



**The Higher Education Academy**  
**Education for Sustainable Development**

# **2008 REVIEW OF EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD) IN HIGHER EDUCATION IN SCOTLAND**

## **FINAL REPORT FEBRUARY 2009**

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## EXECUTIVE SUMMARY

### *Research Brief*

This report contains the findings of a review of Education for Sustainable Development (ESD) in Scottish Higher Education, carried out via two investigations during 2008<sup>1</sup>. The research was organised by the Higher Education Academy (Academy) ESD Project, Universities Scotland (US) and Academy Scotland. The Scottish Funding Council (SFC) commissioned the review to build on initial research carried out in 2005-06 (Forster, 2006)<sup>2</sup> and advised on the design and development of the project. The review aligns with the programme of work across the Scottish tertiary sector to contribute to the current United Nations Decade of Education for Sustainable Development (DESD), which runs from 2005-2014.

First, a survey was issued to all 20 Scottish HEIs in May 2008 concerning sustainability practice in estates management, organisational strategy and academic activities; sixteen replies were received, a response rate of 80%. Second, four HEIs volunteered to be case studies for further inquiry into academic approaches to sustainability: the University of Glasgow, UHI Millennium Institute (hereafter simply UHI), Queen Margaret University (hereafter QMU) and University of St Andrews. Twenty-six qualitative interviews were carried out at these HEIs between June and December 2008.

### *Overview of Findings*

The Forster 2006 report found evidence of growing research activity and research capacity related to sustainable development, but few signs of strategic engagement or curriculum evolution in Scottish HEIs. The evidence base for the 2006 findings had consisted mostly of formal HEI documentation, with a small sample of interviews and two responses to a survey of HEIs.

The 2008 inquiry has generated a significantly stronger set of survey responses and rich qualitative data from the case study consultations. These findings paint an encouraging picture of strategic engagement in support of ESD in many HEIs and there are signs of increasing ownership of the academic challenges, in ways consistent with the expertise within particular institutions. The findings in key areas of strategic engagement demonstrate the following points:

- 14 of the 16 HEIs (87.5%) have made public commitments to sustainability at executive level
- 8 HEIs (50%) have explicit sustainability policies or have incorporated it into their strategic plans
- 15 of the 16 HEIs (93.75%) have clear commitments to sustainable estates management practice
- 8 HEIs (50%) record specific commitments in research geared to sustainability issues
- 7 HEIs (43.75%) cite specific commitments in knowledge exchange targeted to sustainability

Sustainable estates management practice appears to be the focus of systematic effort across the sector and many HEIs are involved with the Environmental Association of Universities and Colleges (EAUC) Campus Sustainability Programme (CaSP) initiative.

The review also suggests that the sector is moving towards further embedding of sustainability in the curriculum and many examples of good practice were identified, in targeted 'sustainable development' programmes and in a range of academic disciplines. There are also valuable examples of the approaches HEIs are taking to create informal learning opportunities among students and staff. The survey findings on learning and teaching issues include these key points:

- 9 of the 16 HEIs (56.25%) have specific learning and teaching commitments to nurture ESD
- 32 UG and 47 PG programmes were identified as explicitly targeted to sustainability issues
- Various pedagogic approaches to ESD are emerging, in strategic terms and within the curriculum
- All 16 HEIs anticipate some intentional increase in their formal sustainability provision

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<sup>1</sup> See section 1.3 for further explanation of the term 'ESD', its use in this review and the relationship between ESD as an educational initiative and the concepts of 'sustainable development' and 'sustainability literacy'.

<sup>2</sup> Hereafter referred to as the Forster report, this baseline investigation in 2005-06 included Scottish FE and HE. The full report is available at: [http://www.sfc.ac.uk/publications/JFA\\_Final\\_Report\\_Sustainability.pdf](http://www.sfc.ac.uk/publications/JFA_Final_Report_Sustainability.pdf) (PDF 486KB)

Overall, the findings indicate positive progress on ESD in Scotland and the absence of prescription at policy level has enabled HEIs to act autonomously in response to the internal and external drivers for sustainability. The overall trajectory is towards further embedding within the curriculum, in addition to the development of targeted programmes with strong sustainability orientation.

Existing examples showed the potential for partnership work in ESD curriculum development, maximizing links to thematic initiatives such as employability, lifelong learning and community engagement. The case for institution-wide generic modules on sustainable development is far less clear and questions have been raised about the relative impact and uptake of such offerings at module level. Overall, the review findings point to a gradual broadening of understanding, from earlier activities to provide '*knowledge about sustainability*' to increasing strategic efforts to engage in '*education for sustainability*'.

## **Conclusions**

Support is needed at both sector level and institutional level, if strategic development in ESD is to become more deeply established in Scottish HE. Further progress will be most effective if ESD is embedded as a strategic principle in the funding arrangements envisaged by the Horizons HE task force (2008), to promote 'joined-up thinking' in institutions. It is hoped that ESD will be included in the general conditions for the General Fund for Universities (GFU) and will be a priority for specific initiatives supported by the Horizons Fund for Universities (HFU). Efforts are also necessary to promote discussion among discipline and professional communities, and to overcome the structural barriers to interdisciplinary work in HE.

Research activity for sustainability appears to grow steadily and HEIs say they intend to expand on curriculum development. This will require further strategic effort at organizational level, not least in staff development to build capacity and ownership in all subject areas. HEIs need encouragement to work on further strategic development, to create partnerships with business and community sectors for ESD, and to explore the role of informal learning and the links to lifelong learning initiatives. The general orientation among HEIs is towards further embedding of ESD within HE curricula, but research is still needed to gauge specific labour market demands across professions, industry and employment sectors.

There has been an extremely positive response to both these investigations, which forms a solid basis for further discussions. This positive engagement with the review could in itself be interpreted as a sign of progress and of growing acceptance of ESD within HE. The findings point to significant development since the initial assessment in the Forster 2006 report. However, one of the important challenges in coming years will be to identify and develop ways to measure the educational value and effects of ESD initiatives, in both formal and informal learning, in order to demonstrate credible, effective impact for the UN DESD.

## **Report Structure**

The introduction in Section 1 outlines the research brief, policy context and matters of terminology and definition regarding ESD and sustainability. Section 2 presents the review findings regarding strategic engagement at organisational level. The next two sections concern learning and teaching issues for ESD: formal curriculum developments are discussed in Section 3 and broader issues of pedagogic strategy are discussed in Section 4. The concluding discussion is contained in Section 5 and the recommendations are listed in Section 6. The Appendices contain the methodology and research process, lists from the survey of undergraduate and taught postgraduate programmes, and research institutes and groups geared to sustainability.

## **Recommendations**

### **To Individual HEIs:**

1. Undertake research among the student body to gauge views on sustainability and ESD in lifestyles and professional choices, and in relation to university cultures and campus practices.
2. Explore channels to develop strategic thinking and build capacity for sustainability, through interdisciplinary discussions, online forums and staff development workshops.

### **To the Scottish Funding Council:**

3. Reflect on ways to incorporate ESD as a thematic topic into policy development processes and to encourage initiatives from HEIs under the funding arrangements envisaged for the GFU and HFU.
4. Revise research funding strategies to enable greater status to be accorded to interdisciplinary, applied and partnership research geared to the investigation of sustainability issues.
5. Continue to support the CaSPr initiative to promote shared planning and the setting of baselines of practice in environmental management and corporate operations across institutions.
6. Explore the links between ESD and lifelong learning arising from DESD activities in other educational spheres and seek guidance from the DESD Steering Group to enhance these links.
7. Together with relevant agencies such as the Academy ESD Project and Universities Scotland, initiate inquiries with professional bodies and employer organisations into current sustainability needs in the graduate workforce, connecting ESD with revised employability strategies.
8. Seek opportunities to collaborate with institutions and initiatives to develop methods of recording academic and strategic progress in ESD, taking account of organisational and subject levels of development, to assist with reporting on the impact of HE in the DESD.

### **To the Higher Education Academy:**

9. Develop events through Academy Scotland and the Academy ESD Project to share practice and promote discussion among academics on the major themes arising from this review, such as the links between ESD, employability, interdisciplinarity, community engagement and lifelong learning.
10. Explore ways to support HEIs in the development of strategic thinking that recognises the permeable boundaries between organisational and academic development for ESD.
11. Ask Subject Centres to include sustainability as a priority theme in individual and joint bids for pedagogic research grants, to enhance opportunities for staff to work on embedding ESD.
12. Support the Academy ESD Project to continue its work across disciplinary, regional and institutional boundaries, to assist in creating more effective links between good practice in Scottish ESD and other ESD pedagogic networks and resources across the UK.

### **To Universities Scotland and QAA Scotland:**

13. Encourage discussion of ESD issues within designated subject benchmarking and qualifications review processes, and invite academics with ESD expertise to join and inform these discussions.
14. Initiate discussions with relevant committees about the presence and scope of ESD in the upcoming QE Theme *Graduates for the 21st Century: Integrating the Enhancement Themes*.
15. Assist in promoting discussion about ESD and inter-disciplinarity among appropriate agencies across the education sector, particularly in relation to progression and the FE-HE transition.

## 1. INTRODUCTION

This section provides an overview of the context for this research, following the designation of ‘sustainable development’ as a policy priority for the Scottish tertiary sector. Section 1.1 outlines the parameters for the 2008 Review, which builds on initial research commissioned in 2005. The policy context for Education for Sustainable Development (ESD) is presented in Section 1.2 and important matters of terminology and definitions are discussed in Section 1.3.

### 1.1 2008 Review of ESD in Scottish HE

The 2008 Review of ESD in Scottish HE consisted of two inquiries to assess current levels of engagement with the ‘Education for Sustainable Development’ (ESD) agenda. The work was commissioned by the Scottish Funding Council (SFC) and funded jointly between the SFC and the Higher Education Academy (Academy) Scotland. The review process was designed in collaboration between Universities Scotland (US) and the Academy ESD Project<sup>3</sup>, with advisory input from the SFC. Dr Alex Ryan carried out the research and interviews for the institutional case studies, analysed the survey responses and composed this report on behalf of the Academy ESD Project<sup>4</sup>.

The first investigation was a survey issued by Universities Scotland in May 2008 to all 20 Scottish HE institutions (HEIs). The survey explored the extent to which sustainability is integrated in the governance processes, academic functions and estates management practices of HEIs<sup>5</sup>. The second investigation was a series of qualitative consultations to explore learning and teaching for ESD in more detail, using interviews in four Scottish HEIs: University of Glasgow, UHI, Queen Margaret University (QMU) and University of St Andrews. The Scottish Funding Council (SFC) commissioned the Academy ESD Project to carry out these case studies to ‘spotlight’ educational strategies for ESD within and beyond the curriculum, and to gain a sense of their relationship to institutional sustainability strategies (see methods Appendix 1).

The case studies were conceived in recognition of the fact that there are many ways that universities can provide learning experiences in support of ‘sustainability literacy’ for students, as sustainability literacy can appear in various guises across different subject areas (see Section 1.3). There is also an unavoidable porosity between the goals and tactics of ESD and general trajectories of academic development that guide strategic planning and operations in HEIs. The inevitable interplay between academic development in general, and ESD developments in particular, prompted the design for this review as a ‘light touch’ survey supported by qualitative institutional case studies. To generate a coherent analysis, it has been important to connect these two mutually informative pieces of research in this final report.

The 2008 review was designed to build on initial baseline research conducted by John Forster Associates to explore the topic of sustainability literacy in the tertiary sector (Forster, 2006)<sup>6</sup>. The Forster 2006 report considered the issues arising for learning and teaching, organisational strategy and recording progress in Scottish FE and HE for the United Nations Decade of Education for Sustainable Development (DESD). Reference is made as appropriate in this report to the Forster work and to the initial Scottish Action Plan produced for the DESD, outlined in *Learning for Our Future* (Scottish Executive, 2006)<sup>7</sup>.

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<sup>3</sup> The HE Academy ESD Project has been in operation since 2005, working across the HE Academy Subject Centre Network with discipline-based and interdisciplinary issues for ESD, as well as strategic matters institutionally and regionally, and for students and communities. See: <http://www.heacademy.ac.uk/ourwork/learning/sustainability>.

<sup>4</sup> In addition, a seminar had been planned by the HE Academy ESD Project as a separate activity to assist the development of strategy at one of the case study HEIs (UHI). This seminar was facilitated by Alex Ryan and Colin Brooks in line with similar events organized at three English HEIs to support organizational development. The series report can be found at: [http://www.heacademy.ac.uk/projects/detail/esd\\_EnglishHEIs](http://www.heacademy.ac.uk/projects/detail/esd_EnglishHEIs).

<sup>5</sup> The survey consisted of 16 questions (and space for comments) relating to sustainability developments in strategy, governance and monitoring, learning and teaching initiatives, research and other activities, and estates management.

<sup>6</sup> The complete report is available at: [http://www.sfc.ac.uk/publications/JFA\\_Final\\_Report\\_Sustainability.pdf](http://www.sfc.ac.uk/publications/JFA_Final_Report_Sustainability.pdf) (PDF486KB).

<sup>7</sup> The Action Plan can be downloaded at: <http://www.scotland.gov.uk/Resource/Doc/137705/0034170.pdf> (PDF 964KB).

## 1.2 ESD: Policy Context

The term 'Education for Sustainable Development' (ESD) signals a diverse global initiative with the aim of integrating sustainability principles and pedagogic change into formal education systems and communities worldwide. In 2002, the United Nations General Assembly designated 2005-2014 the Decade of Education for Sustainable Development (DESD), with UNESCO as the lead agency to promote it. UNECE prepared a European strategy for the DESD which was adopted in 2005, to strengthen cooperation while protecting flexibility and diversity of response across the region.

The Scottish Funding Council (SFC) was tasked with taking forward the ESD agenda in the tertiary sector. Its objectives are to assist the integration of sustainability across the curriculum, encourage widespread development of sustainability literacy and citizenship skills, and to promote understanding of sustainability skills among institutions, employers and learners. The first Scottish Executive Action Plan for the UN DESD was outlined in *Learning for Our Future* (2006) and the UN DESD Action Plan Steering Group was established to take the plans forward and to prepare for the second half of the DESD.

The UK Government Sustainable Development Strategy *Securing the Future* and the Scottish Executive Sustainable Development Strategy *Choosing Our Future* were both published in 2005<sup>8</sup>. The Scottish Executive's five key policy objectives are of particular importance as drivers for sustainability initiatives in education and training, as they encompass the 'greening' agenda and broader concerns with justice, wellbeing and cultural development. Developments in educational strategy in Scotland that touch on ESD include *Curriculum for Excellence*, which incorporates sustainability and citizenship concepts, and multi-disciplinary educational ideals focused on outcomes and skills. In addition, the Scottish Executive's Lifelong Learning vision, *Life through Learning; Learning through Life* (2003), prioritised smooth transition from FE to HE and emphasised social and 'people-centred' goals as well as economic goals.

## 1.3 ESD: Terminology and Definitions

In this report, 'sustainability' is often used as a shorter alternative to 'sustainable development'. In the HE context, these concepts can be applied to particular issues (e.g., in terms of curriculum content or research topics) or practices (e.g., in estates management and corporate operations). The span of issues is vast, including energy, food, poverty, justice, health and technology; scientific solutions and technical applications are considered alongside the issues of human perception, behaviour and power more commonly analysed in the human and social sciences.

'Sustainable development' or 'sustainability' has no fixed definition; the Brundtland definition of the 1987 *World Commission on Environment and Development* has sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". However, generic formulations of this sort are often criticised as they can be co-opted to support the continuity of global inequities and ecological degradation, and to sidestep difficult trade-offs in priorities and conflicts between different societies. Sustainable development requires problems to be understood and responses articulated using 'triple bottom line' analysis, taking economic, ecological and social factors into account.

The term 'Education for Sustainable Development' (ESD) refers to the broad strategic and educational agenda outlined for the DESD and endorsed by the UK devolved administrations (see Section 1.2). ESD points to a developmental vision whereby pedagogic and organisational renewal takes place with the aim of supporting progress towards sustainability<sup>9</sup>. The aspirations for ESD include the ideal of universities as 'learning organisations' producing 'sustainability-literate' graduates for all employment sectors. There are ongoing debates about the nature of 'sustainability literacy'; these skills can be understood as a common generic core of attributes, which overlap with existing views of desirable graduate attributes (e.g., the ability to think critically and synthetically about problems). ESD addresses educational theory and practice

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<sup>8</sup> The UK strategy was linked to the overall 2005 strategic framework for the UK regions, *One Future, Different Paths*, which was launched together with *Securing the Future*. The Scottish Executive embedded sustainable development goals into its 2003 policy framework *A Partnership for Better Scotland*.

<sup>9</sup> It therefore encompasses previous 'adjectival' thematic educational movements, such as 'environmental education' and 'development education' in a broad view that incorporates scientific and social-critical perspectives.

at all levels, so it can be planned and achieved in the most explicit modes of formal curricula as well as in the learning that takes place in the ‘hidden classroom’ and in implicit and informal settings.

Specific ideals and targets in sustainability literacy arise as the concept is taken up in different disciplinary and professional contexts, and these priorities change in relation to growing understanding and emergent problems. However, one fundamental component of all ESD is the pursuit of ‘sustainability competence’: the ability to apply knowledge effectively to real situations and complex problems, in order to affect constructive change towards sustainability. In recognition of this complex definitional terrain, the survey questions in this review used the term ‘sustainable development’, rather than ‘ESD’. Colleagues may have different ways of understanding the term ESD and be at different stages of strategic engagement with its implications for widespread pedagogic and organisational change. Therefore, an inclusive approach was taken and the responses captured ESD developing across various different activities and contexts.

## 2. STRATEGIC ENGAGEMENT

One of the most significant features of this review has been the high survey response rate of 80% (16 replies), which is a substantial shift compared to the Forster inquiry in 2005<sup>10</sup>. The strength of response in itself points to positive engagement and increasing commitment at sector level. This section is based largely on the survey evidence and provides an outline of strategic planning at institutional level (Section 2.1), leadership intentions and the designation of staff roles (Section 2.2), the role of sustainability research activities (Section 2.3), and corporate environmental management (Section 2.4).

### 2.1 HEI Sustainability Strategies

In the survey, 87.5% (14) of the HEIs indicated that public commitments to sustainable development have been made at executive level<sup>11</sup>. In addition, five of these replies showed that sustainability is centrally positioned in strategic understanding, using terms such as ‘core business’ that connect sustainability to central academic functions. Within this overall picture, the 14 HEIs are, understandably, at different stages of strategic development, indicated in their replies as follows:

Stage of Development	Total HEIs
EMBEDDED & EXPLICIT IN HEI STRATEGIC PLANS	4
POLICIES ADOPTED AT EXECUTIVE LEVEL	4
PUBLIC COMMITMENT UNSPECIFIED IN SURVEY	4
CURRENTLY REVISING/DEVELOPING POLICIES	2

**Table 1: Stages of Strategic Development for Sustainability in HEIs**

An additional question invited HEIs to indicate if they have specific commitments for sustainability in five core areas of business and whether progress is reviewed annually at executive level in these areas. The replies show significant effort in estates management and increasing commitment to academic strategy<sup>12</sup>:

<sup>10</sup> The 2005 survey of the tertiary sector elicited only two HEI replies (10%) and signs of active resistance connected to understandable concerns over possible external imposition on the curriculum (Forster, 2006).

<sup>11</sup> One response indicated no commitments in formal documentation and another gave no response to the question.

<sup>12</sup> Two issues arose that could be addressed in future reviews (see Section 5.4): i) the correspondence between those reporting commitments, and those reporting the monitoring of such commitments, was not clearcut; ii) it was not made clear in the survey whether the replies should indicate broad strategic intentions or ‘SMART’ operational targets.

Core Area of Business	Specific Commitments	Annual Monitoring
ESTATES MANAGEMENT	15	9
LEARNING & TEACHING	9	4
RESEARCH STRATEGY	8	5
KNOWLEDGE EXCHANGE	7	4
COMMUNITY ENGAGEMENT	2	2

**Table 2: HEIs with Strategic Sustainability Commitments in areas of ‘Core Business’**

The low number of HEIs reporting commitments to community engagement is significant in Table 2. Only two HEIs cited commitments in all five areas; a further four HEIs had commitments in four of the five areas, but in each case their ‘inactive’ area was in community engagement. This is striking compared to the engagement evident in other areas; however, the case studies revealed examples of community engagement for sustainability which offset this finding to an extent (see Section 4.3). It is important to consider the range of possible interpretations for this category, which may have influenced the survey responses. Nonetheless, it is likely that financial and structural disincentives affect strategy formation on this topic.

## 2.2 Leadership and Strategic Investment

Positive messages appeared regarding the aspirations of HEIs to take lead roles across five main spheres of sustainability activity. Five of the 16 HEIs wish to make a significant contribution in all spheres and three highlighted their intention to contribute, even where ‘sector lead’ roles might not be feasible:

‘Sector Lead’ Activities	Total HEIs
RESEARCH	11
LEARNING & TEACHING	10
ESTATES MANAGEMENT	10
GOVERNANCE & STRATEGY	8
STUDENT ENGAGEMENT	6

**Table 3: Number of HEIs Aspiring to Take Lead Roles on Sustainability**

These replies are encouraging, as they reveal substantial willingness to participate and to make progress, despite the complexities of this diffuse, developmental agenda. Interestingly, a question about adherence to international declarations revealed little engagement with earlier initiatives prioritising the educational agenda of environmental and sustainability movements. Only two HEIs had signed the Talloires (1990) and Copernicus (1993) declarations which arose in this context<sup>13</sup>.

Another revealing survey outcome was that questions about environmental management roles and future provision elicited unexpected details about other senior and academic roles. Two HEIs now have leadership roles for sustainability; one has a 0.5 post for sustainability governance/strategy and corporate social responsibility, and the other has an academic lead post for curriculum development in sustainability. Two further HEIs have posts in particular schools for delivering and managing sustainability curricula<sup>14</sup>.

The findings in Sections 2.1 and 2.2 point to increasing incorporation of sustainability into institutional strategies, compared to the Forster report in 2005-06, which found that few HEIs had ‘robust’ sustainable

<sup>13</sup> In Forster, two more HEIs had signed Copernicus; one did not respond to this survey and one gave a blank reply.

<sup>14</sup> Future reviews designed to monitor progress across the sector might usefully include questions to elicit information about academic responsibilities, as it seems likely that the present survey has not captured all the relevant details.

development policies. This review appears to show greater strategic engagement, cognisant of the way the ESD agenda permeates the academic enterprise. The findings about increasing future provision are also noteworthy in this regard (see Section 3.3).

### 2.3 Research Expertise and Academic Development

The Forster inquiry in 2005-06 found the clearest evidence of academic engagement on sustainable development issues in the research arena, with various initiatives and activities recorded. Sustainability-related research was included in the review survey and 13 HEIs recorded a total of 28 relevant research centres, two in development, and 10 research groups/networks (listed in Appendix 4). These responses confirmed the vitality of the Forster findings; research activities to address sustainability issues in Scotland now range across an increasingly diverse spectrum of subjects and interdisciplinary areas.

The Scottish approach to research pooling has also been an important enabling factor, as in the SAGES (Scottish Alliance for Geoscience, Environment and Society) collaboration of nine HEIs, launched in 2007 with an investment of £6.5m. There is clearly potential for this initiative to assist with capacity-building at sector level; the SAGES project includes interdisciplinary PhD studentships that incorporate societal and policy analysis with scientific understanding. One interesting development in collaborative sustainability research is the plan to develop partnership working through the UHI Sustainable Development Research Centre, involving the University of St Andrews, the Forestry Commission and Forestry Commission Forest Research Agency, Macaulay Land Use Research Institute and the Cairngorms National Park Authority.

The case studies also showed that interdisciplinary research networks and discussion groups in HEIs are an important vehicle for creating ownership of the academic issues at institution level, enhancing the potential for research collaboration and for curriculum development. Space for debate is essential for ESD and the survey findings suggest that HEIs are aware of the value of this sort of exchange. The survey uncovered four internal interdisciplinary networks and 15 of the 16 HEIs stated that they provide opportunities for ESD debate among colleagues. This takes place mainly via formal work groups and committees, but eight HEIs supplement this with newsletters, webpages and targeted discussion events.

The Forster inquiry noted that existing sector level support should create momentum in sustainability research and result in transfer into the curriculum, but also raised questions about the depth and speed of these effects. It is not possible at this stage to attribute causal relationships between research activities and the present findings, but the case study consultations indicated the likelihood of both diffuse and direct effects on pedagogic development, particularly with the impetus generated by the Quality Enhancement Theme *Research-Teaching Linkages: Enhancing Graduate Attributes*. Questions about speed of transfer remain pertinent, however, given the scale and depth of changes sought for effective ESD across the sector, and targeted strategic support for learning and teaching will still be needed.

### 2.4 Environmental Management and Reporting

Section 2.1 (Table 2) shows substantial progress in estates practice, with environmental management of the campus scoring extremely highly in strategic commitments (15 HEIs or 93.75%). This positive picture is evident in staff roles: nine HEIs indicated that at least one staff member is responsible for institution-wide environmental management, and many HEIs listed additional roles with specified duties<sup>15</sup>. HEIs recorded involvement with various external accreditation and recognition systems; however, there appears to be little consistency in the environmental management systems they use<sup>16</sup>. The survey also revealed varied views about what constitutes a 'comprehensive' audit; six HEIs monitor environmental impact on all fronts and five of the remaining 10 HEIs audit individual aspects of resource use and impact<sup>17</sup>.

There was little uptake of the *Global Reporting Initiative* or the *Global Higher Education for Sustainability Partnership* auditing tools (one affirmative reply for the former). Instead, five HEIs stated that they use 'other' reporting tools, four of which are their own, and 10 provided no further response. One HEI made

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<sup>15</sup> Across the 16 replies, various role configurations were detailed, with one HEI listing as many as 12 relevant roles.

<sup>16</sup> These included Carbon Trust HECM initiatives, ISO 14001, BREEAM ratings, and Energy Efficiency accreditation.

<sup>17</sup> For example, in carbon management, waste and recycling, or transport: these smaller scale audits are variously carried out for the purpose of external accreditation schemes or to serve as internal monitoring processes.

specific mention of the *Sustainable Development Guidance for Estate Management* produced in March 2008 for the SFC<sup>18</sup>. The findings indicate the need for further discussion of formal accreditation and monitoring schemes in environmental management (e.g., ISO 14001). As the Forster report noted, positive estates management and corporate social responsibility trajectories benefit the academic enterprise and efforts to integrate 'campus' and 'curriculum', so that HEIs are seen to 'practice what they preach'.

These responses on environmental management formed one element of the survey and should be considered in conjunction with the more detailed survey of practices in the tertiary sector published in 2008 by the Environmental Association of Universities and Colleges (EAUC) Campus Sustainability Programme (CaSPr)<sup>19</sup>. The CaSPr programme featured significantly in the present survey, with many positive comments made about the initiative and its efforts to share approaches sector-wide, to assist in the development of good practice. Three HEIs stated their intention to be involved with an indexing pilot and highlighted their commitment to the CaSPr Universities and Colleges Climate Commitment for Scotland, launched in January 2009 with the signatures of 12 Scottish HEIs.

### 3. CURRICULUM DEVELOPMENT

The degree to which elements of the formal curriculum are badged 'ESD' can vary considerably. ESD can be addressed at different levels of explicitness and its presence is not always apparent in formal documentation (see Section 1.3). In this section, the varieties of formal provision identified in the survey and the case studies are discussed under two headings: targeted 'flagship' programmes (Section 3.1) and sustainability embedded within mainstream provision (Section 3.2). In Section 3.3 consideration is given to the future of formal ESD provision and the barriers identified by the review.

#### 3.1 Flagship Sustainable Development Expertise

'Triple bottom line' analysis for sustainability necessitates interdisciplinary learning and teaching (see Section 1.3) and the Forster report identified some innovative ESD provision in HE. The present case studies included two programmes named in the Forster study: St Andrews undergraduate MA/BSc *Sustainable Development* and UHI BSc/MSc *Sustainable Rural Development* (this review included both undergraduate and postgraduate at UHI), as well as the *Environmental Sustainability* programme formerly offered as an undergraduate award by Glasgow University at its Dumfries campus<sup>20</sup>. 'Flagship' programmes targeted for sustainability can include directly 'on topic' programmes (like the St Andrews example) and others emerging from different disciplines and topics of inquiry, often with interdisciplinary orientation as well as a sustainability focus.

A recent report on interdisciplinary teaching and learning (Thew, 2007) underlines the structural and financial challenges that HEIs face when developing and managing such provision<sup>21</sup> and the St Andrews undergraduate MA/BSc *Sustainable Development* programme provides an instructive example. This is a pioneering programme, open to students from scientific and social-scientific backgrounds, where the epistemological challenges of interdisciplinarity are embedded in the programme design (and feature in more depth in the forthcoming taught postgraduate *Sustainable Development* programme). Staff enthusiasm, student interest and various supportive contextual factors led to the successful growth of the

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<sup>18</sup> Available at: [http://www.sfc.ac.uk/publications/Sustainable\\_Development\\_Guidance\\_March\\_2008.pdf](http://www.sfc.ac.uk/publications/Sustainable_Development_Guidance_March_2008.pdf) (PDF 860KB).

<sup>19</sup> *State of the Campus 2008 Survey* (June 2008, IAB Sustainability Consultants & John Forster Associates), available at: [http://www.eauc.org.uk/file\\_uploads/stateofcampusreport\\_june08\\_final.pdf](http://www.eauc.org.uk/file_uploads/stateofcampusreport_june08_final.pdf) (PDF 502KB). The CaSPr programme was launched in 2005 to become a 'one-stop shop' for the sector, to raise performance and build capacity in waste management, energy efficiency, biodiversity and in sustainable travel, procurement and construction.

<sup>20</sup> *Environmental Sustainability* at Crichton University Campus emerged within Liberal Arts undergraduate provision but suffered from structural changes and circumstances affecting the campus, resulting in withdrawal of the named award.

<sup>21</sup> See *The impact of the Internal Economy of HEIs on Inter-disciplinary Teaching and Learning* (Thew, 2007), report for the HE Academy Interdisciplinary Teaching and Learning Group: <http://www.heacademy.ac.uk/ourwork/networks/itlg>.

programme; however, it is unlikely that such favourable conditions will coincide in many HEIs<sup>22</sup>. St Andrews had to contend with the substantial staffing resource needed to develop the programme and the 'balance of duties' issues for teaching input required across faculties, one of the main challenges highlighted by the Thew report.

The St Andrews programme is exemplary in design and in the depth of its interdisciplinary engagement; it stands as a model of innovative practice that can be promoted as such at international level. However, it also points to the inevitable conclusion that such programmes are not an effective sector-wide solution to the demand for ESD. Another approach is found in UHI's BSc and MSc *Sustainable Rural Development*, illustrating the potential and value of targeted sustainability provision built on local expertise and context. In this case, the local authority and enterprise agency were among those who contributed funding for initial course development. These programmes use UHI's online tuition expertise, which emerged from the need to provide for rural learners, and the postgraduate programme is validated for delivery in Europe. The focus of these programmes has particular relevance for rural and island communities, but suits a wide range of community development contexts. The vocational orientation has resulted in recognition by the Institute of Economic Development, who grant Associate and Full membership to undergraduate and postgraduate graduates respectively.

In 2005-06, the Forster report highlighted one undergraduate and five postgraduate programmes that were directly related to sustainable development<sup>23</sup>, but the present survey findings indicate further growth in this area. When invited to specify programmes targeted to sustainability, HEIs were able to include explicitly interdisciplinary programmes, as well as those emerging within disciplines that might incorporate different levels of interdisciplinarity. The lists were highly diverse as a result, ranging across a spectrum of disciplines and from implicit to explicit examples. The figures for these programmes were<sup>24</sup>:

- 32 undergraduate programmes (including HE diploma level) and
- 47 postgraduate programmes (at Masters/postgraduate diploma level).

Some HEIs restricted their answers to programmes with reference to sustainability in the title and clear interdisciplinary content. Others listed discipline-based 'embedded' programmes (and sometimes modules) targeted to sustainability (particularly in some of the undergraduate examples given). In some cases, entire departments or subject areas were listed, where all provision is oriented towards sustainability<sup>25</sup>.

As indicated above, these examples of 'targeted' programmes are not always linked to research expertise or institutions with 'elite' research status and accompanying resources; curriculum development initiatives for sustainability are appearing in their own right. At UHI, a European Social Fund award is being used to develop a suite of new taught postgraduate programmes in Sustainability Studies. At Glasgow, taught postgraduate offerings include the MSc *Carbon Management* at Dumfries campus (see Section 5.2) and MSc *Justice, Social Movements and Sustainability*, while further proposals for postgraduate programmes are under discussion. The case studies did suggest, however, that there is greater overall confidence and investment in taught postgraduate curriculum development for sustainability than there is at undergraduate level.

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<sup>22</sup> The programme developed from an inter-disciplinary module established as a result of St Andrews' involvement in the *Higher Education Partnership for Sustainability* initiative (HEPS, 2000-2003).

<sup>23</sup> The UG MA/BSc *Sustainable Development* (St Andrews); PG *Sustainable Rural Development* (Aberdeen); PG MSc *Sustainable Rural Development* and MSc *Sustainable Mountain Development* (UHI); MSc *Environmental Sustainability* (Edinburgh); MSc *Sustainable Development* (Stirling); MRes *Pollution Studies and Sustainable Development* (Strathclyde – sustainability-related provision in civil engineering has since changed) (Forster, 2006).

<sup>24</sup> The UG list included the Glasgow *Environmental Sustainability* programme that has since ceased recruitment and one currently in development (Appendix 2). The PG list includes 3 programmes in development and the figure cited here includes 5 programmes omitted in survey responses but identified during the case study process (Appendix 3).

<sup>25</sup> In a few cases, a decision was taken to omit items from the figures reported here, where the degree of relevance was not clear. This highlighted the need to revise future surveys, to provide inclusive but explicit parameters for HEIs to frame their responses in terms of both content and pedagogy geared to sustainability (see Appendix 2).

### 3.2 Embedding Sustainability within Disciplines

The survey and case study findings indicated the gradual penetration of sustainability issues into a wide spectrum of disciplines and in many cases the development of associated pedagogies. Not all of this activity is apparent in formal documentation, as it reaches beyond 'flagship' sustainability provision and into the 'fine grain' of more familiar disciplinary contexts. The case studies evidenced a variety of credible approaches, showing the impossibility of creating stable schema or categories for types of ESD. ESD is most effective and credible when it is translated in context, which means that a degree of imprecision is inevitable when taking an overview of activities in development.

Inevitably, infiltration begins with immediate and obvious sustainability concerns, in disciplines concerned with natural resources (e.g., environmental sciences) and where professional regulations are implicated (e.g., architecture). Professional criteria for sustainability have been developed for Civil Engineering and the University of Glasgow provided evidence of transfer into the undergraduate Civil Engineering curriculum with a number of modules and case studies, assisted by the appointment of a Visiting Professor<sup>26</sup>. There are collegial links and further innovations in teacher education; Glasgow's B.TechEd *Technological Education* addresses design, technical and engineering topics, including modules on energy and resources with active learning project assessments, created with staff expertise in public engagement and sustainability.

Sustainability teaching in other subject areas, particularly human and social science disciplines, appears to have emerged more slowly in most cases. The examples identified during this review cover more and less explicit approaches across various disciplines (e.g., in relation to policy critique, consumer behaviour, and questions of justice); in some cases intentional implicitness may have obscured the overall extent of engagement. For example, the Glasgow level 3 undergraduate module *Society and Environment in the Post-Socialist World* involves students in consideration of the political rhetoric, critical questions and policy implications of the sustainable development agenda in comparative global perspective, by analysing materials from 20<sup>th</sup> century Russia. Pedagogic diversity is also apparent; while active learning approaches are commonly proposed in sustainability education, there were also assertions of the value of the traditional essay for honing the critical reasoning and evaluation skills needed for decision-making that aids sustainability.

Embedding sustainability within subject areas at department level can be well served by the use of review processes, as the School of Business, Enterprise and Management at QMU has shown. Staff with ESD interests in Consumer Studies and Public Sector Management have assisted with the inclusion of sustainability in their recent School review and prepared modules with active learning assessment components geared to ESD. This provides a vehicle for engaging most of the student cohort with sustainability learning opportunities via optional modules that feature across programmes. This shows how the collegial engagement and debate that take place during review processes can promote coherent embedding, even where there are divergent views about political and financial priorities for 'sustainability'.

### 3.3 Future ESD Provision in HEIs

As discussed in Sections 3.1 and 3.2, there seems to be increasing acceptance and movement towards more comprehensive curriculum embedding and this shift was underlined by 15 of the 16 HEIs stating that they intend to add to their existing provision linked to ESD<sup>27</sup>. This included intentions for 'flagship' postgraduate programmes that build on existing expertise and embedding sustainability further into existing subject areas. It also concerned the adoption of broader institution-wide pedagogic approaches to develop sustainability skills (see Section 4.2). These stated intentions of HEIs to develop the curriculum in support of sustainability are revealing, as they were articulated despite concerns registered elsewhere in the survey.

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<sup>26</sup> Since 1998 the Royal Academy of Engineering has appointed Visiting Professors in UK HEIs in Engineering Design for Sustainable Development and the UK-SPEC Standards for Professional Engineering Competence which came into operation in 2004 are specific about the application of sustainable development in professional practice.

<sup>27</sup> One HEI did not give a 'yes/no' reply about their intention to create further provision but simply stated that any future developments would likely take place at module level rather than in the creation of new programmes.

Clearly, the external climate influences the sector at all levels; in disciplinary priorities, institutional strategies, policy concerns, and student and staff interests. Survey responses showed that while strategic commitment does not appear to be a significant barrier, lack of confidence in the level of demand for ‘sustainability literacy’, among both employers and students, is possibly causing confusion. In response to a list of perceived barriers to future curriculum development, the following replies were made:

Perceived Barriers	Total HEIs
UNCERTAINTY ABOUT MARKET DEMANDS FOR SUSTAINABILITY SKILLS	8
TIME PRESSURES ON ACADEMIC STAFF	6
STRUCTURAL OBSTACLES IN CURRICULUM MANAGEMENT	6
UNCERTAINTY OVER DEFINITIONS OF SUSTAINABLE DEVELOPMENT	5
TIME PRESSURES ON SUPPORT STAFF	4
LACK OF EXPLICIT COMMITMENT AT STRATEGIC LEVEL	3
FEW SUBJECT AREAS WITH OBVIOUS RELEVANCE	1

**Table 4: Perceived Barriers to Further Development of Sustainability Curricula**

Despite these cautions over demand, three HEIs indicated explicitly that this is not an issue and that sustainability curricula will continue to develop ‘naturally’, in line with academic capacity and market needs<sup>28</sup>. Uncertainty does exist over the specific needs in sustainability skills across professions and employers, yet there appears to be consensus that demand is increasing overall (see Section 5.2). The fact that interdisciplinary thinking is prominent in ‘sustainability literacy’ underlines the need to be conscious of the structural barriers to interdisciplinarity underlined by the case studies (Section 3.1).

Finally, the value of the institution-wide ‘generic’ module in sustainability as a fruitful future approach to ESD was not clearly established in the review findings. The Forster report noted two examples where student pressure prompted the creation of such modules (St Andrews and Edinburgh), but case study interviewees raised questions about investment in this type of specialist provision at module level. Levels of uptake and relative impact on students were compared less favourably against the value of targeted sustainability programmes and tangible efforts towards embedding within existing curricula.

## 4. PEDAGOGIC STRATEGIES

The review ensured that consideration was given to the broadest range of strategies for ESD, which includes the formal HE curriculum but is by no means restricted to it. This section draws primarily on the case study materials and covers informal student learning (Section 4.1), learning and teaching strategies (Section 4.2), community engagement (Section 4.3) and ‘on campus’ learning opportunities (Section 4.4).

### 4.1 Informal Learning Opportunities

In addition to penetration of the curriculum, ESD is fundamentally concerned with informal pedagogies to support the development of ‘sustainability literacy’. The DESD Action Plan *Learning for Our Future* pointed out that initiatives should not be restricted to formal education, but can span all aspects of the learning experience and different modes of access to learning. The review showed examples of a wide range of projects to raise awareness and to encourage more sustainable habits of behaviour and thinking, e.g., the QMU RE:USE Project, which collects unwanted items from halls of residence to sell cheaply to other students. The service satisfies environmental aims, by minimising waste, and serves a charitable purpose by providing low cost goods (e.g., warm clothes and bedding for incoming international students). QMU’s

<sup>28</sup> It is perhaps worth noting that the numbers concerned about demand are not much higher than those who registered concern about curriculum space and staff time, which are ongoing pressures on any form of academic development.

approach takes account of the financial realities for students that can thwart community engagement, offering printing and food credits as rewards to students for volunteer work.

The case studies also pointed out the importance of engaging with student allegiances and priorities to maximise the impact of informal learning; for example, reaching students via student societies where they have a sense of affiliation. At the University of St Andrews, environmental champions in student halls of residence have succeeded in raising student awareness and involving students in sustainability activities. There were also clear signs that strong systems of student representation and effective channels for the student 'voice' are an important enabling factor for this type of sustainability learning (see Section 4.4).

One of the issues that arises regarding informal learning for students is accreditation; it is often argued that student engagement is difficult unless there are formal 'rewards' in curriculum terms (particularly in the financial climate in which students now operate and given the demands on their time). However, at an event organised by the SFC and NUS Scotland in October 2008, not all students favoured accreditation for volunteer work<sup>29</sup>. One student representative with experience in ESD who was consulted during the review also warned against undue formalisation of the learning gained in project work and volunteering.

The issues of formalisation also arise in consideration of the value of Personal Development Planning (PDP) as an effective vehicle for student learning in sustainability (likewise in connection with the Higher Education Achievement Report<sup>30</sup>). The aim of ESD is to avoid disaggregation of the personal and professional spheres of learning, which implies recognition of the prior and professional experience of HE students (particularly mature students). Avoiding the 'tabula rasa' view of all students and supporting the integration of personal and professional learning is not easily achieved in HE, but this is made possible in the developmental reflection encouraged in PDP. At Glasgow, this potential is being explored in connection with the new PDP scheme and alongside pedagogic research on fieldwork and placement learning, exploring questions about informal learning and the relationship between sustainability learning and assessment.

## 4.2 Formal Learning and Teaching Strategies

For ESD to be credible and valuable within HE, it has to take place without undue imposition and in line with the usual impulses for academic evolution, namely the drivers from scientific, economic and social priorities. In 2005-6, the Forster inquiry explored institutional strategies and found little observable commitment to embedding sustainability across the HE curriculum. By contrast, this review suggests that there have been changes in recent years; HEI responses at strategy level are inevitably diverse, but prioritisation for pedagogic development in ESD appears to be increasing. The following survey responses were given with regard to explicit sustainability prioritisation in learning and teaching strategies:

- 5 HEIs commented that they have integrated sustainability principles into their Learning and Teaching (L&T) strategies
- 4 HEIs stated that their wider strategic plans for sustainability incorporate their L&T strategies
- 3 further HEIs are considering the development of specific L&T principles for sustainability

Where learning and teaching strategies are concerned, HEIs have different terms of engagement, and these 'explicit references' do not always imply explicit aims to embed sustainability in the curriculum<sup>31</sup>. However, many of the generic processes being put in place are clearly conducive to further embedding and academic development over the longer term, particularly where research strategies are also geared towards sustainability issues. As noted in Section 3, the review findings pointed to various signs of embedding, even where this is not articulated in formal strategy at the institutional level.

It appears that, although in most HEIs ESD activity in the curriculum exists only in pockets of mainstream provision or in 'flagship' programmes, broader strategic developments are taking shape. Thematic

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<sup>29</sup> Feedback from David Beards, SFC, via personal communication, arising from the October 2008 event: "Conference to Celebrate Student Contributions to the United Nations Decade of ESD".

<sup>30</sup> This is a new way of recording students' achievements as recommended by The Burgess Report. See: <http://www.universitiesuk.ac.uk/Publications/Pages/Publication-272.aspx>

<sup>31</sup> One HEI response claimed that sustainable development is already embedded in all courses, underlining the fact that future surveys would need to be designed to capture more clearly the nature of the approaches in evidence.

strategies are important mechanisms, whether more or less explicitly articulated; at QMU, sustainability is included within the intended ‘graduate attributes’ and at Glasgow it is woven amongst other pedagogic priorities. Thematic approaches can stimulate ownership and articulation of the ESD agenda and its intellectual and pedagogic terrain, when applied in specific contexts, helping to avoid the reduction of ‘sustainability literacy’ to a ‘core skills’ approach<sup>32</sup>. The new Quality Enhancement Theme *Graduates for the 21st Century: Integrating the Enhancement Themes* is a significant sector-level vehicle, with the potential to promote valuable debate on the place of sustainability in future HE. This is likely to be an important mechanism for future discussion on the prioritisation of sustainability within broader academic strategies, and for nurturing strategic thinking at the institutional level in relation to ESD and pedagogy.

### 4.3 ESD and Community Engagement

It was noted earlier (Section 2.1) that there appears to be comparatively little progress on community engagement, at least in formal strategies connecting ‘community’ and ‘sustainability’, and that structural and financial disincentives may present significant obstacles in this sphere. However, the survey also revealed varied types of engagement for sustainability with different ‘communities’; HEIs were invited to record their local partnerships that touch on sustainability issues and these connections were as follows:

Types of Local Partnership	Total HEIs
COMMUNITY ORGANISATIONS	12
OTHER LOCAL PARTNERS	11
LOCAL BUSINESSES	10
EDUCATION PROVIDERS	8

**Table 5: HEIs’ Local Partnerships Related to Sustainability**

There are different ways to interpret ‘community engagement’, and different incentives and rewards in different spheres, which may be affecting the growth of strategy initiatives in this area. Collaborations arise in environmental management and estates development, involving HEIs with local council planning processes and waste management initiatives. Collaborations on environmental management can be linked to the curriculum; for example, the MSc *Carbon Management* at Glasgow’s Dumfries campus is delivered in partnership with a local carbon management organisation. Curriculum partnerships involving HEIs with enterprise agencies, local businesses and national employers accord with the recommendations of the Horizons report and strategies for local and regional engagement (see Section 5.2). In such partnerships, the benefits, in terms of applied and cutting-edge curriculum input, appear to outweigh the time and effort needed for curriculum development and to ensure effective quality processes.

However, collaborative initiatives for curriculum development in the charity and NGO sphere frequently suffer threats to longevity, with one-off allocations of charitable funding. QMU has expertise in managing the challenges of this type of curriculum development, in pioneering collaborations with Friends of the Earth (*Environmental Justice*) and Scottish Women’s Aid (*Gender Justice*). Given the vagaries of the current economic climate, these spheres of activity can be significantly threatened, and partnership working at all levels will need financial support in order to maximise benefits for sustainability learning.

HE has its part to play in nurturing professional development and civic engagement, and in the interface between national initiatives, training needs and local delivery. Examples provided in the survey included academic expertise used to provide Continuing Professional Development (CPD) on sustainability issues for local authority employees and business managers, and to give educational and scientific support to local ‘Eco Schools’<sup>33</sup>. The *Learning for Our Future* Action Plan provided examples of effective connections between HEIs and the broader spheres of community and lifelong learning at local and regional levels. While the review was not able to explore all these issues in detail, there were examples of good practice

<sup>32</sup> As the Forster report noted, the ‘core skills’ approach in FE is not credible for ESD at HE level (Forster, 2006).

<sup>33</sup> Nine of the 16 HEIs noted particular partnerships with professional associations that have a bearing on ESD.

on all fronts; for example, one HEI that responded to the survey has a public engagement arm linked to its collection of zoology and botany resources, which has been submitted for Eco-Centre status.

One platform for regional engagement is the United Nations University network of Regional Centres of Expertise (RCE) in ESD, which encourages local and regional partnerships across the public and private sectors to promote dialogue and build collaboration at all levels<sup>34</sup>. No RCEs have yet been established in Scotland and this may be an interesting future vehicle, particularly as there is scope for collaboration at European and international levels within the network. The value of such local and regional initiatives does not preclude their significant potential in broader networking and promoting public awareness.

#### **4.4 Campus Sustainability Learning**

As noted in Section 4.3, 'community engagement' in sustainability often concerns the environmental impact of university campuses and the intention at sector level has been to nurture the potential for sustainability literacy arising directly from campus environmental management practices<sup>35</sup>. The case studies suggested that there is potential for further links to be made with local partners and to broaden the scope for sustainability learning, whether at the level of the formal curriculum, through project work on campus, or on an informal basis, as part of the 'student experience' of university life. In this arena, 'campus practice' for sustainability can include environmental management and other operational matters linked to sustainability, for example, corporate social responsibility practices.

Examples were identified where projects among staff and students had contributed to the development of institutional sustainability strategies and policies. At the University of St Andrews, a student campaign on ethical investment prompted strategic changes and assisted in the acquisition of Fairtrade status in the town. At the University of Glasgow, the Student Representative Council was involved in developing an ethical investment policy framework and teacher education students carried out project work as part of their curricular activities that contributed to the institutional transport policy. The case studies also pointed to ways that staff had contributed to organisational development on sustainability matters, illustrating the goals of ESD in promoting the engagement of people and the development of organisations at all levels.

One interesting example of informal learning among students is at QMU, where incoming students were surveyed to gauge their interest and knowledge about environmental issues, particularly in relation to the opening of the new campus with its sustainable design. Environmental management often tackles sustainability in measurable ways, but harnessing the deeper learning potential in exploring corporate practices can be more challenging. Differences arise over practices about which there is relatively easy consensus, and other issues that give rise to disagreement, but the potential for learning and skills development in these arenas is considerable. These learning opportunities highlight the need to promote greater integration and connection between corporate practice and academic strategy for sustainability.

## **5. CONCLUDING DISCUSSION**

The review has identified significant positive engagement with sustainability across Scottish HE, in estates management and corporate operations, as well as the longer term and more complex development of academic and organisational strategy. Creative tensions always exist at the interface between academic disciplines, HE institutions and thematic agendas; for ESD, the ethical, political and interdisciplinary implications raise various structural and intellectual challenges. Despite the diverse and contested nature of ESD aspirations, the groundswell of activity in HE looks set to expand.

However, some case study participants estimated that ESD has only reached the awareness of roughly 10% of staff and students in their institutions<sup>36</sup>. The need for greater engagement beyond certain environmental and technical disciplines, and in a wider range of professional and vocational areas, is an

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<sup>34</sup> Information on the RCE network is available at: [http://www.ias.unu.edu/sub\\_page.aspx?catID=108&ddIID=183](http://www.ias.unu.edu/sub_page.aspx?catID=108&ddIID=183).

<sup>35</sup> The Universities and Colleges Climate Commitment for Scotland includes the curriculum in its intended action plan, although the climate change focus does not encompass all issues implied in 'sustainable development' or 'ESD'.

<sup>36</sup> These estimates are based on anecdotal evidence; some interviewees gave such responses and interestingly, the same figure recurred. It would be valuable for HEIs to conduct their own brief surveys to assess overall levels of awareness (and of enthusiasm and/or hesitation) regarding the various implications of ESD for their institution.

important priority. The review has revealed areas where structural rethinking is still needed and this concluding discussion sets the findings in context. Sustainability activities and the drivers for them are considered in terms of the institutional setting, external markets, sector-level agencies and ways to understand progress in ESD. Reference is made to the findings of the 2008 Horizons HE task force<sup>37</sup> and with the intention of informing priorities for the HE contribution to the second half of the DESD.

## 5.1 HE Institutions and the Organisational Setting

The Forster 2006 report highlighted the importance of formal sustainability strategies in HEIs and this review has found noticeable strategic development in HEIs in both operational and academic planning. This points to solid future trajectories based on the diversity and specialism in individual institutions, which accords with the Horizons task force recommendations. The case studies have shown that senior commitment is important, but it must be matched by the engagement of staff to create a combination of processes that work 'bottom-up' (from staff and academic disciplines) and 'top-down' (senior policy commitment and thematic initiatives). In addition, space and time for institution-wide discussion is crucial for effective strategic development, and HEIs need to be encouraged to engage in these conversations at all levels and to source expert input accordingly, not least at the level of the University Council<sup>38</sup>.

In terms of academic development in HEIs, the initial *Learning for Our Future* plan urged the development of generic cross-disciplinary modules in sustainable development and trans-disciplinary approaches to sustainability learning and teaching. While interdisciplinary perspectives appear to be strengthening, the value of generic modules has been questioned by the present review. Instead, there are signs of deeper engagement, through 'flagship' programmes and embedding, as well as pedagogic and organisational renewal. It is clear that many HEIs understand the essential distinction between '*knowledge about sustainability*' and '*education for sustainability*', and the strategic complexities involved. Future inquiries could usefully explore the level to which current strategic statements filter down over time into staff development activities, a useful indicator of commitment to long-term innovation.

The issues uncovered regarding the experiences and priorities of students suggest that informal learning may play a significant role in the development of 'sustainability literacy'. The role of informal learning in changing behaviour is not fully understood and it will be important to connect ESD in HE with other lifelong learning activities during the DESD to inform the strategic balance that HEIs adopt. The case studies show clearly that HEIs must identify their own appropriate balance of formal and informal approaches. No single schema or ideal applies in all cases and the angles of engagement are linked to regional setting and academic expertise. Effective future ESD initiatives in HEIs will require progress on leadership, informal learning, community engagement and partnership working at all levels.

## 5.2 Market Demand and the Business Case

Both the Forster 2006 report and the *Learning for Our Future* Action Plan noted the need to establish the business case for embedding sustainability literacy in the HE curriculum. This has proved to be a complex task, as professional understandings vary widely and not all employers appear to be certain about future needs, particularly in the present economic climate. However, recent research shows certain trends:

- The Academy for Sustainable Communities report *Mind the Skills Gap: The Skills We Need for Sustainable Communities* (2007) forecasts serious capacity problems in professions required to build sustainable communities, particularly in cross-occupational and inter-professional working<sup>39</sup>;
- The United Nations Environment Report *Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World* (2008) also points to serious skills deficits and to the projected need for skills in renewables, energy efficient construction, sustainable transportation and organic agriculture<sup>40</sup>.

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<sup>37</sup> All documentation and output from the Scottish Executive HE task force, including the response of the SFC, is available at: <http://www.scotland.gov.uk/Topics/Education/UniversitiesColleges/16640/hetaskforce>.

<sup>38</sup> The HE Academy ESD Project has developed an approach to supporting HEIs in strategic discussions to help them identify ways to connect the academic and strategic parameters of the ESD agenda to their expertise and local context. This has been trialled with three English HEIs and the seminar at UHI was organised with similar aims in mind. Further details can be found at: [http://www.heacademy.ac.uk/projects/detail/esd\\_EnglishHEIs](http://www.heacademy.ac.uk/projects/detail/esd_EnglishHEIs).

<sup>39</sup> Available at: <http://www.hcaacademy.co.uk/whatwedo/mind-the-skills-gap-research>.

<sup>40</sup> Available at: [http://www.unep.org/labour\\_environment/features/greenjobs.asp](http://www.unep.org/labour_environment/features/greenjobs.asp).

As the Horizons task force pointed out, HEIs must increase the speed at which they translate labour market demands into the curriculum. These market indicators for ESD need to be connected to strategies to promote employability, with a focus on the Scottish Executive's six priority industry sectors. Value is added where sustainability provision connects with professional requirements; the Glasgow MSc *Carbon Management* and the UHI BSc/MSc *Sustainable Rural Development* are clear examples, with recognition from the Institute of Environmental Managers and Institute of Economic Development.

The likelihood of increasing attention to sustainability, in relation to the interconnected issues of energy and resources, economic turbulence and global conflict, community development and wellbeing, underlines the need for greater penetration in HE. Engagement has strengthened in the built environment, resource use, and environmental sciences, but many other spheres of professional practice and training now need attention. Overall, the need for expertise in sustainability in diverse employment contexts appears to be rising, although more specific evidence is needed. The NHS has been cited as one public sector example where sustainability issues are emerging in professional practice, in relation to major public health problems<sup>41</sup>. As one of the major employers in Scotland and a significant HE client, the Horizons report highlighted the NHS for particular attention in HE policy. In such spheres, close communication with professional bodies is needed to generate relevant programmes and CPD options.

Labour market trends appear supportive of further ESD embedding, despite some uncertainties within HE about levels of student interest (the Forster 2006 inquiries had revealed some hesitation among staff). The 2007-08 *Future Leaders Survey* by UCAS and Forum for the Future showed that almost two thirds of students now seek integration of sustainability in the HE curriculum and 42% expect that sustainability learning will enhance their employability<sup>42</sup>. Demand also varies across local and global student markets; the case studies indicated that international students have been attracted to certain taught postgraduate programmes in greater numbers than 'home' students<sup>43</sup>. Given the intentions of HEIs to increase their sustainability provision, trends in student markets are in need of urgent clarification, to provide reliable planning indicators of how ESD provision relates to student motivations, in programme and career choice.

### 5.3 Supporting ESD at Sector Level

HEIs need support to engage with cross-cutting agendas in ways that make the most effective use of the previous and concurrent thematic initiatives that serve as platforms for ESD implementation. The porous nature of ESD and its overlap with the educational 'core business' of HEIs underlines the importance and the difficulty of this type of strategic synthesis, to integrate ESD with employability, lifelong learning and internationalisation agendas. Above all, it will be important that the SFC takes the opportunity to include and promote ESD within the GFU and HFU funding arrangements to support such strategic innovation. Two distinct needs articulated across the case studies were for additional funded places to support the growth of targeted sustainability programmes, and for the type of 'challenge fund' that will offer support to collaborative bids involving HEIs in external partnerships to develop sustainability provision. Sector-level support at sector level will also be welcome in taking forward joint HEI curriculum initiatives sharing staff and site resources, e.g., in plans to develop energy and waste management provision at Crichton campus.

The issues prioritised by the Horizons taskforce, of partnership working, collaboration among HEIs and attention to key employment sectors, were also emphasised in the interviews carried out for this review. Interestingly, the review did not point to competition among HEIs with regard to sustainability; instead, strong messages emerged about the value of collaboration and the need to incentivise it. The applied thrust of ESD pedagogy means that policy development is a priority, as exemplified by the sustainability concerns of staff at the UHI PolicyWeb Institute, who work in collaboration with parliamentary groups.

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<sup>41</sup> Across the UK, NHS policy in recent years has made increasing reference not just to environmental management but to health impact assessment and connectivity between issues of wellbeing and community development. Case study interviewees pointed to developments such as the provision of sustainability posts in the NHS and increasing awareness of CPD needs for sustainability practice in middle management across public services.

<sup>42</sup> *Future Leaders Survey 2007-08*, Forum for the Future/UCAS, Foreword. The complete report can be downloaded at: <http://www.forumforthefuture.org/files/FutureLeaders0708.pdf> (PDF 587KB).

<sup>43</sup> For instance, there has been significant interest from African, Asian and Latin American countries in Glasgow's MSc *Carbon Management* and MLitt *Tourism, Heritage and Development*, both offered at the Dumfries campus.

Such approaches connect directly with Horizons taskforce recommendations to enhance channels for HE input to national policy. Supporting such vehicles that can combine Scottish sustainability policy expertise will be worthwhile, in line with the successes of Scottish research pooling; one collaborative precedent has been set with the planned UHI Sustainable Development Research Centre partnership.

Strategic effort at sector level will be needed to generate the 'supportive framework' that the Forster 2006 report concluded would be essential for ESD to achieve its aims in the tertiary sector as part of the DESD. Historic structural matters persist, such as the challenge ESD poses to traditional academic status, which is usually acquired through discipline-based expertise. Interdisciplinary fields continue to emerge where academic interests and external drivers meet: the growth of Heritage Studies is a case in point, as ESD urges the development of interdisciplinary and applied research and teaching. However, sector level attention will be needed to overcome the structural and professional challenges ESD presents to existing HE funding streams, administrative procedures, costing practices and research quality indicators.

The interdisciplinary nature of ESD requires a broad compass and the question was raised as to whether it ought to be designated as a future Quality Enhancement Theme. The consultations provided arguments on both sides; those in favour point to the opportunity to engage in debate and share practice, while those against point out that the sheer breadth of the ESD remit, into corporate and estates operations, and matters of organisational strategy, takes it beyond the scope of QE. Further discussion will be beneficial on this topic, but in the interim, the new QE theme *Graduates for the 21st Century: Integrating the Enhancement Themes* will be an essential forum for discussion of the skills, values and attributes required to create sustainability expertise in future graduate cohorts.

To add impetus and acceleration on curriculum integration, the involvement of subject communities in ESD is crucial. Longevity in curriculum development is nurtured at 'grassroots' level, in line with the priorities of subject areas and in recognition of the pressures on curriculum space. At subject level, access to pedagogic development resources is needed, so that academics can be responsive to institutional trajectories and opportunities for ESD. The Academy can play an important role in ensuring that UK-wide approaches are adopted for resource development, engaging existing subject communities and emergent interdisciplinary fields via the Academy ESD Project and Subject Centre network. The relationship of ESD to subject benchmarks is also an important issue and the Forster inquiry noted that roughly one third of subject areas were considering these connections. Such discussions are essential for academic credibility in embedding sustainability, as ESD interpretations vary within the same discipline. Debate is necessary to agree upon principles of inquiry and response regarding sustainability, so that suitable parameters and baselines can be agreed and a collective sense of quality can be generated.

#### **5.4 Future Progress in ESD**

The ideal articulated in the Forster report, of a future 'trans-disciplinary curriculum' for ESD, is a sizeable aspiration, and to make progress towards this will require academic ownership and flexible evolution. Specialist ESD offerings (e.g., interdisciplinary 'sustainable development' programmes) can succeed, but the conditions for success are complex and cannot be guaranteed. In addition, the numbers affected are proportionately small, as most students seek vocational courses and 'embedded' ESD.

The review suggests that the immediate future of formal ESD provision in Scottish HE will involve activities in support of curriculum embedding and targeted programmes, with increasing attention to employability and to partnerships for curriculum development. However, the case studies underline the point that there is no single 'model' for embedding ESD in HEIs. Diversity in provision and modes of delivery, in methodology and epistemology, means that each HEI must develop its own strategic responses and therefore the penetration of ESD into organisational strategy is essential. HEIs can learn useful lessons by contrasting their approaches with others, as comparative views prompt reflection and further innovation.

The initial DESD Action Plan, *Learning for Our Future*, stated the aim that the SFC should report annually on subject and institutional-level progress to the Scottish Executive. This will require 'light touch' approaches that take account of the permeability of ESD with the core functions of HEIs. An annual or

biennial questionnaire<sup>44</sup> to HEIs, supported by qualitative consultations to inquire more deeply on specific issues when necessary, would help to capture developments in various ESD vehicles at HEI level:

- organisational strategies and integration of ESD into generic processes/terms of reference
- strategic investment in research and teaching initiatives and designated posts for ESD
- institution-wide pedagogic strategies (e.g., skills development; validation and review processes)
- targeted ESD content and pedagogy in programmes and modules at undergraduate and postgraduate levels
- partnership work, knowledge transfer, lifelong learning and community engagement for ESD
- CPD activities and support for staff and institution-wide discussion forums for ESD
- integration of ESD into student PDP, volunteering, placements and project opportunities

Progress in professional and disciplinary communities can also be assessed outside the level of the HEI, including two contexts of particular importance in relation to progress in curriculum embedding:

- articulation of ESD requirements among professional bodies and regulatory frameworks
- inclusion of ESD in subject benchmarking and qualifications review processes.

The primary motivation of ESD initiatives is to stimulate change through the creation of effective learning opportunities. Therefore, evaluation of the value of these vehicles for embedding sustainability will be essential, to enable reflection on the impact of formal and informal learning activities and the extraction of lessons about strategic balance for effective ESD. Measuring the quality and impact of learning is notoriously challenging and requires different tools to those used for auditing environmental impact and corporate responsibility practices in HEIs. However, coherent approaches will be necessary to demonstrate meaningful progress in ESD as part of the educational 'core business' of HE.

The size of the Scottish HE sector makes it possible to compare practice relatively easily, to assist in ownership of the agenda, development of its parameters and assessments of progress in HE towards the goals of the UN DESD. The DESD also presents significant opportunities for national and international exchange, e.g., comparing the approach of the Welsh Assembly Government, where ESD is combined at policy level with Global Citizenship. To maximise impact during the second phase of the DESD, all such possibilities should be explored to exchange practice and enhance strategic understanding in ESD.

## **6. RECOMMENDATIONS**

### **To Individual HEIs:**

1. Undertake research among the student body to gauge views on sustainability and ESD in lifestyles and professional choices, and in relation to university cultures and campus practices.
2. Explore channels to develop strategic thinking and build capacity for sustainability, through interdisciplinary discussions, online forums and staff development workshops.

### **To the Scottish Funding Council:**

3. Reflect on ways to incorporate ESD as a thematic topic into policy development processes and to encourage initiatives from HEIs under the funding arrangements envisaged for the GFU and HFU.
4. Revise research funding strategies to enable greater status to be accorded to interdisciplinary, applied and partnership research geared to the investigation of sustainability issues.
5. Continue to support the CaSPr initiative to promote shared planning and the setting of baselines of practice in environmental management and corporate operations across institutions.

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<sup>44</sup> The framework used in the present review could be adapted to serve this purpose, with clarifications to the design on certain issues of strategic management, curriculum content and pedagogic approaches (see Appendix 1).

6. Explore the links between ESD and lifelong learning arising from DESD activities in other educational spheres and seek guidance from the DESD Steering Group to enhance these links.
7. Together with relevant agencies such as the Academy ESD Project and Universities Scotland, initiate inquiries with professional bodies and employer organisations into current sustainability needs in the graduate workforce, connecting ESD with revised employability strategies.
8. Seek opportunities to collaborate with institutions and initiatives to develop methods of recording academic and strategic progress in ESD, taking account of organisational and subject levels of development, to assist with reporting on the impact of HE in the DESD.

**To the Higher Education Academy:**

9. Develop events through Academy Scotland and the Academy ESD Project to share practice and promote discussion among academics on the major themes arising from this review, such as the links between ESD, employability, interdisciplinarity, community engagement and lifelong learning.
10. Explore ways to support HEIs in the development of strategic thinking that recognises the permeable boundaries between organisational and academic development for ESD.
11. Ask Subject Centres to include sustainability as a priority theme in individual and joint bids for pedagogic research grants to enhance opportunities for staff to work on embedding ESD.
12. Support the Academy ESD Project to continue its work across disciplinary, regional and institutional boundaries, to assist in creating more effective links between good practice in Scottish ESD and other ESD pedagogic networks and resources across the UK.

**To Universities Scotland and QAA Scotland:**

13. Encourage discussion of ESD issues within designated subject benchmarking and qualifications review processes, and invite academics with ESD expertise to join and inform these discussions.
14. Initiate discussions with relevant committees about the presence and scope of ESD in the upcoming QE Theme *Graduates for the 21st Century: Integrating the Enhancement Themes*.
15. Assist in promoting discussion about ESD and interdisciplinarity among appropriate agencies across the education sector, particularly in relation to progression and the FE-HE transition.

## Appendix 1: Methodology and Research Process

The rationale for the survey was to gain a 'light touch' overview of the range of activities taking place across the Scottish HEIs with a bearing on 'sustainable development', broadly conceived. The questions about academic activities in both the survey and the case study consultations were inclusive and broad in scope, to enable a breadth of response and to capture diverse understandings related to ESD.

The survey of practice across the 20 Scottish HEIs was issued from Universities Scotland in May 2008 (copies of the survey are available upon request). The questions covered public commitments, learning and teaching activities, other activities such as research and partnership work, and auditing and reporting practices. Space was provided for free form comments at the end of the survey and many HEIs provided supplementary information. The survey took an inclusive approach following the recommendations of the Forster 2006 report and the difficulties reported in eliciting institutional responses to that earlier inquiry.

The case studies were also conceived with a broad vision of activities and strategies for ESD, aiming to capture various points on the map of an institution's engagement with sustainability at a certain point in time. The qualitative methodology provided access to the realities of professional practice 'on the ground' and was intended to enable a depth of response from participants, ensuring academic credibility in the 'spotlighting' of different perspectives. The consultations were conducted using 26 semi-structured qualitative telephone interviews with staff at the four HEIs as follows: Glasgow (10); Queen Margaret (6); St Andrews (5); UHI (5). In addition, supplementary website and documentary research was carried out for each HEI (and brief email input was offered by an additional handful of colleagues). The consultation at UHI was also informed by the outcomes of a discussion event, separately organized by the Academy ESD Project, to assist the development of institutional sustainability strategies in the partnership.

The numbers and role types consulted in the HEI interviews varied according to the range of relevant activities and projects. For example, at St Andrews, it was important to interview those closely involved with the interdisciplinary *Sustainable Development* programme, whereas at Glasgow a range of staff in different subject areas were consulted. In most cases, the role of VP/PVC for Teaching and Learning was included, except at UHI, where this person had retired as the consultation began. Most interviews lasted between 45 minutes and two hours and notes were captured by hand. Interviewees were invited to indicate if they wished any comments to be submerged or kept confidential in case of sensitivities.

Interviews were semi-structured and their focus and content varied considerably in accordance with the role and expertise of the interviewee, but a generic series of questions was used, organized around three main issues: strategic development, formal teaching provision and informal learning activities. Although student data was not part of the original case study design, certain elements of student input were obtained. QMU staff made available the responses to their student survey on sustainability; undergraduate and postgraduate students attending the UHI seminar were consulted during the event, and at Glasgow one Student Council representative working on an ESD pedagogic project was interviewed. Verbal report was also obtained regarding issues discussed at the event organized by the Scottish Funding Council on student contributions to sustainability in October 2008.

Reflection on the survey design in light of the responses raised a number of issues where questions could have been improved to aid respondents and ensure greater clarity. These items should be considered in the preparation of future surveys to HEIs on ESD:

- clarification of terminology should be provided regarding 'ESD' and 'sustainable development'
- distinction should be made between strategic goals and specific operational targets
- clearer guidance should be given regarding monitoring at Executive or Council levels
- recording of roles and responsibilities for ESD should include academic and corporate posts
- categories should be added to enable HEIs to respond at both programme and module levels
- clearer criteria should be provided for recording both sustainability content and pedagogy
- broader inquiries should be made regarding partnership working and community engagement

## Appendix 2: List of Named Undergraduate Programmes Targeted to Sustainability<sup>45</sup>

University of Dundee	Environmental Science
	Renewable Energy
	Social & Environmental Accounting
	Geography
University of Edinburgh	Environmental Geoscience
University of Glasgow	PGDE Primary: Environmental Education
	Environmental Sustainability ( <i>WITHDRAWN</i> )
	Certificate in Environmental Education
Glasgow Caledonian University	Energy & Environment Management ( <i>IN DEVELOPMENT</i> )
Glasgow School of Art	Product Design
University of Highlands and Islands Millennium Institute	Sustainability Studies
	Sustainable Rural Development
	Sustainable Construction
	Sustainable Forest Management
	Environment & Heritage Studies
Napier University	Sustaining People, Planet & Profit
	Renewable Energy & Sustainability
	Sustainable Development
	Sustainable Design
Open University	Environment & Development
	Innovation, Economics & Sustainability
	International Development & Business Innovation
	Computing & Design
	Environmental Studies
Queen Margaret University	Tourism Management
	International Hospitality Management
	Business Management
	Environmental Justice
Scottish Agricultural College	Sustainable Environmental Management
	Environmental Protection
	Green Technology
University of St Andrews	Sustainable Development

<sup>45</sup> In the listing above, some responses were omitted from Aberdeen, Dundee, Glasgow, Heriot Watt and Robert Gordon universities, where the degree of relevance was not clear. The confusion stemmed from the survey design rather than the HEI response and future surveys should be revised to clarify the responses sought to these questions.

### Appendix 3: List of Named Postgraduate Taught Programmes Targeted to Sustainability<sup>46</sup>

University of Aberdeen	Ecology & Environmental Sustainability
	Law & Sustainable Development
	Environmental Microbiology
	Applied Marine & Fisheries Ecology
	Sustainable Rural Development
	Rural Planning & Environmental Management
University of Dundee	Sustainable Construction
	Renewable Energy
University of Edinburgh	Carbon Management
	Environment & Development
	Environmental Sustainability
	Ecological Economics
	Sustainable Energy Systems
	African Studies
	Advanced Sustainable Design
	Outdoor Environmental and Sustainability Education
University of Glasgow	Tourism, Heritage and Development
	Social Movements, Justice and Sustainability
	Environment & Sustainable Development
	Carbon Management
	Environmental Science ( <i>JOINT WITH STRATHCLYDE</i> )
	Water Resources Engineering Management
	Geospatial & Mapping
Glasgow Caledonian University	Energy & Environment Management ( <i>IN DEVELOPMENT</i> )
UHI	Managing Sustainable Rural Development
	Managing Sustainable Mountain Development
	Sustainability Studies ( <i>IN DEVELOPMENT</i> )
Napier University	Sustainable Water Resource Management
	Sustainable Urban Property Development
	Sustainable Project Design
	Sustainable Catchment Management
	Sustainability & Environment
	Sustainable Building Design
	Creativity, Innovation & Sustainability
	Creativity to Sustainability
Open University	Environment, Policy & Society
Scottish Agricultural College	Environmental Protection & Management
	Organic Farming
University of St Andrews	Sustainable Development ( <i>IN DEVELOPMENT</i> )
	Environmental Change
University of Stirling	Sustainable Development
	Sustainable Aquaculture
University of Strathclyde	Environmental Studies
	Sustainable Engineering
	Human Ecology
	Science Technology & Sustainability
	Environmental Entrepreneurship

<sup>46</sup> In the listing above, additional programmes have been included for the Universities of Glasgow, Edinburgh and St Andrews, which were identified during the review process rather than provided in the institutional survey responses.

#### Appendix 4: List of Named Research Institutes and Groups Related to Sustainability

<b>NAMED RESEARCH INSTITUTES</b>	
University of Aberdeen	Centre for Environmental Sustainability (with Macaulay Institute)
	Centre for Transport Research
	Institute of Energy Technologies
University of Dundee	UNESCO Centre for Water Law, Policy & Science
University of Edinburgh	International Development Centre
	Centre for the Study of Environmental Change and Sustainability
	Centre for Carbon Storage
University of Glasgow	Scottish Centre for Ecology and the Natural Environment
	Solar & Bioenergy Research Centre
	Centre for Development Studies
	Glasgow Centre for International Development
Glasgow Caledonian University	Caledonian Environment Centre
	Centre for Research on Indoor Climate & Health
	Sustainability Centre
Glasgow School of Art	Mackintosh Environmental Architecture Research Unit
UHI	Scottish Association for Marine Sciences
	Sustainable Development Research Centre
	PolicyWeb
	Environmental Research Institute
Napier University	Biofuels Research Centre
	Scottish Energy Centre
University of St Andrews	St Andrews Sustainability Institute
	Centre for Environmental History
	Centre for Social and Environmental Accounting Research
University of Stirling	Institute for Aquaculture
University of Strathclyde	David Livingstone Centre for Sustainability
	Institute in Energy and Environment
	Energy Systems Research Unit
<b>RESEARCH CENTRES IN DEVELOPMENT</b>	
University of Aberdeen	Centre for International Development
University of Edinburgh	Centre for Climate Change
<b>NAMED RESEARCH GROUPS/NETWORKS</b>	
University of Edinburgh	Global Change Research Group
	Climate Change Research Network
University of Glasgow	Sustainability Research Network
UHI	Sustainability Studies Research Network
Napier University	Environmental Biology Research Group
	Sustainable Energy Research Group
Open University	Sustainable Technologies Research Group
	Design Group
University of St Andrews	St Andrews Sustainability Institute Network
University of Stirling	Environments & People Research Group