# Renewables (Energy)

## 26 September 2014

## A subject-based aspect report by Education Scotland on provision in Scotland's Colleges on behalf of the Scottish Funding Council

Transforming lives through learning

Promoting further and higher education

## Contents


| | | Page |
|---|---|---|
| 1 | Introduction and methodology | 1 |
| 2 | Summary of key findings | 2 |
| 3 | Background and context | 5 |
| 4 | Programmes in renewables | 8 |
| 5 | Learning and teaching | 12 |
| 6 | Outcomes and impact | 16 |
| 7 | Enhancement through self-evaluation and review | 18 |
| 8 | Recommendations | 20 |

**Appendices**

| | |
|---|---|
| Appendix 1 - Colleges visited in the fieldwork for this report | 21 |
| Appendix 2 - Equalities data - gender | 22 |
| Appendix 3 - Data for construction and engineering programmes, 2010-11 to 2012-13 | 23 |
| Appendix 4 - Portraits of excellent practice | 25 |
| Appendix 5 - Glossary of terms | 30 |

# 1. Introduction and methodology

## Introduction

The Education Scotland publication, *External quality arrangements for Scotland's colleges*, *updated August 2013,* specifies that Education Scotland will produce a number of subject-based aspect reports each year. These reports complement in a subject-specific context the generic evaluations of learning and teaching in Education Scotland's external review reports of colleges. Colleges should act on the recommendations contained in these reports. College inspectors will monitor action towards implementation of these recommendations as part of their normal dialogue with colleges, and will wish to discuss issues arising from subject-based aspect reports during annual engagement visits.

In preparing this report, inspectors visited a sample of seven colleges, drew on the findings of published Education Scotland reviews of colleges, and examined other relevant publications and reports. They consulted with key stakeholders, including employers and professional bodies.

This report evaluates college programmes within the energy (renewables) subject area. Programmes covered by this report are offered at levels 4 to 8 of the Scottish Credit and Qualifications Framework (SCQF). These programmes provide education and training for an industry sector that is making an increasingly important contribution to Scotland's economy.

## Methodology

Six colleges in the sample were visited twice during the fieldwork. Orkney College UHI was visited on a single occasion to explore its contribution to the renewable energy sector. An example of excellent practice at Dumfries and Galloway College was identified during their regular annual engagement visit. Inspectors evaluated the quality of provision through observations of learning and teaching, and discussions with learners, teaching staff and curriculum managers. They also had discussions with local employers and other stakeholders. Colleges gave inspectors access to a range of curriculum documentation, including learning and teaching material, planning and self-evaluation reports. In a number of colleges, areas for development identified by inspectors during the first visit had been addressed by curriculum managers and teaching staff by the time of the second visit. A list of colleges visited during the fieldwork for this report may be found in Appendix 1.

This aspect report evaluates current practice, and identifies important areas for discussion and further development amongst practitioners. It identifies excellent practice found by inspectors and sets out recommendations for improvement.

## 2. Summary of key findings

Renewables provision in Scotland's colleges is characterised by many strengths:

- Colleges have strong working relationships with a range of industry partners which provides accurate intelligence to inform programme design and content. These partners include: sector skills councils; key trade bodies; local and national employers; and equipment manufacturers and suppliers.

- All colleges have established good partnerships with local education authorities and secondary schools to support the delivery of *Skills for Work* programmes, including those in construction crafts and engineering. These programmes provide vocationally relevant studies to enhance the curriculum of young people and promote careers in science, technology, engineering and mathematics (STEM)-related occupations.

- Twenty of Scotland's 25 colleges offer programmes which enable learners to gain skills and knowledge to support employment or further study in the area of renewable energy or micro renewables. These usually include a suitable suite of introductory level further education (FE) programmes (SCQF levels 4 to 6) and advanced level higher education (HE) provision (SCQF level 7 and 8). A few colleges deliver programmes to SCQF level 10, including those who are part of the University of the Highlands and Islands (UHI).

- A few colleges offer specific FE awards associated with renewables which have been developed to meet the needs of local and national employers. For example, a wind turbine technician programme (SCQF level 5/6) and a transmission construction programme (SCQF level 5).

- Almost all learners are well motivated, work conscientiously and apply themselves well to tasks. In practical classes, they use a range of apparatus and material competently, developing sound techniques and practising high levels of health and safety awareness. They work well in teams and develop strong independent learning skills, through practical activities and projects.

- Most teaching staff use their subject and professional knowledge well to engage learners and relate learning activities to industry practice. The majority of teaching staff strike a good balance between teacher-led activities and opportunities for learners to actively engage in practical and project work.

- Investment in the college sector estate has resulted in substantial upgrading and renewal of teaching accommodation for construction and engineering programmes. Almost all of the colleges have high quality purpose-built modern accommodation with good information and communications technology (ICT) access in teaching areas, providing up-to-date, well-resourced training facilities for industry.

- All colleges provide potential learners with clear pre-entry information about their range of construction and engineering programmes. Learners receive a

well-planned and comprehensive induction to their programmes, including detailed health and safety training. Most learners receive helpful on-going guidance and support throughout their time in college.

- Most teaching staff use a suitable range of on-going assessment approaches well to check learners' understanding. Staff provide clear feedback to learners on their work and this helps learners improve their skills. All colleges have well-established systems to organise and manage final assessment for certification.

- Successful completion rates have increased for all full-time learners and part-time HE learners over the previous three-year period and have remained steady for learners on part-time FE programmes. Rates for full-time FE and part-time FE and HE learners sit above the national sector performance level.

- Learners on renewables programmes develop and gain a range of wider personal and social skills. Most learners gain useful employability and citizenship skills during their programmes. These are often developed during practical and project work.

- Most learners who successfully complete programmes progress to employment or further study. Colleges have very good progression arrangements with local universities and a few colleges have very good 2+2 arrangements where learners with a Higher National Diploma (HND) in Engineering can progress directly to the third year of an honours degree programme.

- Programme teams responsible for renewables programmes are committed to improving the quality of the learner experience. They use self-evaluation activities and internal review effectively as tools for improving and enhancing programmes.

However, there are a number of areas for development to improve the overall experience for learners:

- Many colleges are active in engaging young learners through STEM clubs and STEM workshops in partnership with local schools. However, there remains more work to be done by colleges and other partners to further encourage young learners into STEM-related careers.

- The gender balance on renewables programmes is an issue for the sector with the number of female learners remaining very low. Curriculum teams for renewables programmes are aware of the issue and most have explored some of the underlying reasons. However, more requires to be done by colleges to address the issue along with other partners.

- Not all learners, particularly those on FE programmes, make full use of the available materials on the virtual learning environment (VLE) to support and enhance independent learning. Often, this is due to teaching staff not

promoting the VLE effectively or ensuring there is sufficient material for all FE programmes.

- In some theory lessons, staff use a too limited range of learning activities and do not differentiate learning sufficiently to take account of individual learner ability. As a result some learners are not fully engaged.

- In most classes teaching staff do not involve learners significantly in the planning of learning activities and approaches.

- Successful completion rates for learners on full-time HE programmes sit below the national sector performance level.

- In some colleges, the evaluation of learning and teaching is not sufficiently rigorous in identifying what works well and areas where teaching needs to be improved.

## 3. Background and context

Renewable energy comes from sources that cannot be depleted (such as the sun, wind or sea) or that can be replaced (such as wood). In the field of renewables, there are two important strands:

- **energy generation** - either by wind (onshore and offshore) or by the power of the sea through waves and tides (marine offshore); and
- **micro renewables** - small scale, environmentally-friendly methods of producing heat and power in domestic and commercial settings utilising technologies such as solar panels, small scale wind turbines and heat pumps. Micro renewables can make an important contribution to renewable energy and carbon reduction, especially in reducing carbon emissions from both domestic and commercial buildings.

In 2011, the Scottish Government established a new strategic priority - *Transition to a Low Carbon Economy*, as part of its Economic Strategy[1]. The new strategic priority reflected the opportunity to place Scotland in an advantageous position within the global economy and ensure that the benefits of this transformational change are shared across the economy and all its communities. The document highlighted: *Scotland's enviable natural resources, research expertise, and industrial base provide strong foundations to capitalise on the industries of the future, such as renewable energy and in sectors which promote energy and resource efficiency.*

The strategic priority set a number of targets, including:

- *taking greater account of sustainability in public procurement. For example, the national contracts for electricity, which cover 99% of the public sector, will save £10 million a year and will ensure that the majority of power is available from renewable sources;*
- *ensuring that Scotland and its local communities benefit from renewable and low carbon energy developments;*
- *maximising the economic and energy saving opportunities through implementing energy efficiency measures as set out in Conserve and Save - The Energy Efficiency Action Plan for Scotland; to meet our target to reduce Scotland's final energy consumption by 12% by 2020; and*
- *undertaking a significant programme of enhancement of the energy efficiency of the existing housing stock, including renewable energy which will also assist in tackling fuel poverty. This programme of work will also provide a valuable boost to local economies and a realignment of the skills base in the housing sector.*

[1] http://www.scotland.gov.uk/Resource/Doc/357756/0120893.pdf

Allied to the Economic Strategy, the Scottish Government's refreshed skills strategy, *Skills for Scotland: Accelerating the Recovery and Increasing Sustainable Economic Growth*[2] (2010), highlights Scotland's long tradition of valuing learning for the wider benefits it can bring to the individual, to society and communities and to the economy. In particular, higher level skills, such as creativity, innovation and entrepreneurship are viewed as vital in order that industries in which Scotland operates at the leading edge, such as energy, can continue to compete favourably. The report outlined a skills group to be established to develop and implement a skills framework that outlines the specific energy efficiency training interventions required to support the future development of the energy sector. It also details how these will be delivered. The report stated:

*Through the Renewable Action Plan Framework the Scottish Government will work with partners to better understand future skills requirements, improve recruitment and sector attractiveness, ensure adequate training provision to meet sector needs, and develop suitable qualifications for use in schools, universities, colleges and workplaces*.

The *Skills Investment Plan (SIP) for the Energy Sector*, [3] commissioned by the Energy Advisory Board and published in March 2011 by Skills Development Scotland, details the skills needed for the key energy sectors to 2020. The plan identifies the potential for up to 95,000 job opportunities up to 2020 combining replacement demand to sustain more established energy sectors with new additional growth in emerging sectors. Of these, at least 40,000 opportunities are in the renewables sector. It also identifies key areas for action for further collaboration and development across the education and training sectors. This will ensure that Scottish people have the opportunity to take advantage of the employment opportunities created. An updated SIP for the energy sector is due to be published shortly and an Energy Skills Action Group has been established by the Energy Advisory Board to take forward the recommendations.

Colleges in Scotland have responded well to meeting the demand for well-trained staff to work in the energy and renewables industries. The Energy Skills Partnership[4] (ESP) was established in September 2011 to support further this work. ESP is a collaboration of colleges aiming to increase Scotland's capacity to deliver skills and prevent duplication of effort and investment for the energy sector by ensuring capacity, quality and affordability of skilled staff. Almost all colleges offering programmes in renewables are members of ESP.

Work is on-going to build strong strategic links between regional outcome agreements and ESP priorities and targets, in order to provide a regionally and nationally appropriate portfolio of engineering and energy programmes at FE and HE levels.

[2] http://www.scotland.gov.uk/Resource/Doc/326739/0105315.pdf
[3] https://www.skillsdevelopmentscotland.co.uk/media/256998/sds_energysip_final.pdf
[4] http://www.esp-scotland.ac.uk/

ESP has a number of themed groups, including offshore/onshore wind, wave and tidal, and micro renewables. Themed groups identified the following key priorities:

- working with industry partners to understand supply and demand needs;
- mapping current college sector qualifications to those available to industry;
- reviewing qualifications and frameworks to build in more flexibility and create relevant programmes to meet sector demand;
- developing materials and delivery modes to accurately match demand need from industry;
- sharing resources;
- developing continuing professional development programmes to up-skill staff within industry and the colleges;
- establishing a *Wind and Marine Training Network*, including partnerships to provide industry-specific health and safety provision (Renewable (RUK) and Global Wind Organisation (GWO)); and
- establishing the *Energy Efficiency Training Network* to support energy efficiency in construction and micro renewables.

ESP is well-regarded by college staff working in the renewables area and has provided useful resources and support to programme teams.

This report explores the current provision and quality of experience for learners on renewables and renewables-related programmes in Scotland's colleges and is designed to stimulate wider debate on renewables education and training.

# 4. Programmes in renewables

## Introduction

Programmes that deliver the skills necessary to support employment in the area of renewables do not fit neatly into a single subject grouping used by Education Scotland. Programmes in engineering, including those in electrical and mechanical, often contain the skill and knowledge mix that employers in the renewables sector require. In addition, many construction programmes, particularly those in plumbing, gas fitting and electrical installation, prepare learners well for employment in micro renewables. Twenty of Scotland's 25 colleges offer programmes which enable learners to gain the skills and knowledge to support employment or further study in the area of renewable energy or micro renewables. The extent of provision varies from a single craft, such as plumbing, in a few colleges to a suite of engineering and construction programmes in others. The colleges also provide *Skills for Work* programmes, a range of introductory programmes and up-skilling programmes for industry. This range of renewables and micro renewables programmes reflects the current demand and uptake of STEM provision by learners providing them with sufficient choice and flexibility.

## Partnership working

Colleges have strong working relationships with a range of industry partners which provide accurate intelligence to inform programme design and content. These partners include: sector skills councils and key trade bodies such as Construction Industry Training Board (CITB), Scottish Electrical Charitable Training Trust (SECTT), Scottish Joint Industry Board for Electrical Contracting Industry (SJIB), and Scottish and Northern Ireland Plumbers Employer Federation (SNIPEF); local and national employers; and equipment manufacturers and suppliers. Modern Apprenticeship (MA) programmes in areas such as plumbing, engineering and wind turbine technicians are agreed with industry, based on occupational standards set by industry, and therefore match the needs of industry well.

All colleges have established good partnerships with local education authorities and secondary schools to support the delivery of *Skills for Work* programmes, including those in construction crafts and engineering. These programmes provide vocationally relevant studies to enhance the curriculum of young people from local schools and engage them to consider careers in STEM-related occupations. Additionally, many colleges are active in engaging younger pupils through STEM clubs[5] and STEM workshops, funded through a range of sponsorship programmes. Young learners who participate in these programmes, clubs and workshops find them enjoyable and interesting and for some it encourages them to consider further study in this area. However, there remains more work to be done by colleges and other partners to further encourage young learners into STEM-related careers.

[5] See Ayrshire College portrait of excellent practice on page 25

## Range of programmes

Of those colleges offering construction and STEM programmes which support employment in the renewable energy industry, most deliver programmes from SCQF levels 4 to 8. These usually include a suitable suite of introductory level FE programmes (SCQF levels 4 to 6) and advanced level HE provision (SCQF level 7 and 8). A few colleges deliver programmes to SCQF level 10, including those who are part of the UHI.

Colleges have much freedom to develop their non-advanced curriculum to meet the needs of learners who wish to progress to careers in the renewable energy industry. The majority of colleges have developed well-considered entry-level programmes at SCQF level 4 which provide learners with a basic introduction to construction and engineering practices. These programmes usually place an emphasis on developing practical skills but also place importance on further developing core skills, particularly numeracy. They cover broad areas of construction and engineering practice to stimulate learner engagement and encourage learners to consider which particular field interests them most. These programmes usually include elements relating to renewables[6] and sustainability.

Most colleges offer well-considered introductory craft and pre-apprenticeship programmes at SCQF levels 5 and 6. Learners frequently study over a two year period and this allows them to develop and consolidate core skills, practical skills and underpinning knowledge. Again an emphasis is often placed on numeracy and mathematics, particularly where the intended progression route is to a MA or HE study. Colleges usually incorporate Scottish Qualifications Authority (SQA) awards into their programmes. For example, several colleges include the National Progression Award (NPA) in Construction (SCQF level 5) as a component of pre-apprenticeship programmes. General units such as core skills, employability skills and citizenship skills broaden learners' experiences and achievements. Most colleges also include a renewables project as part of the programmes. A few colleges also include the SQA/British Plumbing Employers Council (BPEC) Renewable Energy Awareness Award within their pre-apprenticeship programmes. This component is received well by learners and assists them to consider future career direction.

Most colleges deliver Scottish Vocational Qualifications (SVQ) programmes which support the underpinning knowledge for learners on MA programmes. These meet the needs of local and national employers well. In the field of renewables this is usually in areas such as plumbing and engineering and includes qualifications such as:

- SVQ level 2 Performing Engineering Operations (Electrical);
- SVQ level 2 Performing Engineering Operations (Mechanical);
- SVQ level 3 Electrical Installation; and
- SVQ level 3 Plumbing.

[6] See Inverness College UHI portrait of excellent practice on page 27

An innovative approach by one college[7] has resulted in it recruiting engineering MAs who are employed by the college but who carry out their work component in a number of local companies related to the renewables and micro renewables industries.

A few colleges also offer specific FE awards associated with renewables which have been developed to meet the needs of local and national employers.[8] For example, a few colleges are currently offering a wind turbine technician[9] programme (SCQF level 5/6) as part of a MA or as a full-time programme. The programme equips learners with the practical skills and theoretical knowledge to take up employment in the renewable power industry as wind turbine technicians. A few colleges also offer a 12 week Transmission Construction programme (SCQF level 5) in conjunction with national power companies.[10] Learners completing the programme progress to a national private training provider to complete a further nine months training with guaranteed employment as overhead transmission lines technicians. This programme supports well the renewables industry as the construction of new transmission lines are essential for the transmission of renewable energy from remote locations where power is generated to where it is used by consumers.

Many of the awards place importance on additional certification, such as health and safety or first aid, which greatly enhance the employability of learners. Innovative partnership working between two UHI colleges ensures MAs not only have a suitable vocational qualification, but also have essential maritime skills for working offshore.[11]

All colleges offer advanced level HE programmes, which build on their individual FE provision. In construction, this is usually the Higher National Certificate (HNC) (SCQF level 7) and the HND (SCQF level 8) in Construction Management. Although these awards do not contain specific units related to renewables, many colleges offer bespoke graded units devised and developed around domestic house design and energy specifications linked to micro renewable technology.

In engineering, a suite of awards are available, the most common offered being:

- HNC/D Electrical Engineering (SCQF levels 7/8);
- HNC/D Engineering Systems (Renewables) (SCQF levels 7/8); and
- HNC/D Mechanical Engineering (SCQF levels 7/8).

These awards have common core units and a range of optional units which can be tailored to meet local employer needs. As with construction awards, colleges often use the graded unit to deliver project work incorporating renewables technology.

A few colleges also offer the Professional Development Award (PDA) Renewable Energy Systems (SCQF level 8). Strong articulation links with local universities result in a few colleges delivering degree level work.

[7] See North Highland College UHI portrait of excellent practice on page 27
[8] See Dundee and Angus College portrait of excellent practice on page 26
[9] See Fife College portrait of excellent practice on page 26
[10] See Dumfries and Galloway College portrait of excellent practice on page 25
[11] See Orkney College UHI portrait of excellent practice on page 28

## Gender balance on renewables programmes

The gender balance on renewables programmes is an issue for the sector, with the number of female learners remaining very low. Most colleges have been successful in recruiting some females onto programmes and there are a few female apprentices. Enrolment data for the three-year period 2010-11 to 2012-2013 (appendix 2) indicates 6% of enrolments on construction and engineering programmes are female and 94% are male. This compares against the college sector as a whole where around 52% of all enrolments are female and 48% are male. The pattern reflects employment profiles within the construction and engineering sector. The issue has been highlighted in a number of publications including the Equality Challenge Unit's *Equality in colleges in Scotland statistical report 2013*.[12] More recently, Sir Ian Wood's commission for developing Scotland's young workforce final report: *Education working for all!* [13] further highlighted the issue:

*There have been some improvements in gender balance over the years in a number of areas such as the legal and accountancy professions, but for example we still have only 3% females in engineering MAs and only 3% males into MAs in children's care. ……. Very disappointingly, this trend continues in terms of female participation in some of the newer industries including life sciences, renewables and IT. These are sectors where the environment and range of skills required would lead us to expect females to be as successful as males.*

Curriculum teams for renewables programmes are aware of the issue and most have explored some of the underlying reasons. However, more requires to be done by colleges, along with other partners, to address the gender issue successfully.

[12] http://www.ecu.ac.uk/publications/equality-in-colleges-in-scotland-statistical-report-2013/
[13] http://www.scotland.gov.uk/Resource/0045/00451746.pdf

## 5. Learning and teaching

### Learning process

Almost all learners are well motivated and work conscientiously on coursework activities, applying themselves well to tasks. In almost all programmes, many learning activities are practical in nature and carried out in workshops and project areas. Learners enjoy the practical activities and set about these purposefully and professionally. In practical classes, learners use hand tools, apparatus and materials competently and develop sound techniques and practices. They observe and practise high levels of health and safety awareness. Apprentices value the breadth and range of work undertaken at college and see this as complementing the work they do with their employer on site. Most learners who are not in employment are highly motivated by the employment possibilities presented by their programme.

Learners use a range of resources well to support learning, including ICT. On some programmes, learners use supporting learning material stored on pen drives. They find this material helpful and it increases flexibility to where and when they study. However, most learners on FE programmes do not make sufficient use of material on the VLE to consolidate and extend classroom learning. Learners work well in teams and peer learning is encouraged and supported by staff in class and in workshop areas. Learners are very supportive of each other in class. They work effectively in small teams while participating in a range of workshop activities, such as assembling a renewable energy solar thermal rig or installation of pipework. Learners also develop strong independent learning skills, through their individual practical activities or project work. For example, learners on the HNC Construction Management programme manage a detailed individual project brief for a house refurbishment to include current micro renewable technology.

Learners reflect well and systematically on their learning and progress, using log books, individual learning plans (ILP) and e-portfolios to support this. Most learners make good progress and show confidence in their ability to follow instructions, leading to successful outcomes. Routinely, they successfully carry out numerical tasks and write up reports of investigations incorporated in the design of the lesson. This helps them develop useful written communication and numeracy skills. Most learners display good knowledge and understanding of subject matter and work well on their own or in small groups when required. Most learners have a clear understanding of their industries and the skills they require to gain employment.

### Teaching process

Most teaching staff are enthusiastic, experienced and apply their professional and subject knowledge well to enrich their teaching. They are knowledgeable about the specialist disciplines they teach and most have recent practical experience of the vocational areas with which they are associated. Most teaching staff use their subject and professional knowledge well to engage learners and relate classroom activities to industry practice. This enables them to use up-to-date examples which help ensure that the lesson content is relevant to learners' needs. Most teaching staff maintain good links with industry through regular contact with employers and industry representatives. Almost all teaching staff promote industry standards in

practical tasks and place a strong emphasis on health and safety. Staff also engage learners well in sharing experiences learners have gained in their workplace and these peer contributions help to promote and consolidate learning.

The majority of teaching staff set clear objectives at the start of lessons and revise previous work to check learners' understanding of it. In the majority of lessons, they strike a good balance between teacher-led activities and opportunities for learners to take a more active role. This is often through practical, or project activities, either working independently or in groups. The majority of teaching staff use ICT well to make lessons interesting and to illustrate theory. However, in some theory lessons, staff use a limited range of learning activities which are too passive and do not differentiate learning sufficiently to take account of individual learner ability. As a result some learners, often those who have completed tasks more quickly than their peers, are not fully engaged.

Most teaching staff use questioning techniques effectively to check learners' understanding of work. In the majority of lessons, teaching staff provide good consolidation of learning and preparation for the next stage at the end of lessons. Teaching staff use practical work well to develop learners' vocational skills and ensure theoretical work is sufficiently linked to industry practice. This helps to improve learners' employability. Most teaching staff provide very good support for learners and regularly check to see if they are in need of additional help or challenge.

**Planning for learning and teaching**

Relationships between teaching staff and learners are generally very good and respectful, creating a positive and purposeful environment for learning. Most teaching staff plan lessons systematically and effectively to ensure that learners develop appropriate skills and knowledge. However, in most classes teaching staff do not involve learners significantly in the planning of learning activities and approaches.

Staff support the development of learners' core skills in lessons. In most instances, core skills are embedded within lesson activities. Teaching staff plan activities that require learners to use and further develop communications and numeracy skills in settings relevant to the workplace. For example, they use practical work involving calculations and problem solving. Teaching staff ask learners to produce written reports and complete log books and this is carried out very well by learners to further develop core skills. Staff also plan well to ensure that wider essential skills are incorporated into learning. For example, skills for employability are developed well in learners through lectures from guest industry experts and site visits to installations, such as wind farms. In most classes, teaching staff take opportunities to emphasise the importance of sustainability, particularly in relation to micro renewables. They highlight the importance of conserving energy and the range of building materials and techniques that contribute to sustainable building practices.

## Resources

There has been considerable investment in the college estate over the last seven years resulting in substantial upgrading and renewal of teaching accommodation for construction and engineering programmes. Almost all of the colleges visited for the report have high quality purpose-built modern accommodation with good ICT access in teaching areas, providing up-to-date, well-resourced, industry-standard training facilities. Almost all colleges have well-developed VLE infrastructures. In most colleges, the VLE is populated with a helpful range of materials that support learning, including notes, diagrams, extension materials, quizzes and revision materials for learners to check their progress. The best VLEs also contain high quality commercially-produced learning and teaching materials. However, not all learners, particularly those on FE programmes, make full use of the available materials to support and enhance independent learning. Often, this is due to teaching staff not promoting the VLE effectively or ensuring there is sufficient material for all FE programmes.

Several construction and engineering departments receive substantial donations of equipment and materials from industry and this helps ensure learners have access to the latest developments in technology. One college[14] works with a number of manufacturers of renewable technologies who provide and update the workshops with their latest products. Manufacturers share the facilities with the college and undertake their own training of installers in the college premises. Colleges are able to use the same facilities for their learners. This enhances the experience of college learners as they are exposed to the latest developments in industry.

## Guidance and support

All colleges provide potential learners with clear pre-entry information through their websites about the range of construction and engineering programmes. Usually this includes information about the content of programmes, the entry requirements, awards gained on successful completion and the opportunities for progression to further study or employment. College websites also contain helpful information about the types of assistance available to learners, including financial support. In most instances, college staff interview potential learners to ensure they are placed on the appropriate programme. Most colleges assess the level of learners' core skills at the beginning of their programme, usually with diagnostic software, and use this information to determine any initial support learners may require. These arrangements ensure that learners have well-informed expectations about their programmes before they begin their studies.

All learners receive a well-planned and comprehensive induction to their programmes, including detailed health and safety training. Most learners receive helpful on-going guidance and support throughout their time in college. For most FE learners, this includes class activities to develop personal, study and employability skills further. Most learners take the opportunity to set personal learning goals, reflect on their learning and assess their progress. Most colleges encourage learners to record these processes in a log book or personal learning

[14] See South Lanarkshire College portrait of excellent practice on page 29

plan. These arrangements support learners well to have a clearer understanding of the structure of their programme and the progress they have made. For learners on MA programmes, industry representatives also monitor their progress and these arrangements complement college processes very well. Guidance and support staff provide valuable additional support to learners where needed. This includes help with literacy and numeracy skills and preparation for employment interviews.

**Assessment**

All colleges have systematic and effective arrangements for assessment across construction and engineering programmes. The assessment approaches used by teaching staff are consistent with the Scottish Government's initiative *Assessment is for Learning*, which places an emphasis on assessment *for* learning, assessment *as* learning and assessment *of* learning. Most teaching staff use a suitable range of on-going assessment approaches well to check learners' understanding. In most lessons, teaching staff use effective questioning techniques to check learners' understanding of work. Staff provide clear feedback to learners on their work and this helps learners improve their skills.

All colleges have well-established systems to organise and manage final assessment for certification. Mature internal moderation processes are verified routinely by external moderators from awarding bodies to check final assessment decisions. Teaching staff usually coordinate assessments across the whole teaching block to try to ensure learners are not overly burdened by assessments in different subject areas within a short period of time. Where possible, teaching staff integrate assessment, either within a single unit or across two or more units, to reduce the burden of assessment for learners. Most staff give clear written feedback to learners on assessments and this supports those learners who require to re-sit the assessment. HE programmes contain graded units which assess learners' ability to integrate and apply knowledge covered in individual HN units. Often learners on HN programmes value the challenge posed by their graded units. They welcome the opportunity to research their chosen subject in depth and to achieve a merit or a distinction grade.

# 6. Outcomes and impact

## Retention and attainment

For the purposes of this report, it was decided to include the data for all construction and engineering programmes because all of the programmes associated with renewables are included within these categories. As discussed in the section on programmes of this report, most programmes that support the renewables industry are existing construction or engineering programmes with some additional content rather than bespoke programmes specific to renewables. In the few instances where bespoke programmes have been developed, such as those for wind turbine technicians, these are included within the overall data for construction and engineering programmes. Details on learner withdrawal and completion rates for full-time and part-time FE and HE programmes are given in Appendix 3.

Early withdraw rates give an indication of the numbers of learners who leave the programme before 25% of the programme is completed. Early withdrawal rates for learners in all categories of construction and engineering programmes have improved over the last three years and are now either on or around the national sector performance levels. These trends support the evidence that learners are given good pre-entry information and supported well during the first few months on their programmes.

Withdrawal rates give an indication of the number of learners who continue beyond the 25% completion date but leave before the end of the programme. Withdrawal rates for learners on all categories of programmes have improved over the last three years. For learners on FE programmes and part-time HE programmes, these now sit below the national sector performance level. The withdrawal rate for learners on full-time HE programmes matches the national sector performance level. Completed successful rates give an indication of the number of learners who have completed their award successfully measured against the number of initial learners who enrolled on the programme. Completed successful rates have increased for all full-time learners and part-time HE learners over the previous three year period and have remained steady for learners on part-time FE programmes. Rates for full-time FE and part-time FE and HE learners sit above the national sector performance level. However, rates for learners on full-time HE programmes sit below the national sector performance level.

Completed with partial success rates give an indication of the number of learners who have completed the programme but have not achieved sufficient unit passes to gain the whole award. Learners will, however, have completed some of the units on the programme as well as gaining useful skills. This indicator should be considered alongside the completed successful rates to give an overall indication on learner success. Overall, completed with partial success rates have remained steady over the last three years. Rates for full-time FE and part-time FE and HE learners sit just below the national sector performance level. However, rates for learners on full-time HE programmes sit above the national sector performance level.

The employed status of many FE learners on MA programmes contributes significantly to the good levels of retention and attainment. Many full-time

HE learners find the mathematical components of programmes challenging and this is a contributory factor to lower rate of learners who complete successfully and higher rates of completed with partial success for learners. However, many learners who have not completed the full HE award return to complete the necessary units the following year to gain the complete award.

**Wider achievement**

Learners on renewables programmes develop and gain a range of wider personal and social skills. Most learners also gain useful employability skills during their practical work which they undertake in realistic working environments in colleges. They learn to work flexibly and cooperatively with other learners, to manage their time effectively and to plan, organise and evaluate their work. MA learners on block release programmes gain valuable experience and skills that they may not have the opportunity to develop in their workplaces due to the nature of work their employers are currently undertaking. Some learners, particularly those at HE level, also gain these skills through visits and optional work placements to local sites and facilities. Close links with associated renewable industries and national and international partners are important in enabling learners to gain a broader understanding of the workplace and the kind of skills that are considered important to prospective employers.

Most learners also gain valuable citizenship skills during their programmes. These are often developed during project work where issues of local, national and international interest can be explored and discussed. Some learners are involved in community-based projects that extend their skills and also promote awareness of citizenship issues. The standard of learners' practical work is consistently good. Many learners participate in local and national skill competitions and some colleges are successful in achieving high levels of success. Participation in competitions encourages learners to improve their own skills and provides evidence for employers, who attend the events, of the high quality of craft work being produced in colleges. Learners also improve their confidence by participating in skill competitions.

**Progression**

Most learners who successfully complete programmes progress to employment or further study. In general, FE learners tend to progress to further study or as a route to MAs, often gained as a result of a successful work placement. All colleges have clear progression routes which allow learners to progress from introductory to advanced-level programmes within the same institution. In addition, all colleges have very good progression arrangements with local universities. A few colleges have very good 2+2 arrangements where learners with an HND can progress directly to the third year of an honours degree programme. This works particularly well for learners on engineering programmes delivered through UHI.

## 7. Enhancement through self-evaluation and review

Colleges have comprehensive and effective arrangements for evaluating the effectiveness of programmes. Programme teams responsible for renewables programmes are committed to improving the quality of the learner experience. They use self-evaluation activities and internal review effectively as tools for improving and enhancing programmes. Within these programme teams, most teaching staff are involved in formal self-evaluation activities which include programme team meetings and reporting. However, in a few colleges curriculum managers complete self-evaluation reports, with little or no input from teaching staff. This reduces the effectiveness of the process because not all staff have the opportunity to contribute to discussion on a range of curriculum matters.

Programme teams use a number of approaches to gather the views of learners about their learning experience. All colleges visited have class representatives as members of programme review teams. Most learner representatives consult with classmates before review meetings and feel able to raise issues about learning and teaching. All colleges use end-of-unit questionnaires and surveys to seek learner opinion on learning and teaching issues and these are used to inform self-evaluation activities. Staff respond well to points raised by learners and take action to address issues and improve the experience for learners. However, in a few colleges, staff experience difficulty in ensuring the attendance of industry-based learners in review meetings. This results in their views and concerns not always being fully considered in the review process.

Most colleges make good use of employers' views in the self-evaluation process. Employers provide feedback both informally during college staff work-based assessment visits and formally within meetings. All programme teams have very good relationships with employers who assist in the scrutiny of new programmes to ensure they meet the needs of industry.

Most programme teams consider learner data and performance indicators (PI) for early withdrawal, further withdrawal, and learner completion with success or partial success as part of the internal review process. In most colleges, teams use PIs well to examine reasons for low levels of performance on programmes and identify units which cause most difficulties for learners. This analysis helps to identify what needs to be improved to support learners better. For example, in one college, low programme success on some engineering programmes was identified as learners have difficulty with mathematics units. The programme teams introduced several measures to support learners better, including learning and teaching approaches and the inclusion of some bridging units to support progression. However, most programme teams do not benchmark PIs sufficiently, either internally with other curriculum areas or externally with other colleges and the sector as a whole. This limits the use of PIs as a useful tool for improvement.

Most colleges produce detailed self-evaluation reports which record strengths, areas for development and action points for improvement. However, not all reports are sufficiently evaluative, particularly in the consideration of learning and teaching. In some colleges, the evaluation of learning and teaching is not sufficiently rigorous in identifying what works well and areas where teaching needs to be improved. Often

teaching teams focus their evaluations on issues to do with resources and less on aspects of teaching methods.

Staff delivering renewables programmes are very aware of the importance of continuing professional development (CPD). All colleges have well-developed arrangements to ensure that staff benefit from CPD to update their teaching qualifications and industry experience. Predominantly, CPD is driven by legislative requirements such as gas safety registration and other statutory training.

All colleges recognise the value of ensuring staff have the necessary professional learning and teaching skills to deliver programmes. New teaching staff are often enrolled on the PDA in teaching practice and most progress to Teaching Qualification (Further Education) (TQ(FE)) programmes. One college has recently introduced a PDA in e-learning to improve teaching staff's use of technology in learning.

## 8. Recommendations

**Colleges should:**

- continue to work with partners to widen opportunities for young learners into renewables and STEM-related careers;
- work with partners to take action to address the low representation of females on renewables programmes;
- support teaching staff to incorporate and enhance the use of VLEs in all programmes in renewables and encourage all learners to make better use of these resources;
- support teaching staff to develop a broader range of teaching strategies and approaches in theory lessons that encourage more active learning and engage learners more fully;
- ensure renewables programme teams involve learners more actively in planning and managing their own learning;
- improve learner success rates on full-time HE programmes related to renewables; and
- support renewables programme teams and teaching staff to evaluate more rigorously the quality of learning and teaching and share good practice.

**The Energy Skills Partnership should:**

- draw on the findings of this report to support colleges in taking forward the recommendations.

**Education Scotland should:**

- continue to monitor progress made in terms of the above recommendations through their annual engagements with colleges, and disseminate information on key improvements as they emerge across the sector.

## Appendix 1

**Colleges visited in the fieldwork for this report:**

Ayrshire College

Dumfries and Galloway College

Dundee and Angus College

Fife College

Inverness College UHI

North Highland College UHI

Orkney College UHI

South Lanarkshire College

# Appendix 2

## Equalities data - gender

## Actual enrolments by gender

**Construction and engineering programmes**

| | FE Female | FE Male | HE Female | HE Male |
|---|---|---|---|---|
| **2010-11** | 1,628 | 30,244 | 610 | 6,678 |
| **2011-12** | 1,512 | 27,931 | 675 | 6,565 |
| **2012-13** | 1,412 | 25,547 | 701 | 6,505 |

**All sector programmes**

| | FE Female | FE Male | HE Female | HE Male |
|---|---|---|---|---|
| **2010-11** | 93,130 | 80,714 | 23,764 | 22,158 |
| **2011-12** | 80,904 | 71,830 | 22,524 | 21,398 |
| **2012-13** | 73,487 | 66,444 | 22,241 | 21,006 |

## Percentage enrolments by gender

**Construction and engineering programmes**

| | FE Female | FE Male | HE Female | HE Male |
|---|---|---|---|---|
| **2010-11** | 4% | 77% | 2% | 17% |
| **2011-12** | 4% | 76% | 2% | 18% |
| **2012-13** | 4% | 75% | 2% | 19% |

**All sector programmes**

| | FE Female | FE Male | HE Female | HE Male |
|---|---|---|---|---|
| **2010-11** | 42% | 37% | 11% | 10% |
| **2011-12** | 41% | 37% | 11% | 11% |
| **2012-13** | 40% | 36% | 12% | 12% |

# Appendix 3

## Data for construction and engineering programmes, 2010-11 to 2012-13

**Full-time FE**

**Construction and engineering programmes**

| | Early withdrawal | Further withdrawal | Partial Success | Completed successfully |
|---|---|---|---|---|
| **2010-11** | 10% | 17% | 10% | 63% |
| **2011-12** | 9% | 16% | 10% | 65% |
| **2012-13** | 9% | 13% | 10% | 68% |

**National sector performance**

| | Early withdrawal | Further withdrawal | Partial Success | Completed successfully |
|---|---|---|---|---|
| **2010-11** | 10% | 17% | 11% | 62% |
| **2011-12** | 9% | 16% | 11% | 64% |
| **2012-13** | 9% | 15% | 11% | 65% |

**Full-time HE**

**Construction and engineering programmes**

| | Early withdrawal | Further withdrawal | Partial Success | Completed successfully |
|---|---|---|---|---|
| **2010-11** | 8% | 15% | 19% | 57% |
| **2011-12** | 7% | 13% | 18% | 62% |
| **2012-13** | 6% | 12% | 18% | 64% |

**National sector performance**

| | Early withdrawal | Further withdrawal | Partial Success | Completed successfully |
|---|---|---|---|---|
| **2010-11** | 6% | 14% | 13% | 67% |
| **2011-12** | 6% | 12% | 12% | 69% |
| **2012-13** | 6% | 12% | 12% | 70% |

**Part-time FE**

**Construction and engineering programmes**

| | Early withdrawal | Further withdrawal | Partial Success | Completed successfully |
|---|---|---|---|---|
| **2010-11** | 3% | 5% | 10% | 83% |
| **2011-12** | 2% | 4% | 10% | 84% |
| **2012-13** | 2% | 4% | 11% | 83% |

**National sector performance**

| | Early withdrawal | Further withdrawal | Partial Success | Completed successfully |
|---|---|---|---|---|
| **2010-11** | 4% | 7% | 12% | 77% |
| **2011-12** | 3% | 6% | 12% | 79% |
| **2012-13** | 4% | 6% | 12% | 77% |

**Part-time HE**

**Construction and engineering programmes**

| | Early withdrawal | Further withdrawal | Partial Success | Completed successfully |
|---|---|---|---|---|
| **2010-11** | 4% | 5% | 15% | 77% |
| **2011-12** | 3% | 4% | 15% | 79% |
| **2012-13** | 3% | 4% | 13% | 80% |

**National sector performance**

| | Early withdrawal | Further withdrawal | Partial Success | Completed successfully |
|---|---|---|---|---|
| **2010-11** | 4% | 6% | 15% | 75% |
| **2011-12** | 4% | 6% | 14% | 75% |
| **2012-13** | 4% | 6% | 14% | 76% |

# Appendix 4

## Portraits of excellent practice

### Ayrshire College: school partnership working to promote *Skills for Work* Energy programmes

Ayrshire College has well established successful partnerships with local schools. The college offers a range of *Skills for Work* (SFW) programmes, including construction skills and engineering. However, there is poor uptake on the SFW energy programme and the college has introduced an initiative to address this issue. The college has created direct links with primary schools through its primary engineers programme. Learners on the Access to Electrical and Plumbing programme visited local primary schools to assist the young people with their primary engineering challenge. The primary engineers developed and assembled motorised buggies on a chassis using a component kit. One primary class has visited the college's Cumnock campus where college learners hosted the buggy-build in workshops and provided advice, coaching and supervision. The winning buggy design won first prize at the regional final held at the University of Strathclyde. College learners working with the primary groups have developed a useful range of essential skills including citizenship, working with others and problem-solving skills.

The primary engineers programme has created greater levels of interest in engineering from pupils. Future plans include inviting primary school groups and parents to the college to promote STEM provision within secondary school choices.

### Dumfries and Galloway College: overhead lines technician programme

Dumfries and Galloway College is working in partnership with the sector skills council *Energy and Utility Skills* and industry partners to deliver an innovative training initiative. The college has developed a strategic partnership with ScottishPower Energy Networks (SPEN) and their contractor to help address labour market shortages in the electrical overhead power lines sector.

College staff delivered underpinning knowledge during the 12 week programme and practical training was delivered by a SPEN trainer using a new purpose built training facility on the college estate. During the programme learners achieved the following awards:

- Health and Safety Executive (HSE) First Aid at Work ;
- Royal Environmental Health Institute of Scotland (REHIS) Health and Safety;
- Construction Skills Certification Scheme (CSCS) certification; and
- ScottishPower authorisations.

All of the learners completing the initial programme in 2013 were employed by the company contracted by SPEN to construct and refurbish their overhead powerline infrastructure. The trainees are currently undertaking additional NVQs as part of

their on-the-job training. The programme has successfully addressed local skill gaps in the energy distribution sector and contributed to employment opportunities for local people.

The initial pilot programme at Dumfries and Galloway College has now been reviewed, updated and rolled out to a number of contractors across the power distribution sector. Several colleges now deliver this short programme.

**Dundee and Angus College: Biofuel Academy**

In 2009, the then Angus College replaced ageing gas boilers with new biomass technologies. The procurement of the boiler resulted in the creation of a long-standing relationship with Angus Biofuels. As part of further discussions with Angus Biofuels it was highlighted that the growth in biofuel installations had resulted in a shortage of the skilled workers necessary to support this key emerging industry sector. As a result, the biomass boiler installation project has developed into the creation of a £900,000 new-build boiler installation, combining state-of-the-art biofuel technologies alongside a bespoke training facility. This includes classroom facilities featuring a glass partition to the boiler itself so that learners can view the operation of the biofuel boiler.

Alongside these developments has been the creation of the first *Biofuel Academy* in the UK. The *Biofuel Academy* offers bespoke training aimed at addressing skills shortages within the biofuel industry. Although in its initial stages, this training has been developed through expert input from a number of key local and national partners. The first cohort of learners completed their programme in May 2013. The programme was designed to meet the industry's specific needs and encompassed skills such as: forestry; fencing; tractor driving and maintenance; drainage; welding; first aid; manual handling; abrasive wheels; and chain saw training and assessment. All learners also received construction skills health and safety certification scheme cards which enhances their employability.

Angus Biofuels have offered sustainable employment to one third of the group, with other learners looking at similar opportunities with other employers. This is a major success for long-term unemployed people and has helped to address a skills shortage that was limiting the development of this new sector.

**Fife College: wind turbine technician programme**

One of Fife College's legacy colleges, Carnegie College, was the first college in Scotland to offer a wind turbine technician programme in 2010. The programme was developed in consultation with national and international employers and in response to needs of the wind turbine industry. Currently most wind turbines are still under manufacturer guarantee but as these guarantees expire there is potential work for trained technicians across Scotland and beyond.

The initial programme in 2010 involved apprentices from three major employers, delivered over 16 months. A full-time, 12-month programme was introduced in 2011.

The full-time programme comprises both a City and Guilds diploma (SCQF level 6) and a SVQ level 2 in Performing Engineering Operations (SCQF level 5). These components cover the necessary theoretical elements and also develop the necessary hand skills required by industry. A number of additional health and safety courses are undertaken by learners on the programme, some of which are mandatory for operatives working in this sector.

Further employer engagement also identified training to GWO and RUK standards for working at heights and this has now been incorporated into the programme. These additional awards greatly enhance the employability of learners who successfully complete the programme. The college developed the delivery materials for the programme and these have been shared through the Energy Skills Partnership with other Scottish colleges. The wind turbine technician programme is now offered in several colleges. The full-time wind turbine technician programme delivered at Fife College is now further supported by employer sponsorship and ESP enhancement funding.

The design of this programme is an excellent example of the college sector working with industry partners to develop awards that prepare learners well for employment and meet industry needs.

**Inverness College UHI: electrical installation and renewables project**

Learners on the NC Electrical Installation and Renewables programme (SCQF level 5) undertake a group project to develop a range of practical and personal skills. The project is centred around the design and manufacture of a small wind turbine. Construction is based on a bicycle hub dynamo and learners use only recycled materials in their build. Learners are allocated a specific role within their teams (team leader, designer, manufacturer, etc.) and together they plan, design and manufacture a suitable tail fin which provides power for the dynamo. The teams displayed their designs and working models to a judging panel comprising industry experts and college representatives. The winning team received a prize donated by local industry and press coverage in the local newspaper.

The project provides ideal opportunities for learners to explore issues of green and renewable energy as well as highlighting the need for sustainability and recycling through using existing apparatus and materials. It also encourages independent learning in a team environment and provides a suitable conduit for incorporating the core skills of problem solving and working with others. Learners also evaluate their individual performance and teamworking to produce a recorded personal reflection.

**North Highland College UHI: college engineering apprenticeship programme**

College engineering programmes have historically supported apprentices from a number of key local employers. Currently there a transition in the types of companies training apprentices. The nuclear installation at Dounreay, is in the process of being decommissioned and there has been a reduction in MAs being

trained for the nuclear industry. Currently local employers are also recruiting fewer apprentices due to the economic climate.

The college recognises the importance of renewable energy generation for the local economy, particularly offshore tidal and wave power in the Pentland Firth. However, many of the devices being trialled are still at the prototype stage and it will be several years before full-scale operations begin. The college apprenticeship programme was developed two years ago to ensure that there is a pool of local skilled engineers and technicians to meet industry demand in a few years' time.

Now in its second year, 18 MAs are employed by the college. Start-up funding included contributions from the Nuclear Decommissioning Authority and European funding. Learners spend the first year of the MA in the college's Engineering, Technology and Energy Centre (ETEC), gaining a range of important skills and knowledge. Learners on the second and subsequent years spend periods of employment with a range of different local employers gaining direct industrial experience which complement the skills and knowledge previously gained. The apprentices are monitored in the workplace by a placement officer who is employed by Dounreay as part of their long-term commitment to the local area and economy. This post provides valuable support to both apprentices and employers.

The scheme is a good example of partnership working contributing to ensuring there is a pool of well-qualified local technicians who can support the renewables industry when full-scale offshore generation commences. It also demonstrates the college's responsiveness and responsibility to the local community which it serves.

**Orkney College UHI: maritime skills training for the renewables industry**

Apprentices on the college engineering apprenticeship programme at North Highland College gain additional qualifications in maritime skills through a one-week residential programme at Orkney College's Centre for Maritime Studies in Stromness. The programme content was planned and agreed through consultation between both colleges. The apprentices gain valuables skills and additional qualifications which enable them to work safely offshore.

During the programme, learners gain four separate qualifications that meet the requirements for offshore working:

- deck safety awareness;
- personal survival techniques (PST);
- essential first aid (EFA); and
- VHS radio user.

Two of the qualifications (PST and EFA) are regulated courses by the Standards of Training, Certification and Watchkeeping (STCW). Training is carried out in the Stromness Centre, the local swimming pool and in the local harbour. Apprentices must demonstrate competencies in each of the four areas to achieve certification. The programme in maritime skills training demonstrates strong partnership working between two UHI colleges which results in apprentices being better prepared for employment in the offshore marine renewables industry.

**South Lanarkshire College: partnership working with manufacturers**

The college's construction faculty continues to develop and enhance its curriculum to meet current and future needs from the construction industry for updating skills and knowledge to make best use of micro renewables. The college has developed and delivered successfully a range of full-time and part-time micro renewable energy certificated programmes. These include: introduction to renewable energy; solar thermal-hot water; biomass heating; ground/air source heat pumps; wind power; micro hydro power; and photo voltaics.

Central to the success of these programmes is the high standard of facilities and equipment that learners use during their training. For example, learners on plumbing and gas-fitting programmes work on new boilers and control mechanisms that exceed current building standards. This equipment has been donated to the college by a major national manufacturer who can access the facility to train their own installers in the new technology. This partnership working benefits learners who improve their employability skills by using up-to-date products. The college's low energy, low carbon house, the *Aurora House*, provides a working example of the uses of the various micro renewables technology and energy efficient construction techniques to achieve its net zero carbon status. The materials and plant machinery were donated by local and national companies. Learners on all construction programmes benefit from regular visits to the house during their studies at the college.

## Appendix 5

### Glossary of terms

| | |
|---|---|
| BPEC | British Plumbing Employers Council |
| CITB | Construction Skills Training Board |
| CPD | Continuing Professional Development |
| CSCS | Construction Skills Certification Scheme |
| EFA | Essential First Aid |
| ESP | Energy Skills Partnership |
| ETEC | Engineering, Technology and Energy Centre |
| FE | Further Education |
| GWO | Global Wind Organisation |
| HE | Higher Education |
| HN | Higher National |
| HNC | Higher National Certificate |
| HND | Higher National Diploma |
| HSE | Health and Safety Executive |
| ICT | Information and Communications Technology |
| ILP | Individual Learning Plan |
| MA | Modern Apprenticeship |
| NPA | National Progression Award |
| PDA | Professional Development Award |
| PI | Performance Indicator |
| PST | Personal Survival Techniques |
| REHIS | Royal Environmental Health Institute of Scotland |
| RUK | RenewableUK |
| SCQF | Scottish Credit and Qualifications Framework |
| SECTT | Scottish Electrical Charitable Training Trust |
| SFC | Scottish Funding Council |
| SFW | Skills For Work |
| SIP | Skills Investment Plan |
| SJIB | Scottish Joint Industry Board for Electrical Contracting Industry |
| SNIPEF | Scottish and Northern Ireland Plumbing Employers Federation |
| SPEN | ScottishPower Energy Networks |
| SQA | Scottish Qualifications Authority |
| STCW | Standards of Training, Certification and Watchkeeping |
| STEM | Science, Technology, Engineering and Mathematics |
| SVQ | Scottish Vocational Qualification |
| TQ(FE) | Teaching Qualification (Further Education) |
| UHI | University of the Highlands and Islands |
| VLE | Virtual Learning Environment |

Any enquiries regarding this publication should be sent to us at:

Education Scotland
Denholm House
Almondvale Business Park
Almondvale Way
Livingston
EH54 6GA

Tel: 01506 600 200
e-mail: enquiries@educationscotland.gov.uk

**www.educationscotland.gov.uk**