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# Environmentally Sustainable Maintenance and Housing Associations

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Final Report  
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The logo for Sustainable Designs is a stylized white outline of a rounded square or leaf shape.  
sustainable  
designs on you

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# Introduction

Over the last decade many housing associations (Registered Social Landlords - RSLs) have been applying sustainable development principles to their new build programmes. Through training courses run by Sust., SHARE and the SFHA a general level of awareness of sustainability exists within RSLs and that applying sustainable development principles to new build programmes is relatively easy. The word 'relatively' is important as there remain issues concerning cost implications and varying levels of skill within the design professions and in the construction industry. However, there is a perception that the application of sustainable development principles to maintenance is considerably more difficult both in terms of day to day repairs and of longer term cyclical maintenance programmes.

This study was developed following requests by housing associations to produce more guidance and training for maintenance staff. The starting point was the latest version of the 'Sustainable Housing Design Guide'<sup>©</sup> and interviews were carried out with maintenance and/or development staff of the RSLs that featured in the case study section of the Design Guide. These were RSLs that had already undertaken innovative environmental projects. This study aimed to examine to what extent the thinking about environmental sustainability present in their capital projects had permeated into maintenance. The study also involved a number of RSLs that do not feature in the 'Sustainable Housing Design Guide', but have taken part in Sust. programmes such as training courses and study tours. In all, twenty six housing associations across Scotland have been interviewed. A full list of RSLs interviewed is included in Appendix 1.

This work was commissioned by Sust. the Scottish Government's Sustainability in Architecture programme, as part of the Sustainable Designs on You project. The views expressed do not necessarily represent those of the Scottish Government. The methodology used involved developing a standard questionnaire which was used as the basis for a discussion with each of the RSLs. In a few RSLs interviews also involved people who had overall responsibility for sustainability rather than maintenance or development.

We wish to acknowledge the cooperation of all those interviewed in the course of this study and those who commented on earlier drafts.

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<sup>©</sup>Stevenson, F., and Williams, N., (2007) Sustainable Housing Design Guide for Scotland, Communities Scotland.

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# RSLs and maintenance – the context

RSLs manage 272,000 homes in Scotland, approximately 10% of the housing stock, and they spend over £33million annually on maintenance. Maintenance is at the heart of the landlord role. It ensures that tenants are well housed in warm and dry homes, are provided with a responsive repair service, that their homes are kept at least up to a recognised standard through a regular programme of cyclical maintenance and modernisation, and protects the landlord's assets.

## The importance of maintaining the existing stock

The Scottish Government has an annual target of 35,000 new homes, but actual output over the last few years has been less than 20,000. Around 85% of the stock that will be in use in 2020 is therefore already in existence, and some policy attention is being given to stock maintenance, and how this can contribute to sustainable development targets. Concerns about stock condition led to the creation in 2004 of the Scottish Quality Housing Standard (SHQS) with Ministers setting a target date of April 2015 for its full implementation in the social housing sector. By then, the stock must meet the Tolerable Standard, be free from serious disrepair, be energy efficient, be provided with modern facilities and services and be healthy, safe and secure. The Scottish House Condition Survey 2002<sup>2</sup> estimates that 72% of the social housing stock (both RSLs and local authorities) fails to meet the SHQS standard, with energy efficiency being the largest single failure. The Tenements (Scotland) Act 2004 requires that all tenements should have a scheme for management and maintenance.

## Focussing on sustainability

With that scale of failure, it is not surprising that to date the sustainability focus in housing has been largely on energy use. SHQS was followed by the Sullivan Report<sup>3</sup>, produced by a Ministerial Advisory Group which set out advice on the development of a low carbon building standards strategy to increase energy efficiency

and reduce carbon emissions. The Sustainable Housing Design Guide first published in 2000 was updated in 2007 with more information on maintenance and refurbishment. Historic Scotland publishes research and guidance on the maintenance of traditional buildings, including taking into account the impact of climate change<sup>4</sup>. In the housing association sector, the Scottish Regulator requires RSLs to have in place a verifiable Sustainable Development Policy and Action Plan.

Within the UK, a number of developments have taken place:

- the Sustainable Development Commission<sup>5</sup> published its report in 2005 and the UK Parliament<sup>6</sup> its report in March 2008 on existing housing and climate change.
- English Heritage's website includes a section entitled Climate Change and Your Home an interactive web portal designed specifically to help those who own or manage houses built of traditional brick construction understand more about the potential impacts of climate change and ways to save energy.
- The Energy Savings Trust provides a website which is geared more towards individual home owners.
- BRE has T-Zero, a 3-year project funded by the DTI programme Meeting the Challenge of Zero Emission Enterprise. Through consultations, reviews and case studies it plans to identify criteria and develop decision-making tools for implementing low emission housing refurbishment in the public and private sectors.
- Within the housing association sector, the Housing Corporation in England supports the Sustainable Homes initiative and EcoHomes rating systems for existing housing.

At a European level, the Energy Buildings Performance Directive<sup>7</sup> has led to the introduction in the UK of Energy Performance Certificates (EPC). In Scotland since May 2007 EPCs are required whenever a building is built, and since January 2009 EPCs are required whenever a building is rented out. The impact of

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this on RSLs is that they are required to obtain an EPC for each letting and ultimately to obtain an EPC for each house in their ownership. Some RSLs have had their own staff trained as EPC accredited energy assessors; others use consultants to provide the certificates.

However, environmental sustainability is concerned with more than energy use. It includes embodied energy (energy used in construction and manufacturing), transportation, resource management (including local sourcing of materials and environmental protection), recycling and re-use (involving a whole life cost approach), waste management and the use of chemicals (and their impact on human health and on the planet). While many of these concerns are regularly considered as part of new developments, there is little evidence of these wider environmental sustainability issues being included in maintenance programmes by RSLs in Scotland.

### **The additional challenges of funding and the economic downturn**

Despite recognition of the importance of ensuring that the existing stock is 'fit for purpose', much of the policy work carried out by successive Scottish Governments has been concerned with increasing housing supply and doing so within more and more restricted government funding. The emphasis has been on reducing the amount of the capital Housing Association Grant (HAG) per unit. There are concerns that this will lead to poorer build quality and thus higher long term maintenance costs and to realising immediate savings rather than considering a whole life cost approach, with the implication that sustainability may not be a priority. This could be reinforced by other factors such as the current economic downturn.

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②Scottish House Condition Survey, Key Findings 2007 [www.scotland.gov.uk/Resource/Doc/933/0075642.pdf](http://www.scotland.gov.uk/Resource/Doc/933/0075642.pdf)

③Report of a Panel appointed by Scottish Ministers chaired by Lynne Sullivan (2007) A Low Carbon Building Standards Strategy for Scotland SBSA [www.sbsa.gov.uk/sullivanreport.html](http://www.sbsa.gov.uk/sullivanreport.html)

④See [www.historic-scotland.gov.uk/index/heritage/climatechange.htm](http://www.historic-scotland.gov.uk/index/heritage/climatechange.htm)

⑤Sustainable Development Commission (2005) Sustainable Buildings - The Challenge of Existing Stock, SDC, London [www.sd-commission.org.uk/publications.php](http://www.sd-commission.org.uk/publications.php)

⑥House of Commons Communities and Local Government Committee (2008) [www.publications.parliament.uk/pa/cm200708/cmselect/cmcomloc/432/432i.pdf](http://www.publications.parliament.uk/pa/cm200708/cmselect/cmcomloc/432/432i.pdf)

⑦Directive 2002/91/EC of the European Parliament and of The Council of 16 December 2002 on the energy performance of buildings, Official Journal of the European Communities (see [www.communities.gov.uk/embedded-object.asp?id=1131469](http://www.communities.gov.uk/embedded-object.asp?id=1131469))

# RSLs and maintenance – delivery arrangements

Delivering a maintenance service requires the RSL to have a maintenance team that plans, organises and supervises the carrying out of site work. There is no set pattern; the maintenance teams of the RSLs that took part in this study were organised as follows:

Stand alone Maintenance Department	11
Joint Development and Maintenance Department	6
Technical Services Department	5
Housing Management/ Customer Services Department	3
Multi-discipline Area Based team	1

The skills of these maintenance teams include those with professional qualifications - many teams are headed by a quantity or building surveyor; others have built up experience over years in the building industry.

To undertake building work, all of the RSLs used contractors for some or all work. Twelve of the RSLs had a direct labour team; mainly providing caretaking and gardening services, with some including joinery and plumbing. Only one had a CORGI® registered plumber on the staff.

One RSL was in the process of developing a direct labour squad that would be conversant with renewable technologies. The decision to create the squad came after the RSL felt that it was getting very poor service from other contractors; it has decided that every house should include a renewable technology and that the RSL should be able to provide a service to its tenants. This has involved the RSL investing in specialist training for its squad.

The other RSLs outsourced all their maintenance work; some used a number of contractors with different skills (e.g. plumbing, joinery) with the role of co-ordination being undertaken in-house, others had contracted with a maintenance contractor who has a multi-skilled work force and

who co-ordinates the building work and in some cases provides a repairs reporting and logging facility for tenants. At weekends most RSLs provide an emergency repair service through a contractor.

Generally, RSLs are committed to working with locally based contractors. One explained, “We work with a contractor who has a dedicated work force with local offices. He is equipped with administrative support without the need for a call centre. He charges a fixed rate per week for his services including transport and vans. He has five dedicated tradesmen...we get response rate of 98% for emergency repairs and 96% for reactive repairs. We are exceeding our targets”.

In the majority of cases maintenance contracts used are let on a traditional basis, using the JCT Minor Works® contract and are commissioned on the basis of lowest price. Some RSLs use value based selection with quoted ratios of Quality to Price around 60/40%, with the result that the majority of contract and are price based awards.

“It is a price driven agenda nowadays and we go with traditional arrangements although we are in discussions with another association to undertake some joint working”. All of those interviewed were aware of collaborative contracts but many preferred to continue with the traditional approach to contracting. One said that “we have a vision – collaborative contracts – but this is just a vision”.

A few respondents reported using collaborative contracts such as PPC 2000® or an Engineering form of Contract. Nine had used Partnering Charters with JCT as they did not feel confident to experiment with the new forms of contract, despite a clear perception that:

“there is definitely enough benefit to look into mainstreaming it”. There was also a common belief that a Partnering approach requires a lot of work with supply chain integration. One commented that “there is a need to train contractors and staff how it works.

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Change is very slow and partnering is not well understood”.

One association reported developing a ‘real costs’ based approach programme to give ‘real cost’ results for the future. A handful of others reported using cost control based on cost plan and on historical costs and two were successfully involved in setting up Construction Forums in their localities in an attempt to embrace the whole of local supply chain to find new ways to get partners work together.

One RSL had developed a

“New Framework Programme which aims to make our association a more efficient organisation by delivering best value, improved performance monitoring, reducing management costs and the removal of the need for individual tendering. This will allow us to continue to deliver a high quality maintenance service to our tenants, which is our main priority. Where we used to deal with sixty contractors we now deal with ten. The four year maintenance framework programme gives these local contractors the opportunity to expand their businesses, employ new staff and apprentices along with giving them guaranteed continuity of work, all of which helps to sustain the local economy”.

The delivery of maintenance is changing; the role of the in-house team is also changing. RSLs in the future may share arrangements, will outsource more, and will be more concerned with achieving value for money through their contracting arrangements. These changes may allow for a greater focus on sustainability.

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©CORGI runs the mandatory gas regulatory scheme (see [www.britishgas.co.uk/products-and-services/maintenance-and-repair/why-british-gas/gas-safe-register.html](http://www.britishgas.co.uk/products-and-services/maintenance-and-repair/why-british-gas/gas-safe-register.html))

©The Joint Contracts Tribunal

©PPC2000 is the first standard form Project Partnering Contract, and is a direct result of the Government’s Construction Task Force Report “Rethinking Construction”, Dept of Trade and Industry, London, URN 03/951 HMSO

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# RSLs, maintenance and environmental sustainability

The majority of the RSLs interviewed are aiming to introduce an environmentally sustainable approach to maintenance, but they admit that they do not have in place the necessary support (e.g. internal policy and procedures). At the same time many realise that “if you are committed – it is not difficult”. One association went further and said: “We are committing £100,000 per year on environmental works as we think that they are a major sustainability issue. The council is supporting us with 50% grants”. Only one association out of 26 interviewed stated that sustainability was not a key driver in its maintenance programs.

The RSLs identified that insulation and energy efficiency are relatively easy to address, and are the starting point for developing a sustainable approach to both new build and refurbishment. However, associations acknowledged a number of challenges that they believe have to be overcome so that sustainable development principles can be fully applied to maintenance programmes:

- a **perception** that environmental sustainability would be **costly** to implement in maintenance programmes;
- a need for **encouragement** from the Government and the Regulator, who have not identified sustainable maintenance as a key sustainability issue;
- a lack of **commitment** to sustainable maintenance from many voluntary members of Committees of Management and senior members of RSL staff;
- a need for access to good **information and training** about environmental sustainability and specifically – about sustainable maintenance of the existing housing stock.

## The cost issue

Most of the interviewed RSLs believed that environmental sustainability costs more, particularly in terms of capital investment; however, evidence for this is hard to obtain.

The benefits of this extra investment (if it does cost more) also were difficult to obtain, although one RSL commented

“We recognise that it is worth investing in better quality... It is important to remember the long term benefits, not just short term costs. But to do that we need evidence”.

At the most extreme, there is a view that for the money available in the business plan of a typical association it is impossible to be sustainable.

The general perception is that it is

“probably more expensive, but that it would be good to see some facts and figures on that...” or that

“there is an impact, but difficult to put a figure on it”.

Others believe that it costs around 20% to 30% more. Another association said that the costs were double but believed that the costs should be neutral in the life cycle. Another believed that costs are prohibitive without grant assistance.

A key issue was that of whether or not investment should be recouped through rents as savings generated most directly benefit end users. One association stated:

“We spend £10,000 on a home and save tenants £500 per annum on heating – should we charge £250 more in rent? The installation of the efficient, expensive heating system is to the benefit of the tenant. There is clearly a need to find some middle ground in all of this”.

## The Encouragement from the Government and the Regulator

The Government funding regime within which RSLs operate (the HAG system) was not seen as helpful to the development of a more sustainable approach to maintenance. Despite Government targets, RSLs felt that there is little evidence that the HAG system places sustainability at its heart; a willingness to look at whole life costing; a commitment on how better standards can be funded (i.e. an end to ‘short term-ism’); or to provide a ‘one stop shop’

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approach to funding. For example, RSLs have to find funding from a variety of sources if they wish to incorporate renewables, all of which require separate application forms, takes time and uses up scarce staff resources.

In terms of their experience with energy efficiency projects, RSLs felt that the Government should set higher energy efficiency standards; put a value on carbon savings and provide incentives to save carbon across the whole of the housing stock. Further, most RSLs believed that the construction industry should be helped to gear up more for the provision of environmentally sustainable maintenance.

Some RSLs interviewed also believed that, so far, the Regulator has missed the opportunity to reinforce the Government's sustainability objectives, by not making sustainability one of the key areas for its auditing system. One RSL commented that a regulatory approach, such as has been adopted for health and safety, has driven greater change than exhortation which is all that has been applied to furthering the sustainability agenda.

### **The RSL's commitment to sustainability**

Sustainability was identified as a core issue for 90% of those RSLs interviewed. This would appear to vindicate the work carried out over the last 10 years in developing sustainable development awareness. However, closer examination shows a range of understanding of what sustainability is about. Some RSLs see sustainability as a purely environmental issue affecting only development, while a few see sustainability as concerned with social, economic and environmental factors and affecting all of its activities – development, maintenance, housing services as well as transport and office practices.

Most of the interviewed associations saw the preparation of a sustainable development policy as something that had to be done to satisfy Communities Scotland/ Scottish Government. One said 'creating our own was not our priority'. The policy wizard had been used by four RSLs; others had adopted someone else's policy, while one was created 'by a student who was on placement'.

Because of the word 'development' within the term 'Sustainable Development', many RSLs had initially seen their Sustainable Development policy as one which affected the development programme, only expanding to other parts of the organisation (including maintenance) at a later date. It was also seen (by most) as an environmental policy – not involving either social or economic issues and prepared in isolation – without the involvement of maintenance, finance, or management staff.

There were exceptions to this position. Some RSLs had set up an interdepartmental 'Green Group' or 'Sustainability Group' to look at sustainable development across the organisation; one had employed a member of staff specifically to act as a 'Sustainability Advisor' whose job was to mainstream sustainability across the organisation – but not to take on the responsibility for the RSL. The importance placed on developing, monitoring, implementing and reviewing a sustainable development policy depended very largely on the level of leadership. RSLs that were in the vanguard were those where the committee, a senior staff member or the chief executive took a leadership role.

There was a rural, particularly island, dimension that came out of the interviews. These RSLs saw environmental sustainability as "not an easy option but the only one to follow. We can't do anything else in this part of the world! because of:

- the need to find different ways of alleviating fuel poverty as they operate in 'off-gas' areas;
- a commitment to utilising the natural resources which are available on the islands;
- the need to keep maintenance costs down in remote areas; as they are particularly high;
- the need to support the local economy;
- a wider view of the management of waste. We saw with our own eyes how waste had to be shipped off our island. So we set up our own recycling plant and organised local people to recycle".

### **Information, advice and training**

RSLs identified that while there is plenty of information about sustainability about, there is a dearth of objective information and advice on associated maintenance issues. In discussions, comments were made on a range of providers:

- With the level of investment by Communities Scotland in the Sustainable Housing Design Guide, and its subsequent promotion, there was a reasonable expectation that this would provide the major reference source. However, more than half of the sample (14 out of 26) had not looked at the guide. Most were aware of it, as one explained

"[it is] probably useful, as a lot of it is common sense". Those who had looked at the SHDG found it useful, although one commented "it relates to pilot studies too much and in that sense it can be easily misunderstood. To introduce real efficiencies we need to address the existing housing stock";

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– The Scottish Federation of Housing Associations Maintenance Forum did not provide a source of support for the majority. Only five found it useful, for others

“it is a talking shop on the same issues”. One of the more rural RSLs commented that it was “too far away for us to attend. It is not un-missable”;

– The EST website, BRE, and Google were mentioned as sources of information, as was a reliance on consultants;

– Sust. is not well known or understood by maintenance teams in RSLs. It was never mentioned without prompting and the Green Directory® was not known about;

The Maintenance Teams interviewed suggested that better and more focused information, advice and training needs to be provided, e.g:

– a one door shop for information and funding;

– guidance on toxicity, embodied energy, windows, life cycle costing systems, and sustainable materials;

– awareness training for committee members and non-maintenance staff;

– training for tenants in ‘green issues’;

– setting up benchmarking groups that would allow a sharing of information between RSLs on performance;

– bespoke training for Maintenance Teams, including help with internal RSL processes;

– training for clients and the contractual supply chain in collaborative forms of procurement, partnering and cost control.

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# Lessons learnt from early sustainable projects

Energy efficiency projects have been the entry point for most RSLs into environmental sustainability. These have been partly about reducing demand through higher levels of insulation and airtightness and partly about searching for low carbon generation. The development and marketing of renewables over the last few years, the encouragement by Scottish Homes and Communities Scotland through HAG competitions of the late 1990's and the publication of the Sustainable Housing Design Guide, has led a number of the RSLs interviewed to experiment with a variety of micro-technology solutions within their new build programmes to provide more localised energy sources e.g. thermal solar heating ground and air source heat pumps combined heat and power plants and photovoltaics.

Between them, the RSLs interviewed have a wealth of experience of innovative projects and the impact of these projects on long term management and maintenance. Little of this experience has been shared or recorded and few formal evaluations have been carried out. The interviews therefore gave the opportunity to consider with the RSLs the lessons that they have learnt, particularly regarding the impact of these projects on maintenance. Since these projects were their first steps in achieving more sustainable projects, the RSLs were also able to comment on the impact these have had on their approach to sustainability.

Appendix 2 sets out the list of projects which the RSLs identified as environmentally sustainable and indicates their impacts on maintenance activity.

There was general agreement that the simple solutions in new build have worked best, were easier to maintain and easier for tenants to manage (often because the tenants have little to do). Designing in environmental priorities as part of the development process helps long term maintenance and sustainability e.g. orientation to maximize solar gain (including

solar thermal hot water panels), street patterns arranged to ensure that the maximum gain can be obtained from sunlight (including sun spaces and buffer zones in houses and flats), passive stack ventilation and good insulation. Where the RSLs had carried out major modernisation programmes of existing buildings, external cladding had been effective (although fixing it was identified as problematic, particularly in mixed tenure housing). In all cases, investment in good quality external environmental works, including planting, had not only created biodiversity, but were reported to have improved quality of life.

A feature of many of the projects was the use of 'newer technology'. There was little technological innovation; most of the technology had been used elsewhere – often in mainland Europe. However, there was innovation in terms of application in Scotland although many RSLs were disappointed with the outcomes, including the perception of no reduction in running costs. There were also a few reports of technology that did not work as expected. However, the general conclusion was that it was the **application** of the technology, rather than the technology itself, that caused the difficulties. There were key lessons to learn:

## **1. Involve maintenance teams at the design stages**

The simplest of all the lessons was that maintenance teams should be involved at the earliest point possible in the development stage, i.e. briefing and detailed design and most importantly before cost planning stage. This would ensure that the design and development teams would be aware of the challenges involved in maintaining the end product and at the same time would provide an opportunity for the maintenance team to train themselves and their maintenance contractors.

"When it comes to handover, there should be no surprises". In reality the reported spectrum for involvement in development projects ran

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from “None, really” (eight RSLs) to “Input about technologies and how easy they are going to be to maintain, about materials – how durable they are, how environmentally friendly they could be”(ten RSLs).

## **2. Obtain independent information and advice on technology that encompasses maintenance**

Many RSLs reported a lack of information about how well technologies (e.g. solar panels) could be expected to operate, particularly in winter months. They commented that while organisations such as the Energy Saving Trust(EST)<sup>20</sup> encourage the use of technologies like micro-renewables and publish information about projects they fund, they rarely, if ever, publish information on how well these technologies perform, in terms of effectiveness (energy produced, maintenance issues, ease of use by occupants) or economy (actual savings in either pounds or CO<sub>2</sub>). This apparent lack of technical support and backup is clearly seen as an issue by those interviewed. As an example, for one RSL the issue was choosing the right boiler. It eventually chose a ‘B’ rated condensing boiler because an ‘A’ rated boiler was more complex to install and maintain.

## **3. Hire a consultant with the right expertise**

Some of the consultants with whom the RSLs work were inexperienced in the technologies in question and as a result the designers were too dependent on manufacturers’ information. One RSL reported that

“the architect did not have expertise in the specific heating system so the contractor was given a performance specification and was responsible for designing the system. The contractor subcontracted this to a specialist, who did not have a contract with the association”.

In many cases the choice of the particular technology was based on either what grants were available or on what was the current ‘fad’, rather than selecting an appropriate technology to meet the actual needs, or what could be maintained given the skills and suppliers locally available. Funding availability too often leads which technology to choose, not its appropriateness for a given location. In specifying new technologies, many RSLs commented that these are not traditional domestic systems and recognise that they require the management and maintenance skills of facilities management and the design skills of building services engineers.

## **4. Involve, train and regularly support occupants**

Many of the ‘sustainable developments’ explored, required a different approach to the use of the buildings. The RSLs reported that

many occupants – both tenants and owners for whom they provide a factoring service (and in particular elderly people) – find buildings with newer technology difficult to manage, and that the

“education of end users is important”.

A number of examples were given, summarised in these quotations:

“Tenants complain that radiators are not on! If a radiator is not hot the perception is that it is not working”.

“Tenants were shown several times how to operate the system but they do not seem to take it in. This is because the programmers appear to be too complicated. We get them as ‘packages’ with boilers but tenants prefer a simple scroll up and down version”.

While the ‘education’ of occupants is important, there is also a continuing need for support and for involving occupants in the decision making processes, so that they take ownership of the issues. Many occupants do not share the RSL’s view of the ‘green’ agenda and it therefore needs to be translated into benefits to them as well as the wider environmental benefits. In some cases the action of the RSL itself did not help. For example a number of RSLs with CHP plants or district heating schemes charge their tenants not on usage but on floor area. One RSL explained that

“the way the system is set up is that tenants have power cards and top them up at local shops – they pay for heating based on floor areas of their homes and what happens is that they leave windows wide open! They see no reason why they should save energy. They have no real incentive to be economical either”.

## **5. Ensure that the contractors not only understand, but implement low environmental impact solutions**

Developing a sustainable approach to maintenance involves not only the RSL committee, staff and the tenants, but those who are carrying out the maintenance work – the contractors. RSLs reported that many contractors were also inexperienced, did not understand the technology, or did not apply high enough standards to the project. For example, one RSL reported its experience with a district heating system.

“There were too many defects particularly with metering causing problems with smart cards. The meters were not wired properly and heat from the biomass plant was being lost”.

Another RSL commented

“Achieving airtightness is a major issue; the contractor did not understand why it was important, nor how to test for it”. As in other areas, appropriateness of the technology used depends on the skills of the contractor.

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## 6. Undertake post occupancy evaluations, share and apply the results

When asked about how RSLs measured the impact of a more environmentally sustainable approach, a number said that they used EcoHomes, NHER, SAP, u-values and SHQS as monitoring tools. Others recognised that these were not so much monitoring tools but assessment tools. There was little evidence of monitoring and evaluation. One RSL commented

“(our) maintenance (team) does not use any system of measuring impacts of a more sustainable approach”. None of the associations had used Post Occupancy Evaluation (POE) techniques; many remarked that there was no methodology in place to facilitate this and they would welcome an industry wide approach.

Some associations had started looking at energy usage and costs, but with little guidance on how best to do it.

“What would help would be a benchmark for ‘the cost of average heating bills’ for each property type” explained one respondent, with the aim of reducing costs below the established benchmark. Another said

“We do not collect data on average temperatures and fuel bills – we have no resources to do that”. In one or two cases, associations had tried to use the Energy Services of the Local Authority but these were more to do with the promotion of energy efficiency than monitoring impacts of sustainability. One RSL was considering how EPCs could be used to monitor the theoretical energy performance of buildings.

One association suggested that it would like to have a methodology for monitoring the effectiveness of repair as opposed to replacement of components to see which gives better value for money. Another association suggested that lower maintenance costs compared with costs for non-environmentally sustainable maintenance would be another way of monitoring efficiency and effectiveness.

The only commonly used methodology for monitoring the impact of any environmentally sustainable activity was that of tenant satisfaction surveys. However making comparisons between results was difficult and the setting up of benchmarks impossible as different formats of questionnaires were used by each association.

## 7. The impact of the projects on the approach of maintenance teams

The impact of the ‘sustainable projects’ on the approach adopted by maintenance teams is varied. Four said that they made no impact. But others commented:

“Trying to be more sustainable has influenced our thinking about the carbon footprint of our staff and contractors and we try to reduce travelling”.

“They have led us to looking more at green issues and at energy efficiency/fuel poverty, attending seminars jointly and working in alliance with development”.

“When we are doing major works – we will try to specify environmentally sustainable materials. In reactive maintenance – it’s more difficult and we still replace like for like”.

It would appear that the ‘innovative sustainable projects’ carried out by RSLs and used as case studies in SHDG have had a mixed impact on how maintenance sections regard sustainability. In some cases they have had a negative impact because new technologies have been introduced without understanding the maintenance implications. In most of these cases the maintenance team was not involved in the development process; nor have these pilot projects led to mainstreaming successful solutions, with many RSLs having only one flagship ‘sustainable project’.

Some of the problems by these innovative projects have generated negative attitudes towards anything that is quoted as ‘sustainable’. The lack of any proper evaluation and therefore of understanding and learning from these projects may have also prevented any mainstreaming of techniques which with some changes could be important for effective mainstreaming of sustainable solutions.

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# Environmental sustainability is about more than energy

If fuel poverty and energy efficiency have been the initial driving forces in getting the RSLs interviewed into the environmental sustainability agenda, they are now moving more into other environmental issues, e.g. healthy buildings, materials and resource management. Climate change for them is not simply about the recurring energy requirements, but also about embodied energy and the use of scarce resources. The growth of interest in life cycle costing – which the majority of the RSLs interviewed were concerned about – identifies long term maintenance as one of the key issues to be tackled by associations.

## Improving energy performance

Improving the energy performance of the existing stock remains a major issue for maintenance teams. The vast majority (21 out of 26) of those interviewed reported that they insulated their housing stock with a typical level of loft insulation of between 250 to 300 mm and “as much as we can inject into cavity”. Concerns were expressed by some RSLs about difficulties they have experienced in monitoring the quality of the workmanship of the injected insulation, unless thermographic or infra red photography was used to test the installation. One association had taken a decision not to use cavity insulation because of concerns over possible cold bridging.

Tenements pose more difficulties. While insulating lofts is easy, replacing sash and case windows with traditional windows is much more expensive. Repairing sash and case windows and draught proofing them is seen as a sustainable option, which then needs to be backed up by a secondary glazing system, “as long as the windows can be washed without having to use a cherry picker”.

An additional challenge with tenements, flats and four-in-the-block properties results from the multiple ownership nature of the properties, where the RSL has to coordinate the involvement of owner-occupiers or shop owners and this requires considerable staff resources.

## Windows

A number of RSLs have been specifying good quality pre-treated timber windows are quoted not to require maintenance for 10 years. Although these are relatively expensive to install, the reduction in maintenance can save money in the long term. One RSL explained that “the life cycle cost of windows is such that it can be recovered in a single life cycle”.

There is an ongoing debate within some of the interviewed RSLs about timber versus uPVC windows. The short term attractions of uPVC, in terms of lower capital cost and apparent low maintenance cost, have in many cases outweighed the concerns about toxins in the manufacturing process, of whether toxins are given off during the life of the window, and of the difficulties of disposing of the material. Some RSLs justified using uPVC windows on the grounds that ‘their tenants prefer them’, thus highlighting the challenge of balancing different policies – participation and sustainability. The view taken by BRE that uPVC can be sustainable has further confused the situation; RSLs would appreciate more information and advice on sustainability and windows.

## Material specification

Less than a third of associations stated that they specified that materials for use in their maintenance programmes should be **sourced locally** or that timber should only be from **sustainable sources**.

A slightly higher proportion – almost half – reported stipulating in their specifications a requirement to use **water based paints**. One association worked closely with a paint manufacturer to develop a 6 year life specification for application of durable water based paints free of solvents. Under this arrangement, the paint manufacturer provided technical support, carried out chemical analysis of the paint, advised on quantities and underwrote defects.

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Avoiding **toxic materials** in maintenance specification was not a feature of most RSLs specification requirements. One RSL reported difficulties in obtaining information about toxin free kitchen units and worktops.

None of the associations interviewed kept a **database of environmental products**; a few had looked at BRE's Green Products Specification.<sup>③</sup> None had used the Sust. Green Directory.<sup>④</sup>

Less than half of the associations specified that cleaning materials need to be environmentally friendly.

Less than a quarter of those interviewed confirmed specifying **recycled or easily recyclable materials** and only two associations considered **embodied energy** as a criteria for material selection. The key reason given for not doing so was lack of easily accessible information on products' embodied energy.

Most of the RSLs interviewed recognised that they can have an important impact on the health of their tenants, on local employment, and on sustainability by more careful specification. However, they continued to have concerns about **costs**, and lack of good information and advice.

### Water conservation

Water conservation featured on the agenda of less than a half of those interviewed; others indicated an interest in how this issue can be best addressed. The specification of **aerated taps** and **dual flush toilets** was set as a standard by eight associations, although another stated that it did not specify aerated taps because of concerns over legionnaires disease. Over **bath showers** were non – standard in many associations on the grounds that they are too expensive to install. One association reported installing **water butts** made of recycled barrels from the local distillery in the gardens of a development; however those were received with mixed views by the end users.

### Low energy light bulbs

The use of **low energy light bulbs** was embraced by the majority of the associations interviewed with the help of energy providers under the CERT scheme. A minority of associations reported changing all bulbs from incandescent to low energy at void times. Some associations promote energy efficiency and low energy

bulbs through their newsletters. Two or three associations reported distributing low energy bulbs during public meetings and during events; in their view securing higher turnout of tenants and positive public relations.

### Biodiversity

Three quarters of those interviewed considered **planting** as an integral part of creating sustainable places and this approach was reflected in maintenance programmes. One association involved in provision of **allotments** in the middle of a city, another reported investing £100,000 per annum on landscaping which is supported by a grant from the local council, while a further one runs a **bulb planting** project involving school children.

### Waste management

While most RSLs left the issue of waste management to their contractors or their local council, there were examples of RSLs being more directly involved in waste management; e.g.

- **Composting**
- **Furniture recycling**
- Segregation of **scrap metal**
- **Reusing** and **recycling** of some parts from white goods
- Setting up own **recycling plant** and **creating jobs**

Some of the RSLs interviewed thought that there is a greater role for them to play in reducing waste, particularly in more careful ordering and specification. However, as in other areas, they identified a lack of good guidance.

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③ [www.thegreenguide.org.uk](http://www.thegreenguide.org.uk)

④ [www.sust.org/tgd](http://www.sust.org/tgd)

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# Conclusions and recommendations

High quality maintenance is central to the ability of RSLs to provide quality housing for their tenants and to protect their assets. Within the RSLs that were interviewed for this study, there was not only an ambition to provide the best maintenance service, but there was a high level of aspiration to provide it as environmentally sustainable as possible. Maintenance teams have a pragmatic approach to environmental sustainability – their approach starts with energy efficiency and desire to make best use of resources while providing value for money. With a few exceptions, sustainability is not seen as a ‘way of life’ but as an energy issue for new build or refurbishment with other sustainability issues such as toxins as ‘add ons’.

This reinforces a widely held belief that sustainability in RSLs is basically about new build and then about major refurbishment work. The language itself is misunderstood more often than expected – ‘sustainable development’ is perceived by maintenance staff all too often as the responsibility of development staff; but also it reflects the way that sustainability has been encouraged or promoted by the trainer, regulator and funder – through training focused on development staff, HAG competitions and the promotion and encouragement of new technology in new buildings.

The need for energy efficiency has passed the tipping point – it is widely recognised as a fundamental issue (linked with fuel poverty). There is evidence that RSLs have been encouraged to try renewable technologies without any supporting programme of post occupancy evaluation in place. There is, as a result of this experience, a growing scepticism about the effectiveness of technological ‘fixes’, further exacerbated by problems with poor advice from consultants, contractor incompetence, tenant inexperience, and lack of training in new skills for maintenance staff. This needs to be counterbalanced with objective information about actual performance.

Many of the problems that the maintenance team faces in managing new technology are design issues and not directly maintenance issues. New technologies may require a different approach to design; too often the design of innovative heating systems is left to heating contractors to undertake. This leads to a concern about the lack of a tradition of evaluation. This does not apply only to the concerns about renewables, but of a general approach to innovation. Typically, the HAG competitions did not involve consistent Post Occupancy Evaluation (POE) of competition projects either.

However, the big challenge is how to get RSLs to move on from energy to other sustainability issues – such as materials and toxins, and therefore to focus on health.

The delivery of maintenance is changing. New procurement approaches are being tried out and as a result the task of the maintenance team is changing. The crucial activities become those of specifying materials, of setting standards, of negotiating contracts, of supervising them, of monitoring and evaluation. This puts the maintenance team in the client role. Collaborative working is a potential growth area.

Funding is considered by maintenance teams as a major constraint. Disjointed funding regimes often act as a key barrier that stands in the way of achieving more sustainable solutions. The perception that low environmental impact solutions cost more needs to be investigated; there is little hard evidence on whether or not there are extra costs in a sustainable approach to maintenance and further study would be needed to examine whether this is perception or reality.

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A real concern is that few maintenance people appear to have looked at or read the primary advice document funded by the Government – The Sustainable Housing Design Guide, despite the fact that latest version was designed with maintenance in mind. The lack of a hard copy is a drawback – those that have looked at it have found it difficult to navigate as a web based document. No training about key issues addressed in the guide has been carried out and so the document has not permeated into day to day operations.

There is also a lack of awareness of Sust. – the Government’s key organisation for the promotion of sustainability in the built environment sector. The SHDG is only one of a plethora of guidance available in the form of documents, but more specific guidance and training is needed for maintenance staff who reported that they would welcome guidance/training on specific issues. There is potentially a role for Sust. to act as a single gateway or signpost to information and advice.

Where environmental sustainability in maintenance is being taken seriously within associations – and there are a few associations taking the lead – it is the result of leadership by the Chief Executive and senior management team. The importance of the individual commitment to sustainable development cannot be underestimated. It appears that where one person is responsible for both development and maintenance, the RSL is more likely to apply sustainable development principles to maintenance and there will be a greater integration of maintenance thinking into project briefs. Simply providing support to maintenance staff is insufficient – sustainable development is a process that ought to be embedded throughout the RSL and requires leadership from the top if good results are to be realised.

There is a strong interest within the RSLs interviewed in developing a more environmentally sustainable approach to maintenance. However, this study looked at only twenty six RSLs; these RSLs could be described as among the leaders in the development of a sustainable approach to maintenance and are not necessarily a representative sample. They are giving priority to sustainability; others may not.

To ensure that all RSLs take a pro-active approach to sustainability may require a more interventionist role by the Government. As with disability issues and health and safety, legislation which requires compliance with defined standards and better regulation may be the only way to ensure that Scotland’s housing stock is sustainable. The social housing sector

can lead the way without the need for primary legislation since the Government as funder and the Regulator are able to make sustainability a high priority, if the political will is there.

Our recommendations are therefore based on this approach and are directed at the Government, at RSLs themselves and at Sust.

The **Government** should:

- upgrade its sustainable development requirements for RSLs to include specific standards on maintenance and should enforce it through the Housing Regulator’s audit procedures;
- provide a ‘one-stop shop’ approach to public funding for RSLs, and a consistent simple application process;
- introduce whole life cycle costing assessments for all capital funded programmes;
- introduce a common approach to life cycle cost calculations in maintenance programmes in order to develop benchmarks and enable monitoring;
- require RSLs to use the information generated by Energy Reports from EPCs to inform a programme of ongoing planned maintenance and upgrading;
- commission the development of a standard Post Occupancy Evaluation (POE) process and introduce it as a funding requirement;
- encourage innovation by RSLs through a special HAG funded programme that is also tied to formal POE processes, highlighting whether or not it is worth mainstreaming certain approaches;
- Commission further research to update the financial costs, the business case for sustainability and the benefits of a sustainable approach to maintenance, including whether costs could or should be shared with the tenants through increased rents.

**RSLs** should:

- ensure that their maintenance teams are properly integrated within their management structures;
- involve maintenance teams in development decisions at as early as stage as possible;
- support collaboration between development staff and maintenance staff in decisions relating to environmental sustainability of their housing stock;
- encourage committee members and senior staff to embed sustainable development principles throughout the RSL to ensure the effectiveness of their Sustainability Policies and Action Plans.

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**Sust.** should provide a greater leadership role in sustainability, by:

- updating and marketing the Sust. website to become the key Scottish website and single door to information on environmental sustainability in maintenance, with:
  - the Green Directory having more information designed for maintenance teams;
  - a section on renewables, including information on maintenance costs of renewables;
  - web links to specific sites;
  - case studies using the raw materials from this study;
- offering bespoke training for RSLs as well as general courses, and these should include chief executives and finance staff;
- offering specific training events and information on issues such as:
  - health and housing for maintenance;
  - life cycle costing;
  - embodied energy;
  - materials, e.g. toxicity, eco friendly materials, local sourcing;
  - energy monitoring;
  - renewable technologies in existing buildings;
  - procurement of maintenance programmes (cyclical and reactive);
  - performance specifications;
  - asset Management and Planning in maintenance;
  - Post Occupancy Evaluation;
- developing a maintenance benchmarking group (virtual and real!) where maintenance staff can get help and support and provide through it practical advice to maintenance teams on what is going to make the greatest impacts;
- developing training on sustainable maintenance management (including CPD training) with professional bodies such as SFHA, RICS, BIFM, CIOB and ConstructionSkills;
- discussing training and support for tenants with Scottish Tenants Federation and Tenants Participation Advisory Service;
- promoting best practice through publishing case studies and using its links with European partners, especially in Scandinavia and Germany.

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# Appendix 1

## **Housing Organisations interviewed**

Albyn Housing Society  
Cairn Housing Association  
Cloch Housing Association  
Dunedin Canmore Housing Association  
Elderpark Housing Association  
Eildon Housing Association  
Fairfield Housing Co-operative  
Fife Housing Association  
Forgewood Housing Co-operative  
Fyne Homes  
Hillcrest Housing Association  
Horizon Housing Association  
Kingdom Housing Association  
Link Group  
Lochalsh & Skye Housing Association  
Maryhill Housing Association  
Molindinar and Reidvale Housing Associations  
New Gorbals Housing Association  
Orkney Housing Association  
Partick Housing Association  
Perthshire Housing Association  
Prospect Community Housing  
Shettleston Housing Association  
Servite Housing Association  
Spire View Housing Association  
West of Scotland Housing Association

# Appendix 2

RSL	Projects	Environmental features	Sustainability in maintenance: initiatives and lessons learnt	Procurement initiatives
Eildon Housing Association	Tweedbank	Passive solar heating; air source heat pumps	Energy efficiency Upgrading rather than replacing Planting Segregation of scrap metal 100% Low energy bulbs at void times	Framework agreement for cyclical maintenance; for planned maintenance negotiation via Border Construction Forum Framework is in place for planned maintenance (used BCIF "Building and Construction Industry Forum" to facilitate this) Considering framework for cyclical and reactive maintenance; EHA will take lead using BCIF to provide business development support to small businesses to enable them to develop new skills and increase their business competitiveness
Albyn Housing Society	Aviemore Applecross	Biomass Social sustainability	Non toxic material	Framework Agreement for maintenance services Collaborative Contract
Cloch Housing Association	Weir Street NB	CHP plant	Need for maintenance staff to be involved in selection of materials and systems Need for local sourcing of suppliers Need for risk assessments Need for collateral warranties	
Prospect Community Housing	Dunbeg 2 NB  Clovenstone Park	Solar panels, zinc roof and gutters, breathing wall  Solar Panels	Trained staff Local sourcing of materials Timber only from sustainable sources Non toxic materials High level of investment in environmental works, planting subsidised by the council, cctv cameras, play parks Use of recycled materials Environmentally friendly cleaning materials	

RSL	Projects	Environmental features	Sustainability in maintenance: initiatives and lessons learnt	Procurement initiatives
Fairfield Housing Co-op	Lesley Court  Menzies Court	Resource conservation, reclaimed materials,  Kingspan, mechanical heat recovery system, Beefed up insulation  SHDG Allergy housing	High level of soft planting in common areas Non toxic materials Materials chosen on health grounds Construction waste minimised 100% Low energy bulbs at void times Furniture recycling	Local partnering agreement
Kingdom Housing Association	Turner Crescent	Solar gain, sun spaces, grey water recycling, water conservation, waste minimisation on site, biodiversity, swale drainage, local materials	Using Warmcell for insulation Water conservation - dual flush ECs, aerated taps Non toxic materials Use of recycled materials Construction waste minimised Environmentally friendly cleaning materials Planting 100% Low energy bulbs at void times Strong publicity about energy efficiency	Framework Agreement for maintenance services Collaborative Contract 'real costs' based approach programme to give 'real cost' results for the future
Elderpark Housing Association	Elderpark Street	Gas CHP, sunspaces, passive ventilation, long life materials	Local tradesmen who are multi skilled to cut on repetition and travel time	
Partick Housing Association	589-597 Dumbarton Rd, Glasgow  Crathie Drive, Glasgow  Backcourt Initiative	Crathie Drive, Glasgow	Passive stack ventilation Low toxins materials uPVC eliminated from plumbing/electrics solar ventilation through roof tiles high insulation  A new tenement insulated with sheep's wool, heated by an underfloor heating system, fed by a communal boiler and complemented by solar panels  Highly participative approach including school children's involvement	Increased insulation Local sourcing of materials Timber only from sustainable sources Non toxic materials Water conservation - dual flush ECs, aerated taps Environmentally friendly cleaning materials Planting 100% Low energy bulbs at void times

RSL	Projects	Environmental features	Sustainability in maintenance: initiatives and lessons learnt	Procurement initiatives
Cairn Housing Association	Fort Street, Motherwell	Biomass Social sustainability	<p>The carbon index has been improved from the minimum of 8 to 9</p> <p>The layouts and house types designed to optimise the passive solar gain to larger south and west facing windows to living rooms and smaller north and east facing kitchens and bathroom windows</p> <p>The u-values to the walls, roofs and windows have been reduced by 25% and in the case of the floor by 50% below the Building Standards minimum to further reduce the heat losses</p> <p>Breathing wall construction employing recycled newspapers</p> <p>Sun porches to the south and west entrance doors and rear door lobbies reduce the heat loss further</p> <p>Sun pipes provide natural daylight to the stairwells</p> <p>Passive stack ventilation avoids the use of mechanical extract</p>	
Forgewood Housing Co-operative	Participant in Scandinavian Tour		<p>Increased insulation</p> <p>Condensing boilers, n; using CERT to fund higher than required under BS level of insulation.</p> <p>Planting</p> <p>100% Low energy bulbs at void times</p>	
Fife Housing Association	Lumphinians, Ochilview Fife	Geothermal energy from mine water to provide space heating and hot water	<p>Local sourcing of materials,</p> <p>Increased insulation,</p> <p>Low energy bulbs for all new tenancies and master classes in sustainability for tenants</p>	<p>Developed procurement strategy which is geared more towards partnering</p> <p>Developed asset management strategy Working through Fife Alliance</p>

RSL	Projects	Environmental features	Sustainability in maintenance: initiatives and lessons learnt	Procurement initiatives
New Gorbals Housing Association	Crown Street Urban Design Regeneration  Lauriston Masterplan	Community participation  1750 houses (450 for rent) 33000 sq ft community space, new health centre, a school, a park – all based on a Masterplan; partnership working	Local sourcing of materials Non toxic materials Increased insulation Materials chosen on health grounds Highest possible quality Scandinavian timber windows --- 45 years life expectancy Water conservation - dual flush ECs, aerated taps Construction waste minimised Use of recycled materials Environmentally friendly cleaning materials Planting 100% Low energy bulbs at void times Strong publicity about energy efficiency	Local partnering agreement
Dunedin Canmore Housing Association	Slateford Green	Car free Materials with minimum environmental impact Super-insulation Passive stack ventilation Breathing wall timber cladding Communal gas boilers	Local sourcing of materials Construction waste minimised Extensive planting 100% Low energy bulbs at void times Strong publicity about energy efficiency	Working through Rowan Group, delivering services to local HAS on partnering basis, including provision of EPCs
Link Group	Comley Green Place, Edinburgh	Mixed use including supported accommodation Focus on energy efficiency Recycled materials where possible Scottish timber from sustainable sources Local materials where possible	Local sourcing of materials Increased insulation Timber only from sustainable sources Use of recycled materials Construction waste minimised Water conservation - dual flush ECs, aerated taps Environmentally friendly cleaning materials 100% Low energy bulbs at void times Backcourt upgrades	

RSL	Projects	Environmental features	Sustainability in maintenance: initiatives and lessons learnt	Procurement initiatives
Spire View Housing Association	James Nisbet Street	<ul style="list-style-type: none"> <li>Tenant participation</li> <li>Sunspaces , overcladding</li> <li>Reduced north windows</li> <li>Biodiversity</li> <li>Modification of microclimate</li> <li>Non toxic materials</li> <li>Healthy floor finishes</li> <li>Timber windows</li> <li>Natural clay drainage</li> <li>No timber preservatives</li> <li>Solid wood skirtings etc instead of MDF</li> </ul>	<ul style="list-style-type: none"> <li>Timber only from sustainable sources</li> <li>Local sourcing of materials</li> <li>Construction waste minimised</li> <li>planting</li> <li>100% Low energy bulbs at void times</li> <li>Strong publicity about energy efficiency</li> </ul>	Local partnering charter and long term relationships
Horizon Housing Association	Participant in Scandinavian tour	Loft insulation programmes, standardising boilers	Increased insulation	Partnering for gas servicing through local alliance; looking at partnering in reactive repairs.
West of Scotland Housing Association	Mainholm Rd. Ayr  Dornal Avenue	<ul style="list-style-type: none"> <li>Hag Competition</li> <li>MMC, local sourcing</li> <li>Lifetime homes standard</li> <li>Recyclable</li> <li>Breathing wall</li> <li>Indigenous planting</li> <li>District heating, solar panels, solar panels, piloting heat pumps</li> </ul>	<ul style="list-style-type: none"> <li>Water conservation - dual flush ECs, aerated taps</li> <li>Timber only from sustainable sources</li> <li>Local sourcing of materials</li> <li>Materials chosen on health grounds</li> <li>Materials chosen on embodied energy grounds</li> <li>Increased insulation</li> <li>Environmentally friendly cleaning materials</li> <li>100% Low energy bulbs at void times</li> <li>Strong publicity about energy efficiency</li> </ul>	Setting up partnering contract for kitchen replacement – will involve open book and partnering charter; looking into using kitchen and bathroom pods in refurbishment. Collaborative contracts
Servite Housing Association	Perth and Dundee Project near Forfar Rebuilding of 25 defunct bedsits	<ul style="list-style-type: none"> <li>3 CHP s</li> <li>Biomass district heating scheme</li> <li>(3) Solar panels to numerous properties</li> <li>(4) Air source heat pumps to 53 refurb properties</li> </ul>	<ul style="list-style-type: none"> <li>Investment of £2,000 per home on energy efficiency, where inefficient electric storage heating systems being replaced.</li> <li>High level of insulation and heating, saving tenants on energy bills; 100%</li> <li>Low energy bulbs at void times</li> <li>Backcourt upgrades</li> </ul>	4 year partnering contracts in place for kitchen replacements and painterwork contracts

RSL	Projects	Environmental features	Sustainability in maintenance: initiatives and lessons learnt	Procurement initiatives
Perthshire Housing Association	Lumphinians, Ochilview Fife	Community participation CHP Plant recycling PVs	Local sourcing of materials Non toxic materials Construction waste minimised Education programme for tenants	Looking at joint provision of services following merger
Hillcrest Housing Association	Gilmour's Close, Edinburgh  James Street, Dundee	CTI of listed buildings in World Heritage site which included shop refurbishment: ground source heat pump, super insulation, secondary glazing, sunspaces, underfloor heating heat recovery system mixed use including supported accommodation  Solar Water Heating – piloted with 3 different central heating systems. Sun space balconies. EWGECO real-time Energy monitors installed as a pilot project to 7 units Sustainable timber frame construction with super insulated building envelope. High performance windows. A rated boilers as standard, and where appropriate.	Upgrading insulation programme, piloting air source heat pumps with the view of upgrading the whole stock. A rated boilers as standard, timber window replacement which was not required but done. Water conservation – dual flush ECs, aerated taps Local sourcing of materials Construction waste minimised Environmentally friendly cleaning materials planting 100% Low energy bulbs at void times Strong publicity about energy efficiency  100% low energy bulbs. Recycling facility on site. Low maintenance planting. Educating tenants in sustainability and training in use of new technologies. Contractor complied with Strong publicity about energy efficiency	
Maryhill Housing Association	Current schemes	Eco Homes excellent rating and minimum SAP of 95 as standard.		

RSL	Projects	Environmental features	Sustainability in maintenance: initiatives and lessons learnt	Procurement initiatives
Shettleston Housing Association	Glenalmond Street  Vesalius Street  Springboig	Solar and geothermal energy, car free, passive ventilation, draught lobbies, recycled materials  20 flats and 8 town houses, high level of insulation, extra high quality windows, gas condensing boilers  Reclaimed brick, timber cladding	Scandinavian timber windows Draught proofing programme and double glazing Sourcing materials locally Timber only from sustainable sources Non toxic materials Use of recycled materials (doors, locks, windows Construction waste minimised / recycled Materials chosen on health grounds Water conservation-double flush WCs and aerated taps Planting	Partnering contract for painting in low VOC paints
Orkney Housing Association	Citadal, Stromness  Sommerville Square, Kirkwall	Structural insulated panels, air source heat pumps, heat recovery  Ground source heat pump Biomass	Strong publicity about energy efficiency	
Reidvale Housing Association  Molindinar Housing Association	Reidvale area generally  Moore Street (Graham Square Phase 2)	High quality urban design Orientation, sunspaces Place making Cycle stores Recycling bins Fruit trees for residents	Allotments Insulation programme Timber double glazed windows Sourcing materials locally Strong publicity about energy efficiency Planting Backcourt refurbishment Draught proofing Recycling Insulation programme  Timber double glazed windows Sourcing materials locally Strong publicity about energy efficiency Planting and recycling initiatives Backcourt refurbishment Draught proofing	Local partnering of supply chains Local partnering of supply chains

RSL	Projects	Environmental features	Sustainability in maintenance: initiatives and lessons learnt	Procurement initiatives
Fyne Homes	<p>Ile of Gigha,</p> <p>A'Chrannag Rothesay,</p>	<p>Use of local materials</p> <p>Energy efficiency</p> <p>Good access for all, including people with disabilities</p> <p>Attractive public spaces</p> <p>Super insulation, passive solar gain, optimal form, passive ventilation, thermal mass</p>	<p>Increased insulation</p> <p>Local sourcing of materials</p> <p>Timber only from sustainable sources</p> <p>Timber high quality windows</p> <p>Materials chosen on health grounds</p> <p>Environmentally friendly cleaning materials</p> <p>planting</p> <p>100% Low energy bulbs at void times</p> <p>Strong publicity about energy efficiency</p> <p>Recycling facility</p> <p>Job creation</p> <p>Community participation</p> <p>Staff and committee training</p> <p>Collaborative approach</p> <p>Leadership</p>	<p>Framework Agreement with 10 contractors over 4 years for provision of all maintenance services with the removal of the need for individual tendering, based on reductions in management costs, delivering best value, improved performance monitoring and reductions in management costs.</p> <p>Work with the local Construction Forum.</p> <p>Collaborative contracts</p>
Lochalish and Skye Housing Association	<p>Home Farm, Portree</p> <p>Campbell's Farm, Broadford</p> <p>Coish-Letter</p>	<p>41 houses with ground source heat pumps</p> <p>128 houses with biomass boilers</p> <p>Solar panels</p> <p>Solar panels and timber I beams</p> <p>Air source heat pumps pilot</p>	<p>Use 100% CERT funding to incorporate cavity and loft insulation funding</p> <p>Local sourcing of materials</p> <p>Aspiration to incorporate renewable technologies to ALL housing stock</p> <p>Smart meters</p> <p>Timber only from sustainable sources</p> <p>Materials chosen on health grounds</p> <p>Materials chosen on embodied energy grounds</p> <p>Construction waste minimised</p> <p>Energy efficiency awareness for tenants</p> <p>Eco-friendly initiatives in the office</p> <p>Planting 100% Low energy bulbs at void times</p> <p>Draught proofing programme and double glazing</p> <p>Strong publicity about energy efficiency</p>	<p>Committed to setting up own DLO with staff trained in maintenance of renewable technologies</p>