

## **Developing Scotland's LCBE - Phase 2 Report**

Prepared for: Scottish  
Enterprise

January 2010

BRE Report 255880

**Prepared by**

---

Name        Dr D J Kelly

Position     Principal Consultant

Signature

---

**Approved on behalf of BRE**

---

Name        Laura Birrell

Position     Associate Director

Date

Signature

---

BRE Scotland  
Kelvin Road  
East Kilbride  
Glasgow, G75 0RZ  
T + 44 (0) 1355 576200  
F + 44 (0) 1355 576210  
E eastkilbride@bre.co.uk  
www.bre.co.uk



This report is made on behalf of BRE. By receiving the report and acting on it, the client - or any third party relying on it - accepts that no individual is personally liable in contract, tort or breach of statutory duty (including negligence).

## Contents

1	Introduction	1
2	Task 1 - Technical development and demonstration asset network	3
2.1	Mapping Scotland's low carbon test and validation infrastructure	3
2.2	Identifying users of the current infrastructure	3
2.3	Identifying gaps in testing infrastructure	4
2.3.1	Validation of performance in 'whole house' applications	5
2.3.2	Test protocol for renewable technologies	6
2.3.3	Validation of new material parameters	6
2.3.4	Integration of new technologies	6
2.3.5	Durability of new materials	7
2.3.6	Effectiveness of retrofit measures	7
2.4	Solutions for removing gaps in testing infrastructure	7
2.5	Impact of the solutions identified	8
2.6	Identify ways to promote test and validation infrastructure	8
2.7	Conclusions	9
3	Task 2 - R & D network	10
3.1	Identifying Scottish academia capability in the low carbon sector	10
3.2	Identifying Scottish companies involved in the low carbon sector	10
4	Task 3 - Investigating the industry needs and demand for innovation support	12
4.1	Identifying key players for driving innovation	14
4.2	SE Interventions	17
4.2.1	Information exchange	17
4.2.2	Advisory service	17
4.2.3	Innovation den	17
4.2.4	Information hub	18
5	Task 4 – Demand driven support model	19
5.1	Pre-Commercial Procurement Model	19
5.2	Swot analysis of housing associations issues in the LCBE	19
5.3	Opportunities for SE to support housing associations	19
5.3.1	Proto-type for Scotland-wide use	19
5.3.2	Develop technological solutions	21
5.3.3	Tenant agreement	21
5.3.4	Develop a centralised resource	22
5.3.5	Develop Eco-homes style assessment as a benchmark	22
5.3.6	Develop a "Go-Compare" style website	22
5.3.7	Support housing associations to influence product design	23

5.3.8	Up-front loan for developing low carbon housing	23
5.4	Case Studies of Current Housing Association Projects	23
5.4.1	Dumfries and Galloway: Replacement Heat Project	23
5.4.2	Cumbernauld Housing Partnership: Heating & External Fabric Upgrade	23
5.4.3	Dumfries and Galloway Housing Association	24
5.4.4	Clyde Valley Housing Association: Utilities	24
5.5	Discussion	24
5.6	Recommendations	25
6	Conclusions	26
Appendix 1 – Mapping Scotland's low carbon test and validation infrastructure		
Appendix 2 – Scottish-based companies involved in the LCBE		
Appendix 3 – Consultation feedback from the industry		
Appendix 4 – Copies of pro-formas received by BRE		
Appendix 5 – Supply chain database		
Appendix 6 – Housing association workshop attendees		

## 1 Introduction

BRE have been investigating Scotland's developing low carbon built environment (LCBE) as part of a project commissioned by Scottish Enterprise. Phase 2 of this work is looking at what R&D and testing infrastructure is available in Scotland and who are its users. Specific issues for investigation are as follows:

### Task 1 – Technical development and demonstration asset network

- Map current low carbon built environment test and validation infrastructure in Scotland; summarise skills and services available to users, and related costs.
- Identify users of the current infrastructure.
- Identify gaps in testing infrastructure in Scotland, benchmarking nationally and internationally, and assess impact of gaps, quantifying market failure where possible.
- Propose a range of potential solutions for the gaps identified, and assess their relative impact.
- Identify ways of promoting test and validation infrastructure to a range of potential users, and identify options for supporting usage.

### Task 2 – R&D Network

- Identify and assess Scottish academic capability in relation to the LCBE.
- Identify Scottish companies currently involved in research projects relating to the LCBE.
- Identify companies with potential to become involved in potential future SE initiatives relating to collaborative R&D in the LCBE.

### Task 3 – Supply chain innovation support

- Investigate the industry needs and demand for the collaborative innovation support.
- Identify key players that may drive the innovation within the industry through the collaborative work.
- Advise on how SE interventions can impact on this area of work.

### Task 4 – Demand driven support model

- Develop ideas to integrate LCBE customers and their requirements with the innovation support programme.
- Evaluate the potential of the social housing sector to pilot this demand led approach.
- Identify key players in the development of social housing.
- Advise on work currently underway in relation to the LCBE and social housing in Scotland.

- Develop proposal to utilise social housing provision to drive innovation and economic impact.
- Advise how SE interventions can impact on this area of work.
- Map process of procurement in social housing in Scotland.

These topics will be assessed and reported in the following sections of this report.

## 2 Task 1 - Technical development and demonstration asset network

### 2.1 Mapping Scotland's low carbon test and validation infrastructure

BRE has prepared an interactive Powerpoint presentation which maps the low carbon test and validation infrastructure in Scotland. This mapping exercise was completed using information which is available within the public domain. The findings are presented in Appendix 1. The actual skills set and the cost of testing using the facilities identified has not been determined. This would involve contact with each of the organisations identified in the mapping exercise.

### 2.2 Identifying users of the current infrastructure

Using an online questionnaire, BRE has identified 187 organisations that develop, supply or procure low carbon products and/or services. A report describing the findings from this questionnaire has been developed and reported to SE as part of the Phase 1 outcomes. 13 of these organisations describe their position in the supply chain as that of research and development. Overall a total of 101 organisations practice some type of research and development related to low carbon products and/or services irrespective of their position in the supply chain.

Figure 1 shows who if any one these organisations collaborate with when undertaking their research and development.

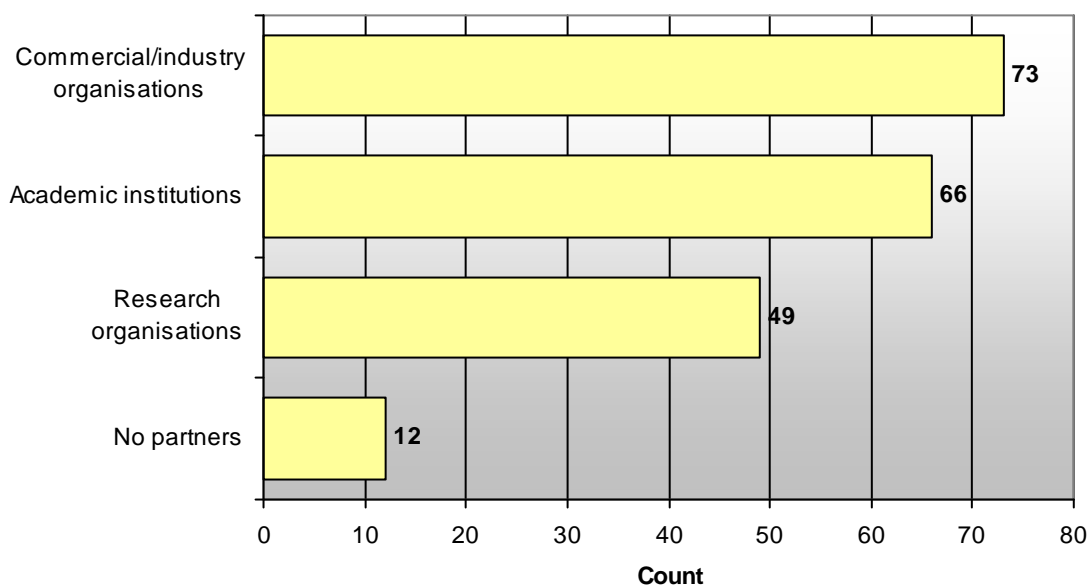
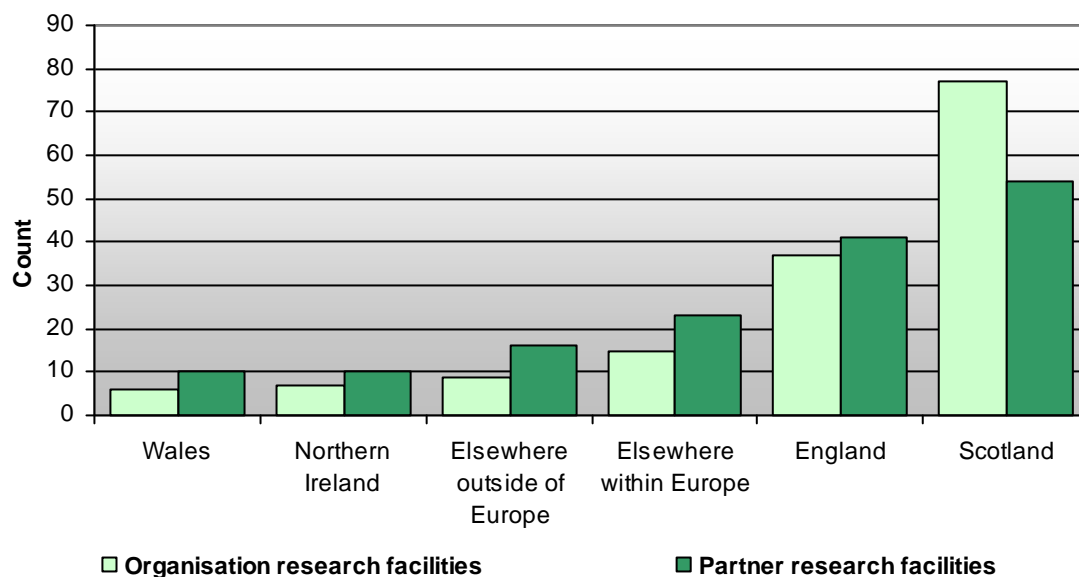


Figure 1. Types of research partner.

Of the 101 organisations undertaking research and development 88.1% do so in collaboration with a partner of some sort. Figure 2 shows the location of the organisations research facilities, as well as those of any partners that they work with.



**Figure 2. Location of research facilities.**

By far the most common locations in which to find research facilities are Scotland and England. Just under one third (31.9%) of organisations have research facilities in two or more locations, one of which in all but four cases is Scotland.

A breakdown of which companies are involved in research in the LCBE sector is given in Appendix 2.

### 2.3 Identifying gaps in testing infrastructure

The testing infrastructure available in Scotland can be generally categorised as being related to the following:

- Structural testing
- Materials testing
- Technologies testing

Structural and material testing is traditionally focussed on determining the strength and durability of products in relation to how they will perform under varying conditions and structural loading. Historically, these facilities were located in Universities and dedicated test centres and supported the industrial manufacturing industry.

Within the built environment, much of the focus of testing has been on materials, their properties, performance and durability. This had led to significant work within the area of building performance through computer simulation and experimental work.



The knowledge of material properties is important for calculation of U-Values and other parameters which inform their performance. However, recent changes in calculation procedures have moved away from an elemental method, where U-Value calculations were used. As buildings, their materials and utilities have become more complex, the calculation of energy consumption of the 'whole building' has become the common approach. This takes recognition of the interaction between materials, utilities and technologies which work together to inform the overall energy performance.

The current testing infrastructure in Scotland, and indeed throughout the UK, is not established to measure and assess the contribution of individual products and materials in a whole house energy measurement. This is being done through computer simulation, however, an accepted protocol or test procedure has not been established. This is further complicated by the absence of standard build systems that have been developed or accepted as solutions for zero carbon buildings. Many examples of zero carbon buildings exist in the UK, however these are developed as bespoke designs or demonstrations.

The consequence of this is a lack of validation of designs after the building has been completed. Until the role of new products, materials and technologies are assessed and proven in post-completion monitoring, a lack of credible data on their performance will be available.

Therefore, gaps in Scotland's testing infrastructure in relation to low carbon materials and products have been identified. The services listed below are not currently available in Scotland and would be required to assist the development of Scotland's LCBE:

- Validation of performance of new materials in 'whole house' applications
- Accepted test protocol for renewable energy technologies
- Validation of new materials parameters in laboratory tests
- Integration and performance of new technologies
- Durability of new materials and products
- Effectiveness of retrofit measures applied to existing buildings

These 'gaps' in testing infrastructure could be addressed by developing and/or encouraging standardised methods of assessment. Each of these gaps could be addressed individually as follows:

### **2.3.1 Validation of performance in 'whole house' applications**

Building energy calculations are currently carried out using a 'whole house' calculation methodology which is commonly assessed using computer simulation. The simulation procedure does not take into account practicalities of site assembly, workmanship or variations in material properties. Consequently, the 'as built' building performance may vary greatly and this will be an important factor is the zero carbon target is to be achieved.

Post occupancy evaluation projects are currently being undertaken for BREEAM rated buildings, however, this has not extended to the domestic market, primarily due to the fact that zero carbon houses are not being developed en masse. Sample testing of building performance, post construction and following an agreed protocol would give confidence to the industry and clients that new products and technologies are successfully and effectively integrated into new buildings.

Test protocols could include existing methods, but offered within an assessment package. For example, air tightness testing and infra-red thermography would be relatively straightforward ways of carrying out a general assessment of construction. In addition to this, energy monitoring could be undertaken over a defined period, again using selected buildings, to determine the effectiveness of energy technologies and controls.

### **2.3.2 Test protocol for renewable technologies**

Renewable energy devices are currently assessed against British and European Standards. The tests associated with these products are not available in Scotland, and much of the product testing is carried out in mainland Europe. This is partly a consequence of the absence of related manufacturing in Scotland and the UK.

The Scottish Renewables Forum have identified an opportunity for renewable heat and associated technologies in Scotland, as the country moves towards the ambitious targets set by Scottish Government. There exists an opportunity in Scotland to develop the manufacturing base associated with the technologies required for renewable heat.

There is also the opportunity to develop a test protocol for renewable technologies which should be based in on-situ performance. This protocol could check the installation procedure (already covered by schemes such as the Microgeneration Certification Scheme (MCS)) and also the in-situ performance.

### **2.3.3 Validation of new material parameters**

Manufacturers of new materials are placing increasing emphasis on the thermal performance and sustainability of their products. This may lead to new ways being developed to assess and validate the performance of materials which have not been used extensively in buildings until recently. The lack of historical performance data for new materials, which can be sophisticated in their operation, has often led to mis-information being presented to the industry.

This, in turn, leads to scepticism around the performance of new products and the actual thermal performance benefits they may provide. This is compounded by the lack of a commonly accepted methodology for assessing and measuring the sustainability of new materials and products. There are assessment methodologies that have been developed, however these are not reinforced by a standardised approach.

### **2.3.4 Integration of new technologies**

More and more new technologies are being developed to assist in the control and performance of building to improve energy efficiency and reduce carbon. The integration of these technologies in new and existing buildings is becoming more common, however their in-use performance is not backed up with a wealth of historical data. The integration of new products and technologies into buildings and optimising their performance is an area which will be developed and adapted in the coming years as the focus on energy efficiency becomes increasingly important.

The stand-alone performance of new technologies is often well documented, however their integrated performance is not often understood or monitored over long periods.

### **2.3.5 Durability of new materials**

The durability of materials and products are often not assessed as part of thermal performance testing or sustainability assessment. The harsh nature of the Scottish climate can be a demanding environment for materials and products to endure. The durability of these products has to be sufficient to allow them to perform over the lifetime of the building and under harsh climatic conditions. Information on the durability of new materials and products is often unknown and untried.

### **2.3.6 Effectiveness of retrofit measures**

Retrofitting existing buildings to meet increasing energy standards is, perhaps, a greater challenge than designing new-build solutions. Designing systems and building elements to operate a high thermal efficiency levels is often difficult when applied to buildings of inherently poor quality and insulation levels. Additional restrictions due to space and/or external finishes can further complicate the application of retrofit solutions.

In recent years, retrofitting measures have focussed on a combination of heating system upgrades, external insulation and replacement windows. This has provided significant benefits to occupiers in relation to thermal efficiency and running costs. The additional steps towards low and zero carbon performance is a greater challenge and will include the utilisation of technologies, some of which have not been extensively trialled and tested to date.

## **2.4 Solutions for removing gaps in testing infrastructure**

Specific solutions for removing the gaps in testing infrastructure that have been identified in Section 2.3 have been described. The gaps identified can be loosely grouped as relating to the following issues:

- Lack of information
- Immaturity of the market
- Client or customer demand.

In order to address these gaps, potential future frameworks and support platforms have been suggested during consultation with the industry.

Information on testing facilities available in Scotland is often not widely known within the industry. This can have an affect on the perceived support for the industry in developing new products for the market. The creation of a central hub or platform, which could act as a one-stop-shop for the industry to engage with research and testing facilities, should be considered. This would help to overcome issues relating to awareness of what testing and product development support is available in Scotland. It would also bring the industry and academia closer together.

The central support hub could also provide case study material on products that have been involved in testing in Scottish facilities and/or been awarded financial support through the available funding streams. This dissemination of 'success' would help to raise awareness within the industry in what working partnerships have been developed and the potential to engage with similar opportunities.

A coordinated approach to innovation support could be provided by an Innovation 'pipeline'. A similar system has been developed by BRE Ventures in which innovative products or 'ideas' are assessed by independent experts to identify their validity and potential funding support. An innovation support system

would allow product and technology manufacturers to identify potential test/development partners and funding streams. This would also help to overcome some of the barriers to the development of new products that have been identified throughout this work.

In addition to this central support mechanism, measures should be taken to incentivise the use of new products and technologies that can assist in the development of low carbon buildings. Incentives could be included in National or regional guidance in which the use of new technologies can be awarded grant funding or other financial benefits to encourage their implementation.

From the industry consultation that has taken place throughout this research, a common theme has been the requirement for demonstrations of good practice and for innovative products. Manufacturers, specifiers and clients have expressed a desire to see new products and technologies operating within buildings, as part of a move towards greater awareness and dissemination of innovation. Demonstrations of these products within occupied buildings and/or dedicated demonstration facilities would further promote the use of innovative products within the industry.

## **2.5 Impact of the solutions identified**

The impact of the solutions proposed for removing gaps in testing infrastructure are as follows:

- Increased awareness of the R&D / test / validation services available in Scotland
- Clear indication of the variety and range of funding support available
- Closer relationships between the industry and academia
- Co-ordinated approach to the low carbon challenge
- Maximisation of Scotland's potential in meeting the low carbon challenge.

## **2.6 Identify ways to promote test and validation infrastructure**

Increased awareness of test and validation infrastructure will undoubtedly contribute to greater utilisation within the industry sectors. The promotion of test facilities and increased awareness of possible industry support will assist in driving the industry to develop new and innovative solutions.

A central hub, or information platform, has been suggested as being central to developing greater links between industry and test and validation infrastructure. The hub could operate a variety of functions and could be built upon existing facilities such as the Scottish Construction Centre (SCC).

The hub could also host the innovation support pipeline and provided details of events, partnering and networking opportunities that could be used by the industry. Case study information on successful collaboration and funding could also be posted on the hub which would not only promote the infrastructure that is available, but also illustrate the role of the hub in reducing fragmentation.

A consistent barrier to the utilisation of test and validation infrastructure is the cost associated with developing and commercialising new products. Creating a demand for innovative products through financial or legislative incentives will encourage greater utilisation of testing infrastructure and further stimulate the awareness of such facilities throughout the industry.

Addressing the funding application process and the duration of funding proposal assessment will also encourage the industry to engage with test and validation facilities. A pro-active approach to raising awareness of funding opportunities and the processes involved in applications would also act as a stimulus. This could form part of a wider awareness raising programme through workshops / seminars and online notifications.

## 2.7 Conclusions

BRE has been looking at what testing infrastructure is available in Scotland and who are its users. As part of this work BRE has completed the following tasks:

- Mapping of the current low carbon built environment test and validation infrastructure in Scotland; summarising skills and services available to users.
- Identified users of the current infrastructure in Scotland which has looked at specific companies and contact details of individuals.
- Identified six specific gaps in LCBE testing infrastructure in Scotland.
- Proposed a range of potential solutions for the gaps identified, and assess their relative impact.
- Identified ways of promoting test and validation infrastructure to a range of potential users, and identify options for supporting usage.

BRE has been looking at what R & D activity and facilities are available in Scotland and who are its users. As part of this work BRE has completed the following tasks:

- Noted and described Scottish academic capability in relation to the LCBE.
- Identify Scottish companies currently involved in research projects relating to the LCBE.
- Identify companies with potential to become involved in potential future SE initiatives relating to collaborative R&D in the LCBE.

### **3 Task 2 - R & D network**

#### **3.1 Identifying Scottish academia capability in the low carbon sector**

Scottish Universities have a long tradition in research and the development of intellectual property relating to the built environment. This has developed in to world-leading research centres being developed within institutions. Academic activity in the LCBE area is widely disseminated through journal and conference publications, and increasingly through existing networks.

The current standing of these research centres in terms of their quality of output is measured through the Research Assessment Exercise (RAE). A list of Scottish Universities' ranking within this assessment is given in Table 1.

One of the most active and prestigious institutions operating in the LCBE is the Energy Systems Research Unit (ESRU) at the University of Strathclyde. The primary LCBE expertise within ESRU is generally seen as being building simulation through ESP-r and the design and test of new types of energy efficient building services systems. The group has a number of experienced members researching and providing consultancy on a wide range of low carbon, renewable energy and support technologies. The Scottish Energy Systems Group (SESG) is the dissemination and feedback forum for the group's activities and projects and has over 60 industrial partners from Scotland and abroad. Recent projects range from internet enabled monitoring and control of buildings, data monitoring and analysis of a heat pump trial in social housing homes of West Lothian Council and the demonstration of a proposed domestic energy model for Korea. This highlights the multi-disciplinary expertise within the group and the range of projects and testing and development facilities available which are directly relevant to LCBE.

#### **3.2 Identifying Scottish companies involved in the low carbon sector**

Scottish companies involved in the LCBE have been identified through the survey questionnaire, BRE contacts, and other related projects such as the BRE Innovation Park. A list of these companies is given in Appendix 2.

**Table 1. Scottish Universities which were awarded a 'world class' (or 4 star) RAE rating.**

University	Research area	Percentage of activity given a 'world class' (RAE 4*) rating
University of Dundee	Civil engineering	15%
	Architecture and the built environment	5%
University of Edinburgh	Architecture and the built environment	25%
University of Glasgow	Civil engineering	15%
Glasgow Caledonian University	Architecture and the built environment	15%
Heriot Watt University	Civil engineering	5%
	Architecture and the built environment	10%
Edinburgh Napier University	Civil engineering	5%
	Architecture and the built environment	5%
Robert Gordon University	Architecture and the built environment	10%
University of Strathclyde	Electrical and electronic engineering	15%
	Civil engineering	5%
	Architecture and the built environment	5%

The information below indicates how much of the research activity (as a percentage) was awarded a RAE 4\* rating.

#### 4 Task 3 - Investigating the industry needs and demand for innovation support

The Scottish construction industry is facing economic and performance challenges in the coming months and years. Although the precise details of these challenges are somewhat unknown, many sectors within the industry are beginning to position themselves to develop new products and technologies which will meet these challenges. This has resulted in 'pockets' of activity within the sector which are pro-actively meeting the challenges of the low carbon built environment.

Much of the financial and business support required to develop new products and technologies comes from the industry itself. Scottish Enterprise is keen to identify the demand for support from the industry and to assess how much industry engagement is currently taking place.

SE is particularly interested in the following:

- What does the industry need in terms of innovation support?
- What is the demand for support?
- What is the view of current SE support?
- Is there a need for additional support?
- What will success look like?

BRE had received feedback from the industry on many of these issues in the earlier survey questionnaire, however, a bespoke question set was developed and circulated amongst a limited number of individuals. This smaller consultation, was targeted at individuals within the industry who were known to be developing new products and technologies for use in the LCBE. The consultation was carried out using a short pro-forma which tackled the questions listed above and also gave the respondent the opportunity to add any further relevant details where appropriate.

The responses obtained from the pro-formas completed and returned to BRE are listed in Appendix 3. The actual pro-formas received are given in Appendix 4. The feedback received from this consultation is summarised as follows:

*Question 1: What does the industry require to develop low carbon products and technologies which can be used to meet future targets?*

- Tactical funding opportunities
- Greater business support for SME's aiming to prototype and develop low carbon home grown products
- Clear legislation
- Client awareness and demand
- Mechanism for giving consistent assessment of new products, solutions and technologies



- Drive towards the commercialisation of products that have proven performance
- Proven technologies linked to verified data
- Proper and timely legislation, too much prevarication on the Governments part at present. Also cohesive strategies between the UK and devolved Governments to ensure compatible markets
- Market acceptance of new technologies – design teams will not specify unless products meet required standards and gain benefit in calculation procedures.

*Question 2: Is there a demand for greater support for innovation within the low carbon built environment?*

- Greater need for replicable solutions will require sponsored research and demonstration projects and presents an opportunity for greater support
- Government should provide as much encouragement and support to companies that are embracing innovation within the LCBE as they possibly can
- Need for more financial support as economic demands can often stifle innovation
- There are substantial research and development costs in this market as whilst low carbon is a driver, products also have to comply with H&S, fire, structural and other legislation
- Yes as these technologies require approval so that they are accepted into SAP/SBEM and warrant by NHBC and Zurich, rigorous data has to be provided.

*Question 3: What is your view of current funding support being provided by Scottish Enterprise?*

- Greater emphasis required on product development and funds for carrying out highly innovative demonstration projects
- Inadequate, not well known or publicised, dependent on who within SE you are dealing with
- I was not aware that Scottish enterprise funded anything in the low carbon built environment or how to access this funding
- I have heard that there are some Universities doing some research but they do not have a good track record of taking anything to market and have no idea about commercial realities
- It is not clear who you contact if funding is required and what the timescales are to receive funding.

*Question 4: Have you engaged with Scottish Enterprise in applying for innovation support funding?*

- The support given has been good but expertise and experience in low carbon and built environment product development appears to be lacking in the people spoken too
- Unsuccessful funding bids have been made but without receiving feedback for reasons of failure

- Varying levels of success in engaging with SE have been reported
- No.

*Question 5: Is there a need for additional support to be provided by Scottish Enterprise (and other public sector organisations)?*

- Yes - Wider support streams for highly innovative demonstration projects that include key Government indicators
- Yes - Scottish Enterprise has an important facilitation role to fulfill especially when we need to bring together companies involved in a complex supply chain
- Yes - Easier and clearer to understand funding routes for companies (small or large) who are undertaking innovative r&d in LCBE
- Yes - SE has a role to play in supporting Scottish businesses to meet future challenges driven by proposed future legislation
- A structured scheme is required giving clear guidelines through the application process and what funding can be used for. Linkages to other sources of funding and support through the innovation process including technical support on standards and legislation
- Yes as stated earlier, it is a requirement of modelling process and insurance requirements that information on product performance is provided. With the Scottish Climate Change Bill signalling greater requirement for low carbon products there should be a support mechanism in place for companies.

#### **4.1 Identifying key players for driving innovation**

There are many individuals and organisations within Scotland who are driving forward innovation in the face of the low carbon 'challenge'. Many of these organisations have demonstrated new products and technologies which have been developed to meet the performance levels which are likely to be required in the buildings of the future. These organisations are helping to create awareness within the industry and the wider supply chains in relation to the benefits of developing and adopting new products and technologies.

These organisations can be viewed as 'key players' in driving innovation through the industry. A number of these companies have been identified and their position within the supply chain is illustrated in Figure 3. A list of the contact details of individuals from each of the organisations listed in Figure 3 is given in Appendix 5.

A number of organisations have also been identified as being active in research and testing in the LCBE sector. These organisations are listed in Appendix 2.

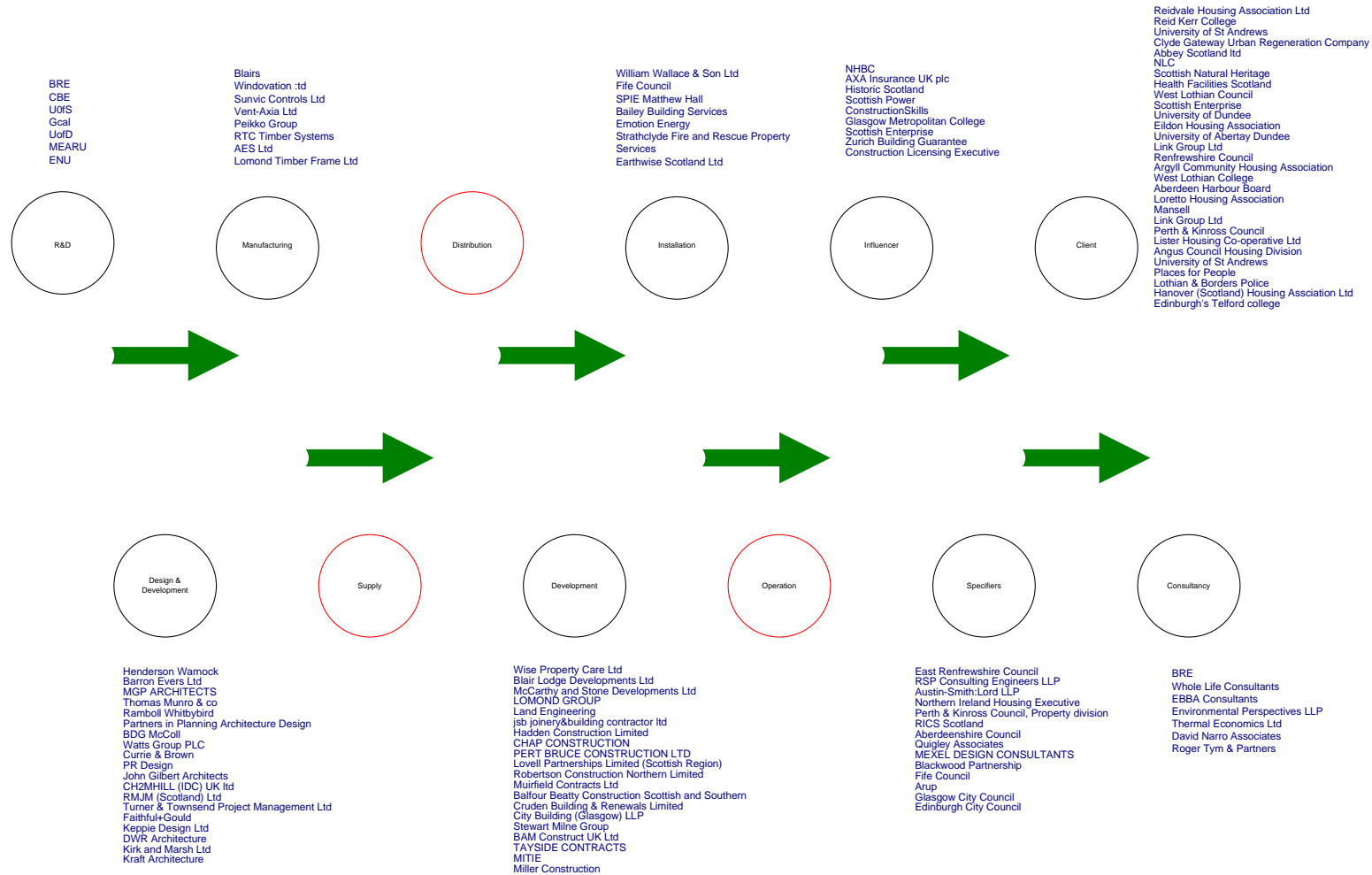


Figure 3. Supply chain key organisations.

## **4.2 SE Interventions**

In order to promote the development of innovation within the construction industry and related industry sectors, a number of support mechanisms should be considered as described below.

### **4.2.1 Information exchange**

Through consultation with organisations involved in research and development, manufacturing and design, it has become apparent that there is an absence of a recognised body which is feeding the industry with information relating to innovation support. Throughout any year, there are a variety of funding calls from UK and EU funding sources, much of which is 'missed' by the industry who are often not fully aware of what is available and how to apply for funding.

Recently, SE has facilitated the presentation of Technology Strategy Board (TSB) funding calls which has proved successful in raising awareness and providing a central information point for the industry. This has been a positive step and should be continued and expanded to other funding calls outwith TSB (Interreg, EPSRC, EU, etc). SE have the opportunity to act as a provider of information to the industry in terms of what type of research funding is available and how to access it. Through this facilitated process, business links and increased partnering with Universities is inevitable.

In addition to information provided on 'external' research funding, SE should also take the opportunities to disseminate their own innovation funding support. Through the industry consultation carried out in this work, it has become apparent that organisations within the industry have little or no knowledge of what funding and/or innovation support is available from SE and how this can be accessed. Dissemination of these funding mechanisms could not only be limited to factual information, but also include case studies of organisations who have engaged with SE in the development of a product and technology. This would increase the interaction between SE and the industry and also encourage organisations to actively seek support from SE.

### **4.2.2 Advisory service**

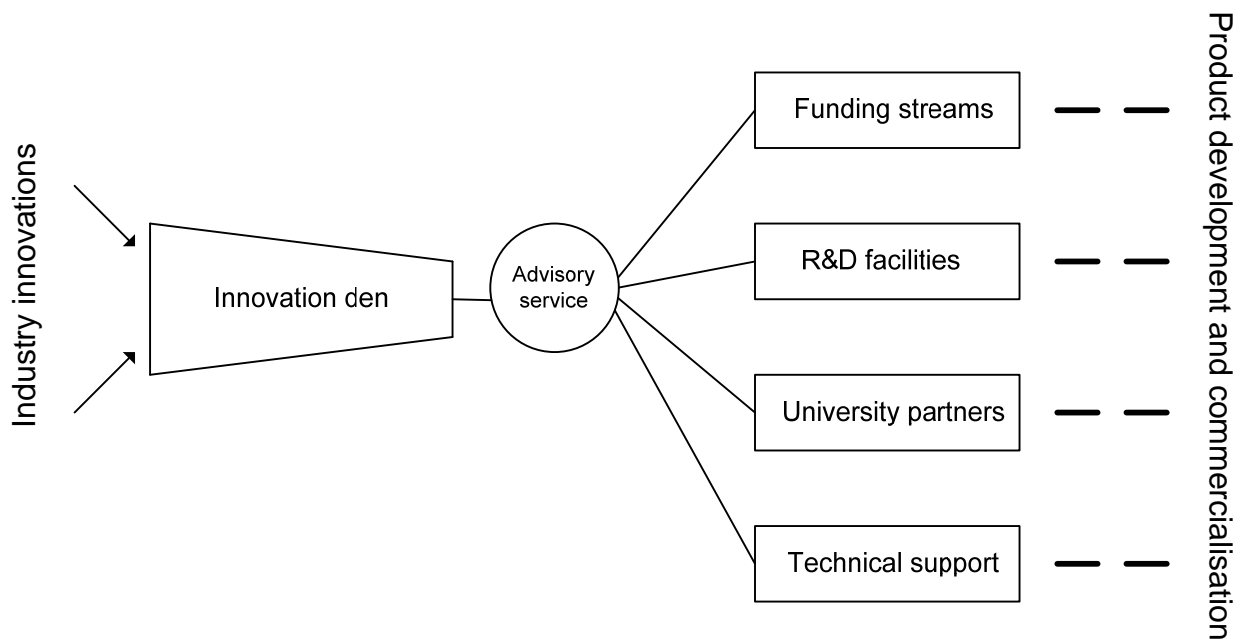
Much of the information provided within the LCBE research has identified individuals and organisations which are active in developing products and technologies which can be used in low carbon buildings. It is often difficult for individual companies to identify funding streams and/or industry or University partners that could assist in developing and commercialising new products.

Throughout this work, discussions have taken place on the possibility of setting up an advisory service which will act as a liaison between the industry and R&D activities. The service would also provide informed personnel to identify opportunities and set up working relationships between academia and the industry. A joined-up approach to creating partnerships and identifying funding mechanisms would assist those organisations engaged in product innovation a greater chance of success.

### **4.2.3 Innovation den**

An additional element of the advisory service could be the provision of an innovation den. This would provide the industry with a facility in which to put forward ideas for new products and technologies. The ideas would be submitted in confidence, before persons working within the advisory service (or similar) would assess the validity and potential market for the new products. Potential partners and/or funders for the development work would also be identified during this process.

The innovation den could operate in a manner similar to that illustrated in Figure 4.



**Figure 4. Innovation hub model.**

#### 4.2.4 Information hub

In order to provide the industry with the information and services described in sections above, an information hub should be provided. This hub could be a web-based portal and/or a physical facility which operates in isolation or in partnership with an existing initiative. The main function of the hub will be to provide a range of information and act as a central support facility for the industry engaged in the LCBE.

An online facility could act as a stand-alone site or be included within the operation of the Scottish Construction Centre (SCC) website. The SCC website already attracts a significant number hits per month and has an established portal that could be adapted to include an additional information hub.

A physical centre for the information hub could reside within SE or at the Innovation Park at Ravenscraig, for example. The exact location of the hub is not as critical as its function, although it should be located centrally and with easy access to industry.

Any of the options described above would be received favourably by the industry. At present, any activity related to accessing funding, developing new products and/or identifying partners for testing and commercialisation work is fragmented and largely unsupported. Providing a coordinated approach to driving forward Scotland's LCBE industry to develop new products and technologies and bring them to the market would be invaluable.

## 5 Task 4 – Demand driven support model

The aim of Task 4 is to gain feedback from members of social housing associations on their pre-commercial procurement experiences, to gain ideas for change or improvements that could be made and develop ideas of how SE could assist in the improvement of this sector. This feedback was obtained through consultation with housing associations and facilitated through a workshop hosted by BRE on 28 October 2009. The invitees to the workshop are listed in Appendix 6 and those who actually attended are highlighted in this listing.

### 5.1 Pre-Commercial Procurement Model

“The Pre-commercial procurement: driving innovation to ensure high quality public services in Europe” (EC, 2008) report is a key document detailing the importance of research and technology to steer pre-commercial procurement in the direction of innovation and cost effective solutions.

The key point demonstrated in this report is the lack of knowledge of innovative technologies that are available to the market, both at present and in the future. A similar issue was discussed at the workshop, where delegates identified a missing link between the development of innovative products and their incorporation into projects. Whether this is down to lack of knowledge, lack of funding or the high risk element of using unfamiliar solutions is difficult to determine.

The EC report recognises that the risks of using unfamiliar technology could hinder innovation in any field. The report proposes to build a bridge through the use of a public procurement model to make it more attractive to utilise innovative techniques and technologies in a bid to improve the LCBE.

The ‘Typical Product Innovation Lifecycle’ as described by the EU is illustrated on the following page. This model formed the basis for the discussions taking place at the workshop on 28 October 2009.

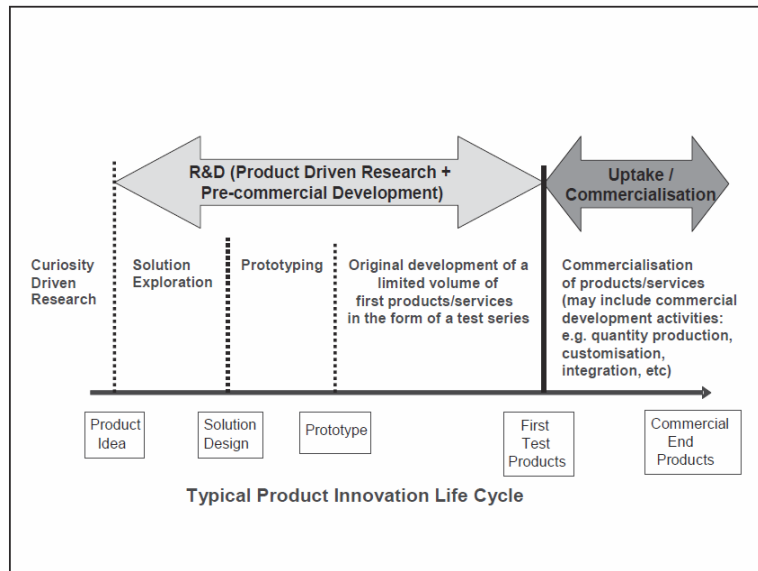
### 5.2 Swot analysis of housing associations issues in the LCBE

A SWOT analysis was used to determine the issues that housing associations may have with a pre-commercial procurement model and the development of the LCBE sector. The issues identified by the workshop delegates are shown in Table 1.

### 5.3 Opportunities for SE to support housing associations

#### 5.3.1 Proto-type for Scotland-wide use

Private housing developers and housing associations develop design solutions to improve the energy and sustainability of their product. The development of new design inevitably incurs costs associated with professional services and research into latest materials and technologies. One option to address the design and development costs of new solutions could be to introduce a generic solution to meet the proposed step changes in energy performance. This could be an ‘off-the-shelf’ solution which would be accessible to any



Pre-commercial procurement: Driving innovation to ensure high quality public services in Europe (EC, 2008).

Table 1: SWOT Analysis.

<p><b><u>Strengths</u></b></p> <ul style="list-style-type: none"> <li>• Well developed consortia's of various sizes in place</li> <li>• Committed to developing unique designs</li> <li>• Eager to drive forward the industry</li> <li>• Willing to try new innovative technologies and participate in trial projects</li> <li>• Competitive mentality between housing associations</li> </ul>	<p><b><u>Weaknesses</u></b></p> <ul style="list-style-type: none"> <li>• Are all housing associations working by the pre-procurement model?</li> <li>• Risk factor is high making innovation a challenge</li> <li>• Difficult to change attitudes or those used to using economies of scale</li> <li>• No environmental assessment (Eco-homes/Code for Sustainable homes) to use as a standard</li> <li>• Bombarded with green-wash information</li> </ul>
<p><b><u>Opportunities</u></b></p> <ul style="list-style-type: none"> <li>• Develop a prototype based on technology rather than the aesthetic aspect</li> <li>• Provide an expert to be available to give advice</li> <li>• Develop a forum to share knowledge and experiences</li> <li>• Develop Eco-homes/Code for Sustainable Homes to use as a sector-wide standard</li> <li>• Produce a "Go-Compare" style website for innovative technology</li> <li>• Develop a method to meet regulations with an electrically heated house where renewable technology is not a viable option</li> <li>• Develop a form of tenant buy-in package</li> <li>• Up-front loan to develop low carbon housing</li> </ul>	<p><b><u>Threats/Barriers</u></b></p> <ul style="list-style-type: none"> <li>• Housing Associations are protective over designs of their individual developments</li> <li>• May not be possible to cover all situations in one Scotland-wide model</li> <li>• Limited funding available</li> <li>• Inconsistency in funding decisions</li> <li>• Timing (especially from funding)</li> <li>• Tenant agreement/involvement is critical for the success</li> </ul>

Source: Based on information gathered in Workshop 28.10.09.

housing association, developer or local council. This could assist Scotland in having a co-ordinated approach to meet Government targets.

The pre-commercial procurement model could be used to develop housing solutions which meet low and zero carbon targets. This approach could minimise the costs and risks associated with developing and testing new products and technologies. By producing prototype solutions, housing associations could share resources and implement co-ordinated approaches to sharing ideas and reducing costs.

One approach to sharing knowledge could be to organise a series of pilot projects which test a different type of technology or design solution. Feedback from the tenants, and the through the procurement and construction phase, would be used to inform other housing associations. This type of approach would reduce financial risks, making it a more viable option to include in new developments. It would then be up to the individual housing associations to utilise this knowledge share in their decision process.

Feedback from the workshop indicated that housing association partnerships already exist. The comments made by delegates attending the workshop indicated that a broad-brush approach to developing generic solutions would not be well received. The 200 housing associations in Scotland work in varying locations which have a wide range of social, economic and geographical challenges. A Scotland-wide pre-commercial procurement model was, therefore, not considered the most effective way to support housing associations.

The workshop delegates also indicated that a strategic approach to retrofit and refurbishment would be valuable to housing associations. Current practice in refurbishment is geared towards upgrading social housing to current standards. However, as legislation moves towards low and zero carbon solutions, the challenge for housing associations becomes more onerous. The use of new materials and technologies will present significant challenges to the existing social housing sector and a centralised information resource tackling these issues would provide value to the sector.

### **5.3.2 Develop technological solutions**

The workshop delegates stated that housing associations are often protective over their developments. They want to develop unique, affordable houses suitable for the local area rather than using a mass produced design which could be seen through-out Scotland. The Investment Reforms document put forward the idea of consorted developers within housing associations and it was not widely acknowledged or approved by those involved. The response from this document was that housing developers did not want a generic housing solution: the performance of the technology and products inside the house should be the key focus. It was suggested that if the pre-commercial procurement model was to work, it should focus on internal technological features rather than a fully-completed off-the-shelf building. Housing associations would then be more likely to use this technology as standard but retain the unique design element of the housing developments at the same time. The approach would also be useful in retrofit projects.

### **5.3.3 Tenant agreement**

Housing Associations cater for different sectors of the population. Workshop delegates stated that tenant agreement to the integration or installation of new products and technologies in social housing is important. This could hinder the introduction of new technologies as it may be less effective to force these upon tenants if they are not going to be used correctly. Consequently, there is a need to educate housing



association staff and their tenants. The workshop attendees implied there is an interest within their staff for new technologies, however tenant satisfaction and approval is a major barrier to its uptake..

#### **5.3.4 Develop a centralised resource**

During the workshop the delegates were asked to describe the procurement process that is currently used to develop social housing solutions. The delegates stated that the only trusted method was to use official networks such as the Scottish Federation of Housing Associations (SFHA). Other less effective ways of gaining information is through media and other publicly-available information.

Discussions between workshop delegates, BRE and Scottish Enterprise included the possible development of a centralised resource in the form of an information forum. The forum could be used to share knowledge and experiences in procuring and developing low carbon social housing solutions. For example, information on new technologies could be submitted and reviewed and linked to a dedicated website and this centralised resource could help to develop closer working relationships between members.

The Scottish Housing Best Value Network (SHBVN) is a forum which does, presently, operate in Scotland. It offers similar services as discussed in the workshop, however no workshop attendees were aware of this network. Although setting up a network of this type has been suggested as the best way to support housing associations, it may be considered a poor use of funding to develop something which is already in existence. However, there is a cost involved in becoming a member of the SHBVN which may discourage housing associations from joining.

An effective way of disseminating information is in the form of conferences, meetings and workshops. One issue raised by the workshop delegates was that conferences held were time-consuming and often not entirely relevant to their particular projects. A suggestion was made for SE to develop, as part of the centralised resource, a section on conferences being held, who they are applicable to, and what topics would be covered. An alternative would be for housing associations to organise the events themselves so that relevant information could be shared and discussed.

#### **5.3.5 Develop Eco-homes style assessment as a benchmark**

At present Scotland is behind the rest of the UK in terms of an up-to-date environmental assessment that can be used on domestic buildings. Workshop delegates indicated they found it challenging to meet Government targets and were concerned about future developments, especially retrofit projects. England uses the Code for Sustainable Homes as the industry standard, where housing developers have to meet Code Level 3 for new social housing projects. This gives a level of conformity for new housing developments and provides guidelines to meet future Government targets. The workshop delegates indicated they were keen to see the development of a similar assessment for Scotland.

#### **5.3.6 Develop a “Go-Compare” style website**

Workshop delegates also discussed the possibility of developing a “Go-Compare” style website where a number of building products and technologies can be compared simultaneously. Similar work has been undertaken by BRE through the development of the ‘Green book’ and the recently completed EU ‘GREEN-IT’ project.

The information provided on individual products should include test certificates and/or certification details, which will give confidence to the specifier on the anticipated performance levels. This could then be backed

up with case studies and reviews from those who have actually used the products. Workshop attendees agreed they would use such a website if guarantees on product performance could be provided.

### **5.3.7 Support housing associations to influence product design**

There is often a great deal of information and reviews provided on new technologies which can be problematic for specifiers in identifying suitable products. The workshop attendees implied that they would find it useful to have accurate data available from certified sources. This would give greater levels in confidence in the specification of new products and would help encourage their utilisation.

One clear outcome from the workshop was that there is a missing link between those developing innovative products and technologies and housing associations. Consistent dialogue between technology providers and specifiers would encourage the development of products which fit the requirements for social housing and facilitate a wider acceptance within the social housing sector.

Although this was a key discussion point agreed upon by workshop attendees, it was also made clear that the end-user, in this case the tenant, needs to be made aware of how to use the technologies in order for them to work efficiently. If money is spent on putting energy saving technology in a building, but the user is unaware of how to work it to maximise its benefit, minimal savings will be made at a substantial cost to the housing association.

### **5.3.8 Up-front loan for developing low carbon housing**

The workshop delegates discussed the issues surrounding the provision of an up-front loan for developing low carbon social housing. Funding and the timing of its delivery during a project is a key issue housing associations are dealing with for housing associations. Getting funding granted for standard technologies is difficult, so to introduce a possible risk element of renewable technologies could make investment difficult to justify. Workshop delegates supported the idea of an up-front loan being made available. This would involve a commitment to incorporate renewable technology or similar solutions in order to meet or exceed future energy targets.

## **5.4 Case Studies of Current Housing Association Projects**

Case studies are a good form for disseminating experiences from the implementation of new products and technologies. Discussing the positive and negative experiences of housing associations will help to identify areas where effective low carbon housing solutions can be developed.

### **5.4.1 Dumfries and Galloway: Replacement Heat Project**

Dumfries and Galloway HA have been working on a replacement heat project for 3000 houses. They requested funding upfront for the project so that the insulation could be improved at the same time. This was proposed to allow them to take a whole house approach in tackling the causes of fuel poverty at the same time.

### **5.4.2 Cumbernauld Housing Partnership: Heating & External Fabric Upgrade**

A new heating system with an external fabric upgrade approach was recently tried in Cumbernauld for the first time. The loft and cavity insulating system previously used had failed and complaints were received from tenants. Cumbernauld Housing Partnership have encountered problems regarding funding for this

project. Funding had been secured to install new insulation, however it is proving difficult to get funding for removing the old insulation. Whilst they were researching funding for this it became apparent that funding was also not available for 'topping up' the existing insulation. This illustrates a significant problem as funding is not consistent with progress of existing developments. The houses in question have put insulation in early on which at the time was good practice; however funding is not being made available for essential maintenance.

#### **5.4.3 Dumfries and Galloway Housing Association**

Dumfries and Galloway Housing Association have recently encountered some difficulty while working on a 25-house project. Retrospective funding was not available and they needed to re-plan and reschedule the works to allow them to develop a cost strategy. They have been successful in gaining funding for air source pumps and would like P.V. although this has not been decided yet. The project has the makings of success as the tenants are embracing the concept of heat pump and photovoltaic technologies to replace their existing electric heating systems. The co-operation of the tenants will be a significant advantage once the technology is in place as they will be more willing to learn how to use it properly in order to achieve maximum benefit and cost savings.

#### **5.4.4 Clyde Valley Housing Association: Utilities**

Clyde Valley Housing Association (CVHA) are looking into utilities funding based on an asset value model. This ensures that investment made in a new housing development is retained once the area is sold on for future re-development. If CVHA are successful in developing this concept it will generate a significant financial saving for all housing associations.

### **5.5 Discussion**

The workshop has provided a valuable insight into housing associations' position within the LCBE. It is clear that the sector is strong and the industry is being driven forward by the stretching energy targets which will come into force in 2010. There is a keen interest in developing the LCBE through use of innovative technologies and solutions. However, there are certain barriers which exist making this a challenge for housing associations. Funding is a key issue in the incorporation of new technologies. An element of risk exists with anything other than standard methods of design and construction with well-established technology. In order to encourage the use of innovative products efforts need to be made to establish new funding opportunities and incentivise the use of unfamiliar solutions which may have a higher associated risk factor.

Conclusions that can be drawn from the discussions held during the workshop are as follows:

- HAs are keen to encourage and incorporate innovative products and technologies, however economic constraints govern the level of activity
- Generic solutions for the development of low carbon social are not the preferred option for those HAs represented at the workshop
- The development of a centralised forum for social housing providers would provide a platform to share information and experiences.

The original concept to support the housing association sector was to develop a low carbon 'off-the-shelf' solution which could be replicated for use in social housing through-out Scotland. However, discussions in the workshop indicated that this is not the kind of solution housing associations require.

## **5.6 Recommendations**

From the comments made in the workshop, the HAs in attendance recommended the following issues should be addressed in order to support the social housing sector in delivering against 'low carbon' targets:

- The development of a centralised information forum, available for local councils and housing associations
- Members of HAs should be encouraged to communicate their experiences with each other, learn of new products available for use, establish personal networks and hear of relevant conferences/meetings/workshops being held
- The establishment of partnerships between HAs and external organisations which in turn would further strengthen the housing industry.

The workshop gave a positive overview of the social housing sector and it was clear that there is a great deal of support for greater co-ordination in developing Scotland's LCBE. The feedback received was invaluable and helped gain a detailed prospective of the current issues being faced by housing associations.

## 6 Conclusions

BRE has completed the tasks described in Phase 2 for the current LCBE project. Task 1 concentrated on identifying the validation and testing facilities available in Scotland. BRE were able to identify a large number of facilities and present these to SE in an interactive document which describes the geographical location of the facility, its range of services and contact details. This is the first step to the provision of a facility which creates closer working relationships between test facilities, academia and the industry.

This section of the research also identified the current users of Scotland's testing and validation infrastructure and the possible gaps which exist in the range of services available. The work undertaken in Task 1 also researched ways of addressing the gaps that were identified, as well as ways to promote the existing services on offer.

Task 2 has identified Scotland's capability in relation to research and development. This has focussed on the academic potential that exists and has identified Scottish businesses involved in research relating to the LCBE.

The focus for much of this research has been to identify ways in which Scotland's LCBE can grow and provide economic stimulus to the economy. The growth of this industry sector could be supported by funding mechanisms provided by SE and/or other Government agencies. Task 3 involved consultation with the industry to identify their needs in relation to innovation support. This provided direct feedback to SE from organisations which are currently, or have in the past, sought funding to support the development of new and innovative products.

The final task in Phase 2 of the project, Task 4, tested the development of a demand driven support model with the social housing sector. The subject of a demand driven support model was presented at a dedicated workshop, hosted by BRE, and attended by housing associations. The discussions at this workshop and feedback received from the housing associations in attendance had been reported by BRE.

This work has utilised BRE's knowledge of the LCBE, its' position within the construction industry, and influence within industry sector to identify and report the latest thinking on the tasks undertaken in Phase 2 of this work. This has involved research and extensive consultation with the industry and describes key outcomes and objectives for this area moving forward. These outcomes and objectives can be described as follows:

- Gaps in Scotland's testing infrastructure in relation to low carbon materials have been identified. Options for addressing these gaps include; validation of performance of new materials in 'whole house' applications; accepted test protocol for renewable energy technologies; validation of new materials parameters in laboratory tests; integration and performance of new technologies; durability of new materials and products; and methods for determining the effectiveness of retrofit measures applied to existing buildings.
- Mechanisms to support Scotland's emerging LCBE sector have been identified as follows; facilitating and encouraging an information exchange across the sector; creating an advisory service to support businesses operating in the LCBE; establishing an innovation den to assist with the development of

new products and technologies; creating an information hub which will act as a central platform for disseminating information to the industry.

## Appendix 1 – Mapping Scotland’s low carbon test and validation infrastructure

### Research, development and testing facilities

A – Z of organisations (Click for more information)

- ACS Physical Risk Control**  
*Surveying for & testing asbestos; Workplace Monitoring; Risk Assessments; Air Monitoring; Contaminated Land Investigation; Analysis of water and effluent.*
- Bodycote Testing Ltd**  
*Tensile stress; Sear stress; Impact tests; Hardness testing; Chemical testing; Corrosion testing; Chemical gas analysis; Metallurgical failure testing.*
- BRE Scotland**  
*Durability testing of wall systems; Climatic testing of building elements; Natural exposure testing of building elements; U-Value measurement; Freeze/thaw testing; Window restrictor testing.*
- Caledonian Laboratories Ltd**  
*X-ray absorption equipment*



### Research, development and testing facilities

- Caledonian University**  
*Twin environmental chamber, Mercury Intrusion Porosimeter, Particle Imaging Velocimetry, Thermal conductivity, Thermal Imaging Camera, X ray absorption equipment.*
- Capital Testing Services**  
*Construction Consultancy; Testing Services.*
- Chem Tech Consultancy Ltd**  
*Risk assessment & control of legionella.*
- C-MIST**  
*Construction Safety Consultancy; Asbestos Surveys; Assessment of & recommendations for remediation of contaminated land; Fire safety.*
- Condensation Control for Healthy Homes Ltd**  
*Construction Technical Consultancy.*



## Research, development and testing facilities

### **Construction Materials Consultants (CMC)**

*Concrete Structure Investigations; Building Fabric Investigations; Analysis of & determination of performance of construction materials; Determining Mechanisms; Use of petrography & microscopy*

### **Delta Calibration Ltd**

*Design, manufacture, calibrate, repair, service & supply test equipment.*

### **DGE Scotland Ltd**

*Technical testing & analysis, research & development.*

### **Dundee University**

*Testing lightweight structures; Testing static & dynamic loads; Physical modelling laboratory; Earth quake simulator; Instron load testing frame; Physical modelling laboratory; Testing Facilities.*



## Research, development and testing facilities

### **Edinburgh University**

*Fire testing; Non-destructive testing; Construction and testing of steel and plywood composite structures.*

### **Energy Technology Centre**

*Equipment & resources for developing, testing & demonstrating small-scale renewable & sustainable energy systems*

### **EnviroCentre Ltd**

*Assessment & redevelopment of contaminated land; Use of recycled & secondary materials; Monitoring of gas emissions; Monitoring & modelling of noise; Flood assessment; Materials resource efficiency; Carbon accounting.*

### **G T Inspection Ltd**

*Testing of construction materials - taking cores, compressive strength, density etc*





## Research, development and testing facilities

### **Glasgow University**

*Fatigue testing; hardness testing; mechanical testing; Taylor Hobson stylus profilometer; Zwick/Roell electromechanical tester; Servo-hydraulic fatigue machines; Vickers hardness & micro-hardness testers; Scanning electron microscope.*

### **H B Energy Consultants**

*Energy solutions for industry, including construction*

### **Heriot-Watt University**

*Anechoic chamber; Horizontal transmission suite; Vertical transmission suite; concrete laboratory; Pipe Testing Centre; Rotating House; Wave Basin; Wind tunnel testing; Drainage Laboratory; Analysis of gases & volatile compounds; Analysis of materials using analytical techniques; Scanning electron microscope.*

### **IKM Consulting Ltd**

*Structural surveys & assessments; Assessment, remediation & redevelopment of brownfield & contaminated land; Ground stabilisation; Building refurbishment.*



## Research, development and testing facilities

### **IRT Surveys Ltd**

*Infra-red thermographic surveys of buildings.*

### **Lothian Inspection Ltd**

*Non-destructive testing of structural steelwork & concrete;*

### **Macaulay Land Use Research Institute**

*Research – Climate Change; Consultancy - contaminated land.*

### **Mini Soil Surveys (Scot) Ltd**

*Undertake geological investigations.*

### **Napier University**

*Joist hanger & timber connector testing; Conditioning chambers; Large scale racking resistance equipment; Timber beam testing; Fastener testing equipment; Timber Drying kiln; Facilities to build & test full-scale structures; Acoustic equipment; Mercury Intrusion Porosimeter; Concrete laboratories.*



## Research, development and testing facilities

**Nicol Acoustic Consultancy**

*Consultancy & monitoring in noise, acoustics & vibration*

**Pilling Geoconsultants Ltd**

*Geotechnical site investigations & testing.*

**Raeburn Drilling & Geotechnical Ltd**

*Ground investigation, including drilling.*

**Remedios Ltd**

*Assessment of contaminated land.*

**Robert Gordon University**

*Non-destructive testing of materials; Fire testing of materials.*



## Research, development and testing facilities

**RUM Consultancy**

*Chemical analysis of soils, water, leachate & contaminants.*

**Scientific Analysis Laboratories Ltd (SAL)**

*Chemical analysis of air, water, food & contaminated land samples; Contamination*

**Scientifics**

*Asbestos testing & analysis; Chemical Analysis; Materials testing; Metallurgical testing; Pressure testing; Geotechnical investigations.*

**Stangers Testing Services Ltd**

*Building defect investigations & surveys; Construction materials testing & consultancy.*

**Terra Tek**

*Analysis & characterisation of concrete; Analysis of water using chemical techniques; Site investigation techniques; Geotechnical testing.*



## Research, development and testing facilities

**Testing and Analysis Limited**

*Materials testing; Tubular tile testing.*

**TRADA Technology**

*Testing & consultancy for timber construction.*

**University of Aberdeen**

*Mechanical Testing of materials; Analysis & characterisation of materials; Surface roughness.*

**University of Strathclyde**

*Materials testing facility; Mechanical workshop; Portable appliance electrical safety testing & strain gauge amplifiers.*

**University of West of Scotland (Paisley, Hamilton, Ayr & Dumfries)**

*Nanoindenter; Mechanical characterisation of construction materials; Heavy structures laboratory*



**ACS Physical Risk Control**

Contact: Roger Willey  
Unit 4, The Claremont Centre, Durham Street, Glasgow, G41 1BS

T: 0141 427 5171

W: <http://www.acs-environmental.com>

e: [acs@acs-environmental.com](mailto:acs@acs-environmental.com)

Other

Carbon accounting & mitigation advice  
Workplace monitoring - limb vibration, noise monitoring, COSHH monitoring  
Risk assessments - general, fire, manual handling & legionella  
Air monitoring - air quality & process emissions  
Contaminated land investigation, remediation & redevelopment  
Analysis of water & effluent

[Return to A – Z listing](#)



**Bodycote Testing Ltd**

Lochend Industrial Estate, Newbridge, Midlothian, EH28 8PL

T: 0131 333 4360

W: <http://www.bodycote.com>

e: [mtweb@bodycote.com](mailto:mtweb@bodycote.com)

Structural testing

Tensile stress at room temperature and elevated temperatures  
Shear tests  
Impact tests

Material testing

Hardness and micro-hardness testing  
Chemical testing  
Corrosion testing  
Chemical analysis – gas analysis in metals; portable x-ray fluorescence  
Metallurgical failure tests

[Return to A – Z listing](#)



**BRE Scotland**

Contact: David Kelly  
Orion House, Scottish Enterprise Technology Park, East Kilbride G75 0RD

T: 01355 576200

W: <http://www.bre.co.uk>

e: [eastkilbride@bre.co.uk](mailto:eastkilbride@bre.co.uk)

Material testing

Durability testing of wall systems  
Climatic testing of building elements  
Natural exposure testing of materials and building elements  
Measurement of U-Value for building elements and materials  
Freeze/thaw testing of materials  
Window restrictor testing

Technologies

Microgeneration Certification Scheme  
BREEAM  
GreenPrint

Other

Infra-red thermography

[Return to A – Z listing](#)



**Caledonian Laboratories Ltd**

Contact: John McKenna  
Unit 4, Strathclyde Business Centre, 391 Langmuir Road, Bargeddie, Glasgow, G69 7TU

T: 0141 771 5419

W: <http://www.caledonianlabs.co.uk>

e: [bargeddie@caledonianlabs.co.uk](mailto:bargeddie@caledonianlabs.co.uk)

Other

Chemical analysis of soils, water, leachate & contaminants and associated consultancy

[Return to A – Z listing](#)



**Caledonian University**

**School of the Built Environment**

Contact: Chris Sanders  
Cowcaddens Road, Glasgow, G4 0BA

T: 0141 331 3000

F: 0141 331 3005

W: <http://www.qcal.ac.uk>

Materials

Twin environmental chamber - simulate climatic conditions to allow performance testing of construction materials (2.5 square metre size samples)

Mercury Intrusion Porosimeter - to determine size, structure & distribution of pores in construction materials

Particle Imaging Velocimetry with Laser Induced Fluorescence - to measure fluid flows & temperature fields - such as measurement of heat transfer & air flows in solar collectors & cavity walls

Thermal conductivity - determine the thermal conductivity & so insulation properties of materials such as dense concrete or polystyrene insulation

X ray absorption equipment - to study movement of moisture in construction materials & so model transport of heat & moisture in building envelopes

Other

Thermal Imaging Camera - to survey buildings to determine quality of insulated envelope & identify design defects & so risks of condensation & mould

[Return to A – Z listing](#)



**Capital Testing Services Ltd**

7 Golf Course Road, Bonnyrigg, Midlothian, EH19 2HA

T: 0131 663 8308

F: 0131 663 8308

Materials

Construction consultancy

Technologies

Testing Services

[Return to A – Z listing](#)



**Chem Tech Consultancy Ltd**

Unit 24, Mossedge Industrial Estate, Linwood, Paisley, Renfrewshire, PA3 3HR

T: 01505 335510

F: 01505 331140

W: <http://www.chemtechconsultancy.co.uk>

E: [office@chemtechconsultancy.co.uk](mailto:office@chemtechconsultancy.co.uk)

Other

Risk assessment & control of legionella, water systems cleaning & disinfection

[Return to A – Z listing](#)





**C-MIST**

Heriot Watt University Research Park, Riccarton, Edinburgh, EH14 4AP

T: 0131 451 5253

F: 0131 451 5440

W: <http://www.c-mist.com>

E: [admin@c-mist.com](mailto:admin@c-mist.com)

Other

Construction safety consultancy - construction design & management regulation & safety training

Asbestos surveys, assessment, monitoring & management

Assessment of & recommendations for remediation of contaminated land

Fire safety - design & specification, investigation, protection & training



[Return to A – Z listing](#)

**Condensation Control for Healthy Homes Ltd**

Rosend, Bridgeview Place, Aboyne, Aberdeenshire, AB34 5HG

Other

Construction technical consultancy



[Return to A – Z listing](#)

**Construction Materials Consultants (CMC)**

Contact: Bill Revie  
Wallace House, Whitehouse Road, Stirling, FK7 7TA

T: 01786 434708

F: 0131 663 8308

W: <http://www.cmcstirling.co.uk>

E: [stirling@cmcstirling.co.uk](mailto:stirling@cmcstirling.co.uk)

Structural

Concrete structure investigations

Materials

Building fabric investigations

Analysis of & determination of performance of construction materials

Determining mechanisms of in-situ deterioration in concrete such as alkali silica reaction, sulfate attack etc

Use of petrography & microscopy

[Return to A – Z listing](#)



**Delta Calibration Ltd**

Contact: Jamie Carline  
18 Sandyford Road, Paisley, Renfrewshire, PA3 4HP

T: 0141 849 7007

F: 0141 849 6006

W: <http://www.deltacalibration.co.uk>

E: [info@deltacalibration.com](mailto:info@deltacalibration.com)

Other

Design, manufacture, calibrate, repair, service & supply test equipment

[Return to A – Z listing](#)





**DGE Scotland Ltd**

24/5 Stenhouse Street West, Edinburgh, EH11 3DX

Materials

Technical testing & analysis, research & development

[Return to A – Z listing](#)



**Dundee University**

**Concrete Technology Unit, Civil Engineering Department**

Contact: Dr Moray Newlands  
Dundee, DD1 4HN

W: <http://www.ctucpd.co.uk>

Structural

Testing lightweight structures  
Testing static & dynamic loads  
Earth quake simulator  
Instron load testing frame

**School of Engineering, Physics & Mathematics**

Structural

Testing facilities for static & dynamic loads

**School of Architecture**

Materials

Physical modelling laboratory

[Return to A – Z listing](#)



**Edinburgh University**

**BRE Centre for Fire Engineering**

Contact: Ricky Carvel

BRE Centre for Fire Safety Engineering, John Muir Building, University of Edinburgh, King's Buildings, Edinburgh, EH9 3JL

T: 0131 651 3576

W: <http://www.see.ed.ac.uk/fire>

e: [Fire.Research@ed.ac.uk](mailto:Fire.Research@ed.ac.uk)

Materials

Fire testing of materials

**Institute for Infrastructure and Environment**

Contact: Margaret Taylor

William Rankine Building, The School of Engineering, The University of Edinburgh, The King's Buildings, Mayfield Road, Edinburgh, EH9 3JL

T: 0131 650 5719

W: <http://www.see.ed.ac.uk/IIE>

e: [Margaret.Taylor@ed.ac.uk](mailto:Margaret.Taylor@ed.ac.uk)

Materials

Non-destructive testing of materials



[Return to A – Z listing](#)

**Energy Technology Centre**

Contact: John Bingham

Scottish Enterprise Technology Park, East Kilbride

T:

W: <http://www.scottish-enterprise.com/energy-technology-centre>

e:

Technologies

Equipment and resources for testing, developing and demonstrating small-scale renewable and sustainable energy systems



[Return to A – Z listing](#)

**EnviroCentre Ltd**

Contact: Prof George Fleming  
Craighall Business Park, Eagle Street, Glasgow, G4 9XA

T: 0141 341 5040

F: 0141 341 5045

W: <http://www.envirocentre.co.uk/>

e:

Other

Assessment & redevelopment of contaminated land  
Use of recycled & secondary materials in construction  
Monitoring of gas emissions, air quality, water & soils  
Monitoring & modelling of noise  
Flood assessment  
Materials resource efficiency  
Carbon accounting & mitigation advice

[Return to A – Z listing](#)



**G T Inspection Ltd**

65 West Drive, Airdrie, Lanarkshire, ML6 8BL

T: 01236 754685

Materials

Testing of construction materials - taking cores, compressive strength, density etc

[Return to A – Z listing](#)



**Glasgow University**

**Mechanical Engineering**

Contact: Prof Nenad Bicanic  
Department of Mechanical Engineering, James Watt South Building, University of  
Glasgow, Glasgow, G12 8QQ

**T:** 0141 330 4343

**W:** <http://www.mech.gla.ac.uk>

Materials

Fatigue testing, hardness testing, mechanical testing

Contact: Trevor Hodgkies

[Return to A – Z listing](#)



**H B Energy Consultants**

19 Corpach Drive, Dunfermline, Fife, KY12 7XG

**W:** <http://www.hbenergy.co.uk>

**e:** [info@hbenergy.co.uk](mailto:info@hbenergy.co.uk)

Technologies

Energy solutions for industry, including construction

[Return to A – Z listing](#)



**Heriot-Watt University**

**School of the Built Environment**  
Riccarton, Edinburgh, EH14 4AS

**T:** 0131 449 5111

**W:** <http://www.hw.ac.uk/home>

Technologies:

Anechoic chamber - to test sound sources  
Horizontal transmission suite - to determine sound insulation properties of walls & partitions  
Vertical transmission suite - to determine sound insulation properties of floors

Structural:

Concrete laboratory  
Wind tunnel testing of model structures

Other:

Pipe testing centre  
Rotating house  
Wave basin  
Drainage laboratory

[Return to A – Z listing](#)



**IKM Consulting Ltd**

Contact: Alistair Keen  
Park House, 39 Bo'ness Road, Grangemouth, Stirlingshire, FK3 8AN

**T:** 01324 878822

**F:** 01324 878823

**W:** <http://www.ikmconsulting.co.uk>

**e:** [info@ikmconsulting.co.uk](mailto:info@ikmconsulting.co.uk)

Structural:

Structural surveys & assessments

Other:

Assessment, remediation & redevelopment of brownfield & contaminated land  
Ground stabilisation  
Building refurbishment

[Return to A – Z listing](#)



**IRT Surveys Ltd**

Contact: Stewart Little  
1st Floor, Seabraes, Greenmarket, Dundee, DD1 4QB

T: 01382 228700

F: 01382 201680

W: <http://www.irtsurveys.co.uk>

Other:

infra-red thermographic surveys of buildings - to determine heat losses, air leakage, quality of insulation, risk of condensation & mould growth etc

[Return to A – Z listing](#)



**Lothian Inspection Ltd**

Unit 5, Cooper Business Park, Broxburn, West Lothian, EH52 6QD

T: 01506 856980

F: 01506 857177

W: <http://www.lothianinspection.co.uk>

e: [info@lothianinspection.co.uk](mailto:info@lothianinspection.co.uk)

Structural:

Non-destructive testing of structural steelwork & concrete using magnetic particle inspection, liquid penetrant inspection & ultrasonic testing

[Return to A – Z listing](#)



**Macaulay Land Use Research Institute**

Craigiebuckler, Aberdeen, AB15 8QH

T: 01224 395000

F: 01224 395010

W: <http://www.macaulay.ac.uk>

Other:

Research - climate change

Consultancy - contaminated land, waste & chemical analysis

[Return to A – Z listing](#)



**Mini Soil Surveys (Scot) Ltd**

14 Culloden Place, Kilmarnock, Ayrshire, KA3 7UG

T: 01563 571611

F: 01563 571611

Other:

Undertake geological investigations, including walkover survey, desk study & intrusive site investigation

[Return to A – Z listing](#)



**Napier University**

**Centre for Timber Engineering**

Contact: Alistair Stupart (Assistant Director)  
10 Colinton Road, Edinburgh, EH10 5DT

**T:** 0131 455 2831

**W:** <http://cte.napier.ac.uk>

**e:** [a.stupart@napier.ac.uk](mailto:a.stupart@napier.ac.uk)

Structural:

Joist hanger & timber connector testing  
Large scale racking resistance equipment  
Timber beam testing - 3 & 4 point bending & torsional testing  
Fastener testing equipment  
Timber drying kiln  
Facilities to build & test full-scale structures

Materials:

Conditioning chambers  
Mercury Intrusion Porosimeter - to determine size, structure & distribution of pores in construction materials  
Concrete laboratories - to mix, cure, test & characterise concrete

Technologies:

Acoustic equipment to assess quality of timber



[Return to A – Z listing](#)

**Nicol Acoustic Consultancy**

Contact: John Nicol  
33 Ballater Crescent, Woodlands Gate, Wishaw, Lanarkshire, ML2 7YJ

**T:** 01698 383545

**F:** 01698 383545

**W:** <http://www.noisecontrol.co.uk>

**e:** [nac@noisecontrol.co.uk](mailto:nac@noisecontrol.co.uk)

Technologies:

Consultancy & monitoring in noise, acoustics & vibration



[Return to A – Z listing](#)



**Pilling Geoconsultants Ltd**

1 Old Chapel Walk, Inverurie, Aberdeenshire, AB51 4TY  
T: 01467 625414

Other:  
Geotechnical site investigations & testing



[Return to A – Z listing](#)

**Raeburn Drilling & Geotechnical Ltd  
(Sister company to Terra Tek)**

Whistleberry Road, Whistleberry Industrial Estate, Hamilton, Lanarkshire, ML3 0HP

T: 01698 7111777  
F: 01698 710999  
W: <http://www.raeburndrilling.com>  
e: [enquiries@raeburndrilling.com](mailto:enquiries@raeburndrilling.com)

Other:  
Ground investigation, including drilling



[Return to A – Z listing](#)

**Remedios Ltd**

Contact: Prof Ken Killham  
Balgownie Technology Centre, Aberdeen Science & Technology Park, Campus 3,  
Balgownie Drive, Aberdeen, AB22 8GW

T: 01224 355690

F: 01224 355691

W: <http://www.remedios.uk.com>

e: [info@remedios.uk.com](mailto:info@remedios.uk.com)

Other:

Assessment of contaminated land



[Return to A – Z listing](#)

**Robert Gordon University**

**Engineering Department**

Contact: Dr Shah Jihan  
Schoolhill, Aberdeen, AB10 1FR

T: 01224 262400

W: <http://www.rgu.ac.uk/eng>

Materials:

Non-destructive testing of materials  
Fire testing of materials



[Return to A – Z listing](#)

**RUM Consultancy**

RUM House, Cookney, Netherley, Aberdeenshire, AB39 3SA

**T:** 01569 739061/739066

**F:** 01569 739071

**W:** <http://www.rumconsultancy.co.uk>

**e:** [enquiries@rumconsultancy.co.uk](mailto:enquiries@rumconsultancy.co.uk)

Other:

Chemical analysis of soils, water, leachate & contaminants



[Return to A – Z listing](#)

**Scientific Analysis Laboratories Ltd (SAL)**

East Kilbride

**T:** 01355 230001

**W:** <http://limsgate.saiman.co.uk>

Materials:

Chemical analysis of air, water, food & contaminated land samples

Contamination - pollutants, dioxins, furans, heavy metals, volatile & semi volatile organics, pesticides



[Return to A – Z listing](#)

**Scientifics**

Contact: Frank Reilly  
2-8 Langlands Place, Kelvin South Business Park, East Kilbride, Glasgow, G75 0YF  
T: 01355 225488  
W: <http://www.scientifics.com>  
e: [east.kilbride@scientifics.com](mailto:east.kilbride@scientifics.com)

Materials:

Asbestos testing & analysis  
Chemical analysis  
Materials testing  
Metallurgical testing - tensile strength, hardness, chemical composition, microscopy  
Corrosion & environmental testing  
Pressure testing

Other:

Geotechnical investigations - trials pitting, auger surveys, contaminated land sampling, soil mechanic testing, ground water sampling



[Return to A – Z listing](#)

**Stangers Testing Services Ltd**

Contact: Laurie Murphy Bogleshole Road, Cambuslang, Glasgow, G72 7DD  
T: 0141 641 3623  
F: 0141 641 9279  
W: <http://www.stangers.net>

Structural:

Building defect investigations & surveys - using methods such as drilled dust sampling, covermeter, crack measurement, borescope & thermography analysis

Materials:

Construction materials testing & consultancy - determining mechanical properties, chemical analysis, metallurgy, petrography optical microscopy



[Return to A – Z listing](#)

**Terra Tek**

Contact: Jim Murray  
62 Rochsolloch Road, Airdrie, Lanarkshire, ML6 9BG  
T: 01236 748949  
F: 01236 747849  
W: <http://www.terratek.co.uk>  
e: [airdrie@terratek.co.uk](mailto:airdrie@terratek.co.uk)

Materials:

Analysis & characterisation of concrete, soil, rock & other materials using various physical & chemical techniques  
Analysis of water using chemical techniques such as gas chromatography, mass spectroscopy, ultra-violet/visible spectroscopy & atomic absorption spectroscopy

Other:

Site investigation techniques including soft ground boring, rock drilling & trial excavations  
Geotechnical testing including moisture content, density, triaxial tests, liquid & plastic limits & particle size distribution



[Return to A – Z listing](#)

**Testing and Analysis Limited**

24 Ravelston Terrace, Edinburgh, EH4 3TP  
T: 0131 332 9411  
F: 0131 332 5937

Materials:

Materials testing  
Tubular pile testing



[Return to A – Z listing](#)

**TRADA Technology**

*The e-Centre, Cooperage Way Business Village, Alloa, Clackmannanshire, FK10 3LP*

**T:** 01259 272143

**F:** 01259 272144

**W:** <http://www.trada.co.uk>

Materials:

Testing & consultancy for timber construction



[Return to A – Z listing](#)

**University of Aberdeen**

**Scottish Offshore Materials Centre**

Contact: Engineering Department

*King's College, Aberdeen, AB24 3FX*

**T:** 01224 272000

**W:** <http://www.abdn.ac.uk>

Structural:

Mechanical testing of materials - tensile, compressive & bending

Materials:

Analysis & characterisation of materials using Fourier Transform Infra-Red Spectroscopy & Electron Microscopy  
Surface roughness, hardness & micro-hardness of materials



[Return to A – Z listing](#)

**University of Strathclyde**

**Material Testing Facility**  
Contact: Mr David Smith  
16 Richmond Street, Glasgow, G1 1XQ  
T: 0141 548 3142/4567  
W: <http://www.strath.ac.uk>  
e: [d.j.a.smith@strath.ac.uk](mailto:d.j.a.smith@strath.ac.uk)

Structural:  
*Materials testing facility - Instron & Zwick - tensile & compressive loading, torsional & shear loading*

**Mechanical Workshop**  
Contact: Mr David Robb  
16 Richmond Street, Glasgow, G1 1XQ  
T: 0141 548 3025  
W: <http://www.strath.ac.uk>  
e: [david.robb@strath.ac.uk](mailto:david.robb@strath.ac.uk)

Materials:  
Mechanical workshop



[Return to A – Z listing](#)

**University of Strathclyde**

**Electronic Workshop**  
Contact: John Maclean  
16 Richmond Street, Glasgow, G1 1XQ  
T: 0141 548 3140  
W: <http://www.strath.ac.uk>  
e: [j.mclean@strath.ac.uk](mailto:j.mclean@strath.ac.uk)

Technologies:  
*Portable appliance electrical safety testing & strain gauge amplifiers*



[Return to A – Z listing](#)

**University of West of Scotland (Paisley, Hamilton, Ayr & Dumfries)**

**School of Engineering and Science**

Contact: Dr John Hughes

*School of Engineering & Science*

T: 0141 848 3101

W: <http://www.paisley.ac.uk>

e: [John.Hughes@uws.ac.uk](mailto:John.Hughes@uws.ac.uk)

Structural:

Nanoindenter – continuous stiffness measurement for studying visco-elastic materials

Contact: Dr Wenzhong Zhu

T: 0141 848 3101

W: <http://www.paisley.ac.uk>

Materials:

Mechanical characterisation of construction materials

Structural:

Heavy structures laboratory



[Return to A – Z listing](#)



## Appendix 2 – Scottish-based companies involved in the LCBE

### Organisations involved in research in the LCBE sector

Key: 1 – academia; 2 – research organisations; 3 – commercial/industry organisations; 4 – no partners

	Organisation	Contact	email	1	2	3	4
12	Arup	Stuart Low	stuart.low@arup.com				X
13	Association for the Conservation of Energy	Chas Booth	chas@ukace.org	X	X	X	
16	Bailey Building Services	Rory Stewart	rory.stewart@ngbailey.co.uk			X	
17	Balfour Beatty Construction Scottish and Southern	Martin Gettings	martin.gettings@bbcl.co.uk			X	
18	BAM Construct UK Ltd	Jesse Putzel	jputzel@bam.co.uk	X	X	X	
21	Benjamin Tindall Architects	BenTindall	ben@benjaminsindallarchitects.co.uk			X	
24	Building Automation Solutions	Chris Evans	chris.evans@bas.uk.com			X	
25	Building Performance Centre, Edinburgh Napier University	Prof Sean Smith	se.smith@napier.ac.uk			X	
26	C Ris Energy	Colin Risbridger	colin@crisenergy.co.uk	X		X	
27	C4Ci Limited	James Sweet	james.sweet@c4ci.eu	X		X	
28	Caledonian Environment Centre, Glasgow Caledonian University	Charles Russell	Charles.Russell@gcal.ac.uk	X	X	X	
29	Carbon Trust	Renate Powell	renate.powell@carbontrust.co.uk				
31	Centre for Timber Engineering	Alastair Stupart	a.stupart@npaier.ac.uk	X	X	X	
32	CH2MHILL (IDC) UK Ltd				X		
33	CHAP CONSTRUCTION	MR J YOUNG	jyoung@chap.co.uk	X	X	X	
38	Construction Licensing Executive	Phil Cornish	phil@cornish4.wanadoo.co.uk			X	
42	Cruden Building & Renewals Limited	Allan Callaghan	a.callaghan@cbri.co.uk		X	X	
44	Cullen Building Products	Doug Cullen	dw.cullen@cullen-bp.com	X	X	X	
47	Deasil Energy Ltd.	George Wallis	george.wallis@deasil.co.uk		X		
48	DSSR Consulting Engineers	Beth Sandilands	b.sandilands@dssr.co.uk				X
49	DWR Architecture	Duncan Robson	drobson@dwrarchitect.com				X
50	EarthEnergy Ltd	Tim Rutherford	t.rutherford@earthenergy.co.uk			X	

51	EARTHWISE SCOTLAND LTD	ANGELA WILSON	AWILSON@EARTHWISESCOTLAND.CO.UK			X	
52	East Renfrewshire Council	Hamish Campbell	hamish.campbell@eastrenfrewshire.gov.uk	X		X	
60	Engineered S	Ian M. Arbon	ian.arbon@engineered-solutions.co.uk	X	X	X	
62	ESRU, University of Strathclyde	Cameron Johnstone	Cameron@esru.strath.ac.uk	X	X	X	
63	ESRU, University of Strathclyde	Professor Joe Clarke		X	X	X	
64	Facilitating Change	Chris Whitehead	chris@fchange.com	X		X	
65	Faithful+Gould	William Brownlie	william.brownlie@fgould.com		X	X	
66	Fife Council	Brian Wallace	brian.wallace@fife.gov.uk				X
67	Fife Council	Nicola Sloan	nicola.sloan@fife.gov.uk				X
69	Fulcrum Consulting	Iain Monteith	iain.monteith@fulcrumfirst.com			X	
70	Fulcrum Consulting	Andrew Thomson	andrew.thomson@fulcrumfirst.com	X		X	
80	Hanover (Scotland) Housing Association Ltd	Bruce Laing	blaing@hsha.org.uk			X	
82	Health Facilities Scotland	Peter Henderson	peter.henderson@hfs.scot.nhs.uk	X	X	X	
83	Helius Energy Plc	John Seed	john.seed@heliusenergy.com	X	X	X	
86	Historic Scotland	Roger Curtis	roger.curtis@scotland.gsi.gov.uk	X	X	X	
87	Holmes Partnership	Alasdair MacLean	alasdair.macleam@holmespartnership.com			X	
88	hri-architects	mark williams	markwilliams@hri-architects.com	X			
91	Intelligent Builders	Richard Everett	richard.everett@intelligentbuilders.co.uk	X	X	X	
94	John A. Fyall Design Consultant	J. Fyall	jfyall@buildingcompliance.org.uk				X
95	John Gilbert Architects	Paul Barham	paul.barham@johngilbert.co.uk	X	X	X	
98	Keppie Design Ltd	Andrew Pinkerton	apinkerton@keppiedesign.co.uk				X
100	kj tait engineers	mark curley	mark.curley@kjtait.com	X			
101	Kraft Architecture	Bruce Newlands	bruce@kraftarchitecture.co.uk	X		X	
102	KSLD	Kevan Shaw	kevan@kevan-shaw.com			X	
107	Link Group Ltd	Colin Culross	ccul@linkhaltd.co.uk		X	X	
108	Lister Housing Co-operative Ltd	Alistair Cant	acant@lister.coop	X	X		
110	LOMOND GROUP	ALAN SEATH	alanseath@lomondgroup.com		X	X	
111	Lomond Timber Frame Ltd	Stuart Rennie	stuart@lomondtimberframe.com	X		X	
114	Lovell Partnerships Limited (Scottish Region)	Elaine brennan	elaine.brennan@lovell.co.uk	X	X	X	
116	McCarthy and Stone Developments Ltd	Marc Primaroh	marc.primaroh@mccarthyandstone.co.uk				X
120	MITIE	Ian Storrar	ian.storrar@mitie.co.uk				X
123	Natural Power Consultants	Giles Dearden	giles@naturalpower.com	X	X	X	
124	NHBC	Malcolm MacLeod	mmacleod@nhbc.co.uk	X	X	X	
128	Northcroft	Ken Scott	kscott@northcroft.co.uk	X	X		

129	Northern Ireland Housing Executive	Andrew Frew	andy.frew@nihe.gov.uk	X			
131	Ore Valley Housing Association	Nick Clark	nclark@orevalleyha.org.uk	X	X	X	
132	Owens Corning (China) Trading Co. Ltd.	David Tang	david.tang@owenscorning.com	X	X		
133	Partners in Planning Architecture Design	Dakers Fleming	DakersFleming@mac.com		X	X	
134	Paton Plant Ltd	Matthew Meikle	matt.meikle@portakabin.co.uk			X	
135	Peikko Group	Phil Peacock	philip.peacock@peikko.com	X	X	X	
141	Powerwall systems	Alistair Campbell	acampbell@powerwall.co.uk	X	X		
150	Renew Services Ltd	Jon Cape	jon.cape@renew.coop	X		X	
152	REpower UK Ltd	Jayne Taylor	jayne.taylor@repower-uk.co.uk		X	X	
153	RICS Scotland	Mrs Sarah Speirs	sspeirs@rics.org	X	X	X	
155	RSP Consulting Engineers LLP	Owen Mc Nee	om@rsp.net	X		X	
156	RTC Timber Systems	Alastair Rennie	alastair.rennie@rtcts.co.uk	X		X	
158	School of Architecture - University of Dundee	Tamer Gado	t.gado@dundee.ac.uk	X	X	X	
159	Scotframe Timber Engineering	Bob Edwards	Bob.edwards@scotframe.co.uk	X		X	
161	Scottish & Southern Energy	Nigel Ellis	nigel.ellis@scottish-southern.co.uk	X	X	X	
162	Scottish Enterprise	Stuart Wilson	stuart.wilson@scotent.co.uk		X	X	
163	Scottish Enterprise	Jennifer Drummond	jennifer.drummond@scotent.co.uk	X	X	X	
165	Scottish Hydro Contracting	Paul Sheather	paul.sheather@sec.eu.com	X		X	
166	scottish natural heritage	sheila currie	sheila.currie@snh.gov.uk	X	X	X	
167	Scottish Power Limited	Willie Kinnaird	william.kinnaird@scottishpower.com	X	X	X	
168	Scottish Power	Callum McCosh	callum.mccosh@scottishpower.com	X		X	
169	Sir Robert McAlpine	John Brady	j.brady@sir-robert-mcalpine.com			X	
170	SNIFFER	Paul	paul@sniffer.org.uk				
171	SNV Consultants	Ian Watson	snvconsultants@btconnect.com	X	X	X	
174	Spirare International Ltd	Malcolm Mulheron	malcolm@spirare.co.uk	X	X	X	
176	Stewart Milne Group	Stewart Dalgarno	Sdalgarno@stewartmilne.com	X	X	X	
179	Sunvic Controls Ltd	Kevin Miller	kmiller@sunvic.co.uk	X		X	
180	Sustrans Scotland	Katharine Taylor	katharine.taylor@sustrans.org.uk	X	X		
181	Synergie Scotland Ltd	Guy Robertson	guy.robertson@synergiescotland.co.uk	X	X		
182	TAYSIDE CONTRACTS	EWAN DUNCAN	ewan.duncan@tayside-contracts.co.uk	X		X	
184	The Centre for the Built Environment	Branka Dimitrijevic	Branka.Dimitrijevic@gcal.ac.uk	X		X	
186	Thermal Economics Limited	Matt Tiller	matt@thermal-economics.co.uk	X	X		
187	Thomas Munro & co	Calum Maclean	c.maclean@thomasmunro.co.uk				X
189	Trillium	Simon Phillips	simon.phillips@trillium.co.uk	X			X

191	Turner & Townsend Project Management Ltd	Toby Kliskey	toby.kliskey@turntown.co.uk	X			
192	UK Value Management	Michael Graham	michael.graham@ukvaluemanagement.co.uk	X		X	
194	University of Dundee	Gordon Davies	g.e.davies@dundee.ac.uk	X			
195	University of Dundee	Burcu Bozdog	b.g.bozdog@dundee.ac.uk	X	X		
196	University of Glasgow	Albert Young	ayoung@admin.gla.ac.uk	X	X	X	
197	University of St Andrews	David Stutchfield	ds51@st-andrews.ac.uk	X			
198	University of Strathclyde	Dr Paul Strachan	paul@esru.strath.ac.uk	X	X	X	
199	University of Strathclyde	Patrick Hoy	p.hoy@strath.ac.uk	X	X	X	
201	Vent-Axia Limited	Ian Mitchell	ian.mitchell@vent-axia.com	X		X	
202	Wallace Whittle	John Finlayson	john.finlayson@walalcewhittle.com				X
204	Watts Group PLC	Martin Elsby	martin.elsby@watts-int.com	X		X	
208	Whole Life Consultants Ltd	Malcolm Horner	r.m.w.horner@dundee.ac.uk	X	X	X	
210	Windovation Ltd	Keith Nurcombe	keithn@supawood.co.uk				X
212	Wood Energy Ltd	Dan Gates	dan.gates@woodenergyltd.co.uk			X	

### Locations of research facilities being used

Key: 1 – Scotland; 2 – England; 3 – Northern Ireland; 4 – Wales; 5 – Elsewhere in Europe; 6 – Outside of Europe

	Organisation	Organisation research facilities						Partner research facilities						
		1	2	3	4	5	6	1	2	3	4	5	6	
1	A & J Stephen Builders Ltd													
2	abbey scotland ltd													
3	Aberdeen Harbour Board													
4	Aberdeenshire Council													
5	Aberdeenshire Council													
6	AC Gold Services Ltd													
7	ACTS Partnership Ltd													
8	AES Ltd													
9	Angus Council Housing Division													
10	Argyll Community Housing Association													
11	Arran Energy Ltd													
12	Arup		X											
13	Association for the Conservation of Energy		X					X	X	X	X	X		

14	Austin-Smith:Lord LLP												
15	AXA Insurance UK plc												
16	Bailey Building Services	X					X	X					
17	Balfour Beatty Construction Scottish and Southern	X	X										
18	BAM Construct UK Ltd		X										
19	Barron Evers Ltd												
20	BDG McColl												
21	Benjamin Tindall Architects	X										X	
22	Blackwood Partnership												
23	Blair Lodge Developments Ltd												
24	Building Automation Solutions		X				X		X	X			
25	Building Performance Centre, Edinburgh Napier University	X											
26	C Ris Energy	X					X	X					
27	C4Ci Limited	X			X	X	X					X	X
28	Caledonian Environment Centre, Glasgow Caledonian University	X					X	X				X	X
29	Carbon Trust												
30	Carden Consulting												
31	Centre for Timber Engineering	X						X		X			X
32	CH2MHILL (IDC) UK Ltd	X	X		X	X	X	X				X	X
33	CHAP CONSTRUCTION	X					X						
34	City Building (Glasgow) LLP												
35	Claiver Ltd T/A PlanToDig												
36	Clyde Gateway Urban Regeneration Company												
37	ConFor												
38	Construction Licensing Executive	X					X						
39	Construction Skills Partnership for Glasgow												
40	ConstructionSkills												
41	CRGP Ltd												
42	Cruden Building & Renewals Limited	X					X						
43	CSA												
44	Cullen Building Products	X					X	X					
45	Currie & Brown												
46	David Narro Associates												

47	Deasil Energy Ltd.	X						X	X	X	X	X
48	DSSR Consulting Engineers	X	X									
49	DWR Architecture	X										
50	EarthEnergy Ltd		X					X				
51	EARTHWISE SCOTLAND LTD		X		X							
52	East Renfrewshire Council	X										
53	EBBA Consultants											
54	eco beton ltee											
55	Edinburgh's Telford college											
56	Eildon Housing Association											
57	emotion energy											
58	Energy Developments ( Management) Ltd											
59	Energy-Link Partnership Limited											
60	Engineered S	X					X	X				X
61	Environmental Perspectives LLP											
62	ESRU, University of Strathclyde	X						X			X	X
63	ESRU, University of Strathclyde	X					X	X	X	X	X	X
64	Facilitating Change	X					X	X				
65	Faithful+Gould							X				
66	Fife Council											
67	Fife Council	X										
68	Forth Construction											
69	Fulcrum Consulting		X					X				
70	Fulcrum Consulting	X	X				X	X				
71	gifford											
72	Gilberts											
73	Gladedale											
74	Glasgow Metropolitan College											
75	Glasgow Metropolitan College											
76	Grontmij											
77	Grontmij											
78	GSG Domestic Energy											
79	Hadden Construction Limited											
80	Hanover (Scotland) Housing Assciation Ltd	X	X				X	X				

81	Harley Haddow LLP												
82	Health Facilities Scotland	X	X	X	X			X	X	X	X		
83	Helius Energy Plc	X	X			X	X	X	X			X	X
84	Henderson Warnock												
85	Highland Council												
86	Historic Scotland	X						X	X				
87	Holmes Partnership	X											
88	hri-architects	X						X					
89	Hulley & Kirkwood												
90	Infinis Ltd												
91	Intelligent Builders	X	X	X	X								
92	Jacobs Engineering Uk Ltd												
93	jaydee heating and electrical												
94	John A. Fyall Bsc(Hons)FBEng. Bld.Eng. Design Consultant	X											
95	John Gilbert Architects	X						X					
96	jsb joinery&building contractor ltd												
97	kennedy twaddle architectural design ltd												
98	Keppie Design Ltd												
99	Kirk and Marsh Ltd												
100	kj tait engineers	X						X					
101	Kraft Architecture	X						X					
102	KSLD	X						X	X				
103	Land Engineering												
104	Land Engineering												
105	Link Group Housing Association												
106	Link Group Ltd												
107	Link Group Ltd	X						X					
108	Lister Housing Co-operative Ltd							X					
109	Lomond energy												
110	LOMOND GROUP							X	X			X	
111	Lomond Timber Frame Ltd	X						X					
112	Loretto Housing Association												
113	Lothian & Borders Police												
114	Lovell Partnerships Limited (Scottish Region)	X											

115	Mansell													
116	McCarthy and Stone Developments Ltd		X											
117	MEXEL DESIGN CONSULTANTS													
118	MGP ARCHITECTS													
119	Miller Construction													
120	MITIE	X												
121	mkm consultancy													
122	Muirfield Contracts Ltd													
123	Natural Power Consultants	X	X			X		X	X			X	X	
124	NHBC		X					X	X					
125	NHS Tayside													
126	NLC													
127	North Harris Trust													
128	Northcroft	X	X					X	X					
129	Northern Ireland Housing Executive		X	X								X		
130	On Site Generation Ltd													
131	Ore Valley Housing Association	X				X	X	X						
132	Owens Corning (China) Trading Co. Ltd.	X				X	X							
133	Partners in Planning Architecture Design	X	X											
134	Paton Plant Ltd		X					X	X					
135	Peikko Group					X						X		
136	PERT BRUCE CONSTRUCTION LTD													
137	Perth & Kinross Council													
138	Perth & Kinross Council, Property division													
139	Perth and Kinross Council													
140	Places for People													
141	Powerwall systems	X						X	X			X	X	
142	PR Design													
143	Quigley Associates													
144	R.A.Wilson Ltd													
145	Ramboll UK													
146	Ramboll Whitbybird													
147	RD Energy Solutions													
148	Reid Kerr College													



149	Reidvale Housing Association Ltd												
150	Renew Services Ltd	X						X	X				
151	Renfrewshire Council												
152	REpower UK Ltd					X						X	
153	RICS Scotland	X	X	X	X	X	X	X	X	X	X	X	X
154	Robertson Construction Northern Limited												
155	RSP Consulting Engineers LLP	X						X					
156	RTC Timber Systems	X						X					
157	Rybka Ltd												
158	School of Architecture - University of Dundee	X						X					
159	Scotframe Timber Engineering	X						X					
160	Scott Wilson												
161	Scottish & Southern Energy	X	X										
162	Scottish Enterprise	X						X	X				
163	Scottish Enterprise	X						X	X				
164	Scottish Enterprise												
165	Scottish Hydro Contracting	X	X										
166	scottish natural heritage	X						X	X		X		
167	Scottish Power Limited	X	X					X	X				
168	Scottish Power	X	X					X	X				
169	Sir Robert McAlpine							X	X	X	X	X	X
170	SNIFFER												
171	SNV Consultants	X						X	X				
172	South Lanarkshire Council												
173	SPIE Matthew Hall												
174	Spirare International Ltd	X		X		X	X	X	X	X			X
175	steve luker assocaites ltd												
176	Stewart Milne Group	X	X					X	X	X		X	
177	Strathclyde Fire & Rescue, Property Services												
178	Summers-Inman												
179	Sunvic Controls Ltd	X							X			X	X
180	Sustrans Scotland	X	X										
181	Synergie Scotland Ltd	X											
182	TAYSIDE CONTRACTS	X						X				X	

183	The Boss Group																			
184	The Centre for the Built Environment	X							X											
185	The Electric Heating Company Ltd																			
186	Thermal Economics Limited		X																	
187	Thomas Munro & co	X																		
188	topek limited																			
189	Trillium	X	X		X						X									
190	Tuckeys Surveying Limited																			
191	Turner & Townsend Project Management Ltd	X	X																	
192	UK Value Management																			X
193	University of Abertay Dundee																			
194	University of Dundee	X																		
195	University of Dundee	X																		
196	University of Glasgow	X								X										
197	University of St Andrews	X																		
198	University of Strathclyde	X																		
199	University of Strathclyde	X	X	X	X	X	X													
200	VELUX Company Ltd																			
201	Vent-Axia Limited		X			X	X		X											
202	Wallace Whittle																			
203	Waterloo Quay properties Limited																			
204	Watts Group PLC	X	X	X	X	X			X	X	X	X	X							
205	wensley & Lawz																			
206	West Lothian College																			
207	West Lothian Council																			
208	Whole Life Consultants Ltd	X								X									X	
209	William Wallace & Son Ltd																			
210	Windovation Ltd		X																	
211	Wise Property Care Ltd																			
212	Wood Energy Ltd		X			X													X	
213	Zurich Building Guarantee																			

### Appendix 3 – Consultation feedback from the industry

Question 1:	What does the industry require to develop low carbon products and technologies which can be used to meet future targets?
Response 1	<p>Tactical Funding Opportunities to allow entrepreneurs / SME's to investigate feasibility options for the use of home grown materials. The use of short-term tactical funding opportunities coupled with investment in prototyping facilities possibly shared by Scotland's Universities would be a worthwhile initiative.</p> <p>Greater business support for SME's aiming to prototype and develop low carbon home grown products, especially products focusing on passive solutions rather than active technologies. Legislation strategy should be clearly signposted and communicated to the industry to ensure that marketing and product development is targeted directly at emerging markets.</p>
Response 2	<p>We now have a range of low carbon solutions that are technically proven. The emphasis now needs to shift to commercialisation in the marketplace. Consequently it is legislative drivers such as the Renewable Heat Incentive and Feed in Tariffs that will make the difference to adoption rates.</p> <p>Education is important. Let's demystify the technologies and concentrate on what they give us!</p>
Response 3	Clear legislation, Client awareness, Sufficient funding parameters.
Response 4	Clear legislative guidelines; Funding for R&D, testing, demonstration; Mechanism for giving consistent assessment of new products, solutions and technologies.
Response 5	<p>Proven technologies linked to verified data.</p> <p>Proper and timely legislation, too much prevarication on the Governments part at present. Also cohesive strategies between the UK and devolved Governments to ensure compatible markets.</p> <p>Market acceptance of new technologies – design teams will not specify unless products meet required standards and gain benefit in calculation procedures.</p>

Response 6	Market demand, investment support and legislation.
Question 2:	Is there a demand for greater support for innovation within the low carbon built environment?
Response 1	Greater need for replicable solutions rather than bespoke solutions. This will require sponsored research and demonstration projects and presents an opportunity for greater support.
Response 2	The 'contractor' mentality that prevails in the construction industry results in a delivery focus which, taken to the extreme, can stifle innovation and creativity. New measures are often rejected on cost grounds.
Response 3	Government should provide as much encouragement and support to companies that are embracing innovation within the LCBE as they possibly can. The whole industry will not take to mass change out of desire, so the more support for those that do, the better.
Response 4	A consistent barrier to innovation is the lack of, or hard to access, funding.
Response 5	There are substantial research and development costs in this market as whilst low carbon is a driver, products also have to comply with H&S, fire, structural and other legislation.
Response 6	Yes as these technologies require approval so that they are accepted into SAP/SBEM and warrant by NHBC and Zurich, rigorous data has to be provided.
Question 3:	What is your view of current funding support being provided by Scottish Enterprise?


Response 1	Greater emphasis required on product development and funds for carrying out highly innovative demonstration projects. SMART Funding to acknowledge the level of innovation of low carbon products must be considered in the context of potential carbon emission reduction contribution.
Response 2	A more accurate answer would be 'it depends' – on industry sector, on immediate priorities, on who you engage with within the organisation.
Response 3	Inadequate.
Response 4	Not aware of what SE currently offer.
Response 5	I was not aware that Scottish enterprise funded anything in the low carbon built environment or how to access this funding.  I have heard that there are some Universities doing some research but they do not have a good track record of taking anything to market and have no idea about commercial realities.
Response 6	It is not clear who you contact if funding is required and what the timescales are to receive funding.
Question 4:	Have you engaged with Scottish Enterprise in applying for innovation support funding?
Response 1	The support given has been good but expertise and experience in low carbon and built environment product development appears to be lacking in the people spoken too.
Response 2	We engage with Scottish Enterprise as a company on many levels with varying success.

Response 3	Failed to make any progress with support funding through SE. Unsure why.
Response 4	No.
Response 5	No.
Response 6	No.
Question 5:	Is there a need for additional support to be provided by Scottish Enterprise (and other public sector organisations)?
Response 1	A specific Low Carbon SMART Funding Programme to acknowledge the level of innovation of low carbon products could be considered in the context of potential carbon emission reduction contribution. Wider support streams for highly innovative demonstration projects that include key Government indicators.
Response 2	Scottish Enterprise has an important facilitation role to fulfill especially when we need to bring together companies involved in a complex supply chain.
Response 3	Easier and clearer to understand funding routes for companies (small or large) who are undertaking innovative r&d in LCBE.
Response 4	SE has a role to play in supporting Scottish businesses to meet future challenges driven by proposed future legislation.

Response 5	A structured scheme is required giving clear guidelines through the application process and what funding can be used for. Linkages to other sources of funding and support through the innovation process including technical support on standards and legislation.
Response 6	Yes as stated earlier, it is a requirement of modelling process and insurance requirements that information on product performance is provided. With the Scottish Climate Change Bill signalling greater requirement for low carbon products there should be a support mechanism in place for companies.
Further comments	
	<p>Scottish Enterprise to partner with HE Establishments to enhance prototyping / manufacturing facilities and low carbon expertise in Scotland.</p> <p>A central and easily accessible facility to test new products is essential, possibly of providing 'testing' 100% grants to trial new products.</p> <p>Help to fund IP Applications and advice.</p>
	Ultimately success is down to the people involved in any bid process – we need a proactive approach at all levels.
	The construction industry is on its knees at the moment and legislative changes are fast approaching. Developers in Scotland have no idea what products will be required by 2016. Our manufacturing base for renewables is non existing in Scotland and we pay a cost premium for products (well tested and government supported from abroad). We then further support these foreign products with grants for their installation. I think we have the technical capability but lack the impetus or funding to take forward to production.

**Appendix 4 – Copies of pro-formas received by BRE**

**BRE Low carbon built environment**

Innovation support consultation 

**Q1. What does the industry require to develop low carbon products and technologies which can be used to meet future targets?**

*Please list with explanation if required (e.g. legislative drivers, strategic funding support mechanisms, etc)*

Tactical Funding Opportunities to allow entrepreneurs / SME's to investigate feasibility options for the use of home grown materials. The use of short-term tactical funding opportunities coupled with investment in prototyping facilities possibly shared by Scotland's Universities would be a worthwhile initiative.

Greater business support for SME's aiming to prototype and develop low carbon home grown products, especially products focusing on passive solutions rather than active technologies. Legislation strategy should be clearly signposted and communicated to the industry to ensure that marketing and product development is targeted directly at emerging markets.

**Q2. Is there a demand for greater support for innovation within the low carbon built environment?**

Yes	X	No		Don't know	
-----	---	----	--	------------	--

*If 'Yes' please elaborate.*

Greater need for replicable solutions rather than bespoke solutions. This will require sponsored research and demonstration projects and presents an opportunity for greater support.

*If 'No' please elaborate on the reasons why (e.g. lack of demand, investment, etc).*



**Q3. What is your view of current funding support being provided by Scottish Enterprise?**

Inadequate	<input checked="" type="checkbox"/>	Adequate	<input type="checkbox"/>	Don't know	<input type="checkbox"/>
<p><i>Elaborate if required.</i></p> <p>Greater emphasis required on product development and funds for carrying out highly innovative demonstration projects. SMART Funding to acknowledge the level of innovation of low carbon products must be considered in the context of potential carbon emission reduction contribution.</p>					

**Q4. Have you engaged with Scottish Enterprise in applying for innovation support funding?**

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	Don't know	<input type="checkbox"/>
<p><i>If 'Yes' please elaborate (e.g. good or bad experience).</i></p> <p>The support given has been good but expertise and experience in low carbon and built environment product development appears to be lacking in the people spoken too.</p>					

**Q5. Is there a need for additional support to be provided by Scottish Enterprise (and other public sector organisations)?**

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	Don't know	<input type="checkbox"/>
<p><i>If 'Yes' please elaborate.</i></p> <p>A specific Low Carbon SMART Funding Programme to acknowledge the level of innovation of low carbon products could be considered in the context of potential carbon emission reduction contribution. Wider support streams for highly innovative demonstration projects that include key Government indicators.</p>					

**Any further comments?**

<p>Scottish Enterprise to partner with HE Establishments to enhance prototyping / manufacturing facilities and low carbon expertise in Scotland.</p> <p>A central and easily accessible facility to test new products is essential, possibly of providing 'testing' 100% grants to trial new products.</p> <p>Help to fund IP Applications and advice.</p>
--

**BRE would like to thank you for participating in this short survey. Feedback received will be treated in confidence, however if you wish, BRE are happy to reference your comments in reports related to this research. Please provide your details below.**

Name	<a href="#">Bruce Newlands</a>
Organisation	<a href="#">Kraft Architecture Ltd</a>
email	<a href="mailto:bruce@kraftarchitecture.co.uk">bruce@kraftarchitecture.co.uk</a>

David Kelly  
BRE  
Tel: 01355 576235  
email: [kellyd@bre.co.uk](mailto:kellyd@bre.co.uk)

## BRE Low carbon built environment

Innovation support consultation **bre**

**Q1. What does the industry require to develop low carbon products and technologies which can be used to meet future targets?**

*Please list with explanation if required (e.g. legislative drivers, strategic funding support mechanisms, etc)*

We now have a range of low carbon solutions that are technically proven. The emphasis now needs to shift to commercialisation in the marketplace. Consequently it is legislative drivers such as the Renewable Heat Incentive and Feed in Tariffs that will make the difference to adoption rates.

Education is important. Let's demystify the technologies and concentrate on what they give us!

**Q2. Is there a demand for greater support for innovation within the low carbon built environment?**

Yes	<input checked="" type="checkbox"/>	No		Don't know	
<i>If 'Yes' please elaborate.</i>					
The 'contractor' mentality that prevails in the construction industry results in a delivery focus which, taken to the extreme, can stifle innovation and creativity. New measures are often rejected on cost grounds.					
<i>If 'No' please elaborate on the reasons why (e.g. lack of demand, investment, etc).</i>					

**Q3. What is your view of current funding support being provided by Scottish Enterprise?**

Inadequate		Adequate		Don't know	<input checked="" type="checkbox"/>
<p><i>Elaborate if required.</i></p> <p>A more accurate answer would be 'it depends' – on industry sector, on immediate priorities, on who you engage with within the organisation.</p>					

**Q4. Have you engaged with Scottish Enterprise in applying for innovation support funding?**

Yes	<input checked="" type="checkbox"/>	No		Don't know	
<p><i>If 'Yes' please elaborate (e.g. good or bad experience).</i></p> <p>We engage with Scottish Enterprise as a company on many levels with varying success</p>					

**Q5. Is there a need for additional support to be provided by Scottish Enterprise (and other public sector organisations)?**

Yes	<input checked="" type="checkbox"/>	No		Don't know	
<p><i>If 'Yes' please elaborate.</i></p> <p>Scottish Enterprise have an important facilitation role to fulfill especially when we need to bring together companies involved in a complex supply chain.</p>					

**Any further comments?**

<p>Ultimately success is down to the people involved in any bid process – we need a proactive approach at all levels.</p>
---

**BRE would like to thank you for participating in this short survey. Feedback received will be treated in confidence, however if you wish, BRE are happy to reference your comments in reports related to this research. Please provide your details below.**

Name	Catherine Cooper
------	------------------

Organisation	Scottish and Southern Energy
email	Catherine.cooper@scottish-southern.co.uk

David Kelly  
BRE  
Tel: 01355 576235  
email: kellyd@bre.co.uk

**BRE Low carbon built environment**

Innovation support consultation **bre**

**Q1. What does the industry require to develop low carbon products and technologies which can be used to meet future targets?**

*Please list with explanation if required (e.g. legislative drivers, strategic funding support mechanisms, etc)*

Market demand, investment support and legislation

**Q2. Is there a demand for greater support for innovation within the low carbon built environment?**

Yes	√	No		Don't know	
<i>If 'Yes' please elaborate.</i>					
Yes as these technologies require approval so that they are accepted into SAP/SBEM and warrant by NHBC and Zurich, rigorous data has to be provided.					
<i>If 'No' please elaborate on the reasons why (e.g. lack of demand, investment, etc).</i>					

**Q3. What is your view of current funding support being provided by Scottish Enterprise?**

Inadequate		Adequate		Don't know	√
------------	--	----------	--	------------	---

*Elaborate if required.*  
 It is not clear who you contact if funding is required and what the timescales are to receive funding.

**Q4. Have you engaged with Scottish Enterprise in applying for innovation support funding?**

Yes		No	√	Don't know	
<i>If 'Yes' please elaborate (e.g. good or bad experience).</i>					

**Q5. Is there a need for additional support to be provided by Scottish Enterprise (and other public sector organisations)?**

Yes	√	No		Don't know	
<i>If 'Yes' please elaborate.</i> Yes as stated earlier, it is a requirement of modelling process and insurance requirements that information on product performance is provided. With the Scottish Climate Change Bill signalling greater requirement for low carbon products their should be a support mechanism in place for companies/					

**Any further comments?**

**BRE would like to thank you for participating in this short survey. Feedback received will be treated in confidence, however if you wish, BRE are happy to reference your comments in reports related to this research. Please provide your details below.**

Name	
Organisation	
email	

David Kelly  
BRE  
Tel: 01355 576235  
email: kellyd@bre.co.uk



**BRE Low carbon built environment**

Innovation support consultation **bre**

**Q1. What does the industry require to develop low carbon products and technologies which can be used to meet future targets?**

*Please list with explanation if required (e.g. legislative drivers, strategic funding support mechanisms, etc)*

Clear legislation  
 Client awareness  
 Sufficient funding parameters

**Q2. Is there a demand for greater support for innovation within the low carbon built environment?**

Yes	✓	No		Don't know	
<i>If 'Yes' please elaborate.</i>					
Government should provide as much encouragement and support to companies that are embracing innovation within the LCBE as they possibly can. The whole industry will not take to mass change out of desire, so the more support for those that do, the better.					
<i>If 'No' please elaborate on the reasons why (e.g. lack of demand, investment, etc).</i>					

**Q3. What is your view of current funding support being provided by Scottish Enterprise?**

Inadequate	✓	Adequate		Don't know	
------------	---	----------	--	------------	--

*Elaborate if required.*

**Q4. Have you engaged with Scottish Enterprise in applying for innovation support funding?**

Yes	✓	No		Don't know	
<p><i>If 'Yes' please elaborate (e.g. good or bad experience).</i></p> <p>Failed to make any progress with support funding through SE. Unsure why.</p>					

**Q5. Is there a need for additional support to be provided by Scottish Enterprise (and other public sector organisations)?**

Yes	✓	No		Don't know	
<p><i>If 'Yes' please elaborate.</i></p> <p>Easier and clearer to understand funding routes for companies (small or large) who are undertaking innovative r&amp;d in LCBE.</p>					

**Any further comments?**

**BRE would like to thank you for participating in this short survey. Feedback received will be treated in confidence, however if you wish, BRE are happy to reference your comments in reports related to this research. Please provide your details below.**

Name	
Organisation	
email	

David Kelly  
BRE  
Tel: 01355 576235  
email: kellyd@bre.co.uk

**BRE Low carbon built environment**

Innovation support consultation **bre**

**Q1. What does the industry require to develop low carbon products and technologies which can be used to meet future targets?**

*Please list with explanation if required (e.g. legislative drivers, strategic funding support mechanisms, etc)*

Clear legislative guidelines  
 Funding for R&D, testing, demonstration  
 Mechanism for giving consistent assessment of new products, solutions and technologies

**Q2. Is there a demand for greater support for innovation within the low carbon built environment?**

Yes	X	No		Don't know	
<i>If 'Yes' please elaborate.</i>					
A consistent barrier to innovation is the lack of, or hard to access, funding					
<i>If 'No' please elaborate on the reasons why (e.g. lack of demand, investment, etc).</i>					

**Q3. What is your view of current funding support being provided by Scottish Enterprise?**

Inadequate		Adequate		Don't know	X
------------	--	----------	--	------------	---

*Elaborate if required.*  
 Not aware of what SE currently offer

**Q4. Have you engaged with Scottish Enterprise in applying for innovation support funding?**

Yes		No	X	Don't know	
<i>If 'Yes' please elaborate (e.g. good or bad experience).</i>					

**Q5. Is there a need for additional support to be provided by Scottish Enterprise (and other public sector organisations)?**

Yes	X	No		Don't know	
<i>If 'Yes' please elaborate.</i> SE has a role to play in supporting Scottish businesses to meet future challenges driven by proposed future legislation.					

**Any further comments?**

**BRE would like to thank you for participating in this short survey. Feedback received will be treated in confidence, however if you wish, BRE are happy to reference your comments in reports related to this research. Please provide your details below.**

Name	
Organisation	
email	

David Kelly  
BRE  
Tel: 01355 576235  
email: kellyd@bre.co.uk

**BRE Low carbon built environment**

Innovation support consultation **bre**

**Q1. What does the industry require to develop low carbon products and technologies which can be used to meet future targets?**

*Please list with explanation if required (e.g. legislative drivers, strategic funding support mechanisms, etc)*

Proven technologies linked to verified data.  
 Proper and timely legislation, to much prevarication on the governments part at present.  
 also cohesive strategies between the UK and devolved governments to ensure compatible markets  
 Market acceptance of new technologies – design teams will not specify unless products meet required standards and gain benefit in calculation procedures

**Q2. Is there a demand for greater support for innovation within the low carbon built environment?**

Yes	✓	No		Don't know	
<p><i>If 'Yes' please elaborate.</i>                  There are substantial research and devopment costs in this market as whilst low carbon is a driver, products also have to comply with H&amp;S, fire, structural and other legislation</p>					
<p><i>If 'No' please elaborate on the reasons why (e.g. lack of demand, investment, etc).</i></p>					

**Q3. What is your view of current funding support being provided by Scottish Enterprise?**

Inadequate	✓	Adequate		Don't know	
------------	---	----------	--	------------	--

*Elaborate if required.*  
 I was not aware that Scottish enterprise funded anything in the low carbon built environment or how to access this funding.  
 I have heard that there are some Universities doing some research but they do not have a good track record of taking anything to market and have no idea about commercial realities

**Q4. Have you engaged with Scottish Enterprise in applying for innovation support funding?**

Yes		No	✓	Don't know	
<i>If 'Yes' please elaborate (e.g. good or bad experience).</i>					

**Q5. Is there a need for additional support to be provided by Scottish Enterprise (and other public sector organisations)?**

Yes	✓	No		Don't know	
<i>If 'Yes' please elaborate.</i> A structured scheme is required giving clear guidelines through the application process and what funding can be used for. Linkages to other sources of funding and support through the innovation process including technical support on standards and legislation.					

**Any further comments?**

The construction industry is on its knees at the moment and legislative changes are fast approaching. Developers in Scotland have no idea what products will be required by 2016. Our manufacturing base for renewables is non existing in Scotland and we pay a cost premium for products (well tested and government supported from abroad). We then further support these foreign products with grants for their installation. I think we have the technical capability but lack the impetus or funding to take forward to production

**BRE would like to thank you for participating in this short survey. Feedback received will be treated in confidence, however if you wish, BRE are happy to reference your comments in reports related to this research. Please provide your details below.**



Name	
Organisation	
email	

David Kelly  
BRE  
Tel: 01355 576235  
email: kellyd@bre.co.uk

**Appendix 5 – Supply chain database**

Company Name	Company Address	Main Contact	Position	Contact Details	Notes / Extra info
Windovation Ltd					No Scottish address. mail@wvnet.co.uk
Sunvic Controls Ltd	Sunvic Controls Ltd Units 1 and 2 Block 1 251 Low Waters road, Cadzow Industrial Estate Hamilton ML3 7QU	D Whigham	CEO	01698 812 944	enquiries@sunvic.co.uk
Peikko Group	Ridgeway DL5 6SP Newton Aycliffe	John Metcalfe	Managing Director	01325 318 619 or 07764660906	No Scottish address
RTC Timber	RTC Timber Systems Moycroft Elgin Moray IV30 1XY	J Carpenter	Director of Timber Frames Sales	01343 547 474 ext 237	
		W Beaton	Director of Design	01343 547474 ext 233	
		R Grant	Director of Production	01343 547474 ext 236	
AES Ltd	2 Fidra Avenue Burntisland, Fife KY3 0AZ	Steve Docker	Chief Executive	01592 871118	CE not based in Scotland

LCBE Phase 2 Report

Lomond Timber Frame Ltd	Lomond Timber Frame Unit 1, Lomond Business Park, Baltimore Road, GLENROTHES, Fife, KY6 2PJ	Stuart H Rennie	Managing Director	01592 776 666	
William Wallace & Sons Ltd	Highland Avenue, Sandbank Industrial Estate, Dunoon	David McKenzie	Renewables Consultant	01369 702 143	
Fife Council	Fife Council Fife House North Street Glenrothes KY7 5LT	Ronnie Hinds	Chief Executive	08451 55 55 55 ext 442332	
SPIE Matthew Hall	SPIE Matthew Hall Mcafferty House 99 Firhill Road Glasgow G20 7BE	Grahame Ludlow	Chairman and C.E.O		
		Eddie O'Donnell	Business Development Manager (Scottish Contact)	0141 945 8900	
Bailey Building Services	Bairds Brae, Glasgow, G4 9SW, United Kingdom	Nimble Thompson	Chairman	(01382) 561485	Chairman is not located in the Glasgow office
Emotion Energy	Kingfisher House, Auld Mart Business Park, Milnathort, KY13 9DA			0870 9619 170	<a href="mailto:info@emotionenergy.co.uk">info@emotionenergy.co.uk</a>

LCBE Phase 2 Report

Earthwise Scotland Ltd	9a Netherton Business Centre Kemnay Inverurie Aberdeenshire AB51 5LX	Jonathan Wilson	Managing Director	01467 641640	
Construction Licensing Executive	Construction Licensing Executive Ltd P.O. Box 23605 Edinburgh Midlothian EH3 7ZD	Phil Cornish	Chairman	0131 226 8596	
Reidvale Housing Associations	Reidvale Housing Association 13-15 Whitevale Street Glasgow G31 1QW	Rob Joiner	Director	0141 554 2406	
Reid Kerr College	Reid Kerr College Renfrew Road Paisley Renfrewshire PA3 4DR Scotland	Joe Mooney	Principal	0141 581 2201	
University of St Andrews	2 St. Marys Pl St. Andrews, KY16 9UZ	Louise Richardson	Principal	01334 462 544	
Abbey Scotland Ltd	Abbey (Scotland) Ltd 1875 Great Western Rd Glasgow, Scotland G13 2YD	Gordon Bennett	Director	0141 958 1278	-

LCBE Phase 2 Report

Health Facilities Scotland	Health Facilities Scotland 4th Floor Empire House 131 West Nile Street Glasgow G1 2RX	Paul Kingsmore	Director	0141 332 3455	-
Eildon Housing Association	The Weaving Shed, Ettrick Mill, Dunsdale Road, Selkirk, Scottish Borders, TD7 5EB, Scotland	Colin Peter Lee	Chief Executive Officer	01750 725 900	
Link Group Ltd	Link Group, Link House, 2C New Mart Road Edinburgh, EH14 1RL	Craig Sanderson	Chief Executive	08451 559 559	
Argyll Community Housing Association	Dalriada House Lochnell St, Lochgilphead, PA31 8ST	Alastair MacGregor	Chief Executive	01546 604 800	
West Lothian College	Almondvale Crescent Livingston West Lothian EH54 7EP	Mhairi Laughlin	Principal and Chief Executive	01506 418 181	
Aberdeen Harbour Board	16 Regent Quay Aberdeen, AB11 5SS	Colin Parket	Chief Executive	01224 597 000	
Perth & Kinross Council	2 High St Perth, PH1 5PH	Bernadette Malone	Chief Executive	01738 475 000	
Lister Housing Co-operative Ltd	36 Lauriston Place, Edinburgh, EH3	Alistair Cant	Director	0131 229 6176	
Angus Council Housing Division	Angus House, Orchardbank Business Park, Forfar DD8 1AX	David Sawers	Chief Executive	01307 476 100	

LCBE Phase 2 Report

Lothian & Borders Police	Lothian and Borders Police Force Headquarters Fettes Avenue EDINBURGH EH4 1RB.	David Strang	Chief Constable	0131 311 3131	
Hanover (Scotland) Housing Association	95 McDonald Road Edinburgh EH7 4NS	Douglas T Boyd	Chair	0131 557 0598	
Edinburgh's Telford College	Edinburgh's Telford College 350 West Granton Road Edinburgh EH5 1QE	Ed Weeple	Chair	0131 559 4000	
Henderson Warnock	38 New City Road, Glasgow, G4 9JT.	Neil Henderson	Director	0141 353 2444	
Barron Evers Ltd	Barron Evers Ltd 3-4 Woodside Place Glasgow G3 7QF	Paul Winstanley	Technical Director	0141 353 5020	<a href="mailto:info@barronevers.com">info@barronevers.com</a>
MGP Architects	Cathcart House 20 Cathcart Street Ayr, Ayrshire KA7 1BJ			01292 263 371	
Thomas Munro & co	Thomas Munro & Co, 62 Academy Street, Inverness, IV1 1LP	Colin Munro	Acting Principal	01463 232 233	
Ramboll Whitbybird	Ramboll UK Newton House, 457 Sauchiehall Street, Glasgow G2 3LG, United Kingdom	Bill Richie	Director	0141 353 0005	

LCBE Phase 2 Report

Partners in Planning Architecture Design	Forgandakey Forgan NEWPORT-ON-TAY Fife DD6 8RB	Dakers Fleming	Principal	01382 543 586	
BDG McColl	BDG McColl 124.125 Princes Street Edinburgh EH2 4AD	Nick Kemp	Managing Director	0131 220 3322	
Watts Group PLC	176 Bath Street Glasgow G2 4HG	Andrew Gear	Director	0141 353 2211	
Currie & Brown	140, West Campbell St, Glasgow, Lanarkshire G2 4TZ			0141 221 0313	
PR Design	PR-Design Studio 33 33 Ashley Terrace Edinburgh EH11 1RE	Peter Robinson	Director	0131 3462600	
CH2MHILL (IDC) UK Ltd	Avon House Kensington Village Avonmore Road West Kensington London W14 8TS	Roy Hill	Managing Director	020 7471 6100	No Scottish details
RMJM (Scotland) Ltd	Skypark SP1 8 Elliot Place Glasgow G3 8EP United Kingdom	Peter Morrison	CEO	0141 275 3410	glasgow@rmjm.com
Turner & Townsend Project	33 Bothwell Street, Glasgow, G2 6NL	Tim Wray	Chairman	0141 221 5358	

Management Ltd					
Faithful + Gould	Canning Exchange 10 Canning Street Edinburgh, EH3 8EG	Campbell Gray	Director	0131 221 5600	
Keppie Design Ltd	160 West Regent Street GLASGOW G2 4RL	Peter Scott	Chairman	0141 204 0066	
DWR Architecture	56 Barclay Park, Aboyne Aberdeenshire AB34 5JF United Kingdom	Duncan W. Robson	Principal	013398 85407	
Kirk and Marsh Ltd	Kirk and Marsh Ltd, Springfield House, Laurelhill Business Park, Stirling FK7 9JQ			01786 406 464	<a href="mailto:info@kirkandmarsh.co.uk">info@kirkandmarsh.co.uk</a>
Wise Property Care Ltd	8 Muriel Street, Barrhead, Glasgow G78 1QB	Les Meikle	Managing Director	0141 876 0300	-
Blair Lodge Developments Ltd	21, Redding Rd, Brightons, Falkirk, Stirlingshire FK2 0AA	Roy Guthrie	Managing Director	01324 718373	<a href="mailto:info@theheatpumppeople.co.uk">info@theheatpumppeople.co.uk</a>
Lomond Group	15 Merchiston Industrial Estate Bankside Falkirk FK2 7PD			01324 612 222	<a href="mailto:info@lomondplant.co.uk">info@lomondplant.co.uk</a>
JSB Joinery and Building Contractor Ltd	93 Downcraig Road, Glasgow G45 9PB			0141 630 0940	<a href="mailto:admin@jsbuilders.co.uk">admin@jsbuilders.co.uk</a>



LCBE Phase 2 Report

Hadden Construction Limited	Hadden Construction Ltd, 1 Maidenplain Place, Aberuthven, Perthshire, PH3 1EL	Scott Hadden	Chairman	01764 660 011	
Pert Bruce Construction Ltd	Munros House Broomfield Industrial Estate Broomfield Road Montrose DD10 8SY	Craig Bruce	Joint Managing Director	01674 673883 ext 201	
Lovell Partnerships Limited (Scottish Region)	Lovell House Parkway Court 271 Springhill Parkway Glasgow Business Park Glasgow North Lanarkshire G69 6GA			0141 773 5710	bizdev.scotland@lovell.co.uk or enquiries@lovell.co.uk
Robertson Construction Northern Limited	10 Perimeter Road Pinefield Elgin IV30 6AE	Bill Robertson	Executive Chairman	01343 548621	EC not based in Scottish office
Muirfield Contracts Ltd	Strathnaver, 1 George Buckman Drive, Camperdown Industrial Park, Dundee, DD2 3SP	Maurice McKay	Managing Director	01382 810 000	
Balfour Beatty Construction Scottish and Southern	Dean House, 24 Ravelston Terrace, Edinburgh, EH4 3TP	Bob Clark	Managing Director	0161 972 7500	

LCBE Phase 2 Report

Cruden Building and Renewals Limited	Cruden Campus Cambuslang Investment Park 5 Clydesmill Road Cambuslang Glasgow G32 8RE	Donald Grant Lyon	Managing Director	0141 646 5400	<a href="mailto:cruden@cbri.co.uk">cruden@cbri.co.uk</a>
City Building (Glasgow) LLP	City Building (Glasgow) LLP 350 Darnick Street Glasgow G21 4BA	Willie Docherty	Managing Director	0141 287 2200	
BAM Construct UK Ltd	Kelvin House, Buchanan Gate, Stepps, Glasgow, Lanarkshire G33 6FB	Richard Gregory	Chief Executive	0141 779 8888	CE not based in Scottish office
Tayside Contracts	Tayside Contracts Contracts House 1 Soutar Street Dundee DD3 8SS	Iain Waddell	Managing Director	01382 812721	
Mitie	Duchess House, 35, Duchess Rd, Rutherglen, Glasgow, Lanarkshire G73 1AU	Ruby McGregor-Smith	Chief Executive	0141 643 4300	CE not based in Scottish office
RSP Consulting Engineers LLP	Coach House, 27 Straiton Road, Straiton, Loanhead, Midlothian, EH20 9NL			0131 448 2171	
Austin-Smith: Lord LLP	296 St Vincent Street Glasgow G2 5RU 0141 223 8500	Iain Wylie	Partner	0141 223 8500	-

LCBE Phase 2 Report

Northern Ireland Housing Executive	NIHE Head Office, The Housing Centre, 2 Adelaide Street, Belfast, BT2 6PB.	Brian Rowntree	Chairman	(028) 90240588	
Perth and Kinross Council, Property Division	Property Division, Council Building, 2 High Street, PERTH, PH1 5PH	Scott Nicoll		01738 475852	
RICS Scotland	RICS Scotland 9 Manor Place Edinburgh EH3 7DN Scotland	Graeme Hartley	Director	0131 240 0890	
Aberdeenshire Council	Woodhill House Westburn Road Aberdeen AB16 5GB	Colin Mackenzie	Chief Executive	0845 608 1207	
Quigley Associates	6a George Square Greenock PA15 1QP			01475 724639	-
Mexel design consultants	Suite 7, Beresford Court, Beresford Lane, Ayr KA7 2DW			01292 619141	
Blackwood Partnership	6-7 Atholl Place, Edinburgh, EH3 8HP	Graham Christie	Senior Partner	0131 229 7268	
Arup	Bergius House 11-12 Claremont Terrace Glasgow G3 7XR United Kingdom	Brian Veitch	Director	0141 332 8534	-

LCBE Phase 2 Report

Thermal Economics Ltd	Thermal House Luton Bedfordshire LU1 1PP	8 Cardiff Road	Rudi Belanyi	Joint Managing Director	01582 450 814	no Scottish address
David Narro Associates	34-36 Argyle Place, Edinburgh, EH9 1JT		David Narro	Director	0131 229 5553	
BRE	Orion House, Scottish Enterprise Technology Park, East Kilbride G75 0RD		David Kelly	Principal consultant	01355 576200	<a href="mailto:kellyd@bre.co.uk">kellyd@bre.co.uk</a>
CBE	Glasgow Caledonian University, Cowcaddens Road, Glasgow G4 0BA		Branks Dimitrijevic			<a href="mailto:Branka.Dimitrijevic@gcal.ac.uk">Branka.Dimitrijevic@gcal.ac.uk</a>
University of Strathclyde	ESRU, Montrose Street, Glasgow		Cameron Johnstone	Director	0141 548 3788	cameron.johnstone@strath.ac.uk
Glasgow Caledonian University	Glasgow Caledonian University, Cowcaddens Road, Glasgow G4 0BA		Peter Kennedy	Dean of School of Built and Natural Environment	0141 331 3000	<a href="mailto:P.Kennedy@gcal.ac.uk">P.Kennedy@gcal.ac.uk</a>
University of Dundee			Malcolm Horner	Whole Life Consultants		<a href="mailto:r.m.w.horner@dundee.ac.uk">r.m.w.horner@dundee.ac.uk</a>
MEARU			Tim Sharpe		0141 353 4500	
Edinburgh Napier University	42 Colinton Road, Edinburgh, EH10 5BT		Sean Smith	Professor of Construction Innovation	0131 455 2563	<a href="mailto:se.smith@napier.ac.uk">se.smith@napier.ac.uk</a>
John Gilbert Architects	201 The White Studios, Templeton on the Green, 62 Templeton Street, Glasgow G40 1DA		Alison Glenn		0141 551 8383	<a href="mailto:alison.glen@johngilbert.co.uk">alison.glen@johngilbert.co.uk</a>
Kraft Architecture	280 High Street, Glasgow G4 0QT		Bruce Newlands	Director	0141 552 2915	<a href="mailto:bruce@kraftarchitecture.co.uk">bruce@kraftarchitecture.co.uk</a>

LCBE Phase 2 Report

Blairs Ltd	Baker Street, Greenock PA15 4TU	John Ritchie		01475 721256	
McCarthy & Stone Developments Lts	Quality House, 2000 Academy Park, Gower Street, Glasgow G51 1PP	Michael McDonald		0141 427 8400	<a href="mailto:michael.mcdonald@mccarthyandstone.co.uk">michael.mcdonald@mccart hyandstone.co.uk</a>
Stewart Milne Group	Falcon House, Curbridge Business Park, Downs Road, Witney, Oxon OX29 7WJ	Stewart Delgarno	Group Product Development Director	01865 303900	<a href="mailto:sdelgarno@stewartmilne.com">sdelgarno@stewartmilne.co m</a>
Miller Construction	2 Lochside View, Edinburgh Park, Edinburgh EH12 9DH	John Stenton			<a href="mailto:John.Stenton@miller.co.uk">John.Stenton@miller.co.uk</a>
Land Engineering	Gardum House, Fenwick, Ayrshire KA3 6AS	Anne Blacklock	Business Development Manager	01560 600811	<a href="mailto:anneblacklock@landengineering.co.uk">anneblacklock@landengine ering.co.uk</a>
NHBC					
AXA Insurance	One Aldgate, London EC3N 1RE	Douglas Barnett			<a href="mailto:Douglas.Barnett@axa-insurance.co.uk">Douglas.Barnett@axa- insurance.co.uk</a>
Historic Scotland	Longmore House, Salisbury Place, Edinburgh EH9 1SH	David Mitchell			
Construction Skills	4 Fountain Avenue, Inchinnan Business Park, Inchinnan PA4 9RQ	Philip Ford	Future Skills Project Manager		<a href="mailto:Philip.Ford@cskills.org">Philip.Ford@cskills.org</a>
Environmental Perspectives LLP	24 Brunton Place, London W1J 6NE	Iain Fraser	Associate Partner	020 7529 1530	<a href="mailto:iain.fraser@environper.com">iain.fraser@environper.com</a>
Places for People	The Mission Hall, 1 Roxburgh Place, Edinburgh EH8 9SU	Diana Harries	Business Development Manager	0131 525 6550	<a href="mailto:diana.harries@placesforpeople.co.uk">diana.harries@placesforpeo ple.co.uk</a>

LCBE Phase 2 Report

Scottish Natural Heritage	Caspian House, Clydebank Business Park, Clydebank G81 2NR	Catriona Morrison	Policy and Advice Officer	0141 951 0871	<a href="mailto:catriona.morrison@snh.gov.uk">catriona.morrison@snh.gov.uk</a>
---------------------------	---	-------------------	---------------------------	---------------	--

**Appendix 6 – Housing association workshop attendees**

<b>Company/Organisation</b>	<b>Contact</b>	<b>Position</b>	<b>Method</b>	<b>Phone</b>	<b>#</b>	<b>Attendance</b>
Castle Rock Edinvar Housing Association	Shelly Hutton	Policy and Performance Manager	Letter	0131 657 0600		Not Attending
East Kilbride and District Housing Association	Jim Macgregor	Technical Services Manager	Letter	01355 227751	1	Confirmed
Cumbernauld Housing Partnership	Louise Rimmer	Asset Manager	Letter	01236 456 456	1	Confirmed
Clyde Valley Housing Association	John Turnbull	Head of Project Services	Letter	01698 268855	1	Confirmed
West of Scotland Housing Association	Elinor Taggart	Development Manager	Letter	01698 495 221	1	Confirmed
Lister Housing Association			Letter	0131 229 6176		Not Attending
Link Housing Association	Maureen Middleton		Letter	08451 400 100		Not Attending
Kingdom	Bill Banks		Email	01592 631661		Not replied
Castlehill Housing Association	Mr Peter Duncan		Letter	01224 251139		Not replied
Dumfries and Galloway Housing Partnership	Mr Mike Trant		Letter	01387 242 541 or 07712666869	2	Confirmed
Tenants First Housing Co-operative	Mr Hugh Crothers		Letter	01224 628 400		Not Attending
Trust Housing Association	Joanna Voisey		Letter	0131 444 1200		Not Attending
Cube Housing Association	Maureen Hannigan		Letter	0141 242 4897		Not Attending
Home Group	Margarita Morrison	Managing Director	Letter	0141 7735630		Not replied

LCBE Phase 2 Report

Home Group	Karen Heaney	Services Delivery Director	Phone	0141 773 5640 or 07872 060 027		Not replied
Heriot Watt University	Angela Currie		Letter	0131 451 4603		Not replied
Lochalsh & Skye Housing Association	James Stephenson	Senior Development Officer	Phone	01478 612035		Not replied
				<b>Total</b>	6	