phase 1 was made up of a large volume of relatively small value grants and therefore it also required the largest administration effort and involved dealing with a significant number of customers and paperwork. As the design of this stream affected the largest number of customers, this is also where much of the public and industry focus lay regarding Phase 1 of the scheme. Indeed there was a generally held misconception that Phase 1 only comprised of the householder stream and therefore we worked hard to correct this with the public and stakeholders.

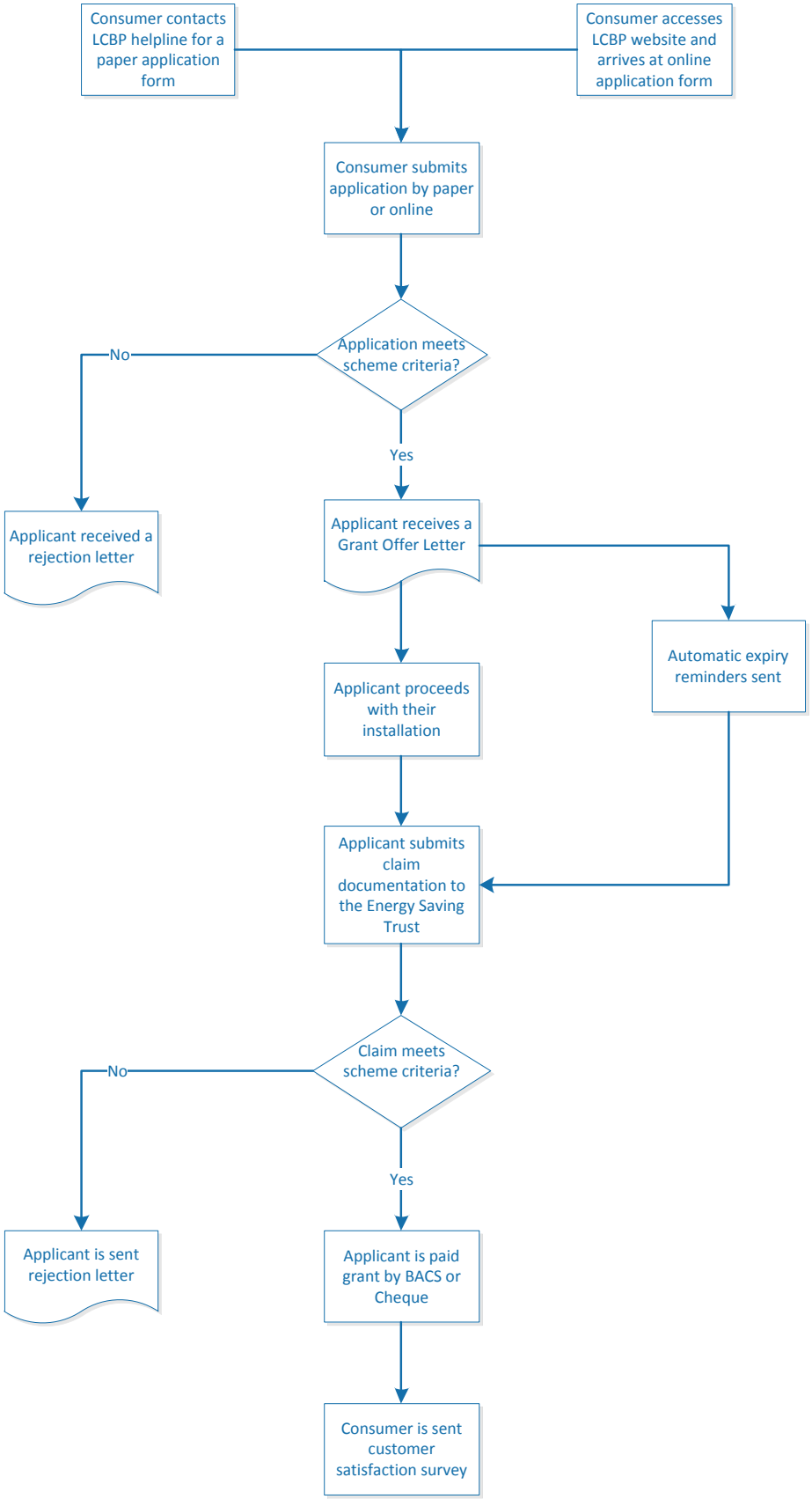
At the end of the programme, the following grants had been paid under the householder stream (LCBP 1 and LCBP 1e):

Technology	Number	Value
Automated Feed Pellet Stove	14	£7,698
Air Source Heat Pump	826	£738,762
Ground Source Heat Pump	843	£1,008,727
Small Scale Hydro	7	£20,600
Solar PV	4,428	£13,136,531
Solar Thermal	7,761	£3,105,513
Wind Turbine	762	£1,756,122
Wood Fuelled Boiler	603	£892,879
Total	**15,244**	**£20,666,831**

The householder stream was opened to applications in May 2006 with a budget of £6m. The administration of the scheme was managed using an online application form on the Low Carbon Buildings Programme website. This allowed customers to enter their own details and receive an instant decision on the success of their application. A facility to apply on a paper form by post was offered for those without access to the internet.

Help and support with the application process was provided through a dedicated 0800 LCBP helpline and information hosted on the LCBP website. Once an applicant had secured a grant offer, support was also available through the grant administration team by phone and email.

Application Process



Design Changes

In response to varying levels of demand for the householder stream, the design and criteria of the stream changed over time.

When the programme was launched, the grant levels for the householder stream were as follows:

Product	Grant Available (Percentages relate to eligible costs)
Solar Photovoltaics	To 31st March 2007:Maximum £3,000 per kW installed up to a maximum of £15,000 subject to an overall 50% limit of the installed cost (exclusive of VAT).
Wind turbines	Maximum £1,000 per kW installed, up to a maximum of £5,000 subject to an overall 30% limit of the installed cost (exclusive of VAT)
Small hydro	Maximum £1,000 per kW installed, up to a maximum of £5,000 subject to an overall 30% limit of the installed cost (exclusive of VAT)
Solar thermal hot water	Maximum £400 regardless of size subject to an overall 30% limit (exclusive of VAT)
Ground source heat pumps	Maximum £1,200 regardless of size subject to an overall 30% limit (exclusive of VAT)
Bio-energy: 1.Room Heater/Stoves automated wood pellet feed 2. Wood fuelled boiler systems	 Maximum £600 regardless of size subject to an overall 20% limit (exclusive of VAT) Maximum £1,500 regardless of size subject to an overall 30% limit (exclusive of VAT)

These levels were broadly similar to those available under the predecessor programmes, the Major PV Demonstration Programme and Clear Skies.

However, it became apparent a matter of months into the programme that funding was being allocated much more quickly than had been anticipated and that the funding available for the householder stream would be fully allocated far sooner than the end of the 3 year programme.

In order to mitigate this, a system of capping the monthly value of allocated grants was introduced in December 2006. This provided some control over the speed of allocation of funds and ensured some funding was reserved for later in the programme.

Due to the demand for the programme, the amount of funding available each month was fully allocated prior to month end which had the unintended consequence of

causing a stop/start environment for the microgeneration industry. As the public became more aware of the way in which funding was released, there was an increasing rush to secure grant offers at the beginning of the month when the funds were released and by March 2007, the funding for the month was fully allocated in under 2 hours.

This situation was unworkable for industry in the long term and so the householder stream was suspended in March 2007 and redesigned to cope with the demand levels before being re-launched in May 2007. There were three main changes as a result of this to the programme design. Firstly, there was an additional requirement for customers to have secured planning permission before applying for a grant. This ensured that once a grant was awarded, a customer was in a position to proceed with their installation straight away converting commitment under the programme into spend more efficiently. Secondly, the expiry periods for each technology were reduced; again to encourage customers to act straight away. The third change was the most significant. The levels of grant were reduced for some technologies in order to allow the available funding to support a higher volume of installations. In conjunction with this, an additional £6m was made available for the householder stream in the budget of March 2007.

Following the re-launch of the householder stream, the grant levels were revised as follows:

Product	Grant Available (Percentages relate to eligible costs)
Solar Photovoltaics	Maximum of £2,000 per kW of installed capacity, subject to an overall maximum of £2,500 **or** 50% of the relevant
Wind turbines	Maximum of £1,000 per kW of installed capacity, subject to an overall maximum of £2,500 **or** 30% of the relevant
Small hydro	Maximum of £1,000 per kW of installed capacity, subject to an overall maximum of £2,500 **or** 30% of the relevant
Solar thermal hot water	Overall maximum of £400 **or** 30% of the relevant eligible costs, whichever is the lower
Ground source heat pumps	Overall maximum of £1,200 **or** 30% of the relevant eligible costs, whichever is the lower
Air source heat pumps	Overall maximum of £900 **or** 30% of the relevant eligible costs, whichever is the lower
Bio-energy: 1.Room Heater/Stoves automated wood pellet feed 2. Wood fuelled boiler systems	 Overall maximum of £600 **or** 20% of the relevant eligible costs, whichever is the lower Overall maximum of £1,500 **or** 30% of the relevant eligible costs, whichever is the lower

The reduction in grant levels initially caused a dip in demand for the scheme but gradually the number of applications rose again. This did not cause the same issue again as the budget was now sufficient to cope with this demand and a more stable market was established.

In March 2009 a further £10m of funding was announced for the householder stream of Phase 1. This was known as Phase 1e or the extension. This provided a bridge between the Low Carbon Buildings Programme and the future policies of Feed-in Tariffs (FiTs) and the Renewable Heat Incentive (RHI). The Energy Saving Trust was awarded this extension contract via competitive tender and the extension contract was administered in the same way as the original funding with no apparent change to the customer.

The householder stream was closed to new applications for electricity generating technologies in March 2010 in anticipation of the launch of FiTs. The stream closed completely to new applications in May 2010 in advance of the introduction of the RHI.

Stream 1 – Communities

Stream 1 Communities launched in June 2006 with a budget of £4m. The grant stream was aimed at the public sector and community groups, each eligible for one grant of up to £30,000. As pressure began to build on the limited money available for Stream 1 Householders, some funding from the Communities stream was diverted leaving a budget of £2.9m. In December 2006 Phase 2 of the Low Carbon Buildings Programme was launched. It was aimed at the same audience as the Communities stream and therefore the Communities stream was closed in January 2007 with a final commitment of £1.3m.

The application process for a Stream 1 Communities grant comprised of a pre-registration form and, if eligible, an application form. Due to the level of demand under the stream, a large number of applicants could not proceed to the application form stage as there was limited funding available. Despite the stream being operated on a first come, first served rolling basis, grants were rationed monthly due to constraints on the total amount of funding available and therefore only the first eligible registrants were sent application forms in any given month.

Once an application was submitted to the Energy Saving Trust, it was first assessed by the grant administration team against a checklist of basic eligibility criteria to ascertain whether the application was of sufficient standard to proceed to a technical assessment. The technical assessment which was carried out by BRE measured the suitability of the technologies to the installation address and assessed that all reasonable energy efficiency measures had been carried out in order to fulfil the aim of creating holistically low carbon buildings.

Only if an application passed both the grant administration assessment and the technical assessment was a grant awarded. A formal grant offer letter was then issued for the technologies listed in the application form and valid for 12 months from the date of issue.

On receipt of the grant offer letter, the applicant could proceed with their installation. On completion of their installation, the applicant could then claim the grant awarded

to them. Following submission of their grant claim form, receipted invoices for the installation(s) and completion certificate(s) the claim was assessed by the grant administration team and payment made by cheque.

As the communities stream closed after a short period of time, there was little scope for amending the administration process in response to feedback. However, it was clear that monthly rationing on the number of full applications forms available caused dissatisfaction amongst applicants who may have missed out in more than one month.

As demonstrated through the larger scale streams of Phase 1, projects supported under the communities stream often required extensions to their grant validity period. Reasons cited included problems with securing match funding, delays to the wider project that the installations were part of and a lack of resource in the applicant organisation to drive the project forwards.

Stream 2a – Medium Scale

This funding stream was administered through a competitive application process run over 5 funding rounds aimed at medium scale installations by public bodies, SME's or larger commercial organisations. The maximum grant available under each application was £100,000 and applicants had 18 months to complete their projects and claim their grant.

Demand for this funding stream was high and many applicants did not secure funding, although many were invited to reapply for later rounds.

The number of applications received and the number awarded funding is shown below. Further statistics on successful projects under this stream can be found in the appendices in section 11.

Round	No. of Applications	Number	Value
1	104	25	£472,830
2	89	19	£340,678
3	105	47	£1,083,860
4	104	27	£672,624
5	194	87	£1,987,746
Total	**596**	**205**	**£4,557,739**

Please note that not all applicants awarded funding went on to complete their projects and receive the funding they were offered.

Due to the competitive nature of this stream, many applications were not awarded funding. Applicants unsuccessful through the selection panel were either rejected or invited to resubmit at a later round. Therefore competition between bids in the later rounds was more fierce than in earlier rounds.

The average grant value under this stream was lower than had been anticipated at the outset at just over £20,000. This may reflect the economic climate at the time the

later application rounds were held. Similarly, there was a comparatively high dropout rate under this stream at 26% which could also support this argument.

Despite this, many of the successful projects under this stream were extremely committed and have actively promoted their microgeneration installations to their customers or visitors.

"Guests have learnt a lot about renewables during their stay and they have proved to be a selling point"

Asheston Eco Barns,

Case studies of two projects funded under this stream can be found in the appendices at section 11.

Stream 2b – Large Scale

This funding stream was also awarded via a competitive application process and was aimed at the same audience. However, this stream focused on large scale major refurbishment and new buildings and grants were available of up to £1m. In order to provide more support for these large and often innovative projects, the Carbon Trust was contracted by DECC to provide a technical support consultant (TSC) for each project. They provided expertise and handholding from initial application right through to completion of the project.

The application process for Stream 2b was made up of two stages. The initial stage was the Building Assessment where applicants were required to complete a relatively short application form with details of their project and the RIBA stage they were currently in. These forms were competitively scored by a selection panel comprised of buildings and sustainability experts from industry and the best projects chosen to proceed to the next stage. Those successful at this stage were assigned a TSC who assisted them with their full application form and provided a supporting report assessing the feasibility of their proposed project. These were then submitted to another selection panel to be competitively scored and the best chosen to receive funding.

The number of applications received and number successful at each stage in the process is shown below. Further statistics on successful projects under this stream can be found in the appendices at section 2.11.

Round	Building Assessment Apps Received	No. Successful at Building Assessment	Full Applications Received	No. Successful at Full Application	Value of Applications awarded funding
1	48	11	9	2	£983,047
2	43	11	15	6	£2,270,466
3	16	7	12	5	£911,706
4	72	13	15	10	£1,683,479
Total	**179**	**42**	**51**	**23**	**£5,848,697**

Please note that not all applicants awarded funding went on to complete their projects and receive the funding they were offered. Some full applications were submitted in more than one round.

The projects awarded funding under this stream were also impacted by the economic climate with some new buildings not proceeding. This was particularly apparent in the new build housing sector. The administration of the grants for projects of this size was much more complex than other streams of Phase 1 due to the scale and complexity of the overall projects. Therefore a significant amount of administration time was spent working with the projects to secure the paperwork required to process their claims.

Information on the outcomes of the projects funded under Stream 2b and lessons learned from these can be found in the Carbon Trust report.

Management and Administration

The variety of audiences and administration processes employed to support such diverse scales of funding resulted in a complex management system for Phase 1. The needs and support of householder applicants, for example, was significantly different to the level of support required by large businesses funded through Stream 2b. The costs of administering each type of grant are also significantly different although the administration effort was not broken down by stream in order to accurately record this.

The management and administration costs of the programme are shown in the table below, broken down by financial year and split between the original LCBP contract and the extension.

Financial Year	LCBP 1	LCBP 1e	Total
2006/07	£920,903	£0	£920,903
2007/08	£1,116,502	£0	£1,116,502
2008/09	£798,083	£0	£798,083
2009/10	£856,343	£113,012	£911,095
2010/11	£604,188	£325,000	£929,188
2011/12	£0	£250,000	£250,000
Total	**£4,296,019**	**£688,012**	**£5,913,219**

The largest costs associated with the management of the programme were grant processing, the call centre supporting the dedicated LCBP helpline and technical support subcontracted to BRE.

2.4 Accreditation

Requirements of the Programme

Throughout the Low Carbon Buildings Programme, all streams were underpinned by a system of accreditation for installers of the technologies and the key components of the technologies. Given that some of the technologies being supported were not yet considered to be mainstream, this was particularly important in giving customers confidence in the equipment they were installing and providing some security in their purchasing decisions.

However, the form of accreditation used by the programme has varied through its lifetime. In parallel to the launch of the Low Carbon Buildings Programme, the development of a new accreditation scheme was launched called the Microgeneration Certification Scheme (MCS). Since this was not in place for the launch of LCBP, an alternative of using the existing accreditation system in place for the predecessor Major PV Demonstration Programme and Clear Skies was used. Once MCS was developed to a sufficient capacity, it superseded this previous arrangement in December 2009.

In addition to this, the scope of MCS was limited to the definitions of microgeneration as stated in the Energy Act 2004 of 50kW for electricity generating technologies and 45kW for heat generating technologies. Some of the projects funded under Stream 2 exceeded these capacities and therefore alternative, sometimes bespoke, approval had to be given to those projects.

Changes in the accreditation system proved confusing for applicants but the introduction of MCS provided a more robust accreditation and an increased level of confidence in technologies and installers.

Product Issues

Given that the technologies supported by the LCBP are still relatively innovative, it is not surprising that the programme was affected by two product recalls; one a wind turbine and one a heat pump.

Once we were made aware of the issues concerning these products, we felt a duty of care to grant applicants who had declared that they would be installing these products to ensure that they had been contacted by the manufacturers concerned. In both cases, this had been done and the manufacturers worked to resolve the issue directly with customers.

The main impact on the programme of these recalls was to delay those customers who had specified them for their installations. The programme made several grant extensions to applicants as a result of the delay caused by rectifying the product faults.

2.5 Programme Assurance

The administration of all streams of the programme was designed to safeguard against fraudulent applications. Features included:

- Requirement for the applicant's signature on the grant claim form
- Requirement for a receipted invoice from the installer of the technology
- Requirement for a copy of the MCS completion certificate for the installation
- Payment only made directly to the applicant by BACS or cheque
- System checks at application stage to ensure funding had not already been awarded to the same address and technology combination

Audits

In order to provide added assurance that government money was being used appropriately over and above the processes described above, a programme of audits was undertaken of successful grant claimants.

The audit rate for each stream was as follows:

- Stream 1 – Householders – 2% of completed grant funded installations
- Stream 1 – Communities – 30% of completed grant funded installations
- Stream 2 – All Stream 2b completed grant funded installations plus Stream 2a completed grant funded installations to total 50% of all Stream 2 completed grant funded installations.

The audits were designed primarily to ensure that the grant funded technologies were in situ. In addition to this, the energy efficiency requirements that formed part of the terms and conditions of the grant were verified. The audits did not assess performance of the installation.

No compliance failures were identified in the 25 inspections carried out under Stream 1 Communities or in the 83 inspections carried out under Stream 2. No instances of fraud were identified under the householder stream however a small number of non-compliances with energy efficiency prerequisites were identified. The results of the audits under the householder stream are shown in the table below.

Status	Number
Completed grant funded installations	15,244
Audits undertaken	316
Non-compliances identified	55
Non-compliances rectified on follow up	55
Grant reclaims pursued	0
Grant reclaims received	0

2.6 Programme Promotion

Due to the level of demand for all streams of Phase 1 from the launch of the programme in April 2006, very little promotion was required.

Through responses to our householder stream customer satisfaction survey, it has been shown that most LCBP applicants found out about the scheme from their installer which indicates that installers actively promoted the programme. This is of course in their interest if it incentivises customers to purchase microgeneration technologies.

When the extension to LCBP Phase 1 was launched a small marketing budget was made available. This was used to undertake the following promotion activities:

Presence at the National Home Improvement Show

This show was held at Earls Court in London from 2nd-4th October 2009. The show offered us an excellent opportunity to engage with our target audience with over 13,000 visitors to the show over the 3 days. Many visitors to the stand had an understanding (of varying levels) of renewable technologies and were considering installation.

There were a number of “green” technology installers at the event which was beneficial as they were able to display LCBP materials and signpost visitors to the stand. There were a number of talks on renewable technologies that we were able to “leaflet drop” at and drive people to the stand.

The stand (below) was designed to look like a living room with plenty of space to stand and speak to members of staff.

Approximately 6,000 pieces of literature were distributed at the event including the LCBP householder flyer (see below), buyers guides and factsheets on renewable technologies.

We also placed an advert in the event's Newswire which was an e-newsletter run by the event organisers. As a result the LCBP website received 120 additional visitors. (The Newswire contained 12 ads in total and LCBP had the second highest click through rate of the Newswire).

LCBP Householder Stream flyer

The flyer was distributed primarily through our Energy Saving Trust advice network but was also used during the National Home Improvement Show.

2.7 Programme Outcomes

Stream 1 – Householders

Status	Number	Value
Applications Received	20,910	n/a
Grants Committed	20,659	£26,566,004
Grants Withdrawn	1,098	£1,257,544
Grant Expired	4,093	£4,320,696
Grants Rejected	224	£203,215
Drop-out	26%	n/a
Grants Paid	**15,244**	**£20,666,831**

Successfully funded installations were well distributed across the UK with the highest number in the South East. The number of applications and grants paid in Scotland and Northern Ireland were perhaps lower than could have been expected due to alternative funding sources being available in those nations that could not be matched with LCBP funding. In both cases, the local schemes offered more favourable grant levels and therefore the uptake of LCBP funding in those areas was lower as a result.

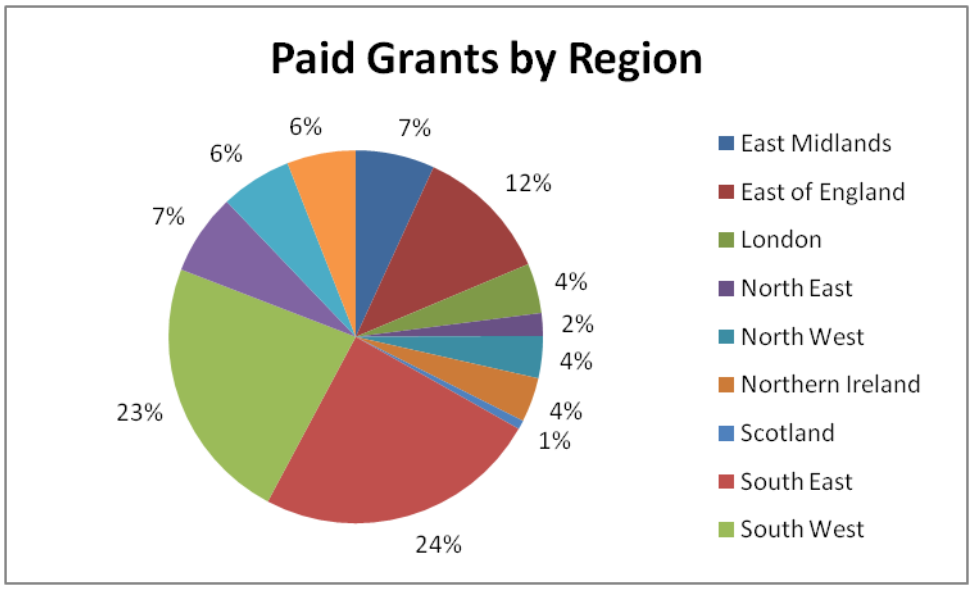


Figure 5 – Grants paid by Region

Installations were also spread across all technologies with Solar PV accounting for the largest proportion of grant funding paid and Solar Thermal Hot Water accounting for the highest number of installations.

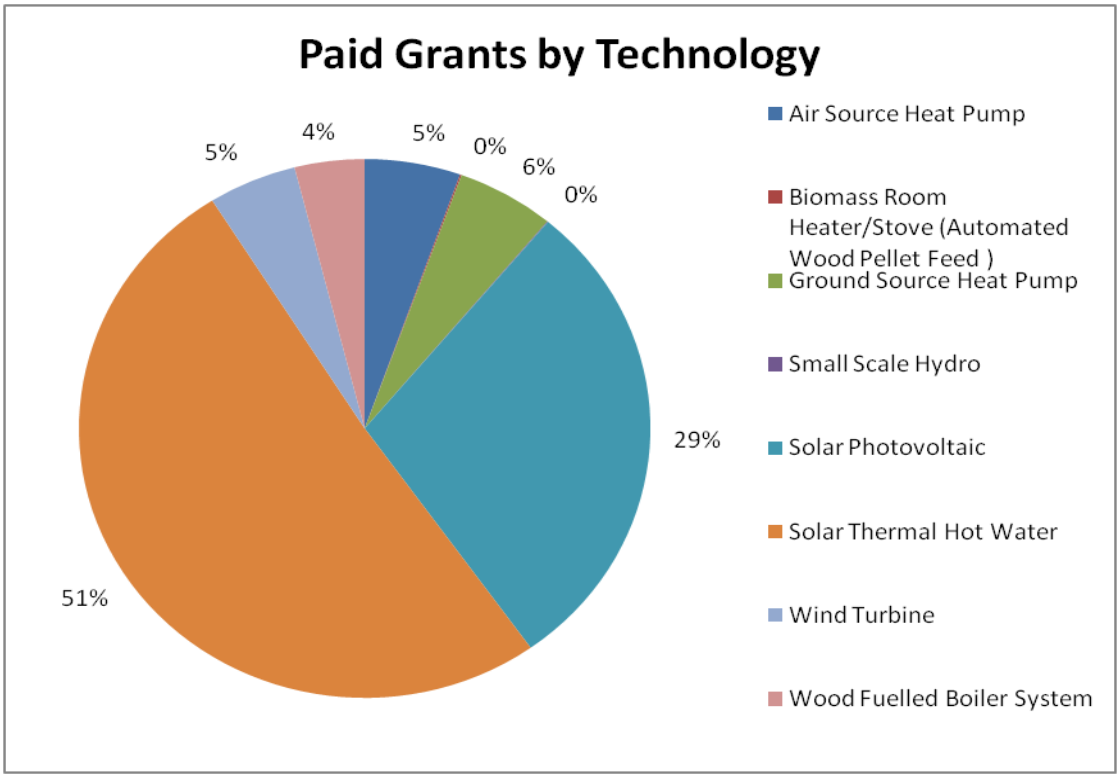


Figure 6 – Grants paid by Technology

One of the objectives of the programme was to bring costs of microgeneration technologies down over the life of the programme. Under the householder stream where we have a significant number of installations of similar sizes, the cost of technologies has been tracked.

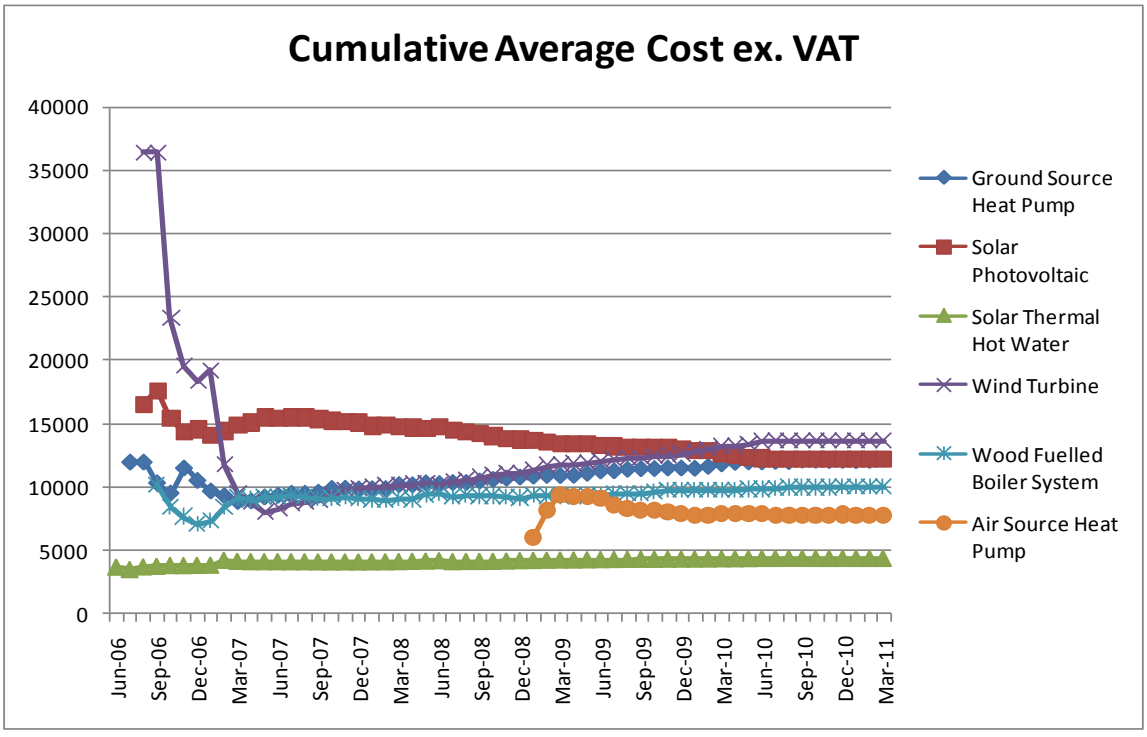


Figure 7 - Average Cost of Technology over time

This is not exact as this shows the total cost of installation which may include auxiliary items such as heating distribution system or scaffolding costs. However, this shows that apart from Solar PV, the average cost of installation has not decreased over the lifetime of the LCBP.

Further statistics on the householder stream can be found the appendices section.

Stream 1 – Communities

Status	Number	Value
Pre-registrations received	469	£8,419,912
Full applications issued	135	£2,234,570
Full applications received	133	£2,195,472
Grants Offered	103	£1,625,334
Grants Withdrawn	16	£197,046
Grants Expired	3	£58,088
Grants Rejected	2	£33,876
Grants Paid	**80**	**£1,302,086**

The regional spread of successful projects under the communities stream was broadly equal. The exception to this is in Scotland where there were no successfully funded projects due to the separate grant programme in operation during the life of LCBP that could not be matched with LCBP funding.

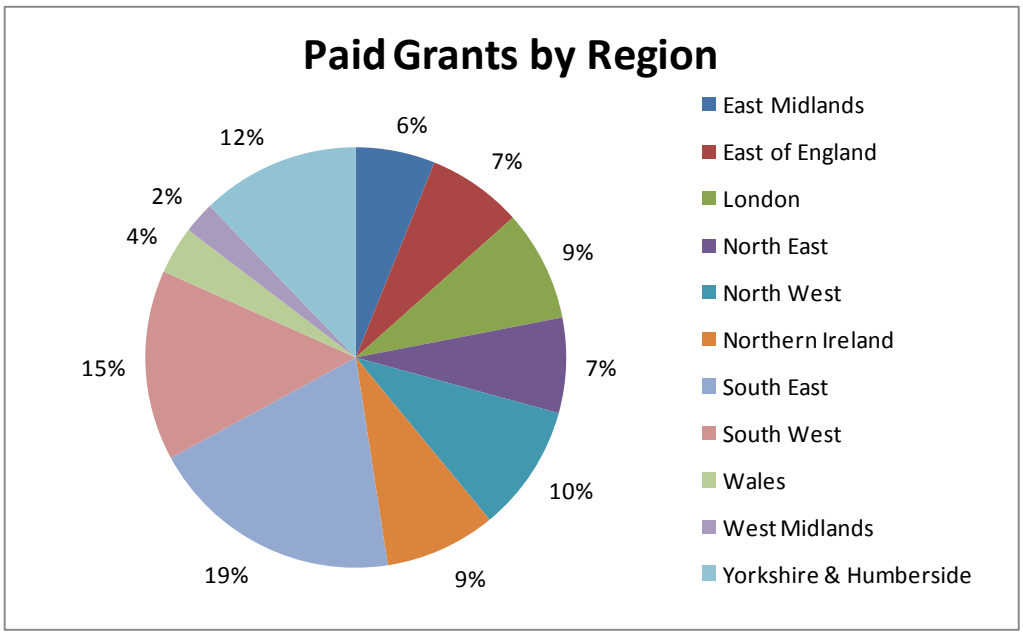


Figure 8 - Grants paid by Region

Stream 2a – Medium Scale

Status	Number	Value
Pre-registrations received	1792	£71,674,258
Full applications issued	1785	£71,274,084
Full applications received	596	£20,897,557
Applications submitted to selection panel	474	£16,026,387
Grants Offered	205	£4,557,739
Grants Withdrawn	23	£595,327
Grants Expired	31	£923,735
Grants Paid	**151**	**£2,858,029**

A varied selection of projects was supported through Stream 2a in terms both of technologies and types of building. 14% of successful projects were funded for two or more technologies. A broad categorisation of building types is shown in the chart below.

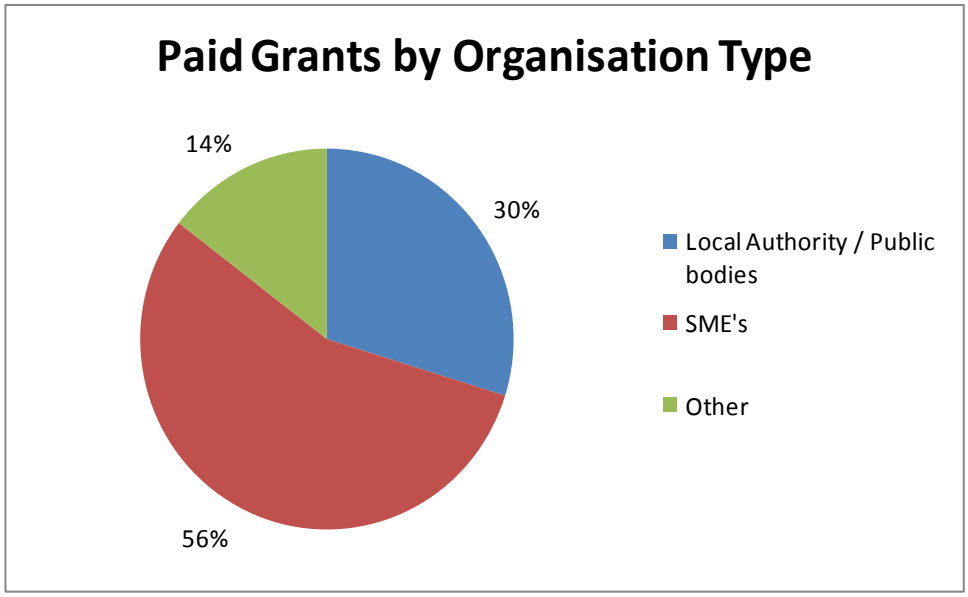


Figure 9 - – Grants Paid by organisation Type

Stream 2b – Large Scale

Status	Number	Value
Building Assessments received	179	£53,606,789
Full applications issued	42	£16,012,524
Full applications received	51	£18,327,548
Applications submitted to selection panel	51	£18,327,548
Grants Offered	23	£5,848,697
Grants Withdrawn	6	£2,445,912
Grants Paid	**17**	**£2,924,077**

As with Stream 2a, the projects supported under Stream 2b were varied. Many had a unique combination of microgeneration technologies and were true exemplar

buildings. In fact at least 2 of them have gone on to win awards for sustainability. However, there was a significant dropout (26%) under this stream between grant offer and completion stage. This was due in part to the economic climate which caused delays in many construction projects and in some cases this made the project timescales incompatible with those of the LCBP.

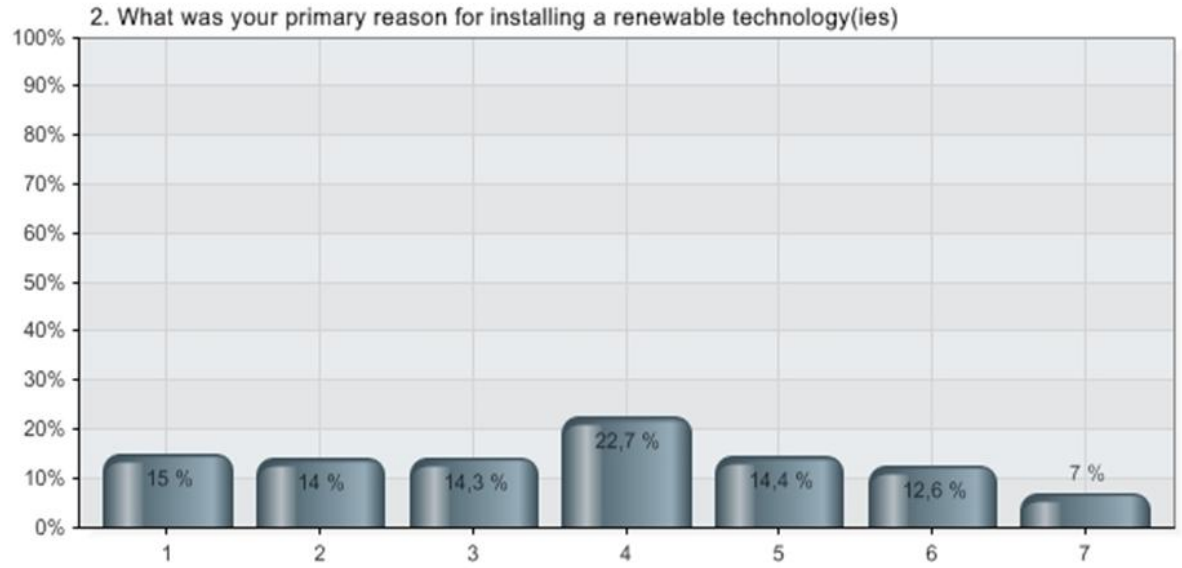
For more information on the projects supported through this stream please also see the Carbon Trust report.

2.8 Customer Satisfaction

Summary of Customer Satisfaction Surveys

From September 2009 until the end of the programme, a series of customer satisfaction surveys were sent to householder stream grant recipients a month following payment of their grant. These surveys aimed to find out the customer's experience of the installation, their reason for installing and their satisfaction with the Low Carbon Buildings Programme process.

Results from all survey respondents to the three main questions on the survey are shown below as well as a few verbatim comments from respondents to more open questions.



Alternatives	%	No
To reduce my electricity bills	15	450
To reduce my heating bills	14	420
To reduce my carbon dioxide emissions	14	431
To help the environment	23	682
To be more self-sufficient	14	432
To protect against energy price rises	13	379
Others	7	210
TOTALS	**100**	**3,004**

The reasons for installing varied and although overall a higher percentage chose ‘to help the environment’, this fluctuated over time and many free text comments state that all the options above contributed to the decision to install.
The comments below are representative of many comments made.

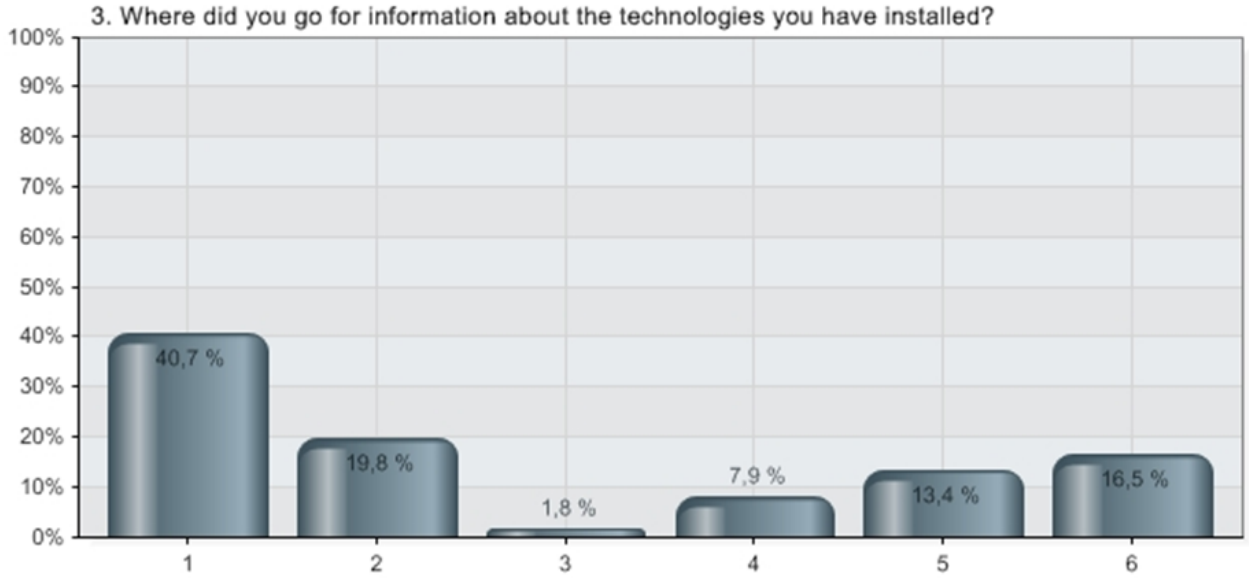
“To both help the environment and my pocket”

“To provide an exemplar for others to copy”

“Most of the above but mainly to get savings out of banks into something more useful/productive”

Comments such as the last one above became more frequent following the introduction of Feed in Tariffs indicating that installation of microgeneration technologies is becoming an investment.

As discussed earlier, there has been very little promotion of the householder stream. Indeed this is something that has come up through the customer satisfaction survey with respondents feeling that they were lucky to have found out about the programme when other perhaps have not.



Alternatives	%	No
Installer	41	1,215
Energy Savings Trust Website	20	593
Energy Savings Helpline	2	53
Low Carbon Buildings Programme	8	236
Recommendation Friend/Colleague	13	399
Web sites (Others)	16	492
TOTALS	**100**	**2,988**

Unsurprisingly then, responses show that most customers have found out about the availability of the grant from their installer. Web searches through the Energy Saving Trust, LCBP and others also make up a significant proportion. Interestingly 13.4% of respondents received a recommendation from a friend or colleague showing that word of mouth is an important channel of information.

One of the main reasons for conducting the customer satisfaction survey was to learn about how customers who had received a grant felt about the service they received from the Low Carbon Buildings Programme in order to improve the process and learn lessons for future schemes. Several questions were asked regarding each aspect of the application and claim process. The overall satisfaction levels are shown below.

Alternatives	%	No
Very Satisfied	76	2,273
Fairly Satisfied	20	596
Neither Satisfied nor Dissatisfied	2	75
Not Very Satisfied	1	43
Not at all Satisfied	1	14
TOTALS	**100**	**3,001**

Satisfaction levels have been consistently high throughout the period over which the surveys were sent. Small fluctuations month on month seem to correlate directly to payment processing times with slightly worse scores being seen at times where payment timescales have approached the SLA target of 25 working days.

The majority of verbatim comments are positive with the comments below representing common themes.

“It was excellent in every respect - quick, simple and very effective. I must confess to being very pleasantly surprised by the whole process”

"I was pleasantly surprised at the simple and clear stages to obtaining my grant. A simple and very efficient process for which LCBP are to be praised."

"I was very impressed by how straightforward and sensible it was. We had to add some loft insulation to our house, but that is an entirely fair requirement, and I'm glad we did it, quite apart from making the grant

Results of all questions asked in the customer satisfaction survey can be found in the appendices in section 11.

Summary of Complaints

Unfortunately as with any mass customer facing programme, we received some complaints. As a proportion of the total number of customers dealt with through the programme, estimated at over 20,000, the complaint rate was very small.

Complaint Type	Number
Appeal	85
Technical Issue	3
Installer Feedback	65
Programme Complaint	102
Total	**255**

Many of the installer complaints were in relation to a small number of companies who went into administration during the lifetime of the programme where customers were struggling to claim back deposits paid. Programme complaints were typically in relation to the eligibility criteria of the programme. Particularly in relation to retrospective applications and the requirement to use MCS accredited installers and products.

Reclaimed Grants

As discussed earlier, no grants were reclaimed through the programme as a result of inspection non-compliance. However, some grants were reclaimed as a result of de-installation of equipment or non-compliance with grant terms and conditions that was identified by other means.

In total 44 grants totalling £24,510 were reclaimed during the life of the programme. The majority of these (39) were as a result of de-installation of equipment, mostly for roof mounted wind turbines.

2.9 Key Findings

For a programme of this size, complexity and duration, it is unsurprising that there have been a great many lessons learned. These lessons form the basis of the

recommendations set out below to be taken into account in any future similar incentive schemes.

Simplicity is key when designing grant application and claim processes. Feedback has shown that the online application system for householders was well received and considered easy and straight forward to use. In contrast, the application process for the larger scale projects was criticised by some as being overly complex. The level of administration required needs to be commensurate to the level of funding being offered and must safeguard against fraudulent activity. However, this should be balanced against providing a customer friendly and simple process.

At times through the life of the householder stream, there has been a lack of continuity in terms of programme structure and criteria. This caused uncertainty from both industry and customers and interrupted the uptake of grants under this stream. This is especially highlighted when uptake for LCBP householder grants is contrasted with the equivalent Scottish Community and Householder Renewables Initiative (SCHRI) in Scotland. Uptake in Scotland of renewables has steadily and sustainably increased in response to a long running grant programme with very few changes to criteria and no grant level amendments.

Levels of awareness of the programme were generally low. From the customer satisfaction survey responses it can be seen that the majority of applicants found out about the grant scheme from installers. Promotion of the scheme centrally was conducted in pockets in response to the demand levels at the time and many customers who were alerted to the scheme by these promotional activities commented that the programme should be marketed to a wider audience. Whilst a widespread marketing campaign was not necessary for the programme, the lack of general awareness of the programme hindered progress towards the objective of increasing awareness of microgeneration technologies more widely.

Tailored administration approaches have been vital but have sometimes led to the programme seeming like 4 programmes pushed together. A holistic view of the programme was sometimes lacking with the householder stream taking the most focus due to the higher volume and scrutiny from industry. Some opportunities have perhaps been missed to use the larger scale projects to promote microgeneration at a domestic level. Similarly, sharing best practice between grant recipients was not encouraged.

2.10 Conclusions

In conclusion, Phase 1 of the Low Carbon Buildings Programme was very complex to administer and faced many challenges over its lifetime. However, it also achieved a large number of installations and helped to generate awareness of microgeneration technologies.

As outlined in the Ipsos Mori evaluation of the Low Carbon Buildings Programme commissioned in 2011 by DECC, the programme in its entirety met some but not all of its objectives but achieved some important outcomes that were not originally designed as objectives of the scheme.

A criticism of Phase 1 of the LCBP was that it did not incentivise significant numbers of additional installations that would not have taken place in the absence of LCBP. This is particularly apparent in feedback from applicants under the householder stream who frequently stated that they would have been likely to proceed without the availability of the grant funding.

However, the programme contributed towards establishing MCS and the quality standards now operating within the microgeneration industry and also sustained the microgeneration industry so that it is now in a position to take advantage of the new policy instruments of FiTs and the RHI. Arguably, without these elements, the market conditions would not have been right to implement the current policies and in that respect, LCBP played an important role in the success of the microgeneration industry.

2.11 Appendices

Detailed Programme Statistics

Number and value of grants paid by nation, region, and Local Authority

Stream 1 – Householders

Nation/Region/LA	Number	Value
Amber Valley	22	£24,272
Ashfield	15	£26,621
Bassetlaw	18	£23,665
Blaby	9	£18,212
Bolsover	6	£17,385
Boston	14	£25,330
Broxtowe	12	£20,382
Charnwood	25	£31,110
Chesterfield	9	£12,508
Corby	7	£10,700
Daventry	123	£95,157
Derby	21	£34,040
Derbyshire Dales	34	£55,300
East Lindsey	41	£65,600
East Northamptonshire	45	£37,257
Erewash	19	£21,500
Gedling	15	£19,800
Harborough	21	£39,610
High Peak	11	£14,728
Hinckley and Bosworth	26	£37,960
Kettering	29	£30,964
Leicester	74	£107,658
Lincoln	5	£15,390
Mansfield	10	£11,785
Melton	18	£21,306
Newark and Sherwood	34	£55,144
North East Derbyshire	15	£24,093
North East Lincolnshire	8	£9,734
North Kesteven	30	£51,248
North Lincolnshire	4	£2,100
North West Leicestershire	15	£20,128
Northampton	44	£31,530
Nottingham	11	£19,128
Oadby and Wigston	4	£8,120
Rushcliffe	47	£59,500
Rutland	16	£22,998
South Derbyshire	12	£17,700
South Holland	21	£38,954

Nation/Region/LA	Number	Value
South Kesteven	30	£37,756
South Northamptonshire	71	£72,470
Wellingborough	27	£24,001
West Lindsey	26	£31,681
East Midlands Total	**1044**	**£1,344,524**
Aylesbury Vale	1	£1,200
Babergh	69	£94,107
Barking and Dagenham	5	£9,540
Basildon	11	£15,354
Bedford	36	£37,028
Braintree	67	£83,929
Breckland	39	£55,988
Brentwood	14	£19,200
Broadland	48	£68,573
Broxbourne	12	£13,185
Cambridge	51	£57,860
Castle Point	7	£20,292
Chelmsford	42	£66,229
Colchester	64	£100,541
Dacorum	48	£83,930
East Cambridgeshire	26	£37,400
East Hertfordshire	55	£123,444
Enfield	1	£2,500
Epping Forest	12	£11,712
Fenland	23	£26,328
Forest Heath	13	£12,820
Great Yarmouth	10	£15,208
Harlow	6	£4,500
Havering	14	£19,144
Hertsmere	6	£8,300
Huntingdonshire	48	£53,031
Ipswich	10	£10,580
King's Lynn and West Norfolk	59	£73,911
Luton	1	£400
Maldon	23	£32,160
Mid Bedfordshire	37	£43,420
Mid Suffolk	88	£98,143
North Hertfordshire	36	£67,170
North Norfolk	92	£105,873
Norwich	19	£27,905
Peterborough	28	£43,234
Redbridge	14	£19,180
Rochford	14	£36,600
South Bedfordshire	23	£39,740
South Cambridgeshire	106	£125,028
South Norfolk	87	£114,034
Southend-on-Sea	15	£12,228

Nation/Region/LA	Number	Value
St Albans	43	£60,332
St Edmundsbury	50	£53,731
Stevenage	5	£8,300
Suffolk Coastal	168	£166,080
Tendring	28	£20,698
Three Rivers	19	£32,065
Thurrock	14	£16,700
Uttlesford	38	£57,522
Waltham Forest	1	£400
Watford	8	£7,400
Waveney	30	£42,700
Welwyn Hatfield	15	£18,985
East of England Total	**1799**	**£2,375,861**
Barnet	33	£70,590
Bexley	17	£23,790
Brent	18	£40,548
Bromley	51	£79,375
Camden	34	£61,470
Croydon	40	£75,770
Ealing	18	£28,540
Enfield	11	£11,980
Greenwich	12	£33,606
Hackney	15	£23,060
Hammersmith and Fulham	17	£27,780
Haringey	27	£64,595
Harrow	19	£51,495
Hillingdon	29	£69,646
Hounslow	18	£23,448
Islington	55	£76,460
Kensington and Chelsea	11	£28,005
Kingston upon Thames	16	£32,850
Lambeth	21	£41,995
Lewisham	19	£14,400
Merton	20	£27,400
Newham	5	£14,161
Redbridge	6	£8,700
Richmond upon Thames	52	£66,645
Southwark	26	£55,904
Sutton	17	£30,421
Tower Hamlets	1	£2,500
Waltham Forest	11	£16,806
Wandsworth	31	£39,169
Westminster	7	£11,930
London Total	**657**	**£1,153,037**
Alnwick	15	£18,060
Berwick-upon-Tweed	10	£15,500
Blyth Valley	5	£4,100

Nation/Region/LA	Number	Value
Castle Morpeth	27	£30,900
Chester-le-Street	7	£10,700
Darlington	9	£18,456
Derwentside	5	£8,300
Durham	30	£52,320
Easington	6	£5,206
Gateshead	5	£4,100
Hartlepool	1	£400
Middlesbrough	5	£5,128
Newcastle upon Tyne	17	£23,128
North Tyneside	12	£14,000
Redcar and Cleveland	6	£8,200
Richmondshire	1	£1,200
Sedgefield	22	£33,990
South Tyneside	2	£5,000
Stockton-on-Tees	15	£20,100
Sunderland	5	£4,128
Teesdale	22	£28,400
Tynedale	40	£63,200
Wansbeck	2	£800
Wear Valley	29	£52,471
North East Total	**298**	**£427,787**
Allerdale	21	£33,388
Barrow-in-Furness	2	£785
Blackburn with Darwen	10	£26,141
Bolton	5	£6,200
Burnley	14	£25,263
Bury	6	£9,585
Carlisle	21	£26,600
Chester	23	£35,620
Chorley	10	£14,000
Congleton	11	£12,775
Copeland	16	£24,795
Crewe and Nantwich	13	£13,426
Eden	50	£67,020
Ellesmere Port & Neston	1	£2,500
Fylde	3	£5,800
Halton	3	£7,500
Hyndburn	2	£1,600
Lancaster	24	£34,628
Liverpool	17	£27,140
Macclesfield	27	£57,050
Manchester	11	£20,178
Oldham	7	£9,613
Pendle	6	£20,950
Preston	7	£12,300
Ribble Valley	14	£36,407

Nation/Region/LA	Number	Value
Rochdale	8	£9,878
Rossendale	13	£34,498
Salford	4	£6,300
Sefton	12	£15,984
South Lakeland	47	£75,911
South Ribble	16	£6,428
St. Helens	5	£7,268
Stockport	12	£14,128
Tameside	4	£7,900
Trafford	7	£11,068
Vale Royal	21	£28,585
Warrington	15	£24,568
West Lancashire	12	£25,083
Wigan	5	£9,128
Wirral	37	£52,818
Wyre	14	£27,130
North West Total	**556**	**£887,937**
Adur	16	£35,090
Arun	62	£80,932
Ashford	54	£65,968
Aylesbury Vale	77	£128,581
Basingstoke and Deane	50	£96,766
Bracknell Forest	14	£22,345
Brighton and Hove	142	£111,541
Canterbury	69	£72,334
Cherwell	51	£78,080
Chichester	163	£226,751
Chiltern	49	£73,052
Crawley	12	£9,000
Dartford	17	£16,800
Dover	41	£69,137
East Devon	1	£2,500
East Hampshire	84	£127,576
Eastbourne	19	£25,800
Eastleigh	31	£53,725
Elmbridge	46	£66,437
Epsom and Ewell	15	£25,230
Fareham	30	£57,528
Gosport	8	£15,760
Gravesham	18	£21,230
Guildford	75	£105,613
Hart	41	£77,156
Hastings	12	£11,100
Havant	36	£67,630
Horsham	125	£130,002
Isle of Wight	79	£165,245
Lewes	191	£168,454

Nation/Region/LA	Number	Value
Maidstone	62	£68,570
Medway	33	£32,705
Mid Sussex	92	£111,000
Milton Keynes	45	£61,915
Mole Valley	49	£85,371
New Forest	110	£135,059
Oxford	79	£90,859
Portsmouth	19	£45,100
Reading	37	£74,865
Reigate and Banstead	52	£69,668
Rother	64	£89,940
Runnymede	31	£43,020
Rushmoor	9	£12,000
Salisbury	2	£5,000
Sevenoaks	76	£113,089
Shepway	59	£52,960
Slough	5	£13,568
South Bucks	21	£25,200
South Oxfordshire	100	£143,702
Southampton	14	£24,378
Spelthorne	19	£20,920
Surrey Heath	17	£19,900
Swale	32	£37,480
Tandridge	56	£68,745
Teignbridge	1	£2,500
Test Valley	64	£117,610
Thanet	24	£31,200
Tonbridge and Malling	56	£45,623
Tunbridge Wells	81	£110,524
Vale of White Horse	100	£152,421
Waverley	95	£114,108
Wealden	138	£201,741
West Berkshire	112	£163,730
West Oxfordshire	81	£110,690
Winchester	82	£123,009
Windsor and Maidenhead	57	£86,858
Woking	25	£34,020
Wokingham	45	£86,079
Worthing	34	£44,060
Wycombe	47	£104,528
South East Total	**3753**	**£5,181,075**
Bath and North East Somerset	118	£177,815
Bournemouth	16	£11,100
Bristol, City of	121	£169,420
Caradon	57	£73,749
Carrick	98	£108,633
Cheltenham	39	£42,920

Nation/Region/LA	Number	Value
Christchurch	14	£30,628
Cotswold	83	£76,100
East Devon	177	£240,087
East Dorset	49	£60,562
Exeter	27	£31,400
Forest of Dean	85	£116,398
Gloucester	20	£25,182
Isles of Scilly	9	£7,300
Kennet	65	£82,618
Kerrier	95	£140,484
Mendip	136	£220,766
Mid Devon	108	£151,501
North Cornwall	123	£133,270
North Devon	65	£95,882
North Dorset	62	£74,660
North Somerset	196	£225,760
North Wiltshire	76	£79,627
Penwith	74	£116,213
Plymouth	31	£48,698
Poole	26	£23,500
Purbeck	39	£73,849
Restormel	65	£84,626
Salisbury	106	£113,995
Sedgemoor	83	£143,436
South Gloucestershire	119	£169,331
South Hams	147	£223,926
South Somerset	150	£217,438
Spelthorne	1	£2,500
Stroud	172	£164,150
Swindon	24	£28,620
Taunton Deane	99	£153,643
Teignbridge	84	£123,328
Tewkesbury	34	£51,966
Torbay	10	£10,300
Torridge	80	£96,165
West Devon	93	£94,909
West Dorset	97	£179,262
West Oxfordshire	4	£4,200
West Somerset	59	£49,778
West Wiltshire	60	£77,141
Weymouth and Portland	18	£29,600
South West Total	**3514**	**£4,656,435**
Birmingham	32	£48,968
Bridgnorth	18	£35,828
Bromsgrove	14	£35,060
Cannock Chase	7	£15,400
Coventry	16	£32,854

Nation/Region/LA	Number	Value
Dudley	9	£14,100
East Staffordshire	13	£18,328
Herefordshire, County of	203	£269,646
Lichfield	21	£22,411
Malvern Hills	59	£77,183
Newcastle-under-Lyme	19	£25,111
North Shropshire	34	£42,197
North Warwickshire	8	£8,328
Nuneaton and Bedworth	10	£7,200
Oswestry	34	£41,168
Redditch	9	£8,700
Rugby	34	£46,373
Sandwell	2	£2,500
Shrewsbury and Atcham	40	£46,134
Solihull	16	£30,350
Newcastle-under-Lyme	19	£25,111
South Shropshire	60	£71,790
South Staffordshire	16	£21,870
Stafford	21	£23,700
Staffordshire Moorlands	17	£19,550
Stoke-on-Trent	5	£10,080
Stratford-on-Avon	63	£91,440
Tamworth	8	£5,328
Telford and Wrekin	20	£18,928
Walsall	9	£7,942
Warwick	46	£72,424
Wolverhampton	2	£2,900
Worcester	11	£12,800
Wychavon	41	£66,806
Wyre Forest	22	£18,028
West Midlands Total	**939**	**£1,271,426**
Barnsley	17	£18,893
Bradford	26	£42,440
Calderdale	59	£129,101
Craven	25	£40,385
Doncaster	19	£18,928
East Riding of Yorkshire	164	£99,577
Hambleton	47	£68,840
Harrogate	56	£95,468
Kingston upon Hull, City of	7	£4,500
Kirklees	186	£339,247
Leeds	55	£88,802
North Lincolnshire	34	£49,180
Redcar and Cleveland	1	£2,500
Richmondshire	17	£18,004
Rotherham	16	£21,068
Ryedale	28	£34,660

Nation/Region/LA	Number	Value
Scarborough	13	£15,155
Selby	19	£42,079
Sheffield	57	£98,221
Wakefield	21	£26,223
York	42	£40,796
Yorkshire and Humberside Total	**909**	**£1,294,068**
England Total	**13469**	**£18,592,152**
Aberdeen City	1	£2,500
Aberdeenshire	20	£72,356
Angus	4	£9,900
Argyll and Bute	8	£19,780
Dumfries and Galloway	7	£14,600
East Ayrshire	2	£5,428
East Dunbartonshire	1	£385
East Lothian	3	£14,680
Edinburgh, City of	6	£17,341
Eilean Siar	1	£900
Fife	8	£30,705
Highland	14	£22,268
Midlothian	1	£6,000
Moray	9	£27,682
North Ayrshire	3	£11,200
North Lanarkshire	1	£428
Perth and Kinross	7	£25,983
Renfrewshire	1	£428
Scottish Borders	5	£10,568
Shetland Islands	1	£5,000
South Ayrshire	4	£9,600
South Lanarkshire	6	£7,942
Stirling	5	£2,052
Scotland Total	**118**	**£317,724**
Blaenau Gwent	1	£2,500
Bridgend	9	£16,307
Caerphilly	15	£17,545
Cardiff	29	£44,080
Carmarthenshire	110	£134,883
Ceredigion	68	£59,385
Conwy	19	£24,627
Denbighshire	18	£27,800
Flintshire	34	£47,929
Gwynedd	75	£103,591
Isle of Anglesey	45	£67,140
Merthyr Tydfil	2	£3,400
Monmouthshire	61	£95,417
Neath Port Talbot	11	£12,082
Newport	10	£12,528
Pembrokeshire	96	£102,191

Nation/Region/LA	Number	Value
Powys	351	£329,426
Rhondda, Cynon, Taff	14	£18,300
Swansea	40	£34,982
The Vale of Glamorgan	34	£56,960
Torfaen	10	£28,480
Wrexham	18	£18,713
Wales Total	**1070**	**£1,258,265**
Antrim	15	£13,500
Ards	30	£21,200
Armagh	25	£28,943
Ballymena	13	£10,600
Ballymoney	4	£9,100
Banbridge	29	£17,897
Belfast	7	£6,400
Carrickfergus	9	£7,900
Castlereagh	17	£10,000
Coleraine	22	£14,680
Cookstown	29	£25,042
Craigavon	17	£15,600
Derry City	9	£6,360
Down	64	£55,700
Dungannon	30	£32,954
Fermanagh	34	£32,700
Larne	10	£11,081
Limavady	8	£5,900
Lisburn	34	£30,920
Magherafelt	20	£12,000
Moyle	6	£2,900
Newry and Mourne	49	£28,503
Newtownabbey	18	£21,493
North Down	33	£21,200
Omagh	35	£37,458
Strabane	20	£18,660
Northern Ireland Total	**587**	**£498,690**
Programme Total	**15244**	**£20,666,831**

Stream 1 – Communities

Nation/Region	Number	Value
East Midlands	5	£70,518
East of England	5	£81,480
London	7	£131,801
North East	6	£124,484
North West	8	£126,176
South East	15	£260,157
South West	12	£141,326

Nation/Region	Number	Value
West Midlands	2	£56,256
Yorkshire & Humberside	10	£182,395
England Total	70	£1,174,594
Wales	3	£26,270
Northern Ireland	7	£101,222
Programme Total	**80**	**£1,302,086**

Stream 2a – Medium Scale

Nation/Region	Number	Value
East Midlands	10	£195,079
East of England	18	£307,948
London	11	£339,580
North East	5	£92,361
North West	5	£71,833
South East	30	£762,347
South West	27	£458,941
West Midlands	8	£115,418
Yorkshire & Humberside	9	£203,654
England Total	**123**	**£2,547,161**
Scotland	10	£157,355
Wales	10	£84,963
Northern Ireland	7	£68,549
Programme Total	**150**	**£2,858,029**

Stream 2b – Large Scale

Nation/Region	Number	Value
East of England	1	£137,346
London	3	£473,512
North East	1	£116,382
North West	1	£192,325
South East	2	£152,096
South West	3	£617,825
West Midlands	1	£111,926
Yorkshire & Humberside	2	£597,972
England Total	**14**	**£2,399,385**
Wales	2	£331,327
Northern Ireland	1	£193,366
Programme Total	**17**	**£2,924,077**

Number, value and capacity of grants paid by technology

Stream 1 – Householders

Technology	Number	Value	Collector	Thermal	Electricity
Air Source Heat Pump	826	£738,762	0	49,399	0
Biomass Room Heater/Stove	14	£7,698	0	129	0
Ground Source Heat Pump	843	£1,008,727	0	11,571	0
Small Scale Hydro	7	£20,600	0	0	46
Solar Photovoltaic	4428	£13,136,531	91,669	0	10,806
Solar Thermal Hot Water	7761	£3,105,513	45,149	0	0
Wind Turbine	762	£1,756,122	0	0	3,399
Wood Fuelled Boiler System	603	£892,879	0	83,326	0
Grand Total	**15244**	**£20,666,831**	**136,818**	**144,425**	**14,251**

Stream 1 – Communities

Technology	Number	Value	Collector	Thermal	Electricity
Air Source Heat Pump	0	0	0	0	0
Biomass Room Heater/Stove	1	£7,464	0	15	0
Ground Source Heat Pump	10	£136,915	0	232	0
Small Scale Hydro	0	0	0	0	0
Solar Photovoltaic	23	£292,764	0	0	95
Solar Thermal Hot Water	26	£365,212	863	0	0
Wind Turbine	18	£283,068	0	0	245
Wood Fuelled Boiler System	12	£216,663	0	1,215	0
Grand Total	**90**	**£1,302,086**	**863**	**1,462**	**340**

Please note that the total number shown above is greater than the number of grant recipients as some grants were for multiple technologies.

Stream 2a – Medium Scale

Technology	Number	Value	Collector	Thermal	Electricity
Air Source Heat Pump	0	0	0	0	0
Biomass Room Heater/Stove	4	33,014	0	60	0
Ground Source Heat Pump	28	452,729	0	947	0
Small Scale Hydro	1	50,566	0	0	32
Solar Photovoltaic	30	630,177	0	0	257
Solar Thermal Hot Water	42	433,479	1,036	0	0
Wind Turbine	27	480,848	0	0	353
Wood Fuelled Boiler System	45	777,216	0	5,224	0
Grand Total	**177**	**£2,858,029**	**1,036**	**6,231**	**642**

Please note that the total number shown above is greater than the number of grant recipients as some grants were for multiple technologies.

Stream 2b – Large Scale

Technology	Number	Value	Collector	Thermal	Electricity
Air Source Heat Pump	0	0	0	0	0
Biomass Room Heater/Stove	0	0	0	0	0
Ground Source Heat Pump	10	£1,515,04	0	1,933	0
Small Scale Hydro	1	£30,135	0	0	5
Solar Photovoltaic	7	£277,718	981	0	111
Solar Thermal Hot Water	9	£275,793	761	0	0
Wind Turbine	1	£32,924	0	0	15
Wood Fuelled Boiler System	6	£792,463	0	3,350	0
Grand Total	**34**	**£2,924,07**	**1,742**	**5,283**	**131**

Please note that the total number shown above is greater than the number of grant recipients as some grants were for multiple technologies.

Number and value of grants paid by house type

Property Type	Number	Value
Detached Bungalow	2,171	£2,813,452
Detached House	8,932	£12,645,877
End Terraced House	447	£573,998
Flat	51	£67,393
Maisonette	30	£44,170
Mid-Terraced House	825	£1,092,729
Semi Detached Bungalow	262	£294,560
Semi Detached House	2,526	£3,134,652
Programme Total	**15,244**	**£20,666,831**

Number and value of grants paid by organisation type

Organisation Type	Householders		Communities		2a		2b	
Householders	15,244	£20,666,831	0	0	0	0	0	0
Company limited by G'tee	0	0	0	£6,597	0	0	0	0
Housing Association or Trust	0	0	9	£209,607	0	0	0	0
Local Authority / Public bodies	0	0	17	£319,228	45	£976,722	7	£1,237,945
Local community group with constitution	0	0	8	£127,402	0	0	0	0
Registered Charity	0	0	22	£310,180	0	0	0	0
School	0	0	16	£224,545	0	0	0	0
SME's	0	0	0	0	84	£1,231,282	4	£735,754
Other	0	0	7	£104,527	22	£650,024	6	£950,379
Programme Total	**15,244**	**£20,666,831**	**80**	**£1,302,086**	**151**	**£2,858,028**	**17**	**£2,924,078**

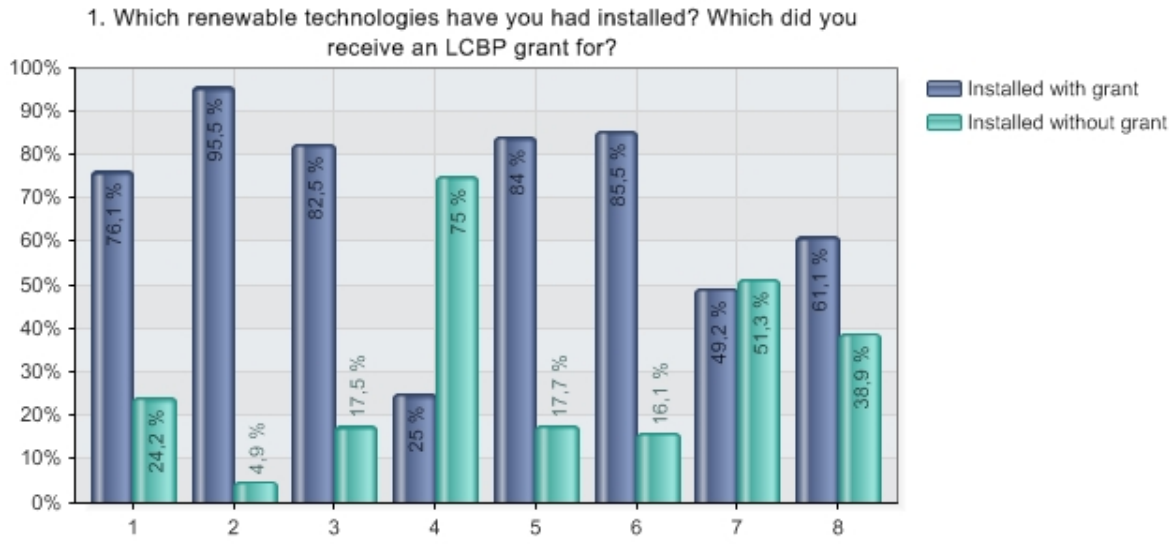
Installation cost and grant awarded by stream

Stream	Total Installation	Total Grants Paid	Grant as a % of Costs
Stream 1 - Householders	£120,897,309	£20,666,831	17%
Stream 1 - Communities	£3,338,114	£1,302,086	39%
Stream 2a – Medium Scale	£7,029,084	£2,858,029	41%
Stream 2b – Large Scale	£6,595,392	£2,924,077	44%
Grand Total	**£137,859,899**	**£27,751,023**	**20%**

Detailed Customer Satisfaction Statistics

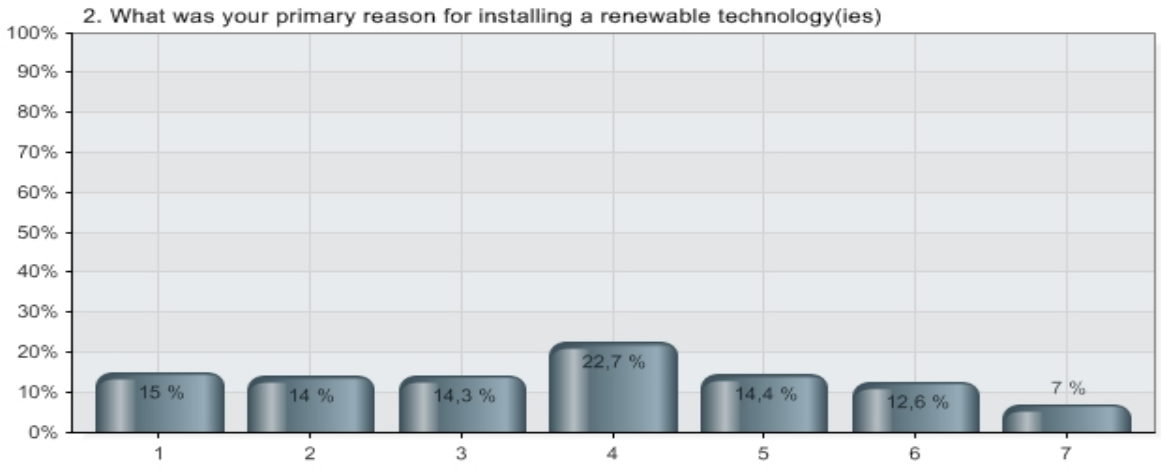
The aggregated results for all questions asked as part of the customer satisfaction survey which ran from September 2009 to March 2011 are shown below.

1. Which renewable technologies have you had installed? Which did you receive an LCBP grant for?



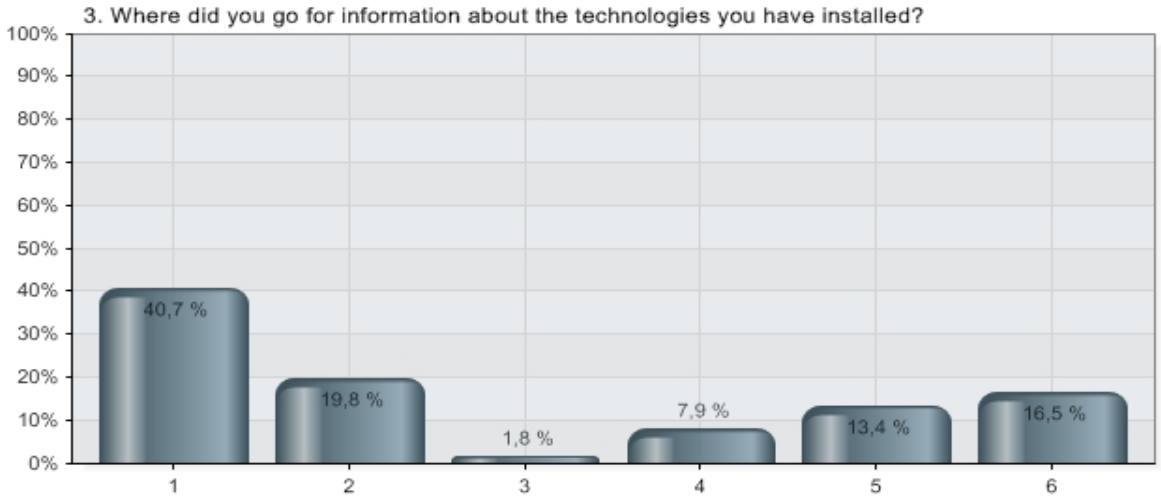
Alternatives	No
Solar Thermal Hot Water	1,495
Solar Voltaics (Solar PV)	1,501
Wind Turbine	63
Small Scale Hydro	4
Ground Source Heat Pump (GSHP)	175
Air Source Heat Pump (ASHP)	379
Wood Fuelled Boiler	187
Pellet Stove	18
TOTALS	**3,822**

2. What was your primary reason for installing a renewable technology(ies)



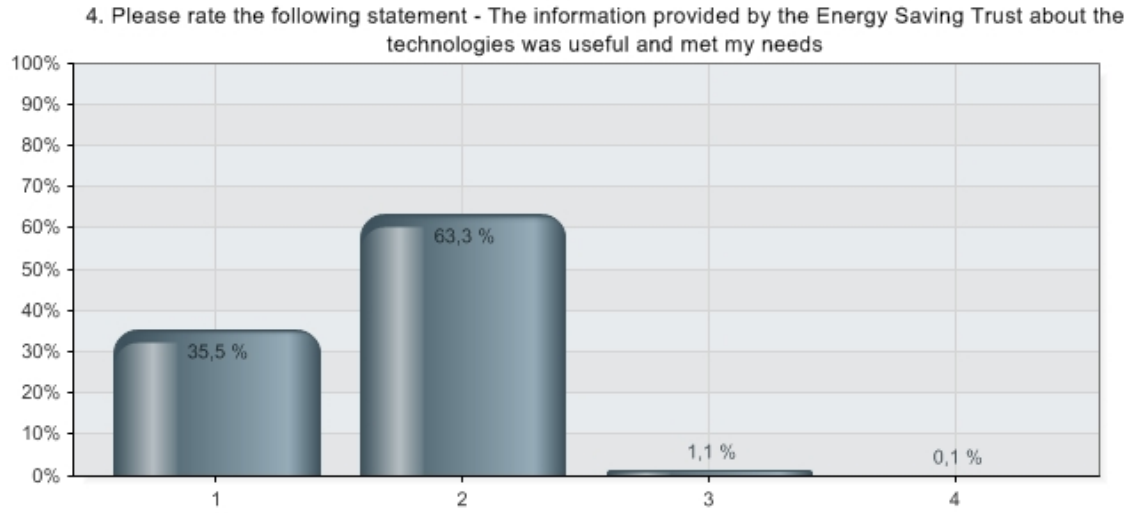
Alternatives	%	No
To reduce my electricity bills	15	450
To reduce my heating bills	14	420
To reduce my carbon dioxide emissions	14	431
To help the environment	23	682
To be more self-sufficient	14	432
To protect against energy price rises	13	379
Others	7	210
TOTALS	**100**	**3,004**

3. Where did you go for information about the technologies you have installed?



Alternatives	%	No
Installer	41	1,215
Energy Savings Trust Website	20	593
Energy Savings Helpline	2	53
Low Carbon Buildings Programme	8	236
Recommendation Friend/Colleague	13	399
Web sites (Others)	16	492
TOTALS	**100**	**2,988**

4. Please rate the following statement - The information provided by the Energy Saving Trust about the technologies was useful and met my needs



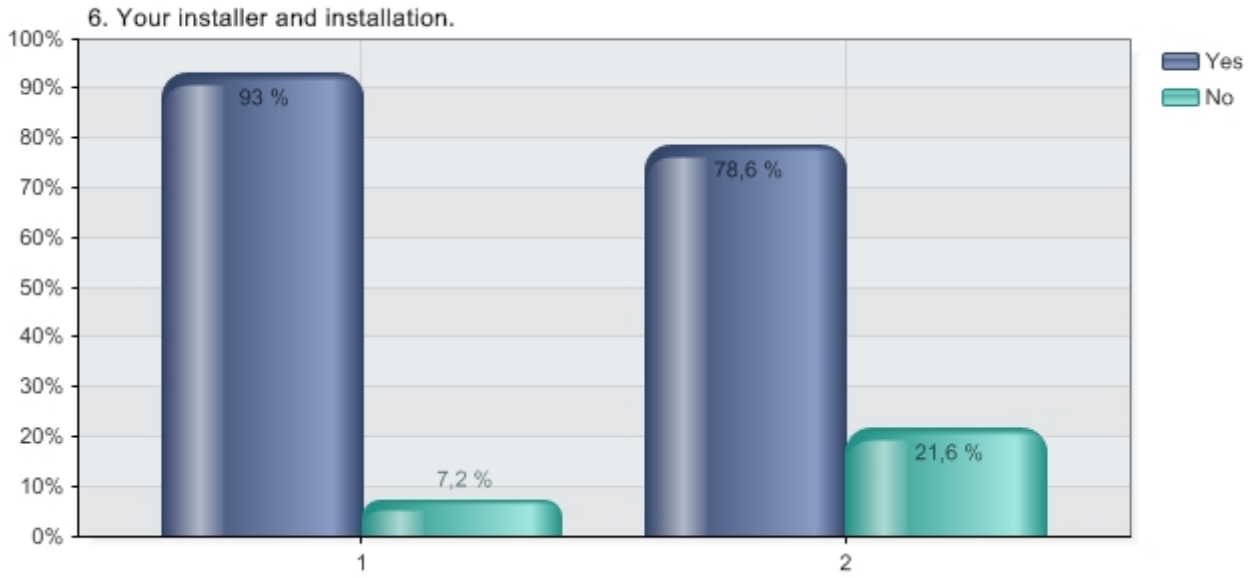
Alternatives	%	No
Strongly Agree	36	312
Agree	63	556
Disagree	1	10
Strongly Disagree	0	1
TOTALS	**100**	**879**

5. What, if any, other information from the Energy Saving Trust would you have found useful about the technologies?

Most common themes were:

- Nothing – I found everything I needed
- Information on payback times
- Comparisons between different products and their efficiencies
- Case studies of 'ordinary people's' experiences
- Advice on combining technologies e.g. Solar PV and heat pumps

6. Your installer and installation.

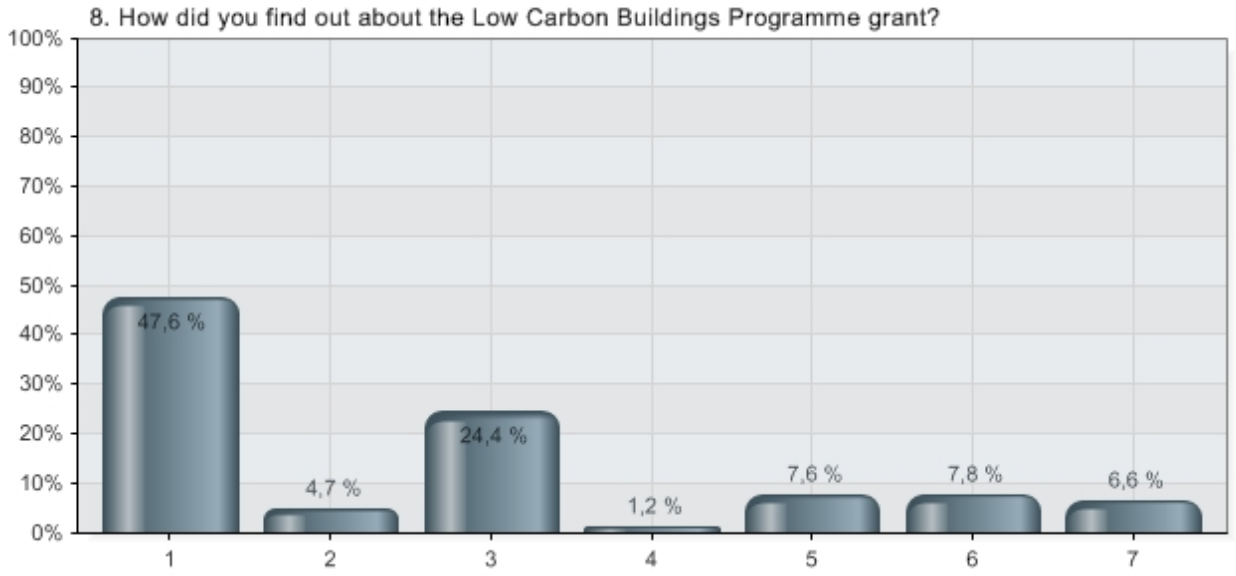


	YES %	No %	Sample
Were you provided with adequate information from your accredited installer on how to use your (new) system?	96.8	7,2	2,985
Did you receive adequate information from your accredited installer on how to maximise energy savings from your (new) system?	78.4	21.6	2,949

7. If you have any comments on your installer or the installation process please enter in the box below

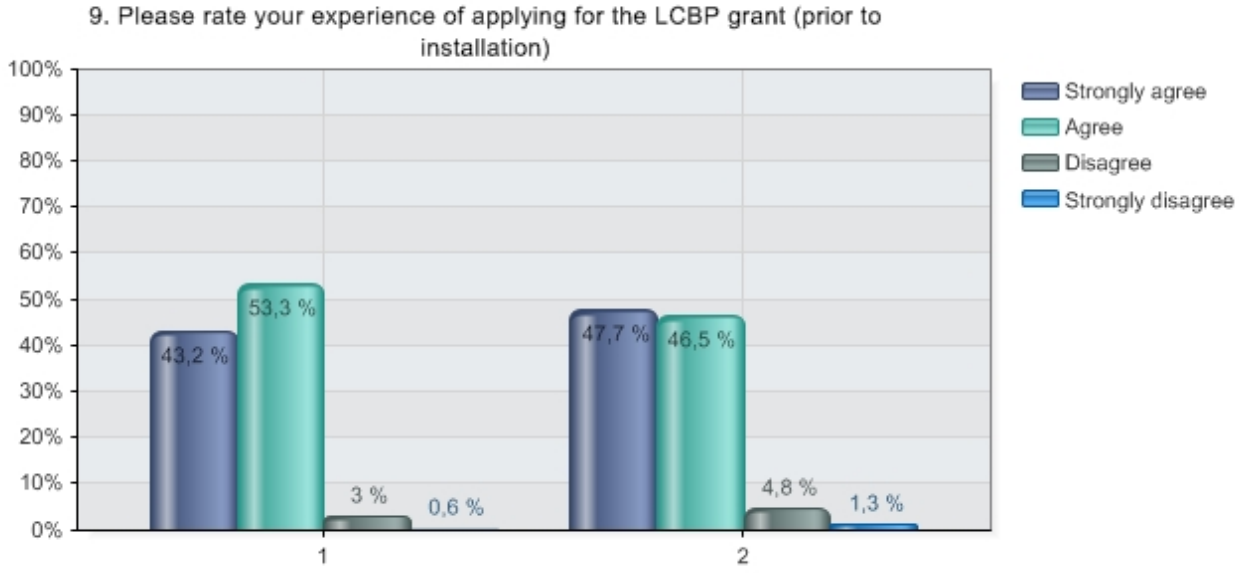
The majority of comments in this section were very positive with respondents particularly appreciating prompt, informative and tidy installers. A few comments reference that it is too early to say whether the installation will yield the returns they are expecting. Most comments centre on management of expectations in both good and bad examples.

8. How did you find out about the Low Carbon Buildings Programme grant?



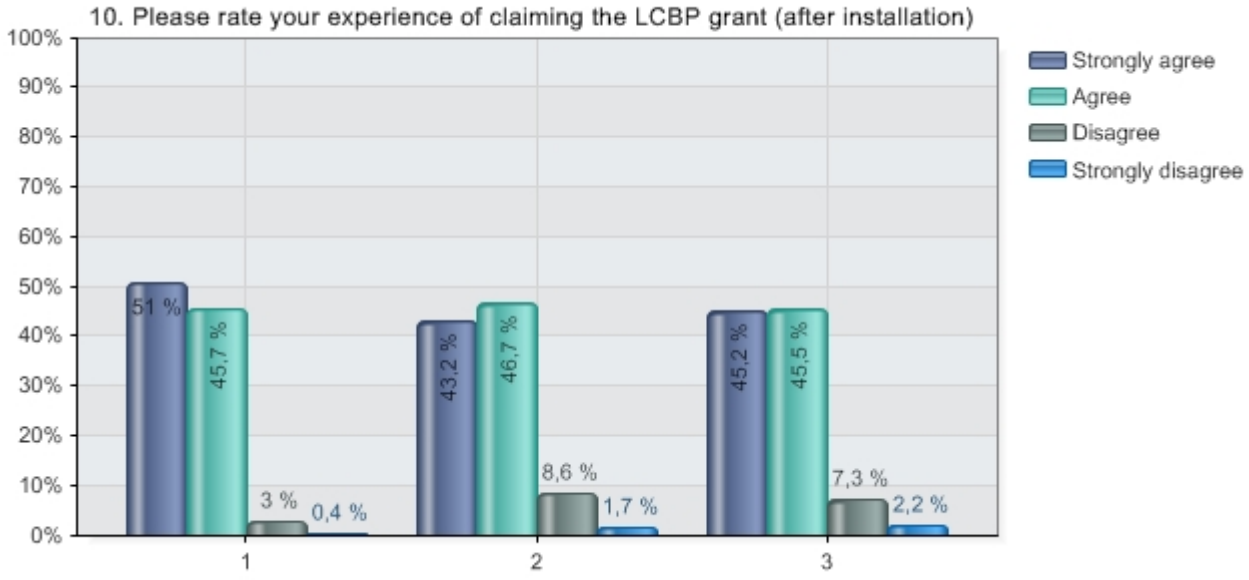
	%	Number
Installer	47.6	1,426
Promotional Literature	4.7	141
Energy Saving Trust Website	24.4	731
Energy Saving Trust Help Line	1.2	36
Recommendation from Friend/Colleague	7.6	228
Newspaper / Publications	7.8	233
Web sites	6.6	199
TOTAL	**100**	**2,994**

9. Please rate your experience of applying for the LCBP grant (prior to installation)



	Strongly Agree	Agree	Disagree	Strongly Disagree	Sample
The information on the application process for a LCBP grant was useful and easy to understand	43.2	53.3	2.9	0.6	2988
The grant application process was straight forward	47.6	46.4	4.7	1.3	2986

10. Please rate your experience of claiming the LCBP grant (after installation)



	Strongly Agree	Agree	Disagree	Strongly Disagree	Sample
I was given clear guidance on how to claim my grant in the Grant Offer Letter	50.9	45.7	3	0.4	2969
I was kept adequately informed about the progress of my claim	43.1	46.6	8.6	1.7	2967
My claim was processed in a reasonable length of time	45.2	45.4	7.2	2.2	2961

11. If you would like to comment on any aspect of the LCBP grant process please do so in the box below

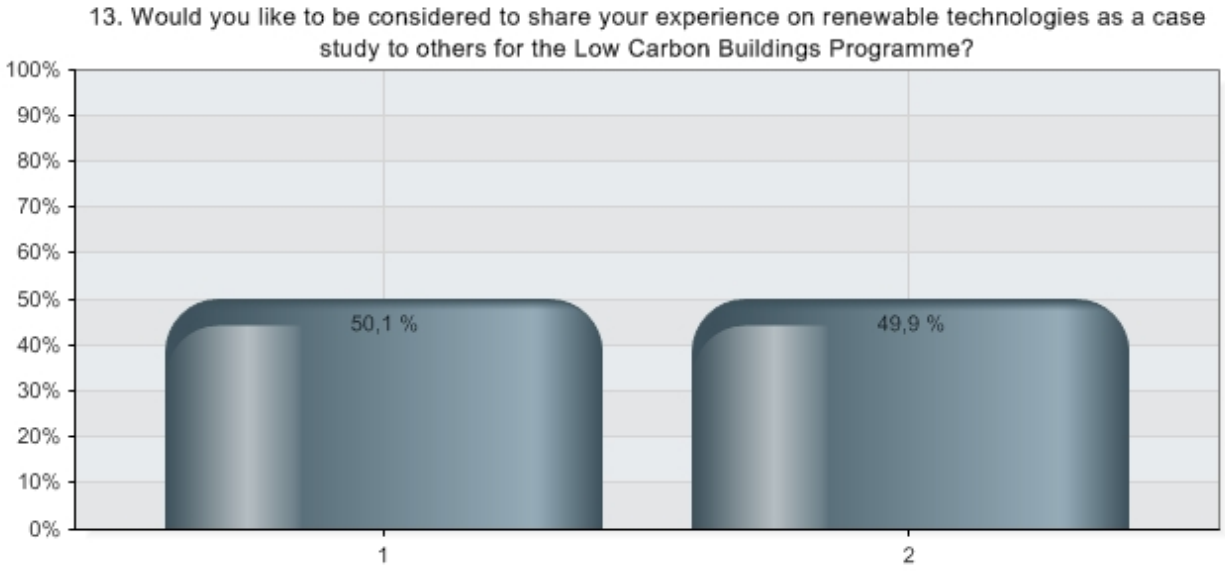
Common themes were as follows:

- Comments on the ease of the process
- Comments on future policy e.g. mandating that all new houses have technologies installed
- Appreciation for extensions to grant validity due to delays outside the applicant's control
- An approximately equal number of people commenting that the payment process was quick and those complaining that it was too lengthy – 25 working days was deemed too long to wait by some.

12. Overall, please rate your level of satisfaction with the service provided by the grants administration team at the Energy Saving Trust

	%	Number
Very Satisfied	75.7	2,273
Fairly Satisfied	19.9	596
Neither Satisfied nor Dissatisfied	2.5	75
Not very Satisfied	1.4	43
Not at all Satisfied	0.5	14
TOTALS	**100**	**3,001**

13. Would you like to be considered to share your experience on renewable



	%	Number
YES	50.1	1,497
NO	49.9	1,490
TOTAL	**100**	**2,987**

Case Studies

A number of case studies have been written up (see table below) and are available on the DECC internet site:

http://www.decc.gov.uk/en/content/cms/meeting_energy/microgen/microgen_cs/microgen_cs.aspx

Type of Grant Applicant	Technology	Estimated Annual Yield	Estimated CO_2 Savings
Householder	Solar PV	3,250	1309
Householder	Solar Thermal	1,200	228
Householder	Wood-fuelled Boiler	1,800	450
Householder	Micro-hydro	46,000	19,780
Householder	Ground Source Heat Pump	25,792	2,770
Householder	Solar Thermal Hot Water	2,000	380
Householder	Wind Turbine	10,000	4,300
Community - School	Solar PV	3,780	2,053
Community - Village Hall & Centre	Wind Turbine	8,000	4,344
Communities – 'Social' Housing	Solar Thermal Hot Water & Ground Source Heat Pump	42,330	3,493
Medium Scale Project – Holiday Cottages	Solar Thermal Hot Water, Wind Turbine & Ground Source Heat Pump	61,810	13,183
Medium Scale Project – Zoo	Biomass	313,000	78

SECTION 3

LCBP-2 and LCBP-2e

Monika Munzinger – Buildings Research Establishment

Section 3 LCBP-2 & 2e - Contents

3.1 Executive Summary

The Government and in particular the Department of Energy and Climate Change (DECC) are helping create a low-carbon Britain, with energy supplies which are affordable, secure and sustainable. In order to promote the uptake of locally based microgeneration, DECC sponsored programmes, such as the Low Carbon Building Programme (LCBP). Phase 1 was launched in April 2006 and offered grants to householders and initially also private business and other organisations. Phase 2 was launched in December 2006 and offered grants to public sector not-for-profit organisations, such as churches, schools and charities. The scheme had an initial grant budget of £48 million and organisations could apply for up to 50% of the cost of installing approved microgeneration technologies. Initially these had to be supplied and installed using Framework Suppliers and their appointed certified contractors. The scheme was opened up to all certified installers and products and in August 2009 and extended to March 2011.

This allowed continued support until the introduction of the Feed-In Tariff (FIT) for electricity producing projects in April 2010. It was less successful to provide support to heat generating projects until the introduction of the Renewable Heat Incentive (RHI), initially planned to follow in April 2011 (this has been postponed following further consultation). This was despite the fact that grant support for electricity and heat generating projects ceased at different dates, Feb 2010 and May 2010 respectively. As locally based renewable energy is gaining momentum in the UK it is important to evaluate the impact of grant programmes such as the LCBP.

LCBP Phase 2 and Phase 2 Extension were part of the UK Environmental Transformation Fund (ETF), a joint DECC/Defra fund, intended to bring forward the demonstration and deployment of low carbon energy and energy efficiency technologies.

An independent evaluation[1] was completed in August 2011, assessing whether LCBP has met these aims. This report summarises the key outcomes for LCBP2 and LCBP2E and tries to capture some of the main issues delivering what was part of the largest renewable grant programme in the UK.

3.2 Introduction

The main timescales of the programme are detailed earlier in this report but those specific to Phase-2 are listed below.

December 2006 – launch of LCBP-2 (for Schools, Communities Charities and other not-for-profit organisations) with an initial grant budget of £48 million

[1] Evaluation of the Low Carbon Buildings Programme; Ipsos MORI and CAG consultants for the Department of Energy and Climate Change, Aug 2011

May/June 2008 - series of eight events across the UK to promote LBCP-2 in partnership with Framework Suppliers (FS)

March 2009 – LCBP-2 technology pot for Solar Photovoltaic's and Heat Pumps exhausted, grants for these suspended; applications worth £10.3m are submitted in March

April 2009 – additional funding of £35 million made available in Budget 2009 for an extension until March 2011, £5m are added to the PV pot straight away

July 2009 – deadline for accepting applications under LCBP-2, applications worth £7m, £8m and £17.5m are submitted in April, May and June

July 2009 –BRE re-appointed as Management Contractors for Phase-2e following competitive tender process

August 2009 – launch of LCBP-2e

May/June 2008 - series of eight events across the UK to advertise the new LBCP-2e, highlighting any changes

December 2009 - LCBP-2 stopped accepting new applications for Solar PV as the technology pot has been exhausted, applications worth £8.6m are submitted in November

December 2009 - MCS transitional arrangements were introduced in, suspending the Clear Skies products lists from the end of 2009.

February 2010 – closure to all electrical microgeneration applications, due to the introduction of the Feed In Tariffs (FITs) in April and wanting to preserve some LCBP-2e funding for continuing thermal Microgeneration in the run-up to the Renewable Heat Incentives (1st April 2011).

May 2010 – Both Phases of LCBP closed to all new applications.

March 2011 – all grant claims processed, resulting in spending a total of £61m on 2749 projects.

Over the life of Phase 2, the programme resulted in over 2,700 community sized installations, amounting to grants worth £61 million. At the peak of the allocation in September 2010, 3,494 projects had been accepted, totalling grants worth just over £80m. There has therefore been a drop off of grant take up of around £20m, of which £17m were due to projects withdrawing between September 2010 and March 2011. The remainder is made up of successful projects claiming less than their original grant value.

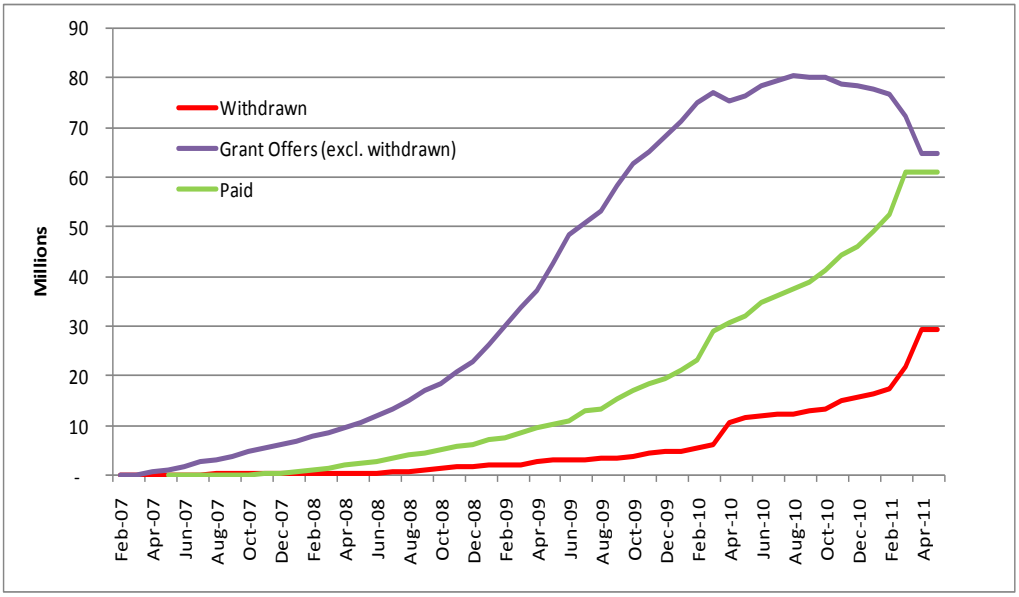


Figure 10 - Combined rates of allocation, withdrawal and payment

3.3 Programme Administration

Project Team

Following a competitive tender process, the experienced BRE Team were selected to manage the LCBP-2 Programme (And subsequent extension LCBP-2e) The team had previous experience with the Clear Skies and PV Domestic Field Trials.

The team also managed another grant programme the Community Sustainable Energy Programme (CSEP) funded by the BIG Lottery.

Technical experts were called upon for assessing project costs and technical details of the applications. The main pool consisted of experts within the Sustainable Development Group. The core team was also supported by BRE's IT group, events management and promotion.

Phase 2 and Phase 2 Extension

Most of the statistics shown are combined for both LCBP-2 and LCBP-2e, as there were distinct timelines as outlined previously.

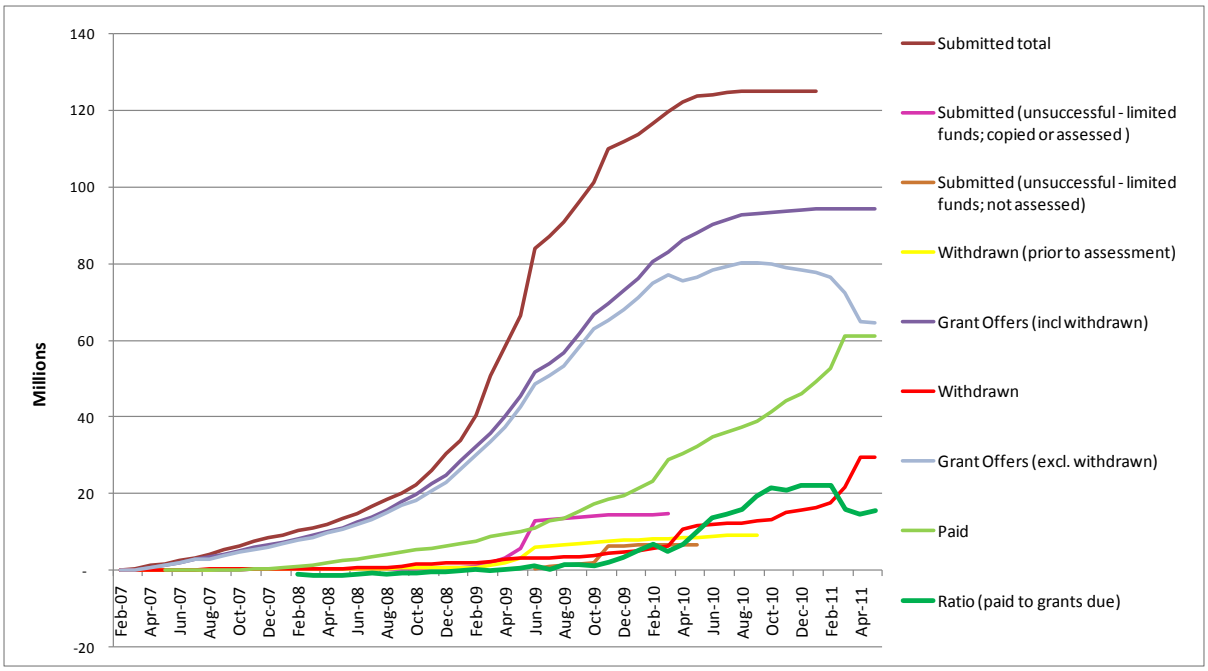


Figure 11 - Level of activity for LCBP2 and LCBP2E.

This summary table shows the level of activity. Out to a total of 5147 submitted applications (worth £124m), 4027 (78%) worth £94m (75%) received a grant offer letter. Of these 2749 projects (£61m) resulted in actual installations, meaning 1263 projects worth just under £30m withdrew. Although the remaining applications did not result in actual projects they still created a considerable amount of administration effort and should be taken into consideration when assessing the overall administration and management costs..

The table shows that payments levelled the amounts allocated one year previously up until October 2009, thereby meeting the scheme deadline of one year. After this the ration of paid versus grant due increases to over £20m in January 2011. This in the end turned out to be the final amount of grants not taken up by applicants (£20.89m). Reasons for this level of withdrawal are explored in section 3.7

The overall annual budget for LCBP-2 and LCBP-2e for grants and administration is detailed in Section 1 of this report.

Consolidating the grant payments with the actual payments made showed overall £351,333 need to be refunded to DECC, mainly due to projects withdrawing and repaying e.g. their interim claim to BRE. This includes three projects which have to repay their grant, amounting to £134,447.27.

Two of these projects are in dispute with their installer and DECC are aware of the situation. The third one needs to repay a grant, which was paid twice. The amount of

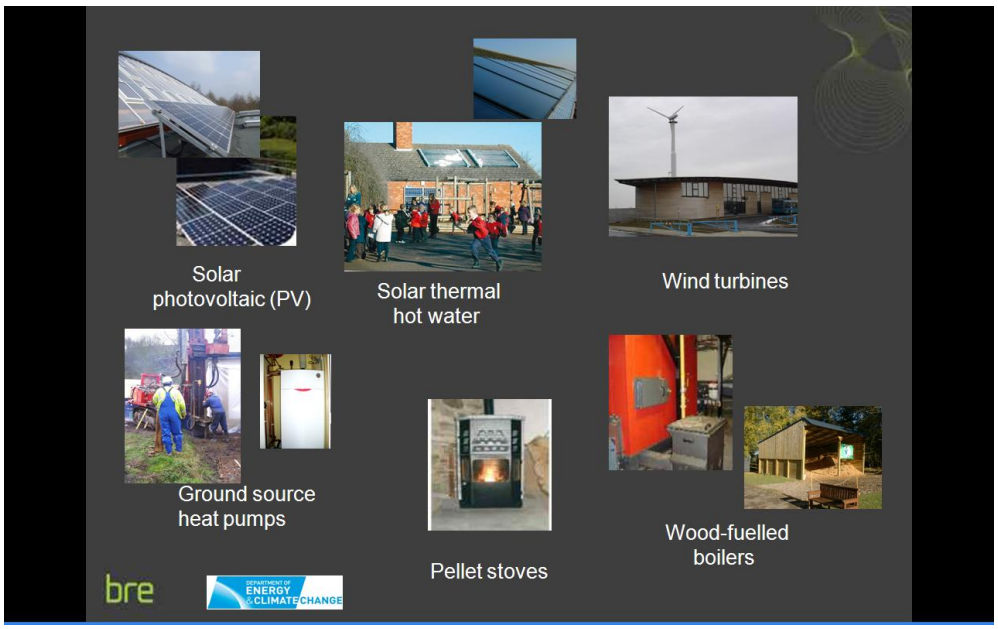
errors, such as overpaying a project, were quite limited (~18) considering 3,142 payments were made in total.

3.4 Rules and Changes

Level of funding

The initial level of funding for the supply and installation of any combination of the following technologies was:

- Solar photovoltaics (PV) – 50%
- Solar thermal hot water (ST) – 30%
- Wind turbines (WT) – 30%
- Ground source heat pumps (GSHP) – 35%
- Automated wood pellet stoves (Wpel) – 35%
- Wood fuelled boiler systems (WFB) – 35%



The level of grant was increased to 50% in April 2008 for all technologies, take up was found to be lower than expected. Low take up was also the reason DECC (then DTI) agreed to hold a series of ten events across the UK to promote the scheme, also see section 3.7. Overall promotion was not part of the core contract delivery as the scheme was mainly advertised through the seven framework contractors (FS) and their network of installers (See section 3.5).

The available funding "pots" for each technology changed over time. The additional £30 million for and were discontinued for LCBP-2e :

£ Million	Dec-2007	Mar-2009	Apr-2009	Aug-2009	Total Allocated	Total Spent
Solar PV	17.5	26.5	31.5	31.5	46.3	30.8
Solar Thermal Hot Water	7.0	7.0	7.0	7.0	15.2	10.7
Wind Turbines	12.0	5.0	5.0	5.0	5.9	2.1
Ground Source Heat Pumps	7.5	7.5	7.5	7.5	20.5	15.7
Biomass	4.0	2.0	2.0	2.0	2.1	1.6
Addition for LCBP-2e (all technologies)	0.0	0.0	0.0	30.0		
TOTAL	**48.0**	**48.0**	**53.0**	**83.0**	**90.0**	**60.9**

The Budget for LCBP-2 and LCBP-2e and adjustments is shown over time, compared to total accepted and paid values in the table above

The total accepted allocation for technologies is lower than the figure in the previous section due to adjusting the database following payments, i.e. the technology value was reduced in case the actual claim amount was lower than the requested grant amount.

Promotional Tools

DECC[2] had agreed for BER to run a series of events to raise awareness and to increase uptake of Phase 2 of the grant scheme, please see section 3.7 for further details.

Changes within LCBP-2e

- Adding another £35m of which £5m were already allocated to PV in April 2009
- Extension to March 2011 in order to support technologies until the introduction of Feed-in Tariffs and the Renewable Heat Incentive.
- The programme was open to all products and installer companies registered on the Microgeneration Certification Scheme (MCS). In terms of the product scheme, this includes Solar Keymark for solar thermal technology, and those approved under Clear Skies (until December 2009). A full list of these can be found at www.microgenerationcertification.org.
- The upper limit for heat technologies was raised to 300kW.
- Air Source Heat Pumps (ASHP) and Micro-Hydro Turbines also became eligible

[2] Then the Department for Business, Enterprise and Regulatory Reform (BERR)

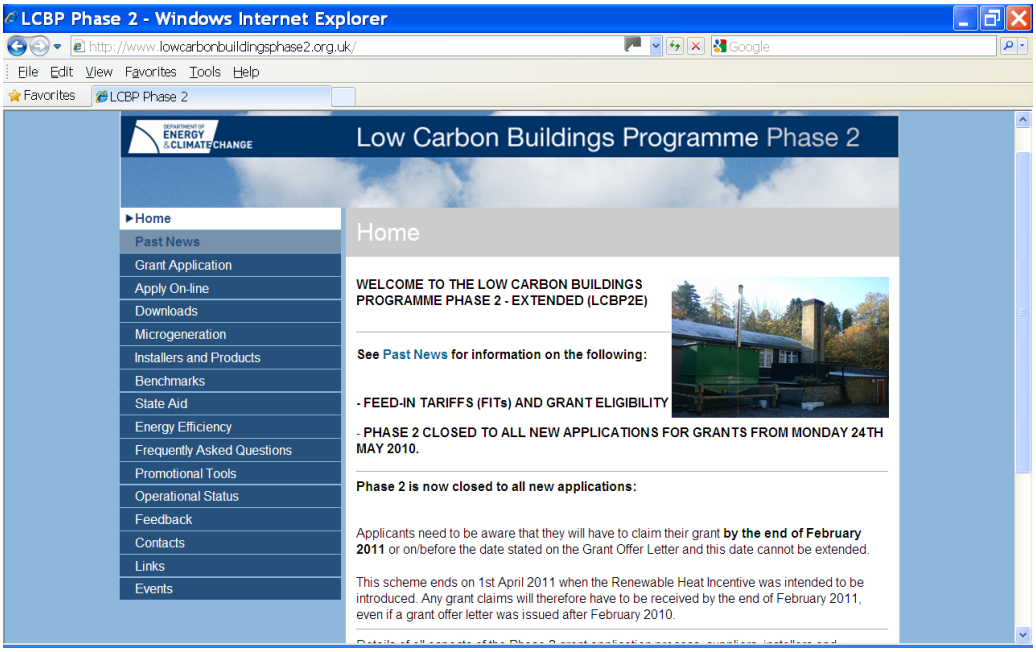
- Organisations may apply for up to 50% of the cost of installing approved technologies up to a maximum of £200,000 (though maximum grant levels may depend on the nature of the organisation).

Processes

The services offered included a website and helpline, both feeding into a dedicated database. The system allowed real time data gathering, monitoring and dissemination.

They were designed to enable call handling of up to 1,000 calls/month and support 4,500 website hits/month. It was anticipated that 1,200 grant offer letters would be issued under LCBP-2 and around 750 under LCBP-2e based on the initial grant budgets.

These figures have been exceeded although they are not far from the actual numbers installed (2,749). Website statistics also show that that the site supported well over 12,000 visitors/month or 200,000 hits/month.



LCBP2E website

Telephone Enquiries

The following helpline performance targets were applied:

- 90% of calls during working hours to be answered within 10 seconds (achieved for 147 weeks out of 236, 62% success rate)
- 85% of calls during working hours to be answered within 20 seconds (achieved for 224 weeks out of 236, 94% success rate)
- 95% voicemail messages replied to that day or the morning of following working day (this was usually achieved other than over Christmas periods,

when BRE was usually closed or during adverse weather conditions not allowing staff to get to the office)

- 95% of enquiries responded to within one working day, including dispatching information pack and application form (this was usually achieved, during busy times notification emails were send, stating that an issue will be dealt with in due time).

The helpline dealt with 14,212 emails using the dedicated LCBP-2 email address resulting in 13,920 responses. This would indicate that only 2% were not dealt with. This total number however excludes any email sent directly to helpline staff and the suspected number of emails is expected to be much larger. Especially as there were dedicated personnel dealing with changes to successful applications and grant claims.

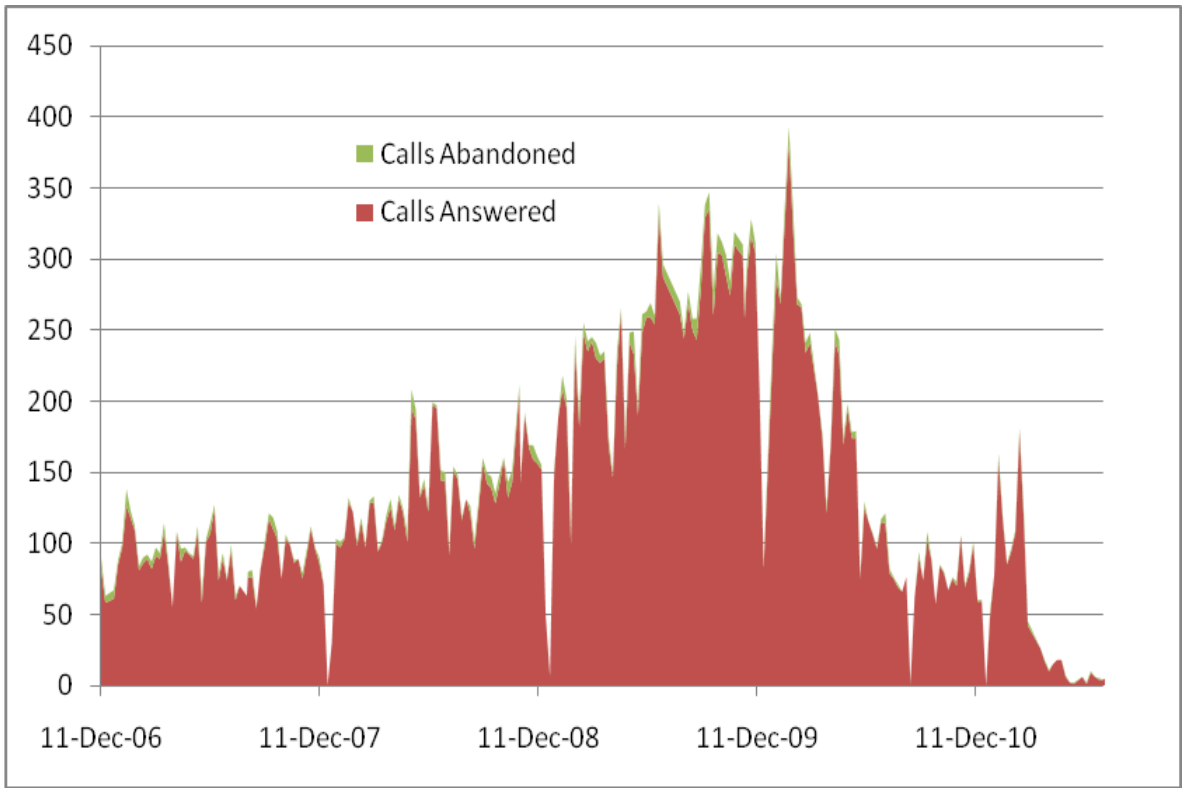


Figure 12- The number of calls answered and abandoned to the LCBP-2 & 2e Helpline throughout the programme lifetime.

Application Assessment

Allocating the grant budget on a first come first served basis, in line with dedicated technology pots and within the programme timetable were paramount to the success of the programme. Also a certain flexibility to re-allocate grants should projects withdraw had to be applied.

Applicants were able to apply either online or by post. Although the following timescales were applied, they were mainly used as guidance to make sure assessments are dealt with as efficiently as possible. Also see section 9.

- Letter confirming receipt of application sent out within 2 working days.
- Assessments carried out within 5 working days (LCBP-2) and 15-20 working days (LCBP-2e) providing that the application was straight forward
- If further information or clarification needed to be provided these times had to be extended

Assessment Period	Number	%
7 working days	777	19
8-15 working days	539	13
16-21 working days	448	11
Within 2 Months	730	18
Within 3 Months	597	15
Within 4 Months	534	13
Within 5 Months	179	4
Within 6 Months	82	2
Above 6 Months	142	4
TOTALS	**4,028**	**100**

The Summary of Assessment periods for all applications resulting in a grant offer letter (GOL) is shown in the table above

The period for assessing applications within LCBP-2e increased considerably due to a number of reasons. LCBP-2 applications submitted prior to August 2009 were given priority resulting in the creation of a waiting list as soon as LBCP-2e was launched.

This waiting list was two-fold, as in any submitted LCBP-2 applications had to be transferred to the new LCBP-2e Terms & Conditions (T&Cs), meaning applicants had to submit a signed T&C declaration. Without this the assessment process was not started. The date for the declaration submission was captured on a separate spreadsheet but not the main database, preventing a meaningful analysis of assessment times for LCBP-2e, as there could be quite considerable delays between submitting an application on-line and providing the signed declaration.

Having to deal with LCBP-2 applications first, meant new PV and heat pump submissions under LCBP-2e had to be put on a separate waiting list to be processed once all the LCBP-2 had been dealt with. This second waiting list was mainly for PV and ground source heat pump projects, as their funding pots had been exhausted under LCBP-2e.

In total £10.8 million or 287 projects were copied from LCBP-2 to LCBP-2e of these around 60% completed and claimed a grant, 35% withdrew and 5% abandoned their application. Assessment figures were slightly skewed due to a number of other issues. Initially the database allowed incomplete applications to be submitted,

requiring the team to ask for additional information before being able to pass it on to the technical assessment. This was rectified later only allowing application submission once all essential fields had been completed.

Other delays were encountered due to applicants not providing the correct cost breakdown within the installer's quote or failing to provide additional information should the average costs exceed the framework supplier average.

During LCBP-2 the technical section was mostly completed by the framework supplier or their affiliated MCS certified installers. Hence delays decreased considerably once everyone became familiar with the application process. However this issue re-appeared once LCBP-2 Extension (LCBP-2e) was launched as applicants could now use any MCS certified installer, and most of these were largely unfamiliar with the application processes.

In addition applications for a grant value exceeding £100k required additional DECC approval. Similarly under LCBP-2e heat projects between 45 and 300kW, also required additional assessment, as they were outside the certified MCS criteria.

3.5 Accreditation

Framework suppliers

The department selected seven Framework Suppliers to provide at least one but not necessarily all of the eligible technologies. Each technology was available from three Framework Suppliers, see list below.

Framework Suppliers were required to offer products at pre-agreed (maximum) prices. Applicants were advised to obtain quotes from all Framework Suppliers that provided the technologies they were seeking. The prices quoted were monitored as part of BRE's technical assessment of applications.

How were the Framework Suppliers chosen?

Framework Suppliers were selected by the department following a competitive tender process to ensure quality, range and value for money. Contract notices for Framework Suppliers were published at the Official Journal of the European Union (OJEU) in June 2006.

Using a limited number of suppliers and installers caused concerns within the industry about anti competitiveness. Whilst it was not possible to become a framework supplier DECC did allow framework suppliers to increase their pool of certified installers. Ultimately this model became redundant under LCBP-2e.

Framework Supplier	Technologies Supported				
	Biomass Systems	Ground Source Heat Pumps	Solar PV	Solar Thermal Hot Water	Wind Turbines
British Gas	x	x	x	x	x
Dimplex UK Ltd		x			
E.On UK	x	x			x
Solar Microgeneration Ltd (SML)				x	
The Low Carbon Partnership			x	x	x
RES Heat & Power	x				
Solarcentury			x		

Framework Suppliers

The specific technology products offered by the Framework Suppliers, as well as their appointed installers, had to be "approved" under relevant DECC accreditation schemes. These DECC-approved listings evolved over the life of the programmes. Originally products and installers accepted were listed under the Clear Skies Programme (non-PV), Major PV Demonstration Programme (PV only) plus those listed under the Microgeneration Certification Scheme (MCS). The listings were reduced to MCS installers only as of 3rd April 2009 and MCS products only plus those products listed under the MCS Transitional Arrangement as of 1st October 2010.

Installers

As mentioned above any installer appointed by the Framework Suppliers had to be on the Clear Skies list or be MCS certified. Each framework supplier had to name their appointed installers, which were added onto the approved list for LCBP-2. The restriction on only using these installers was lifted with the increasing level of grant applications. Hence the number of installers rose from 42 to 154, all of these had to also be listed on Clear Skies or be MCS certified.

The number of installers increased to 2,492 under LCBP-2e which was open to all MCS certified installers and products, as well as other certification schemes (also see following section – Products). In line with achieving good value for money applicants were advised to obtain at least two quotes from different installers for each technology they were intending to install.

	Technologies Supported						SUB-TOTAL
	Biomass Systems	Ground Source Heat Pumps	Solar PV	Solar Thermal Hot Water	Wind Turbine	Small Scale Hydro	
LCBP REGISTER JULY 2009							
Number of Products	19	23	127	20	16	0	205
Number of Installers							
Installers working for 1 FS	3	24	57	18	33	0	135
Installers working for more than 1 FS	0	0	15	1	3	0	19
Total number of Installers	3	24	72	19	36	0	154
LCBP-2e REGISTER MARCH 2011							
Number of Products							
MCS	210	617	595	19	98	8	1547
ECA	297	0	0	0	0	0	297
Solarkeymark	0	0	0	1,092	0	0	1,092
Total number of products	507	617	595	1,111	98	8	2,936
Number of Installers							
Registered for 1 technology	38	121	1,314	127	60	21	1,681
Registered for more than 1 technology	0	0	0	0	0	0	811
Total number of Installers	38	121	1,314	127	60	0	2,492

Number of Products and Installers listed under LCBP-2 and LCBP-2e

Products

The specific technology products offered by the Framework Suppliers had to be "approved" under relevant DECC accreditation schemes. The number of products available under LCBP-2 can be seen the table above. The evolution of the certification schemes meant that MCS transitional arrangements were introduced in December 2009, suspending the Clear Skies products lists from the end of 2009. The transition also meant that only MCS products plus those products listed under the MCS Transitional Arrangement could be used within LCBP-2e from October 2010.

As MCS Standards developed, other certification processes were also acknowledged. This meant solar thermal equipment listed on the Solarkeymark website also became eligible. Similarly, with the introduction of the 300kW thermal limit under LCBP-2e, products larger than 45kW and up to 300kW listed on the Enhanced Capital Allowances (ECA) Scheme also became eligible. Any heat application between 45kW and 300kW had to provide additional information, such as previous case studies and basic technical drawings.

There two main issues which took longer than anticipated:

- Updating Product and Installer lists. Even though the Framework Supplier product list was supposed to be static updates were required due to certain models becoming unavailable. Any update had to meet the agreed costs and approved by DECC. The move from the Clear Skies to MCS product approval lists also caused a considerable amount of enquiries and additional effort. Updating the certified products and installers became a major task, with a 14 fold increase of products and 16-fold increase of installers within LCBP-2e. LCBP-2 was initially set up to accommodate product lists with minimum changes, due to the framework supplier set up. Hence this is something that should have been accommodated when preparing for LCBP-2e. It was however impossible to predict the level of certification. Also the timescale between announcing (April 09) LCBP-2e, tendering and having to be operational and launch (Aug 09) was extremely tight. This meant existing processes were only slightly amended in order to provide the seamless continuity of services under LCBP-2e.

- Processing grant claims too took longer than anticipated as a large amount of projects did not provide the required information and documents. This was despite making sure the requirements featured prominently in all the appropriate scheme documents, i.e. the grant offer letter (GOL), guidance notes, website and reminder emails. Another issue was that initial project contacts had moved on and their replacements usually did not know about the grant or how to claim it. Quite a lot of projects had also changed the product or installer without prior approval, adding further delays.

3.6 Programme Assurance

In addition to requiring installer and product certification there were a number of processes in place to prevent fraud and generally manage the risk associated with the programme. No official risk register was required, which in hindsight should have probably been part of the management processes.

BACS payment procedure

Stage payments and final claims had to go through rigorous checks by the administration team, making sure all the appropriate paperwork was complete, i.e. pictures of the installation, a commissioning certificate and receipted invoices. They then had to be signed off by the office manager and the finance department. Complete claims were usually processed within one to two weeks of receipt and payment made within another two to four weeks. This was due to having to submit itemised statements of all payments to applicants to DECC on a weekly basis, following which they issued payment to BRE. Only then could applicants be paid. Unfortunately DECC had not agreed to a float grant amount, which would have reduced payment periods considerably. The frequency of issuing DECC with itemised statements was increased during 2011, as around £15 million or 23% of the total paid funds were processed between January and March.

Applicants had to supply their bank account details on the initial application form and confirm this when sending in the final proof of installation. Payment was only made if the name on the application form matched the name on the bank account to help prevent fraudulent claims.
BRE also uses accrual accounting methods and operates finance systems which are compliant with UK GAAP and government accountancy methods.

Fraud risk was further limited as installers had to enter into a framework contract with DECC (DTI at the time) under LCBP-2. In order to match projects to their framework supplier they had to provide a unique reference number when applying. This was introduced early on, after discovering a number of applications not linked to a framework supplier.

As part of meeting the KPI's around 54 projects were inspected, representing two percent of the completed installations. Even though the main purpose of the inspections was to check that the specified technologies were installed, it also provided an ideal opportunity to gather feedback first hand from applicants. Although a detailed analysis was not possible overall the feedback reflects issues covered in the BRE Trust publication "Lessons Learnt from community based microgeneration projects - The impact of renewable energy capital grant schemes" (Please check the BRE website for publication dates).

The application form was also designed to ask for appropriate documentation, such as proof of not for profit status, as well as offering and updating advice within the scheme guidance notes and Frequently Asked Questions. Applicants had to confirm that projects meet state aid criteria and detailed examples were issued, as this was of particular concern to housing associations.

3.7 Programme Promotion

Event & Promotional Tools

DECC[3] had agreed for BER to run a series of events to raise awareness and to increase uptake of Phase 2 of the grant scheme, please see section 3.6 for further details. The events were run across the country throughout the May and June 2008.

These events included a high profile event held at BRE head office in Watford, including tours of the BRE Innovation Park, attended by the Energy Minister Malcolm Wicks. The other seven regional promotional events were held at a variety of agreed locations across the UK. Where possible, government buildings were used to host the events in order to minimise costs.

[3] Then the Department for Business, Enterprise and Regulatory Reform **(**BERR)

BRE liaised closely with the department and framework suppliers to ensure that a comprehensive promotional campaign was delivered, targeted at appropriate organisations and individuals, with an aim of securing a minimum of 700 potential applicants. BRE also coordinated the promotion, attendance and presentations of Framework Suppliers and also delivered the keynote presentation and provided technical input at each of the eight events.

A total of 776 delegates attended the events out of a total of 1,028 booked. The majority of visitors were from the private sector (558), followed by the public/community organisations (427) and charities (43).

BRE produced a combination of articles, advertorials and advertising in media serving each of the three target sectors – public, charity and community, to promote the LCBP2. All of these were approved prior to issue by the department.

Technology allocation and uptake

Overall the promotion campaign has increased enquiries to the helpline and website visits. Comparing quarters 3 from last year with this year (July to September) shows that the amount of calls has increased by 60% (total number of calls 1064 in q3 2007 to 1702 in q3 2008) and emails by 100% (from 200 to over 400). During the same time the website traffic has also increased by 25%.

Please see the following tables taken from the webtrends for more detailed figures for q3 2007 and 2008. Another indication for how successful the promotion was is looking at the uptake of grants over time. The graphs showing technology uptake and allocation below, indicate that there had been a marked increase of applications since June of 35% (£11.8m in June 2008 to over £18m in October 2008).

The main way of assessing the impact of the promotional activities is using tick boxes within the application form and finding out how many actual applications have resulted due to the campaign.

Since July 2008 an average of 9% of successful applicants have specified the LCBP-2 promotion and events as their source of information. See the tables below for a monthly breakdown.

Furthermore the figures for applications in progress indicate that on average about 16% of potential applications can be traced back to the promotional efforts.

Considering the applications might be not be completed by the actual applicant, but the installers, framework suppliers or agents, it is possible that the results are somewhat skewed towards industry sources. Overall these figures do indicate however that the promotion campaign did have the desired effect of increasing the amount of actual applications

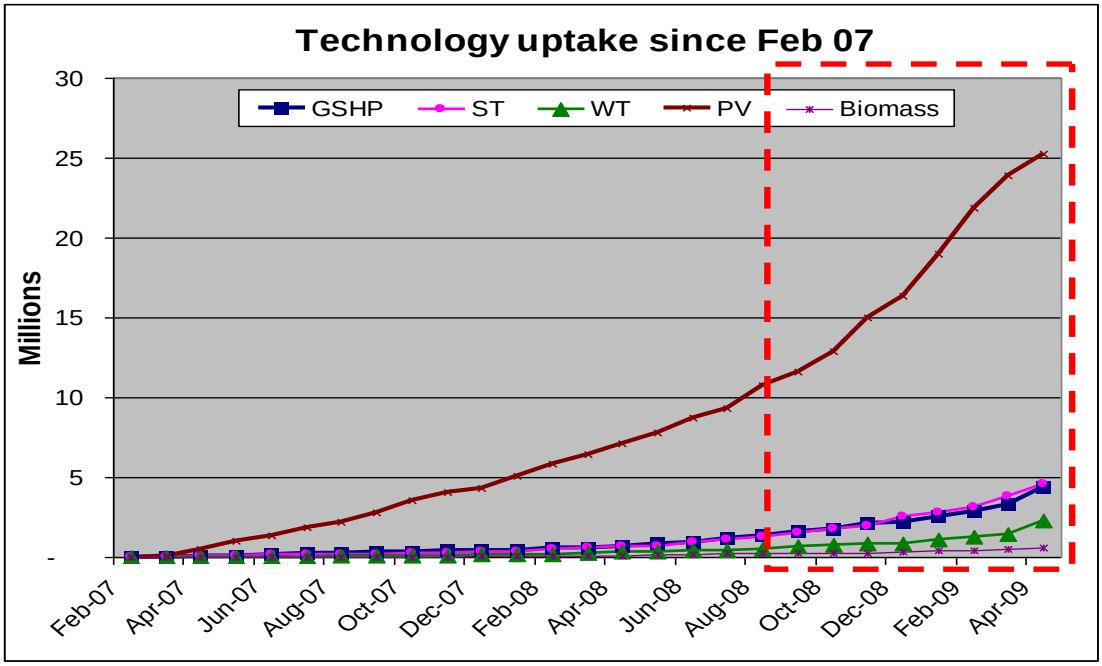


Figure 13 - Snapshot of allocations in April 2009:

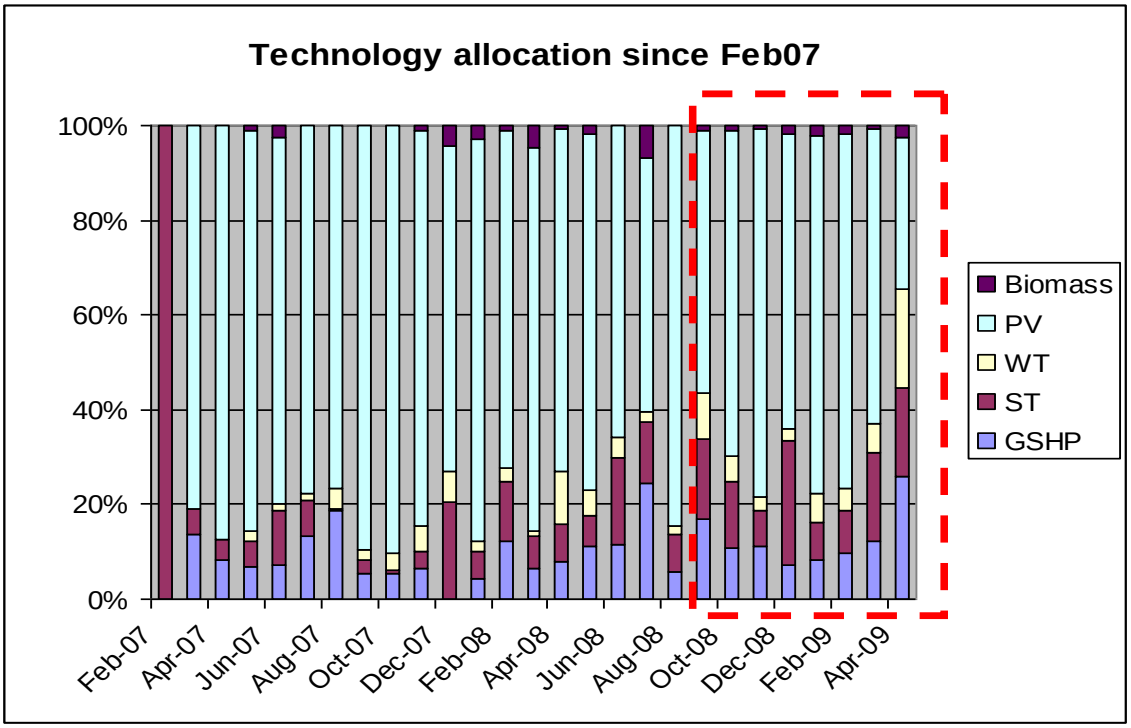


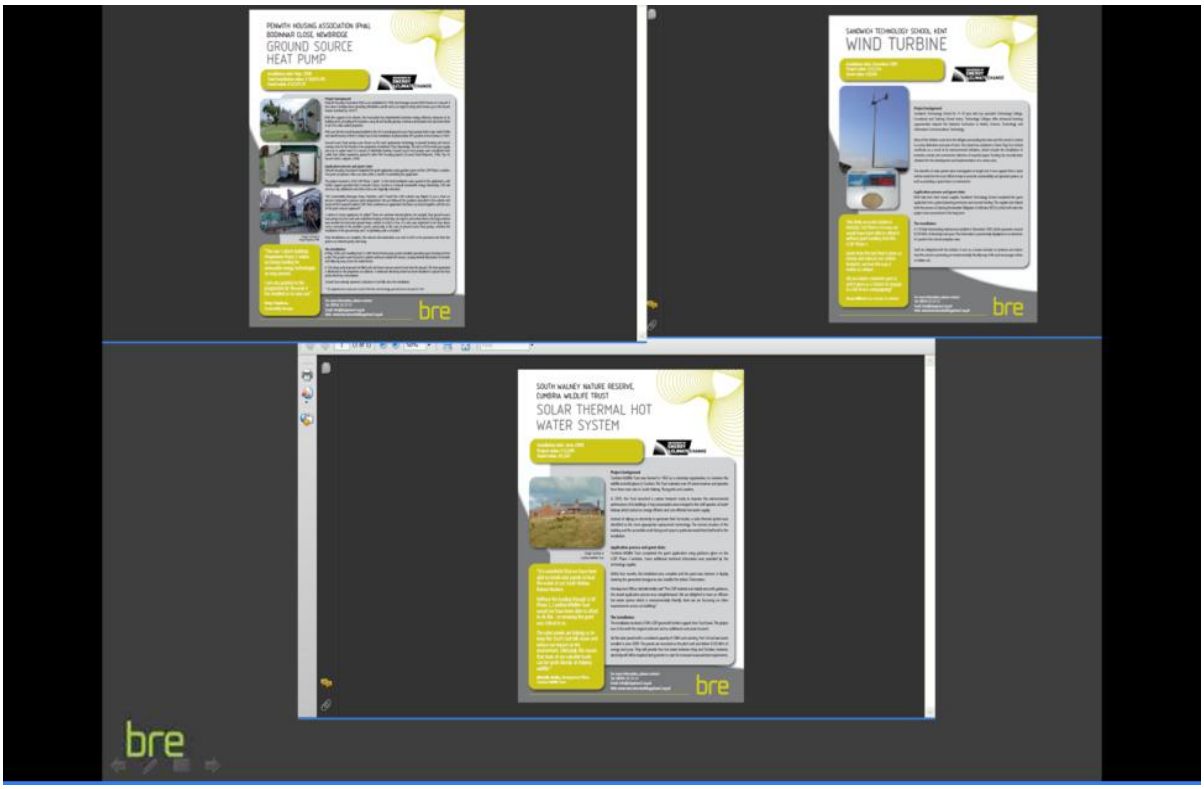
Figure 14 - Technology Allocation since February 2007

Take up rate per technology are shown in the above two graphs – there has been fairly significant increases in uptake of non-PV technologies from April 2008. This was due to a combination of grant level increases to 50% for all technologies and promotion efforts.

A similar series of events was held following the launch of LCBP-2 Extension, which was opened by the then Energy Minister David Kidney MP at BRE's headquarters in Watford in November 2009. The main aim of these events was to highlight the changes of the programme rather than increase uptake. Hence no detailed result analysis was completed.

Other PR

All the event presentations were published on the programme website including project summaries from successful applicants. Five mini case studies (one page long) were published in April 2009. Another four case studies are about to be published this month.



Examples of three mini case studies, which were available from the LCBP2 website.

In conjunction with the BRE Trust a detailed report on the lessons learnt is also being published shortly[4]. Learnt from community based microgeneration projects - The impact of renewable energy capital grant schemes.

The PR team produced press releases and articles , which featured in regular mail outs to the BRE customer base, as well as the house journal Constructing The Future (CTF), which is published quarterly and distributed to around 35,000 professionals and opinion makers within the construction sector.

[4] Please check the BRE website for "Lessons Learnt from community based microgeneration projects - The impact of renewable energy capital grant schemes".

3.8 Programme Outcomes

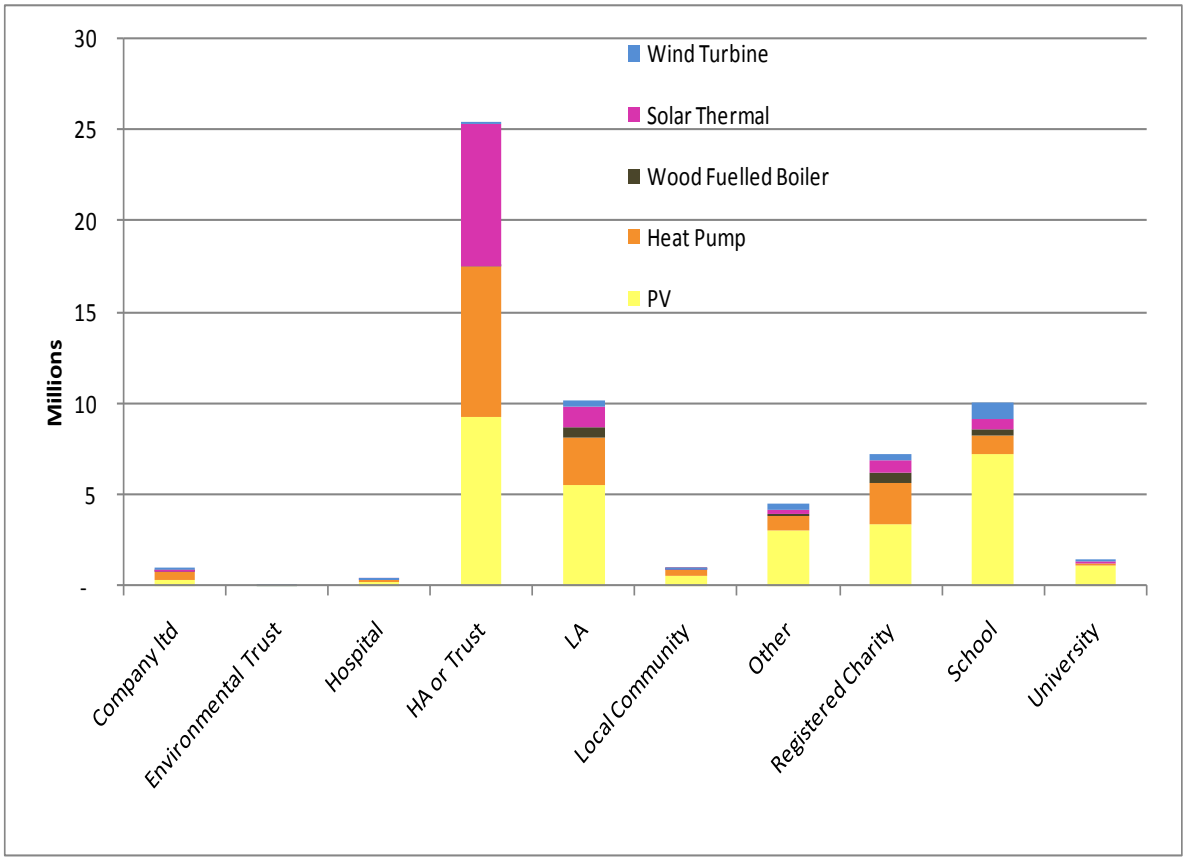


Figure 15 – Programme Outcomes by Organisational type

£	Sum Grant Requested	Sum Claim Amount	No of Projects	Project %	PV	PV %	Heat Pump	HP %	Wood Fuelled Boiler	WFB %	Solar Thermal	ST %	Wind Turbine	WT %
Company Limited by Guarantee (ltd)	912,798	894,354	88	3.2%	353,726	1.1%	392,677	2.5%	45,709	2.8%	84,665	0.8%	17,577	0.8%
Environmental Trust	29,001	29,001	3	0.1%	8,423	0.0%	-	0.0%	-	0.0%	-	0.0%	20,578	1.0%
Hospital	403,698	403,698	7	0.3%	253,334	0.8%	81,479	0.5%	-	0.0%	4,143	0.0%	64,743	3.1%
Housing Association or Trust (HA or Trust)	27,981,141	25,307,076	882	32.1%	9,286,590	30.2%	8,200,144	52.1%	66,065	4.1%	7,743,216	72.2%	11,061	0.5%
Local Authority (LA)	10,568,584	10,199,206	459	16.7%	5,562,501	18.1%	2,570,200	16.3%	529,839	32.9%	1,210,676	11.3%	325,990	15.4%
Local community (group with Constitution)	1,001,663	994,948	72	2.6%	561,086	1.8%	329,498	2.1%	10,372	0.6%	39,218	0.4%	54,773	2.6%
Other	4,546,537	4,481,625	192	7.0%	3,037,158	9.9%	753,556	4.8%	134,146	8.3%	265,522	2.5%	291,244	13.8%
Registered Charity	7,575,338	7,240,660	386	14.0%	3,353,916	10.9%	2,276,082	14.5%	572,021	35.5%	660,489	6.2%	378,152	17.9%
School	10,250,304	10,059,660	628	22.8%	7,247,036	23.5%	1,028,998	6.5%	252,014	15.7%	596,152	5.6%	935,458	44.2%
University	1,387,678	1,356,488	32	1.2%	1,125,653	3.7%	92,441	0.6%	-	0.0%	121,990	1.1%	16,370	0.8%
Grand Total	**64,656,743**	**60,966,716**	**2,749**	**100%**	**30,789,424**	**100%**	**15,725,075**	**100%**	**1,610,166**	**100%**	**10,726,070**	**100%**	**2,115,947**	**100%**

LCBP-2 & LCBP-2e - Number of Grants and value of Grants by Type of organisation

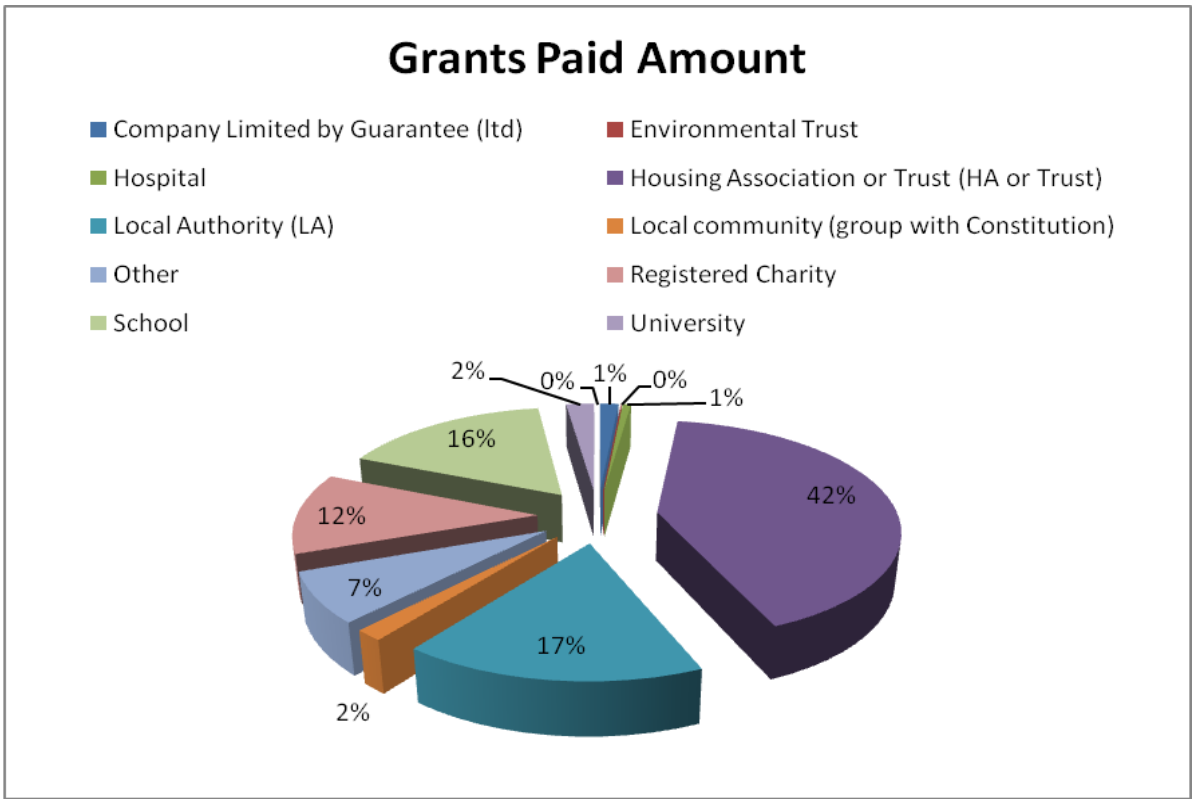


Figure 16 – LCBP-2 & 2e Value of Grants paid by Organisation Type

Region / £	Sum Grant Requested	Sum Claim Amount	No of Projects	Project %	PV	PV %	Heat Pump	HP %	Wood Fuelled Boiler	WFB %	Solar Thermal	ST %	Wind Turbine
East Midlands	4,341,443.68	4,297,770.93	181	6.6%	1,545,451.48	5.0%	1,401,883.26	8.9%	23,290.43	1%	1,174,263.35	10.9%	152,882.43
East of England	4,668,245.42	4,431,971.87	209	7.6%	1,690,449.37	5.5%	1,868,499.40	11.9%	128,445.50	8%	501,416.03	4.7%	243,161.56
London	8,591,779.56	8,408,945.67	303	11.0%	5,989,522.87	19.5%	1,260,322.83	8.0%	146,315.38	9%	939,655.41	8.8%	73,129.25
North East	1,671,260.99	1,625,188.86	89	3.2%	468,311.41	1.5%	678,633.35	4.3%	39,641.00	2%	323,809.54	3.0%	114,793.57
North West	5,204,576.37	5,109,068.64	237	8.6%	3,144,360.31	10.2%	792,733.18	5.0%	38,217.85	2%	917,558.09	8.6%	216,199.21
Northern Ireland	903,679.96	893,538.31	47	1.7%	429,770.18	1.4%	23,779.42	0.2%	210,297.63	13%	44,393.80	0.4%	185,297.28
Scotland	3,242,393.06	2,950,103.68	134	4.9%	1,013,398.43	3.3%	945,231.33	6.0%	277,415.89	17%	579,152.43	5.4%	134,905.61
South East	11,992,808.89	11,467,104.08	533	19.4%	6,250,606.18	20.3%	3,162,654.69	20.1%	182,817.54	11%	1,677,344.24	15.6%	193,646.60
South West	9,179,524.38	8,477,468.17	470	17.1%	4,770,130.29	15.5%	2,074,732.71	13.2%	354,862.54	22%	762,492.86	7.1%	515,249.73
Wales	6,016,009.99	5,448,215.17	186	6.8%	1,651,985.72	5.4%	785,510.12	5.0%	84,430.73	5%	2,849,528.00	26.6%	76,760.59
West Midlands	4,155,255.95	4,082,610.15	232	8.4%	1,875,584.66	6.1%	1,299,040.70	8.3%	86,238.37	5%	746,062.57	7.0%	75,683.85
Yorkshire & Humberside	4,689,764.32	3,774,730.75	128	4.7%	1,959,852.93	6.4%	1,432,053.62	9.1%	38,193.25	2%	210,393.96	2.0%	134,236.98
Grand Total	**64,656,742.57**	**60,966,716.28**	2,749	100%	**30,789,423.83**	**100%**	**15,725,074.61**	**100%**	**1,610,166.11**	**100%**	**10,726,070.28**	**100%**	**2,115,946.66**

It is difficult to assess how much the recession contributed to the withdrawal rate, in light of processing £32m worth of grant claims in 2010/11. This represents half of the programmes spend and would suggest that projects were able to invest their own money in view of potential future energy bill savings or even income through FITs and RHI.

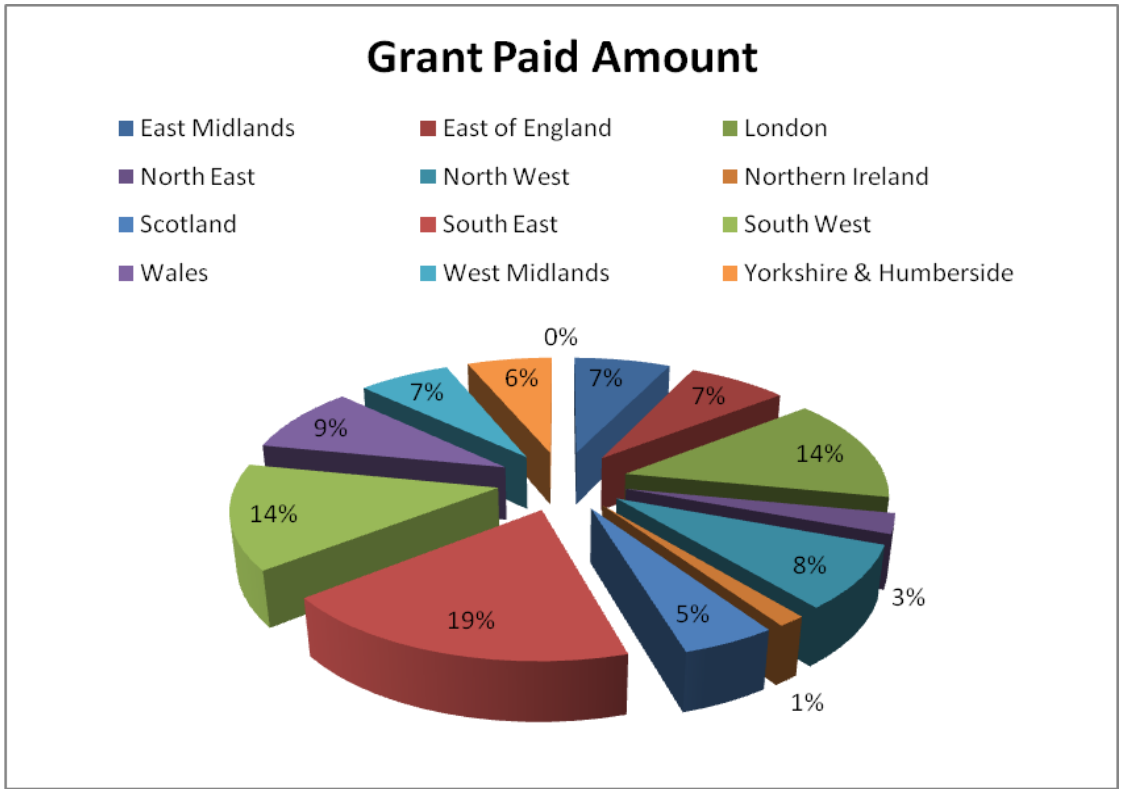


Figure 17 – LCBP-2 & 2e Value of Grants paid by English Region

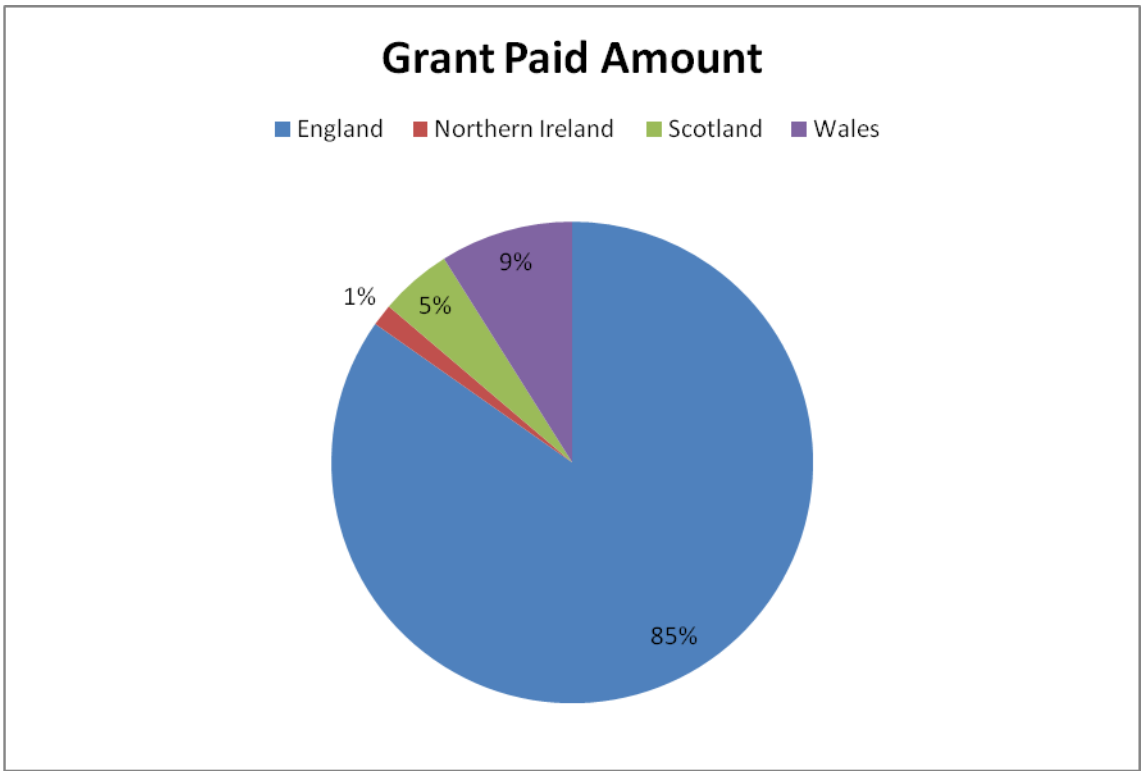


Figure 18 – LCBP-2 & 2e Value of Grants paid by UK Nation

Below is a table showing, with time the value of grants paid denoted 'C' and the value of grants withdrawn or cancelled, denoted 'W'

C-Completed / W -Withdrawn	PV - C	HP - C	WFB - C	ST - C	WT - C	Wpel - C	PV - W	HP - W	WFB - W	ST - W	WT - W	Wpel - W
Feb-07	-	-	-	22,333	-	-	-	-	-	-	-	-
Mar-07	78,473	13,342	-	5,142	-	-	41,541	-	-	-	-	-
Apr-07	404,993	38,288	-	19,770	-	-	-	-	-	-	-	-
May-07	474,758	40,283	6,251	23,244	-	-						
Jun-07	373,914	35,254	12,919	55,378	6,935	-						
Jul-07	511,082	87,801	-	40,741	9,355	-						
Aug-07	334,506	81,046	-	-	17,492	-	271345.56					
Sep-07	561,947	52,488	-	17,876	6,757	-	13,571					
Oct-07	696,592	41,217	-	5,082	23,244	-				10,488		
Nov-07	477,793	-	6,926	20,642	27,199	-				13,263		
Dec-07	214,788	-	19,190	49,399	22,013	-	5,901					
Jan-08	688,821	35,585	22,715	13,646	11,850	-	17,042					
Feb-08	742,137	35,218	6,213	73,319	19,785	-						
Mar-08	457,876	27,133	36,542	47,587	6,758	-						
Apr-08	600,619	71,708	6,808	53,481	93,422	-				1,296	7,904	
May-08	603,061	77,322	15,255	47,527	50,075	-			8,313			
Jun-08	667,112	155,805	-	193,620	55,643	-	50,481	-	-	9,963	7,347	
Jul-08	528,198	286,411	61,805	101,232	10,624	-	65,314	-	-	-	14,414	-
Aug-08	1,345,076	98,179	-	102,013	21,800	-	119,353	47,114	22,225	-	6,777	-
Sep-08	677,538	235,934	16,365	250,365	79,812	-	107,267	-	-	5,457	13,549	-
Oct-08	897,189	204,655	16,754	233,050	64,582	-	84,119	517,351	-	-	6,773	-
Nov-08	1,507,328	222,140	15,731	115,489	14,350	-	88,123	36,665	7,490	26,307	7,181	-
Dec-08	1,030,750	148,685	42,963	325,126	41,769	-	153,941	48,285	-	12,940	-	-
Jan-09	1,781,897	247,869	51,580	110,527	142,139	-	33,419	57,614	-	23,857	5,742	-
Feb-09	2,079,889	358,778	62,871	214,597	94,906	-	13,305	-	-	6,344	7,860	-
Mar-09	844,133	310,218	26,775	217,359	99,249	-	92,815	-	6,335	-	6,781	-
Apr-09	575,126	823,476	40,287	537,683	258,676	-	484,752	-	7,395	21,155	49,771	-
May-09	1,800,291	928,221	22,172	421,822	260,928	-	12,429	42,364	-	229,275	-	-
Jun-09	1,314,405	324,120	-	1,086,955	158,012	-	49,913	-	-	10,988	14,614	-
Jul-09	1,043,402	-	59,381	78,694	103,967	-	58,683	-	-	9,627	-	-
Aug-09	271,854	642,543	118,976	76,993	104,753	-	108,490	27,481	-	-	-	-
Sep-09	1,644,747	811,022	33,861	553,103	28,095	2,856	116,562	12,112	-	15,346	9,900	-
Oct-09	1,619,555	718,637	8,673	679,151	81,097	-	139,936	179,953	-	13,386	12,425	-
Nov-09	657,674	821,906	14,811	489,575	70,596	-	253,160	88,595	-	281,325	42,507	-
Dec-09	1,004,023	1,000,288	-	284,626	-	-	112,300	42,050	-	7,163	14,777	-
Jan-10	710,052	1,146,013	18,961	278,846	78,577	-	46,418	-	-	93,961	42,275	-
Feb-10	1,171,959	1,129,500	68,312	422,802	14,750	-	342,859	-	-	138,597	140,430	-
Mar-10	352,882	825,638	253,077	427,750	36,737	-	428,540	72,293	-	72,047	45,336	-
Apr-10	30,790	1,084,667	51,153	1,215,267	-	-	3,186,304	207,269	50,870	731,691	388,558	12,401
May-10	12,193	467,011	61,059	673,074	-	-	809,544	31,816	-	26,188	12,425	-
Jun-10	-	963,825	90,208	555,083	-	1,842	140,824	54,592	77,075	19,530	40,186	-
Jul-10	-	584,039	64,198	307,227	-	-	180,826	42,437	49,038	3,485	-	-
Aug-10	-	254,384	72,049	168,721	-	-	-	81,522	33,760	6,236	-	-
Sep-10	-	115,575	148,468	32,318	-	-	243,155	193,808	-	42,092	148,933	-
Oct-10	-	46,766	13,846	12,159	-	-	92,220	80,250	-	16,036	194,126	-
Nov-10	-	55,491	-	-	-	-	471,832	27,338	39,925	687,681	322,068	-
Dec-10	-	20,284	38,316	60,178	-	-	229,452	74,932	18,550	26,541	312,970	-
Jan-11	-	56,309	-	5,500	-	-	410,935	233,252	-	28,217	95,105	-
Feb-11							305,612	423,901	-	291,709	102,562	-
Mar-11							2,234,714	1,024,754	61,608	208,674	479,029	-
Apr-11							3,803,629	1,052,346	133,786	1,410,680	1,188,478	-
May-11							47,537	51,098	19,725	6,167	14,777	-
Total A / W	30,789,424	15,725,075	1,605,468	10,726,070	2,115,947	4,698	15,468,161	4,751,190	536,094	4,507,714	3,755,580	12,401

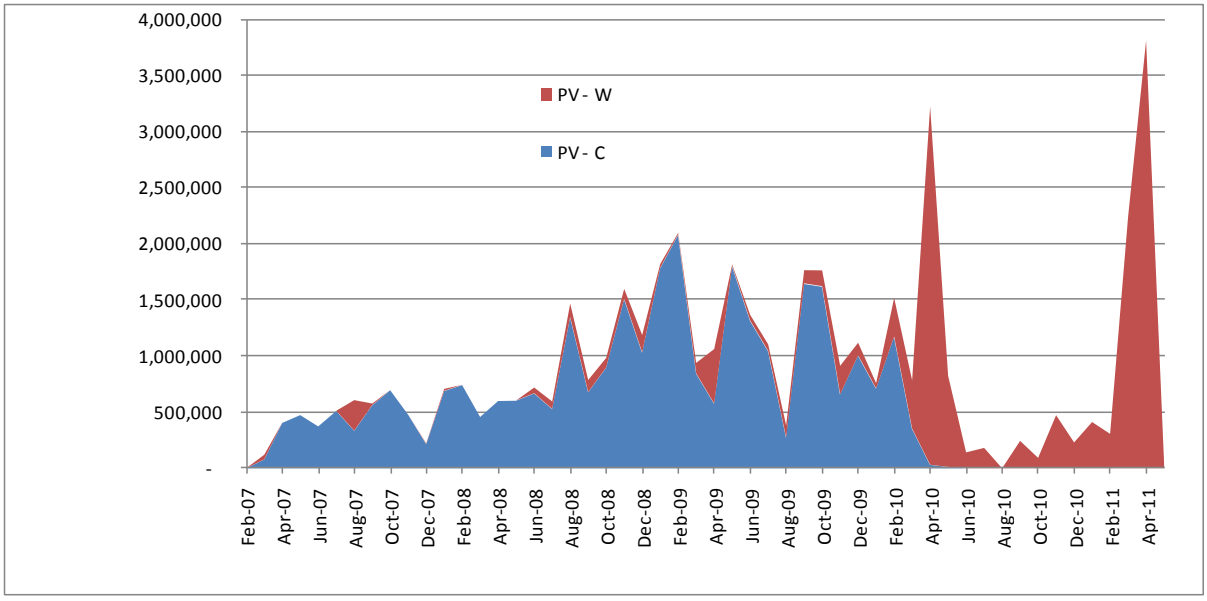


Figure 19 - Solar PV – Value of Installations Completed (blue) and grants withdreaw / Cancelled (red)

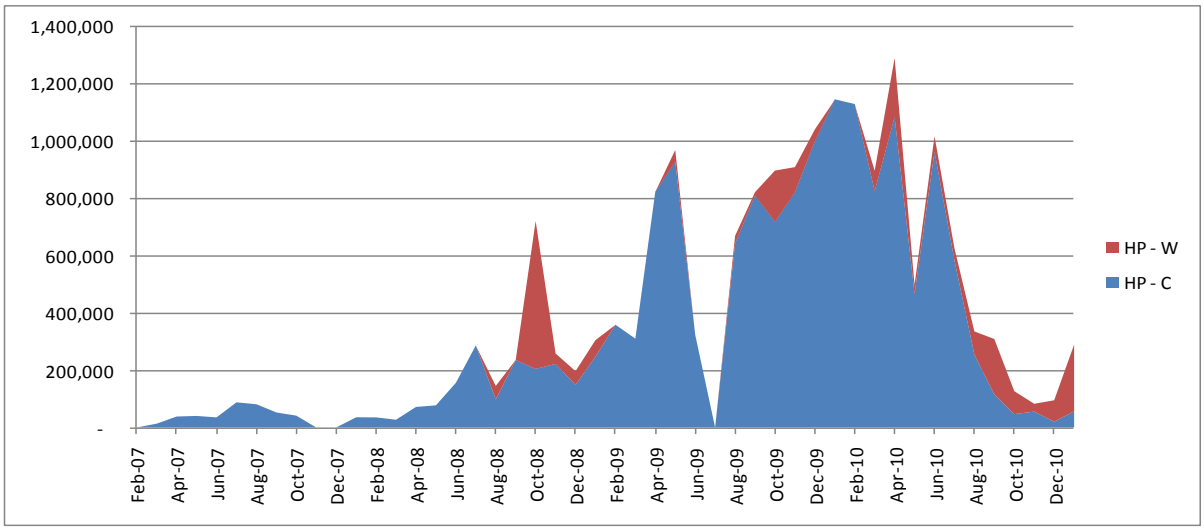


Figure 20 - GS Heat Pumps – Value of Installations Completed (blue) and grants withdreaw / Cancelled (red)

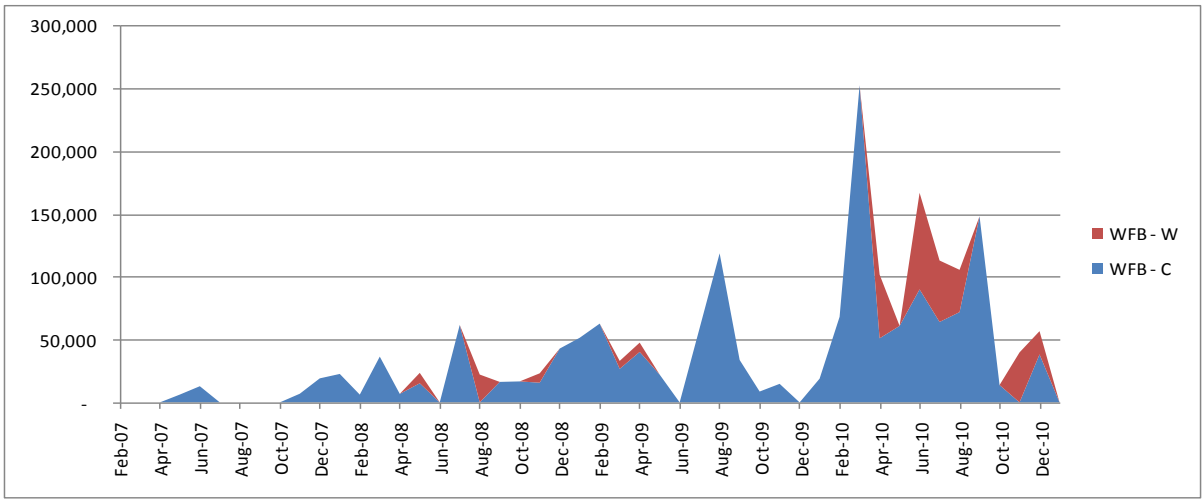


Figure 21 - Wood Fuelled Boilers – Value of Installations Completed (blue) and grants withdreaw / Cancelled (red)

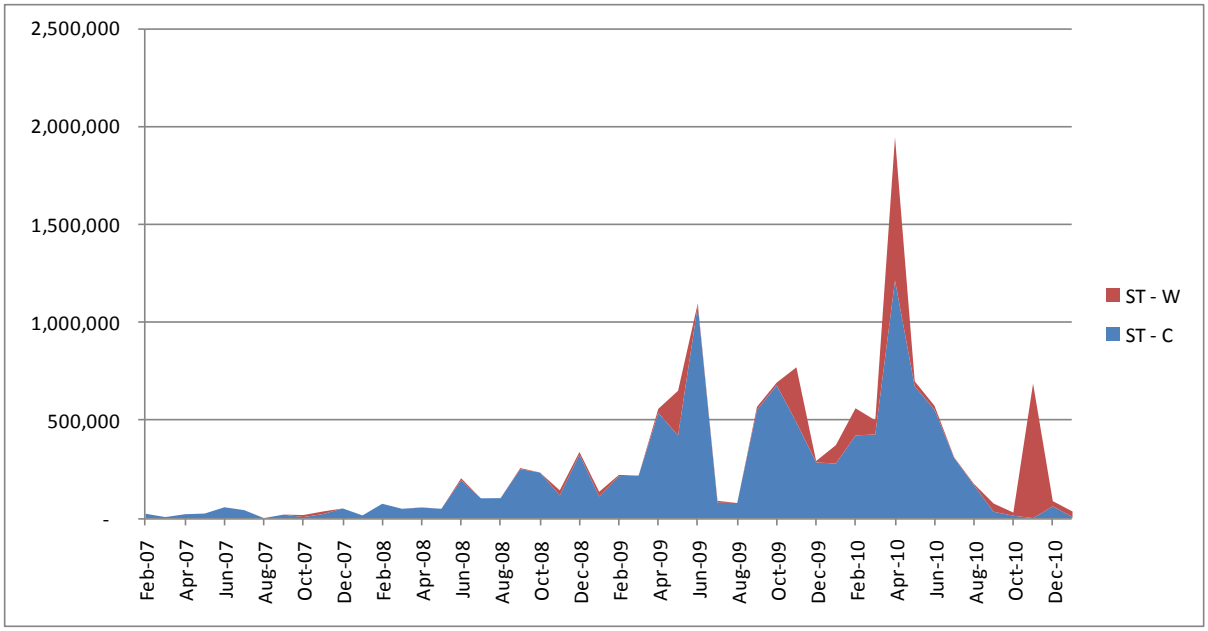


Figure 22 - Solar Thermal – Value of Installations Completed (blue) and grants withdreaw / Cancelled (red)

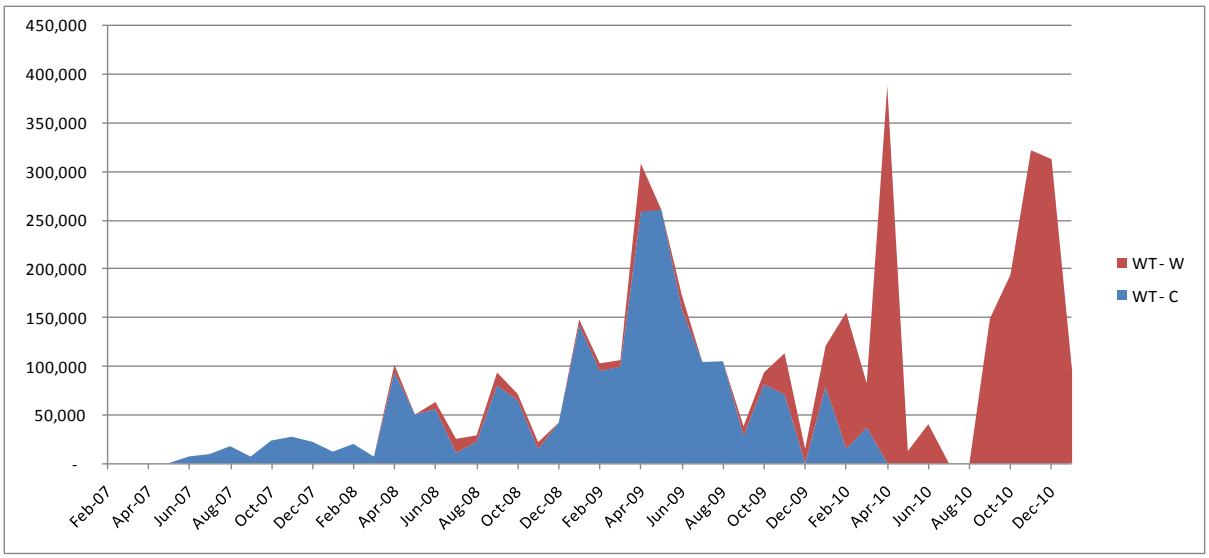


Figure 23 - Wind Turbines – Value of Installations Completed (blue) and grants withdreaw / Cancelled (red)

Information gathered from the technical section of the application form was used to estimate the cost (based on total installation cost) of saving a unit quantity of carbon dioxide (CO_2) over the expected lifetime of the installation. These figures were then compared to "benchmarks" and if they were higher, applications were either:

- rejected
- grant amounts reduced
- further information and clarification requested

Asking for additional clarification was the most common approach as it was acknowledged that costs could vary considerably, depending on system size and

complexity of installation work. This process worked well, as it allowed to compare projects not only based on £/kW but also including performance and fuel replaced.

Average installation costs £/kW and value of allocated grant (£)	PV	Poly-crystalline Av £/kW	Mono-crystalline Av £/kW	Hybrid Av £/kW	Thin Film Av £/kW	HP	GSHP Av £/kW	ASHP Av £/kW	WFB / Wpel	Av £/kW	ST	Flat plate Av £/kW	Evacuated tube Av £/kW	Unglazed Av £/kW	WT	Average £/KW
Feb-07	-					-			-		22,333	2,956	1,757		-	
Mar-07	78,473	5,589				13,342	866		-		5,142	1,516			-	
Apr-07	404,993	5,284	5,533	5,965		38,288	1,481		-		19,770	1,370			-	
May-07	474,758	5,558	6,004	5,478		40,283	2,049		6,251	759	23,244	906	2,440		-	
Jun-07	373,914	5,634	6,214	5,992		35,254	1,822		12,919	820	55,378	1,402	2,677		6,935	4,623
Jul-07	511,082	5,573	6,402	5,507		87,801	1,608		-		40,741	1,023			9,355	4,136
Aug-07	334,506	6,033	6,574	4,754		81,046	2,044		-		-				17,492	4,509
Sep-07	561,947	5,319	5,074	5,444		52,488	2,039		-		17,876	1,624		288	6,757	4,841
Oct-07	696,592	5,187	6,151	5,673	7,185	41,217	1,563		-		5,082	1,236			23,244	5,060
Nov-07	477,793	5,393	5,069	5,092	5,994	-			6,926	707	20,642	1,330			27,199	4,720
Dec-07	214,788	5,368	5,719	5,882		-			19,190	778	49,399	1,356	1,741		22,013	7,818
Jan-08	688,821	5,485	5,798	5,960		35,585	1,469		22,715	1,442	13,646	1,258			11,850	4,740
Feb-08	742,137	5,080	5,088	5,447		35,218	1,337		6,213	1,775	73,319	1,420	1,494		19,785	3,664
Mar-08	457,876	5,824	6,329	5,010		27,133	1,570		36,542	1,182	47,587	1,731			6,758	4,505
Apr-08	600,619	6,108	5,936	5,666		71,708	2,807		6,808	432	53,481	1,338			93,422	5,895
May-08	603,061	5,212	5,530	5,724		77,322	1,910		15,255	678	47,527	1,290	2,635		50,075	4,628
Jun-08	667,112	5,230	5,628	6,330		155,805	1,623		-		193,620	1,577	2,507	326	55,643	3,775
Jul-08	528,198	5,485	5,952	5,731	7,529	286,411	1,838		61,805	1,384	101,232	1,468	1,735		10,624	3,541
Aug-08	1,345,076	5,980	6,451	5,967		98,179	2,283		-		102,013	1,888			21,800	4,360
Sep-08	677,538	5,422	6,130	5,988		235,934	1,660		16,365	727	250,365	1,543	2,504	345	79,812	5,897
Oct-08	897,189	5,585	5,914	6,130	6,924	204,655	1,777		16,754	1,197	233,050	1,464	1,678		64,582	6,061
Nov-08	1,507,328	5,811	5,640	5,957		222,140	1,527		15,731	350	115,489	1,153	2,623		14,350	5,740
Dec-08	1,030,750	5,119	5,679	5,621		148,685	1,935		42,963	1,225	325,126	1,419	1,517		41,769	4,646
Jan-09	1,781,897	5,413	6,010	6,248		247,869	1,973		51,580	1,246	110,527	1,624	2,065		142,139	5,683
Feb-09	2,079,889	5,569	6,278	5,645		358,778	2,081		62,871	1,440	214,597	1,301	2,000		94,906	6,156
Mar-09	844,133	5,446	5,652			310,218	1,738		26,775	1,190	217,359	1,593	2,204		99,249	5,951
Apr-09	575,126	5,315	5,290	4,963		823,476	1,815		40,287	1,791	537,683	1,562	1,885		258,676	6,177
May-09	1,800,291	5,497	5,760	6,030		928,221	1,897		22,172	522	421,822	1,874	1,981		260,928	4,923
Jun-09	1,314,405	5,411	5,862	5,660	8,563	324,120	1,288		-		1,086,955	1,411			158,012	5,661
Jul-09	1,043,402	4,753	5,116	5,851	7,077	-	2,167		59,381	1,366	78,694	1,230	1,904		103,967	3,906
Aug-09	271,854	6,253	5,325	5,813		642,543	1,781		118,976	2,498	76,993	1,698	2,832		104,753	6,818
Sep-09	1,644,747	5,203	5,870	5,949		811,022	1,907	1,007	36,717	797	553,103	1,673	1,508		28,095	4,687
Oct-09	1,619,555	5,345	5,932	6,079		718,637	1,934	852	8,673	385	679,151	1,511	2,683		81,097	5,720
Nov-09	657,674	5,047	5,428	7,641		821,906	2,371	898	14,811	741	489,575	1,402	1,645		70,596	4,775
Dec-09	1,004,023	4,836	5,477	5,176		1,000,288	1,935	859	-		284,626	1,808	2,093		-	
Jan-10	710,052	4,584	5,708	5,429		1,146,013	2,304	919	18,961	790	278,846	1,762	2,503		78,577	6,381
Feb-10	1,171,959	5,660	5,080	5,140		1,129,500	1,692	745	68,312	312	422,802	1,488	2,177		14,750	5,083
Mar-10	352,882	4,764	5,758			825,638	2,018	816	253,077	774	427,750	1,602	2,606		36,737	6,193
Apr-10	30,790	5,232	5,043			1,084,667	1,949	873	51,153	1,066	1,215,267	1,451	2,389		-	
May-10	12,193	5,747				467,011	1,832	770	61,059	757	673,074	1,616	2,031		-	
Jun-10	-					963,825	1,811	781	92,049	998	555,083	1,514	1,797		-	
Jul-10	-					584,039	1,447	746	64,198	606	307,227	1,322	1,901		-	
Aug-10	-					254,384	1,484	737	72,049	512	168,721	1,666			-	
Sep-10	-					115,575		721	148,468	506	32,318	1,011			-	
Oct-10	-					46,766	2,511	701	13,846	346	12,159	1,194			-	
Nov-10	-					55,491			-		-				-	
Dec-10	-					20,284		451	38,316	651	60,178	1,218	905		-	
Jan-11	-					56,309		472	-		5,500		1,700		-	
Feb-11																
Mar-11																
Apr-11																
May-11																
Total	30,789,424	5,439	5,780	5,786	7,212	15,725,075	1,860	833	1,610,166	926	10,726,070	1,523	2,134	320	2,115,947	5,384

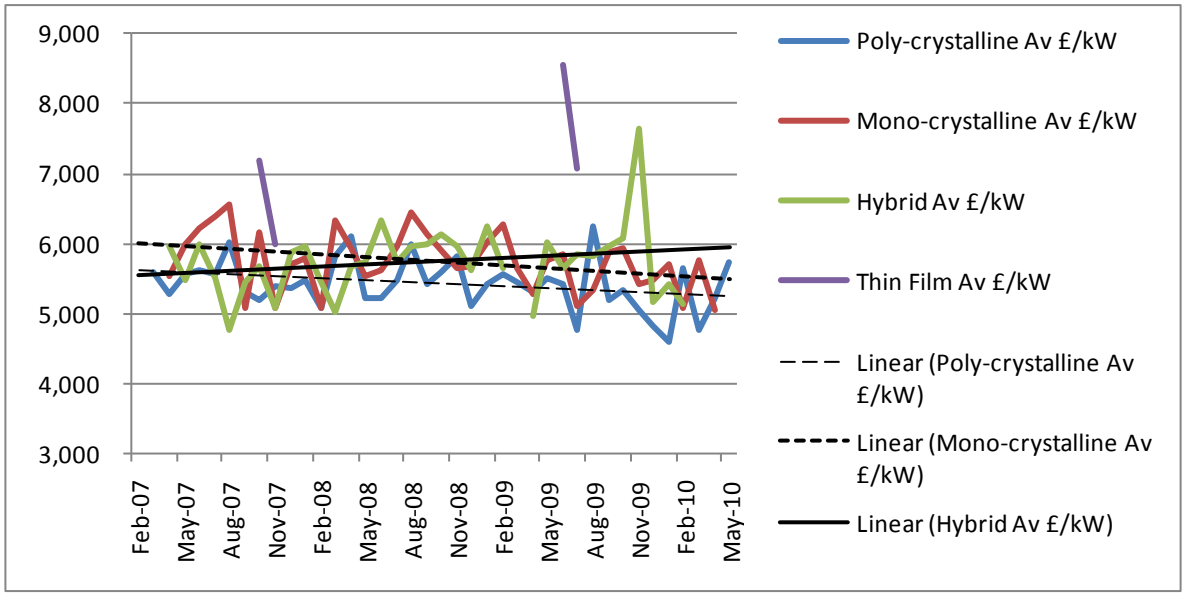


Figure 24 - Average Cost £/KW for Solar PV by Type of PV

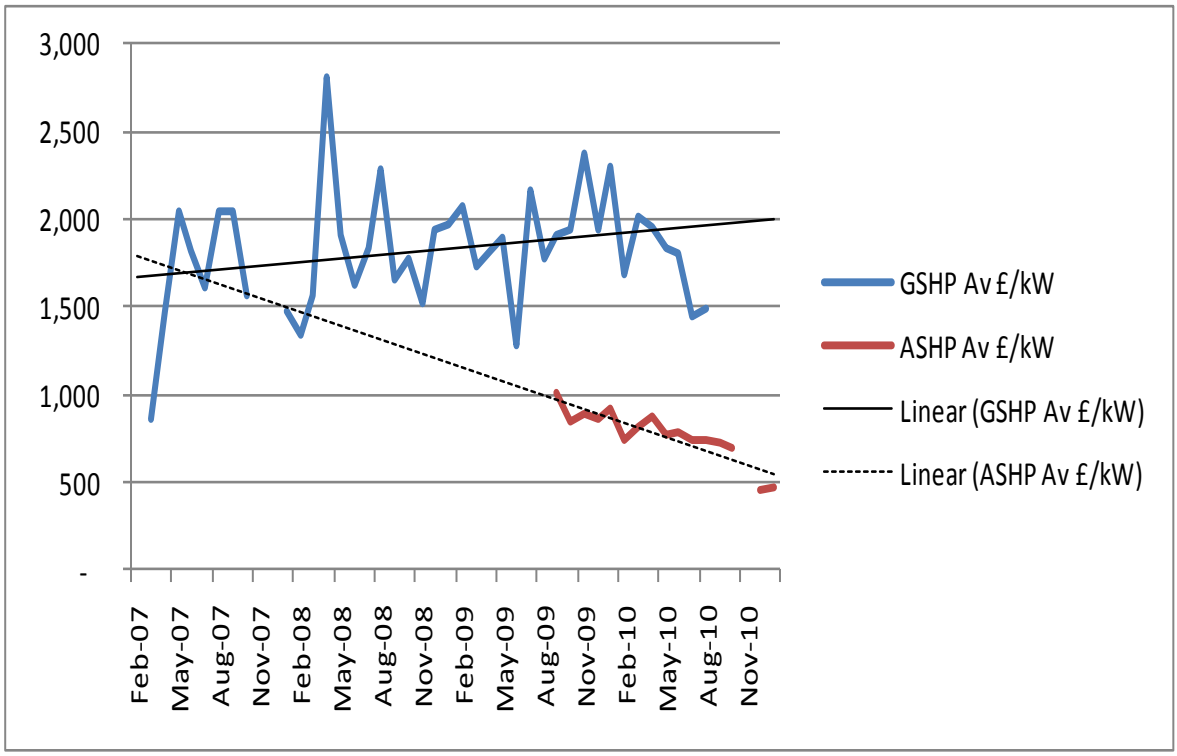


Figure 25 - Average Cost £/KW for Heat Pumps by Type

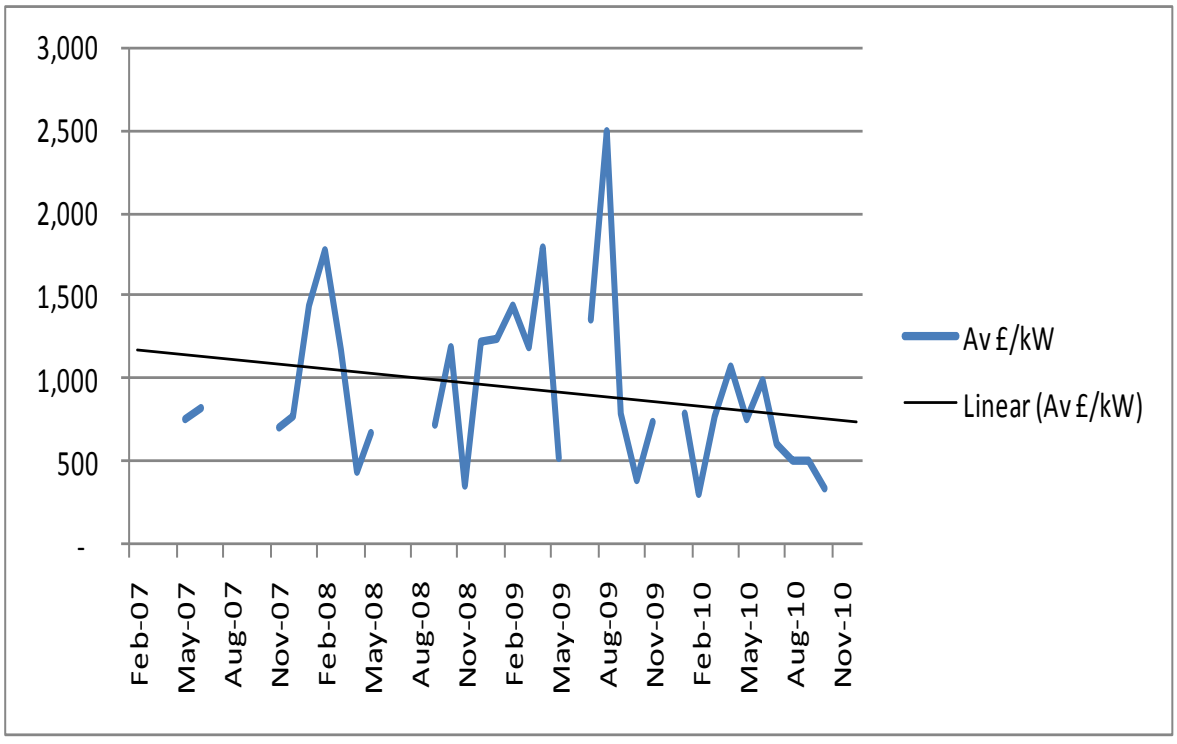


Figure 26 - Average Cost £/KW for Wood Fuelled & Wood pelet Boilers

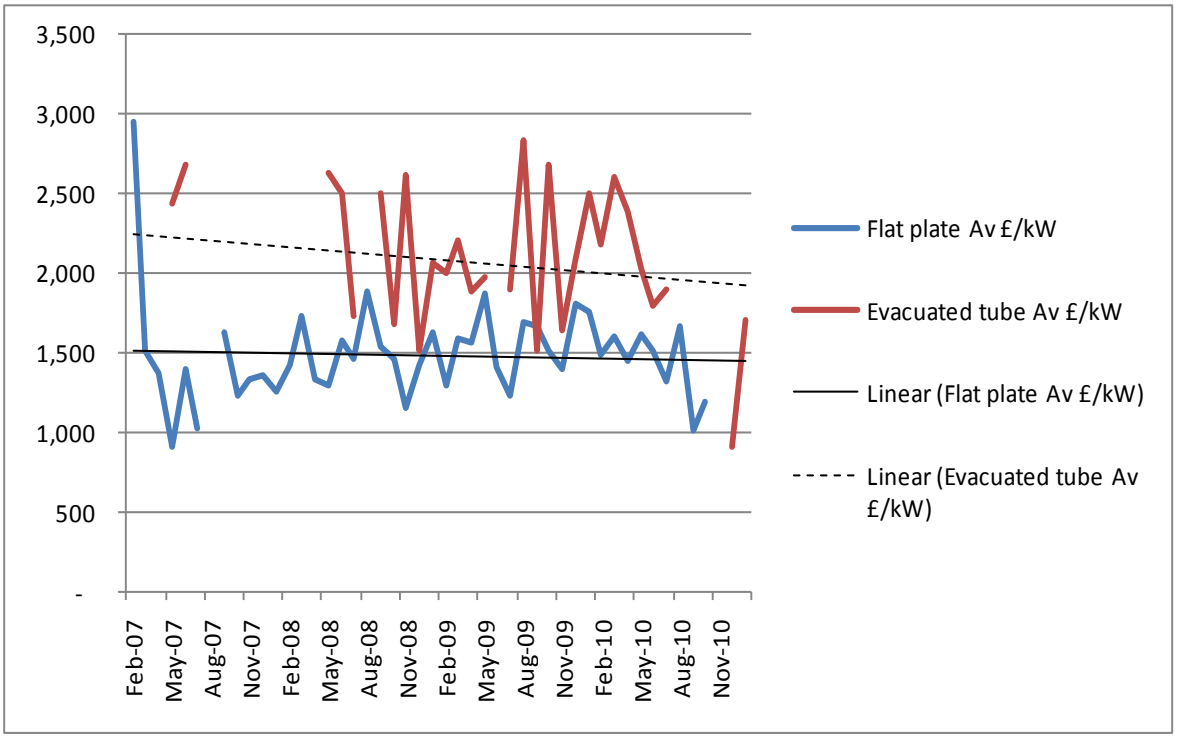


Figure 27- Average Cost £/KW for Solar Thermal

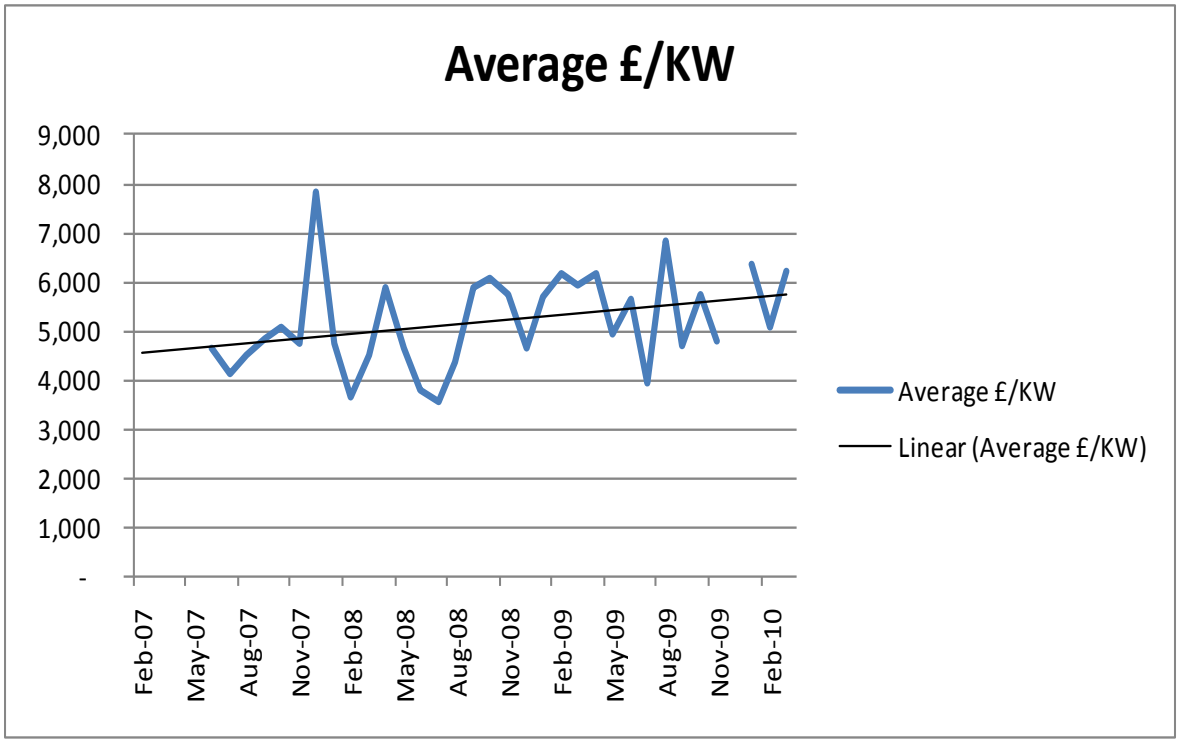


Figure 27- Average Cost £/KW for Wind Turbines

Information gathered from the technical section of the application form was used to estimate the cost (based on total installation cost) of saving a unit quantity of carbon dioxide (CO_2) over the expected lifetime of the installation. These figures were then compared to "benchmarks" and if they were higher, applications were either:

- rejected
- grant amounts reduced
- further information and clarification requested

Asking for additional clarification was the most common approach as it was acknowledged that costs could vary considerably, depending on system size and complexity of installation work. This process worked well, as it allowed to compare projects not only based on £/kW but also including performance and fuel replaced.

Technology	tCO_2 savings		MWh		Total MW installed
	annual	lifetime	annual	lifetime	
Solar PV	3,936	98,406	9,154	228,853	11.49
Wind Turbines	601	12,030	1,399	27,976	0.83
sub-total electricity	***4,538***	***110,436***	***10,553***	***256,830***	***12***
Solar Thermal	2,666	53,326	10,114	202,275	15.81
GSHP	7,299	145,971	49,609	992,173	25.83
Biomass boilers	2,613	52,262	8,671	173,430	5.12
sub-total heat	***12,578***	***251,559***	***68,394***	***1,367,878***	***47***
Total	**17,116**	**361,995**	**78,947**	**1,624,707**	**59.09**

Estimated Carbon Savings from LCBP-2 & 2e Installations

3.9 Customer Satisfaction

Summary of Customer Satisfaction forms (part of the claims form)

There are 2,749 completed applications under the LCBP Phase 2 & 2e grant scheme. Each successful applicant was asked to complete a feedback form to enable BRE to monitor the administrative organisation of the scheme and gather some insight into the experiences of applicants involved in the LCBP scheme. This report provides feedback from 2,159 (78.5%) applicants who completed a feedback form; another 552 forms were not uploaded at the time of the analysis and 38 projects did not complete one (these were mainly older projects).

The same feedback form was sent to applicants receiving a grant via LCBP-2 and LCBP-2e of the LCBP grant programme. Organisations could apply multiple times under each funding stream resulting in some organisations given feedback more than once. However each feedback from is in relation to an individual project relating to a particular site or development. Hence feedback forms have been kept anonymously allowing all the feedback to be analysed.

The majority of applicants were clear that they would not have carried out the installation if the LCBP grant was not available. This was the case for 87% of applicants who were involved in LCBP-2 compared with 80% of applicants involved in LCBP-2e (Table 1).

Table 1 Would you have carried out this installation without the LCBP-2 grant?

	LCBP-2	LCBP-2e	Total
Yes	13%	20%	16%
No	87%	80%	84%
Number	1,053	1,066	2,119

LCBP grant applicants were able to apply for the grant by completing an online or paper form. The majority (71%) of organisations completed an online application for the grant scheme. There were slightly more online applications from the LCBP-2e tranche of applicants compared to the LCBP-2 group

Table 2 How did you make your application?

	LCBP-2	LCBP-2e	Total
Paper Form	32%	26%	29%
Online	68%	74%	71%
Number	1,031	1,039	2,070

Over 1,800 (89%) applicants rated the service that they received from the 'LCBP-2 Helpline staff' this suggests that the majority of applicants were in contact with this team at some stage during the grant application process. The majority of applicants rated the service provided to be 'very helpful' or 'helpful' and there is little difference between the LCBP-2 and LCBP-2e applicants.

Only 1% of applicants reported that the 'LCBP helpline staff' were 'not very helpful'. Twelve applicants provided further information about the issues that they considered problematic. The most common complaint was related to the length of time it took to respond to an enquiry.

Table 3 How helpful did you find the LCBP-2 Helpline staff when you were making your enquiries?

	LCBP-2	LCBP-2e	Total
Very helpful	53%	57%	55%
Helpful	34%	33%	33%
Not very helpful	1%	2%	1%
N/a	13%	8%	11%
Number	1,059	1,007	2,066

The majority of respondents found the grant application and claim process 'very easy' or 'easy', however 13% of applicants found the process 'not very easy' (Table 5). Eighty-five applicants (37 LCBP-2 and 48 LCBP-2e) provided information about the problems they faced with the applications and claim process. Many applicants reported problems that were due to the application process, the type of issues varied and included the following:

- The inability to print/access the online form (subsequent
- The level of detail required for the application
- The type of technical information needed for the application
- The online form – the boxes restricted the amount of information that could be provided
- LCBP-2e applicants only – noted that the system changed and this caused confusion

Those applicants who had problems with the claim reported that some aspects of the guidance were unclear or that the claim had been delayed in some way.

Table 4 How easy to follow did you find the grant application and claim process?

	LCBP-2	LCBP-2e	Total
Very Easy	32%	32%	32%
Easy	58%	52%	55%
Not Very Easy	11%	15%	13%
Number	1,066	1,025	2,091

Two-thirds of applicants reported that the supplier/installer was 'very helpful'; there was a small difference between applicants involved in the two phases of the grant

process (Table 5). Forty-seven applicants who rated their supplier/installer ‘not very helpful’ provided further explanation.

There were a number of reports of delays to the delivery/installation and there were also problems caused by some level of poor communication. Two applicants were dissatisfied with the quality of work provided by the installer. A few applicants noted that problems with the company remained unsolved, for example, one applicant reported that the ‘installation manual’ had not been received.

Table 5 How helpful did you find your supplier/installer, throughout the installation process?

	LCBP-2	LCBP-2e	Total
Very helpful	63%	69%	66%
Helpful	33%	28%	31%
Not very helpful	4%	3%	4%
Number	1,059	1,072	2,131

The vast majority of applicants were satisfied with their installation although overall, 13% of applicants reported problems with the installation.

Table 6 Are you satisfied with the installation?

	LCBP-2	LCBP-2e	Total
Yes	99%	99%	99%
No	1%	1%	1%
Number	1,071	1,065	2,136

Table 7 Have you had any problems with the installation?

	LCBP-2	LCBP-2e	Total
Yes	15%	11%	13%
No	85%	89%	87%
Number	1,066	1,067	2,133

Fifteen percent of applicants that received a grant via the LCBP-2 scheme reported having problems with the installation. The majority (133) of these applicants provided details about the type of problems. Table 8 provides a summary of the issues faced by applicants; in many cases, respondents noted one or more problems. A number of applicants reported technical faults. The nature of the technical fault varied from a faulty display panel to a ‘persistent fault’ with am inverters on the PV system. Some

of the applicants noted that the fault had been rectified; however there were some cases where a problem was ongoing at the time the feedback for was completed. In many cases, the applicant was disappointed by the changes that had to take place to the technology to ensure that it worked effectively, much of this was due to poor planning/design from the technical advisors. One example of this was an applicant who stated that: 'The flat roof would not support the weight of the panels and adjustments had to be made to the design.' There were a few reports of damage caused to the building, mainly because of leaks, there was one report of an installer damaging roof tiles.

Generally, applicants were disappointed by poor communication and the lack of customer services from the installers this was demonstrated because of delays. When things went wrong the applicants' feedback often noted the issue but also reported whether it had been rectified. One applicant noted:

'Minor snagging in balancing systems - all been attended by contact with emergency contact point" - Very professional"'

While another applicant was disappointed that a request had been ignored by the installers

'we are awaiting photographs 2 months after the installation and haven't been sent them'

Table 8 Further information about the problems with the installation LCBP-2

Explanation of the problem	Number of occurrences
Technical faults	38
Poor planning/design	22
Unspecified/specified problem solved	22
Delays due to the installer/supplier	18
Poor quality work	14
Other	10
General delays	8
Damage (e.g. leak)	7
Unexpected/additional costs	6
Work to rectify problem pending	6
Delays due to the weather	5
Delays financial	3
Damage caused by installer	1

There were fewer problems reported by applicants from the LCBP-2e scheme; ninety-three respondents provided further information about the problems related to the installation. Technical faults were often reported, the major issue here related to Mitsubishi recalling the Ecodan product (Table 9). Only two applicants referred to poor quality work.

Table 9 Further information about the problems with the installation LCBP-2e

Explanation of the problem	Number of occurrences
Technical faults	40
Unspecified/specified problem solved	19
Other	11
Delays due to the installer/supplier	10
Damage (leak)	8
General delays	6
Delays due to the weather	3
Unexpected/additional costs	3
Poor planning/design	2
Poor quality work	2
Delays financial	1
Work to rectify problem pending	1

The majority of applicants did not report any problems, however for those that did, 90% reported that the problem had been rectified (Table 10). This corroborates the information provided in the Table 8 and Table 9 which suggests that in many cases, solutions were found to problems when they arose.

Table 10 Have any problems reported been rectified to your satisfaction?

	LCBP-2	LCBP-2e	Total
Yes	88%	92%	90%
No	13%	8%	10%
N	200	232	432

Most of the applicants would use the supplier/installer again and recommend them to others, however overall 4% of applicants would not make such a recommendation. For those involved in the LCBP-2 scheme the main issues why a suppliers or installer would not be recommended or used again were due to poor communication or directly related to poor customer satisfaction because of a specific problem with

the installation. For both schemes poor project management and communication were singled out as key reasons why applicants would not use certain suppliers or installer.

Table 11 Would you use this supplier/installer again and recommend them to other people?

	LCBP-2	LCBP-2e	Total
Yes	94%	97%	96%
No	6%	3%	4%
N	1,051	1,054	2,105

Overall, most applicants reported that they were satisfied with the service that they received from the grant programme. Although, a number of comments provide some insight into ways that the grant scheme could have been improved, these included:

- Improving the clarity of the application process
- Setting and adhering to timescales for responding to communication from applicants (grant administration and installers)
- Stressing the importance of careful planning and design
- The need for well qualified installers
- Providing a framework for the installers/grant administration to document and respond to problems

Summary of inspections

As part of meeting the KPI's around 54 projects were inspected, representing two percent of the completed installations. The main purpose of the inspections was to check that grant assisted products were installed as expected rather than the quality and performance of the technologies. All of the projects inspected met the scheme Terms & Conditions

They also provided an ideal opportunity to gather feedback first hand from applicants. Although a detailed analysis was not possible the general feedback reflects issues covered in the BRE Trust publication "Lessons Learnt from community based microgeneration projects - The impact of renewable energy capital grant schemes" (to be published soon).

Summary Website feedback

There were fifty-one comments under LCBP2 and thirteen comments under LCBP2E. Most of these were in relation to asking for help with the on-line log in feature or update on a submitted application. All the feedback would have been dealt with at the time. Other comments /queries received were:

- asking why there is only a limited number of framework suppliers (LCBP-2)
- querying the lack of print option when completing the form (LCBP-2)
- complaining about the time it takes to receive a quote as the framework supplier seems to be too busy (LCBP-2)
- will Air Source Heat Pumps be added to the extended programme (LCBP-2)
- expressing their disappointment about the closure of the PV stream (LCBP-2e)
- asking for clarification on the benchmark calculations (LCBP-2e)
- stating that the website is great and includes easy to follow guidance (LCBP-2e-)

Summary of complaints

All complaints were dealt with in line with the programme guidance and complaints procedure. A number of complaints required clarification from DECC, which usually re-iterated BRE's initial decision. Given that the programme was operational for four and a half years the number of complaints is considered to be quite low. Having said this, the total figure of forty five only includes issues escaladed to the programme manager. It was impossible to capture the less serious complaints, which were usually dealt with by the administration team. None of the complaints resulted in a legal challenge.

- Appealing the withdrawal of a project due to not being able to meet the 2009/10 claim deadline. This was one of the major causes of complaints about a third of a total of forty complaints.

- Appealing grant claim rejection (reasons for rejection included changing the product to one that was not MCS certified; changing to a non MCS certified installer – these changes were done without notifying BRE).

- Framework supplier delaying project beyond agreed start date.

- One manufacturer complaint that LCBP-2 & 2e is reducing his business share of installations.

- Product safety resulting in the temporary suspension of that product.

Key Findings

Programme Management by DECC

There were frequent management changes within DECC, which also changed departments three times from Department of Trade and Industry (DTI) to the Department for Business, Enterprise and Regulatory Reform (BERR) to DECC.

Each manager had slightly different priorities, which were reflected in changing reporting requirements. Monthly progress reports evolved from providing standard information on finances and KPIs to complex reports including estimated carbon dioxide saved. Eventually these reports were replaced by reporting only on the financial side. From a contractor point of view these changes were very time consuming and prevented a continuous accumulation of information, useful for final reports or overall programme evaluations.

The above situation was reflected in the number of parliamentary enquiries passed on to BRE> Although the total number of enquiries was quite small (< 100), they were usually very time consuming and had to be dealt with immediately. There were a large number of enquiries towards the end of 2008 and start of 2009. Most were about the number of applications received in a certain region or district, as well as asking about allocated funding, forecast and spend. The level of involvement was thought to be excessive, especially as all the information was made available in progress reports. Up to date allocation and payment figures were also available on the programme websites. In addition DECC managers had access to the web-based database and reporting tools.

Programme Design

The grant schemes applied the microgeneration definitions stated in section 82 of the Energy Act 2004. For electricity generating technologies, the maximum limit for each installation was 50kW and for heat 45kW. This meant that heat applications were limited from the outset as small to medium sized organisations require larger than 45kW boilers or heat pumps. This is something that was also found within the Clear Skies Community stream, where the majority grants went to larger than 45 kW systems. Even though this was relaxed by allowing ECA products to be used under LCBP-2e, the choice of products was still very limited especially for heat pumps. Maybe allowing more flexibility and a review of system sizes throughout the programme could have resulted in the programme capturing a larger proportion of heat projects.

3.10 Conclusions

Overall LCBP-2e delivered in regards to grant offers issued but fell short on grant expenditure. Unfortunately there were a series of external factors which contributed to projects withdrawing rather than taking up their grant. Also the change in government meant grant budgets not taken up were returned to the Treasury, rather than be recycled within LCBP to support heat projects. This could have been a sensible way to also bridge the gap between the closure of LCBP-2e to heat technologies in May 2010 and the planned introduction of the RHI in April 2011. Managing grant demand in view of the introduction of the renewable energy tariffs was always going to be a challenge.

Similar to other parts of LCBP, Phase2 and 2e might only have met some of the original programme aims, but it managed to provide an important stepping stone in the development of the UK microgeneration market. LCBP overall has have also played a vital role in expanding the knowledge and skills base for installers and end users, reflected in the expansion of the MCS scheme.

The case study and inspection findings also highlight the importance of projects being able to address practical issues, especially understanding the operation and maintenance of the installed technology. It was found that the approach taken by contractors varied widely some providing an excellent hand over and after sales services, whereas others only offered limited support once the installation was completed.

In view of the introduction of renewable energy tariffs, which pay based on metered output or deeming, this is an area which deserves more attention. Although there are quality measures in place for installers, mainly through MCS, there does seem to be room for improvement. After all the benefits of any new financial initiative will only be realised if there are appropriate quality assurances in place resulting in good quality installations, which offer maximum performance.

3.11 APPENDICES

Detailed Programme Statistics

		Accumulative		Accumulative		Accumulative		Accumulative		Accumulative			Accumulative	Accumulative			Accumulative	
£	Submitted total	Submitted total	(unsuccessful; submitted - copied from LCBP2 to LCBP2E or assessed and unsuccessful as limited	Submitted (unsuccessful - limited funds; copied or assessed)	Submitted (unsuccessful - limited funds; submitted but not assessed)	Submitted (unsuccessful - limited funds; not assessed)	Withdrawn prior to assessment)	Withdrawn (prior to assessment)	Grant Offers	Grant Offers (incl withdrawn)	Withdrawn	Withdrawn	Grant Offers (excl. withdrawn)	Av assessment period	Paid	Paid	Ratio (paid to grants due)
Feb-07	35,675	35,675	-						22,333	22,333		-	22,333	4			
Mar-07	373,641	409,315	-				3,561	3,561	138,498	160,830		-	160,830	7			
Apr-07	837,983	1,247,298	12,355	12,355			159,331	162,892	463,051	623,881	41540.5	41,541	582,340	7			
May-07	489,880	1,737,178	-	12,355			14,506	177,398	601,917	1,225,798		41,541	1,184,258	11	2,007	2,007	
Jun-07	818,445	2,555,623	-	12,355			14,010	191,408	647,044	1,872,842		41,541	1,831,302	11		2,007	
Jul-07	746,891	3,302,514	-	12,355			13,571	204,979	1,011,928	2,884,771		41,541	2,843,230	8		2,007	
Aug-07	713,213	4,015,727	-	12,355				204,979	485,821	3,370,592	345,876	387,416	2,983,176	9	5,142	7,149	
Sep-07	1,288,396	5,304,123	-	12,355			159,080	364,059	903,454	4,274,046	13,571	400,987	3,873,058	10	2,809	9,957	
Oct-07	1,145,267	6,449,390	-	12,355			11,061	375,120	870,620	5,144,665	10,488	411,475	4,733,190	12	126,307	136,264	
Nov-07	1,154,844	7,604,234	291,195	303,550				375,120	774,361	5,919,027	13,263	424,739	5,494,288	12	87,892	224,156	
Dec-07	815,867	8,420,100	-	303,550			22,377	397,497	557,608	6,476,635	5,901	430,640	6,045,995	14	256,869	481,025	
Jan-08	749,724	9,169,825	-	303,550			4,522	402,019	834,712	7,311,347	17,042	447,682	6,863,665	15	316,891	797,916	
Feb-08	1,138,055	10,307,879	-	303,550			57,012	459,031	998,256	8,309,603		447,682	7,861,921	13	237,816	1,035,732	- 1,013,399
Mar-08	708,099	11,015,978	-	303,550			9,140	468,171	802,194	9,111,797		447,682	8,664,116	19	415,367	1,451,099	- 1,290,269
Apr-08	945,006	11,960,984	-	303,550			17,079	485,250	1,075,184	10,186,981	9,200	456,882	9,730,100	24	562,941	2,014,041	- 1,431,700
May-08	1,464,960	13,425,944	43,972	347,522			10,000	495,250	955,947	11,142,928	8,313	465,194	10,677,734	18	427,972	2,442,013	- 1,257,755
Jun-08	1,248,324	14,674,268	-	347,522				495,250	1,484,320	12,627,249	67,791	532,985	12,094,264	27	499,821	2,941,833	- 1,110,531
Jul-08	1,898,356	16,572,624	110,498	458,020			25,000	520,250	1,220,980	13,848,229	79,727	612,712	13,235,517	22	530,347	3,472,180	- 628,950
Aug-08	1,961,280	18,533,903	15,000	473,020				520,250	2,014,974	15,863,203	195,469	808,181	15,055,022	29	538,040	4,010,220	- 1,027,044
Sep-08	1,420,888	19,954,791	2,183	475,203			26,925	547,175	2,141,234	18,004,437	126,273	934,453	17,069,984	9	609,497	4,619,717	- 746,659
Oct-08	2,452,875	22,407,666	42,605	517,808			14,980	562,155	1,826,891	19,831,328	608,243	1,542,697	18,288,632	13	696,169	5,315,886	- 582,697
Nov-08	3,651,457	26,059,124	75,739	593,547			71,437	633,592	2,688,472	22,519,800	165,766	1,708,463	20,811,337	11	527,273	5,843,160	- 348,872
Dec-08	4,237,469	30,296,593	115,557	709,104			109,256	742,848	2,290,833	24,810,633	215,166	1,923,629	22,887,004	11	511,071	6,354,230	- 308,235
Jan-09	3,480,383	33,776,976	-	709,104				742,848	3,583,649	28,394,282	120,632	2,044,261	26,350,021	14	721,150	7,075,380	- 211,715
Feb-09	6,761,190	40,538,166	166,899	876,003			79,091	821,938	3,803,652	32,197,934	21,165	2,065,426	30,132,508	16	435,551	7,510,931	350,990
Mar-09	10,375,250	50,913,416	1,008,555	1,884,558			403,742	1,225,680	3,629,898	35,827,832	105,931	2,171,357	33,656,475	19	1,213,376	8,724,307	60,192
Apr-09	7,339,831	58,253,247	1,233,147	3,117,706			683,579	1,909,260	4,211,499	40,039,331	633,522	2,804,879	37,234,452	32	736,737	9,461,044	269,055
May-09	8,087,409	66,340,656	2,633,309	5,751,014			1,365,056	3,274,316	5,556,013	45,595,344	284,068	3,088,947	42,506,397	38	667,374	10,128,418	549,316
Jun-09	17,591,749	83,932,405	7,127,639	12,878,654	379,840	379,840	2,799,913	6,074,230	6,030,699	51,626,043	75,514	3,164,461	48,461,582	44	886,183	11,014,602	1,079,662
Jul-09	3,033,003	86,965,408	437,773	13,316,427	602,410	982,250	241,388	6,315,617	2,316,428	53,942,471	68,311	3,232,772	50,709,700	55	1,880,472	12,895,073	340,443
Aug-09	3,747,418	90,712,826	235,547	13,551,974	246,451	1,228,701	459,166	6,774,784	2,651,623	56,594,094	135,971	3,368,743	53,225,351	63	570,446	13,465,519	1,589,503
Sep-09	5,323,721	96,036,547	196,031	13,748,005	372,802	1,601,503	194,212	6,968,996	5,099,077	61,693,171	153,921	3,522,664	58,170,507	78	2,083,277	15,548,796	1,521,188
Oct-09	5,176,727	101,213,274	356,834	14,104,839	361,211	1,962,714	385,401	7,354,397	5,086,177	66,779,347	345,700	3,868,364	62,910,984	68	1,622,087	17,170,882	1,117,749
Nov-09	8,686,003	109,899,277	232,145	14,336,984	4,286,867	6,249,581	300,805	7,655,203	2,841,403	69,620,751	693,900	4,562,264	65,058,487	57	1,399,076	18,569,958	2,241,379
Dec-09	1,930,112	111,829,389	165,625	14,502,609	10,574	6,260,155	128,986	7,784,188	3,223,515	72,844,265	176,290	4,738,554	68,105,712	57	967,111	19,537,069	3,349,934
Jan-10	1,914,488	113,743,877	50,000	14,552,609	221,298	6,481,453	184,383	7,968,571	3,334,701	76,178,966	182,654	4,921,207	71,257,759	55	1,731,858	21,268,928	5,081,093
Feb-10	2,688,503	116,432,380	9,000	14,561,609	58,894	6,540,347	162,541	8,131,112	4,270,091	80,449,057	635,424	5,556,631	74,892,426	69	1,919,825	23,188,753	6,943,755
Mar-10	3,224,464	119,656,844	237,525	14,799,134	20,965	6,561,312	134,859	8,265,972	2,670,127	83,119,184	608,266	6,164,897	76,954,287	69	5,693,929	28,882,682	4,773,793
Apr-10	2,464,719	122,121,563	-		90,764	6,652,077	238,253	8,504,225	3,099,592	86,218,776	4,568,912	10,733,810	75,484,966	53	1,666,973	30,549,655	6,684,797
May-10	1,539,007	123,660,570	-		57,665	6,709,741	127,073	8,631,298	1,908,612	88,127,388	879,973	11,613,783	76,513,605	69	1,624,491	32,174,146	10,332,251
Jun-10	467,104	124,127,674	-				146,173	8,777,471	2,204,102	90,331,489	332,207	11,945,990	78,385,500	67	2,670,071	34,844,217	13,617,365
Jul-10	662,884	124,790,558	-				441,476	9,218,947	1,250,956	91,582,445	275,785	12,221,775	79,360,671	62	1,360,888	36,205,105	14,504,595
Aug-10	57,915	124,848,473	-					9,218,947	1,072,395	92,654,841	121,518	12,343,293	80,311,547	80	1,187,021	37,392,126	15,833,225
Sep-10	62,011	124,910,484	-				62,011	9,280,958	504,925	93,159,766	627,988	12,971,281	80,188,485	105	1,439,103	38,831,229	19,339,278
Oct-10	45,301	124,955,785	-						162,760	93,322,526	382,632	13,353,913	79,968,613	180	2,451,064	41,282,293	21,628,691
Nov-10	4,082	124,959,867	-						454,758	93,777,284	1,623,028	14,976,940	78,800,344	295	2,923,187	44,205,480	20,853,007
Dec-10	20,284	124,980,151	-						312,423	94,089,708	652,511	15,629,452	78,460,256	209	1,829,013	46,034,493	22,071,219
Jan-11	15,257	124,995,408	-						63,000	94,152,708	788,698	16,418,150	77,734,558	275	3,093,370	49,127,862	22,129,896
Feb-11			-						-	94,152,708	1,164,007	17,582,157	76,570,551		3,517,706	52,645,568	22,246,858
Mar-11			-							94,152,708	4,176,172	21,758,328	72,394,379		8,321,148	60,966,716	15,987,571
Apr-11			-							94,152,708	7,585,318	29,343,647	64,809,061			60,966,716	14,518,251
May-11			-							94,152,708	139,304	29,482,950	64,669,757			60,966,716	15,546,889

SECTION 4

MAJOR DISSEMINATION PROGRAMME & LCBP PHASE 2b LESSONS LEARNED

Will Ray – Carbon Trust

Section 4 Dissemination – Contents

4.1 Background

LCBP Stream 2B was focussed on larger scale new-build and major refurbishment projects including large commercial and residential developments as well as community and education buildings. Through a competitive bidding process, developers committed to significant reductions in carbon emissions, through the use of on-site renewables, implementation of low carbon design principles and procurement of energy efficient equipment.

For projects in Stream 2b, the Carbon Trust provided a package of low carbon design support. Carbon Trust worked alongside the Energy Saving Trust (EST), who managed the grant awards with the successful bidders' building projects, to influence and report on the key decisions made by the respective clients, and to use the collected data as the basis for effecting change in the buildings sector. The diagram below illustrates Carbon Trust's role in the programme and the structure of our involvement with the projects.

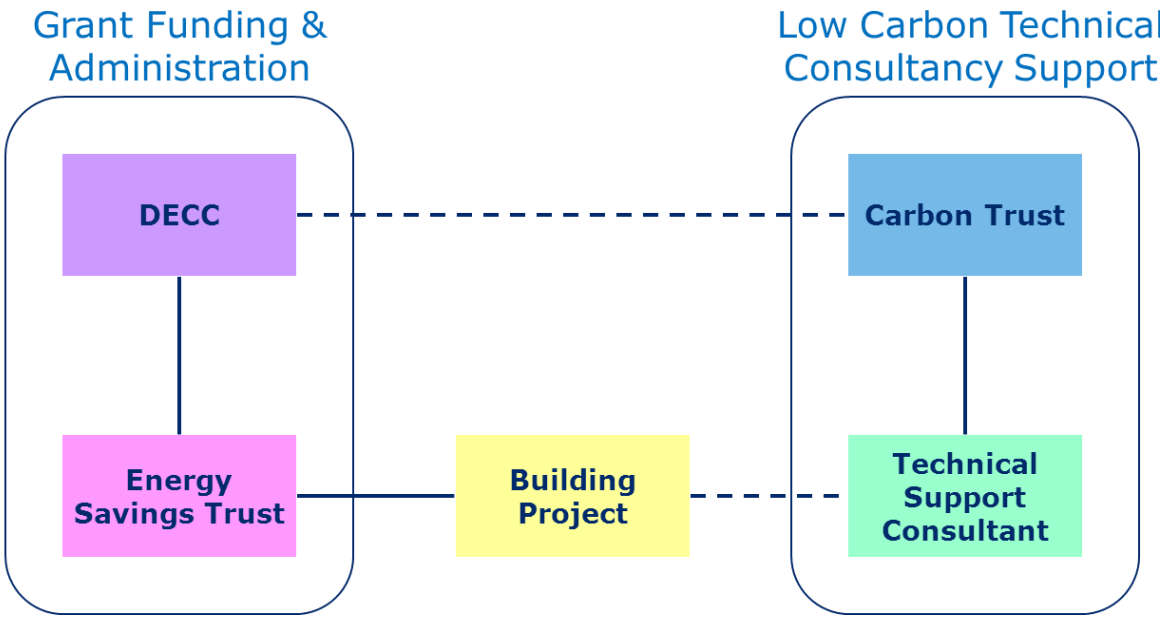


Figure: 28 - LCBP Phase 2B organisation structure.

This involvement was intended to support the broader LCBP objectives described in the Executive Summary

4.2 Projects Grant Applications

23 buildings were selected from 178 applications. Of the original 23 projects, 15 completed construction and operational monitoring and 11 sites produced greater

than 12 months operational data before the end of the monitoring period in December 2010. Two sites completed construction, but no operational monitoring data were collected and one site was still under construction at the time the LCBP finished. Five sites withdrew, mostly due to project setbacks (i.e. financial problems or major construction programme delays). The total construction budget for the 15 sites that completed both construction and operational monitoring stages was £376m.

Combined with the Carbon Trust's Low Carbon Building Accelerator work on refurbishment, this research base forms the largest study on operational buildings since the PROBE studies (see www.usablebuildings.co.uk for details).

For each project the technical support consultants liaised with members of the project teams to produce a monthly Project Progress Report (PPR) for the Carbon Trust. Evidence collected included commentary on experiences of the project team, including management and associated issues, modelled savings from implemented measures and delivered cost and carbon savings from specific measures implemented and monitored (including renewables) as well as anecdotal feedback on performance.

Observations were recorded in a standardised template according to RIBA project stages. These observations and further data collected formed the basis of 4 project reports which were produced at the nominal points of concept design (or grant award), detailed design, construction completion and end of occupational monitoring. The stages and reports are shown in the diagram below.

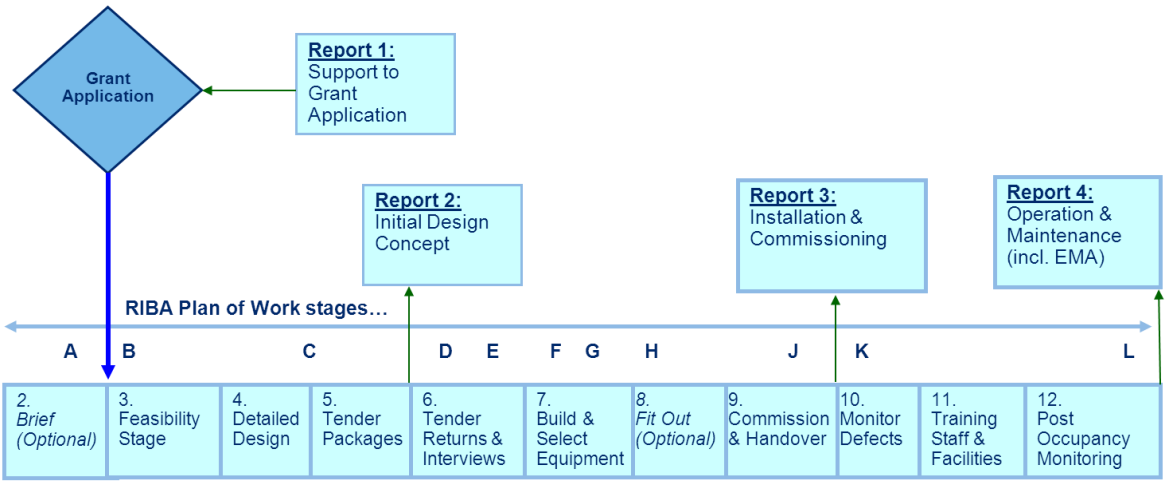


Figure 29 - RIBA project stages showing when data collection reports were produced.

The reports and associated project data (including monitored energy data) have been archived by Carbon Trust for future research as well as forming the basis of lessons learned and case study material that have been widely disseminated.

In addition, two projects were added to the Carbon Trust's scope during dissemination including a retrospective review of a selection of Stream 2A (refurbishment) projects and the investigation of potential for replication and demonstration of community-scale low and zero carbon technologies at Royal Botanic Gardens Kew.

4.3 Project summary data

The table below provides a brief summary of the projects in Stream 2B of the LCBP and the low/zero carbon technologies that were installed at each.

Project name	Type	Project Budget (£m)	Status at Dec 2010		Low/Zero Carbon Technology Max Capacities (kW)						
			Construction Complete?	Monitoring period (mths)	Biomass	GSHP (heat)	GSHP (cool)	PV	Wind	SHW	Hydro
Fairglen	residential	£4.1m	☐	>12		5.8		1.2			
Lake Shore (formerly Urban Splash)	residential	£60m	☐	<12	360	350					
Dandridge's Mill	residential	£2.03m	☐	>12		46		3.69			4.6
New England	residential	£17m	☐	>12	500			9.36			
Green House	residential	£14m	☐	<12		600			12	96.8	
Woodbrook	residential	Not known	☐	>12	2000			1			
Cruddas Park	residential	£94m	☐	<12	700						
Leafields	residential	£40m	☐	0						1.98	
LSHTM	academic	£14.5m	☐	<12			150	3.5	1.5		
Bideford College	academic	£45m	☐	0	500						
City Academy, Hackney	academic	£40M	☐	>12		200	57	21			
Edge Hill University	academic	£15.1M	☐	>12		380	525			15	
Pembrokeshire College	academic	£3.7M	☐	>12	300					0.9	
Ceredigion County Council	office	£15M	☐	>12	1200				6	11	
West Suffolk House (SEBC)	office	£21.5M	☐	>12		463	430			10	
Stoke Local Service Centre	library	Not known	☐	>12		90		8.3		2.1	
RHS Harlow Carr	visitor centre	£3M	☐	<12		22			15	2.85	
Mildmay	community centre	£2.2M	☐	0		8.4		18.1		2.1	

As part of the application for grant funding, each building project aimed to achieve significant carbon emission savings relative to the minimum specified by the contemporary (2006) Building Regulations. Figure 30 below shows the Percentage Emissions Reduction Commitment (PERC) achieved at the initial design stage (LCBR 1) and the as built stage (LCBR 4) for each site through a combination of low and zero carbon technologies and energy efficiency measures. Projects were required to achieve within 80% of their initial PERC in order to claim the full grant amount - verification of this was carried out by the Energy Savings Trust. Note that PERC values were based on modelled estimates of carbon emissions from Building Regulation compliance calculations.

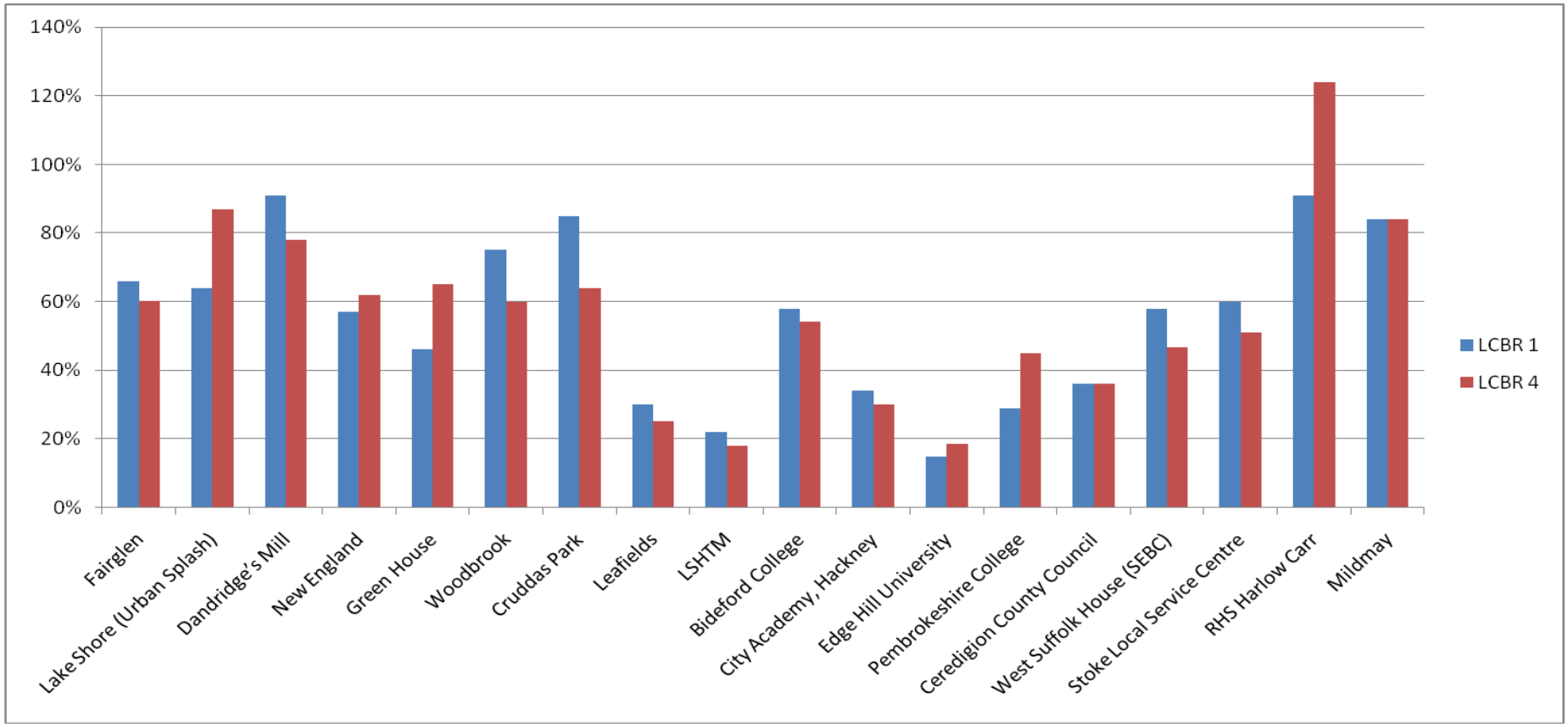


Figure 30 - Carbon emissions savings aimed for by the building projects.

4.4 Key Findings on Projects

This section includes discussion of some of the key themes encountered on the projects that influenced the carbon performance of the buildings, including the gap between design and actual performance, cost-effectiveness of low carbon technologies, enabling technologies and management processes, regulatory compliance, procurement and achieving replication.
Lessons for buildings clients have been captured in a series of booklets published by the Carbon Trust – see below for details.

Gap between design and performance

A key outcome of the research shows that despite genuine intentions to develop a low carbon building, expectations often fail to translate into reality. Evidence gathered during the programme suggested this is caused by issues related to both the management of projects and issues that arose during the design, installation and operation of the technologies involved. Such issues can occur at all stages of a project, from inception to completion.
Predictions of CO_2 reductions often fluctuated significantly during the projects as the graph below shows. This would not have been captured without checks done by Carbon Trust technical support consultants at each stage.

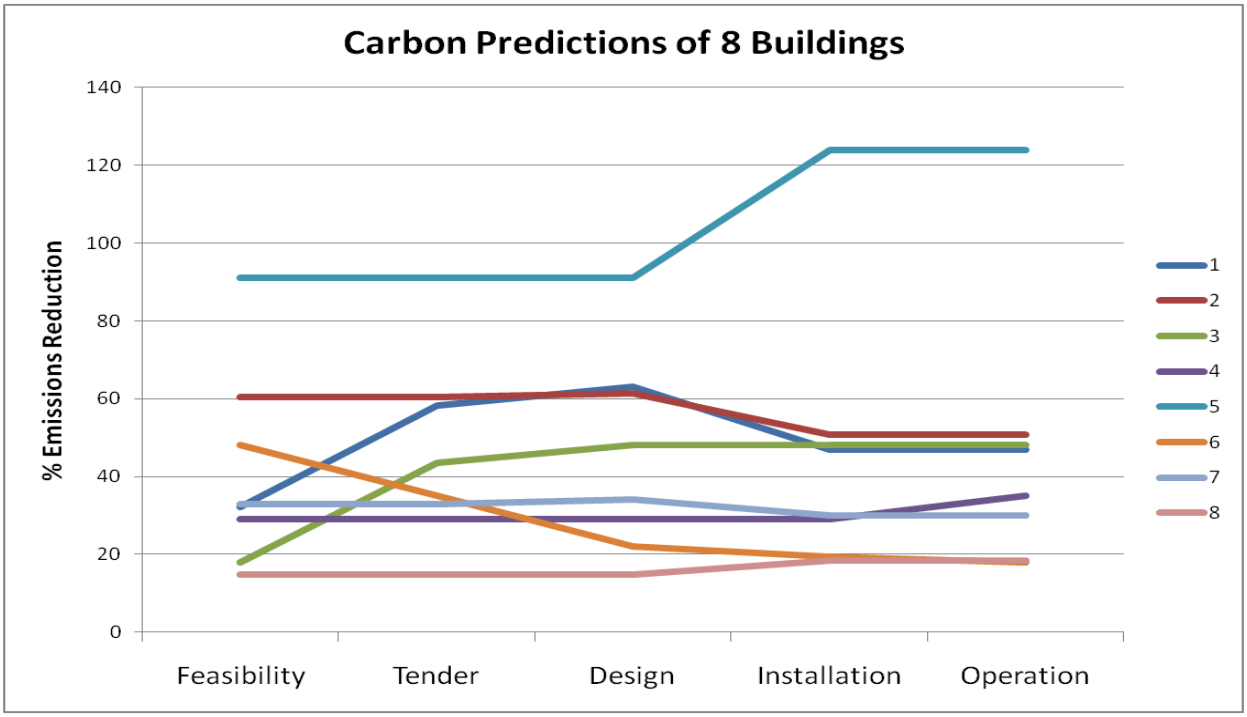


Figure 31- Predicted percentage CO^2 reductions at key stages.

A number of reasons were identified for these changes, including different versions of modelling software and changes to the specification of low/zero carbon

technologies.The graph below shows data from five typical projects comparing measured regulated energy use with predictions from modelling for Part L compliance and EPCs. Clearly, there were large discrepancies between modelled and actual energy consumption – actual energy use was typically up to 5x greater than predicted.

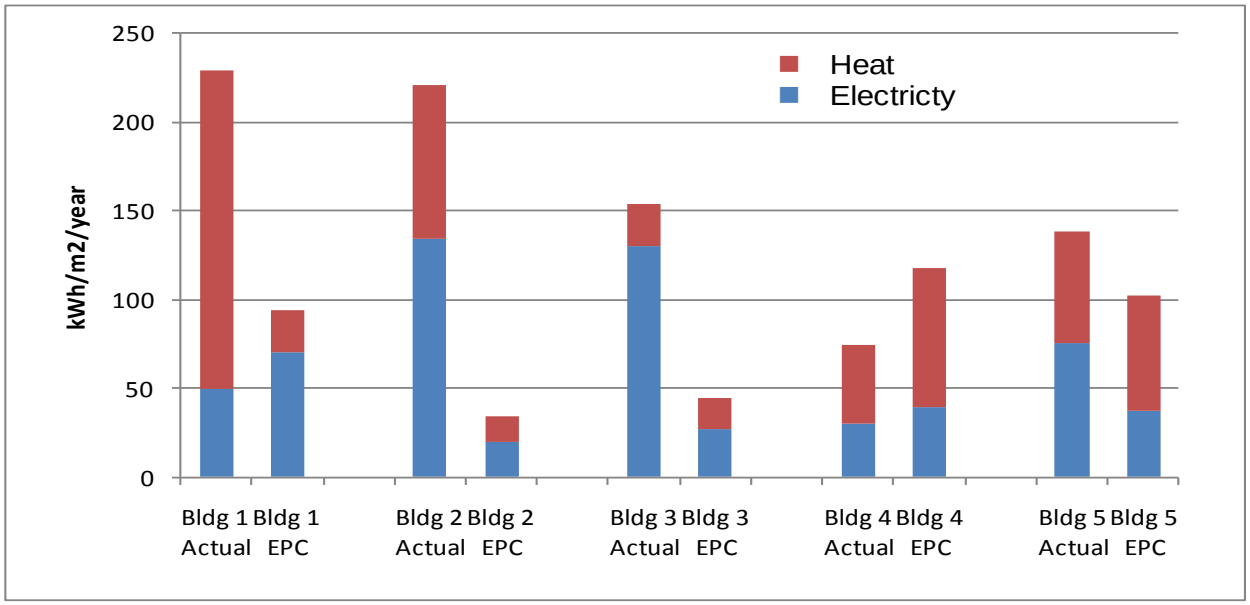


Figure 32 - Comparison of actual building performance vs. EPC rating.

Benchmarking data proved to be a much better predictor of measured performance than compliance models, as the graph below shows. However, 25% of designs did not perform as well as expected against relevant industry benchmarks.

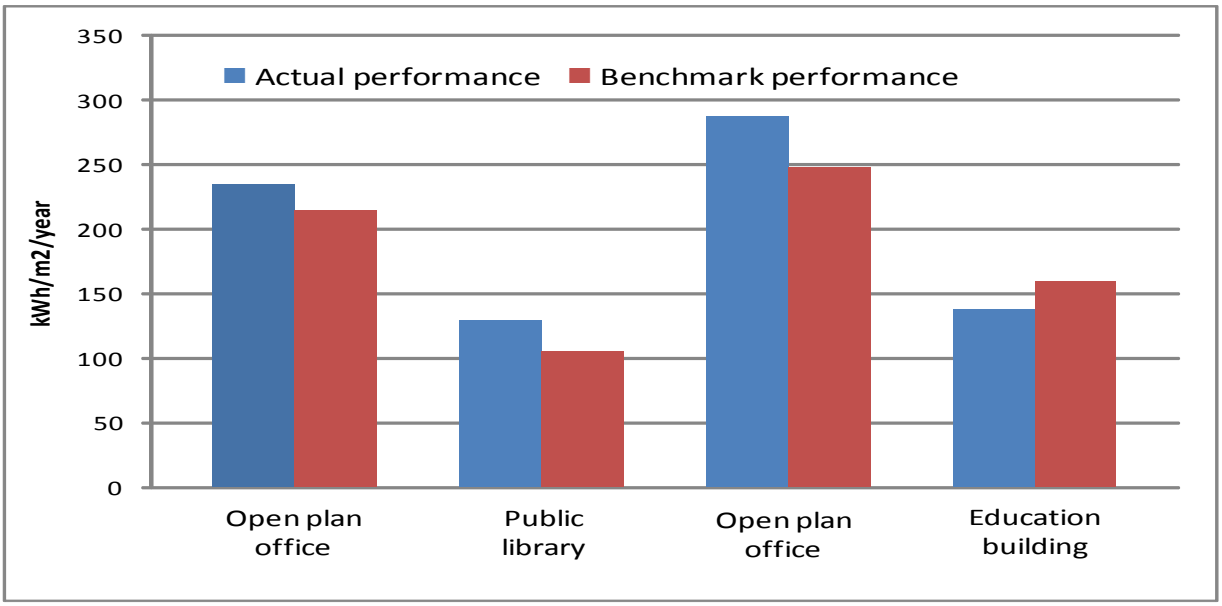


Figure 33 - Comparison of actual performance vs. benchmark performance by building type.

In addition, the actual performance of Low and Zero Carbon (LZC) technologies was also often poorly predicted using regulatory tools. The graph below shows the extremes of by how many times over (red bars) or under (green bars) the software estimated output of various LZCs (i.e. in the worst case solar thermal output was 20x over-estimated).

Figure 34 - Comparison of predicted and actual performance of LZC technologies.

In practice, it is often hard to quantify the size of the performance gap, because:

- Design teams are not required to predict performance in-use;
- Current calculations focus on compliance rather than performance;
- There are many unknowns during the design which make prediction complex;
- There is a lack of available benchmark and performance data to bridge the gap;
- The tools currently available are generally poor at predicting in-use performance, particularly of non-domestic buildings and some LZC technologies.

The analysis suggested some key reasons why low carbon aspirations do not materialise are:

- The aim for the building to be low carbon in-use is not clearly conveyed to the design team;
- The design is not robustly tested at regular intervals;
- The design intent is not delivered in practice on site;
- Controls and systems are overly complex;
- Commissioning is inadequate or not completed satisfactorily;
- There are insufficient means of measuring and so optimising energy performance once operational;
- Designers / constructors are not involved after completion;
- The building is not operated or used as the designers anticipated;

It has not been possible to accurately quantify the relative importance of these factors and further research is required in this area. However, some of these issues are addressed in more detail in the sections below.

As a result Carbon Trust have produced a publication called “Closing the gap – lessons learned on realising the potential of low carbon building design” which examines the gap between design predictions and real performance of low carbon buildings using the data gathered from the projects. The booklet provides advice and tips on the right approach to building design, project management and operation to enable a low carbon building to deliver on its expectations and to save money.

In particular, complexity often proved to be the enemy of success. None of the more complex HVAC systems blending traditional and renewable heat technologies appeared to operate in accordance with their design. All had higher than expected emissions during their first year of operation. These performance issues were compounded by a lack of adequate metering, which hampered the ability to diagnose problems in these projects. The benefits of an adequate and well considered metering strategy are considered further in the sub-section on metering and monitoring under the enabling technologies section.

Cost effectiveness and performance of low and zero carbon technologies

Figure 35 below summarises the cost effectiveness (£/T of CO_2 saved) of the carbon reduction performance of low and zero technologies as measured during their first year of operation. Passive design and energy efficiency features were significantly more difficult to monitor and hence to attribute carbon savings or costs to.

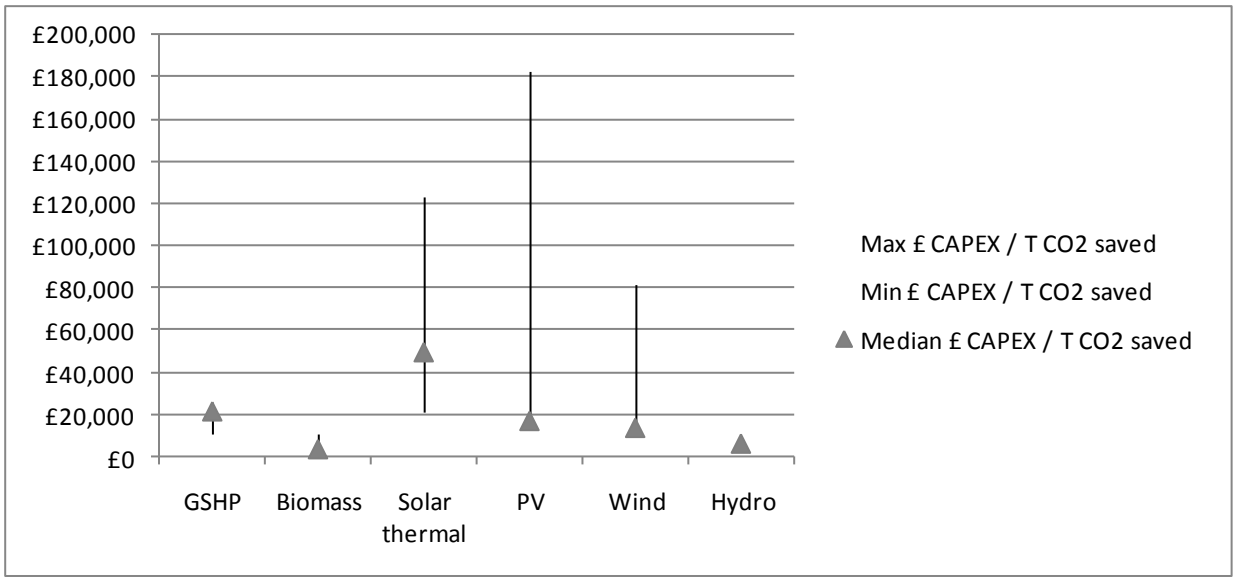


Figure 35 - Cost per tonne of CO^2 saved by technology as measured during the first year of operation.

The figures are based on measured kWh generated where possible. The CAPEX figures used were generally high because they included installation, commissioning and associated costs as well as equipment. In addition costs were higher than market norms, partly because more innovative designs and systems were preferred in the selection process. The generation figures are based on the measured kWh generated and the median value is used so one high value doesn't skew the results within this relatively small sample set. For example, Wind is made up of three case studies (CCC, RHS and Greenhouse with £k/TCO_2 respectively £80, £10 and £13) with the median value at £13k/TCO_2. The analysis also assumes that renewable heat technologies were offsetting standard gas boilers with 97% system efficiency and CO_2 factors for electricity and gas were 0.545 $kgCO_2$/kWh and 0.184 $kgCO_2$/kWh respectively.

The figure implies relatively high cost and/or poor performance of the technologies in this stream of the LCBP. The following sections examine some of the reasons behind this. However as the data represents performance during the defects and early occupation phase of the projects, the figures are unlikely to be representative of the long term cost effectiveness of the carbon savings from the technologies.

Ground Source Heat pumps (GSHP)

Whilst around half of GSHP installations performed well, the rest performed significantly below expectations due to problems with design, delivery & operation. In particular it appears the industry needs better standards and a cheaper feasibility study process that clients are prepared to pay for. This would encourage more effective screening of unsuitable sites and wasted effort. A number of projects did not install sufficient metering to enable the performance of the GSHPs to be measured accurately. However, on those projects where GSHP performance could be measured, there was often a small gap between predicted average performance and what was delivered in practice, as shown below.

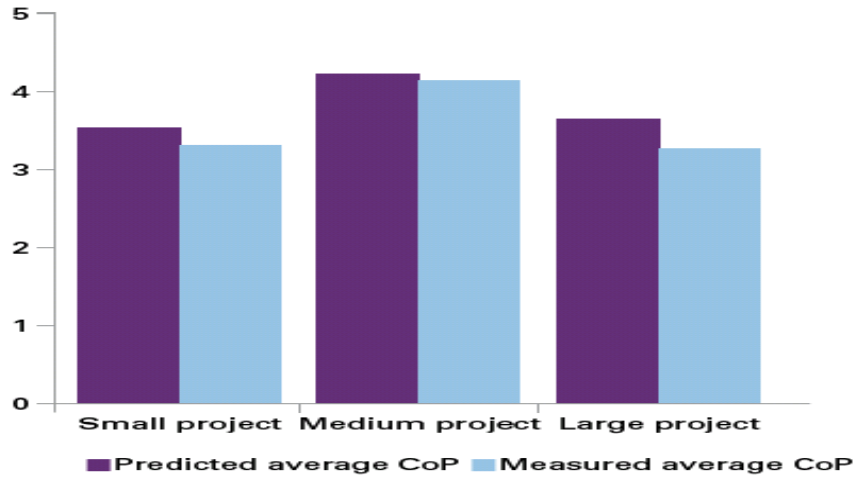


Figure 36 - Comparison of predicted and measured CoPs for small, medium and large GSHP installations.

However, the integration of GSHPs with heating and cooling systems that also included gas boilers or chillers created a variety of issues that were common across many projects. The meter data showed that control and prioritisation of different heating or cooling sources can be difficult when each system is working at different temperatures. This poor control was observed to reduce the efficiency of heat pumps and significantly increase the running cost and carbon emissions of the overall system.

A simple system design is preferable and the designer needs to provide a clear description of how the heat pump interacts with the controls for the whole heating system. This is even more important where the system provides both heating and hot water.

Carbon Trust has produced a booklet to inform construction clients called “Down to Earth” to address these and other issues.

Biomass Heating

For Biomass heating systems, whilst the systems generally worked, all non-ESCo installations experienced reliability issues with controls, equipment or fuel supply. These issues have been dealt with in more depth by the Carbon Trust’s Biomass Heat Accelerator.
Additionally, some potential issues were highlighted that related to the use of community or district heat networks to supply heat to buildings built to modern standards. High system heat losses (>20%) were measured at all sites where these networks were used. A suspected cause was often lack of demand, but further investigation generally identified the exact causes of the high losses. An example from Ceredigion County Council is shown below, where the cause of losses was initially unclear, before a pipe leak was identified.

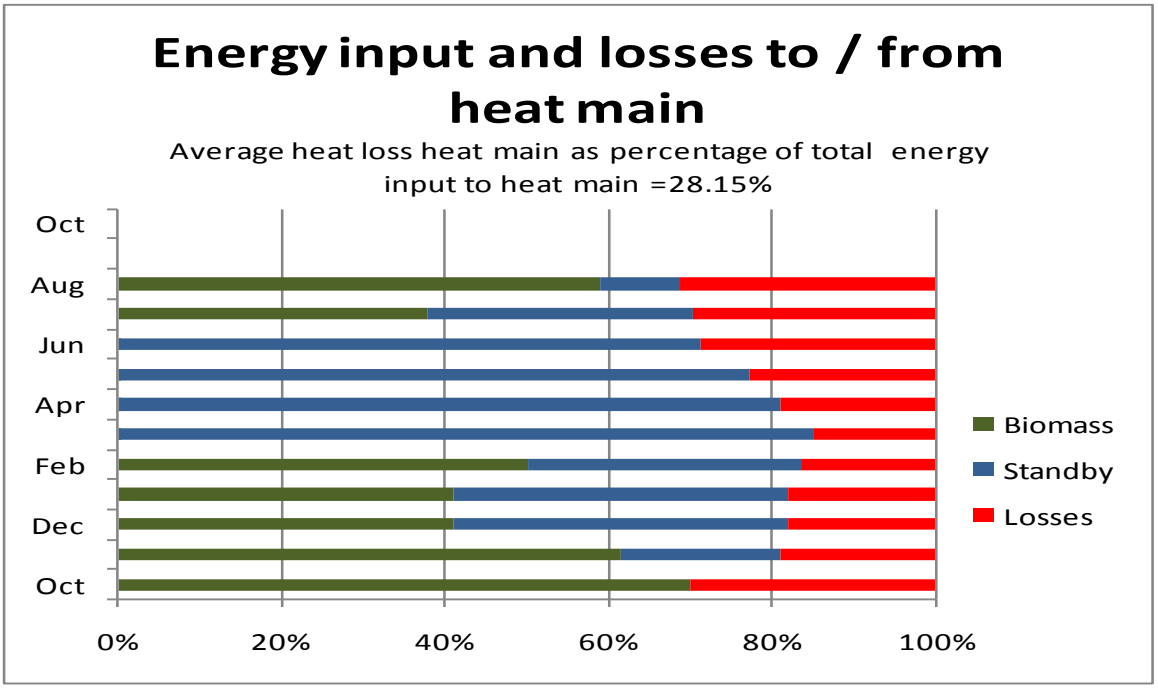


Figure 37 - Heat loss from the heat main as a percentage of total energy input, which is split by input source.

Solar Photovoltaics (Solar PV)

Estimated payback periods from the case studies varied from 16.5 years to 29; however, purchase and installation costs are coming down all the time, and if more up-to-date costs are applied, these payback periods are reduced by around a third. Installed costs ranged between £6,200 and £6,500 per kilowatt-peak for standard 'bolt-on' types of panel although the costs increased quickly on projects where: access was difficult; PV was integrated into other building elements; or they were used as an architectural 'feature'. One project's original renewable energy strategy included a solar thermal system for hot water, but this had to be rethought during the tender stage due to escalating costs. In another project, the additional cost of controls and equipment, installation, builder's work and commissioning were roughly equal to the cost of the PV modules themselves.
The PV installations generally performed according to their design expectations. The only installation that performed poorly was a building integrated PV installation which had a low density of cells included to allow daylight penetration in to an atrium and overshadowing by other services on the roof, caused by poor coordination during the design. In addition, the bespoke nature of the integrated system required by the planning control office meant that final costs were five times those predicted at earlier stages. It is therefore essential that clients realise the cost and performance implications of any planning constraints on design before agreeing to purchase such systems.

Overall, commissioning the PV modules at the case study projects took less than a

day, as on-going commissioning to overcome teething problems was not generallynecessary for PV modules. Nevertheless, specialist advice was found to be valuable throughout the commissioning stage, particularly when relating to the safety of future maintenance. For example, on one project, the commissioning engineer suggested installing railings on the roof to ensure inspections could be safely carried out. Also PV systems and the associated metering and monitoring systems may well require fine-tuning to ensure readings are calibrated properly.

Carbon Trust has produced a booklet called “A place in the sun” to address these issues and inform construction clients.

Small Wind Turbines

Small wind turbines generally performed poorly where they were installed on or very close to the buildings. This was typically due to poor local wind conditions and also technical failures of some turbines, which caused significant downtime.

This matches with other more detailed research and field trials undertaken by the Carbon Trust, Energy Saving Trust and BRE on building-mounted small wind turbines and building integrated turbines in particular.

As a result of work in the earlier stages of the project and to encourage clients to investigate their local wind resource before applying for a LCBP grant, the Carbon Trust has produced an online small wind turbine output estimation tool that assists clients to more accurately assess the feasibility of an installation. See http://www.carbontrust.co.uk/emerging-technologies/current-focus-areas/offshore-wind/_layouts/ctassets/aspx/windpowerestimator/windpowerestimatorterms.aspx for more information.

Retrofitting renewables (Phase 2a)

During 2007 to 2010 over 150 businesses and other organisations received grant funding from Stream 2a of the Government’s Low Carbon Buildings Programme to install renewable energy systems. About half of these projects involved retro-fitting the renewable energy systems to existing buildings, or as part of refurbishments, whilst the other half were allocated to new build projects.
At the end of 2010, the Carbon Trust, held in-depth interviews and visited building owners at 15 of the sites that had retrofitted renewable energy systems to their existing buildings, to record what their experiences had been and to understand what lessons and insights could be learnt.

Overall, the vast majority of the owners were positive and were either “very” or “quite” satisfied with the systems they had installed and they felt that their original objectives had been met. Interestingly, several of the businesses had used the renewable energy systems as part of their marketing materials.

Nevertheless, there were still lessons to be learnt and things that they would have done differently. Generally, formally assessing feasibility, setting out requirements and careful selection of an appropriate installer were critical to ensuring a successful outcome. These issues are discussed below.

Selecting an installer and buying a system

Many of the clients had not prepared a formal written brief or outlined a specification of their requirements, but had relied on telephone discussion with potential installers and the installers visiting the sites. As a result, some projects had items added during or after installation, increasing the costs and causing disruption.
A forthcoming Carbon Trust guide will include a procurement checklist to help clients to develop a specification and think through all of the items that might need to be covered.
Two key factors were identified as creating the conditions for a successful project:

- Good client – installer relationships; and
- The ability of the installer to provide good aftercare in the first few months after the installation and to resolve any issues that did arise.

This points to the importance of following up on installer references before appointing them and asking for evidence of their ability to provide good aftercare and support during the first few months of operation at the selection stage.

Managing the installation contract

Another aspect that caused some issues was the management and co-ordination of the installer and other contractors. There were some examples where the installer acted as a main contractor, employing subcontractors, for example in the case of one ground source heat pump installation where the subcontractor dug the trenches for the ground loops. When the subcontractor damaged some buried services, this arrangement worked as the main contractor took responsibility for fixing the damage, at their cost.
In other situations, the installer had worked alongside other contractors on site doing building, plumbing or electrical work. In some examples, these interfaces had been well managed by the client or the client's advisor, but in other instances some elements had been missed, which caused problems which generally added time and cost to the project.

Handing over

After the installation was complete, it was important that the installation, like any building improvement, was properly handed over to the client and their caretaker or facilities staff. This was to ensure that all of the required labelling and

documentation was in place and that staff understood how to operate the systems and carry out basic maintenance checks. Less than half of the sites said they had received training on how to operate the systems. Interestingly, several of those that had received training felt that it was of limited use, as they had not needed to apply the knowledge until several months later when an issue occurred with the system. The Carbon Trust's research suggested that it may be worth videoing or otherwise recording the training session to keep a record of it for future reference. Alternatively, owners may wish to ask installers to provide a refresher training course as part of their price or just to make sure that they are available at the end of a telephone during the first year of operation.

In the absence of actual performance data for such new technologies there is a need to establish operational performance benchmarks for the new system. Such benchmarks can only accurately be set after a year of operation, particularly for heating plant, so it is worth the client considering an extension of the defects and corrections period for new technologies beyond 12 months.

Ensuring best performance

Clients may need to change the way they operate the building after the renewable energy system has been installed. Where renewable heating technologies were used in combination with under floor heating, (e.g. ground source heat pumps and wood chip boilers) clients had to learn how to use the systems in a different way (i.e. they could not expect instant heat from the systems, but needed time to allow the temperature of a room to rise or fall).
Several of the owners that were interviewed were carefully monitoring the performance of their systems, by taking monthly meter readings. Some also had remote monitoring arrangements in place with the installers. However, some of the sites suffered from a lack of monitoring so, although the systems were working, it was hard to know whether they were working optimally.

Overall the surveys showed that installing renewable energy systems on existing buildings can deliver real benefits to owners. However, these benefits will be maximised with careful forethought and research at the early stages of a project, following some simple guidelines when selecting installers, buying systems and paying careful attention to the on-going monitoring and maintenance of the systems.

Overall costs

Whilst overall building cost data is difficult to assess, evidence from some new build projects suggest that the capital cost of low carbon buildings is not significantly more than other buildings and that the cost of low and zero carbon technologies can be lost in the variability of building costs.

Case studies

On one project there were two adjacent buildings, which were originally almost identical in design and size. One building was cost engineered, which simplified the design and reduced the cost by 25% or some £5 million. Operational energy data suggests the lower cost building is performing better than its neighbour, which illustrates the point that low carbon buildings need not be expensive buildings.

4.5 Enabling Technologies and Processes in Low Carbon Buildings

Meters and Monitoring

Energy metering and monitoring systems are a relatively cheap combination of hardware and software that provide vital feedback on building performance. These data are then used to set performance benchmarks for the building and to target areas for improvement. Metering, monitoring and targeting systems are essential for any building that aspires to be cost effective to run and to limit its carbon emissions. The right system will more than pay for itself by saving money and reducing energy waste.
Where metering installers focused on regulatory or BREEAM compliance rather than developing a bespoke metering plan for the building, based on which services were the most important to measure, more meters were installed than were needed to affect performance. The consequent lack of focus on the useful outputs from the system meant that using the systems for diagnostics or performance monitoring took significant effort and in some cases this was not possible at all. In addition there have been problems with design, specification and commissioning of metering and monitoring systems on many of the projects investigated. Heat meters were a particular problem.

Carbon Trust found clients that got actively involved at an early stage to define the objectives of the metering strategy and the required output ended up with well-designed metering systems that delivered useful data that were simple to analyse and spot cost-saving opportunities for the rest of the installation's life. Typically such an installation would pay back within 3 years as shown in Figure 38. However, in most projects there was no comprehensive metering or monitoring strategy. The Carbon Trust's research suggests that building clients do not appreciate the potential benefits of spending a little time up front to specify their needs for metering and monitoring, instead preferring to only meet minimum regulatory requirements.

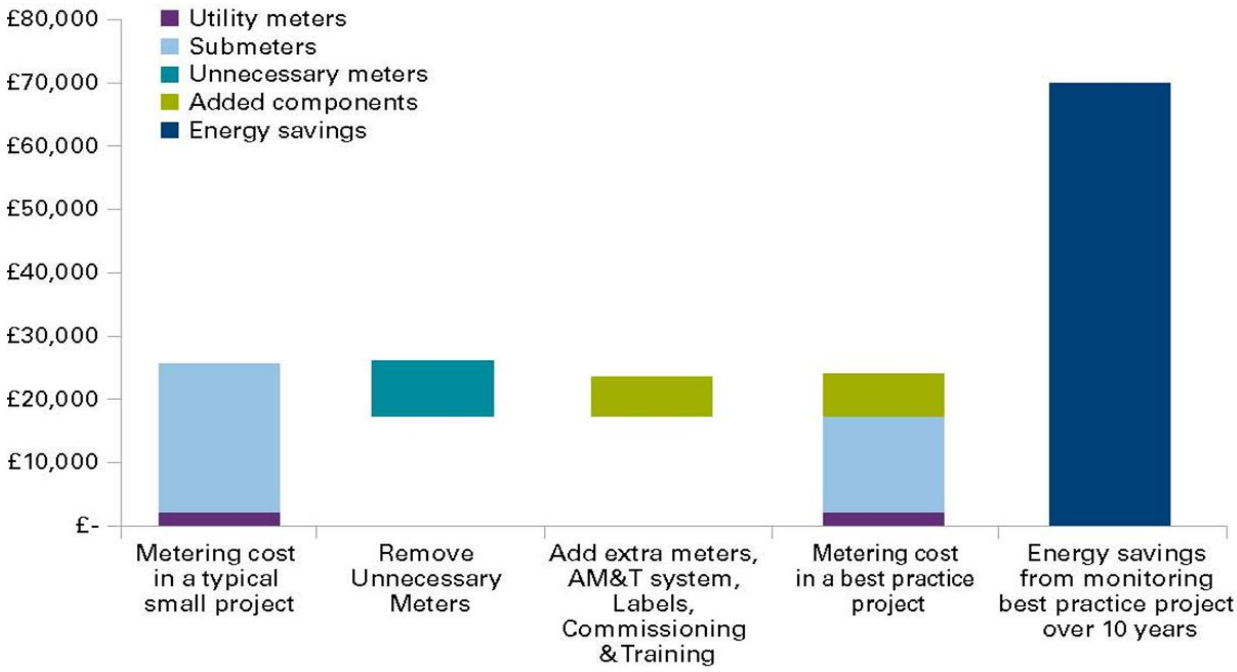


Figure 38 - Comparison of costs between specifying a bespoke vs. an unplanned metering and monitoring system. Note an unplanned system may not enable any savings if the data are too complex to analyse.

Carbon Trust has produced a booklet called “Green Gauges” to address these issues and inform construction clients of the value of effective metering and monitoring.

Case study

At Pembrokeshire College, metering on the solar thermal system identified a fault during the first six months that would probably have remained undetected during the life of the system. On another project building managers didn’t monitor the solar hot water and missed a leak for three months over the summer when the system could have been saving carbon and money.

Control systems

Carbon Trust found that BMS and control systems, whilst capable of saving carbon, were a significant weak point in the energy management strategy and in some cases buildings were failing to deliver anticipated carbon savings.
Problems with building management systems (BMS), sub-system controls, such as lighting controls, and poor user controls contributed to increased energy use in around 50% of projects. This affected HVAC, natural ventilation and renewable energy system performance and led to under-utilisation of their carbon saving potential.

Issues seen include:

- a procurement exercise that resulted in three different systems being installed that were incompatible with each other. Between them they couldn't control the building to the degree that was required to make it a truly low carbon building.

- ineffectual integration of a ground source heat pump into a BMS resulted in the heat pump having to be manually switched off during sunny days to avoid wasting heat produced from the solar thermal installation.

- value engineering of the controls at a project meant that the on-site maintenance team could not alter any setting or interact with the controls allowing 12 months to pass with the ground source heating only operating during the summer.

Carbon Trust has produced a booklet called "Taking control" to address these issues and inform construction clients.

Commissioning and Handover

Commissioning of building systems is a key weak point in delivery of low carbon buildings as > 40% of projects did not properly commission all building systems. In addition all projects required extended bedding-in periods (typically > 1 year) to improve operation & realise benefits of low & zero carbon technologies as no standard benchmarks currently exist for these technologies. Follow-on services to provide fine-tuning and seasonal commissioning should be part of a continuous process. On many projects regular detailed checks of performance data, particularly energy, were not done by FM staff as this was not specified in their contract.
The LCBP showed that buildings that are commissioned well will perform well, and have a greater chance of achieving their CO_2 targets and cost savings. Buildings that are commissioned poorly will use more energy, emit more CO_2, drive up running costs, and annoy their occupants.

In summary commissioning is too important to leave until the last minute, and cannot be rushed, so it should be planned from project inception. An independent commissioning engineer, appointed early by the client, will offer a greater guarantee of success. Carbon Trust recommends that further work is done to quantify the relative costs vs. benefits of commissioning buildings well or poorly as commissioning is an activity that is not currently given priority by many clients.

Carbon Trust has produced a booklet called "Making Buildings Work" to address these issues and inform construction clients.

Case study

At Edge Hill University the client appointed a specialist consultant to oversee commissioning and handover of the Faculty of Health building. The specialist monitored the production of the operational and maintenance manuals. Good co-operation between the commissioning specialist, the services engineers, the main contractor and the sub-contractors resulted in a smooth handover. The specialist had a data-link to the building's controls systems so that they could monitor and operate the building.
The Faculty of Health has average monthly energy consumption lower than ECON 19 and TM46 benchmarks. Carbon dioxide emissions were measured as 31 $kgCO_2/m^2$ per annum.

The importance of structured procurement approach

Standard methods of construction procurement struggle to deliver low carbon buildings as they are intended. All the projects required extended bedding-in periods (typically greater than 1 year) to improve operation, optimise energy performance and realise benefits from low & zero carbon technology. A small number of projects demonstrated benefits of alternative contract approaches. This included the use of a soft landings model at City Academy, Hackney and ESCo models with contractual responsibility for performance of LZC technologies at Woodbrook and Cruddas Park (Riverside Deane).
The common theme that explains the relative success each of these newer models was the involvement of a skilled and engaged team member (e.g. and energy manager) with a long term interest in the operation of the building.

Case studies

Positive outcomes were seen at three projects:

- Ceridigion County Council with their in-house technical estates team that had built knowledge from previous smaller projects.

- One Brighton had Bioregional Quintain which has a green brand and also a planning obligation that includes a year three performance report to Council on whether they have achieved their targets

- Finally Vital Energy’s involvement as an ESCo at Riverside Deane meant they had a contractual interest in the on-going technology performance for a community heating system

4.6 Regulatory Compliance

Building regulations and EPCs

During the LCBP process it became apparent that there may be instances of Building Regulation requirements that are not always comprehensively implemented.

Areas where Building Regulations appear not to be thoroughly implemented or checked include:

- assumptions put into software prediction models;
- metering provision;
- building Logbooks.

Carbon Trust also noted that around a fifth of the buildings had significant errors in their EPC calculations (wrong fuel selected for heating, or wrong floor area).

4.7 Achieving Replication

Towards the end of the LCBP, Carbon Trust was contacted by the Royal Botanical Gardens Kew (RBGK) for some assistance in planning their future energy management. This opportunity to demonstrate the benefits of putting into practice the lessons that were learnt from the LCBP was taken and a report was commissioned providing RBGK with recommendations that were based on these lessons.

The RBGK site is spread out with buildings situated in clusters some distance from each other and it contains some very large buildings that are suitable for growing plants in controlled conditions. Thus, the first recommendation was that further metering and monitoring should be installed and the data collected should be analysed to identify energy saving opportunities and the subsequent (reduced) demand profiles used to inform decisions on what type and scale of LZC plant to install.

The report took account of RBGK's annual budget and planned the implementation of the metering strategy in stages that took account of this and any predicted savings. The report also recommended that the BMS was disconnected from the metering system and that all the meters were linked to a new AMT system as this would provide the energy manager with the most user friendly interface to analyse the data and make adjustments to the BMS. The consultants concerned felt that this measure alone would allow a suitably qualified individual to make savings of up to 40% in the laboratories and glass houses, just by identifying opportunities to implement good practice and translating these into practical control measures.

Finally, the RBGK review looked at financing models. The diverse and dispersed nature of many of the buildings at the site suggested that each building cluster would have its own potential to reduce energy usage by implementing energy efficiency measures and by installing LZC plant. However the consultants recognised the value of simplicity in having a single facilities manager to operate and maintain this diverse portfolio of technologies. Thus the report recommended that RBGK use an ESCo model to contract out the installation and maintenance of the metering solution and the LZC plant to ensure that the difference between predicted performance and actual performance was as small as possible.

4.8 Reflections on the Programme

PERC as a measure for grants

Requiring grant recipients to achieve a given PERC proved to be a useful means to ensure that the (modelled) carbon performance of the buildings was considered throughout the design and construction process. It enabled design teams to review the impact of any changes on the carbon performance of the building, and the risk of losing the LCBP grant certainly focused minds on achieving the target carbon performance.

However, the significant gaps identified between (modelled) design carbon emissions and the (measured) actual emissions of the buildings in-use illustrates the limitation of the PERC approach. For future demonstration or incentive programmes It may be valuable to consider requiring beneficiaries to commit to an in-use carbon performance target. However, carefuly consideration would have to be given to the allocation of risk between clients, engineers and the funders, given the uncertainties inherent in predicting and controlling in-use energy consumption.

Clients

The respective roles of the Energy Savings Trust (EST) and the Carbon Trust (CT) were sometimes confusing to the clients. There were contractual complexities that compromised the Carbon Trust's ability to capture key data, such as cost information – with the clients contracted to EST and its terms, rather than to the Carbon Trust. As a result, Technical Support Consultants (TSCs) were in a weakened position with an indirect relationship with the client, so it was not always possible to gather sufficient data to effectively analyse the performance of the installed technologies. It may be less confusing to participants in future similar programmes for a single agency to deliver such a programme.

Technical approach and process

The process of recruiting 21 TSCs (approximately 14 used on regular basis) from six different consultancies was necessary at the start of the programme to manage the logistics and provide a fair and proper assessment of the all the applications. The process was developed to manage the initial programme application assessment, and the legacy of retaining a relatively large group of TSCs throughout the programme has had both advantages and disadvantages.

Advantages include:

- The sharing of ideas and insights on an individual site basis;
- The opportunity to introduce ideas and issues relevant from different organisations;
- It enabled knowledge sharing within the construction design industry over 5 years.

Disadvantages include:

- The length of time spent ensuring consistency of approach and communicating between TSCs
- Emphasis and core messages were interpreted differently by various TSCs.

Limitations of monitoring

The LCBP has provided the Carbon Trust and wider industry stakeholders with a greater understanding of the construction process for the built environment, where the critical points of intervention are (i.e. refurbishment, and design process specification) and the impact of the various LZC technologies (installation cost and carbon displaced). Much of the dissemination material and insights have been sourced from the 11 projects with 12-months monitored data. However, these 11 projects did not all have comprehensive metering installed and included a wide range of LZC and energy efficiency design features. As a result, the insights and lessons used within the dissemination material have necessarily been based on a limited dataset.

External Factors

The economic downturn of 2008-9 had an adverse impact on a number of LCBP projects, some closing completely and most being slowed down, and thus on the programme overall. Interim deadlines were relaxed by DECC – on recommendation from the Carbon Trust and EST – in order to enable projects to complete installation and commissioning of LZCs. However, the final end date was not extended beyond March 2011, and this reduced the value and impact of the programme as only a

limited period of in-use monitoring could be completed.

Dissemination

Due to the over-running of many projects the dissemination phase of the project has been compressed. Despite this challenge a significant amount of material has been produced and a wide audience reached through the Carbon Trust's website and industry events.

Demonstrating low carbon buildings are a reality

Part of Carbon Trust's remit was to demonstrate that low carbon buildings are a reality. As such Carbon Trust produced video case studies that tell the story of low-carbon developments including the client's motivation, design, technology, construction and operational issues.
http://www.carbontrust.co.uk/about-carbon-trust/case-studies/buildings/pages/default.aspx

Carbon Trust has also created a map of UK case studies of high-performing buildings and supported individual sites' own PR and case-studies.

Explaining the opportunities and challenges of low carbon buildings

As the insights from the monitoring on the projects were collected, it became increasingly clear that it was critical to use the outcomes to help industry understand and explain the opportunities and challenges of low-carbon building design and implementation. So Carbon Trust has produced a series of booklets called "Sharing our experience" highlighting technology, design and project management and operational issues across the programme. They are designed to help construction clients plan, build and manage cost-effective low carbon buildings that really work to save money and carbon. These cover:

- The gap between design and performance (Closing the Gap)
- Low carbon refurbishment (Power Play)
- Commissioning building systems (Making Buildings Work)
- Control systems (Taking Control)
- Natural ventilation (A Natural Choice)
- Meters and monitoring systems (Green gauges)
- Ground source heat pumps (Down to Earth)
- Photovoltaics (A Place in the Sun)
- Biomass heating (Taking the Heat)

In addition Carbon Trust and their team of technical consultants has presented

insights from the programmes to a wide range of industry audiences reaching

several thousand key people at events across the UK including Ecobuild, Sustainability Now and Sustainability Live.

Insights on low-carbon building design and implementation have also been presented to key policy makers at DCLG, DECC and BIS. This has led to input being provided into the Low Carbon Construction IGT report, DECC's Technology Innovation Needs Assessment on non-domestic buildings, the Microgeneration Strategy and formulation of rules around the Renewable Heat Incentive.

Support for new tools for the industry

Beyond the deliverables produced as part of its involvement with the programme Carbon Trust has also provided input, based on these experiences into:

- a new guide called "Delivering the Future, Today – Specifying and Designing Public Sector Low Carbon Buildings – the Productivity Design Approach" produced by Carbon Trust Scotland office (not yet published);
- WRAP guidance and model clauses to help clients and developers ask for carbon-efficient buildings when procuring design, construction and facilities management services. http://www.wrap.org.uk/construction/tools_and_guidance/carbon_efficiency.html

Finally Carbon Trust has archived all project data and created a data index to provide access to data for researchers which has been offered for use through engagement with key UK University research groups.

4.9 Conclusions

The LCBP has been an extremely valuable demonstration exercise, particularly in the data captured during the monitoring phase. The results emphasise the need for a continued focus on innovation in regulation, design, construction, project management, building operation and building technologies to achieve low carbon outcomes in the built environment. In particular there is a need for more demonstration programmes which include monitoring of operational low carbon buildings and which focus on costs vs. benefits of different approaches and processes, as well as technology combinations and contract models.
The requirement for the buildings that applied for grants to be innovative to qualify may have led to increased system complexity. The results from the LCBP show that complex integrated systems are less easy to control than simple systems, which suggests that there is a law of diminishing returns. If this is the case there is likely to be a point at which systems become so complex that they will achieve a limited carbon saving and no cost benefit at all in practice.

Whilst further research would be valuable, the results from the LCBP clearly indicate that complexity adds cost and reduces the likelihood that savings in practice will be close to those predicted during the design phase. It is worth noting that the same conclusion was reached in the Probe studies: “keep it simple, do it well” is a familiar and relevant refrain.

The comparison of building performance data between projects has been essential to spot the trends and make the observations in this report. However, the data set for the LCBP was limited and much more data are required to give further significance to these observations and to quantify the relative costs vs. benefits of some of the issues raised. This data could be more easily collected if operational performance information (including meter data) for public buildings was made available for comparison online, and if basic data on the energy performance of all commercial buildings was required to be made available.

These data would enable the following beneficial activities:

- further research into the causes of good and poor building performance;
- financial analysis of the costs and benefits of different combinations of LZC technologies;
- better information for use in procurement of facilities management services and by contractors when diagnosing issues on site;
- a continuous incentive to actively monitor building performance, both for the client (for cost control and reputational reasons) and for the facilities management contractor (for competitive reasons).

SECTION 5

MINOR FUNDING STREAMS

Mike Gardiner – DECC

Section 5 Minor Funding Streams – Contents

5.1 FUEL POVERTY STREAM

The Government has a statutory commitment to, as far as is practicable, end fuel poverty in vulnerable households in England by 2010 and in all households in England by 2016. DECC established a pilot fuel poverty workstream within the Low Carbon Buildings Programme ("LCBP") to examine the merits of using microgeneration technologies to support the fuel poor. This pilot established clear benefits of using the LCBP to assist fuel poor households in terms of lowering fuel costs and adopting a bulk purchasing and installation approach.

Grants were offered to three Regional Authorities; Yorkshire First (£500,000), One North-East (£500,000), East of England Authority (£1,000,000) and the Welsh Assembly (£1,000,000)

Financial Summary

The Fuel Poverty Programme funded the following:

Technology	Units	Cost £
Solar Thermal	65	136,500
Air Source Heat Pumps	635	2,124,592
Solar Photovoltaics	61	388,418
Solid Wall Insullation	54	351,000
Contribution		-918
TOTAL		**2,999,592**
Underspend		408

One North-East & Yorkshire First

One North-east and Yorkshire First cooperated in their delivery and entered into a contract with Community Energy Solutions CIC (CES) of Boldon, Tyne & Wear for the delivery of the Project.
The Project aimed to deliver community-based microgeneration and mains gas connections projects to non-gas communities in deprived areas in Yorkshire and Humberside, including packages of cost-effective domestic energy efficiency, heating and other measures (benefits entitlement checks etc.). The project must cover both rural and urban settings within the Government Office Yorkshire and Humberside geographic area.

The Grant is for capital expenditure, and was used for the purchase and installation of microgeneration technologies for space-heating. The Grant was only used for

products and installation companies certificated under Microgeneration Certification Scheme. More information on the scheme is available on the website: http://www.microgenerationcertification.org/

The Project sought to deliver affordable warmth improvement measures to approximately 120 households, including 100 domestic micro-renewable heating systems, by 31 March 2011.

The core funding for the Project consisted of the £500,000 Grant for One North-East and £500,000 for Yorkshire First.

The combined funds from DECC and YF were used as a basis for attracting additional funding and in-kind support from sources such as the Carbon Emissions Reduction Target, gas distribution network companies, gas and electricity suppliers, gas transporters, and any other appropriate organisations or funding sources to meet the anticipated total funding for the project.

In total, the project delivered the equipment and delivery costs for 110 Air sourced Heat Pump systems.

East of England Authority (EEAA)

Tendered and placed orders with Mitsubishi for 440 Ecodan (2 sizes) ASHP units and 60 Daiken (split system) units. These orders come to the £1M and covered the capital cost only
EAA signed SLAs with Local Authorities & Housing Associations for 350 units and are seeking to deploy the remaining 150 units they will have available (meetings with potential recipients are still ongoing). Installations were contracted to 4 MCS approved companies who have also undergone an OJEU process (Mitie, Dodd Group, Eagaheat, CHN).

The LAs and Housing Associations are responsible for gaining Planning Permission - this varies across the region (some concerns from Environmental Health Depts on noise levels). They also confirm to us that the tenants are in Fuel Poverty.

As at 15th March 2011, 23 units had been installed and the remainer are being installed in a rolling programme throughout the remainder of 2011

An under spend of £408 was declared on the grant offer.

Welsh Assembly

The money was rolled into the Assembly Government's £30m Strategic Energy Performance Investment Programme – ***arbed***.
The arbed programme covers a range of area-based, home energy efficiency and renewable energy retrofit projects. These projects support low income, fuel poor households in deprived communities.

WAG approved a portfolio of area-based, home energy efficiency and renewable energy schemes, to be funded predominantly from its Strategic Capital Investment Fund (SCIF) funded ***arbed*** budget as well as the £1m from the DECC Low Carbon Building Programme .The total £30m ***arbed*** budget has now been allocated in full to 28 schemes, with final project delivery by 31 March 2011.

The ***arbed*** budget for this portfolio of schemes is £30m.

WAG estimated that significant leveraged funding is being invested alongside the ***arbed*** budget - primarily from social housing providers, councils and energy companies.

Social housing providers and councils took advantage of the cost savings and economies of scale offered by ***arbed*** schemes to realign / bring forward their budgets for maintenance, housing renewal, neighbourhood support, etc – this investment is enabling homes to receive multiple energy efficiency measures alongside boiler upgrades and replacements, window upgrades, roof extensions, structural work and energy saving advice.

WAG estimated that the ***arbed*** budget of £30m will support around 6,500 households in Wales. They estimated that the additional investment of £25m enhanced the support offered to the 6,500 households and supported a further 1,500. In total, they estimated that around 8,000 households would be supported as a result of this ***arbed*** portfolio of schemes.

The £30m ***arbed*** investment is split roughly evenly between, on the one hand, external wall insulation and, on the other hand, micro-generation and fuel switching / gas connections. It will deliver approximately £6m solar PV, £3.5m solar hot water, £1m air-source heat-pumps, 1.65m fuel-switches/gas connections and 17m external wall insulation although this may change around the margins as projects are being delivered.

The DECC element of the grant was to deliver affordable warmth improvement measures to 500-1000 householders, by 31 March 2011 - the exact number of households, and the exact nature of the microgeneration measures, would be determined by whatever is most appropriate and cost effective for the households involved in the project.

Measures attributed to £1m LCBP funding:

Technology	LCBP contribution to total cost	Number of installations	Overall cost
Solar Hot Water	£2,100	65	£136,500
Air Source Heat Pumps	£5,000	25	£125,000
Solid Wall Insulation	£6,500	54	£351,000
Solar PV (not FIT eligible)	£6367.5	61	£388,418
Total		**214**	**£1,000,918**

5.2 Microgeneration Testing and evaluation Programme.

Wind Testing Facilities

In 2009 approval was sought to utilise up to £550,000 of LCBP funding to support the establishment and development of new micro wind turbine Test Pads at Myres Hill Test Site and run an R&D Project to examine testing and certification requirements under the Microgeneration Certification Scheme (MCS) for Micro Wind turbines and to explore opportunities to streamline the process without losing the robustness of the standards.
It involved the design, build and commissioning of ten fully functional small scale test pads at the Myres Hill test site in Scotland.

These built upon existing test pads owned by NEL to significantly increase and enhance the UK's testing and certification capability.

In addition to the test pads, wider improvements were planned under the project to enhance the test infrastructure that will support testing and certification during the project, including:

- Site data communication infrastructure and facilities
- Refurbishment of roads and tracks on the site to aid accessibility to the test pads
- Creating additional hard core areas for safe crane lifting operations
- Providing a portable site building to accommodate visitors to the site, with access to office facilities, water and power
- Enhancements to site
- General facility improvement

Additionally, a further £200,000 was made available to examine the testing and certification requirements with a view to simplify the process whilst maintaining its robustness. As a result 15 micro wind turbines were installed and tested against the MCS micro wind turbine standard. The testing process was carefully monitored for each turbine including pre and post test activities.

Support for participants who meet all relevant criteria was set at £7,750 for testing and £1,800 for certification.

The qualifying testing and certification activities had to be completed satisfactorily in order to receive support.

The maximum support that could be paid out was calculated as £127,750. A summary of this amount and the status at 1st July 2011 is presented below:

COMPANY	£	STATUS JUNE 2011
Eclectic Energy Ltd	9,550	Turbine failed in high winds
Evoco Energy Ltd	9,550	In process of checking all conditions met & arranging payment
Vertical Wind Energy	9,550	Testing in progress
Evance	1,800	In process of checking all conditions met & arranging payment
Proven Energy	9,550	Testing in progress and nearing completion
Maassen Teo	9,550	Turbine not working
Endurance Wind Power Inc.	1,800	Testing status unknown
Renewables Devices Swift Turbines	9,550	Company in Receivership
Bryan J Rendall (Elect) Ltd	9,550	Testing completed - certification nearing completion
NHEOLIS	9,550	Deadlines for installation not met
Quiet Revolution Ltd	9,550	Testing Completed
Ampair Ltd	9,550	Testing completed - certification in progress
API Engineering Ltd	9,550	Turbine not working
Blue Flag Ltd	9,550	Testing nearing completion
Gaia-Wind Ltd	9,550	Testing completed and product certified
TOTAL	**127,750**	

Overall the funding was:

	Grant Value	Actual Spend
Test facilities	550,000	520,969
R&D Programme	200,000	196,374
TOTAL	**750,000**	**717,343**

In May 2011, an independent appraisal of the facilities was conducted by Optimat Limited 'MCS R&D Project - Due Diligence, May 2011 (confidential report) and concluded:

- ‘Substantial development in the UK’s small wind turbine certification testing infrastructure has been completed at the Myres Hill testing station, with the construction and commissioning of ten new DECC funded test pads. The overall facility has been significantly enhanced with on-site communication networks, safe hard surfaced lifting areas, improved access roads and on-site buildings for visitiors. Continued controlled management of the site is recommended for security reasons, commercial sensitivity and effective management of the test pads.

- Results to date from Myres Hill suggest that small scale wind turbine manufacturers obtained significant benefits by offsetting costs (eg 14%-20% reduction) associated with testing and certification from the independent UKAS third party test facility. However, further evaluation of the project results will be required before the benefits can by fully quantified.

Solar Thermal Field Trials

In budget 2009, additional funding amounting to £175,000 to support EST’s work on Solar Thermal Field Trials was made available utilising funding from the Low Carbon Buildings Programme (LCBP).

The project aimed to complete its first large scale field trial of in-situ domestic solar thermal water heating systems in the UK.

This field trial was a key component of the EST’s portfolio of microgeneration and low carbon technology field trials designed to inform DECC policy, industry and consumers alike.

The objective of the field trial was to measure the in-situ performance, under normal operating conditions, of a sample of existing solar thermal installations in UK homes. The data collected will allow for the calculation of the seasonal performance and an indication of realistic carbon savings from each installation monitored.

Field trial can support the monitoring of approximately 70 installations for one year. However, due to the wide range of domestic solar thermal products available to consumers, the EST recommended that a sample size well in excess of 100 properties was be required.

5.3 OTHER FUNDING STREAMS

Clear Skies and Major PV Extension Programmes.

At the start of the LCBP Programme in April 2006 (then part of the former DTI), the Government BIS) was lobbied by industry to provide continuity between the existing Clear Skies and Major PV Demonstration programmes and the commencement of the LCBP Programme. £1.5 million of the initial LCBP 'pot' (£0.75 million for Clear Skies and £0.75 million for major PV) was ring fenced to provide that continuity.

The final reports for both these programmes indicated large under spends' Since both programmes had a under spent, the additional £0.75 million was unspent on each programme.
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£	Budget	Spent	Under Spend
Major PV Demonstrator	750,000	0	750,000
Clear Skies	750,000	0	750,000

Clear Skies was managed by BRE and Major PV by EST.

There was some 'legacy' complaint work for Clear Skies and Major PV Demonstration programme which continued up to late 2009. These costs were absorbed in LCBP-1 administration costs and are not accounted for separately.

Microgeneration Certification Scheme (MCS)

In FY2008/09, no separate budgets were created for the evolution of the Microgeneration Certification Scheme (MCS) as certification was then an integral part of grant programmes. MCS was a step change in certification from previous certification schemes. Government support for MCS was on the basis that the scheme would move to a self-financing model in the short to medium term. Discounts were offered to installation companies to support first year costs. The costs for MCS were which was funded as programme from LCBP-2 (these are accounted for in LCBP-2 admin fees which are consequently over spent)

Low Carbon Communities Challenge (LCCC)

In FY2010/11, £100,000 was taken from LCBP-2 as capital for the Low Carbon Communities Challenge. This is accounted for from LCBP-2e Contract Variation-4.

6. GLOSSARY

The following abbreviations have been used throughout this report to refer to the various phases and streams of the LCBP.

LCBP-1: Phase 1 householder stream, launched in May 2006 and administered by EST

LCBP-1c: Phase 1 communities stream, launched in May 2006, administered by EST

LCBP-1(2a): Phase 1 Stream 2a with medium-scale projects, launched in November 2006, administered by EST

LCBP-1(2b): Phase 1 Stream 2b with large-scale projects, launched in Octoberr 2006, administered by EST

LCBP-1e: Phase 1 householder extension, launched in July 2009, administered by EST

LCBP-2: Phase 2 non-domestic stream, launched in 2007, administered by BRE

LCBP-2e: Phase 2 non-domestic extension, launched in July 2009, administered by BRE

Fuel Poverty Stream: Grants issued to One North-East, Yorkshire First, East of England Authority and the Welsh Assembly

Major Dissemination Programme (LCBP-1 (2b) Lessons Learned: Support and advice programme to a number of exemplar projects throughout the design, installation and operation to allow real issues to be evaluated and real performance to be measured against the design criteria and to publish the various outcomes in various formats. The programme was run by Carbon Trust

Wind Test Equipment: A grant given to TUV NEL Limited to provide new wind turbine test facilities and to support manufacturers in gaining Microgeneration Certification under the MCS.

Clear Skies and Major PV Demonstration Extension Programmes: pre-cursor programmes to LCBP run by BRE and EST with funding through the early stages of LCBP inception to provide continuity of grant availability.

Solar Thermal Field Trials: support give to a field trial programme run by Energy Saving Trust

Microgeneration Certification Scheme (MCS): funding available through BRE for installer accreditation under the developing MCS scheme. Note that MCS accreditation for equipment and installation became a pre-requisite for grant funding

under LCBP. These cost were absorbed into LCBP-2 management and administration charges.

Low Carbon Communities Challenge(LCCC): funding that was available to a number of community projects under LCCC that were under-risk due to lack of funding. This was a one-off payment and was managed by LCCC management.

State Aid: LCBP-1 streams 2 were cleared by the EC under State Aid Rules. This meant that businesses ('undertakings') sould be funded without the requirement to meet de minimus rules. All under funding streams under LCBP were subject to State Aid Regulations in the normal course of events.

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