

Energy Training for Construction Workers for Low Energy Buildings

Final Publishable Report

QualiBuild

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FOREWORD

This final publishable report for QualiBuild under the Intelligent Energy Europe programme was funded by the European Commission through the European Agency for Small and Medium Enterprises (EASME). The report outlines the process of the design, development and delivery of the BUILD UP Skills QualiBuild project over the period November 2013 to July 2016. This includes detail of how the development was informed by consultation with all the partners and with relevant stakeholders with the formation of a steering committee.

The report also presents some reflections from the delivery of the project over the 33 months with a number of conclusions presented along with recommendations for the future development and delivery of construction-related projects.

We wish to acknowledge the immense efforts from all the QualiBuild partners, members of the steering committee, other stakeholders and the assistance and advice from our Project Officers, Zoe Wildiers and Philippe Moseley. Finally a huge thank you to all the construction workers and trainers who participated in both training programmes and the development of the construction workers register, who, without their efforts we would not have achieved such a success.

Disclaimer

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Background and Introduction



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Europe of the European Union

EU Build Up Skills Initiative



Build Up Skills Ireland –
Pillar 1



QualiBuild Project – Pillar 2

The **QualiBuild** project funded by European Commission BUILD UP Skills Initiative was set up in 2013 as part of wider efforts to create employment in the sector and to assist Ireland in achieving the EU 2020 energy efficiency target, by encouraging all Irish building construction workers to undergo training and up-skilling at a National Level.

Ireland is committed to reduce its total energy consumption by 20% by the year 2020, which corresponds to the European 2020 targets. As the Residential and Commercial/Public Sectors account for approximately 40% of energy consumption in Ireland, improving energy efficiency and renewable energy uptake in buildings are important elements of meeting these sustainable energy targets. To achieve these targets a new approach towards the construction of new and retrofitted building activities must be applied. This means that those working in or entering the construction sector require new knowledge, skills and competences to achieve the standards introduced by the new building regulations and understand the principles of Quality Low Energy Building.

The core principle of the BUILD UP Skills QualiBuild project was one of Quality Low Energy Building. By focusing on quality buildings, of which low-energy buildings is a priority theme, this creates greater opportunities for the construction supply chain to take ownership of the issue. BUILD UP Skills QualiBuild addressed the main issues identified within the Irish BUILD UP Skills (BUSI) by:

- Developing a Foundation Energy Skills Programme for the target group which would increase their knowledge and capacity in the field of low energy buildings.
- Implementing a Train the Trainers programme to increase the knowledge and competency of trainers involved in construction training. The Irish BUILD UP Skills Roadmap highlighted the need to back up training provision with mechanisms which allow workers to benefit, in the market place, from having taken such training.
- Building on experiences from other schemes in Ireland, the project developed and piloted an industry backed Quality Building Training Registration Scheme.
- Developing a focused, innovative and targeted communication campaign to convince consumers, workers and construction companies of the value of addressing quality when completing low energy building projects.
- Developing a National Roll Out Plan which ensures that the BUSI Roadmap actions have been fully integrated into the Irish construction sector's policy and practice. The National Roll-Out Plan has set a path for the full implementation of the BUSI Roadmap, transfer ownership of Skills, outputs to relevant stakeholders and also set objectives for post 2020, in particular the continuation of the QualiBuild FES and Train the Trainer courses nationally.

Background to the project

In 2011, the EU funded project Pillar I IEE BUILD UP Skills Ireland (BUSI) was tasked with establishing the extent of the skills gap in the building sector in Ireland for achieving 2020 energy saving targets. The broad training provision for construction workers in Ireland was considered in light of the significant changes to building standards and the technologies currently being adopted onsite for energy performance. This resulted in the development of a National Roadmap of actions to address the issue (available to download at <http://www.qualibuild.ie/wp-content/uploads/2015/01/BUSI-Roadmap-Final-Print-Version.pdf>)

The BUSI project concluded *“a gap had developed in the requisite skills and knowledge for onsite implementation of energy efficiency measures and the integration of renewable energy systems”*.

Generally, the gap identified was one of knowledge rather than skills. However, this knowledge is fundamental for the successful construction of low energy buildings. It is important to understand the mind set of workers who, based on their years of experience, believe that they already know the 'right way' to do their job. Addressing attitudinal change is recognised as being one of the most challenging outcomes in training in particular encouraging workers to take responsibility for their own actions.

BUSI also found that “the majority of trainers of construction related crafts lacked the experience and knowledge on the construction of low energy building and largely unaware of the implications for onsite implementation of new energy performance standards for buildings.” This highlighted a lack of formal structures for the continuous professional development (CPD) of trainers involved in the delivery of construction skills.

Following on from the BUSI Roadmap, the major outputs to be carried out by the BUILD UP Skills QualiBuild project are:

- a) A **Foundation Energy Skills Programme** targeted at all construction workers and operatives with content available in hardcopy and on-line (EQF Level 4 & 5).
- b) A **Train the Trainers programme** (EQF Level 5 or 6) which will increase the knowledge and competency of trainers involved in construction training in Ireland with content available in hardcopy and on-line.
- c) A proposal for a **Continuous Professional Development (CPD)** scheme for trainers in the construction sector
- d) A **Quality Building Training Registration System**, driven initially by industry, which will provide a transparent means of demonstrating the level of competency and knowledge craft workers/operatives have in relation to low energy buildings
- e) A **Quality Building Communications Campaign**, focused on the theme of low energy buildings, which will target all consumers, builders and workers
- f) A **National Roll Out Plan** which reinforces and ensures the sustainability of the BUSI Roadmap actions, while also addressing actions post-2020.
- g) **Active engagement** of all stakeholders in the construction sector in the definition and implementation of the core BUILD UP Skills QualiBuild actions

The QualiBuild Key Actors:

Many of the key Actors and Stakeholders were involved with BUSI BUILD UP SKILLS Irish Roadmap and were also instrumental in ensuring that the QualiBuild project was a success.

The project involved five **partners** each with their own specialist expertise.



Limerick Institute of Technology (LIT) were the Coordinators of BUSI Irish Roadmap and QualiBuild projects. LIT are a Third Level Education Institute with 5 campuses in Limerick, Clare and Tipperary specialising in Lifelong learning training programmes, energy efficient buildings, renewable technologies, enterprise, research, community and social projects.



Institute of Technology Blanchardstown (ITB) are a Third Level Education Institute in Dublin specialising in training and lifelong learning programmes. ITB are involved in delivery of craft apprenticeships with emphasis on sustainability and energy efficiency.



Dublin Institute of Technology (DIT) have 6 campuses based in Dublin City Centre focussing on research, innovation and a wide range of technological, economic, social and cultural aspects.

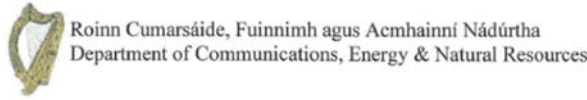


The Irish Green Building Council (IGBC) launched in 2011 include organisations and businesses from the entire value chain of the built environment with a common goal to accelerate the rate of change in Ireland to a sustainable built environment.



The Construction Industry Federation (CIF) is the Irish construction industry’s representative body. CIF supports the construction sector directly with information and expert advice on a range of construction specific issues through regional offices throughout Ireland.

There were 14 active organisations on the **steering committee** representing all the relevant key actors.



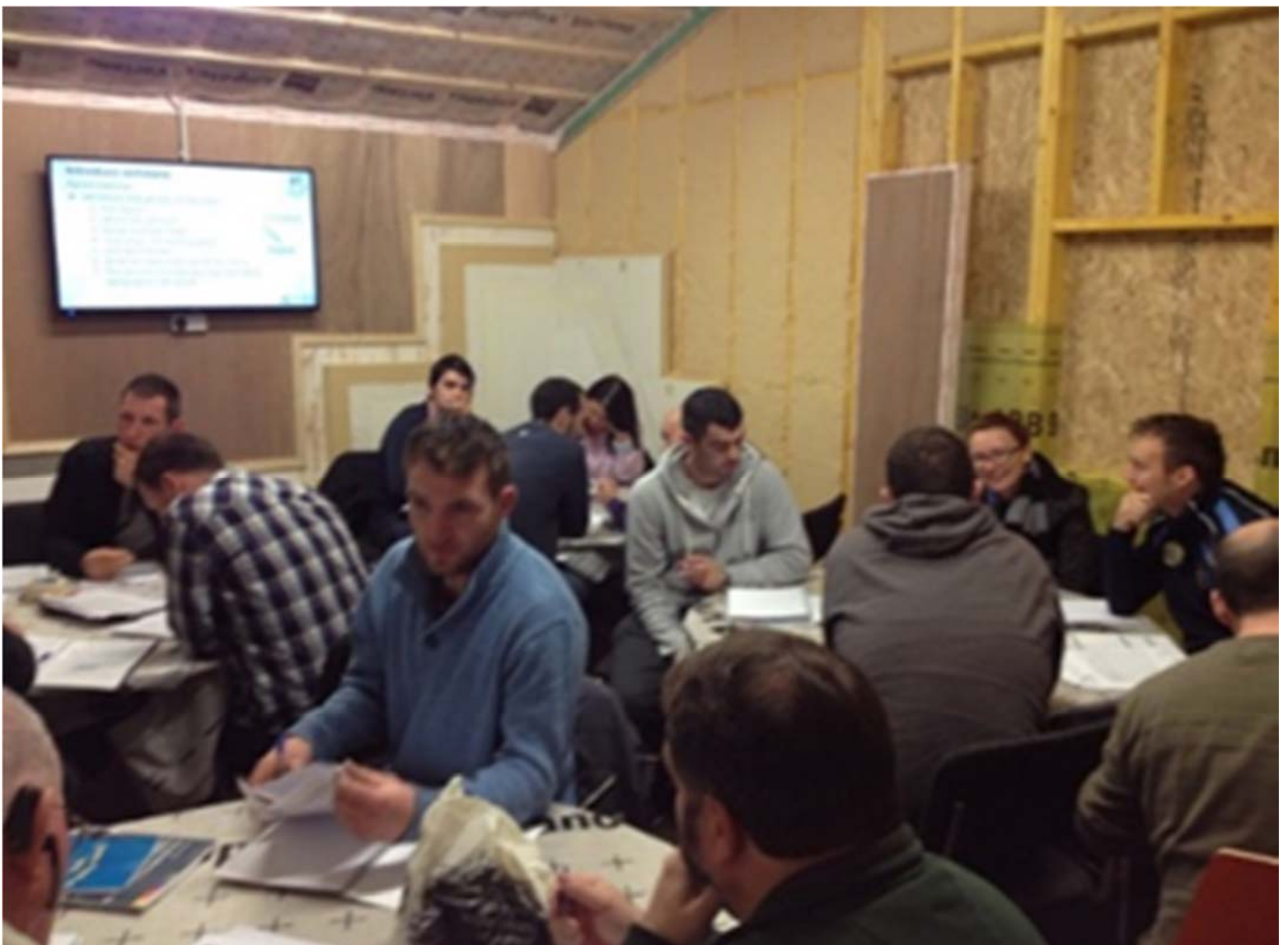
Other stakeholders worthy of mention, became active during the piloting of the training courses providing training units, classroom facilities and energy efficiency products to ensure practical and successful training programmes.



Waterford Institute of Technology
INSTITIÚID TEICNEOLAÍOCHTA PHORT LAIRGE



Training Approaches



Pedagogical Exchange

During the initial stages of the QualiBuild project, it was important to gather best practice advice to determine the most appropriate approach to upskilling construction workers. Although LIT and ITB have extensive expertise in training professionals in the field of low energy construction, upskilling craft workers and general operatives would be a challenge. It was decided to travel to Douai, Northern France in May 2014 for a pedagogical exchange with BUILD UP Skills counterparts from France and Luxembourg. This further informed the design and pedagogical approach of the programme.



The exchange consisted of a number of presentations on the progress of BUILD UP Skills initiatives in the three countries and visits to the ADEME PRAXIBAT facility, where a three day practical training course on air tightness was conducted for construction workers. Resulting from this exchange, ITB and LIT agreed to consider the following fundamental factors for the development of the training courses:

- The target cohort of construction workers with varied academic and practical experience would not suit a traditional classroom mode of training, which predominantly focuses on PowerPoint presentations to teach technical knowledge. It was decided that the training should focus on active participation and group work which maximises engagement and enhances the possibility of general acceptance of low energy building principles.
- Construction workers are predominantly visual and practical learners. As a result, images and graphical examples should be used to introduce concepts and reinforce learning of best practice low energy building techniques.
- Delivery of the training should preferably be in mixed groups of trades and disciplines, facilitating constructive discourse around the importance of collaboration onsite. The practical training or demonstration on low energy building techniques was essential to achieve the desired learning outcomes.

Train the Trainer Programme

The main objective of BUILD UP Skills QualiBuild is to initiate the key training action identified in the BUSI Roadmap, the need for a foundation energy course for all building construction workers. In support of the piloting of this new 'Foundation Energy Skills' (FES) programme, it was proposed to develop and deliver a Train the Trainer programme to up-skill 100 trainers of construction skills.

The QualiBuild Train the Trainer programme served the dual purpose of establishing a pool of suitably qualified trainers of FES for national delivery and ensure that a significant number of existing trainers of construction craft apprenticeship were prepared for envisaged future updating of curricula.

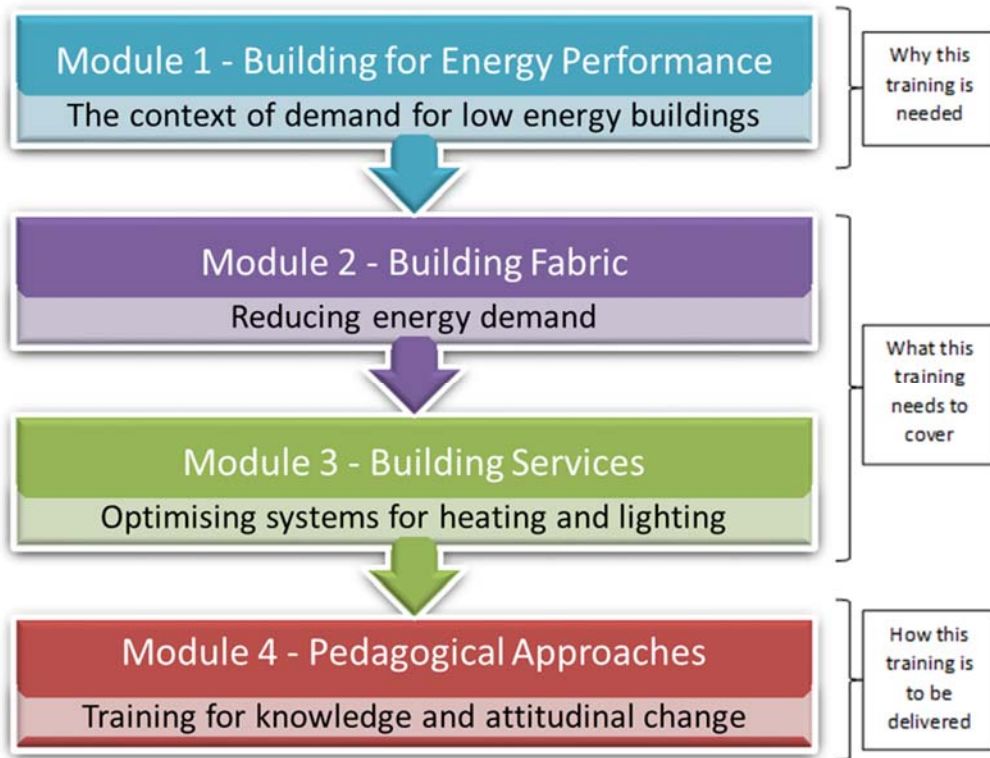


The Train the Trainer programme was designed and developed in tandem with the FES programme in order to align the content and pedagogical approach. The programme was developed and certified as a four module Special Purpose Award at NFQ Level 7 (20 ECTS Credits) – “Certificate in Training in Low Energy Buildings”. In appreciation of the capacity of the target cohort for independent, self-directed learning, and the constraints of full-time employment, the programme adopted a part-time blended learning format. The activities were hosted on ITB’s Moodle Virtual Learning Platform (VLP). This consisted of ‘flipped classroom’ approach whereby participants engaged with the course content with learner manuals ahead of a one day workshop and site visit. Pre-workshop online activities were designed to engage learners with the content of the manuals, motivated by an award of marks as part of the module assessment. These activities consisted predominantly of group activities designed to engage the learners with the content of the manuals and promote discussions and debate between the mixed crafts/disciplines represented in each training group.

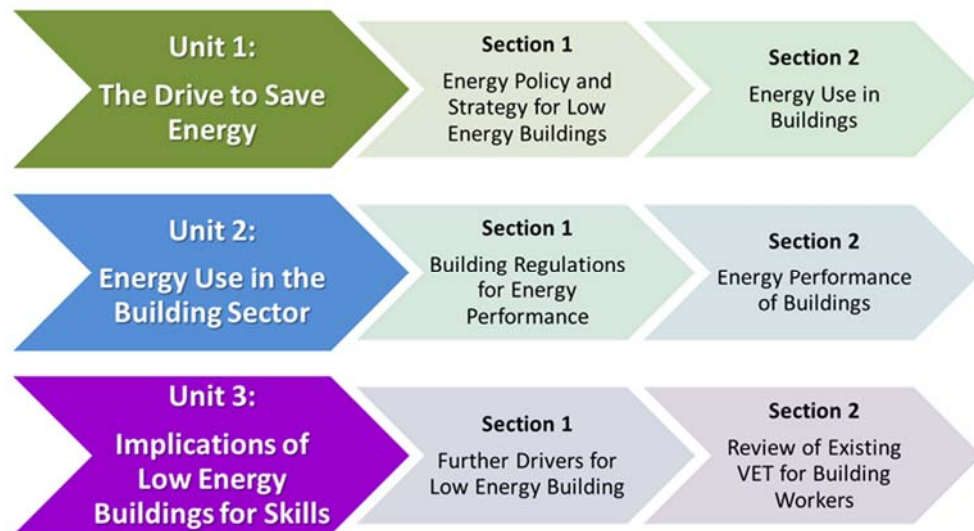


The course was divided into 4 parts (modules) to cover topics in Building for Energy Performance, Building Fabric, Building Services and Pedagogical Approaches. The sequential process of the programme structure is explained by:

- Why there is a need for training,
- What needs to be covered
- How the training will be delivered.



For each module, a structure was developed to divide the content into units and sections, sequenced to provide for progression of learning from basic concepts to more advanced levels. Further details of the Train the Trainer course and the breakdown of the modules are available at <http://www.qualibuild.ie/resources/project-information/>



Piloting of the Train the Trainer Programme

As the main target group for the programme were trainers of construction related craft apprenticeship, the Institutes of Technology (IoTs) and Education and Training Board (ETBs) were prioritised for the recruitment of participants. A number of trainers from the IOT sector, in particular Institute of Technology Sligo (IT Sligo) identified QualiBuild training as a means of accessing continuing professional development for a number of their staff. Interest from the ETBs was however problematic due to the untimely changes in the further education training (FET) process.

It was necessary to deliver the Train the Trainer programme over two phases rather than the one initially scheduled, to allow for further recruitment of not only ETB trainers but also private trainers. Phase 1 of the course delivery commenced in October 2014 with 2 training groups, in Dublin and Sligo with 55 registered participants. Workshops and site visits were scheduled for each module sequentially until February 2015. For the first 3 modules, a site visit was incorporated to follow each workshop day including surveys of existing dwellings for simulated Building Energy Rating (BER) surveys, visit to a bespoke energy training facility at Ecological Building Systems¹ and to Cloughjordan Eco-village in North Tipperary².



A further phase of delivery with 32 participants was conducted from September 2015 to March 2016, in Dublin and Cork to cater for demand in the south of the country. Based on feedback from Phase 1, the delivery schedule was extended for a month, providing extra time for completion of assignments and engagement with following module content. It was also decided to schedule workshops and site visits on consecutive days adjacent to weekends, in consideration of participants travelling significant distances to attend.



Feedback

Participants on the programme ranged from lecturing staff of a number of IOTs, teachers and trainers from the ETB sector and a number of trainers from private training organisations. 59 of the 85 trainers succeeded in completing and passing the course, providing a 69.5% pass rate. Success was affected in some cases by the time demands on trainers in full-time employment and a lack of opportunity to obtain cover for teaching hours. Participation was impacted by the relatively low numbers of trainers currently employed in provision of apprenticeship training in the construction trades, following severe downturns in employment in the sector since 2007.

Conclusion	Action
Registration system for trainers of construction skills to manage and monitor the CPD of members	Circulate QualiBuild CPD proposal to relevant agencies for consideration
A body comprising key stakeholders who will monitor industry trends and establish standards	Meeting of relevant parties to review implementation strategy
Recognition of value – cover for teaching hours, support for attendance at training	Circulation to EU partners to identify emerging CPD options in other countries

Feedback from participants of the programme was unanimously positive, particularly with regard to the group work and activities incorporated in the delivery and the standard of the learner manuals provided. However, recruitment and retention of participants on the programme was certainly affected by a lack of value associated with the qualification. In the absence of a formal CPD framework for trainers of construction skills, and a perceived lack of

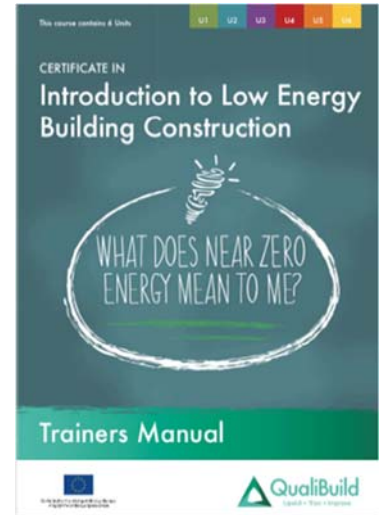
¹ <http://www.ecologicalbuildingsystems.com/Ireland>

² <http://www.thevillage.ie/>

opportunity for trainers of construction-related programmes, demand for the programme is likely to remain relatively low.

“I really enjoyed the course and would love to get a chance to deliver it in the future!!”

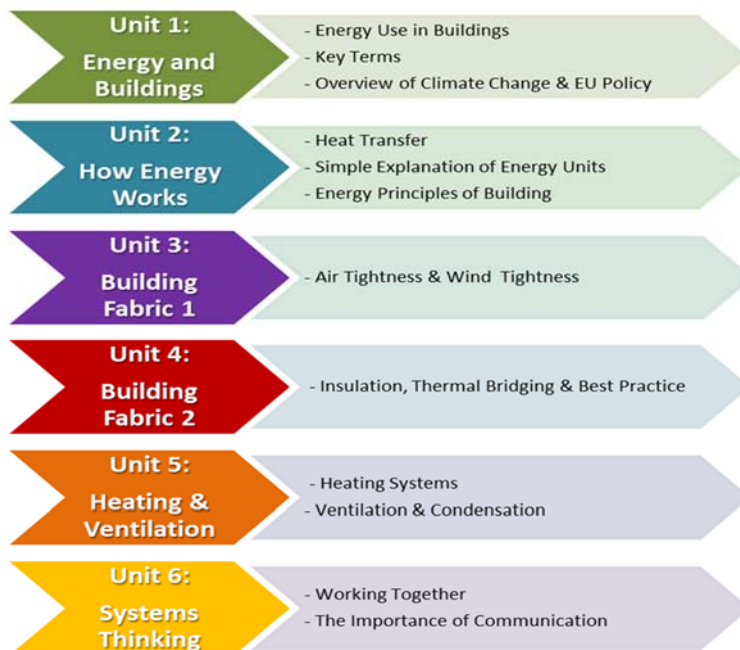
Three trainers qualified from phase 1 of the Train the Trainers course were chosen to participate in the training for the Foundation Energy Skills course, FES. These were chosen to cover the areas of Dublin, Galway and Cork. A training manual was provided to assist the trainers with the task of carrying out the FES course and to maintain a level of consistency and standard within each course. This training manual was prepared between LIT and ITB.



Foundation Energy Skills (FES) Course

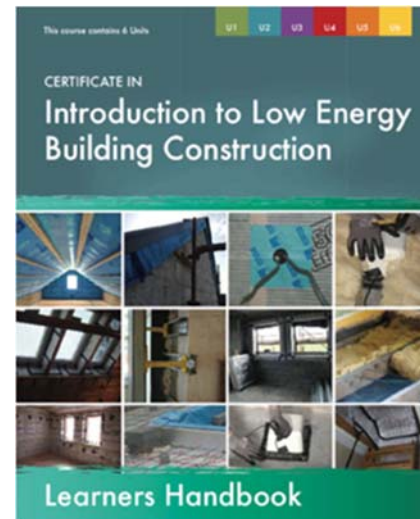
A core recommendation of the BUILD UP Skills Ireland report was for all construction workers to complete a Foundation Energy Skills programme which would not only improve their knowledge but also improve awareness of quality building and a focus and willingness to complete work to the highest quality.

The FES course has a series of Learning Objects for each unit which guides the delivery of the course. A particular focus has been placed on ensuring that the training materials and delivery methods are suitable for the target audience. Additional materials were developed to include visual aids such as videos, graphical details and animated characters which have become affiliated with the QualiBuild project. One of the main criterion for the FES course is that it is capable of being delivered nationally and the participants include a wide range of craft workers and general operatives (collectively known as building construction workers). The course is divided into 6 units, covering different aspects of the course. These units are intended to be sequential and facilitate the proposed different delivery modes (day and evening)



This FES course is designed to introduce construction workers to the important principles in the development and construction of quality low-energy buildings. It is a blended learning programme supported with visual materials which are available on the QualiBuild website. The main reference document is the QualiBuild handbook which is to be used by the construction workers to discuss, the what, the how and the why of low energy buildings. The information follows a sequence with the following important topics:

- Climate change, policies and regulations – The why
- Energy use in buildings – The what
- Nearly Zero Energy Buildings (NZEB) - The target
- Working together on site to make it happen – The how



The FES course material was developed to encourage maximum discussion and participation of the construction workers. Three sets of videos were produced to explain how important communication and working together is on site - this concept was termed as “System Thinking”. It was emphasised that the FES course was not only about understanding the principles of low energy building and knowing how to install materials, but also how to transfer the knowledge and communicate through the entire construction chain. It was a requisite to ensure a mix of trades at each course to encourage communication.

A number of learning techniques were used in the classroom environment during the course. In particular there was a focus on a limited use of PowerPoint presentations. Content was provided through a range of active learning methods including the use of animated videos, small group discussions and poster exercises. The poster exercises were intended to encourage all participants to take part and to develop their understanding of a particular topic through discussion and presentation.

The demonstration day utilized other techniques such as the “think pair share process”, which involved an assessment to be carried out not only on the group but also on the individuals. Acetates were provided and each group were required to present their understanding on the use of air tightness tapes, choice of materials and continuous insulation.



Validation of the FES programme was delayed due to the fact that the structures for validation of Further Education Training (FET) programmes (Level 6 and below) were undergoing change in Ireland. It was decided to proceed with an accredited course at Level 6 Higher Education Special Purpose Award programme with 2 modules (2 x 5 ECTS credit modules) validated through LIT and ITB. The FES course is offered as a Single Subject Certificate 5 credits. The construction workers may avail of completing the second module and obtaining the Level 6 Special Purpose Award in due course. The Foundation Energy Skills programme was validated in February 2015 by LIT and subsequently validated in ITB. The BUSI Roadmap recommended that a Level 5 would also be available, to facilitate those who may not meet Level 6 entry requirements, this is to be recommended for the future long term roll out.

Recruitment Challenge and Piloting

The FES programme would be carried out in 2 phases targeting 200 construction workers. The entry requirement set for the programme is as follows:

- A copy of a craft qualification for a construction related trade **or**
- A copy of a qualification upwards of NFQ level 5 in a construction related discipline **or**
- A letter from an employer confirming current or previous employment in building construction works **or**
- In the case of self-employed, two or more letters from business clients confirming their employment in building construction works **and/or**
- A copy of a Safe Pass (Safe Pass training is a legal requisite for all construction workers on site)

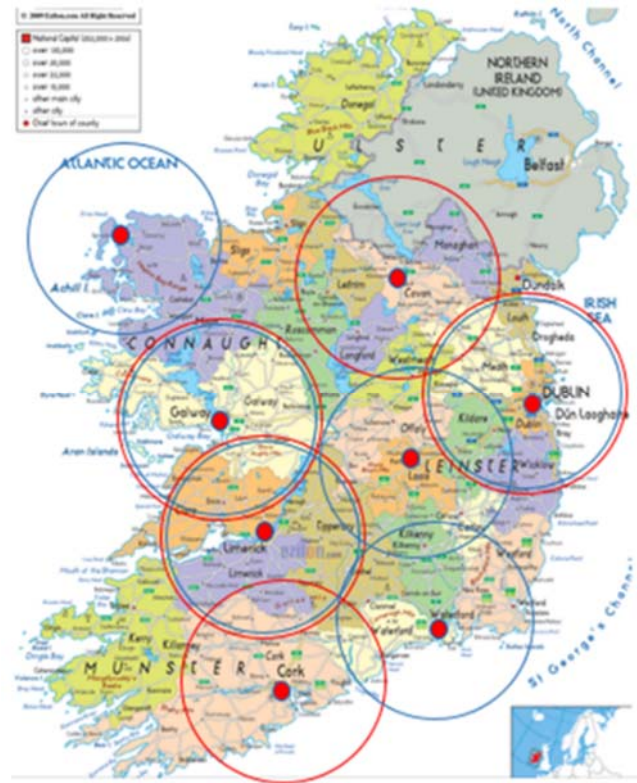
The national piloting of the FES programme commenced in 2 phases between September to December 2015 and January to May 2016. This change to the original delivery schedule followed consultation with industry as it was concluded that the original timescale of delivery within a 2 month timeframe was too optimistic. The delivery for the 3 day FES course was carried out in a daytime or evening/Saturday format. It was planned to achieve the target of 200 construction workers to be trained over 10 courses with groups of 20 trainees.

By the end of the pilot, 232 participants had registered for the training with 195 attending all sessions and receiving certification. However this required the scheduling of 14 courses rather than the 10 originally planned. This was mainly the result of modest demand in the early stages of phase 1 participant recruitment. As the programme gathered momentum, later courses experienced higher demand with many courses being full or over-subscribed. This was supported by word of mouth from the phase 1

participants who engaged fellow workers to partake on the course, as well as the QualiBuild FES course being acknowledged as CPD for companies on the construction industry register Ireland, CIRI register.

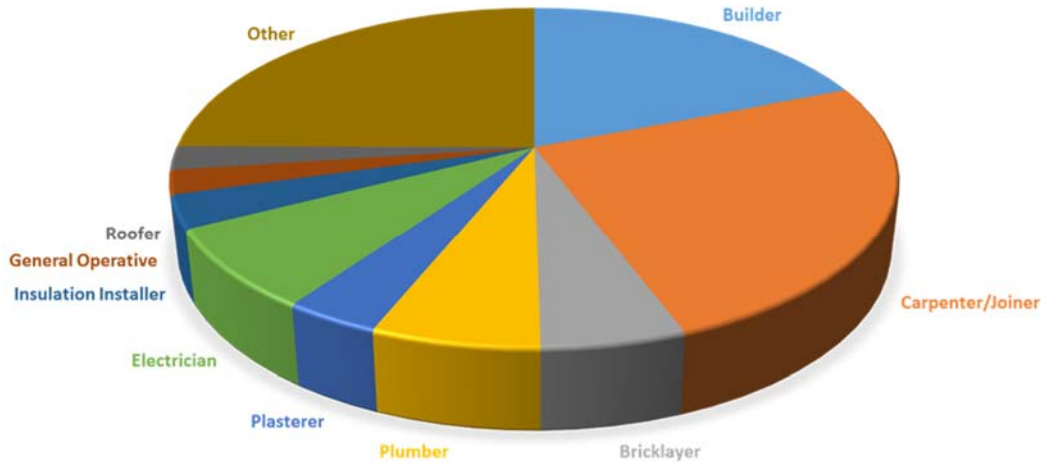
In the first phase of training, 7 courses were offered at venues in Dublin (ITB), Cork (CIT), Galway (Partel), Limerick (LIT) and Cavan (Saint Gobain) in both daytime and evening variants. In each mode, the middle day of training involved a series of practical demonstrations of low energy building principles. To facilitate this, suitable training units needed to be identified in the vicinity of the delivery centres. Partnerships were developed with organisations where such facilities were existing, including ETB Training Centre Ballyfermot, Cork Institute of Technology (CIT), Saint Gobain Technical Academy in Kingscourt, Cavan and Partel LTD in Claregalway.

A further 7 deliveries were undertaken in 2016. This included courses in Dublin, Limerick and Galway and the addition of a Waterford venue (WIT). QualiBuild were approached by the coordinators of an SEAI Better Energy Communities project in Belmullet, Co. Mayo to organise a one-off delivery for 20 contractors and tradespeople in the Gaeltacht region. This was facilitated with the classroom elements of the training taking place in Belmullet and the demo day hosted at Partel in Galway. The Irish Prison Services also requested a similar standalone course for their Trades Officers, responsible for the maintenance of their buildings. Classroom training for this group was hosted at the Irish

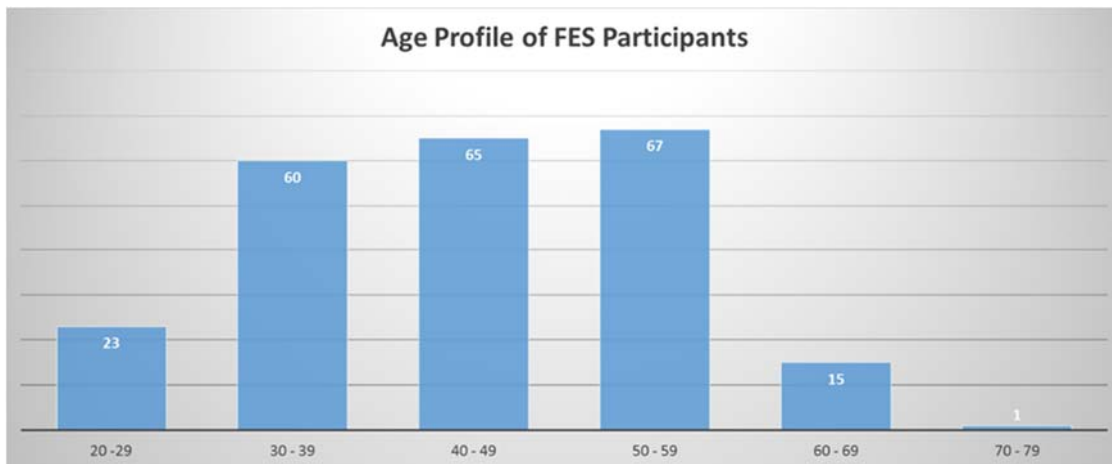


Prison Service College in Portlaoise, with the 22 participants travelling to ETB Ballyfermot Training Centre for the Demo day.

The profiles of the participants were recorded to assess the target groups and determine their needs. One of the criteria of the FES course was to include a variety of trades at each FES course and carpenters and builders represented 44% of the total.



Interestingly, 82.7% of participants were in the 30 – 59-year old group, with almost 57% in the 40 – 59-year old group. It is unclear as to why there was such a proportionately low level of participation in the 20 to 29-year old age bracket, despite the conclusion of the BUSI project that recently qualified apprentices in construction trades would equally benefit from the training.



CPD System

Continuing Professional Development (CPD) is the updating of professional skills through lifelong learning or continuing education. It is considered to be increasingly important in light of changes in technology and legislation, globalisation and the emergent need for interdisciplinary skills in professions.

The BUSI report specifically identified that trainers involved in construction education were largely unaware of changes to building regulations and their impact on the skills and knowledge needs in the industry. It was noted that there was

a lack of a formal CPD system for trainers of construction skills and that this, when combined with lack of experience of onsite implementation of new building methods, has inevitably led to knowledge gaps.

A proposal for a framework of CPD for trainers of construction skills was undertaken with the objective of proposing a framework of formal CPD for those involved in the delivery of training for construction workers. A report was completed outlining an overview of existing CPD frameworks for trainers while presenting the possibilities for integration of available CPD opportunities for construction professionals to keep knowledge and skills updated. Download the Report Continuing Professional Development System Proposal at <http://www.qualibuild.ie/resources/project-information/>

It is reasonable to conclude that the provision of suitable CPD opportunities in construction topics could be adequately provided for through existing offerings. This would limit the responsibility of any new CPD body for construction trainers, but it may be possible for an organisation such as SOLAS, with responsibility for apprenticeship training at a policy level, to direct some form of consistent approach to CPD for trainers from all of the providers involved.

It is reasonable to conclude that it would not require significant additional resources to implement a formal system or policy of CPD for trainers. Rather, a specific directive from government or the introduction of legislation for mandatory training of energy skills for building construction workers would effectively establish it as a necessity. In the shorter term, there are a number of possible interventions which have potential in avoiding significant knowledge/skills gaps emerging in the future.

The following are a number of priority actions which could have significant first steps in progressing this proposal:

- Circulate CPD proposal to relevant agencies for consideration
- Meeting of relevant parties to review implementation strategy
- Circulation to EU partners to identify emerging CPD options in other countries

Conclusions and Recommendations	
The majority of FES participants rated their knowledge of low energy buildings as middling, with most believing that they would require further follow-on training.	This is consistent with the conclusions of the BUSI project which identified a need for different levels of training for the occupational tiers; Operative Level, Craft Level and Supervisory Level.members
Many participants expressed a preference for more practical demonstrations and/or hands-on training on the course.	This is consistent with the profile of the target cohort who traditionally undertake practical skills training onsite or in simulated conditions in workshops and labs.
The majority of participants would be prepared to pay for a similar training programme if it were not free.	But believe that cost should be minimised or subsidised as the objectives of quality buildings and energy savings should be supported by government.
The FES course should be revalidated at a vocational educational level more appropriate to the 3-day training programme and the target cohort for the training.	This should maximise the opportunity for traditional vocational providers, including private training organisations, to be in a position to offer the training and widen the scope.
Many participants would like to see greater recognition of the FES qualification, along with a register of construction worker’s competences.	Indicating that this would improve the value of the course

Construction Workers Skills Register (CWSR)

Construction Worker Skills Register



train, register, promote, search

[Home](#) [About The Register](#) [Training](#) [Search](#) [Promote](#) [FAQ](#) [Useful Links](#) [Contact](#) [Register](#) [Login](#)

The Construction Worker Skills Register encourages engagement in training and skills development within the building sector. To register, construction workers must complete a minimum of Safe Pass & Foundation Energy Skills training. The public or potential employers can search the register and view training records before hiring a construction worker.

Search the Register



Join the Register



Brought to you courtesy of:



As outlined in the Irish BUSI BUILD UP Skills Roadmap it is recommended to implement a Building Contractors register which addresses the need for industry to demonstrate its focus on quality buildings through appropriate controls and systems. The Construction Workers Skills Register (known as CWSR) is primarily focused on the suitability and inclusion of all construction workers in Ireland displaying their skills.

In 2011 the figures involved directly in the construction Industry total approximately 60,000 people³ but these figures have increased significantly and to date there has been no comprehensive register of workers. A small number of registers exist mainly focused on electrical and plumbing/heating sectors. In 2015, it is estimated that the construction sector employs 96,300⁴ people directly, accounting for 5.2 percent of the total employment in Ireland, and indirect employment of circa 48,000. However, the sector is fragmented, as is the case globally and occupationally diverse. The majority of employees are involved in construction trades (c. 60 percent) with the remainder occupied across a range of other professional services and other activities. The construction sector is currently comprised of over 40,500 enterprises, with the vast majority (96.7 percent) engaging less than 10 people. Developing a registration system to accommodate this number of individuals is a significant challenge. To ensure success a thorough investigation and appropriate approaches were undertaken:

- Review existing Registration Systems both nationally and in Europe to develop a registration system model
- Consult at national level the proposed registration
- Pilot the proposed model developed
- Explore the future development opportunities of the register



Development and Consultation

It is important to analyse and understand existing registration systems to determine the best practice approach to design and development. A detailed review of the majority of Irish registration bodies in the broad area of the construction industry was completed and an in depth comparison matrix was developed. Although the review was primarily at national level, it did review a number of EU examples relevant to the construction industry for comparison. The complexity of developing the CWRS is illustrated when identifying the range of representative bodies and registers

³ BUILD UP Skills – Ireland National Roadmap for Energy Training in Construction

⁴ CSO Statistics Office - <http://www.cso.ie/en/statistics/construction/>

that already exist. Many are focused on professionals i.e. engineers, architects with a small number of registers directed at craftworkers only. It should be noted that it is mandatory to register as an electrician and heating installer.

A proposed registration system model was developed and used as a discussion topic during the national consultation process. The outcome produced a document entitled ‘Addressing the key questions’ covering the main considerations acknowledged as having a significant effect on the design and viability of the register. These include the following:

- Transparency and recognition by the industry
- Legal implications regarding use of terminology and code of conduct
- Location and management /maintenance of register
- Consumer protection.
- Entry criteria requirements and membership duration
- Costs to register, whether annually or otherwise.
- Programming for numbers and types of construction workers
- Links to other registers and other avenues of entry

After a comprehensive desktop study invitations were issued to relevant stakeholders, construction companies and academics to attend a registration workshop at the end of 2014. These were held nationally at Dundalk, Waterford, Cork, Sligo, Limerick and Dublin.

In parallel to the QualiBuild project the Construction Irish Federation (CIF) had been developing a new register Construction Industry Register of Ireland, CIRI. CIRI had emerged as a recommendation following discussions between CIF and the Irish Government as a result of some market failures in the sector. Initially CIRI is to be set up as a voluntary initiative which allows construction companies, sole traders and self-employed builders to register following stringent eligibility criteria. This CIRI register however excludes individual construction workers and does not provide information regarding their skills and training. It is hoped that both CIRI and the CWSR can be intrinsically linked and eventually move from a voluntary status into a mandatory requirement for all construction workers.



CWSR Piloting

The findings from the reviews and consultation confirmed the need to develop a CWSR as the skills register would provide a platform for Construction Workers to record and maintain their training and CPD records for view by potential clients, employers and the general public. The CWSR is designed to highlight the work of those construction workers who maintain higher standards, raise and promote awareness of quality in building and ensure that clients/consumers are better informed about the construction industry, be better prepared and have a greater sense of awareness and confidence before meeting with construction professionals.

There are three main functions of the CWSR for the two main user groups, general public and the construction workers. The ‘Search the Register’ function, for the general public can be used to access, search and select relevant publically available information for each registered member including name, address and relevant up to date training qualifications.



Construction workers can use The 'Join the Register' function, where they can upload information of their training and documentation and choose whether to display their training skills or not. One of the objectives of the register is to encourage as many site operatives and craft workers onto the register as possible and in so doing encourage engagement with continuous training and upskilling (CPD).



Registered members can use the annual CWSR logo in their promotional material to generate new business leads which is beneficial to members in three ways: as a place to hold a record of their training and skills development history, to download or print the record in an attractive format with the Construction Worker Skills Register logo, and as a public display of their engagement with training and continuous professional development (CPD)

The Brand reflects the aim of providing transparency to the building sector and acts as a stamp of recognition to those who engage in training. The tagline *train, register, promote, search* is used on the website and in the footer of the printable training record.



While it was envisaged that the register would be piloted extensively during the project a number of delays were encountered which prevented this. The CWSR became live in July 2016 and of the 195 construction workers who graduated with a certificate in Foundation Energy Skills (FES) 38 had registered before the end of the project. It should be noted that 73% of the group eligible to join expressed an interest in joining the Register. This is a positive sign and an endorsement of the value of the Construction Workers Skills Register, CWSR. Further recruitment will ensue.

The Construction Worker Skills Register (CWSR) is an online skills register to display the building training history of site operatives and craft workers engaged in construction activities in Ireland

The CWSR is live on-line at <https://www.constructionworkerskillsregister.ie/>

Location	Construction workers can store and update their training records;
Display	A means of demonstrating the level of knowledge and training achieved by individual construction workers;
Awareness	Raise awareness of training and skills development in the construction industry in Ireland;
Promotion	Promote the importance of training to potential clients / employers looking for construction workers - creating a direct link between training and employment opportunities;
Reassurance	Provide reassurance and transparency to potential clients.
Transparency	The management and maintenance of the CWSR should be transparent and regulated

Although the QualiBuild project concluded on 31st July 2016, a number of QualiBuild initiatives are proposed to keep the momentum for training construction workers, including the CWS Register, will continue thereafter. It is envisaged that this registration system will be managed by the QualiBuild consortium in the short term as it is intrinsically linked to the QualiBuild Website. The long term focus is discussed as part of the national roll out.

Quality Building Information and Awareness Campaign



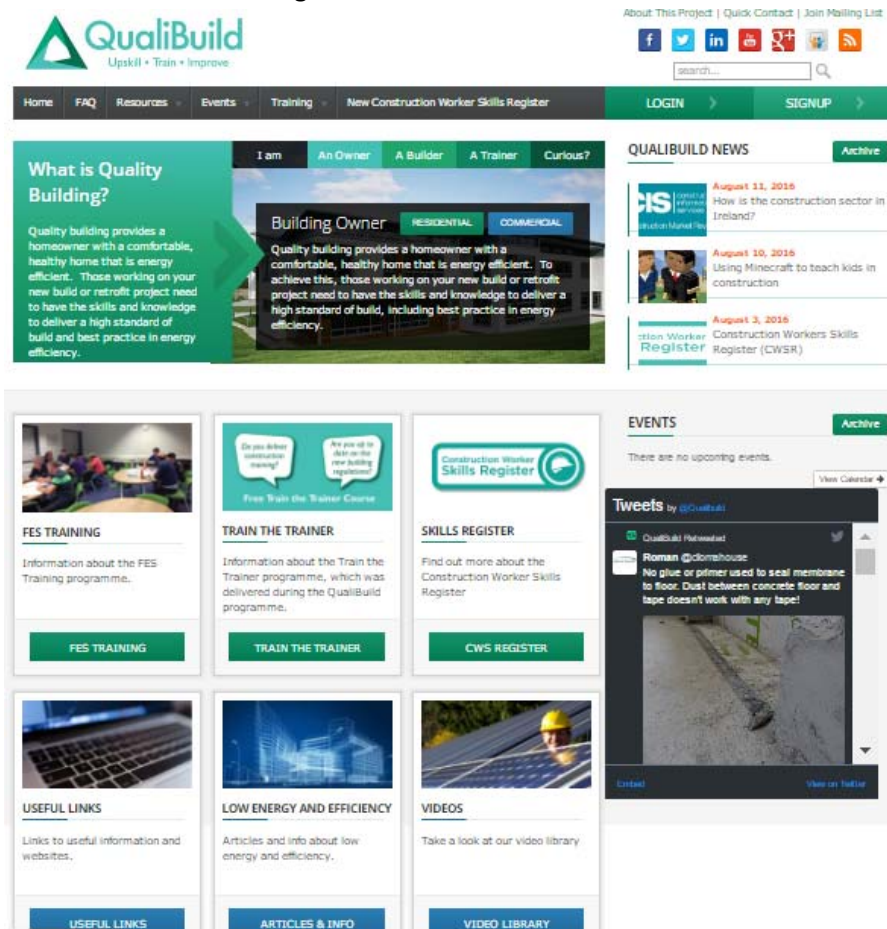
To encourage Quality low energy building it was important to develop a **Quality Building Information and Awareness Campaign**, with the intention of overcoming the poor image associated with the current building in Ireland while creating an opportunity to focus on a new, better, quality construction approach.

As identified in the BUSI National Roadmap, the Construction sector would benefit from focusing on changes being made to improve quality control and the systems thinking approach to low-energy buildings. This presents an opportunity to focus on quality and efficiency of new construction and retrofitting practices. The Quality Building Information and Awareness Campaign outreached to a number of target groups providing information and guidance not only to decision makers involved in procuring construction service but also to educate the actual homeowners in their decision making. During the project, QualiBuild developed a significant amount of materials for dissemination and promotional purposes enabling a variety of interactions with stakeholders, both in-person and online. These resulted in over 14,000 unique visitors to the website; nearly 4,000 views of the QualiBuild videos; over 500 connections with builders, trainers and construction professionals through programmes; over 30,000 interactions through tradeshows and events.

QualiBuild Website and Social Media

The communication materials are hosted on the QualiBuild website at www.QualiBuild.ie.

The number of unique site visits for QualiBuild was targeted at 10,000, however the unique visits exceeded this result with 14,465 visits, as of end of July, 2016. Analysing the results showed just under 25% of the unique visitors to the QualiBuild website were looking for information regarding the training programme, the articles, events, the Quality Building e-book and case studies received a significant amount of traffic.



The QualiBuild project was active on a number of social media channels, which resulted in 878 followers on Twitter, 186 likes on Facebook, 3,845 video views on YouTube and 1,569 views on SlideShare.

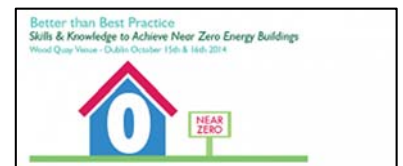
Whilst these resulted in over 14,000 unique visitors to the website; nearly 4,000 views of the QualiBuild videos; over 500 connections with builders, trainers and construction professionals through programmes; over 30,000 interactions through tradeshows and events.

Events

There were a number of industry events that the project team organised and the in-depth workshops resulted in engagement with over 160 stakeholders. The QualiBuild project presented at fifteen conferences with a combined attendance of over 4,300 people and exhibited and supplied information at six industry events with over 1,400 stakeholders. To achieve outreach to consumers on the topic of Quality Low Energy Building, the project exhibited at three consumer trade shows, with nearly 30,000 attendees.

QualiBuild hosted two conferences in Ireland - **The Better than Best Practice conference** and The Final National Roll Out conference.

The Better than Best Practice conference was held in Dublin for 2 days in October 2014 as a joint hosted conference with the IEE EU funded SUSTAINCo (Sustainable Energy for Rural communities) project. The conference was opened by Zoe Wildiers representing EASME, followed by a number of international speakers from Germany and experts in the field of nearly zero energy buildings, nZEB. The programme debated a number of issues around the nZEB and quality practices, with a panel of experts encouraging discussion. The first day presented and discussed the topics on skills and knowledge to achieving nZEB, initiatives from Europe and Ireland to support the up-skilling of building construction workers and how building professionals and companies are responding to the changing landscape of regulations and standards. The agenda for the active workshop on the second day, reviewed the design tool developed in the SUSTAINCo project, the new technologies and systems which are emerging as key requirements for nZEB and quality practices and examining cost optimisation, specific detailing and case studies in Ireland. This was a great success and a platform to promote the QualiBuild project within the construction industry.



The Final QualiBuild National Roll Out Conference was held on the 21st June 2016 in Portlaoise. The attendance exceeded 60 delegates from a range of backgrounds encouraging much discussion among themselves with everyone agreeing how important it is to up-skill the construction workforce and regulate the industry.

The final presentation encapsulated the entire QualiBuild project – how the training courses, register and other supporting measures can be further developed and rolled out in Ireland. There was great interest and support from SOLAS, ETBI, SEAI, NSAI, public and private training bodies and industry to roll out the training programmes nationally and hold a single register for all construction workers.

Events with other EU Projects

QualiBuild attended a number of events and conferences with other EU projects. The **Ren-Net** project partly funded by the European Union's European Regional Development Fund through the INTERREG IVA Programme invited QualiBuild to present at their final conference in on the 27th February 2015 to 144 delegates.



The **EU Sustainable Energy Week**, EUSEW held in Brussels, Belgium from 15-19 June 2015, saw a number of events around Europe. As part of this event LIT presented QualiBuild alongside presenters of other EU BUILD UP Skills projects. This was a great opportunity to see how the other countries were getting on with their projects and learn from their problems and solutions.





Better than Best Practice
Skills & Knowledge to Achieve Near Zero Energy Buildings
 Wood Quay Venue - Dublin October 15th & 16th 2014

The entire landscape of the construction sector in Ireland is rapidly changing. Will you be a positive part of that change?
 Change is rapid and knowledge is a key challenge for those in the construction sector to keep up to date with the practical and regulatory. This conference has been specifically designed to help you achieve this.

The skills and knowledge to achieve Near Zero Energy Buildings (NZEB) is a key challenge for those in the construction sector. This conference will provide you with the skills and knowledge to achieve this. This is a key challenge for those in the construction sector to keep up to date with the practical and regulatory. This conference has been specifically designed to help you achieve this.

Oct 15th Conference Programme
 9.00am - 10.00am Registration
 10.00am - 11.00am Welcome
 11.00am - 12.00pm Keynote
 12.00pm - 1.00pm Lunch
 1.00pm - 2.00pm Session 1
 2.00pm - 3.00pm Session 2
 3.00pm - 4.00pm Session 3
 4.00pm - 5.00pm Session 4
 5.00pm - 6.00pm Session 5
 6.00pm - 7.00pm Session 6
 7.00pm - 8.00pm Session 7
 8.00pm - 9.00pm Session 8
 9.00pm - 10.00pm Session 9
 10.00pm - 11.00pm Session 10
 11.00pm - 12.00pm Session 11
 12.00pm - 1.00pm Session 12

Oct 16th Training Course
 9.00am - 10.00am Registration
 10.00am - 11.00am Welcome
 11.00am - 12.00pm Keynote
 12.00pm - 1.00pm Lunch
 1.00pm - 2.00pm Session 1
 2.00pm - 3.00pm Session 2
 3.00pm - 4.00pm Session 3
 4.00pm - 5.00pm Session 4
 5.00pm - 6.00pm Session 5
 6.00pm - 7.00pm Session 6
 7.00pm - 8.00pm Session 7
 8.00pm - 9.00pm Session 8
 9.00pm - 10.00pm Session 9
 10.00pm - 11.00pm Session 10
 11.00pm - 12.00pm Session 11
 12.00pm - 1.00pm Session 12

Conference Fee €95
Training Fee €95

Why attend?
 Gain the skills and knowledge to achieve Near Zero Energy Buildings (NZEB) is a key challenge for those in the construction sector. This conference will provide you with the skills and knowledge to achieve this. This is a key challenge for those in the construction sector to keep up to date with the practical and regulatory. This conference has been specifically designed to help you achieve this.



QualiBuild Final Conference
 21st June 2016

#QualiBuild www.QualiBuild.ie



On 15-16 September 2015, an international joint exchange event known as the **Nordic exchange** was held in Stockholm, Finland for representatives from the Finnish (BEEP), Swedish (SWEBUILD) and Irish (QualiBuild) BUILD UP Skills pillar II projects. LIT, attended the event presenting the QualiBuild Train the Trainers, the FES course, associated training material and supporting resources. Discussions were held around finance and sustainability and the introduction of a registration system for construction workers.



QualiBuild attended a number of events such as the second **QUALICheck** Conference “EPBD Review – Elements for better compliance and quality of works” which took place in Brussels.

IGBC and LIT participated in the **NaSaBau** project Surecon advisory process in Dublin. The programme occurred over a number of weeks with the ultimate outcome to develop a network for SURECON advisors who will assist building owners on ways to sustainably fund renovation works.



The Build Upon workshop: Deep renovation in the Residential Buildings Sector was held in Cloughjordan, Co Tipperary on 31st May 2016 and is one of a number of workshops anticipated for Ireland. The project intends to guide key stakeholders across 13 countries through a structured process, to design and implement the national renovation strategies. QualiBuild attended this workshop as one of 23 key stakeholders to assist with the development of this community networking process.



Industry Events

The partners from QualiBuild attended a number of national events in Ireland organised by industry and key stakeholders.

The National Construction Summit began in 2015 in the RDS, Dublin with the purpose to bring together 2000 policy makers, professionals, construction companies, industry, technologists, building managers and owners in order to stimulate debate, connect stakeholders, improve knowledge and ensure quality building. QualiBuild representatives from LIT and ITB attended the first event in June 2015 and again in 2016 discussing the aims of QualiBuild and the QualiBuild Challenge - Building Skills, Building Quality.



QualiBuild presented at a number of smaller events directed at a specific audience, mainly within the realms of quality construction, energy efficiency and renewables expertise. These include the Better Energy Finance Scheme event organised by Carlow Kilkenny Energy Agency, CKEA, the Irish Onsite Wastewater Association, IOWA annual conference, Cork Energy Cluster breakfast meetings and the annual technical conference for the Association of BER Assessors Ireland.



The Construction Industry Federation, CIF, annual conference was held in Dublin in October 2014 and 2015 and QualiBuild presented an exhibitor booth at the conference. CIF are partners to the project and represent over 100 thousand construction workers and companies in Ireland.

QualiBuild also attended a number of annual events aimed at promoting quality energy efficient building, not only within the construction sector, but also at the end-users and consumers. This cohort of stakeholders are influential, as they play an important role in decision making during the design and construction of the building. QualiBuild held exhibitor booths at four major events which include the Architecture Expo in Dublin on the 12th-13th October 2014, the Green Oasis in Dublin on the 9th July 2015 aimed at experts in the field of energy efficient technologies and passive house construction.



Innovation in Building in Dublin on the 12th September 2014 and provided flyers in delegates packs at the Fuel Poverty Conference in Dublin on 6th October 2014. The **Self Build Show** is an annual consumer-focused trade event in Ireland aimed at attracting prospective homebuilders and trades within the construction sector. This type of show was an important event for QualiBuild to attend as one of the objectives of the project is to direct home owners into the understanding of constructing quality low energy buildings. QualiBuild exhibited materials, played videos and provided extensive advice to the attendees at two Self Build shows in Dublin in Sept 2014 and 2015 and in Cork during November 2015.

Promotional Material

A number of promotional materials were developed for construction workers, homeowners and consumers during the project these include brochures, posters, flyers and visual presentations.



Providing videos was an important factor in transferring knowledge and promoting the QualiBuild project. Four animated videos were produced as part of the FES course to demonstrate the principles of quality low energy building. All these videos are downloadable from the website and easily understood not only by professionals, construction workers and building managers but also by the end users and those with no understanding of say “thermal bridging”. Other videos available on the website are directed at what the construction industry need, such as quality controlled

site supervision to maintain and improve building standards and indeed the understanding of nearly zero energy building, nZEB. Videos are available on the QualiBuild website at <http://www.qualibuild.ie/resources/videos/>

Training promotion

The QualiBuild programme developed three types of training materials during the project lifetime: materials for the Foundation Energy Skills programme, materials for the Train the Trainer programme and informal learning materials for the industry and consumers. In regards to outreach to the industry, the project has had over 700 responses to Foundation Energy Skills programme (mix of builders and craftsmen), over 130 responses to Train the Trainer programme (professionals and craftsmen) and over 300 responses to the professional-worker briefings.



There is a section on the QualiBuild website allowing the trainees to download these resources and other relevant information. Additionally, videos were created from the FES demonstration activities and these were uploaded onto the QualiBuild website and the QualiBuild YouTube channel for use as training resources. The animated videos developed for the FES course are also available.

Homeowners Promotion

QualiBuild succeeded in promoting and registering home owners and building owners onto the QualiBuild e-book, especially at the Self Build trade shows. The 18-page Quality Building e-book designed for consumers and professionals is available to download on the QualiBuild website at <http://www.qualibuild.ie/quality-building/> For the informal learning elements, there are additional informational videos and project presentations accessible on the QualiBuild website, the QualiBuild YouTube channel and QualiBuild SlideShare channel.



Various articles were published in magazines such as passive house plus, SelfBuild and the ETBI Journal (Education Training Board Ireland), Construction Magazine, Irish Times newspaper and Engineers Ireland Journal. In total there were 21 articles ranging from discussions of energy efficiency, best practice building to approaches to training and passive house design for buildings.



Ten radio interviews were targeted, initially to promote QualiBuild, then promote the principles of constructing quality low energy buildings, leading to encouraging construction workers and professionals to take part on the Train the Trainer and FES courses and finally promoting the National Roll Out.



National Roll Out



It is important to establish a comprehensive **National Roll Out** plan for the training programmes and the CWSR but a number of key factors are essential for success:

- 1) An organisation willing and able to take on the responsibility and coordination function for the National Roll Out
- 2) Finance to pay for the training programme delivery and the management of the CWSR
- 3) Organisations and venues willing to deliver the training courses
- 4) The development of a mechanism (CWSR), providing value to the training and skills of the construction workers
- 5) The promotion strategy for highlighting of the importance of the training programmes and the register. (CPD)

In addition to these requirements, a policy of Government which would render the undertaking of such a course mandatory for construction workers (much as the Safe Pass is at present) would increase the likelihood of the programme's take-up.

Sustainable Funding

One of the objectives of the QualiBuild Project was to hand over the Training Programmes and the Construction Workers Skills Register (CWSR) to a national body/agency(s) which would take on the responsibility for rolling-out the training programmes to an estimated 60,000 to 100,000 building construction workers currently employed in the sector and also manage and operate the CWSR. In order for this objective to be achieved, it was recognised that a sustainable funding model would be required. It is assumed that there are sufficient trainers trained (59) from the QualiBuild Train the Trainer Programme to deliver future training if phased over a six to ten year period.

Sources of Funding

As part of the identification of a sustainable funding model, existing and potential sources of funding were reviewed. To review these funding sources in more detail, refer to the QualiBuild report Roadmap Implementation and National Roll Out which is downloadable on the website at: <http://www.qualibuild.ie/resources/project-information/>

The following table summarises the limited potential and available funding sources in Ireland.

Funding Source	Description
Direct payment	Direct payment from the participants for training by building construction workers and their employers
The National Training Fund (NTF)	Resourced by a levy on employers of 0.7% of reckonable earnings of employees in certain employment courses, which is collected through the PAYE/PRSI system. This is used to fund the Skillnet programme
European Social Fund (ESF)	Co-financing for a range of training courses to meet the needs of unemployed persons or other job-seekers by the Programme for Employability, Inclusion & Learning (PEIL) 2014-2020
The European Globalisation Adjustment Fund (EGF)	To support workers made redundant as a result of major changes in global trade patterns and its purpose is to provide supports to redundant workers to improve their employability and to assist them back into employment.
Energy Companies & Financial Institutions	Both show interest and support for the course but are not in apposition to financially contribute or support in the present climate.
Paritarian Social Funds in the Construction Industry	There are two Paritarian funds in Ireland: - Construction Industry Monitoring Agency (CIMA) and the Construction Workers Pension Scheme (CWPS). CIF and ICTU investigated this funding previously and may revive the idea in the near future.
Levy on Construction Materials	The government proposed to place a levy on certain aggregates (due to pyrite crisis in Ireland) which could be generated into income for funding training, this is postponed due to objections from certain bodies in the construction industry.
Building Products Manufacturers	Capital investment from private companies providing materials, products, models and venue hire.
Tax Breaks	The Home Renovation Incentive (HRI) Scheme provides Income Tax credit at 13.5% of qualifying expenditure on repair, renovation or improvement works carried out on a main home or rental property by 'qualifying' Contractors.

Following on from this investigation a number of potential funding schemes are explained in more detail and how they can contribute to the training aspects of the QualiBuild project.

Skillnets

Skillnets was established in 1999 and is funded from the National Training Fund (NTF) through the Department of Education and Skills (DES) for a wide range of training networks that provide subsidised training to companies and employees and free training to unemployed people through a number of key programmes. Skillnets subsidise the training costs of employers by 20-30. It is worth noting that should the FES course become mandatory then subsidisation for employers through Skillnets would no longer be available.

Construction IT Alliance

The CITA Skillnet⁵ is promoted by the Construction IT Alliance Limited (CITA) representing a membership of in excess of 100 construction companies and is also funded by the National Training Fund. The network focuses on ICT training needs within the Irish construction industry and target organisations include professionals, main contractors, clients and suppliers. In 2015 CITA Skillnet provided support for non – IT related training for construction and related sectors. CITA Skillnet also provides training to the unemployed.

Recognition of Trainees/Building Construction Workers' Tickets

The reintroduction of a Registered Employment Agreement or equivalent would pave the way for a Construction Workers Skills 'Ticket' to be recognised in the same way that the existing plant operator's or scaffolder's tickets are. The rate of pay for an operative who has a specialised construction ticket such as the Construction Skills Certification Scheme is usually higher than one who does not. Another possible incentive to contribute to training costs would be Tax Credits⁶. If a Training Credit was introduced it could be used to reduce the tax on building workers gross pay or the introduction of a scheme where workers could claim tax relief in respect of training costs could also be an attractive alternative.

Education and Training Board Courses

Some ETB courses are available free of charge to the unemployed. Given that it is anticipated that the ETBs will be major providers of the FES programme it should also be possible for them to offer some places on these courses for unemployed construction workers.

Springboard

Springboard courses are state-funded programmes in Higher Education which are provided free of charge to the unemployed. Free places on the HE forms both for the QualiBuild FES and the Train the Trainer courses could be provided through the Springboard programme.

MOMENTUM

MOMENTUM is a publically funded initiative delivered in collaboration with both public and private education and training provider. Participants will receive training in areas with recognised skill shortages with an element of on-the job training in the form of work experience modules as well as development of the skills required to obtain and retain employment.

Funding the National Roll Out

An analysis of current funding mechanisms in Ireland and the EU was carried out to determine the sustainability implications into the future. The main focus was on the FES course as an estimated 60,000 Building Construction Workers were identified as having significant gaps in their understanding of low energy building. This figure, however, related to a period when the construction sector was at a low ebb and the figure now may be closer to 100,000⁷. It is important to assess the financial resources to deliver the required courses and equally necessary to review the capacity of the system to deliver these courses over a number of years.

During the consultation process many of the stakeholders which included construction workers, academics, unions and industry predicted an appropriate fee of €300 for the three day FES course (these figures were compared to the one day safe pass course with a fee of €100). So a study was carried out to determine the appropriate costs for the QualiBuild FES training programme. Consideration was taken into account for trainers' costs, direct costs and overheads to determine a basic estimate and a full class attendance of 20 workers was assumed. It was also noted that the class may not be fully attended so a range of fees would be more appropriate.

⁵ <http://www.cita.ie/training-cita-skillnet/cita-skillnet/>

⁶ <http://www.revenue.ie/en/tax/it/credits/index.html>

⁷ CSO Statistics Office - <http://www.cso.ie/en/statistics/construction/>

Category	Scenario 1	Scenario 2	Scenario 3
Number of participants per course	20	18	16
Number of teaching hours per course	24	24	24
Cost per teaching hour IoT rates	1695	1695	1695
Cost of manuals and printing €45 per participant	900	810	720
Cost of travel and subsistence per course	500	500	500
Room Hire and catering €450 (tea/coffee) per day	1350	1350	1350
20% Overheads management per course	889	871	853
Registration and admin €100 per person	2000	1800	1600
Total	7334	7026	6718
Minimum fee per participant	367	390	420

The initial estimates would indicate that the fee for participants on the FES course would be in the range of €300-€500.

The costs in year one (and possibly two) are likely to be somewhat higher due to the capital investment required and the income would be somewhat lower as the programme gets off the ground. This means that there would be a shortfall between income and expenditure in year one and this would need to be provided for in state funds. Over the period of the programme, however, any initial expenditure should be capable of being recouped depending on the number of construction workers trained. Taking the assumption of an average fee of €400 for each participant.

Category	Scenario 1	Scenario 2	Scenario 3
Numbers to be trained	60,000	80,000	100,000
Average fee per course member	400	400	400
Total fee per course	7,000	7,000	7,000
Total fee income	24,000,000	32,000,000	40,000,000

Understanding the costs involved to deliver these courses to the construction workers is important and how these courses can be delivered within certain timeframes should also be considered. Assuming that the courses will be fully attended with 20 people and facilities of the 20 ETBs are available, the following table demonstrates how many courses per year could be achieved.

Category	Scenario 1	Scenario 2	Scenario 3
Numbers to be trained	60,000	80,000	100,000
Annual average number of courses over three years	1,000	1,334	1,667
Annual average number of courses over six years	500	667	834
Annual average number of courses over ten years	300	400	500
Annual average number of courses per centre over three years	50	67	83
Annual average number of courses per centre over six years	25	33	42
Annual average number of courses per centre over ten years	15	20	25
Annual average number of courses per trainer over three years	17	22	28
Annual average number of courses per trainer over six years	8	11	14
Annual average number of courses per trainer over ten years	5	7	8

The most realistic scenario suggests training construction workers over a six year period. Therefore, the average number of courses per centre if predicted to be between 25 to 42, which is achievable with each trainer providing FES

training on average 10 times a year. Additional assistance can be provided through the private training network as a number of private trainers have been trained on the QualiBuild Train the Trainer programme. It must be remembered that this is based on training up to 100,000 workers over six years.

These figures appear to be achievable though, if the ETBs and private trainers are the bodies delivering the training they will require dedicated staff to manage the administration and resources for the courses.

Other Roadmap Training Actions

Although QualiBuild concerned itself primarily with developing and producing learning materials for the FES and Train the Trainer courses the need for additional training at levels above the basic FES course was acknowledged in the BUSI Roadmap, as was the need for apprentice curricula to reflect the current Building Regulations and Standards in the area of low energy buildings. It is important to determine what types of courses are available for the construction workers to progress in their training and CPD. A summary of the investigation is listed.

QualiBuild have been working intensely with SOLAS (as they are active members of the steering committee) over the last few years to investigate ways to incorporate FES training into the various training programmes around Ireland.



The learning outputs of the current apprentice curricula and other specialist training were scrutinized to see how they aligned with the learning outcomes from the FES course.

FES+ - Although the Apprenticeships for Electrical and Plumbing Curricula were very strong on renewable technologies and the Carpentry and Joinery Curriculum does acknowledge sustainability; no specific references could be found to: - Air Tightness, Thermal Bridging, Insulation Continuity or Systems Thinking. There are a number of specialist private courses covering these topics, but one area requiring attention is for smart lighting and energy management systems for electricians.

FES++ - Senior tradesmen and trades foremen/supervisors. There are a number of existing courses in the fields of Passive House training, sustainable construction and IT for site workers

FES+++ - Construction/Site Managers and Site Foremen are generally educated to degree level but a significant number come from trade backgrounds. Certain Project Management skills such as Communication Management would be seen as prerequisite for these roles. The areas of Health and Safety is well covered but the knowledge of the latest Building Regulations and Standards, nZEB and renewables would be beneficial in assisting these managers carry out their roles and fulfil their responsibilities. All these courses have been developed and delivered so that it is not considered necessary to develop new courses. It following factors should be noted:

- Their limited number of locations
- The frequency with which they are offered
- Their cost
- Their structure
- Their capacity to accommodate large numbers
- Their visibility to the relevant potential learners



Roadmap Supporting Measures

Three measures identified to support the training actions outlined in the BUSI Roadmap are:

- Introduce Industry Driven Training Requirements
- To support implementation of the Building Contractors Register
- Provide for the Upskilling of Building Control Officers

This supporting action is closely linked to supporting action to develop a Quality Building communications campaign. It was envisaged that if the market (homeowners etc.) was informed by the media of the need for Quality then it would stimulate the Industry into providing well trained and suitably qualified contractors. If homeowners were made aware that they had a choice between employing contractors with a quality trained workforce and those that hadn't then they would insist on the former. This in turn would act as a stimulus for contractors to send their employees on training courses such as FES. Another stimulus for encouraging training take-up would be for industry to insist/strongly encourage their contractors to undergo training if they want to tender for their work or remain on approved contractor registers/frameworks.

The fact that CIRI lists QualiBuild as a source for structured CPD on its website should act as a stimulus for more contractors to send their employees on the FES course. The CIRI Register is not now expected to be on a statutory footing until 2018 at least and as a result the take-up for contractor registration has been low. However, once CIRI transitions from voluntary to mandatory it should encourage a larger number of firms to register and, thereby, direct more building construction workers to the FES course. It has not been possible to hand over the CSWR to a national organisation as was originally planned. However, discussions on this issue are ongoing and it is hoped that SOLAS or CIRI will ultimately take responsibility for this.

Handover and National Roll Out Conclusion

An important element of the QualiBuild project is the identification and agreement of the mechanisms through which this course will be rolled out nationally to between 60,000 and 100,000 construction workers. A project of this scale will clearly require the involvement of a major national public organisation with functions in this area. The sheer scale

of upskilling 60,000 to 100,000 building construction workers points in the direction of SOLAS. SOLAS is the only body with the capacity for co-ordinating the rolling out of FES and for coordinating the delivery of the add-on FES+ type course on the scale that is required. It is also the only organisation with a geographically dispersed network of providers (the ETBs) which would, between them, be in a position to run the training courses at the number and frequency required. A number of ways of financing the roll-out of the FES and Train the Trainer programmes have been discussed. Some of these offer the possibility of subsidising the cost of programme delivery in the short term plan. However, the responses to the evaluation of the pilot programmes suggest that in the medium to long term, the Foundation Energy Skills programme can be self-funding and that very little will be needed in the way of subsidy once the programme delivery is established.

For the **short term plan** an agreement has been established between LIT and ITB to continue offering the programme. The FES course had captivated a degree of momentum during phase 2 of the FES training programme and a number of enquiries had arisen. The QualiBuild consortium are in the process of formalising an agreement for future deliveries of FES courses (post-project). This involves setting up an MOU with a number of public and private training organisations, in which LIT and ITB will act as programme managers, partnering with the other providers for delivery.



With this in mind, ITB in cooperation with LIT, were successful in obtaining Sustainability Skillnet funding until the end of the year 2016. QualiBuild are therefore committed to offering 2-3 FES courses in the October/November period, more than likely two in Dublin and another in Cork. The intention would be to advertise dates for courses from the first week in September on the QualiBuild website, in order to allow some lead time for October start.

<http://www.qualibuild.ie/fes-training/foundation-energy-skills-fes-sustainability-skillnet/>

To ensure a successful **long term plan**, investigation and preparation of resources for delivering the FES programme are something of a challenge. Although the ETBs are well established in Ireland many do not have the equipment or resources to carry out the FES training course. There are many private training organisations who have the resources, but have not been trained on the Train the Trainer programme. Both these issues need to be addressed before any decision can be made on running FES programmes into the future.

The long-term National Roll-Out Plan is for SOLAS to co-ordinate the roll-out and help deliver the course through the ETB network as well as private venues. The likelihood is that additional Train the Trainer courses will have to be run to ensure that the ETBs have the necessary trainer resources that will meet the programme requirements. However, resources for the marketing, management and administration of both FES and Train-the-Trainer would need to be provided to the ETBs and private organisations if they are to be the bodies primarily responsible for this aspect of the overall project.

Many of the key stakeholders recognise the importance of the continued operation of the CWSR, until such time that an organisation willing to assume long-term responsibility can be identified. To that end, an MOU agreement between the project partners has been drawn up to manage the CWSR for a period of two years alongside the QualiBuild website. During this time work will continue on the identification of a long-term management organisation whether this is through SOLAS, with its experience of managing the Safe Pass Register and in charge of the skills and training areas, or CIF/CIRI with the newly established construction companies register and strong links with the construction industry.

Results and Recommendations

Air Tightness



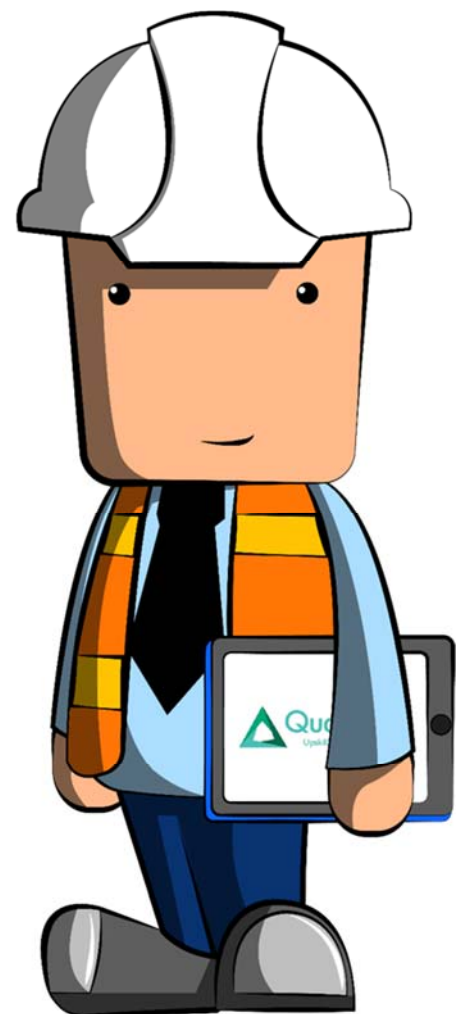
Continuous Insulation



Best Practice



In Compliance



The scale of the project (upskilling between 60,000 and 100,000 Building Construction Workers in the area of energy efficiency) requires the involvement of a major national public organisation with functions, skills, capacity and a coordinating role in this area. The approach required will be a ‘top-down’ one where the requirements and the organisation of delivery is carried out at a national level and is likely to require a wide range of providers.

The following conclusions were extrapolated from the evaluation report and is available to download on <http://www.qualibuild.ie/resources/project-information/>

Conclusions	
Training Delivery	The duration of the FES course for 3 days appears to be sufficient for the achievement of the learning objectives while being acceptable to individuals and employers from a time perspective.
Practical Training	Many participants expressed a preference for more practical demonstrations and/or hands-on training on the course. This is consistent with the profile of the target cohort who traditionally undertake practical skills training onsite or in simulated conditions in workshops and labs.
CPD Training	Post-training, a significant majority of FES participants rated their knowledge of low energy buildings as middling, with most believing that they would require further follow-on training. This is consistent with the conclusions of the BUSI project which identified a need for different levels of training for the occupational tiers; Operative Level, Craft Level and Supervisory Level.
Training Support	The approach of employing group work/teamwork in the training activities appears to have been well received and positive for promoting cross trade discussions and understanding. Having both weekday and evening/weekend options for the training appears to be important as larger employers would normally support staff to attend during working hours while smaller enterprises are unable to sustain such absence for training.
Training Costs	The majority of participants would be prepared to pay for a similar training programme if it were not free but believe that cost should be minimised or subsidised as the objectives of quality buildings and energy savings should be supported by government.
Mandatory Training	The vast majority of individual participants and employers are of the opinion that a FES course or similar is important for all onsite construction workers, with many believing that it should be a mandatory training requirement (similar to Safe Pass).
CWSR	Many participants would like to see greater recognition of the FES qualification, along with a register of construction worker’s competences, indicating that this would improve the value of the course.
National Roll out	There are a number of public and private sector training providers that offered facilities to accommodate the delivery of the FES pilots and have expressed an interest in offering the training post-project. Their support and cooperation is instrumental to the success of the long term roll out.

Having consulted with many individuals and groups and having examined the capacity of various relevant organisations, the main recommendation of this report is that SOLAS, which is the public agency with responsibility for funding, planning and co-ordinating Further Education and Training (FET) in Ireland, assume responsibility for the long-term National Roll-Out of the Foundation in Energy Skills (FES) training programme.

Finally, given SOLAS experience in operating the Safe Pass register it may also be an appropriate body to operate the CWSR in the long term pending Government decisions on the structure of the construction sector in Ireland. CIRI is obviously the most suitable option by linking the individual construction workers register with the newly established Contractors register, as they have strong well established links with the industry.

In the short term and pending a decision by either organisation, the QualiBuild FES course will continue to be delivered at a small scale and the CSWR will be managed and maintained by project partners as part of the Website maintenance. When a long-term location is found for the CWSR it has been designed so that it can be ‘unplugged’ from the LIT Website and ‘plugged-in’ to another website/ register or it can ‘

References

BUSI BUILD UP Skills Ireland National Roadmap for Energy Training in Construction available to download at <http://www.qualibuild.ie/wp-content/uploads/2015/01/BUSI-Roadmap-Final-Print-Version.pdf>

The following reports as listed below are available to download at <http://www.qualibuild.ie/resources/project-information/>

QualiBuild FES Learners' Handbook

QualiBuild FES Trainers' Manual

QualiBuild FES Training Material Resources

QualiBuild FES Training Videos

QualiBuild FES Pilot Evaluation Report

QualiBuild Train the Trainer Module 1

QualiBuild Train the Trainer Module 2

QualiBuild Train the Trainer Module 3

QualiBuild Train the Trainer Module 4

QualiBuild Train the Trainer Implementation Report

QualiBuild CPD System Proposal

QualiBuild Existing Registration Systems

QualiBuild Review of the Registration Piloting Phase

QualiBuild Implications of the Mandatory Registration Requirements

QualiBuild Communication Campaigns Strategy

QualiBuild Materials for Communication Campaigns

QualiBuild Evaluation Report of Communication Campaigns

QualiBuild Sustainable Funding Plan

QualiBuild Other Roadmap Training Actions

QualiBuild Handover and National Roll Out

QualiBuild Dissemination Strategy



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