Scottish Forest and Timber Technologies sector: Skills & training scoping study

EXECUTIVE SUMMARY

Report by Inverness College UHI on behalf of Skills Development Scotland

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This scoping study and report arose from discussions between Inverness College UHI and Skills Development Scotland. The need to understand and clarify the skills and training needs of the forestry and timber technologies sector was clear. Through a proposed action plan, the study should inform specific review, curricula innovation and development thus ensuring readiness of a growing and sustainable FTT sector capable of meeting current and future targets, needs and demands.

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1. Remit and focus of study

    i. Investigation of current training provision by all providers, across all levels, over the **Forestry and Timber Technologies (FTT)** sector

    ii. Undertake a skills needs assessment across the FTT sector

    iii. Identification of routes to employment for students at all levels, over the FTT sector

    iv. Identification of barriers to current training provision for large and small employers and to students

    v. Recommend an action plan to address the training needs of the FTT sector in Scotland

2. The **definition of FTT** for this study was sector activity and training provision that covered:

    - The science and practice of managing forests, trees and woods in rural and urban settings

    - Timber processing including milling, grading, merchanting, transportation

    - Timber engineering and wood technologies including sustainable construction

    - Wood energy and woodfuel

    - Forest-based services e.g. forest tourism, forestry investment

Academic coding of training courses was mapped as closely as possible onto FTT sector and sub-sector definitions. This enabled rigorous analysis of the number of enrolments against particular skills and training areas defined by sector activities. Through this analysis a much clearer picture of skills gaps could be obtained.

3. Key **stakeholder groups** in the Scottish training and skills landscape were identified into four main groups:

    i. Government and government sponsored agencies – these include bodies with a direct responsibility of skills and employment e.g. Sector Skills Councils, Skills Development Scotland and the Enterprise Network. To some extent Forestry Commission Scotland which has policy and strategic level functions that directly relate to skills, can also be considered a government body in this context.

    ii. Training Providers – including further and higher education institutions, for example the Scottish School of Forestry (Inverness College UHI) and SRUC (Scotland's Rural College) which operates across a number of sites; and private training providers, supplying recognised certificates.

iii. Funding Bodies – including a range of different organisations, for example, Skills Development Scotland, the Scottish Funding Council and European funding.

iv. Industry – this includes a diverse range of employers and employees, for example Scottish Woodlands, Network Rail, Trade Unions, and professional bodies and institutes like ConFor and the Community Woodlands Association.

4. To fulfil the scoping brief and inform and evidence the proposed action plan, evidence was obtained through:

Secondary data sources that were included in the review were:

a. The HESA database. A bespoke paid-for dataset was obtained to include Scotland specific information about HE provision of "D5 Forestry, arboriculture and related" courses and student enrolment

b. The SFC Infact database. Searches were conducted using the free public interface providing information about student numbers and graduate destinations from HE and FE providers involved in "Agriculture and related topics"

c. Documents collected from interviewees and sector bodies including briefing papers, notes and minutes of meetings.

d. FE and HE sector data derived from FES and HESA returns made by FE and HE institutions respectively was compiled and compared with the results available to external organisations (above).

Semi-structured interviews with 34 representatives of industry and training providers, using a snowball sampling method and a sampling frame of 110 contacts.

Table 1 shows the number of interviewees by sector stakeholder representation. Table 2 shows the number of interviewees by FTT sub-sector.

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Skills & training scoping study

Table 1   **Number of interviewees by sector stakeholder representation**

Stakeholder group	Organisation type	Number of respondents
Government sponsored bodies	Forestry Commission	4
	Skills Sector Council	1
Training providers	FE & HE training providers	8
	Private training providers	2
Industry	Industry / Membership associations and forums	10
	Forest Enterprise Scotland	5
	Forestry companies	3
	Forestry consultants	1
	Estate managers	1
	Utility companies	1
	Total	**36**

Table 2   **Number of interviewees by FTT sub-sector**

FTT sub-sector	Number of respondents
Forestry, silviculture & operations	21
Forestry, silviculture & operations / Urban forestry and arboriculture	4
Biomass and wood energy	4
Timber engineering	3
Multiple sectors	2
Estates management	1
Forest Tourism	1
Total	**36**

5. **Scottish Qualifications and Training** is primarily organised through the recently revised Scottish Credit and Qualifications Framework (SCQF). Between 2013 and 2016 some qualifications are being withdrawn, others introduced and some revalidated against new SCQF attainment levels. Relevant to the FTT sector there are three main training approaches that can be identified from the many types of qualifications, delivery modes and training frameworks:
    i. New entrants to roles through a course of study aimed at skilled, semi-skilled and managerial levels
    ii. Training of in-work entrants and career progression aimed at skilled, semi-skilled and managerial level roles
    iii. Developing and maintaining skills within the existing workforce, e.g. CPD, NPTC

6. **Scottish FTT training and skills provision** should meet key industry demands arising from:
    i. Increases in a growing timber harvest (scheduled to increase from around 8 million cubic metres per annum to 10 million cubic metres per annum over the next 10 years).
    ii. Increase in woodfuel supply demand.

      iii. Replanting of felled areas to meet Scottish Government targets of increase in the forest area by 100,000ha over the next 10 years.

      iv. Growing markets for low carbon timber construction, innovation in timber engineering and wood products.

      v. Emerging resilience issues from increasing, and new, pests and diseases

      vi. A diversifying and increasingly complex sector requiring a varied skill set, often required in individual job roles.

In terms of skills and training, two key issues underline specific concerns in the sector:

- The need to recruit suitably trained candidates into the full range of employment opportunities across the FTT sector.
- The importance of retaining, refreshing and developing the knowledge and skills of existing employees so that they continue to meet the challenges associated with maintaining a competitive FTT sector.

7. The evidence relating to the kind of training required by particular parts of the Scottish FTT sector can be complex and difficult to interpret. However, comparison of national trends in Scottish lifelong learning, including those in FTT, supports the following observations:

- Youth unemployment is a key concern for the Scottish Government reflecting similar concerns in the FTT sector. The needs of the Scottish FTT sector to replace an aging workforce, appear synergistic with Scottish Government concerns addressing youth employment.
- Numbers of HE students within Scottish FE-HE institutions are increasing but in FTT related subjects they are falling. The numbers of students enrolling into FTT courses has decreased markedly since the 1970s and 1980s (200-500 students) compared to current numbers fluctuating between (100-150)(see Table 3).
- Scottish HE providers have moved away from providing part-time courses towards full-time courses and this may not be reflected in FTT requirements to meet sector trends.
- There is little capacity within the forest industries for employer provided training. The fragmented nature of the sector is likely to be the main factor in limiting capacity for the industry to support training and skills development. There is a significantly lower rate of reported employer provided training, training needs assessment and CPD undertaken by FTT employees compared with other businesses.

Table 3   Enrolments by year, location, FE/HE and mode of attendance

ENRs		FT			FT Total	PT			PT Total	Grand Total
Level of Study	Institution	2011/ 12	2012/1 3	2013/ 14		2011/ 12	2012/ 13	2013/ 14		
FE	Angus College					27		24	51	51
	Banff & Buchan College of Further Education						24		24	24
	Barony College	58	35	51	144	479	458	480	1417	1561
	Borders College	11	26	27	64					64
	Elmwood College		10	12	22	66	55	41	162	184
	Inverness College	66	64	46	176	45	11	31	87	263
	Kilmarnock College	38	31	32	101					101
	North Highland College		5	10	15	47	30	66	143	158
	Oatridge College	13	14	12	39	168	109	340	617	656
FE Total		**186**	**185**	**190**	**561**	**832**	**687**	**982**	**2501**	**3062**
HE	Aberdeen, University of	13	6	16	35	1	1		2	37
	Highlands and Islands, University of	50	43	31	124	3	9	12	24	148
HE Total		**63**	**49**	**47**	**159**	**4**	**10**	**12**	**26**	**185**
Grand Total		**249**	**234**	**237**	**720**	**836**	**697**	**994**	**2527**	**3247**

Source: Combined FES/HESA data

8. **Evidence of training supply, training and skills demand**, student outcomes/destinations and perceived or reported skills gaps were considered in each FTT sub-sector covered by the scoping study:
   - Forestry
   - Wood energy – including estates management with wood energy
   - Sustainable construction and timber engineering
   - Forest tourism
   - Emerging markets – including estates management and forest investment

Training provision in each sub-sector considered:

   - FE/HE provision including postgraduate, first degree, HND/HNC and diplomas
   - Modern Apprenticeships
   - CPD, certification and employer provided training

Forestry

The key issues around sector needs and skills gaps that emerged from the interviews and review of other data and documentation were as follows:

Sector need:

- Increased numbers of skilled technical forestry workers particularly harvest machine operators trained at SCQF levels 6-8 (13% of vacancies reported by Lantra).
- The next generation of forest managers and professional occupations trained at SCQF levels 8-11 (16% of vacancies reported by Lantra).
- Increased numbers of forest workers and contractors able to operate to quality standards.

Framework Development:

- Close contact between training providers and industry needs to continue to ensure that frameworks and training progression pathways suit both students and employers.
- The value of MAs in the mix of provision requires continuing discussion. There are significant barriers to delivering the employer led MA model in the forestry sector.
- Progression between SCQF levels is a major incentive to student recruitment. The evidence suggests that it is more difficult to market, recruit and retain students on courses where there is no clear link or route through to BSc. This provision currently exists at Inverness College UHI.
- The lack of well-established pathways into employment requires support for work placements and internships to provide relationships with industry that facilitate entry of what were described as "new, first generation foresters". The provision of work placements, work-based degrees including time with industry, is particularly important. This includes maintaining or increasing offers in both full time and part time modes of delivery, at both FE and HE levels.

Curricular and course content:

- Actions to map and market the available training and trainers would help address industry perceptions that appropriate frameworks, courses and providers are hard to identify and the suitability and quality of courses is hard to assess.
- Regardless of course content and mapping, there is a perceived issue with a lack of alignment to industry need. Providers would benefit from sharing more information on course content and delivery or from meeting with employers to discuss what kind of training might address any gaps.
- Employers consistently mentioned a skills gap amongst forest workers and managers understanding the forest value chain and the links between silvicultural management decisions and market requirements along that value chain.
- the list of theoretical and technical skills noted as required and potentially absent related to:
  - management practice for commercial forestry
  - silvicultural practice
  - timber markets and value chains
  - business management

- carbon economy
- botany, pathology and tree pests and diseases
- numeracy

Current and existing provision should be regularly reviewed and audited to ensure that the identified training requirements are met. There are also pointers as to how promotion and recruitment to existing courses could be focused to include the required theoretical and technical skills of the sector.

Wood Energy

Increasing demand for wood energy products is leading to an increasing demand for training in this sub-sector. This was evidenced by interviewees and some training providers. Rapid growth in this relatively new FTT sub-sector represents a challenge to the proficiency of operators and businesses.

Needs and skills gaps identified in the wood energy sub-sector are:

- improving understanding of quality standards for woodfuel
- providing businesses with current information that helps them meet requirements and regulations
- training to explain the economics and profitability of wood energy
- trainers with expertise to deliver training to a consistent standard
- finding the support to deliver the SVQs and progressive qualifications

Sustainable construction and timber engineering

Within construction and FTT there is increasing demand for skilled and semi-skilled workers, to avoid any restriction to market growth. The focus is in off-site build, an area of expertise for which Scotland is world leading. Edinburgh Napier University leads the majority of research and development and also training in off-site build. Connections between practice based training, such as the architectural technology courses at Inverness College UHI, and research and innovation at Napier are perceived as positive factors in improved student outcomes compared to older courses.

Shortages and skills gaps identified in sustainable construction and timber engineering:

- the need to update training courses to provide the skills to match recent innovation and new technologies.
- training focused on timber grading and merchanting
- development of modern apprenticeships suited to the needs of the off-site timber construction industry
- a perceived need to include training about the end uses of timber as part of the curriculum in other FTT sub-sectors
- sector leadership is an issue e.g. the Institute of Civil Engineering has limited interest in timber construction and product development

Forest Tourism

There are no specific courses in forest tourism, but there are a number of programmes in which forest is the main focus for tourism activity/training. These are shown in Table 4.

Table 4   Forest Tourism training provision in Scotland 2014/15 and 2015/16

Qualification	SCQF level	Course title	Duration (years)	Mode[1]	Provider
NPA	4	Activity Tourism	11 weeks	FT	SRUC - Ayr
NC	6	Activity Tourism	9 months	FT	SRUC - Oatridge
BA/BA (Hons)	10	Outdoor Pursuits Management	3-4	FT	SRUC - Ayr
BA/BA (Hons)	10	Adventure Tourism Management	4	FT	West Highland College UHI (Lochaber)
BA/BA (Hons)	10	Activity Tourism Management	3-4	FT	SRUC - Oatridge

1. SC – Short Course, PT – Part time, FT – full time, DL – Distance Learning

Source: database evidence derived from 3 UCAS databases, Scottish college web pages and web search of private training provider offers

Some forestry courses cover alternative uses of forestry including recreation, sporting and tourism. For example at Inverness College UHI, the HNs and the degree course include these elements and can involve joint learning with students from other programmes in UHI, for example in countryside and game management. This enhances understanding of the views, management objectives and priorities of stakeholders in other parts of the land-based sector.

Forest-based tourism is a growing area, important to local and community-based businesses. There was explicit concern expressed in the interviews that training provision prioritised in this area might direct resources away from the core business of the forestry sector and the shortage of forestry workers concerned with planting, managing and harvesting.

Needs and skills gaps in forest tourism:

- the need for tourism managers to understand the constraints imposed by working forest environments
- forest management planning to account for visitor pressure
- public engagement and conflict management in multiple use forest zones

Emerging Markets: Estate management

Courses with land and estate management in the course description ranged from SCQF level 4-11. The Masters level courses are in Countryside Management at SRUC and Landscape: Integrated Research and Practice at the University of Glasgow. A number of rural and countryside practical skills courses run at Dundee, Angus and Borders Colleges. Notably in the interviews, there was a preference for students to learn on the job in these skills areas, rather than being College based. This contrasts with the Forestry sub-sector where there was an implied preference for College based courses.

Estate management sub-sector needs and skills gaps:

- forest establishment
- forest management
- professional services
- deer management and stalking linked to forest management

9. Analysis of the interviews highlighted a number of issues associated with **routes to employment and variations in supply and demand of training and skills by geography**. These were:

- FE/HE providers located in the right place to service the needs of the sector:

  i. Recognition of the limited size of the forestry training resource. Two approaches were suggested to address this: 1. To look at facilitating trainer mobility and resource sharing between Scottish FE/HE institutions. 2. To look for the generation of alternative funding mechanisms to support and develop existing training provision and trainers.
  ii. An understanding that the major demand for harvester operators, grading and merchanting between 2016 and 2031 will be in south and west Scotland, where the majority of harvesting volumes will arise. There will also need to be an adequate supply of trained operators in other regions of Scotland.
  iii. The need for greater consideration of cross border links, for example with the National Forestry School at Ambleside. Respondents felt that the National Forestry School could have an important part to play balancing geography with the availability of critical training needs.

- Woodfuel demand and usage by commercial and industrial scale users shown to be located in the Highlands and Aberdeenshire. Demand for skills is therefore likely to be greatest in these areas.

- There is increasing demand for arboriculturalists, particularly in the Scottish central belt. There was a relatively strong perception that arboriculture SMEs were able to attract forestry graduates because of the perceived opportunities for career progression, employer supported CPD and productivity bonuses.

- There is particular demand for sustainable construction and timber engineering workforce in the Central belt and a hub around Inverness.

- Forest tourism has clearly defined areas of growth potential.

- There is relatively high demand for trained entrants that are mobile. This means new recruits can find employment and progression opportunities quickly and employers can consequently lose on their investment in individuals.

- The loss of training opportunities and recruitment by Forestry Commission Scotland since 2010, was often mentioned by interviewees. A consequence of this is the growing

importance of larger FTT businesses and private consultancy businesses as a graduate destination.

10. The majority of evidence and views for **barriers to training provision** are familiar and well known to the sector. These are as follows:

    i. The availability and allocation of resources for training.
    ii. Frameworks, including Modern Apprenticeships that are not designed to service the specific character of the FTT sector.
    iii. Confidence in course content and training pathways.
    iv. The on-going difficulties of designing student centred courses within existing frameworks and structures.
    v. The acceptability of practice-based training in HE institutions.

11. **Barriers to the uptake of training**, as with barriers to provision, are well known to the sector. The key issues are:

    i. Lack of awareness amongst industry of what training is actually available.
    ii. Lack of a central register of courses, course navigation, modes of delivery and trainers.
    iii. Continuing poor perception amongst potential students and trainees of what FTT courses offer and what the industry has to offer.
    iv. Continuing poor understanding of career progression amongst potential students and trainees.

12. The evidence from the study suggests that Scottish FTT training is in a period of transition, with many of the FE/HE and other organisations involved in training provision, developing and implementing a range of initiatives to move the sector forward. Table 5 shows the list of key training and skills gaps, barriers to provision and indicative level of supporting evidence for each that were identified in the study.

The issues evidenced in the study and shown in Table 5, inform the proposed plan (Figure 1), a Scottish Forest and Timber Technologies Sector Skills and training action plan.

Table 5   **A summary of the skills gaps, training needs and barriers to training provision and uptake elicited through the scoping study**

Skills gap/training need	SCQF level	Barriers to provision	Supporting evidence
i. Forest mechanisation and use of harvesting machinery	6-10	Costs high High student/instructor ratio Availability of equipment limited Trainee consolidation and practice opportunities limited	High
ii. Processing mechanisation e.g. use of sawmilling machinery and grading systems	6-10	Costs Availability of trainers	High
iii. Funding sources supporting FTT training	All levels	High costs to providers FTT employers unable to contribute Other funding sources limited	High
iv. Provision of tree and timber / general woodland MAs	6-10	SE models not suited to FTT sector conditions Employer acceptability low Low numbers of recruits Location of training providers relative to industry/students Costs of specialised training modules and trainer learner ratios high No higher level MA	High
v. Trainer expertise and location	All levels	No strategic map of expertise Gaps in expertise not known	Medium
vi. Understanding forestry value chain and links between roles/functions	All levels	Curriculum development across streams	High
vii. Forestry business management skills	Particularly 8-11	Curriculum development Available training expertise Opportunities for practice-based learning with industry limited	Medium
vii. Provision of wood fuel MAs	6-10	Resources	High

		Marketing Quality Assurance system	
ix. Clear career pathways and courses signposting	All levels	Forestry Careers Map not widely known Multiple information sources and many messages Range of training options with different provides including CPD and certification confusing	Medium / High
x. Adaptive silvicultural practice (risk management, pests and disease, climate change)	Particularly 8-11	Curriculum development Available expertise Opportunities for practice-based learning with industry limited	Medium
xi. Marketing of FTT training offer	All levels	Recruitment and marketing lacks competitive approach Understanding and interest of FTT offer amongst young people low Employer knowledge of current FTT offer not comprehensive	Medium
xii. Forest planning and GIS	6-11	Curriculum development	Low/ Medium
xiii. IT competencies	6-11	Curriculum development	Low/ Medium

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Figure 1   Scottish Forest and Timber Technologies Sector Skills and Training Action Plan

Increased provision of training and skills for forest mechanisation and use of harvesting machinery	1
Secure funding sources (particularly through innovative models) to support forest training and skills delivery	2
Consider best fit models for MA delivery tailored to FTT sector	3
Map available trainer knowledge and location within FE/HE institutions	4
More effective forestry business management training and skills development into training	5
Support for the development of SVQ and frameworks for growing wood energy sector	6
Increased provision of training and skills in mechanisation and processing machinery	7
More effective and targeted knowledge transfer from sector practice into training courses across the sector	8
Establish credible and well known established career pathways and professional development	9
Ensure training is current and responsive to inclusion of new approaches to silvicultural practice e.g. adaptive management	10
Implement unified, effective marketing and communication strategies around available courses and training opportunities	11
Embed training in forest planning using GIS	12
Ensure general level IT competency, numeracy and skills ensure as standard across all training delivery	13

INCREASING PRIORITY