

INCLUSIVE VOCATIONAL EDUCATION AND TRAINING FOR LOW ENERGY CONSTRUCTION



COUNTRY SUMMARY BELGIUM
FEBRUARY 2019

European Federation
of Building
and Woodworkers



THIS SUMMARY was prepared by the research team,
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COVER PHOTO: Carpentry trainee at Vantaa Vocational College/Finland



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Construction Industry¹

The gross value added (GVA) by the construction industry is around 5%, which remained stable between 2012 and 2016). In 2016, there were a total of 24,331 companies.

- o Small (<20): 93%
- o Medium (20-99): 6%
- o Large (>100): 1%

Between 2012 and 2016, the number of construction employers decreased by about 8% (26,564 in 2012). The drop was 8.6% in NSSO 24, 7.4% in NSSO 26, 14.5% in NSSO 44, and 7.1% in NSSO 54. Looking at the drop in the number of companies by size, it appears that small and medium size firms are more likely to have closed in the economic downturn; while the number of small (<20) and medium size (20-99) firms declined by over 8%, the number of large firms dropped by only 1.8%.

Construction workforce²

In 2016, the total number of construction workers in the four NSSO activity categories was 251,360. This included the following groups of workers:

- o FTE regular workers (blue collar): 117,475
- o FTE employees (white collar): 39,364
- o Temporary workers: 3481
- o Self-employed: 62,000
- o Posted workers: 29,040

Between 2012 and 2016, the total level of employment appears to have remained stable, but there has been fluctuation in some types of employment. In the last four years, the number of temporary workers and posted workers more than doubled. At the same time, there was a small drop in the number of full time equivalent (FTE) blue collar workers (down from 118,343). There has also been a slight increase in the number of FTE white collar workers from 31,660. The number of self-employed also increased slightly, from 58,667. The characteristics of the workforce are:

- *Migrant workers* (2016): Among blue-collar workers, over 85% are of Belgian nationality and the remaining 15% are from other European nationalities.
- *Age* (2016): Among blue collar workers, three quarters are between the ages of 25 and 54 and 12% are over the age of 55. This is an ageing workforce with few young people entering the sector; only 12.7% are aged 15-24.
- *Training levels of regular blue-collar workers*: This description of construction workers' education levels uses the collective labour agreement (CLA) classification of salary levels, which are based on workers' professional aptitudes (p.11). It is estimated that:
 - o 16% of workers are unskilled (salary levels I, IA)
 - o 24% hold a construction diploma from full-time education (salary levels II, IIA)
 - o 25% have expert knowledge with a minimum of three years experience (Salary III)
 - o 37% are considered to have superior professional competence (Salary level IV).

1 The overview of the construction sector presented in this section is based on data about four categories of NSSO (Belgian National Social Security Office Index):
24 – construction of buildings, road construction, levelling work, dredging
26 – painting, installations, joinery, business and rental
44 – floor coverings, plasterers
54 – roofing, pointing

2 "Information in this section refers to workers who are included in the DMFA declarations in JC 124, with the worker codes 015, 027 and 035, without any selection on the basis of the service codes, therefore, including long-term illness.
015: workers and apprentices in this category starting from the year of their 19th birthday
027: apprentices, workers and interns in the normal category
035: apprentices and equivalent – manual workers up to 31 December of the year of their 18th birthday (e.g. apprentices from the middle-income bracket, industrial apprenticeship contract, interns)" [From footnote on p. 3 of report]

Vocational Education and Training (VET) system

The social partners govern VET and the state's role is limited to the development of education policy with advice from expert third parties, coordinated by the Department of Education and Training. Funding is through a combination of state funds and employer contributions. Initial VET (IVET) is a hybrid of college based and dual systems, with responsibility assigned in construction to Constructiv, a joint body formed by trade union and employer representatives, supported by technical and regional advisory groups, in which representatives of the sector and of training providers participate. Constructiv leads the development of occupational profiles used to draw up educational profiles and indicate the underpinning knowledge required for each training path. Educational programmes and curricula are drawn up by schools and training organisations who are responsible for ensuring that learning objectives are met through the training delivered. Regional steering groups in Flanders, Brussels and Wallonia are responsible for implementing sectoral frameworks and play a role in the development of courses. The key characteristic of the system is the involvement of all stakeholders: employer organisations, trade unions, training providers, regional authorities, and other experts. Pathways to obtain a qualification in construction include: Vocational Secondary Education, Technical Secondary Education, Day Release Training, Special Secondary Education (for students with special needs) and adult education. 40% of participants follow the Vocational and Technical Secondary Education paths.

CONTINUING VET: Further training, or training for adults, tends to be organised by employers and employer organisations. Since the 1990s, *Constructiv* has also been involved in further training and training for job seekers and career changers.

Belgian Build Up Skills – LEC training needs

In relation to the development of VET for low energy construction (LEC), the national Status Quo Analysis (SQA) noted that: low levels of formal training and qualification among the workforce, including the low levels of general education among young entrants and the high staff turnover rates, present a challenge. Without employer support, for many workers, participating in CVET for LEC would be too expensive and not fit into work schedules. Although there are several courses in energy efficiency (EE) and renewable energy sources (RES) for different construction

occupations, in Flemish and French, delivered across all regions and in varying modes of study, awareness of and participation in these are very low. In 2011, less than five per cent of all VET participation was LEC related. The Roadmap recommended improving knowledge and awareness of LEC, reorienting VET to better integrate EE and RES, redefining occupational competence profiles, expanding practical training, catering for workers with different levels of existing training and developing systems to accredit worker qualifications in LEC related areas.

VET for LEC development

The development of VET for low energy construction (LEC), in keeping with the broad occupational training approach to IVET, has been within mainstream IVET, rather than through revising the occupational structure of the sector. As opposed to creating new occupations based on specific competences, the strategy is to introduce and integrate LEC knowledge and competences into existing occupational profiles, between which there are also considerable overlaps. The social partnership model means that all stakeholders, including employer organisations, trade unions, education experts and training organisations, have been involved in this revision of occupational profiles, led by *Constructiv*. Occupational profiles are used as guidelines for the development of curricula, which are developed by colleges and training organisations. The content of LEC training is likely to be uniform across the country though the range of courses available may vary between the regions. Profiles can be very detailed, with clear indications of where LEC specific elements in the qualification occur. A premium is placed on workers' independence and responsibility through detailed specification of *savoir être* (attitude, similar to German *Fähigkeiten*) competences, for instance in the *couvreur-étancheur* or roofer profile, thus assuming a high degree of independence on the part of the construction worker. Construction continuing VET (CVET) tends to be organised by employers and employer organisations and is more fragmented.

Initiatives related to VET for LEC

Stepping-stone construction jobs is a government led initiative to encourage the integration of young people into the labour market and increase their recruitment into construction. Young people are considered to be an 'at risk' group and employers are required to invest 0.1% of their total salary outlay on the integration of such groups. The sectors can themselves determine 'at risk' groups, provided that they spend 0.025 per cent of their investment on young people under 26

BELGIUM – 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/retrofit
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/m ² /y)	✓

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

years of age. Sectors can benefit from extra resources if they double their contributions. Specific sectors can also determine the 'at risk' groups in a collective labour agreement (CLA). Stepping-stone construction jobs (*ETC - Emploi Tremplin Construction*) is a result of the CLA on the 'Sustainable integration, reintegration and vocational training of at risk groups' (25 June 2015). The CLA of 10 March 2016 explains what an ETC means and what conditions it must satisfy: a young person with less than one year's experience is taken on by a firm that provides mentoring and training suited to the young person's needs. After six months, the company carries out a performance interview. The scheme is funded by employer contributions and firms receive practical and financial support in drawing up the training plan, its organisation and administration. *Constructiv* provides sector-based support in delivering the training and a bonus of 1,000 Euros if a company meets these conditions.

National NZEB definition

According to the European Commission's Joint Research Centre for Policy Report (EC 2016a), NZEB definitions have been included in an official document in Belgium's three regions.

In their definitions, Belgium's three regions define NZEB for both residential and non-residential buildings and includes three specific subcategories: single family houses, apartment blocks, and offices (ibid: 16: Table 4).

In terms of building typology, classification, balance type, and physical boundary, Belgium's three regions refer to new buildings and renovations, private and public buildings, and single buildings respectively (ibid: 17-18: Figure 3).

The three definitions include four types of energy use: heating DHW; ventilation, cooling and A/C; auxiliary energy; and lighting. In addition, plug loads, appliances, IT, and central services may be possible to add in Belgium Flemish Region though the latter are not considered in Belgium Walloon region (ibid: 18-19: Table 5).

With regard to the specification of generation boundaries in the definition, Belgian regions' definitions consider on-site, off-site, and external generation. In the Belgium Flemish Region, crediting is foreseen on law (ibid: 20-21: Table 6).

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

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

RESIDENTIAL BUILDINGS (kWh/m ² /y)		NON-RESIDENTIAL BUILDINGS (kWh/m ² /y)		NOTES
NEW	EXISTING	NEW	EXISTING	
45 + max (0; 30- 7.5°C) + 15*max (0; 192/VEPR-1) kWh/m ² /y (Brussels region) E 30 (Flemish region) Ew45 and Espec85 (equal to 85 kWhEP/m ² /y)(Walloon region)	~ 54	95-2.5°C Or (95- 2.5°C)+[1.2*(x15) kWh/m ² /y (Brussels region) E 40 (Flemish region) Ew45 (Walloon region)	~ 108	Included energy use: Heating, DHW, appliances in Brussels and Walloon regions. Flemish and Walloon region: Maximum E defined as a percentage of a reference primary energy consumption

BELGIUM – 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
BE Brussels: From 1 January 2015, requirement on final/ primary energy demand close to Passive House standard (for housing, office, service buildings and schools)	BE Brussels: n/a	BE Brussels: The target is deeper defined in line with the Passivhaus requirements (e.g. net heating need below 15 kWh/m ² /y).	BE Brussels: Requirement on final/ primary energy demand close to Passive House standard (for housing, office, service buildings and schools).	BE Brussels: n/a	BE Brussels: The target is deeper defined in line with the Passivhaus requirements (e.g. net heating need below 15 kWh/m ² /y).
BE Flanders: Requirement on primary energy demand for new and non-residential buildings: 45 kWh/m ² /y	BE Flanders: n/a	BE Flanders: For residential and office buildings and buildings for education, E-level requirements have to comply with E60 since 2014. U-values have to be tightened. Next tightening is in 2016 (E 50) as follows: residential buildings and office buildings of public organisations: E50. Office buildings and buildings for education: E55.	BE Flanders: As other new buildings 2015: K 40, E 60, U-values tightened.	BE Flanders: n/a	BE Flanders: NZEB U-value requirements are the 2016 requirements. E level is sharpen to E 50 in 2016.
BE Wallonia: All new buildings have to comply with a "very low energy standard" from 2014 onwards (Ew< 80 and, for residential buildings, Espec130 kWh/m ² /y, K< 35).	BE Wallonia: n/a	BE Wallonia: Next tightening is in 2017 (E65 and, for residential buildings, Espec115).	BE Wallonia: As other new buildings	BE Wallonia: n/a	BE Wallonia: n/a

Intermediate energy targets

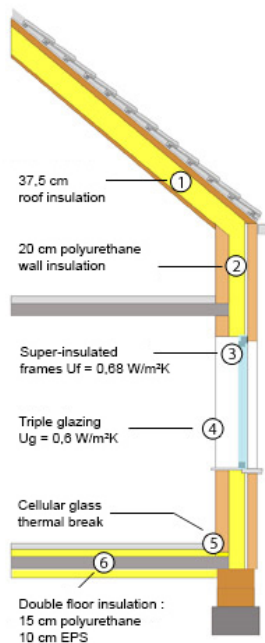
The three Belgian regions have set the intermediate targets above for all new buildings, and all new buildings occupied and owned by public authorities.

Case study

The case study refers to a single-family residential new built in Auderghem, Brussels region. The following observations complement, and should be read in conjunction with, the information contained in the National Report.

Brussels Centre NZEB standard appears to be essentially Passivhaus (PH) with variations in the Flanders and Wallonia regions. It is not possible to assess NZEB Primary Energy (PE) due to the use of PHPP data (PH design software known as 'Passivhaus planning package' – PHPP) which includes appliances.

FIGURES – 'Max.isol K19 pack'



Building type	K value	Estimated annual heating energy consumption
Team Construct passive house	K15	15 kWh/m² year
Team Construct house + Maxisol pack	K19	35 kWh/m² year
Standard Team Construct house	K30 k40	70 kWh/m² year
2010 insulation standards	K45	+/- 115 kWh/m² year
2004 insulation standards	K55	200 kWh/m² year
Walloon region standards 1995	K70	250 kWh/m² year
Old building	> K100	> 350 kWh/m² year

The Auderghem case study uses a package system variously described as 'Max.isol K19 pack' or 'Pack Max.isol K19'. The specification does not include renewables and is very similar to the Passivhaus design approach. The figures show 'Max.isol K19 pack' at 35 kWh/m²/y versus Passivhaus at 15 kWh/m²/y. The manufacturer claims this represents a reduction to 30% of Belgian 2010 building regulations. Note also, the 'Max.isol K19 pack' K19 value (35 kWh/m²/y) is below the 2015 qualitative target of K40 established for the Flanders region.

The Building Regulations for Flanders and Wallonia refer to various measures including an 'E' standard between 50 and 60, a K ratio of 40, a Be ratio of 450 and 'k values' for building elements such as walls:

- E-level is the Energy Performance expressed as the fraction of primary energy consumption (for heating, hot water production, auxiliary equipment and cooling, plus lighting in the case of offices, from which the production from the cogeneration and solar panels, if any, is subtracted), by an expression including the area of the building envelope with thermal losses, the volume, the ventilation rate and, in the case of offices, the usable floor area and a variable for lighting (<http://www.buildup.eu/sites/default/files/content/CA3-National-2012-Belgium-Brussels-ei.pdf>).
- The K ratio concerns the total level of thermal insulation calculated on the basis of a technical standard established by the Belgian Institute for Standardisation (IBN). It takes into account mainly the insulation of the various shells but neither solar heat, occupant behaviour or the efficiency of heating. The lower the K factor the better the total insulation of a dwelling.
- The Be ratio concerns the calculation of the net needs for energy for heating, which means taking into account the free inputs of solar heat. The calculation of the Be ratio is published in the "Arrêtés" of the Walloon Government of 15 February 1996, "Moniteur belge" of 30 April 1996 and 9 May 1996.
- A "k value" designates a heat loss coefficient of a wall system of a building. It allows the calculation of the specific heat loss of a wall while the K65 or K55 (note the capital K) is the heat loss value of a whole building (<https://www.iea.org/policiesandmeasures/pams/belgium/name-21669-en.php>).

Sources: <https://www.teamconstruct.be/en/maxisol-k19-pack> and <https://www.teamconstruct.be/en/passive-house>



Control units, EFB VET College workshop, Brussels



Mock-up of roofing insulation: CDR Training Centre, Brussels

VET for LEC visit to Belgium: Summary Report

The visit to Belgium took place on 4-5 December 2017, involving interviews at:

- EFP vocational training college, Brussels
- CDR training centre, *Centres de Référence* in the Brussels-Capital Region
- Belgian Construction Confederation
- *Constructiv*, the Belgian paritarian construction organisation

VET for LEC

Occupational profiles are drawn up through consultation between union, employer and educational representatives. With low energy construction (LEC), the *chapiste* (concrete layer/screeder) needs to know much more about what others are doing and the appropriate mix of cement for ground source heating. For *étancher des parois* (wall waterproofing) the abilities to close thermal bridges, achieve air tightness, and effectively communicate are necessary, whilst drilling operatives need to know the operational environment (e.g. not damaging insulation or creating thermal bridges, using insulation materials such as foil and being aware of damp screens). Occupational overlapping is well-established for hybrid unclassified occupations like the roofer/installer of photo-voltaic panels, though electricians belonging to a different sector, are just as likely as a roofer to install solar panels. Insulation does not have a particular profile though the *étancheur* (insulator) is envisaged to concern insulation and industrial heating vents etc. *Constructiv* considers that the *coffreur* (shutterer), *plafonneur* (partitioner), *maçon* and *electrician* are

suitable to further adaptation to meet LEC and renovation needs. Given that most construction occupations are broad-based and encompass overlaps with other occupations, the general principle holds that existing occupational classifications should remain but boundaries can shift as necessary without the need for new LEC occupations.

Constructiv has a legal obligation to build LEC houses and ensure that professional competence profiles are drawn up but has no control over actual qualifications. It creates the occupational standards to be followed up in the vocational training colleges, so that industry indirectly says what should be included. Performance standards have to be complied with (e.g. for damp screens) and are made available by SFMQ (*Service Francophone des Métiers et des Qualifications*), which translates professional profiles into the qualification profiles used by the colleges to devise curricula. All profiles are organised according to *savoir faire* (know-how), *savoir* (know-that) and attitudes. The state has no involvement, though innovation is ultimately driven by compliance requirements.

Training Colleges and Centres

Construction was well represented in the vocational training college visited, which encompassed 70 occupations (*métiers*) and associated workshops and classrooms for more theoretical work. The college is funded by the region and community. Levy money goes to *Constructiv*, whose role is to promote training, and only part finances training. Only 1% of school leavers choose construction and training varies between two and five years. College construction students spend 3 days per week in the company (e.g. on site) and 2 in college. Vocational trainers are entitled to six and a

half days training per year and have a personal responsibility to ensure their own professional updating.

The Centres de Référence in the Brussels-Capital Region, built with government support on a partnership between employment and training providers and employer representatives, work to improve training opportunities to better meet employer needs and to get the inhabitants of Brussels into work by providing complementary training or a chance to retrain and learn new skills. The one visited was co-founded seven years ago and is concerned mainly with greater sustainability and safer construction, running courses on safety, insulation, airtightness, working at heights, and waterproofing. The centre is responsible for green construction training of 3-9 months duration for the workless, with trainers trained in insulation and airtightness.

Labour market issues

The workforce ten years ago was 160,000, but is now 140,000, with a decline in direct employment and a rise in self-employment (now 60,000) and the use of posted workers (30,000). The union has had a campaign to recruit posted workers, for instance from Poland. Though a Belgian construction worker is paid about €30-35 per hour, posted workers' pay can be as low as €12-13. Union membership is over 90% and the unions are concerned with promoting the economic and employment benefits of LEC and renovation, life cycle analysis (grey energy) and recycling. However, their core role is to negotiate conditions of work. Collective agreements for skilled labour are mandatory

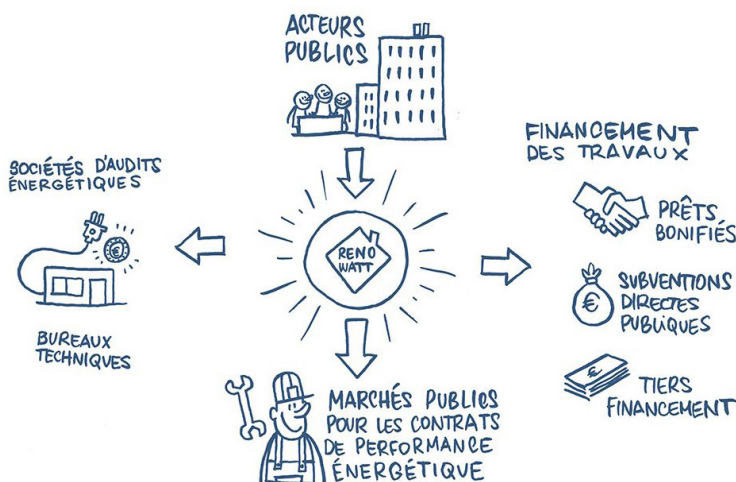
and wage levels are tied to them and to relevant qualifications. Workers are employed for 40 hours a week, and social benefits are good. The *Construbadge* and the *Bouwbadge* are forms of social ID for the construction sector, though a licence to practise only applies to self-employed.

Large French, Dutch and Danish contractors with their management in Belgium all belong to the Belgian Construction Confederation (BCC) as do small enterprises, of which the membership is 40,000 to 50,000. The self-employed can still be considered an employer and there is a special association for the self-employed. The BCC is involved in training at all levels, including responsibility for the self-employed (non-unionised) sector of the industry. BCC supports a dual system of VET but there is a general decline in apprenticeships. BCC is not keen on the creation of new occupations for energy efficiency, although recognising the need for some, for instance cladding and external insulation. Employers have programmes to encourage women but these are more successful at the 'white collar' end of the construction industry.

NZEB

NZEB definitions differ in different regions and, whilst there is little problem for new build, this is not the case with renovation; no basic standards are applied to deep retrofit. In general, there is a shortage of enterprises able or willing to carry out LEC work. An incentive scheme called ESCO (energy service company) exists where an owner pays for a deep retrofit through rent to the builder. Since 2011, EPC certification, stipulating the energy class and annual CO₂ emissions, is required if an apartment or a house is sold or rented. Building regulations are one route to enforce new standards and introduce LEC training and the way forward is to raise the bar. BCC argues that buildings older than 20 years should reach the standard of new build, as in electrical installation. There is no discussion concerning the carbon intensity of materials, though wood is gaining in popularity and has many advantages, for instance for prefabrication. 90% of building materials are recycled. There is a non-mandatory but costly LEC quality framework in Flanders; the Brussels regional authority also has a subsidy per square metre for Exemplary Buildings high in energy efficiency.

There are various initiatives, including Renowatt, a pilot project of energy renovation of public buildings in the province of Liège supported by the EU. It has involved: five Energy Performance Contracts for the renovation and the performance maintenance of 136 buildings, particularly insulation, with savings of 34% of energy consumption guaranteed; 322 direct jobs and 780 indirect jobs; 16,450 hours of training and/or use of social economy enterprises; and 12 public authorities.



Renowatt activity chart