
Superhomes Skills and Knowledge Profile Report



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 890492 (Superhomes2030)

Contents

List of Abbreviations	3
Executive Summary	4
Introduction	5
Methodology	6
Step 1 - Engagement with stakeholder groups	7
Step 2 Review	10
Step 3 Results & Development	12
Superhomes Skills & Knowledge Profile for in-house Engineers	13
Step 4 Feedback	36
Conclusion	39

List of Abbreviations

OSS	One Stop Shop
SHEI	Superhomes Electric Ireland
BER	Building Energy Rating
SEAI	Sustainable Energy Authority Ireland
DEAP	Dwelling Energy Assessment Procedure
nZEB	Near/nearly/naught Zero Energy Buildings
SME	Small Medium Enterprises
DASBE	Digital Academy for Sustainable Building Environment
EGFSN	Expert Group on Future Skills Needs
CAP	Climate Action Plan
M&E	Mechanical and Electrical
SPA	Special Purpose Awards
PM	Project Management
PV	Photovoltaic
CPD	Continual Professional Development
WWETB	Waterford, Wexford Education Training Board
LOETB	Laois, Offaly Education Training Board
HLI	Heat Loss Indicator
PSCS	Project Supervisor Construction Stage
PSDP	Project Supervisor Design Process
CPD	Continuous Professional Development

Executive Summary

The Superhomes skills & knowledge profile is the first step in the development of SH2030 training plan as the profiles will be used by both the in-house engineering staff and contractors to identify any skills & knowledge gaps for them to be able to meet the Superhomes standards.

The methodology section describes the steps in the development of the profiles, the steps undertaken were:

1. Engagement with key stakeholder groups
2. Review
3. Results and Development of Skills and knowledge profiles (for in house and contractors)
4. Feedback

Conclusion

The developed knowledge profiles will add value to the Superhomes organisation as they provide an overview of the professionalism required for delivery of a SuperHomes retrofit. The checklist of skills and knowledge can be used by contractors and in house staff alike to identify any shortcomings in knowledge. It is envisaged that both current and new in-house engineers & Contractors will evaluate their training status using this tool and provide SHEI a good indication of the continuous professional development CPD packages they need to develop or plan for (Deliverable 3.5).

The contractor situation is more complex due to the nature of the sector and constraints on SMEs. this is why an incentive by SHEI is essential for the success of the training of contractors. Without proper incentive the risks identified will be very hard to mitigate.

Next steps in the Superhomes training development are to:

- Review existing training programs to find the best match for each skills and knowledge profiles and document key delivery metrics such as: schedule of training, cost of training, delivery format of training, number of trainees required etc.
- Identify gaps in training and begin developing training to alleviate the gaps in knowledge.

Introduction

In order to meet the growing demand for residential retrofits in Ireland Superhomes needs to increase the numbers of in-house engineering staff and associated contractor base, the target is to have more than 100 in-house engineering staff and 200 contractors / SMEs by 2030. To ensure the continued delivery of high-quality retrofits between now and 2030 Superhomes needs to ensure that both in-house engineering staff and contractors have the appropriate training.

SH2030 will create a training plan that will focus on the upskilling of in-house engineering staff and contractors. The foundation of the SH2030 training plan will be the **Superhomes skills & knowledge profile**, this profile will be used by both the in-house engineering staff and contractors to identify any skills & knowledge gaps for them to be able to meet the Superhomes standards.

In order to provide context to this document it is important at this stage to describe who the stakeholder groups are:

Superhomes In-house engineer

Superhomes engineers have highly technical and project management skills at their core, gained from a combination of higher-level education and work experience. Due to the dynamic nature of retrofit projects engineers must be able to work in a multidisciplinary team, as the projects will involve many stakeholders from homeowners, BER assessors, principle and sub-contractors, fellow engineers, SEAI and the wider Superhomes organisation.

A Superhomes engineer should have the skills and knowledge to deliver all the tasks involved in the workflow process of a typical retrofit project as shown in Figure 1 below:

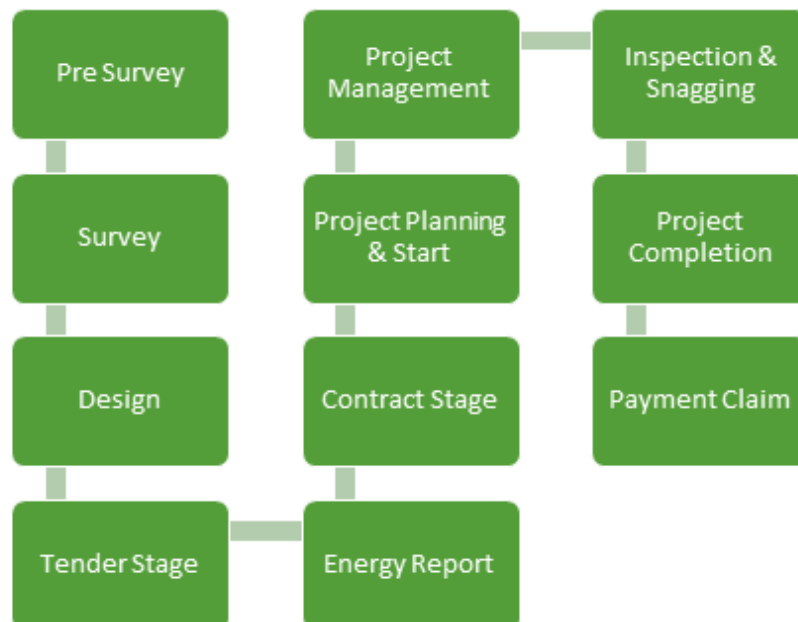


Figure 1 Superhomes Engineering Flow Process for a typical retrofit project

Figure 1 demonstrates the wide scope of skills and knowledge needed, thus highlighting the importance of this task and the subsequent training plan for in-house engineers.

Superhomes Contractors

The vast majority of contractors that work with Superhomes are construction related SME's, that consist of a team that can directly¹ or in-directly² deliver the retrofit project to the Superhomes design and standard. Apart from the delivery of the actual design measures the contractor needs to be able to, amongst other things:

- Project manage multiple retrofit project
- Complete necessary SEAI grant documentation
- Be a SEAI registered contractor for main upgrade measures
- Inspect all works to both SEAI and Superhomes standards
- Represent the Superhomes brand in a professional manner

Methodology

The main objective of this deliverable is the development of the Superhomes skills & knowledge profile for both the Superhomes engineering team and retrofit contractors. The development phases were identified as:

1. **Engagement with stakeholder groups** that are directly involved with the retrofit sector such as senior engineers in Superhomes and training providers that are currently delivering or developing training content for the retrofit market.
2. **Analysis & Review** of the recently published '*Skills for Zero Carbon The Demand for Renewable Energy, Residential Retrofit and Electric Vehicle Deployment Skills to 2030*' which was developed by the Expert Group on Future Skills Needs.
3. **Results & Development** of skills & knowledge profiles:
 - a. Skills & knowledge profile for Superhomes In-house Engineers
 - b. Skills & knowledge profile for Contractors delivering Superhomes retrofits
4. **Feedback & Revision** from SHEI senior engineers

Step 1 - Engagement with stakeholder groups

The purpose of this step was to ascertain the skills & knowledge needed to work successfully in the retrofit sector from the viewpoint of the Superhomes in-house engineering team, the retrofit contractor and training providers that are currently delivering or developing training content for the retrofit market. The following section will provide key insights from the engagement activities.

Superhomes in-house engineering team / contractor base

To date Superhomes has completed more than 500 high quality residential retrofits, this extensive experience allows the senior engineers in the Superhomes organisation to provide valuable insights into the skills and knowledge needed for both the in-house engineering team and contractor base.

A series of interviews and workshops with senior engineers were held during 2021 which resulted in an extensive list of skills & knowledge needed by both the Superhomes in-house engineering team and contractors. This list was fully incorporated into the completed Superhomes skills & knowledge profile for both stakeholder groups and can be found in section 3 of this report. It is important to note that Superhomes provides a detailed design service for each retrofit project, which reduces the workload from the contractor, but the contractor needs to understand the design process for sign off and inspection of retrofit measures.

Training Providers

Engagement with training providers who provide training or are involved with the development of training for the retrofit sector provided another valuable opportunity to support the development of the skills and knowledge profiles.

This engagement resulted in valuable insights from a number of organisations:

Table 2 The Digital Academy for the Sustainable Built Environment (DASBE)

Overview	DASBE seeks to create a National Digital Academy Platform to enable the Construction Industry, SMEs, Manufacturers and Workers to upskill and gain new knowledge in a cost effective, worker centric learning environment. In relation to the construction industry DASBE is offering a range of programmes in Energy Efficiency, Circular Economy and Digitalisation for workers and professionals.
Key Insight (retrofit perspective)	The following insights were provided by Elisabeth O'Brien, the DASBE Manager. <ul style="list-style-type: none">• Retrofit specific programme currently in development, expected to be available in 2022:<ol style="list-style-type: none">1. Certificate in Fabric & Airtightness for Retrofit

2. Certificate in M&E for Retrofit
3. Certificate in Retrofit Management

The above programmes are aimed at the construction industry in the form of special purpose awards (SPA), minor and major awards.

- How did the 'Training needs' analysis justify the creation of these courses?

The rationale for programme development is one of addressing the needs of the industry and verifying there is demand for such a programme. Strategic policy initiatives in particular the CAP and Just Transition are considered, as well as relevant research outcomes from industry and academics fields. The EGFSN report focussed on the area of retrofit concluding a number of supply strategies and recommendations for the construction industry. Workshops and/or surveys are used to gain the opinion of the industry direct, whilst learner demand is informed by a number of student online surveys gathering feedback to apprise the learner interest and need. Finally, an employment statement outlines the future careers for the graduates both nationally and internationally, strengthening the need in the industry to enhance a proactive and highly qualified workforce to bring a new generation of workers to modernise the construction industry.

- What skills and knowledge are needed for the next 5 years in the retrofit market for engineers and contractors to meet the retrofit targets?

The reports notes that "it is unlikely that an entirely new degree programme is necessary, expansion of the availability of and capacity in these engineering courses, as well as post-graduate and CPD training, is likely to increase the pool of engineers who could work in the retrofit sector."

Furthermore, it recommends ensuring that viable pathways and training from other areas such as architecture and surveying are available will help to provide a stable supply of Retrofit Engineers/Designers over the coming decade, but there will be difficult to fill the number of Retrofit Engineer/Designer positions in the future.

	Identification by industry of potential shortages in relation to experienced Construction and Building Trades Supervisors and Construction Project Managers with the retrofit expertise.
--	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Table 3 Centres of Excellence in nZEB and retrofitting

Overview	The introduction of the Near Zero Energy Building (nZEB) standards in Ireland resulted in the WWETB establishing an nZEB “Centre of Excellence for Green Building Skills” in 2018 in order to upskill the construction sector. This is further expanded to include retrofit training and the creation of 4 more centres of excellence. Currently the WWETB and LOETB are offering retrofit training in dedicated centres of excellence with 3 more centres planned for delivery in 2022.
Key Insight (retrofit perspective)	<p>The following insights were provided by trainers in both WWETB and LOETB.</p> <ul style="list-style-type: none"> • An understanding of nZEB principles and building physics is essential for all workers involved in retrofits. • The centres offer the opportunity for hands on training with tools and materials, so learners can appreciate the skills and knowledge needed for good fabric and air-tightness installation. • The skills and knowledge provided in the nZEB ventilation course meets the requirements of 2019 Part F building regulations for the design, installation, and commissioning of natural and mechanical ventilation • A course dedicated to HP servicing and maintenance is in development to meet an identified need.

The training provider engagement added to the development of the skills and knowledge profiles by highlighting the importance of nZEB and digital skills while also providing a structure in which to categorize the skills and knowledge needed for the retrofit sector i.e., the DASBE suggestion of splitting the core skill of retrofitting into the following headings:

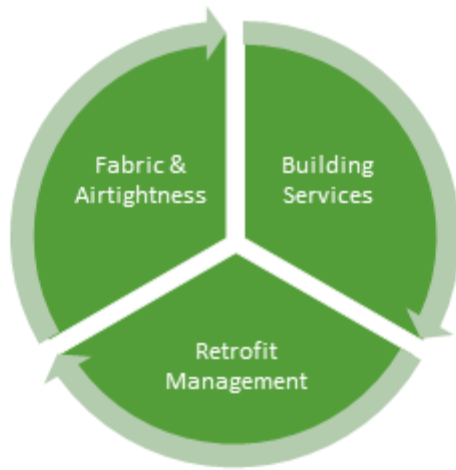


Figure 2 Core skills of retrofitting

Step 2 Review

Introduction

The publication of the November 2021 report ‘Skills for Zero Carbon -The Demand for Renewable Energy, Residential Retrofit and Electric Vehicle Deployment Skills to 2030’, created by the Expert Group on Future Skills Needs (EGFSN) is pertinent to this deliverable as the report describes in detail the core occupations and skills needed for the residential retrofit sector.

A review and analysis of this report will act to validate and support what Step 1 has achieved and more importantly identify any missing skills and knowledge that should be added to the profiles.

Review and Analysis

The EGFSN report categorize the occupations required for the retrofit sector in a number of tables, for summary Table 4 was created, the table shows the emerging occupations involved in the retrofit market and a description of each occupation. It is from these description that key skills and knowledge for each occupation is identified.

Table 4 EGFSN report core occupations technical skills

	Occupation	Description
Emerging Occupations	BER Assessor	Residential BER Assessors carry out Building Energy Rating assessments for clients and provide advice as to retrofit requirements.
	Retrofit Engineer / Designer	Retrofit Engineers / Designers are responsible for

		planning and designing domestic retrofits. They carry out BER surveys and perform heat loss calculations to identify necessary works, prepare plans and drawings for contractors, and certify that works have been completed to the required safety and operational standards.
	Retrofit Coordinator	Retrofit Coordinators generally project manage the retrofit process on behalf of the client, and help to ensure that projects are safe, high quality and performing to their maximum potential. In some lower-risk projects, they may also fill other roles in the retrofit process.
	Heat Pump installer	Heat Pump installers design, install, service and repair air-source and ground-source heat pump systems in domestic and commercial premises.
	Domestic Solar PV installer	Domestic PV Solar installers design and install domestic solar systems, often on rooftops.
	Air Tightness & Insulation Operatives	Insulation operatives install insulation by hand or by using machinery in order to reduce heat loss in buildings, including through internal (dry-lining), external, cavity wall, attic, and underfloor insulation.

In addition to the technical skills required by the retrofit occupations the report also identifies broader skills, these skills were identified from literature reviews and stakeholder engagement, Table 5 below summaries these skills. The mix of core technical & non-technical skills have also been identified by the SH2030 project.

Table 5 EGFSN report core occupations non-technical skills

Core Non-technical skills	Description
---------------------------	-------------

Behavioural Skills	Customer and stakeholder communication, Problem Solving Skills, Adaptability, working part of Multidisciplinary team
Commercial skills	Growth strategies, Business plans and standard operating procedures
Health and Safety Skills	Health and safety documentation, health, and safety courses
Digital Skills	MS applications, Computer skills, controls, and digitalisation

Step 3 Results & Development

This section of the report presents the final Superhomes skills and knowledge profiles, each profile is dealt with separately i.e.

1. Skills & knowledge profile for Superhomes In-house Engineers
2. Skills & knowledge profile for Contractors delivering Superhomes retrofits

At the end of each profile is a section for additional skills and knowledge, this may be appropriate for workers involved in specific retrofit projects or preparation for technologies entering the construction space.

Skills & knowledge profile for Superhomes In-house Engineers

Table 6 Superhomes Skills & Knowledge Profile for In-house Engineers (Retrofit Management)

Superhomes Skills & Knowledge Profile for in-house Engineers		
		Date:
Retrofit Management	Core Areas	Skills & Knowledge
	Overview	Understand:
		<ul style="list-style-type: none"> • What is the SHEI One-Stop-Shop
		<ul style="list-style-type: none"> • The role of the contractor in the SH process
		<ul style="list-style-type: none"> • The role of the in-house engineer in the SH process
	<ul style="list-style-type: none"> • the national retrofit targets 	

	<ul style="list-style-type: none"> NZEB principles for retrofits
	<ul style="list-style-type: none"> the SHEI project flow process and where the stakeholders involved
	<ul style="list-style-type: none"> the building regulations that apply to retrofits, the SEAI grant requirements and SHEI requirements
Project Management	Understand the key PM skills involved in:
	<ul style="list-style-type: none"> Coordinating multiple retrofits (sequencing work, people, and time management)
	<ul style="list-style-type: none"> Avoiding and resolving conflict with stakeholders
	<ul style="list-style-type: none"> Project risk management (Health & safety, Covid 19 etc)
	<ul style="list-style-type: none"> Customer engagement and handover process
Building Survey	Know the different house typologies & how to identify construction element types
	Competency in using DEAP 4
	Ability to work from existing BER data for a dwelling and verify if the BER is accurate
	Emitter survey – Ability to assess emitter condition and heat output

	Distribution pipe work survey – Ability to assess condition of pipe work and suitability for HP installation
	Structural defects – Ability to identify major structural defects for example cracks and dampness in attic timbers
	Homeowner engagement, what will and won't be acceptable from their point of view
	Carrying out a retrofit survey including measurement & drawing (hand sketch, drawing app, etc). Note: Survey is not just the thermal envelop but the whole building.
Retrofit design	Working with DEAP 4 software to achieve both BER uplift & target, HLI targets and homeowner requirements with a focus on cost optimal solutions (low cost, low disruption & high impact)
	Creation of project pricing document for contractor and energy report for homeowner
Quantity surveying	Knowledge of:
	<ul style="list-style-type: none"> • current construction material pricing and associated labour costs
	<ul style="list-style-type: none"> • Average market rates for various building elements

	Ability to:
	<ul style="list-style-type: none"> • Compare Contractor rates per m2 / system
	<ul style="list-style-type: none"> • Cross check contractor / sub-contractors prices
	<ul style="list-style-type: none"> • identify over & under pricing
	<ul style="list-style-type: none"> • Understand how to use the internal SHEI pricing database.
Quality Assurance	Overview of ISO9000 and link to SHEI QA processes
	Ability to carry out inspection of works to necessary quality checklists (SEAI & SHEI Standards)
	Understand the following QA processes:
	QA control of in-house engineering processes
	QA control of Onsite works
Project Documentation	Ability to review and complete all SEAI + SHEI documentation for grant works (Declaration of works, HP tool, commissioning certs etc)

	Operation and Maintenance manual
	Safety file
Health & Safety on Site	Understand the health & safety regulations and SHEI guidelines, including the duties of the PSDP (project supervisor design process and PSCS (project supervisor construction stage)

Deliverable 3.4 as part of SuperHomes2030

Table 7 Superhomes Skills & Knowledge Profile for In-house Engineers (Fabric and Airtightness)

Superhomes Skills & Knowledge Profile for in-house Engineers		
		Date:
	Core Areas	Skills & Knowledge
Building Fabric & Air Tightness	Overview	Understanding of the in-house Engineering role and contractor role
		Understand the importance of managing air & moisture risks in building elements
		Be familiar with the range of fabric solutions and their uses – what is the most appropriate solution for a specific building element
		Have a basic understanding of the installation procedure of the main fabric solutions with a link to the SEAI & SHEI checklists

	Understand the main do's and don'ts when selecting, designing, and installing. – link to case-studies
Design	Understand + calculate U values for entry into DEAP 4
	Understand the SHEI Quick reference tables
	Understand how to read an NSAI agreement cert
Air Tightness	Understand the targets and requirements for the contractor to conform with the building regulations and the impact on the BER result
	General understanding of the methods of airtightness for retrofits
	Overview of the problem areas per house type – including cost optimal solutions

Table 8 Superhomes Skills & Knowledge Profile for In-house Engineers (Building Services)

Superhomes Skills & Knowledge Profile for in-house Engineers		
		Date:
Building Services	Core Areas	Skills & Knowledge
	Heat Pump & distribution system & DHW	Carry out a room-by-room heat loss calculations as per the standards
		Calculate the size of a HP for a specific dwelling
		Calculate emitter sizing
		Understand both the SEAI and SHEI requirements for Heating controls + monitoring
		Competent to review the SEAI HP designer sign off sheet
		Be familiar with HP & emitter products
		Understand key elements of a HP installation for the purposes of quality control / inspection

	Understand key elements of a HP commissioning for the purposes of quality control / inspection
	Ability to carry out HP hand-over instructions to homeowner
Ventilation system	Be familiar with the types of systems, differences between systems, rational of why 1 system over another.
	Be able to specify a ventilation type to meet project design requirements
	Understand key elements of a ventilation system installation for the purposes of quality control / inspection – links to SH checklist
	Understand key elements of a ventilation system commissioning for the purposes of quality control / inspection
	Ability to carry out ventilation system hand-over instructions to homeowner
PV system + Battery storage	Be familiar with the different systems available
	Size a systems to meet project requirements
	Understand key elements of a PV system installation for the purposes of quality control / inspection – link to installation standards and SEAI & SHEI checklist

	EV charging systems	Be familiar with the different systems available including the SEAI grant requirements, limitations, and cost
--	---------------------	---------------------------------------------------------------------------------------------------------------

Table 9 Superhomes Skills & Knowledge Profile for in-house Engineers (Additional Training)

Superhomes Skills & Knowledge Profile for in-house Engineers		
		Date
Additional Training	Core Areas	Skills & Knowledge
	Sales / SHEI customer experience	Ability to communicate effectively and personable to the homeowner
	Traditional Buildings	Be familiar with:
		- the current status of traditional buildings (SEAI grants, best practice reports etc)
- the various fabric systems available for traditional buildings		

	- the SHEI in-house standards on stone walls etc
	Have an awareness of special considerations of the typical upgrade measures to the traditional building elements – link to breathability
Lean methodologies – SIX SIGMA	Understand how to improve business processes through elimination of waste and increasing quality and efficiency.
Teaching & mentoring of junior engineers	Train the trainer skills
Post Retrofit Testing, Monitoring and Evaluation	Understand the benefit of post retrofit testing, monitoring and evaluation.
	Awareness of the tools and techniques to analysis data
Emerging Technologies	Understand how to keep tract of emerging technologies entering the retrofit market
Radon risks	Understanding Radon and mitigation measures in retrofits
Carbon cost of materials	Understand the impact of material choice and how to measure the carbon cost of a project
Building Survey	Awareness of the latest digital survey tools e.g., LiDAR & & apps
	Ability to use the SHEI survey tool of choice

Overheating	Understand the risks associated with overheating and how to mitigate against them
-------------	-----------------------------------------------------------------------------------

Skills & knowledge profile for Superhomes Contractors

Table 10 Superhomes Skills & Knowledge Profile for Contractors (Retrofit Management)

Superhomes Skills & Knowledge Profile for Contractors i.e., site foreman / project manager		
		Date:
Retrofit Management	Core Areas	Skills & Knowledge
	Retrofit Overview	Understand:
		<ul style="list-style-type: none"> • What is the SHEI One-Stop-Shop
		<ul style="list-style-type: none"> • the contractor role

		<ul style="list-style-type: none"> the engineering role
		<ul style="list-style-type: none"> the national retrofit targets
		<ul style="list-style-type: none"> NZEB principles for retrofits
		<ul style="list-style-type: none"> the SHEI project flow process and where the contractor fits in
		<ul style="list-style-type: none"> the building regulations that apply to retrofits, the SEAI grant requirements and SHEI requirements
		Understand the key principles of managing air, moisture & thermal bridging risks
		Understand the key PM skills involved in:
		Coordinating multiply retrofits (sequencing work, people, and time management)
	Project Management	Avoiding and resolving conflict with stakeholders
		Project risk management (Health & safety, Covid 19 etc)
		Customer engagement and handover process
	Building Survey	Know the different house typologies & how to identify construction element types

	Understand a DEAP 4 output and dwelling report
	Understand what measures can impact a DEAP result
	Ability to carry out a verification survey to ascertain can the contractor complete the works to the required design specifications.
	Ability to verify the design retrofit measures
	Ability to complete SHEI pricing schedule
Retrofit design	Understand the rational for the SHEI design process and how this impacts on the works to be delivered
Quantity surveying	Ability to price for jobs and complete tender documents
Quality Assurance	Ability to oversee and carry out inspection of works to necessary quality checklists (SEAI & SHEI)
Final Project Documentation	Ability to review and complete all SEAI documentation for grant works (Declaration of works, HP tool, commissioning certs etc)

	Health & Safety on Site	Understand the health & safety regulations and SHEI guidelines, including the duties of the PSDP (project supervisor design process and PSCS (project supervisor construction stage)
--	-------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Table 11 Superhomes Skills & Knowledge Profile for Contractors (Fabric and Airtightness)

Superhomes Skills & Knowledge Profile for Contractors i.e., site foreman / project manager		
		Date:
Building Fabric & Air Tightness	Core Areas	Skills & Knowledge
	Overview	Understand:
		The role of the SHEI in-house Engineer and contractor
		the importance of managing air & moisture risks in building elements
		the importance of managing various trades / work personnel in order to maintain fabric and air-tightness quality targets
		the principles of U-Value calculations

	<p>Be familiar with the range of fabric solutions and their uses – what is the most appropriate solution for a specific building element – link to the NSAI database and SEAI grant requirements</p>
	<p>Understand the main do's and don'ts when selecting, designing, and installing. – link to SHEI case-studies</p>
Installation of fabric measures	<p>Ability to oversee the project works so high level of quality is achieved and design targets achieved</p>
	<p>Know how to find the relevant building regulation, best practice guide, NSAI agreement cert etc on all the fabric measures</p>
Fabric Quality Assurance	<p>Ability to oversee and carry out inspection of all fabric measure to necessary quality checklists (SEAI & SHEI)</p>
Documentation	<p>Ability to understand and organise all the necessary paperwork to demonstrate SEAI grant compliance</p>
Air tightness	<p>Understand:</p>
	<p>why airtightness is important</p>
	<p>the targets, - link to ventilation choice</p>
	<p>methods to achieve the targets in a cost optimal way including systems currently available on the market</p>

		how a blow door test works
		How to interpret the results of a blow door test
		The main air-tight issues per house type areas such as dormer etc – link to SHEI case studies
		Ability to oversee the project works so high level of quality is achieved and design targets achieved
		Ability to oversee and carry out inspection of all air tightness measures to necessary quality checklists (SEAI & SHEI)

Table 12 Superhomes Skills & Knowledge Profile for Contractors (Building Services)

Superhomes Skills & Knowledge Profile for Contractors i.e., site foreman / project manager		
		Date
Building Services	Core Areas	Skills & Knowledge
		Understand:

Heat Pump & distribution system & DHW systems	- SHEI design rational and requirements(Impact of HP choice and BER target, control, zoning, HP size, etc)_
	- Inspection process from both SEAI & SHEI
	- Certification and documentation process
	Be familiar with HP & emitter products on the market – types and features available
	Have the ability to oversee all aspects of the Heating system:
	- Design
	- Install
	- Commission
	- Organise certification and documentation
	- Carry out Inspection
	- Hand over (Maintenance & Warranty)

Heating system Quality Assurance	Ability to oversee and carry out inspection of all heating system measures to necessary quality checklists (SEAI & SHEI).
Ventilation system	Understand:
	- System types + SEAI requirements
	- Design considerations such as plant locations, duct design
	- Installation considerations such as method to reduce fan vibration
	- New commissioning requirements – ability to coordinate an independent NSAI validator (SEAI update)
	- How to complete a handover to the homeowner
	Have the ability to oversee all aspects of the ventilation system:
	- Design
	- Install
	- Commission

	<ul style="list-style-type: none"> - Organise certification and documentation
	<ul style="list-style-type: none"> - Carry out Inspection
	<ul style="list-style-type: none"> - Hand over (Maintenance & Warranty)
Ventilation system Quality Assurance	Ability to oversee and carry out inspection of all heating system measures to necessary quality checklists (SEAI & SHEI).
PV + battery system	Understand
	<ul style="list-style-type: none"> - Systems types and features available
	<ul style="list-style-type: none"> - SEAI & SHEI requirements – link to checklists
	Have the ability to oversee all aspects of the PV system:
	<ul style="list-style-type: none"> - Design
	<ul style="list-style-type: none"> - Install
	<ul style="list-style-type: none"> - Commission

		Organise certification and documentation
		Carry out Inspection
		Hand over (Maintenance & Warranty)
	PV system Quality Assurance	Ability to oversee and carry out inspection of all PV system measures to necessary quality checklists (SEAI & Superhomes Standards).
	EV charging points	Be familiar with the different systems available including the SEAI grant requirements, limitations and cost and technical requirements for the installation.

Table 13 Superhomes Skills & Knowledge Profile for Contractors (Additional training)

Superhomes Skills & Knowledge Profile for Contractors i.e. site foreman / project manager		
		Date
Additional Training	Core Areas	Skills & Knowledge
	Sales / SHEI customer experience	Ability to communicate effectively and personable to the homeowner within the boundaries of the SHEI contractor role

Traditional Buildings	Be familiar with:
	the current status of traditional buildings (SEAI grants, Best practice reports etc)
	the various fabric systems available for traditional buildings
	the SHEI in-house standards on stone walls etc
	Where further training & resources are available
	Have an awareness of special considerations of the typical upgrade measures to the traditional building elements – link to breathability
Radon risks	Understanding Radon and mitigation measures in retrofits
Carbon cost of materials	Understand the impact of material choice and how to measure the carbon cost of a project
Emerging Technologies	Understand how to keep track of emerging technologies entering the retrofit market

Step 4 Feedback

The senior in-house engineers have reviewed the profiles, skills & knowledge identified and have identified associated risks that may occur / have occurred previously when contractors or in house staff have/had to attend courses, training, or events:

Risk Level	Risk	Possible Solutions
High	Contractors lack the finance to send their workers to attend training.	<p>SHEI will provide the finance to send contractor's workers to attend training. There must be a limit agreed with SHEI.</p> <p>SHEI to provide a course to contractors to provide for free. This would require someone in SHEI to undertake all courses / have the knowledge profile (identified in Step 3) to create a course that will cover all topics.</p> <p>SHEI will alleviate this extra cost with Continual Professional Development packages to incentives contractors to join the SHEI team.</p>
High	Contractors or in house staff will have no interest in attending training. Work/learning dichotomy.	<p>SHEI will provide an incentive to entice contractors to attend training.</p> <p>SHEI will provide a microlearning experience for training. Toolbox talks or mini webinars.</p>

		SHEI will provide Continual Professional Development packages to incentives contractors to join the SHEI team.
High	Contractors have no time to attend training. Time Constraints.	<p>SHEI will provide an incentive to entice contractors to attend training.</p> <p>SHEI will provide a microlearning experience for training. Toolbox talks or mini webinars.</p> <p>SHEI will provide Continual Professional Development packages to incentives contractors to join the SHEI team.</p>
Mid	Course does not cover topics that are identified in the knowledge profile.	Level of experience / time served contractors / in house engineers have a wealth of knowledge that can be extracted to produce materials for a contractor training course.
Low	There is no information on the topic available in Ireland.	<p>SHEI & TUS will research further the topic.</p> <p>Engineers Ireland and CISBE contacts can be utilised.</p>
Low	Information from training will have a negative effect. Practicality of the course is poor.	<p>SHEI will provide a pilot site to test initiates knowledge.</p> <p>SHEI will attend the course in order to test the courses practicality.</p>

Low	A more Trained Contractor will lead to a more expensive contractor for SHEI	<p>SHEI will alleviate this extra cost with Continual Professional Development (CPD) packages to incentives contractors to join the SHEI team.</p> <p>SHEI will benefit from improved knowledge of contractor, increasing the profitability of retrofits for SHEI.</p>
-----	-----------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

The results of this report and the feedback stage have provided good insight and will help to finalise Deliverable 3.5 Superhomes Training Plan and Resources.

Conclusion

The developed knowledge profiles will add value to the Superhomes organisation as they provide an overview of the professionalism required for delivery of a SuperHomes retrofit. The checklist of skills and knowledge can be used by contractors and in house staff alike to identify any shortcomings in knowledge. It is envisaged that both current and new in-house engineers & Contractors will evaluate their training status using this tool and provide SHEI a good indication of the CPD packages they need to develop or plan for (Deliverable 3.5).

The contractor situation is more complex due to the nature of the sector and constraints on SMEs. this is why an incentive by SHEI is essential for the success of the training of contractors. Without proper incentive the risks identified will be very hard to mitigate.

Next steps in the Superhomes training development are to:

- Review existing training programs to find the best match for each skills and knowledge profiles and document key delivery metrics such as: schedule of training, cost of training, delivery format of training, number of trainees required etc.
- Identify gaps in training and begin developing training to alleviate the gaps in knowledge.