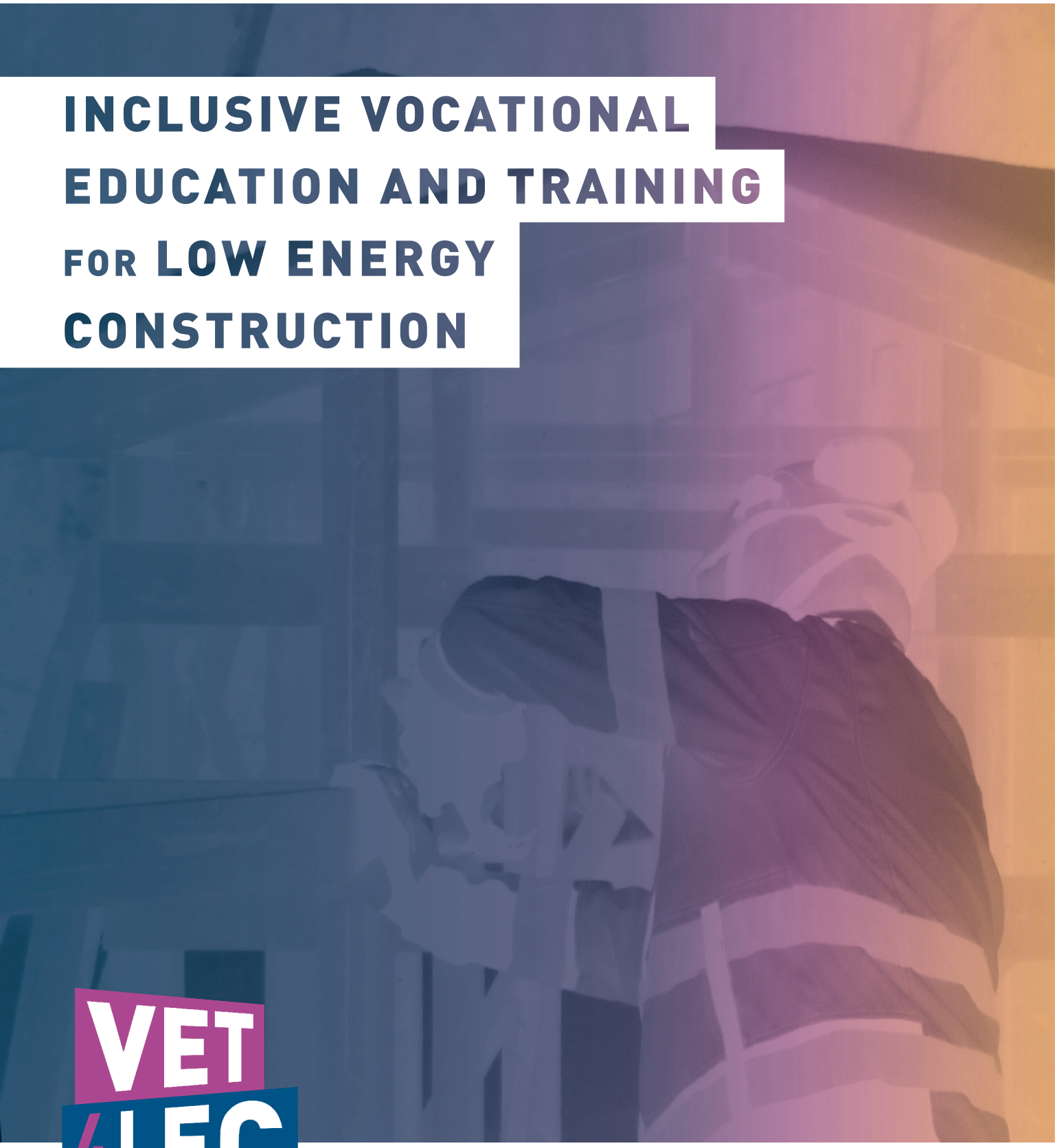
INCLUSIVE VOCATIONAL EDUCATION AND TRAINING FOR LOW ENERGY CONSTRUCTION



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COUNTRY SUMMARY IRELAND
FEBRUARY 2019

European Federation
of Building
and Woodworkers

EFBWW

FIEC

THIS SUMMARY was prepared by the research team,
based on the Irish national report produced by Limerick Institute of Technology.

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IRELAND

Construction Industry

The construction industry in Ireland is emerging from a period of deep recession and in 2017 it is projected to contribute 10% to GDP. In the same year, it accounted for 7% of the employment market. The estimated size of the *shadow economy* is 12.8% of total GDP, and construction sector activity is likely to account for a significant share of this.

The recession had a dramatic effect on the sector. Prior to this, in 2006, the number of construction workers had increased to a quarter of a million (276,670). In 2013, it had dropped to 96,400. At 81%, the biggest drop was among bricklayers and masons, due to very low levels of house building and the transition from traditional concrete build to timber frame building. The number of self-employed increased from 25% to 37%.

Thousands of workers, both foreign and Irish nationals, left Ireland for the UK and Australia. During the recession, the number of apprentices dropped from 29,000 (2005-6) to 5,700 in 2013. During the recession, the number of those enrolling on apprenticeship programmes in the construction sector fell dramatically. Carpentry, for example, had 2,000 apprentices in 2005, and this had fallen to 90 in 2012.

The sector has been recovering steadily since 2013, which is partly due to government initiatives to redevelop schools and public offices. There has been a shortage of skilled workers in the context of increasing demand since 2013, as Ireland catches up with delayed investments particularly in infrastructure and housing. Since 2016, there has been an increase in the volume of all types of projects going on site, including residential, commercial, social, sport and leisure. There is an increase in planning applications granted. From 2016 to 2017, building construction output was up by over 19%. Output volumes in residential building increased by 30%, and in non-residential building, by 24%. The number of workers has been increasing steadily since 2012 and reached 142,500 in 2017. The number of apprentices is also on the up; they have climbed back up to 10,000. The forecast for future craft apprenticeships remains positive and registrations in the construction sector are forecast to more than double from approximately 1,700 in 2015 to over 3,600 by 2018.

The sector is dominated by very small firms and characterised by sub-contracting and self-employment. A large number of workers also engage with small, medium and large companies on a sub-contract basis. In 2008, there were 61,965 firms, of which over 95% were classified as micro-enterprises (firms that employ fewer than 10 people). In 2015, the number of firms totalled 50,546 and 49,192 of those were micro enterprises. The increase in the number of micro-companies could be due, in part, to the medium/larger companies successfully tendering for large government projects and then subcontracting the work.

Construction workforce

The number of full-time construction workers employed by companies was 73,587 in 2015. This figure increases to 108, 720 if construction workers employed on a temporary basis, casual labour, part-time and sub-contracting and also those in administration are included. In 2017, the total number of workers engaged in the entire construction sector (NACE F[1]) was over 140,000. In 2016, there were approximately 68,000 persons employed in craft occupations. The characteristics of the workforce are:

- *Gender (2016)*: 9.2% of workers across all skilled trades are women. Among electricians, only 1% of the self-employed, and 4% of the employees are women. Among those working in the building trades, only 2% of the self-employed and 5% of employees are women. In 2016, women took up only 33 state funded apprenticeships. To put this into perspective, there were 10,000 apprenticeships available that year.

1 NACE is the statistical classification of economic activities in the European Community, Code F refers to construction.

- *Age (2016):* 66% are between the ages of 25-54. Between 2011 and 2016, the number of under 24 year olds and the 25-34 age group decreased while the number of older workers – 35 years old and up-increased. This reflects the collapse in recruitment following the recession, and tallies with the drop in the number of apprentices. The age profile of plasterers, bricklayers and other construction trade workers is the most mature, with almost one quarter aged 55 or older.
- *Type of employment:* 36.7% of construction workers are self-employed and the majority has no paid employees. Self-employment has increased since the recession, from an average of 25% between 2000 and 2007.
- *Migrant workers:* In 2014, migrants accounted for about 12% of the construction workforce, with the majority being from Eastern and Central European countries. This is a drop from 18% in 2007. In 2007-2008, 7% of electricians, 16% of carpenter and joiners, 25% of brick and stone layers, and 19% of plasterers were foreign nationals. Following the recession, many are thought to have left Ireland.
- *Levels of education* are generally low, with 20 per cent not having completed the final secondary level exit exam (Leaving Certificate). Only 17.6% possessed a third level (degree and non-degree) qualification, compared to 33.4% amongst the workforce in general. According to the National Skills Bulletin, this trend continues in 2016; compared to 11% of construction workers, 47% of the total workforce hold third level qualifications. Among apprentices, the level of education is higher than that for the general population.

All occupations in the construction industry face skills shortages. An estimated 30,000 skilled workers are needed, though it is likely that these forecasts underestimate the actual numbers in future years in view of the anticipated and significant expansion in new residential development. Many workers do not have any qualifications, although generally education levels are quite high.

Vocational Education and Training (VET) system

Responsibility for training and education lies with the Department of Education and Skills (DES). The implementation and regulation of education policy is divided between a number of bodies funded by and operating under the remit of the DES. Social partners are not involved in the development or implementation of vocational education policy. Quality and Qualifications Ireland is responsible for maintaining the ten-level National Framework of Qualifications (NFQ), making awards and setting standards for Further Education and Training (FET) programmes and some tertiary level education programmes, reviewing the effectiveness of quality assurance in FET and higher education providers in Ireland. Vocational Education Committees (VECs) are responsible for the management and operation of second level schools, further education colleges, and a range of adult and further education centres.

Ireland has a well-developed Initial Vocational Education and Training (IVET) system, mainly college-based but with a substantial apprenticeship element. Most VET takes place at post-secondary level and in the state sector, after the completion of secondary education, and is delivered by the 16 Education and Training Boards (ETBs). At secondary level, the construction studies curriculum is part of the leaving certificate and covers the construction of buildings and the built environment. This is a QQI Level 5 course that provides a basic understanding of materials, techniques of application and energy efficiency topics in renewables and sustainable design. Post-secondary programmes include apprenticeships, post-leaving certificate courses (PLCs) and training by ETB colleges, private or sectoral providers. PLC courses, delivered in ETB colleges, may combine vocational and general education and lead to NFQ level 5 or 6 (EQF Level 4 or 5) awards. VET at tertiary level, provided mostly by Institutes of Technology, universities and other HE providers, leads to NFQ Level 6 or 7 awards. Apprenticeships are available in carpentry, brickwork, electrics and plasterwork, and combine theory and on-the-job training with an employer and lead to an NFQ Level 6 (EQF Level 5) award. They run over four years and are provided through collaboration between the employer, an education and training body and institutes of technology. There are currently 27 apprenticeship programmes.

Provision of continuing (CVET) is more varied. SOLAS is the Further Education and Training (FET) authority, responsible for planning, co-ordinating and funding FET in Ireland. Further Education and Training Courses (FETAC) range from one-day courses by private companies to comprehensive 3-year programmes. FETAC courses are generally QQI level 5-6 and can be awarded by SOLAS/ETBI and some education organisations. City and Guilds are also present in Ireland. The Higher Education Authority (HEA) is responsible for the effective governance and regulation of tertiary education institutions and the tertiary education system. For adults, a broad range of courses is available in the HE sector. The Institutes of Technology are HE providers, providing courses at Levels 6-10 as well as phases 4-6 of apprenticeships. There are also courses for the unemployed and for early school leavers aged 15-20.

Irish Build Up Skills – LEC training needs

The Build Up Skills status quo analyses estimated that 65,000 workers need to be trained in energy efficiency at different occupational levels for Ireland to meet its targets. In relation VET for LEC, the main findings of the study are that the current training provision does not reflect the changes in building regulations or prepare workers for the requirements of energy efficient construction. There are some newly introduced training programmes, some by manufacturers and some nationally recognised, but these tend to be technology or product specific, too short and do not teach the principles of low energy buildings. The qualitative assessment of training needs suggests that the gap is one of knowledge, and recommends that all workers are given sufficient training to understand the science behind energy efficiency. While training needs to be differentiated for Operative, Craft and Supervisory levels and specialised by occupation, workers at all levels must develop a common knowledge base and understand their role within the construction process as a whole. About 100 trainers per year need to complete the foundation and specialist training needed at Operative and Craft levels alone to support estimated training needs. More technical aspects and installation of RES need to be supervised by appropriately trained contractors and technicians. The report recommends the establishment and maintenance of a framework of mandatory qualifications to motivate participation in further training and improve standards. Supporting measures called for include governmental funding, as the cost of further training tends to act as a significant barrier particularly for SMEs, and a campaign to raise awareness of energy efficient construction. Finally, conditions in the labour market were identified as a major barrier to achieving these ambitious training targets, given the labour shortage after the exodus of large numbers of skilled Irish and migrant workers following the recession. The number of apprentices also dropped sharply.

VET for LEC developments

The development of VET for LEC for building operatives was initiated with the Build Up Skills investigation. QualiBuild, the BUS Pillar II project, involved the development and delivery of a short introductory course, Foundation Energy Skills (FES), which is the only QQI (Quality Qualifications Ireland) accredited LEC course available for tradespersons. Developed as a stand-alone short course, this is now being gradually rolled out across Ireland in a process that gained speed after the more active adoption of the EU NZEB agenda by the Irish government and as part of its investment plans in the construction sector and the economy still recovering from the 2008 crash. The course covers the basics of LEC and develops clear communication skills between occupations on site, so enabling efficient and quality building. It is a detailed, self-contained module, giving thorough coverage of LEC, and designed for self-study rather than as an integrated part of an IVET or CVET upgrade programme. This programme is currently part of a HETAC QQI level 6 accreditation project, requiring an additional on-site module. Workers completing FES can register with the Construction Workers Register. It is also anticipated that the course will be updated to account for the new building regulations Part L and to introduce criteria for NZEB, which was officially adopted in early 2017. Additional courses may also be developed to target specific areas such as renewables, NZEB or sustainable retrofitting. Further courses for professionals and site managers are being discussed, either as add-ons to the FES course or as Level 6-7 courses by Institutes of Technology.

There are also a number of further education courses (FETAC) available in renewable technologies at levels 5 or 6, provided by QQI, Institutes of Technology and some regional Education and Training Boards (ETBs). In addition, City and Guilds runs a number of courses, ranging from 2 to 14 weeks in duration, in energy efficiency and sustainable construction. *Ad hoc* programmes are also provided by the private sector, such as the passive house tradesperson course, LEED and BREEAM training, though not certified under QQI.

There is evidence at both IVET and CVET level that low energy requirements are being incorporated. This is borne out by the case studies. Two key areas to support the ongoing development of VET for LEC are the roles of: apprenticeships (IVET) in upskilling skilled occupations in construction as their numbers are forecast to more than double by 2018; and continuing VET (CVET) to achieve quality low energy building and NZEB certification. To support the needs identified, SOLAS updates skills forecasts and works with stakeholders to ensure that mainstream and targeted VET initiatives are attuned to the supply of skills required to deliver the Action Plan. New LEC occupations are recognised.

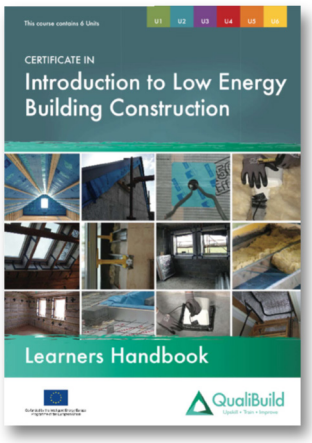
Initiatives related to VET for LEC

QualiBuild (2014-2016) was developed as part of Build UP Skills Pillar II and aimed to stimulate the implementation of some of the recommendations of BUS Roadmap, including enhancing the capacity of the sector to build and retrofit to low energy standards, to develop trainer capacity, and to develop a registration system for workers who have enhanced competency in low energy building. As part of QualiBuild, the

Foundation Energy Skills (FES) course was developed, supported by a Train the Trainer Programme. FES was completed by 196 workers, through daytime and evening courses provided in four locations. The Train-the-Trainer programme was less attractive than expected (59 were trained, as against the target of 85), which is likely to be due to the downturn in construction training. The project was publicised and training promoted through a range of media, including a dedicated website[2]. The QualiBuild videos were viewed nearly 4,000 times, and the website was visited by 14,000 unique visitors. Workers completing the project were awarded a single subject certificate and can register on the Construction Workers Skills Register of workers trained in quality building. A Continuous Professional Development scheme for the construction sector trainers is also planned[3]. An e-book was created aimed at homeowners to raise awareness and understanding of the LEC principles. Financial issues and time restrictions were identified as important barriers to FES participation and need to be taken into consideration in the plans to roll out the course.

- *Meeting of Energy Professional Skills (MEnS):* Ireland is a partner in this Horizon2020 project which aims to design and deliver accredited training programmes for building professionals such as managers, engineers and architects[4].
- *Build Upon (2015-2017):* Green Building Council (GBC) Ireland participated in this Horizon 2020 funded project along with 12 Green Building Councils, under the coordination of GBC Spain and support from the World Green Building Council. The project sought to create a collaborative community, establishing innovative platforms for cross-sector partnership. Through 80 connected events, it aimed to help countries design and implement national renovation strategies.
- *NZEBRA*: Ireland is part of this international network established to promote NZEB[5]. The first World NZEB Conference was held in Ireland, Wexford, in November 2017.
- *Initiatives to encourage women into construction:* SOLAS/ETBs offers a bursary to employers in the public and private sectors to encourage the recruitment of women into apprenticeships. The Women in Trades Network Ireland (WITNI) provides consultancy services to support women in all trades.

QualiBuild Training Workshop, Dublin



Foundation Energy Skills, Course Handbook

2 http://www.qualibuild.ie/
3 https://ec.europa.eu/energy/intelligent/projects/en/projects/build-skills-qualibuild
4 http://www.mens-nzeb.eu/en/
5 https://www.nzebra.ie

IRELAND – NZEB definition

OFFICIAL STATUS	In official document
RESIDENTIAL/ NON-RESIDENTIAL	✔
SINGLE FAMILY HOUSES	
APARTMENT BLOCKS	
OFFICES	
EDUCATIONAL BUILDINGS	
HOSPITALS	
HOTELS/RESTAURANTS	
SPORT FACILITIES	
WHOLESALE AND RETAIL	
BUILDING TYPOLOGY	New build
BUILDING CLASS	Private/public
BALANCE	-
PHYSICAL BOUNDARY	Single building
HEATING DHW	✔
VENT, COOL, A/C	✔
AUXILIARY ENERGY	✔
LIGHTING	✔
PLUGS, IT, APPLIANCES	✖
CENTRAL SERVICES	✖
ELECTRIC VEHICLES	✖
EMBODIED ENERGY	✖
ON-SITE RES	-
OFF-SITE RES	-
EXTERNAL GENERATION	✖
CREDITING	-
PRIMARY ENERGY INDICATOR (kWh/m²/y)	✔

Source: based on European Commission (2016a) *Synthesis Report on the National Plans for Nearly Zero Energy Buildings*, JRC Science for Policy Report

National NZEB definition

According to the European Commission's Joint Research Centre for Policy Report (EC 2016a), Ireland's NZEB definition has been included in an official document.
In its definition, Ireland defines NZEB for both residential and non-residential buildings but does not include specific subcategories (ibid: 16: Table 4).
In terms of building typology, classification, balance type, and physical boundary, Ireland refers to new buildings, private and public buildings, and single building respectively (ibid: 17-18: Figure 3).
Ireland's definition includes four types of energy use: heating DHW; ventilation, cooling and A/C; auxiliary energy; and lighting (ibid: 18-19: Table 5).
With regard to the specification of generation boundaries in the definition, Ireland's definition does not define on-site, external generation or crediting. Off-site generation has not been considered (ibid: 20-21: Table 6).

The numeric indicators of energy performance below, expressed as primary energy (kWh/m²/y) have been specified in Ireland's definition (EC, 2016a: 23-26, Table 7).

The following qualitative definition of NZEB was inserted into the Building Regulations (Amendment) Regulations 2017:

> *[a building] that has a very high energy performance where the nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources including energy from renewable sources produced on-site or nearby: http://www.qualibuild.ie/what-is-nzeb-in-ireland/*

The quantitative calculation requires 'Dwelling Energy Assessment Procedure' (DEAP) software (published by Sustainable Energy Authority of Ireland) to ensure a Building Energy Rating (BER) of either A1 or A2. Additionally, Document L 2017, defines NZEB as having a 'Maximum Permitted Energy Performance Coefficient' (MPEPC) of 0.30 and a 'Maximum Permitted Carbon Performance Coefficient' (MPCPC) of 0.35 for dwellings completed after 31st Dec 2020 subject to regulatory process. These recommendations are numerically expressed as:

- Offices: 40-55 kWh/m²/y of net primary energy with, typically, 85-100 kWh/m²/y of primary energy use covered by 45 kWh/m²/y of on-site renewable sources.
- New single-family house: 15-30 kWh/m²/y of net primary energy with, typically, 50-65 kWh/m²/y of primary energy use covered by 35 kWh/m²/y of on-site renewables.

IRELAND – Energy performance expressed as primary energy (kWh/m²/y)

RESIDENTIAL BUILDINGS (kWh/m²/y)		NON-RESIDENTIAL BUILDINGS (kWh/m²/y)		
NEW	EXISTING	NEW	EXISTING	NOTES
45 – defined as energy load	75-150	~60% PE	n/a	Included energy use: Heating, ventilation, DHW, lighting.

IRELAND – Intermediate targets

ALL NEW BUILDINGS			ALL NEW BUILDINGS OCCUPIED AND OWNED BY PUBLIC AUTHORITIES		
QUALITATIVE 2015 TARGET	QUANTITATIVE 2015 TARGET	NOTES	QUALITATIVE 2015 TARGET	QUANTITATIVE 2015 TARGET	NOTES
The aim is to target 60% improvement by 2019 subject to cost-optimal calculations. An upgraded Energy Performance Standard for existing buildings undergoing renovation is foreseen.	No quantitative targets have been set for dwellings or for non-residential buildings to achieve nearly zero energy prior to 31 December 2020.	The 2011 step change at 60 kWh/m²/y is the intermediate step to advance towards 2020 performance levels of 45 kWh/m²/y. A draft standard will be produced in 2015 for dwellings; it will be passed into legislation in the timeframe between 2015 and 2020, but may be applied on a voluntary basis once published. An improvement of between 40% – 50% over the 2008 standard is proposed as an interim measure to be introduced in early 2015. A further review is expected to achieve an aggregate improvement of between 50% – 60% over the 2008 standard, to be completed by 2018.	The approach for buildings in the public sector will be largely similar to that for non-residential buildings. An improvement of between 40% – 50% over the current 2008 standard is proposed as an interim measure to be introduced in early 2015, with a further review to achieve an improvement of between 50% – 60% over the 2008 standard by 2018. This will facilitate the public sector in meeting the advanced deadline for NZEB by 31 December 2018.	No quantitative targets have been set for new public buildings to achieve NZEB prior to 31 December 2018. The Government foresees energy efficiency improvements of 20% by 2020, with the target of 33% set for the public sector.	The public sector will lead by example achieving defined nearly NZEB standard two years in advance of the private sector. It is envisaged that new regulations / technical guidance will be finalized by in early 2015. An improvement of at least 40% is proposed over the existing 2008 standard (primary energy demand of 67 kWh/m²/y for a naturally ventilated primary school rising to 220 kWh/m²/y for air-conditioned office).

Intermediate targets

Ireland has set the intermediate targets above for all new buildings, and all new buildings occupied and owned by public authorities.

Case studies

Note that both of the Irish case studies appear on the QualiBuild's 'What is nzeb in Ireland?' (18 Jul 2017) website.

The Irish case studies refer to two new build residential developments. The following observations on the case studies complement, and should be read in conjunction with, the information contained in the Irish National Report.

CASE STUDIES 1 AND 2: Madeira Oaks (left) and Silken Park

CASE STUDY 1: Housing development 'Madeira Oaks' in Moyne, Enniscorthy, Wexford. Phase 2 of the project clearly meets current the NZEB definition at an A1 BER with low U-values, MVHR, on-site renewable heat (extract air heat pump) and renewable electricity (photovoltaics). For an excellent descriptive and technical analysis of the Enniscorthy project see the online video: https://phai.ie/info/passive-house-nzeb/7-steps-nzeb/

CASE STUDY 2: Durkan Residential's, Silken Park housing scheme in Dublin. Phase 2 has a BER of A2-3 and subsequently, the A3 housing will not meet NZEB. However, the Phase 3 development definitively meets NZEB with a BER of A1.

The Irish case studies therefore provide current examples of construction to Passivhaus specification with additional on-site renewables, effectively a cross-European definition of new build NZEB, and warrant further analysis of their IVET and CVET, supported by in-use energy performance monitoring.

VET for LEC visit to Ireland: Summary Report

The visit to Ireland took place on 7-9 December 2017 and involved interviews at:

- Limerick Institute of Technology (LIT)
- SIPTU, the construction sector trade union
- Michael Bennett & Sons Building Contractors, including a visit to the firm's completed passive house scheme for Wexford County Council.

VET for LEC

Lack of LEC training is being addressed, spurred by Ireland's participation in the Build Up skills project. The Irish project *QualiBuild*, led by LIT, involved the development and running of an introductory Foundation Energy Skills (FES) course for building operatives, open to both envelope and services occupations. Following its successful delivery as a BUS project, plans to roll out FES have been stalled by changes to the VET governance structure and by the sharp fall in the demand for training following the recession. Interviews at LIT highlighted the difficulty of winning national support for the FES initiative, as well as the generally low levels of awareness of NZEB legislation and its implications for construction VET. Currently, there are no plans to incorporate LEC training into existing IVET/ apprenticeship programmes[6].

Initial VET is not nationally co-ordinated. It was described as 'basic' and 'inadequate', including by the trade union, with limited government funding and no employer training levy. The culture of 'quick and cheap builds' conflicts with the precision and quality called for by LEC; the industry needs instead to develop a culture where high standards are the norm. Correspondingly, the approach to VET needs to change fundamentally so that skilled construction workers are valued, their training taken seriously and the importance of LEC knowledge appreciated. Interviewees agreed that without appropriately equipped workers, NZEB legislation, though perfect on paper, could not become a reality.

6 Since our visit, plans have been put in place to accredit FES by City and Guilds and deliver more widely under the leadership of ETBs. The first set of courses are expected to commence in Autumn 2018.

NZEB implementation

The Irish construction sector was severely affected by the recession, with construction output and the number of workers and trainees dropping drastically. The implementation of NZEB in Ireland is gaining speed as the deadlines approach, particularly with the government's drive to stimulate the industry through investment in refurbishment and new building programmes in order to address the housing shortage and widespread fuel poverty, This investment is expected to create jobs and increase demand for LEC-trained workers There are serious barriers, however, to the participation of SIPTU, the sector trade union, in the energy efficiency agenda in terms of influencing policy, training development and responding to employment effects because there are no formal platforms to facilitate social dialogue.

Low energy building example

The low energy scheme visited is a 12-unit passive house social housing development already occupied by tenants. The scheme was built by Michael Bennett (MB) & Sons Building Contractors, a medium size, local firm based in Wexford, which moved into 'green/ eco' construction gradually, starting with a single house in 2007 serving as a learning project for the company. The passive house trained company surveyor has been involved in all the Passive House certified projects: three single houses for private owners; another built without commission; followed by the 12-unit social housing scheme. The company seeks to build a 'basic passive house'; houses all meet passive house standards, are certified and built to the highest energy efficiency rating of A standard, yet they cost no more than traditional houses built for the council. The interviewees argued strongly that the image of green construction as expensive needs to be countered; savings can be made on wood, joinery, kitchens, doors, bathrooms and chimneys without compromising the passive house energy efficiency standard. They had used locally sourced timber frames and the houses are fitted with heat recovery and mechanical ventilation units.

The work was completed by local sub-contractors, with whom the company has a long-standing relationship and who were introduced to the principles of passive house construction and trained on site by the surveyor as there was no external training available. Particular attention was paid to communication with sub-contractors and prior planning of the works, including co-ordination between occupations. High quality training combining theory and hands-on practice for all workers and sub-contractors are seen as essential to achieving high energy efficiency standards. The company reported a lack of training opportunities and very low levels of awareness of green construction among the workforce, apart from small numbers involved in the niche but growing number of passive house projects. Nevertheless, with NZEB legislation coming into effect, the green construction market is expected to grow; the company has been commissioned to build 52 NZEB compliant houses for a housing cooperative and is highly supportive of the development of the European NZEB Centre of Excellence in Wexford, one of only three such training centres in the world.

Labour market context

The construction sector, still recovering from a deep recession, is dominated by micro-firms, self-employment and the use of agency workers mainly by large companies. Though posted workers are not common, a number of construction workers are from Eastern Europe; some also join the union. Interviewees suggested that plans to regulate the construction industry through a register of companies and training requirements for workers would counter the current culture where qualifications and training are not valued in the labour market.

Conclusions

VET for LEC provision for building operatives was initiated through involvement in the Build Up Skills project and wider provision is expected to gain speed with the government's increasing support for NZEB, also evidenced by the investment in the NZEB Centre of Excellence. Currently, contractors in the small LEC market rely on in-house training. Low levels of general education, lack of interest in and funding for further training for the existing workforce, many of whom are self-employed, the impact of recession on the demand for training and for energy efficient housing are seen as barriers to implementing NZEB. It is suggested that the transition calls for a fundamental shift in understanding of the roles of skilled construction workers and VET, as well as a culture change in the industry to prioritise the quality and the precision that LEC requires.