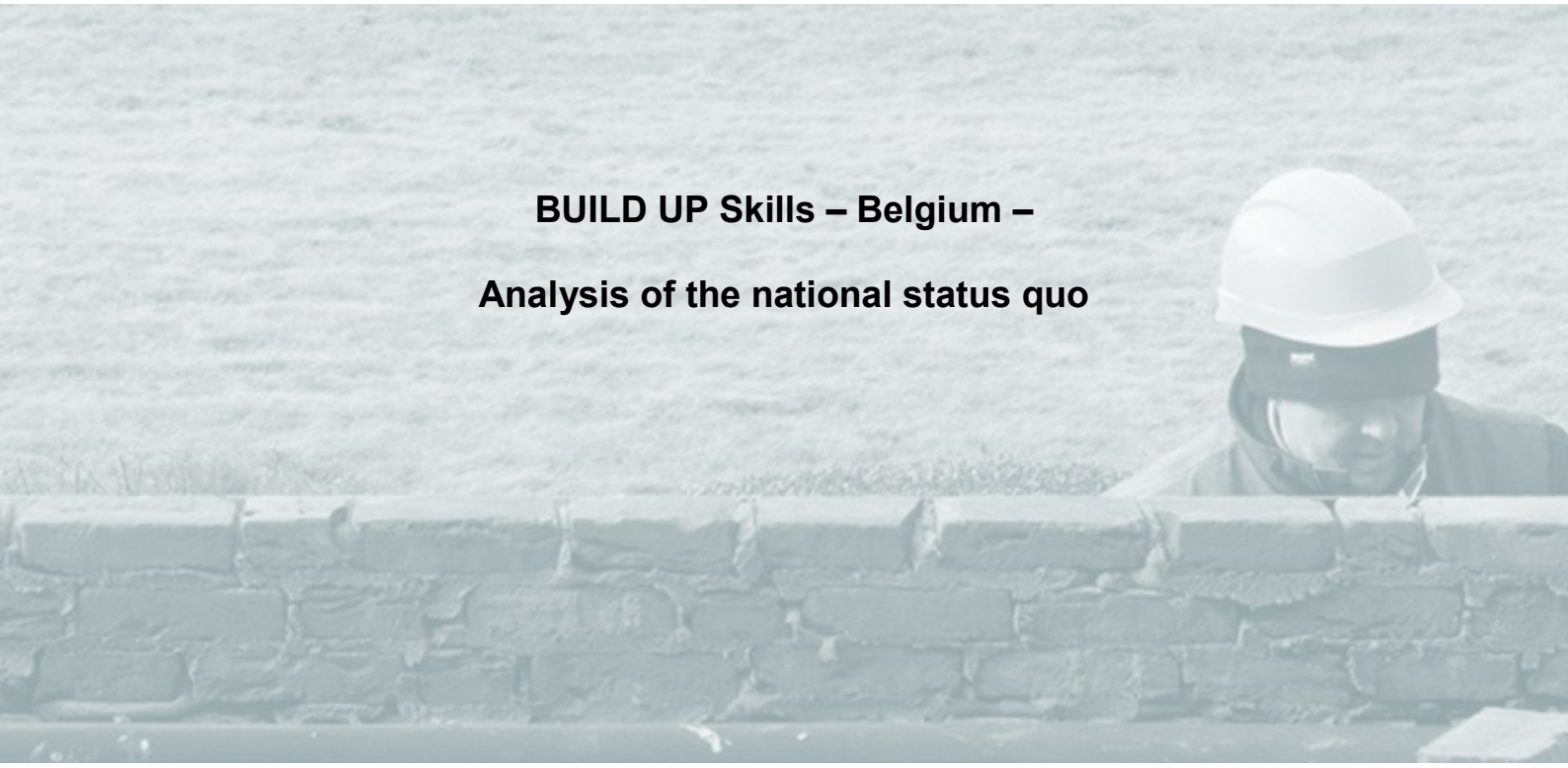
BUILD UP SKILLS

ENERGY TRAINING FOR BUILDERS



BUILD UP Skills – Belgium –

Analysis of the national status quo

August 2012

Further information

More details on BUILD UP Skills can be found at www.buildupskills.eu

More details on the IEE programme can be found at http://ec.europa.eu/intelligentenergy

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0 Executive summary

In the environmental field the 20-20-20 climate targets have been formulated by the EU. In concrete terms it is being postulated that by 2020:

- emissions of greenhouse gases will be cut by 20%,
- a 20% share of energy end-use will be from renewable energy sources and
- there will be a 20% saving in energy demand.

The construction sector can make an immense contribution to help society meet these targets. The means, among other things, that there will need to be an increase in the number of qualified workers. The transposition of these developments into appropriate craftsmanship and the qualifications they entail, training in short, perhaps constitutes the greatest challenge.

The European Community shares this concern. For this reason a call for projects was issued from the European authorities for projects to be set up in the various member states which would help in ensuring that the workers' qualification level is of a nature such that they are capable of erecting and renovating buildings that meet the new requirements. Build Up Skills Belgium is a consortium consisting of fvb-ffc Constructiv [the Belgian construction industry training fund], BBRI, VEA [the Flemish Energy Agency] and SPW-DGO4 [the Walloon Public Service for Planning, Housing, Heritage and Energy]. They are conducting research jointly in order to achieve the project target.

The results of this report will be used to prepare a step-by-step plan that will bring about a qualified workforce that has the requisite competencies to achieve the 2020 targets.

0.1 Key findings

0.1.1 Building stock

The McKinsey report (*'Pathways to world class energy efficiency in Belgium'*) concludes that Belgian energy consumption per square meter is well above the EU average (there is a gap of 72% with Europe as a whole and 51% with our neighbouring countries). Due to the climate in Belgium our heating needs are nevertheless slightly lower than those of our neighbours. The difference in consumption is therefore related to the nature of the Belgian building stock (older, less compact, less well insulated). Accordingly the greatest potential for energy savings is in existing buildings. (1).

0.1.2 Current energy consumption and green electricity generation

Total housing-related energy consumption appears to have remained more or less stable since the nineties, despite a rise in the number of families (+15% since 1990). Conversely electricity consumption in the residential sector has increased sharply.

	< 1946		1946-1970		1971-1990		1991-2005		> 2005	
	NER-H	PE	NER-H	PE	NER-H	PE	NER-H	PE	NER-H	PE
Detached house	334	603	343	603	238	499	165	311	103	157
Semi-detached housing	295	477	300	486	221	463	145	278	92	144
Terraced house	231	385	234	384	167	368	119	232	77	125
Self-contained apartment	140	252	134	243	99	264	93	197	60	112
Non self-contained apartment	341	560	333	549	204	488	163	319	99	159

Table 0.1 – Net energy requirement for heating (NER-H) and primary energy consumption (PE) of dwelling types [in kWh/yr.m²]

Total net green electricity generation rose in 2010 by over 20% compared with 2009. This rise is primarily the result of a spectacular increase in generation from PV panels.

0.1.3 Turnover

Research shows that an overwhelming majority of the annual intake of construction sector workers consists of young people without formal qualifications. This means in other words that there is a substantial intake of unqualified personnel. This shows that raising the competency level of the workforce up to standard constitutes a challenge for existing workers. Without losing sight of the formal qualification routes, a major effort will be needed to develop a competency policy that focuses on existing construction sector workers.

0.1.4 Barriers

Below you will find the barriers to arriving at a population of construction sector workers with a suitable level of competency, which were confirmed by 30% or more of respondents surveyed:

- a shortage of qualified workers (irrespective of training);
- a shortage of trained workers;
- high-quality execution of contracts does not offer any economic added value;
- existing training courses are too theoretical;
- the existing manpower allocation does not offer any opportunity to enter into any results or performance commitments;
- technical progress is not being followed up on soon enough;

- the way in which work is organised does not allow workers to be sent for training;
- the cost of training is too high to send workers for training;
- there are no results or performance commitments included in the scope of contract execution.

As the section on turnover suggests, the construction sector perceives a major shortage of qualified workers (irrespective of training too). In addition to this there is the call for high-quality work to be valued. The quality of existing training courses can also be improved, with better follow-up on technical progress in particular.

0.1.5 Population of construction sector workers

The table below shows numbers of construction sector workers per occupation (group):

Occupation (group)	2009	2010	2011	Estimated EE and RES training need for 2020
Construction machinery	21,788	21,944	23,044	2,300
Road worker	14,461	14,093	15,794	1,500
Bricklayer	27,078	26,714	25,393	6,400
Formworker/steel fixer	13,258	13,059	12,541	1,200
Rendering/Pointing worker	2,549	2,551	2,359	600
Floor covering layer/Tiler/Plasterer	11,667	11,682	10,712	2,500
Roofer	10,442	10,663	11,335	2,800
Joinery	24,281	24,633	25,457	6,400
Glazier	1,090	1,089	1,094	2,500
Insulation worker	2,646	2,662	3,652	900
CH fitter	6,076	6,257	6,736	2,250
Plumbing installer	5,537	5,684	6,092	2,050
Others	20,970	20,937	20,534	2,000
Total	163,852	163,978	166,754	33,400

Table 0.2 – Construction sector workers per occupation (group) and projected training need

This table also presents a rough estimate of the numbers of vocational practitioners to be trained. This is based on an estimate of annual turnover and the unqualified intake determined from it. This is estimated at 14% per annum. Accordingly this means around 100% of the total of vocational practitioners over a 7-year period. A quarter of the intake leaves the construction sector immediately, thus leaving 75%. Of these groups it is estimated that one in three will need training in the period leading up to 2020, or 25% of the total number of vocational practitioners in 2011. This percentage is estimated at 33% for CH fitters and Plumbing installers, for construction machinery, road workers and the 'others' category,

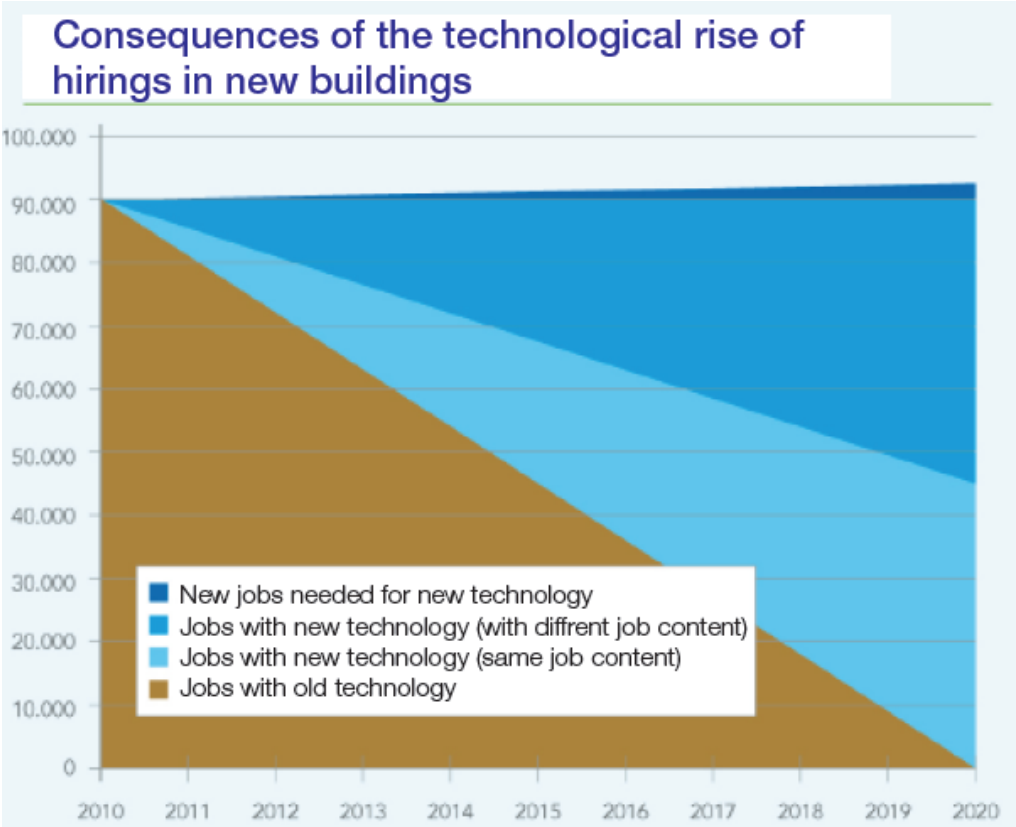
this percentage is estimated at 10%. The results of this exercise are shown in the table above.

1 Introduction

It is in the area of energy consumption that the greatest potential lies for reducing greenhouse gas emissions in buildings. Based on this observation the European Commission has included the buildings sector in its list of priorities for achieving the targets laid down in the “Europe 2020 strategy”. (2). That is why on 19 May 2010 it adopted a new directive on energy performance of buildings. This new directive that must be transposed by member states in July 2012 at the latest, entails, among other things, that as from 2021, it will be required of new buildings that they be nearly energy neutral. (3).

The challenges and hence the opportunities for construction companies are numerous. The size of these challenges in connection with cutting greenhouse gas emissions from buildings is a consequence of the poor energy performance of Belgian buildings. The McKinsey report (Pathways to world class energy efficiency in Belgium) concludes that Belgian energy consumption per square meter is well above the EU average (72% gap with Europe as a whole and 51% with our neighbouring countries). Due to the climate in Belgium our heating needs are nevertheless slightly lower than those of our neighbours. The difference in consumption is therefore related to the nature of the Belgian building stock (older, less compact, less well insulated). Accordingly the greatest potential for energy savings is in existing buildings. (1).

In the context of the 2020 strategy requiring by the EU to be implemented, we can conclude that all jobs that are involved in new build will be green jobs. All new buildings will in actual fact require to be nearly energy neutral. Changes in the construction process which will be necessary to produce these nearly energy-neutral homes will also have knock-on effects on work content. In passive buildings for instance there is very little, if any work for a heating installer, whereas in a ‘traditional’ building installing heating is a significant business. However installing ventilation is optional in a traditional house but all the more important in a passive dwelling. The heating-ventilation job content in new build will therefore, as part of the greening of the construction sector, shift from heating to ventilation. (2). In addition to ventilation with heat recovery (as used in a passive house) there is also the possibility of using demand-driven ventilation as an alternative. These demand-driven systems are more likely to be installed by electricians.



A survey conducted by IDEA Consult on behalf of the Building Confederation reveals that the attitude of contractors to sustainable building varies from passive (it must be done) to highly active (wanting to follow trends). The most active attitude can be found among contractors who carry out installations. In addition to this it is also evident that construction companies have a demand for additional training, both trade-related and non-trade-related courses. It is also evident that many contractors are still anxious about the price of sustainable building (4).

Training construction sector workers therefore merits due attention. An action plan will need to be developed within the construction sector. To this end a start can be made in various fields. Adapting existing vocational profiles to the new needs comes to mind here. Initiatives have already been adopted for this in within fvb-ffc Constructiv. At present workgroups have started adjusting those vocational profiles for which the need is greatest (roofing, installers, etc.). Adjustments to these vocational profiles are to result in changes to the various training programmes (for basic training courses, sandwich courses as well as advanced training courses). Furthermore thought can be given to developing specific training modules on technologies relating to Energy Efficiency and Renewable Energy. This should enable businesses to offer a rapid response to the changing requirements being imposed on their competencies. There must of course be sufficient training capacity available for this and trainers need to be adequately trained. Moreover training courses, regardless of their nature, also require to be of high quality. The BBRI as well as material manufacturers can also play an important part in content quality assurance.

2 Objectives and methodology

2.1 Report objective

This report analyses the current status quo in the Belgian construction sector and more specifically the situation for workers and/or technical staff. It provides an outline of the existing facilities in terms of training, the policy regarding it and the various operators.

2.2 Research objectives

Analysis is thus conducted on the construction sector and existing government policy on the one hand and at the same time an analysis is conducted on the education, development and training capabilities and the policy for these aspects on the other.

2.2.1 Sectoral analysis

An analysis of the construction sector in Belgium, the features of the construction sector in particular:

- the existing building stock;
- low-energy buildings;
- the existing workforce;
- energy and renewable energy;
- national and regional policy in terms of energy efficiency and renewable energy.

2.2.2 VET analysis (Vocational and educational training)

An analysis of the existing VET facilities:

- institutions responsible;
- training centres;
- training offer;
- training courses completed;
- problem areas in respect of training;

- new skills.

2.3 Research method

The data and analyses presented originate from all manner of sources. These sources are outlined in the summary below.

Literature review: a comprehensive arsenal of available literature and research was utilised for the purposes of this research. The sources of the various findings are shown in each case.

Database research: in the Belgian construction sector there are databases available in this field that contain information on the construction companies on the one hand and the workers who are active in the construction sector on the other. Moreover there is historic and current data available on the supply of training courses and training courses attended. These databases enabled a summary to be created of the supply of training and training courses completed on EE and RES in the construction sector.

Feedback: interim findings were fed back at set times to a group of stakeholders (see above for list). They could suggest adjustments where necessary. This enabled the quality of the findings to be maximised.

Workgroups: a number of workgroups are engaged at vocational level in mapping out the competencies required. These consist of representatives from management and workers, experts from the training industry, people with technical expertise and safety experts. These workgroups determine the competencies required within the various vocations.

Online survey: work was carried in stages in order to identify the various barriers. To start with, a workgroup identified the various potential barriers. This was followed by an online survey. 127 respondents replied to this survey.

The results of this survey are set out in this report.

2.4 Stakeholders

In the table below you will find a list of the various stakeholders who were consulted and who provided data for this report.

Name	Description
ABVV	Workers' representative, construction
ACLVB	Workers' representative, construction
ACV	Workers' representative, construction
Agoria	Employers' representative, technology industry
ATTB	Industry organisation (RES)
BCCA	Quality monitoring
BELPV	Industry organisation (RES, solar panels)
Bouwunie	Employers' representative, construction
BRC / CDR	Sectoral training centre (Brussels)
Bruxelles-Formation	Public training centre (Brussels)
Cifful	Training knowledge centre
Confederatie Bouw	Employers' representative, construction
Construtec	Sectoral training centre (Flanders)
CSTC	Construction research institute
EDORA	Industry organisation (RES)
EDUTEC	Sectoral training centre (Wallonia)
Espace Formation PME	Public training centre (Brussels)
Federplast	Industrial organisation (chemicals, plastics and rubber)
FEEBEL	Industry organisation (RES)
FEMA	Employers' representative, construction
FEPROMA	Employers' representative, construction
FOREM	Public training centre (Wallonia)
Fvb-ffc Constructiv	Joint training fund, construction
IBGE BIM	Public authority (Brussels)
IFAPME	Public training centre (Wallonia)
NELECTRA	Industry organisation (RES, electricity)
OCH-CFB	Joint training fund, timber
ODE (Arcadis)	Industry organisation (RES)
Passiefhuis-Platform	Industry organisation (passive buildings)
Plat-forme maison passive	Industry organisation (passive buildings)
SPW-DGO4	Public authority (Wallonia)
Syntra	Public training centre (Flanders)
VDAB	Public training centre (Flanders)
VEA	Public authority (Flanders)
VEROZO	Industry organisation (solar shading)
Vormelek	Joint training fund, electricity

Table 2.3 – BUSB Stakeholders

3 Features of the construction sector

3.1 General

The construction sector embraces various operations: house building (structural and finishing), industrial buildings and civil engineering (soil, roads and water works), as well as services (including project design and management) and the manufacture of materials and building components. The construction sector in Belgium generates 46.6 billion euros in turnover (22% in the Walloon Region, 11% in the Brussels Region and 66% in the Flemish Region). (5). This sector creates wealth in excess of 16 billion euros, i.e. a share of approximately 5% of GDP. (6).

The size of the businesses is in proportion to the scale of the projects on which they are working. We have seen nevertheless that two third of the businesses have no employees. 21% of them have 1 to 4 employees. Only 1% of companies have more than 50 employees. Small businesses operate mainly in the residential market. Medium-sized business dominate the non-residential market, and large companies are capable of taking on large infrastructure projects as well (7).

The construction sector operates mainly on a local basis; this manifests itself in more stable employment than other industrial sectors. The sector is less sensitive to changes in competitiveness. Large companies do operate internationally because an export market exists for large-scale construction and infrastructure projects.

Competitive positioning plays an important part especially in the manufacture of building materials, both within Europe and internationally. Advanced products are often imported at present. Some materials for which mass production is becoming significant, e.g. photovoltaic panels, are relocating to countries such as China where manufacturing costs are a great deal lower (7).

Competition between manufacturers of building materials is intense and based primarily on cost and price considerations. There is however sluggish evolution noticeable towards a more value-driven market. This means that manufacturers compete on the basis of the value of their products and that the market is prepared to pay more for products of better quality. This therefore brings about greater opportunities for niche players to specialise in offering more complex sustainable products. (8).

3.2 Challenges

3.2.1 Innovation

Innovation and sustainable building can exist at two levels:

1. products and processes and
2. the manufacturing process. The latter entails an approach that focuses more on using, upgrading and refurbishing buildings and infrastructure.

There is evidence of cross-sectoral innovation to an increasing extent, in other words: technologies from renewable energy for instance are being incorporated in building components. Thus solar cells for instance are built into roofing.

Innovation occurs mostly in knowledge centres. On the other hand, the application of this innovation in construction companies themselves and its permeation to the demand side is proceeding rather sluggishly. This is partly attributable to the large number of small businesses that do not always possess the trained employees or the resources to implement new technologies.

There is evidence of a rising level of automation and increasing use of prefabricated materials, because this offers greater benefits of scale and allows greater control of working conditions (e.g. the weather). This evolution is certainly of importance in green building because the higher environmental performance depends to a large extent on assembly accuracy. An additional benefit of using prefabricated materials is that technological innovations are easier to disseminate, even with small businesses (8).

3.2.2 Sustainable building

The concept of sustainable building entails consideration for the environment (e.g. energy efficiency), health (e.g. air quality) and social aspects (e.g. independence for the elderly).

Green building is a sub-aspect of sustainable building in which the focus is on the environmental dimension. The aim is to reduce the need for natural raw materials such as energy, water, land, non-renewables, etc. and the overall environmental impact of buildings and infrastructure. The life cycle approach is key to this. Green building embraces the entire chain of the construction process and the life cycle of the building, from design to demolition of the buildings, from developing and manufacturing building materials to recycling them.

Because the implementation of green building is possible on any scale and is appropriate in every activity, all companies operating in the construction sector are potentially engaged in green building, along with conventional business activities.

Various studies have attempted to identify the size of this share in practice. A survey with Building Confederation members in 2010 revealed that 70% of businesses are active in sustainable building (4).

The energy efficiency of residential buildings in Belgium is currently among the lowest in Europe. The total energy consumption of a home is accounted for mainly by consumption for heating, the ventilation or air conditioning system, hot water consumption and electricity.

4 National policy and strategies to contribute to the EU 2020 energy targets in buildings

4.1 National and regional policy in terms of energy

4.1.1 National and regional policy to meet the 2020 targets

The Belgian “National renewable energy action plan” was submitted to the European Commission on 1 December 2010. The federal government and the three regions compiled the plan. The plan describes how Belgium can achieve the target on renewable energy by 2020.

This target is binding. The measures, target percentages per sector (electricity, heat and transport) and the interim targets are only indications. The existing measures are assessed on a regular basis and – where necessary – additional measures introduced to eliminate any problem areas (arising).

The action plan describes the existing policy measures and regulations in respect of renewable energy and new measures in prospect: a minimum share of renewable energy in buildings, quality accreditation for installers and additional support for green heat. These measures are undergoing further elaboration.

In order to optimise regional policy, the target for Belgium is being transposed into a target for each region. Accordingly, each region can employ its optimum mix of renewable energy sources and tools. (9).

This National action plan is being reviewed at present. Its submission to the European Commission is scheduled to take place by September 2012. Given the provisional and confidential nature of the working document it cannot be implemented at present in this National Status Quo.

As soon as the National Action Plan has been sent to the EC, this document can be added to the NSQ by way of an addendum.

4.2 National and regional policy in terms of VET

4.2.1 National and regional policy in terms of green skills and jobs

One cannot talk about a policy per se on green skills and jobs. This is a policy that is to be developed on the one hand, on the other it is a fact that the construction sector traditionally attempts to respond to all qualification needs that might be established. As has been made clear in the introduction to this document, there are new skills. There is a need on legislative, policy and economic grounds to be able to implement these skills. At present the need to

acquire these new skills is being catered for by the existing sectoral training strategy. There are 3 pillars for this strategy: education, jobseekers and active construction sector workers. Green jobs and skills will be required in future to form an inextricable component of this sectoral strategy.

4.2.2 National and regional implementation of the EQF

The transposition of the European Qualification Framework into a National Qualification Framework was started in both the French and the Flemish Communities in 2005. The German-speaking community has only recently started this transposition. (10).

4.2.2.1 Flemish Community

4.2.2.1.1 General

The Flemish Parliament ratified the decree on the Flemish qualification structure at the end of April. This decree lays down, among other things, the [Flemish] qualification framework (*VKR* in Dutch) with level descriptors, qualification types as well as accreditation procedures. This structure comprises eight levels. They are distinguished from one another based on generic features of competencies. These level descriptors describe for each level the required knowledge and skills as well as the context and degree of autonomy and responsibility of the competencies. The bachelor's, master's and doctor's level descriptors set out in the decree on restructuring in higher education, are equivalent to the level descriptors of levels six, seven and eight respectively of the qualification framework.

It is an integrated structure that contains both training and vocational qualifications at all levels. The aim of this qualification structure is to raise the transparency of qualifications in Flanders and to clarify relationships (both horizontal and vertical) between the qualifications. Furthermore this should enable better communication to take place between the labour market and education.

The path from formal ratification to practical implementation is proceeding rather slower than anticipated. The implementation orders that enable the qualification structure to be used in practice have not been published yet.

4.2.2.1.2 Flemish Qualification Framework content

The qualification structure is a systematic arrangement of recognised qualifications based on a generally applicable framework. This arrangement is aimed at making qualifications and their interrelationships transparent so education, training providers as well as other players in the community can communicate unambiguously about qualifications and the competencies they embody.

The decree stresses that this Qualification structure can be used as a reference framework to bring about training courses that lead to recognised qualifications and to compare qualification certificates. Quality monitoring for the various paths leading to qualification is carried out by the Agency for Quality Assurance in Education and Training. This agency manages all types and levels of qualification, apart from level 5 to 8 educational qualifications.

4.2.2.1.3 Levels and descriptors

The qualification framework comprises eight different levels, ranging from level one up to level eight. Each level in the framework is described on the basis of a level descriptor. A level descriptor gives a generic description of the features of the competencies that pertain to the qualifications at that level and consists of five descriptor elements: knowledge, skills, context, autonomy and responsibility. They determine the level of the qualification. Level descriptors are used to describe both education and vocational qualifications and to rank them. Compared with the EQF (European Qualification Framework) these descriptors are more detailed, certainly so for the lower levels. Furthermore ‘competence’ is not classed as a separate descriptor element. On the other hand importance is attached to the context in which an individual can operate.

Correlating the EQF and the VKR revealed that the 8 EQF levels correspond to the 8 VKR levels.

4.2.2.1.4 Use of learning results

Competencies and the results of learning are viewed as mutually interchangeable. The descriptors based on learning results describe two major qualification categories: Vocational and educational qualifications. A vocational qualification, a completed and categorised set of competencies with which a vocation can be practised, these can be acquired within as well as outside an educational setting. An educational qualification, a completed and categorised set of competencies which are necessary to function and participate in the community, with which further studies in secondary or higher education can be embarked upon or with which vocational activities can be carried out. An educational qualification can only be acquired through education. Educational and vocational qualifications exist for all 8 levels.

4.2.2.1.5 VKR for Lifelong Learning and Higher Education

A qualification framework for higher education (geared to Bologna) has been developed and implemented already (2008). It can be claimed that this qualification framework is incorporated in the Flemish Qualification framework.

4.2.2.2 French Community

4.2.2.2.1 General

Although the idea of a Francophone Qualification Framework (FQF or *FKR* in Dutch) and the link with the EQF received great support, the pending question in connection with the integration of a higher education qualification framework into an all-embracing qualification framework is delaying operations. However the process has speeded up since the autumn of 2009. On 16 September 2010 the competent authorities decided that a qualification framework should be developed: a framework consisting of vocational and educational qualifications, divided into 8 levels and consistent with the EQF. The proposed framework is in line with the Flemish proposal.

4.2.2.2.2 Francophone Qualification Framework content

The aim of the FQF is to increase transparency of the existing education and training systems. This mechanism is not yet being viewed as a lever to reform institutes and structures at this time. However the framework is capable of facilitating development of aids and mechanisms that increase transparency, particularly the recognition of informal and non-formal learning.

The activities around developing a qualification framework for further education took place in parallel with the development of a lifelong learning qualification framework.

4.2.2.2.3 Levels and descriptors

An 8-level model is being proposed, in which the terms knowledge, skills, context, autonomy and responsibility are used. Detailed descriptors are still being developed at present.

4.2.2.2.4 Use of learning results

The use of learning results is an integral component of the training and education policy in the French Community. These results can indeed be described in in different ways, and the way in which they affect education and training can vary. In compulsory education learning results are described as '*socle de competences*' [skills base] and '*competences terminales*' [final skills]. For further education reference is made to '*capacités terminales*' [final abilities].

An interesting aspect of developments in the Francophone Qualification Framework is the methodology that positions qualifications on levels based on learning results. This methodology is based on four steps (and questions):

1. Can the qualification be ranked? Is a qualification issued?
2. How does the qualification relate to the FQF and EQF descriptors?
3. How does the qualification relate to other qualifications and regulations in the labour market?
4. At what level is the qualification to be ranked? A recommendation will be made on the basis of the 3 preceding steps.

4.2.2.3 German-speaking Community

4.2.2.3.1 General

The German-speaking Community will develop its own qualification framework. The approach by the other two communities will constitute a starting point for this. In addition inspiration will also be drawn from other countries such as the Netherlands and Germany. The model to be developed is likely to have 8 levels and comprise both educational and vocational qualifications.

5 Statistics on buildings and energy sectors

5.1 Statistics on the construction sector

5.1.1 Building stock

Data on the building stock was obtained mainly from official Belgian government statistics (11)(12). This data is often at variance with the statistics quoted in other references (13) (14) (15). For the sake of good order the authors therefore wish to state that for the purposes of this report they consider a multi-family dwelling as a unit rather than a number of housing units in multi-family dwellings. This method of approach stems from the thinking that if one housing unit in a multi-family dwelling is due for renovation, normally this will also be the case for the other housing units within the building. Although overall renovation of such buildings will not always be undertaken, it can indeed be said that, from an energy standpoint, the entire building should be considered. For the sake of completeness we will add some data in subsection 5.1.1.1 on the total number of housing units.

Comprehensive data was sometimes available. The authors however chose to consider data as from 2006, the year mandatory EPB reporting was introduced.

5.1.1.1 Distribution of building types

In the socioeconomic survey and studies (15) (16) the Belgian building stock was categorised according to the various building types. Here a distinction was drawn between single family and multi-family dwellings. Single family dwellings are generally further subdivided into terraced, semi-detached and detached housing. Table 5.4 shows an outline of the distribution of these building types in Belgium and the Regions.

		Single family dwellings			Multi-family dwellings[4, 5]	Others	Total
		TH[1]	SDH[2]	DH[3]			
2006	**Belgium**	**1,157,234**	**889,732**	**1,305,138**	**135,047**	**791,049**	**4,278,200**
	Flemish Region	*640,359*	*530,176*	*838,349*	*86,467*	*424,808*	*2,520,159*
	Walloon Region	*406,666*	*344,289*	*461,115*	*21,498*	*330,774*	*1,564,342*
	Brussels Capital Region	*110,209*	*15,267*	*5,674*	*27,082*	*35,467*	*193,699*
2007	**Belgium**	**1,158,298**	**895,758**	**1,316,775**	**140,092**	**789,542**	**4,300,465**
	Flemish Region	*640,881*	*534,465*	*845,141*	*89,716*	*423,212*	*2,533,415*
	Walloon Region	*407,523*	*345,965*	*465,957*	*22,579*	*331,205*	*1,573,229*
	Brussels Capital Region	*109,894*	*15,328*	*5,677*	*27,797*	*35,125*	*193,821*
2008	**Belgium**	**1,159,849**	**902,306**	**1,329,572**	**145,203**	**787,923**	**4,324,853**
	Flemish Region	*641,554*	*539,192*	*852,703*	*93,040*	*422,082*	*2,548,571*
	Walloon Region	*408,728*	*347,764*	*471,161*	*23,592*	*331,083*	*1,582,328*
	Brussels Capital Region	*109,567*	*15,350*	*5,708*	*28,571*	*34,758*	*193,954*
2009	**Belgium**	**1,161,245**	**909,469**	**1,341,971**	**150,552**	**787,112**	**4,350,349**
	Flemish Region	*642,191*	*544,141*	*859,855*	*96,574*	*421,496*	*2,564,257*
	Walloon Region	*409,817*	*349,959*	*476,388*	*24,706*	*331,165*	*1,592,035*
	Brussels Capital Region	*109,237*	*15,369*	*5,728*	*29,272*	*34,451*	*194,057*
2010	**Belgium**	**1,162,672**	**915,575**	**1,352,578**	**155,794**	**786,262**	**4,372,881**
	Flemish Region	*642,765*	*548,449*	*865,705*	*99,879*	*420,935*	*2,577,733*
	Walloon Region	*410,989*	*351,737*	*481,138*	*25,915*	*331,291*	*1,601,070*
	Brussels Capital Region	*108,918*	*15,389*	*5,735*	*30,000*	*34,036*	*194,078*
2011	**Belgium**	**1,164,209**	**922,108**	**1,362,462**	**160,787[6]**	**784,600**	**4,394,166[7]**
	Flemish Region	*643,417*	*552,866*	*870,939*	*103,077*	*419,989*	*2,590,288*
	Walloon Region	*412,135*	*353,824*	*485,792*	*27,082*	*330,976*	*1,609,809*
	Brussels Capital Region	*108,657*	*15,418*	*5,731*	*30,628*	*33,635*	*194,069*

1. TH: terraced housing
2. SDH: semi-detached housing
3. DH: detached housing, farmhouses and châteaux
4. For multi-family dwellings the building as such is described as a unit rather than each accommodation unit separately (as is actually the case in other reference documents). This may result in the figures (see below) appearing rather 'low'.
5. According to (14) 95% of multi-family dwellings are apartments, and only 5% are studios, lofts, etc.
6. By way of illustration: in 2011 there were 1,164,804 accommodation units in 160,787 multi-family dwellings.
7. By way of illustration: in 2011 there were 5,131,391 accommodation units in Belgium.

Table 5.4 - Outline data for building type distribution in Belgium (2006-2011) (12)

As shown in Table 5.5 and Table 5.6 the Belgian building stock consists primarily of single family dwellings (79%), followed by other buildings (18%) and multi-family dwellings (3%). There is a distinct difference between typical buildings in the Flemish and Walloon Regions and the Brussels Capital Region, where more terraced housing and multi-family dwellings (15%) occur.

	Single family dwellings			Multi-family dwellings	Others	Total
	TH	SDH	DH			
Belgium	**27%**	**21%**	**31%**	**3%**	**18%**	**100%**
Flemish Region	*15%*	*12%*	*20%*	*2%*	*10%*	*59%*
Walloon Region	*9%*	*8%*	*11%*	*1%*	*8%*	*37%*
Brussels Capital Region	*3%*	*0%*	*0%*	*1%*	*1%*	*4%*

Table 5.5 - Distribution of buildings in Belgium and the Regions by type (12)

	Single family dwellings			Multi-family dwellings	Others	Total
	TH	SDH	DH			
Flemish Region	*25%*	*21%*	*33%*	*4%*	*17%*	*100%*
Walloon Region	*26%*	*22%*	*30%*	*2%*	*21%*	*100%*
Brussels Capital Region	*56%*	*8%*	*3%*	*15%*	*18%*	*100%*

Table 5.6 - Distribution of buildings in the Regions by type [2]

	Single family dwellings			Multi-family dwellings	Others
	TH	SDH	DH		
Belgium	**1,332,857**	**939,174**	**1,376,255**	**1,164,804**	**318,301**
Flemish Region	*691,279*	*558,251*	*876,244*	*680,128*	*179,464*
Walloon Region	*446,670*	*363,621*	*493,927*	*201,847*	*94,647*
Brussels Capital Region	*194,908*	*17,302*	*6,084*	*282,829*	*44,190*

Table 5.7 - Accommodation units in Belgium and the Regions (2011)

	Single family dwellings			Multi-family dwellings	Others
	TH	SDH	DH		
Belgium	**1**	**1**	**1**	**7**	**0**
Flemish Region	*1*	*1*	*1*	*7*	*0*
Walloon Region	*1*	*1*	*1*	*7*	*0*
Brussels Capital Region	*2*	*1*	*1*	*9*	*1*

Table 5.8 - Number of accommodation units by building type in Belgium and the Regions (2011) (12)

5.1.1.2 Non-residential buildings

In order to give an idea of the importance of the sectors, and indirectly the need for buildings in the non-residential building stock, Table 5.9 shows the number of businesses for each NACE sector in Belgium and the Regions.

	NUMBER OF BUSINESSES																
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	PQZ	TOTAL
Belgium	**67,565**	**291**	**313**	**50,650**	**358**	**92,361**	**187,420**	**56,557**	**27,619**	**4,225**	**168,742**	**601**	**3,769**	**10,298**	**68,680**	**168**	**739,617**
Flemish Region	*42,897*	*190*	*120*	*31,584*	*169*	*56,752*	*112,611*	*34,014*	*17,008*	*2,310*	*100,808*	*337*	*2,357*	*6,032*	*42,298*	*58*	*449,545*
Walloon Region	*23,624*	*97*	*176*	*14,422*	*120*	*27,183*	*53,845*	*16,287*	*6,585*	*1,067*	*40,677*	*181*	*979*	*3,500*	*19,270*	*87*	*208,100*
Brussels Capital Region	*976*	*4*	*14*	*4,500*	*60*	*7,647*	*19,851*	*6,247*	*3,903*	*843*	*27,066*	*82*	*429*	*764*	*7,074*	*22*	*79,482*

A: Agriculture, hunting and forestry
B: Fisheries
C: Mineral extraction
D: Industry
E: Electricity, gas, water
F: Construction industry
G: Trade, repairs, vehicles & domestic items
H: Hotels, restaurants
I: Transport (except merchant navy and sports instructors), storage, communication
J: Financial institutions
K: Property, hire, services to businesses
L: Public administration
E-mail: Education
N: Health, social services
O: Communal, social and personal facilities
PQZ: Other

Table 5.9 - Number businesses by NACE business section in Belgium and the Regions (2007) (17)

In the sections that follow the key sectors as set out in (18) will be provided with some statistical data. Based on this data it cannot be concluded immediately that the percentage distribution quoted in (18) is applicable to the Belgian non-residential building stock.

5.1.1.2.1 Wholesale & retail

Belgium boasts around 8,500 shops (food and non-food), that account for a total floor space of approximately 7,500,000 m². The distribution by region matches the population density.

	convenience store		hypermarket		supermarket		Total	
	Number of shops	Total m²	Number of shops	Total m²	Number of shops	Total m²	Number of shops	Total m²
Belgium	1,219	237,910	95	670,650	2,446	2,330,942	3,760	3,239,502
Flemish Region	*726*	*144,000*	*50*	*315,250*	*1,425*	*1,309,752*	*2,201*	*1,769,002*
Walloon Region	*379*	*70,515*	*36*	*289,350*	*877*	*862,890*	*1,292*	*1,222,755*
Brussels Capital Region	*114*	*23,395*	*9*	*66,050*	*144*	*158,300*	*267*	*247,745*

Table 5.10 - Number of food businesses and total floor space by store type in Belgium and the Regions (2008) (19)

	Total	
	Number of shops	Total m²
Belgium	4,915	4,391,520
Flemish Region	*2,866*	*2,346,440*
Walloon Region	*1,674*	*1,755,265*
Brussels Capital Region	*375*	*289,815*

Table 5.11 - Number of non-food businesses and total floor space by store type in Belgium and the Regions (2008) (20)

5.1.1.2.2 Offices, semi-industrial and logistics buildings

The office, semi-industrial and logistics building stock comes to around 39,000,000 m². The largest number of offices is in the Brussels Capital Region, while the majority of logistics buildings are located in the Flemish Region. The number of buildings of a semi-industrial nature in relative terms is greatest in the Walloon Region.

	Offices	Semi-industrial buildings	Logistics buildings
Belgium	**19,137,221**	**13,973,394**	**5,879,340**
Flemish Region (21) (22)	*5,200,000*	*7,818,734*	*4,184,275*
Walloon Region (23) (22)	*1,400,400*	*5,685,486*	*1,441,755*
Brussels Capital Region (24) (22)	*12,536,821*	*469,174*	*253,310*

Table 5.12 - Floor space for offices, semi-industrial and logistics buildings in Belgium and the Regions (in m²)

5.1.1.2.3 Educational buildings

Research institutions, schools of music and art academies aside, Belgium boasts around 6,300 educational institutions.

	Primary education	Secondary Education	Higher education
Belgium	**4,567**	**1,680**	**89**
Flemish Community (25)	*2,527*	*1,071*	*29*
French Community (26)	*1,974*	*599*	*59*
German-speaking Community (26)	*66*	*10*	*1*

Table 5.13- Number of educational establishments in the Communities

5.1.1.2.4 Hotels

Over 50% van de Hotels in Belgium are located in the Brussels Capital Region. There is no data available regarding the age of the hotels.

	Number of hotels
Belgium	3,862
Flemish Region	*1,210*
Walloon Region	*639*
Brussels Capital Region	*2,013*

Table 5.14 - Number of hotels in Belgium and the Regions (2007) (17)

5.1.1.2.5 Hospitals

The 210 Belgian hospitals are spread across the regions approximately in line with population density.

	General	Psychiatric
Belgium	142	68
Flemish Region	*74*	*38*
Walloon Region	*47*	*20*
Brussels Capital Region	*21*	*10*

Table 5.15 - Number of general and psychiatric hospitals in Belgium and the Regions (2007) (17)(27)

5.1.1.3 Distribution of buildings by age

The data in Table 5.16 suggests that only 23% of buildings in Belgium were constructed post 1981.

	Single family dwellings			Multi-family dwellings	Others	Total	%
Number of buildings constructed	**TH**	**SDH**	**DH**				
before 1900	282,766	163,563	135,160	11,335	127,251	720,075	16%
from 1900 to 1918	183,445	68,869	42,050	7,986	48,099	350,449	8%
from 1919 to 1945	296,869	141,396	88,255	15,310	90,228	632,058	14%
from 1946 to 1961	170,668	174,034	145,433	24,795	110,326	625,256	14%
from 1962 to 1970	71,454	101,265	161,958	25,876	96,652	457,205	10%
from 1971 to 1981	77,456	116,383	272,954	23,899	115,110	605,802	14%
post 1981	81,551	156,598	516,652	51,586	196,934	1,003,321	23%
Total	1,164,209	922,108	1,362,462	160,787	784,600	4,394,166	100%

Table 5.16 - Age of building stock in Belgium (2011) (12)

Table 5.17, Table 5.18 and Table 5.19 reflect these statistics by Region. The Brussels Capital Region and the Walloon Region have a significantly older building stock relatively speaking than the Flemish Region. This is also suggested by (24).

In the Walloon and Brussels Capital Regions 51% and 66% of the buildings respectively were constructed before 1945.

Number of buildings constructed	Single family dwellings			Multi-family dwellings	Others	Total	%
	TH	SDH	DH				
before 1900	98,503	32,815	45,993	4,451	44,214	225,976	9%
from 1900 to 1918	77,479	23,636	18,624	2,660	19,120	141,519	5%
from 1919 to 1945	189,109	88,766	57,657	7,073	50,156	392,761	15%
from 1946 to 1961	111,636	122,732	100,624	13,522	57,350	405,864	16%
from 1962 to 1970	50,849	75,675	114,118	17,661	57,129	315,432	12%
from 1971 to 1981	53,981	83,397	181,566	17,466	67,448	403,858	16%
post 1981	61,860	125,845	352,357	40,244	124,572	704,878	27%
Total	643,417	552,866	870,939	103,077	419,989	2,590,288	100%

Table 5.17 - Age of building stock in the Flemish Region (2011) (12)

Number of buildings constructed	Single family dwellings			Multi-family dwellings	Others	Total	%
	TH	SDH	DH				
before 1900	165,740	130,256	88,967	4,482	73,829	463,274	29%
from 1900 to 1918	73,970	44,335	23,113	1,278	20,749	163,445	10%
from 1919 to 1945	74,290	47,902	29,225	1,820	32,753	185,990	12%
from 1946 to 1961	42,064	46,179	43,205	3,523	49,076	184,047	11%
from 1962 to 1970	17,171	23,579	46,879	3,708	37,944	129,281	8%
from 1971 to 1981	22,307	32,342	90,897	4,102	46,478	196,126	12%
post 1981	16,593	29,231	163,506	8,169	70,147	287,646	18%
Total	412,135	353,824	485,792	27,082	330,976	1,609,809	100%

Table 5.18 - Age of building stock in the Walloon Region (2011) (12)

Number of buildings constructed	Single family dwellings			Multi-family dwellings	Others	Total	%
	TH	SDH	DH				
before 1900	18,523	492	200	2,402	9,208	30,825	16%
from 1900 to 1918	31,996	898	313	4,048	8,230	45,485	23%
from 1919 to 1945	33,470	4,728	1,373	6,417	7,319	53,307	27%
from 1946 to 1961	16,968	5,123	1,604	7,750	3,900	35,345	18%
from 1962 to 1970	3,434	2,011	961	4,507	1,579	12,492	6%
from 1971 to 1981	1,168	644	491	2,331	1,184	5,818	3%
post 1981	3,098	1,522	789	3,173	2,215	10,797	6%
Total	108,657	15,418	5,731	30,628	33,635	194,069	100%

Table 5.19 - Age of building stock in the Brussels Capital Region (2011) (12)

In order to be able to show the age of building stock geographically by municipal district, building stock in (16) has been compiled in 5 types. Type 1 consists of municipal districts with a high proportion of pre-1919 buildings. Type 2 is characterised by an overrepresentation of buildings constructed during the interwar years. Type 3 is dominated by homes built between 1946 and 1970 and type 4 by homes of the period between 1971 and 1980. Type 5 concentrates finally on recent homes (mainly post 1980).

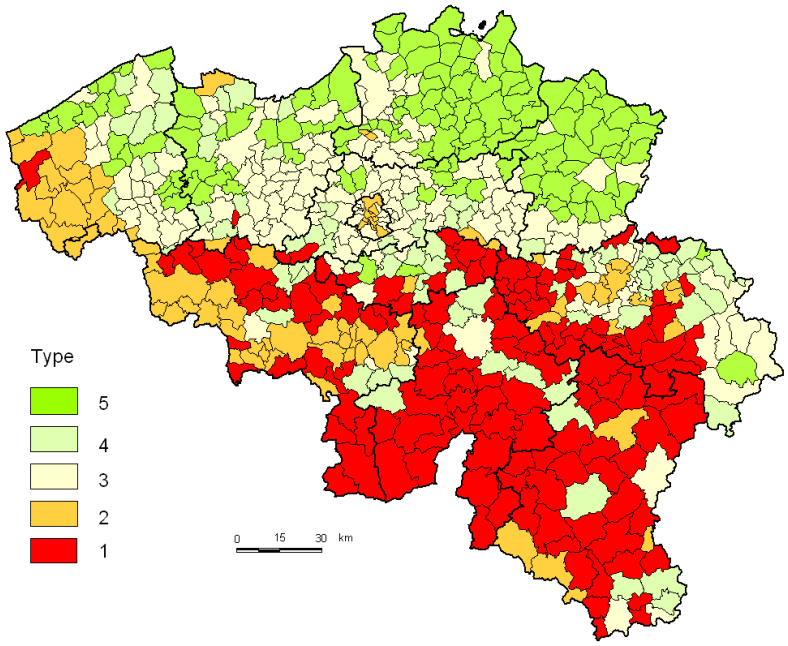


Figure 5.1 - Geographic representation of building stock. (16)

At first sight, it could be said that there is a significant difference between the Flemish Region and the others. The absolute numerical values for the Flemish Region (Table 5.4) suggest however that there are many old buildings still standing in Flanders, but that a substantial increase in new buildings is concealing this.

Compared with neighbouring countries Belgium has a relatively outdated building stock (28).

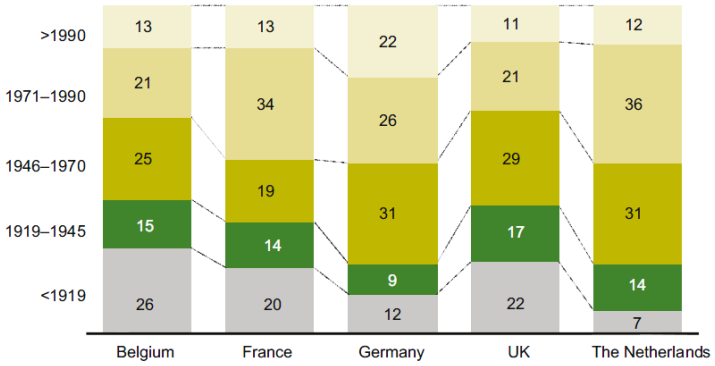


Figure 5.2 – Age of building stock by period in some neighbouring countries (2005) (28)

5.1.1.4 *Annual rate of new build and refurbishment*

Statistics concerning the issue of building permits in Belgium show that approximately 28,000 permits are issued a year which relate to renovating residential buildings and around 5,500 for refurbishing non-residential buildings. This equates to around 33,500 renovations over a total building stock of approximately 4.25 million buildings, or a renovation rate of 0.79% a year (11). This is against a background of 77% of buildings in Belgium having been built before 1981.

At around 25,000 new build residential and 4,000 new build non-residential buildings the annual new build rate of the past decade is approximately 0.74% a year. (11) (12). This places Belgium below the estimated European average increase of 1% (18).

		residential			non-residential	
		new build		renovation	new build	renovation
		number of single family dwellings	number of multi-family dwellings	number of buildings	number of buildings	number of buildings
2006	**Belgium**	**26,596**	**4,099**	**28,734**	**4,508**	**6,073**
	Flemish Region	*17,454*	*3,052*	*18,019*	*3,464*	*4,265*
	Walloon Region	*9,015*	*865*	*9,337*	*999*	*1,666*
	Brussels Capital Region	*127*	*182*	*1,378*	*45*	*142*
2007	**Belgium**	**23,841**	**3,688**	**27,792**	**4,521**	**5,968**
	Flemish Region	*15,684*	*2,642*	*17,560*	*3,593*	*4,196*
	Walloon Region	*8,075*	*887*	*9,021*	*891*	*1,616*
	Brussels Capital Region	*85*	*159*	*1,211*	*37*	*156*
2008	**Belgium**	**24,290**	**3,387**	**28,520**	**4,774**	**5,857**
	Flemish Region	*15,845*	*2,353*	*17,898*	*3,824*	*3,960*
	Walloon Region	*8,290*	*891*	*9,287*	*898*	*1,739*
	Brussels Capital Region	*155*	*143*	*1,335*	*52*	*158*
2009	**Belgium**	**21,632**	**2,842**	**27,697**	**4,417**	**5,221**
	Flemish Region	*14,545*	*1,930*	*17,216*	*3,562*	*3,556*
	Walloon Region	*6,968*	*791*	*9,078*	*817*	*1,513*
	Brussels Capital Region	*119*	*121*	*1,403*	*38*	*152*
2010	**Belgium**	**24,082**	**2,952**	**28,812**	**4,740**	**5,245**
	Flemish Region	*16,727*	*2,031*	*18,037*	*3,838*	*3,456*
	Walloon Region	*7,249*	*805*	*9,323*	*864*	*1,655*
	Brussels Capital Region	*107*	*115*	*1,451*	*37*	*133*
2011	**Belgium**	**13,860**	**1,699**	**18,626**	**3,161**	**3,601**
	Flemish Region	*9,507*	*1,155*	*11,420*	*2,593*	*2,360*
	Walloon Region	*4,304*	*487*	*6,093*	*558*	*1,132*
	Brussels Capital Region	*50*	*55*	*1,116*	*10*	*110*

Table 5.20 - Building permits issued for new build and renovations in Belgium and the Regions (2006 - August 2011) (11)

If we consider the renovation and new build rate by region and compare this with the total share of the building stock by region, it is evident that more construction and renovation is being done in the Flemish Region than in the other regions.

	new build rate (absolute)	renovation rate (absolute)	new build rate (relative)	renovation rate (relative)	Share of building stock
Belgium	**0.74%**	**0.79%**	**100%**	**100%**	**100%**
Flemish Region	*0.51%*	*0.50%*	*69%*	*64%*	*59%*
Walloon Region	*0.22%*	*0.25%*	*30%*	*32%*	*37%*
Brussels Capital Region	*0.01%*	*0.03%*	*1%*	*4%*	*4%*

Table 5.21 - Renovation and new build rate by region (absolute and relative)

5.1.2 Statistics on low-energy buildings

A definition is given in (29) for 'low-energy dwellings' in order to be able to qualify for a federal tax credit.

This states that a low-energy dwelling is taken to mean a dwelling that is located in a member state of the European Economic Area for which the total energy demand for space heating and cooling is restricted to 30 kWh/m².yr of climate-controlled floor space. According to (30), this criterion will be met if a combination of a K rating lower than K25, and E rating lower than E40 and good airtightness is achieved.

Regardless of the aforementioned definition, the Regions do not give any set definitions for 'low' or 'very low' energy dwellings or 'passive houses'. This is due, among other things, to the direct link between such designations and the prevailing level of the requirements. If the requirement level shifts upward, the designation will move with it.

In the current data from the VEA (Flemish Region) and viewed in relative terms relative to the current level of requirements, for residential buildings in the Flemish Region the E60/E40 group are considered to be 'low' or 'very low' energy buildings. However there is no connection between the E rating, the K rating and consumption in kWh/m².yr. There are no definitions available for low-energy offices, schools or industrial buildings either.

In order to comply with the term 'low-energy dwelling' at this time, the Brussels Capital Region refers to a net heating demand ≤ 60 kWh/m².yr (31) and in some cases of an E rating ≈ E60(32). The Walloon Region quotes an E rating ≤ E_w60 and a K rating ≤ K35 (33).

5.1.2.1 Number of low-energy buildings

5.1.2.1.1 Flemish Region

A facility for submitting EPB statements has existed since 2007. In view of the fact that the average time lapse between the permit application date for the and the EPB statement submission date is about 2 years, a significantly greater number of declarations have been lodged as from 2009.

	2006	2007	2008	2009	2010	2011	Total
Start declaration	4,520	20,809	24,573	24,769	26,738	25,570	126,979
EPB statement		965	8,039	21,206	30,665	34,152	95,027

Table 5.22 - Number of start declarations and EPB statements per submission year (34)

The proportion applicable to the Flemish Region of EPB applications relating to new build, complete rebuild or demolishing is 73% against 27% for other work, such as minor partial rebuild, small extensions, alterations and change of use.

Over 96% of EPB statements are submitted in order to construct a residential building. Single family dwellings account for around 60% of these. The number of EPB statements for new, rebuilt or demolished offices or schools, buildings with another specific purpose or industrial buildings, is relatively small (34).

Figures for E ratings achieved in new buildings, broken down by year of application for the urban planning permit, show some interesting and positive developments.

Year	Single family dwellings		Multi-family dwellings		Office buildings		School buildings	
	$E_{average}$	$K_{average}$	$E_{average}$	$E_{average}$	$K_{average}$	$K_{average}$	$E_{average}$	$K_{average}$
2006	86	40	86	100	100	39	87	37
2007	83	39	84	87	88	36	80	37
2008	80	38	82	83	83	35	61	32
2009	77	36	80		81	37	78	35
2010	70	33	75	79	71	33	70	36

Table 5.23 - Average E rating and K value for new build buildings in the Flemish Region [source: VEA]

Figure 5.3 shows that the group of ‘E60-E80’ builders is clearly increasing. This group rose gradually from 27% in 2006 to 63% in 2010. This was matched by a decrease in the group of ‘E100-E80’ builders from 69% in 2006 to 33% in 2009 and on down to virtually nil in 2010. New buildings are clearly more energy-saving.

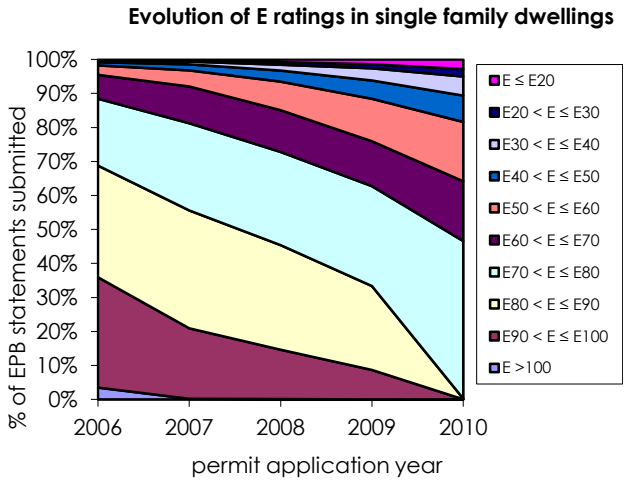


Figure 5.3 - Evolution of E ratings in single family dwellings [source: VEA]

This positive trend notwithstanding, the 'pioneer' group that is building to a higher energy-saving standard than the stipulated requirement, is growing rather slowly. For permits applied for in 2010, around 35% are building a low-energy dwelling rated at E60 or lower.

By analogy with new build dwellings, for apartments the group with an E rating between E60 and E80 is also growing and the E80-E100 group was clearly disappearing in the 2006-2010 period.

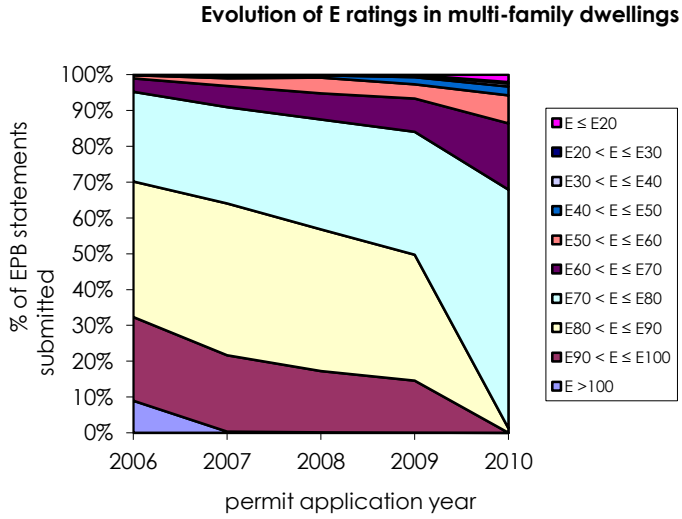


Figure 5.4 - Evolution of E ratings in multi-family dwellings [source: VEA]

A similar trend can be observed in office buildings where a rise from 8% to 30% can be noted for buildings with an E rating of 70 or lower.

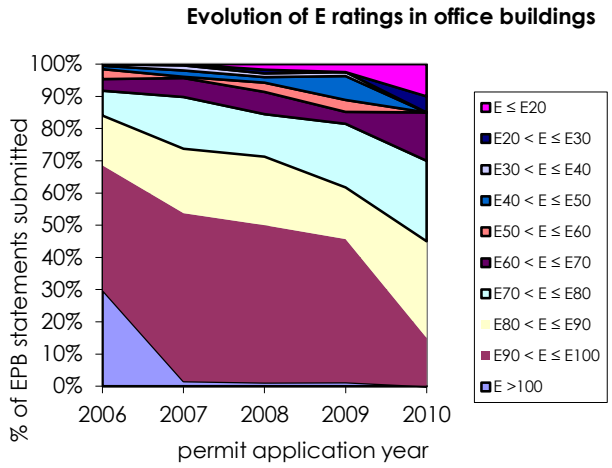


Figure 5.5 - Evolution of E ratings in office buildings [source: VEA]

Of the building permits applied for in 2010, 18.5% of the files state the utilisation of at least one renewable energy measure (solar water heaters, heat pumps or PV). This accounted for a mere 6% in 2006.

Data from the Flemish Energy Agency (VEA) suggests that the majority of E40-E60 or lower dwellings achieve a low E rating by utilising innovative systems (heat pumps, type D ventilations systems, PV, solar water heaters) and not so much by purely optimising the building shell (thorough insulation and airtight building shell). Airtight building however is gaining ground given its quite low investment cost and large impact on a building's energy performance. VEA audits reveal that airtightness measurements in dwellings in 2007 was still rare with just 3.5% of new residential buildings in which an airtightness test had been carried out in order to validate the effort of airtight building in the E rating. In 2010 this percentage had risen to 22%. The buildings that were tested were found to achieve very good energy performance. They achieved an average E rating of E62, which is noticeably lower than the overall average of E83.

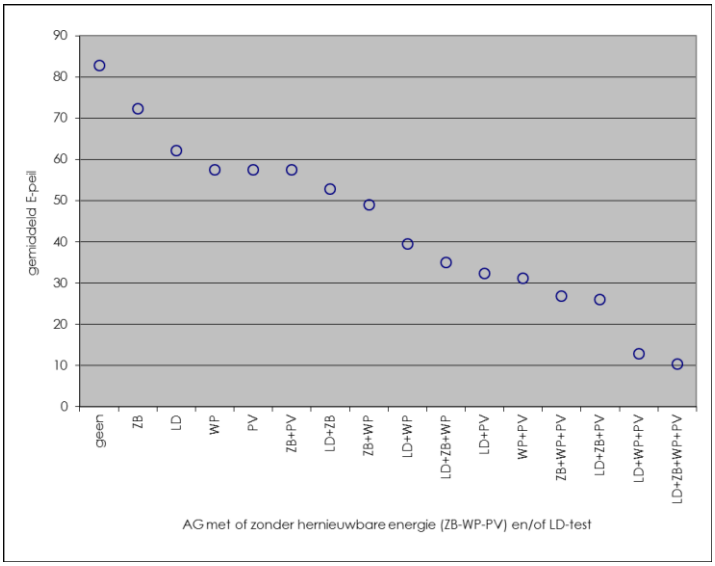


Figure 5.6- Average E rating according to measure(s) utilised [source: VEA]

ZB: Solar water heater; LD: air density; WP: heat pump; PV: photovoltaic cells

5.1.2.2 Annual rate of new build and renovation in terms of energy efficiency

5.1.2.2.1 Flemish Region

Annual increases have been observed since 2006 and are shown in Table 5.24 and Table 5.25.

	2006 – 2007	2007 – 2008	2008 – 2009	2009 – 2010
E70 < E ≤ E80	5.98	1.75	1.96	16.97
E60 < E ≤ E70	3.79	1.47	0.93	4.38
E50 < E ≤ E60	1.95	3.67	4.10	4.94
E40 < E ≤ E50	0.84	1.48	2.12	2.38
E30 < E ≤ E40	0.38	0.89	1.87	2.02
E20 < E ≤ E30	0.11	0.41	0.41	1.01
E ≤ E20	0.15	0.52	0.64	1.41

Table 5.24 - Annual increase in the number of applications for single family dwellings within a certain E rating interval (in %) [source: VEA]

	2006 – 2007	2007 – 2008	2008 – 2009	2009 – 2010
E70 < E ≤ E80	1.85	3.79	3.63	32.34
E60 < E ≤ E70	2.16	1.39	1.99	9.24
E50 < E ≤ E60	1.27	2.24	-0.41	3.84
E40 < E ≤ E50	0.39	0.17	1.33	0.48
E30 < E ≤ E40	0.45	-0.39	0.55	0.19
E20 < E ≤ E30	0.03	0.01	-0.04	0.41
E ≤ E20	-0.01	0.04	0.01	2.01

Table 5.25 - Annual increase in the number of applications for multi-family dwellings within a certain E rating interval (in %) [source: VEA]

Figure 5.7 shows a picture of the annual increase in the utilisation of renewable energy and airtightness measures as they appear in EPB statements for single and multi-family dwellings.

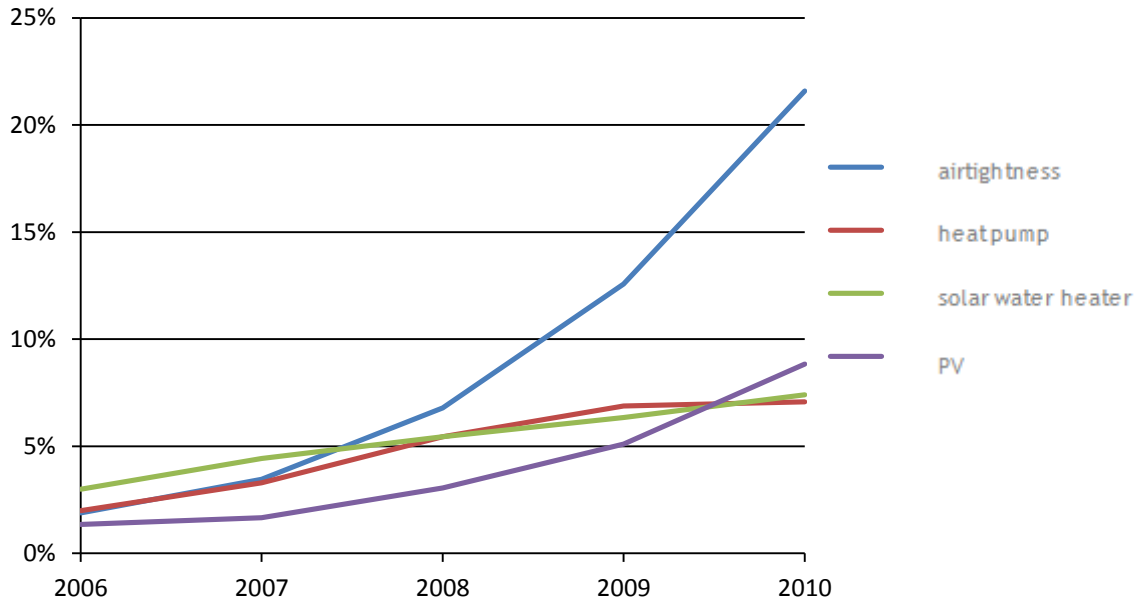


Figure 5.7 - Annual increase in renewable energy and airtightness measures in single and multi-family dwellings [source: VEA]

5.1.3 Businesses in the construction sector

5.1.3.1 Evolution

5.1.3.1.1 Evolution by Region

The table below shows the evolution in the number of employees who are part of PC 124, the joint committee for the construction industry.

Region	2009	2010	2011
Brussels	1,788	1,811	1,776
Flanders	18,452	18,559	18,593
Wallonia	10,111	10,100	10,078
Total	*30,351*	*30,470*	*30,447*

Table 5.26 Evolution in employers by Region

5.1.3.1.2 Evolution by business size

The table below shows the evolution in the number of employees in PC 124 by business size.

Business size	2009	2010	2011
0-5	23,719	23,741	23,664
6-19	5,132	5,205	5,258
20-49	1,141	1,156	1,142
50-99	237	240	247
100-249	96	102	108
250-499	22	20	21
+500	4	6	7
Total	*30,351*	*30,470*	*30,447*

Table 5.27 Evolution in employees by business size

5.1.3.1.3 Evolution by sector

The table below shows the change in the number of employees in PC 124 by sub-sector.

Business size	2009	2010	2011
Structural	10,689	10,828	10,761
Other finishing	4,236	4,283	4,263
Joinery	4,138	4,229	4,225
Structural finishing	3,251	3,231	3,228
Plumbing and CH	3,075	3,185	3,177
Others	1,805	2,233	2,214
Trade/Hire	1,406	1,066	1,062
Unknown	1,080	750	857
Road construction	638	633	628
Dredging	33	32	32
Total	*30,351*	*30,470*	*30,447*

Table 5.28 Evolution in employers per sector

5.2 Statistics on existing workforce in the construction sector

5.2.1 Evolution

5.2.1.1 Evolution by age

The table below shows the number of workers employed in the construction sector by age category.

Age	2009	2010	2011
15-19	475	2,632	2,673
20-24	17,612	19,585	19,888
25-29	21,923	22,464	22,811
30-34	20,682	20,510	20,827
35-39	20,685	20,424	20,740
40-44	22,180	21,857	22,196
45-49	21,836	21,284	21,613
50-54	19,127	18,454	18,739
55-59	12,533	10,937	11,106
60-65	4,789	3,821	3,880
Total	161,843	161,968	164,743

Table 5.29 Evolution in workers by age

5.2.1.2 Evolution by occupation

In the table below you will find the number of workers per vocation who are employed in PC 124.

Occupation	2009	2010	2011
1. Mechanic (for dredging sector)	1,125	1,098	1,114
2. Dredging worker	958	928	1,017
3. Tower crane operator	1,324	1,303	1,247
4. Mobile crane/telehandler operator	2,203	2,235	2,394
5. Borer	1,006	1,049	1,136
6. Wellpoint drainer	588	611	657
7. Pile-driver operator	410	419	449
8. Driver	8,813	8,785	8,923
9. Site plant operator	7,444	7,542	8,238
10. Road worker	14,461	14,093	15,794
11. Natural stonemason	2,390	2,307	2,274
12. Bricklayer	27,078	26,714	25,393
13. Formworker	9,027	8,876	8,585
14. Steel fixer	4,231	4,183	3,956
15. Concrete repairer	1,019	1,005	979
16. Prefab erector	2,020	2,018	1,959
17. Rendering worker	1,198	1,204	1,133
18. Pointing worker	1,351	1,347	1,226
19. Floor covering layer	2,072	2,071	1,914
20. Tiler	3,753	3,756	3,599
21. Plasterer	5,842	5,855	5,199
22. Roofer	5,906	6,021	6,338
23. Weatherproofing roofer	4,536	4,642	4,997
24. Joiner - Carpenter	20,644	20,913	21,621
25. Interior fitter	3,637	3,720	3,836
26. Glazier	1,090	1,089	1,094
27. Scaffolding erector	2,186	2,190	2,093
28. Industrial insulation worker	2,646	2,662	3,652
29. Central heating fitter	6,076	6,257	6,736
30. Plumbing installer	5,537	5,684	6,092
31. Painter-decorator	7,762	7,849	7,611
32. Industrial painter	1,828	1,859	1,799
33. Storeman	1,682	1,679	1,689
Total	161,843	161,968	164,743

Table 5.30 Evolution in workers by occupation

We see an increase in the following occupations (evolution over three years in brackets):

- Roofer (+432)
- Weatherproofing roofer (+461)
- Joiner - Carpenter (+977)
- Industrial insulation worker (+1006)
- Central heating fitter (+660)
- Plumbing Installer (+555)
- Site plant operator (+984)

These are precisely the occupations (apart from site plant operator) that have a major impact in the field of Energy Efficiency and Renewable Energy.

5.2.2 In depth

5.2.2.1 Occupation by region

In the table below you will find the number of workers per occupation who are employed in PC 124, and broken down by region.

Occupation	Brussels	Flanders	Wallonia	Total
1. Mechanic (for dredging sector)	126	731	257	1,114
2. Dredging worker	152	749	116	1,017
3. Tower crane operator	91	729	427	1,247
4. Mobile crane/telehandler operator	127	1,633	634	2,394
5. Borer	64	787	285	1,136
6. Wellpoint drainer	48	417	192	657
7. Pile-driver operator	29	297	123	449
8. Driver	674	5,861	2,388	8,923
9. Site plant operator	457	5,690	2,091	8,238
10. Road worker	1,116	10,697	3,981	15,794
11. Natural stonemason	77	1,655	541	2,274
12. Bricklayer	1,867	14,822	8,705	25,393
13. Formworker	635	5,101	2,849	8,585
14. Steel fixer	357	2,436	1,163	3,956
15. Concrete repairer	79	594	305	979
16. Prefab erector	127	1,247	585	1,959
17. Rendering worker	97	700	336	1,133
18. Pointing worker	117	764	345	1,226
19. Floor covering layer	114	1,201	599	1,914
20. Tiler	211	2,275	1,112	3,599
21. Plasterer	307	3,160	1,731	5,199

Occupation	Brussels	Flanders	Wallonia	Total
22. Roofer	244	3,761	2,333	6,338
23. Weatherproofing roofer	163	3,010	1,825	4,997
24. Joiner - Carpenter	888	14,882	5,850	21,621
25. Interior fitter	175	2,642	1,020	3,836
26. Glazier	80	764	249	1,094
27. Scaffolding erector	197	1,340	556	2,093
28. Industrial insulation worker	128	2,883	641	3,652
29. Central heating fitter	564	4,076	2,096	6,736
30. Plumbing installer	500	3,705	1,887	6,092
31. Painter-decorator	719	4,878	2,014	7,611
32. Industrial painter	176	1,122	500	1,799
33. Storeman	117	1,072	499	1,689
Total	10,822	105,684	48,237	164,743

Table 5.31 Workers by occupation and by region

5.2.2.2 By qualification and by age

There is no data for the number of workers by qualification level, however in the construction sector building tradesmen are paid on the basis of a pay scale that is related to the qualification level or experience of the worker in question. Based on this data we were able to compile the table below.

Age	Unskilled		Experienced		Trained, grade 1		Trained, grade 2		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
15-19	1,549	66.0%	683	29.1%	94	4.00%	21	0.9%	2,347	100.0%
20-24	7,724	39.7%	8,158	41.0%	2,570	13.2%	985	5.1%	19,437	100.0%
25-29	4,955	21.0%	8,659	38.4%	5,889	26.1%	3,034	13.5%	22,537	100.0%
30-34	3,331	16.4%	6,668	32.7%	6,026	29.6%	4,334	21.3%	20,359	100.0%
35-39	2,882	13.0%	6,119	27.6%	7,043	31.8%	6,104	27.6%	22,148	100.0%
40-44	2,343	10.1%	5,633	24.3%	7,536	32.6%	7,634	32.0%	23,146	100.0%
45-49	1,825	8.4%	4,757	21.8%	7,364	33.8%	7,855	36.0%	21,800	100.0%
50-54	1,183	6.3%	3,708	19.8%	6,497	34.6%	7,382	39.3%	18,771	100.0%
55-59	642	6.1%	1,821	17.4%	3,562	34.0%	4,438	42.4%	10,463	100.0%
60-64	535	15.4%	560	16.2%	948	27.4%	1,422	41.0%	3,465	100.0%
Total	26,968	*16.4%*	*46,766*	*28.43%*	*47,528*	*28.9%*	*43,210*	*26.3%*	*164,473*	*100.0%*

Table 5.32 Workers by age and qualification level

5.3 Statistics on energy and renewable energy in buildings

Where energy consumption is concerned, the various sources juggle with different energy units (boe, toe, MWh, PJ, etc.). When two sources are considered and the units are converted, this does not necessarily result in similar figures.

In order to arrive at national statistics, subsection 5.3.1. shows Eurostat data, instead of simply adding up the figures obtained from the Regions.

In 2005 residential and commercial buildings in Belgium were responsible for 35% of total primary energy consumption (PE). Residential buildings consumed 73% (39 million BOE) of PE. Within non-residential buildings there is virtually equal distribution among schools, hospitals and commercial buildings (10 million BOE each).

According to the McKinsey report (1) (28) average residential energy consumption in Belgium in 2005 amounted to around 348 kWh/yr.m², over 72% above the average for the EU-25 countries. The building stock does not appear to perform as well as it does in neighbouring countries either, where a similar climate nevertheless prevails.

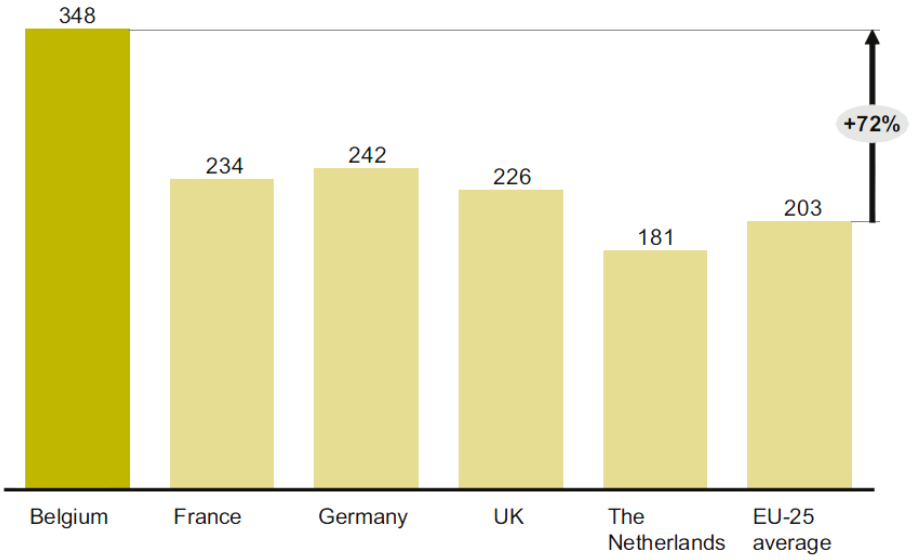


Figure 5.8 - Average residential energy consumption in some European countries [in kWh/yr.m²] (2005) (28)

There are several reasons for this. Not only, as shown earlier in Figure 5.2, is the Belgian building stock outdated compared with neighbouring countries, but there is also a relatively low demolition rate (0.075%/year). In addition to this the Belgian building stock has a high proportion of single family dwellings and measures to bring in energy efficiency were somewhat behind those of neighbouring countries. Table 5.33 shows a comparison between Belgium and the United Kingdom, which according to Figure 5.2 has a building stock with approximately the same distribution by age, as far as the implementation of energy-efficient measures is concerned.

	Belgium	United Kingdom
Wall insulation	41%	No data
Double glazing	36%	71%
Roof insulation	58%	73%

Table 5.33- Comparison of energy-efficient measures, Belgium-UK (% of building stock) (2005) (28)

Furthermore, the McKinsey report (28) states that residential and commercial buildings have the greatest potential where energy efficiency is concerned. A potential 61 million boe have been calculated.

5.3.1 Current energy consumption

Total housing-related energy consumption appears to have remained more or less stable since the nineties, despite a rise in the number of families (+15% since 1990). Conversely electricity consumption in the residential sector has increased sharply (35).

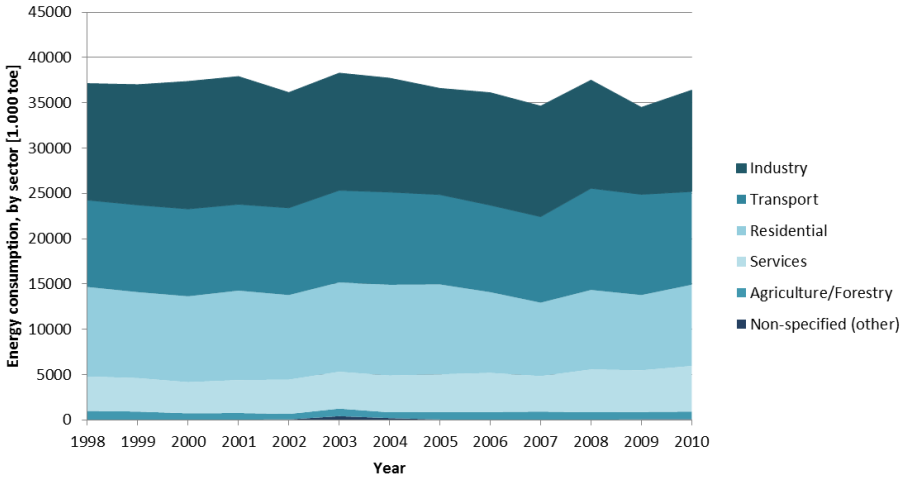


Figure 5.9 - Energy consumption by sector (1998-2010) (36)

The Tabula project (37) divides the Belgian residential building stock into 25 dwelling types. These types represent certain building types from five distinct building periods. The current architectural features and system characteristics are given for each of these types. Table 5.34 - K value and E rating for the 25 Belgian dwelling types according to building period and Table 5.35 - Net energy requirement for heating (NER-H) and primary energy consumption (PE) of dwelling types [in kWh/yr.m²] can be drawn up on this basis. A similar table has been included in (38) for the Flemish Region.

	< 1946		1946-1970		1971-1990		1991-2005		> 2005	
	K value	K rating	K value	K rating	K value	K rating	K value	K rating	K value	K rating
Detached house	185	380	181	369	117	299	84	194	54	100
Semi-detached housing	175	310	172	302	115	279	80	182	52	97
Terraced house	161	274	158	265	105	246	77	163	49	90
Self-contained apartment	-	179	-	172		187	-	140	-	80
Non self-contained apartment	-	229	-	292	-	260	-	170	-	85

Table 5.34 - K value and E rating for the 25 Belgian dwelling types according to building period (37)

	< 1946		1946-1970		1971-1990		1991-2005		> 2005	
	NER-H	PE	NER-H	PE	NER-H	PE	NER-H	PE	NER-H	PE
Detached house	334	603	343	603	238	499	165	311	103	157
Semi-detached housing	295	477	300	486	221	463	145	278	92	144
Terraced house	231	385	234	384	167	368	119	232	77	125
Self-contained apartment	140	252	134	243	99	264	93	197	60	112
Non self-contained apartment	341	560	333	549	204	488	163	319	99	159

Table 5.35 - Net energy requirement for heating (NER-H) and primary energy consumption (PE) of dwelling types [in kWh/yr.m²] (37)

From an energy standpoint it can be stated that the larger or older the building, the more energy its occupation will consume (37).

5.3.1.1 Flemish Region

Figure 5.10 shows the evolution of energy consumption in homes in the Flemish Region from 1990 to 2010.

Compared with 1990 the share of heating oil use has dropped by 7%, natural gas consumption rose by 10%.

In 2010 the residential and comparable sectors accounted for 41% of total energy consumption in the Flemish Region (industry was 40% and transport 19%). Of this fraction 65% was made up of domestic (272.6 PJ) and approximately 27% by the service sector (112.1 PJ).

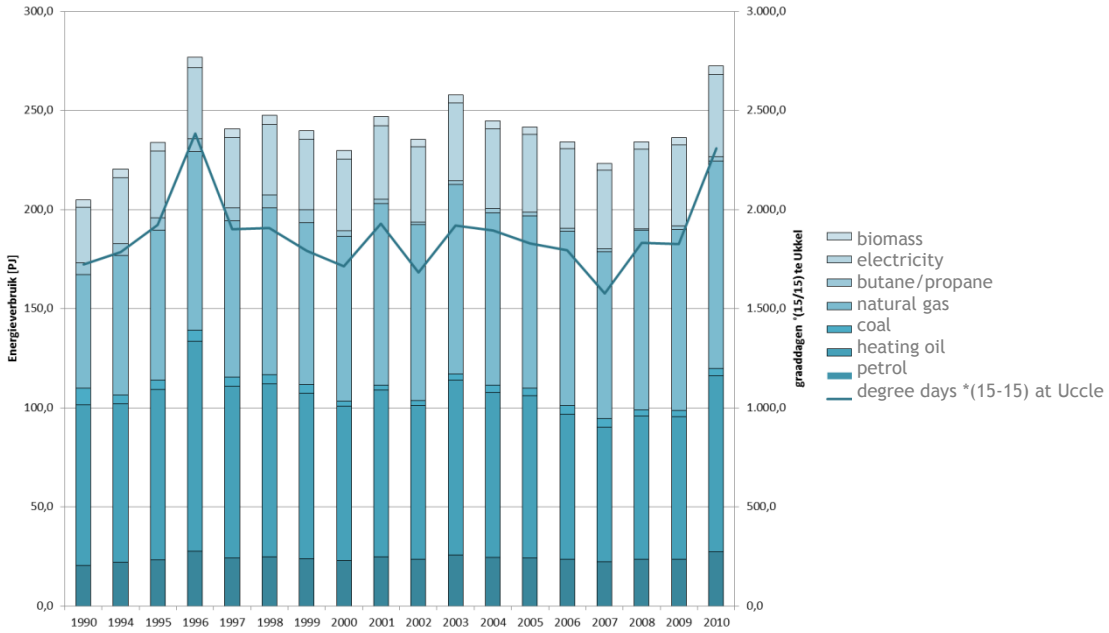


Figure 5.10 - Evolution of energy consumption by homes in the Flemish Region [in PJ] (2010) (39)

	Energy consumption PJ
hotels and restaurants	8.3
healthcare	9.3
education	11.9
offices and administrative departments	38.8
trade	31.9
other services	12.0
service sector total	112.1

Table 5.36 - Energy balance for the service sector in the Flemish Region (2009)

5.3.1.2 Walloon Region

Total final consumption in the Walloon Region in 2008 came to 147,909 GWh NCV. From 1990 to 2008 consumption by the service sector and the residential sector showed rises of 61% and 9% respectively.

In 2008 the residential and comparable sectors accounted for 34% of total energy consumption in the Walloon Region (industry was 41% and transport 25%). Of this fraction 70% was made up of domestic (35,116 GWh NCV) and approximately 27% by the service sector (13,757 GWh NCV).

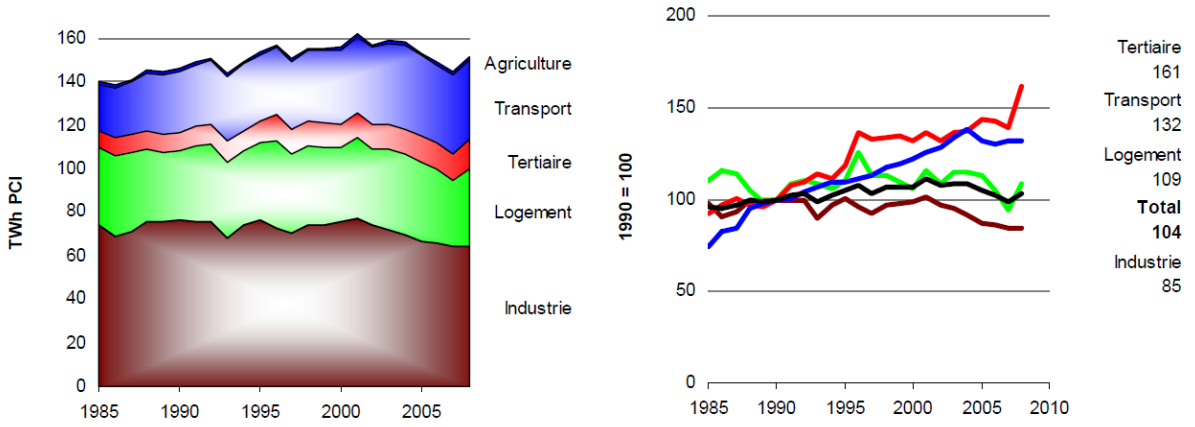


Figure 5.11 - Total energy consumption and evolution in the Walloon Region by sector (2008)(40)

5.3.1.3 *Brussels Capital Region*

Total final consumption in the Brussels Capital Region in 2009 came to 1,961 ktoe. From 1990 to 2009 consumption by the service sector and the residential sector showed rises of 17% and 7% respectively.

In 2009 the residential sector was the largest energy consuming sector in the Brussels Capital Region, with 40% of the total, followed by the service sector (33%) and then the transport sector.

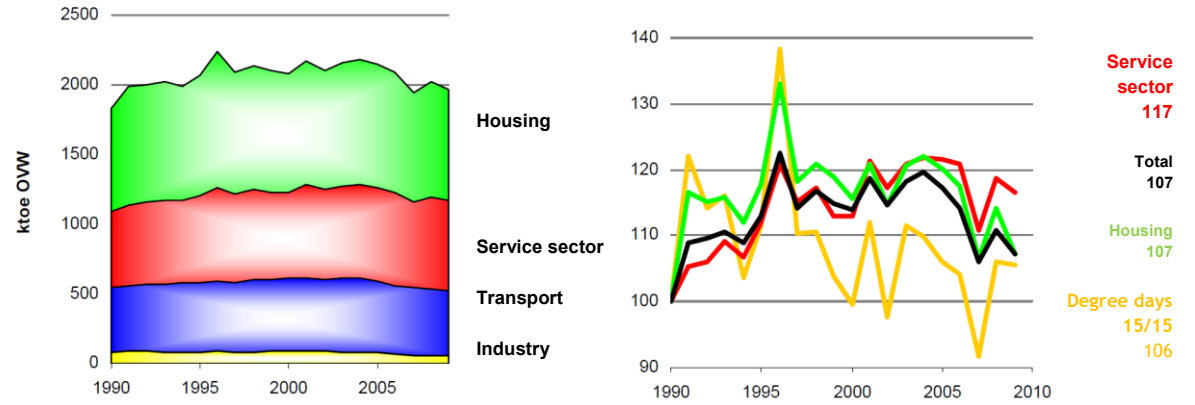


Figure 5.12 - Total energy consumption and evolution in the Brussels Capital Region by sector (2009)(41)

	Energy consumption ktoe NCV
heating for single family dwellings	347.8
heating for multi-family dwellings	231.1
residential buildings excl. heating	262.9
total for residential and related sectors	841.8

Table 5.37 - Conventional consumption by dwelling type and type of heating (2009)(41)

	Energy consumption ktoe NCV
trade	146.8
transport and communications	46.6
banks, insurance companies and business services	161.1
education	47.2
healthcare	63.5
culture and sport	29.5
other services	22.8
administrative and international boards	109.5
water & energy	13.3
service sector total	644.3

Table 5.38 - Energy balance for the service sector in the Brussels Capital Region (2009)(41)

5.3.2 Renewable energy generation

5.3.2.1 Flemish Region

Total net green electricity generation rose in 2010 by over 20% compared with 2009. This rise is primarily the result of a spectacular increase in generation from PV panels. (42) (43) (44) (45) (46).

According to (42) the share of gross green electricity generation in gross final consumption rose from 1.8 % in 2005 to 5.5% in 2010. The total installed power for green electricity generation in the Flemish Region in 2011 came to around 2,500,000 kW_e. In situ generation of green electricity at buildings was based primarily in a number of PV systems. The contribution by these PV systems amounted to approximately 1,400,000 kW_e.

	2004	2005	2006	2007	2008	2009	2010	2011
PV solar	947	1,498	3,660	25,706	92,823	538,644	792,424	1,389,835
total	242,278	453,380	524,597	633,181	749,659	1,292,452	1,658,908	2,553,860

Table 5.39 - Installed power for photovoltaic systems in the Flemish Region [kW_e] (2004-2011) (42) (43) (46)

	Number of systems	Installed electrical power kWe	Net green electricity generation MWh
PV solar	97,521	792,424	484,867
total		1,658,908	3,278,486

Table 5.40 - Number of PV systems and net green electricity generation in the Flemish Region (2010) (42) (46)

According to (42) the share of gross green heat generation in total heat generation rose to 2.3% in 2010.

	steam/heat generation GJ
heat generation by biomass systems	
industry	2,789,746
service	52,191
domestic	3,961,477
agriculture	456,474
heat pumps	317,401
heat pump water heaters	253
solar water heaters	217,520
total	7,795,062

Table 5.41 - Green heat generation by systems that generate heat only [in GJ] (2010) (42)

	2009	2010
Domestic solar water heaters	3,520	3,375
Other solar water heaters	100	80
Domestic heat pumps	621	317
Other heat pumps	45	62

Table 5.42 - Number of grants accepted in the Flemish Region (per annum) (source: VEA)

5.3.2.2 Walloon Region

Total net green electricity generation rose in 2010 by over 28% compared with 2009. This rise is primarily the result of a spectacular increase in generation from PV panels. (47).

	2000	2005	2008	2009	2010
PV solar	0.0	0.0	4.2	24.1	65.7
total	459.5	358.2	707.3	843.6	1,081.37

Table 5.43 - Installed power for photovoltaic systems in the Walloon Region [GWh] (2004-2011) (47)

	Number of systems	Installed electrical power kWc	Net green electricity generation MWh
PV solar	21,530	86,149	65,747

Table 5.44 - Number of PV systems and net green electricity generation in the Walloon Region (2010) (47)

	steam/heat generation GWh
heat generation by biomass systems	5,858
heat pumps	69.5
solar water heaters	74.7
total	6,002.2

Table 5.45 - Green heat generation by systems that generate heat only [in GWh](47)

5.3.2.1 Brussels Capital Region

5.3.2.1.1 Photovoltaic solar energy

In 2009 photovoltaic solar panels in the Brussels Capital Region accounted for total generation estimated at 174 toe (41).

5.3.2.1.2 Thermal solar energy

At the end of 2009 the total installed surface area of solar panels was around 12,730 m². Based on previously installed capacity, generation by the solar panels in the Brussels Capital Region is estimated at 423 toe of heat. On this basis it will is assumed that 50% of installed capacity pertains to the housing sector and, whereas the remainder is part of the service sector.

	Heat generation toe	Installed surface area m²
1993	41	1,800
1995	46	1,800
2000	56	2,000
2005	110	4,400
2006	151	6,000
2007	199	8,700
2008	288	10,100
2009	423	12,700

Table 5.46 - Thermal solar energy generation in the Brussels Capital Region (2009)(41)

5.3.2.1.3 Heat pumps

Total heat generation from heat pumps is estimated at 923 toe. Around 600 toe relate to heat pumps installed for the residential sector.

	Heat generation toe
residential	614
others	309
total	923

Table 5.47 - Energy generation by heat pumps in the Brussels Capital Region (2009) (41)

5.4 Missing data

5.4.1 Building stock

The rate at which the existing building stock is replaced is difficult to ascertain. Besides the renovations for which a permit will have been issued, there is a great deal more unlicensed work. In addition to this there is limited data available regarding the use of buildings.

It is not always easy to track down the number or total floor space of non-residential buildings in Belgium and the regions. Often it is only the number or the total floor space that is given. Ground occupancy according to the nature of the properties (in 2007) is listed in (17). However this takes the entire surface area of the property into account rather than just the area built on. This is less relevant in the context of this report. There is therefore insufficient data available on non-residential buildings in Belgium and the Regions. Subsection 5.1.1.2 was compiled relying on various documents, which do not necessarily exhibit consistency from one to another.

5.4.2 Current energy consumption

Although domestic energy consumption is closely related to heating of buildings and climatic fluctuations, it is difficult to determine the exact share of energy consumption for heating, cooling, ventilation, generating hot water, lighting and the use of electrical appliances.

The share of renewable energy which is actually generated at the building locations themselves cannot be ascertained from the statistics available.

5.4.3 Number of low-energy buildings

It is not easy to obtain exact figures for the number of low-energy buildings. The EPB statement on which the E rating is declared is after all submitted after a delay of approximately 2 years. Data is shown in 5.1.2 as it appears in the various regional publications.

6 Existing VET facilities

6.1 Institutions responsible

6.1.1 Formal education

6.1.1.1 Different players

The role of government

The primary role of government is to develop educational policy. The authority for education rests with the regional governments (Flemish Community, French Community and German-speaking Community). The department for education and training will draft a decree. At this preparatory stage the competent minister is required to enlist the advice of the various third parties (e.g. in respect of funding, validity of legislation, etc.). One of these third parties is the Education Council (*Vlor* [Flemish Education Council], *Conseils pour l'enseignement* [French]). This council works independently of the department for education and the competent minister. Once this Education Council has had the opportunity to formulate a recommendation the decree can go before parliament. After that authority rests with the executive (the Department for Education) to implement policy. During this implementation the policy will be assessed by schools and inspectorates.

Networks

Freedom of education is a key component of the Belgian constitution. Education is organised by various networks. This guarantees the right of schools to work out their own teaching approach. There are three major networks:
- Community education
- Official subsidised education (organised by municipal authorities or provinces)
- Free subsidised education

6.1.1.2 Development, accreditation and regulation of qualifications and skills

The first step consists of vocational competence profiles being drawn up, these profiles are to meet the needs of the construction industry. These vocational profiles are validated by management and the workers. They are the basis for learning outcomes in the various paths that can be followed by young people. Vocational profiles are developed using an analytical procedure. The source material is compiled first: manuals, training courses, literature, as well as interviews with businesses and experts. A draft of the vocational profile will be prepared next. This draft will be presented to management and workers as well as experts in the field.

This enables adjustments and changes to be made. Finally the document is presented to all relevant management and worker representatives. Minor amendments can still take place after this last phase. This process ensures that management and workers endorse the content of the vocational profile. The vocational profile as such can be used as a vocational standard or as source material for 'derived' products. It can be used as a source for college training courses and modules, as well as for training courses in training centres, etc.

The second step is to set up training profiles, this task is carried out by the aforementioned Education Council. These profiles pursue the following objectives:

- Achieving consistency between the requirements of education and those of the labour market
- Encouraging the flow of qualified employees
- Guaranteeing quality of education.

These profiles embrace the necessary knowledge and skills that a construction sector worker will need to possess at the start of his career. The aim of a training profile: to develop a tool, validated by a specific sector, that will enable VET to be consistent with the reality of the labour market.

The third step is to set up learning programmes, this is usually carried out by the various networks. The curriculum consists of:

- General trades
- Practical trades
- Work placements

Colleges (or the networks) develop the learning programmes. The government lays down the development targets and final attainment levels. However, given that the vocational profiles have been drawn up and validated by management and workers and these vocational profiles constitute the source and reference material that determines these final attainment levels, management and workers will have considerable influence on the learning programme.

The way in which these objectives are achieved is the responsibility of the college or the training centre. A large part of the responsibility regarding quality and effectiveness of education rests with the colleges. Government does audit colleges in order to ascertain whether the final attainment levels are being met. This inspection also ensures that:

- Colleges achieve the minimum requirements and approved education profiles follow
- Final attainment levels are being met
- The infrastructure is adequate.

6.1.1.3 The structure of VET and qualifications

Competence is related to performance of workplace activities in a circumscribed vocational activity and is based on an integration of knowledge, skills and attitudes. It is assumed that a student will rely on knowledge (e.g. properties of insulation materials), skills (the ability to install insulation material) and (work) attitudes (a degree of precision, efficiency, collaboration, etc.). Final attainment levels are described in terms of competencies: a student is able to complete a certain task, a student knows certain facts and possesses certain attitudes.

A qualification is an exhaustive set of competencies for which someone can obtain an official certificate. A qualification defines those competencies that are relevant for a specific job, community post or access to an education system. Different routes exist to obtaining qualifications. These routes are set out in the passage that follows.

Special needs secondary education

This is an education system aimed at students with a physical disability, learning difficulties or developmental disorders (such as ADHD, autism, etc.). Students can obtain a qualification by attending a training course in this system. To this end a student must attend training for at least 2 years and a maximum of 4 years. This consists of practical and theoretical training in a college setting (observation phase). This is followed by a qualifying phase. This in turn consists of 2, 3 or 4 years of training. In this phase there is also a work placement in a company. After that the student will have the option of choosing to attend a sandwich course (2 days a week in college and 3 days a week at a company).

All education systems focus on 3 areas:

- General training: how to function in society and how to develop as an individual;
- Preparatory training: preparation for further education;
- Preparing for the labour market: acquiring competencies that can be used to find a position in labour market.

All colleges must pay attention to these three areas. However, the emphasis placed on any of these areas can differ in the various education systems. Special Needs Education focuses almost exclusively on training aimed at work. On the other hand ASO [General Secondary Education] focuses almost entirely on preparation for further education.

The 6 years of secondary education (between the ages of 12 and 18) is divided into 3 2-year levels. Level one (years 1 and 2) is the same in all education. In level two the student will choose a certain area. In level three the student will opt for a specific field.

Vocational secondary education

The traditional route to obtaining a qualification in the construction sector is full-time education: Vocational secondary education. This education system prepares young people for employment as qualified employees and contributes towards vocational and social development.

Technical Secondary Education

The aim of this education is twofold. Students prepare for the labour market, but they also prepare for further education. The syllabus pays more attention to design than just carrying out tasks.

Adult Education

Adults can attend training courses in centres for adult education (*CVO* in Dutch).

The above education systems consist of full-time education in a college (although set periods are spent in a company as well). Young people who have reached level three can also choose a sandwich course. In this system the youngsters spend the majority of their time in a company (60-80%), the rest of the time is spent in a training centre.

There are two different systems. Although they are similar in terms of training content, they do differ as far as the 'institutional authority' and the overall objective are concerned.

- *Industrial Apprenticeships scheme* (*ILW* in Dutch): a system that trains young people into qualified workers. In the construction sector there is a Joint Apprenticeship Committee. This committee manages the proper conduct of Industrial Apprenticeships scheme within the construction sector.
    - Before a training course can start within the ILW a contract must be signed between the apprentice and the company. This contract must be recognised by the committee.
    - Other conditions:
        - The company must appoint an individual responsible for training (and experienced worker).
        - The young person must attend a training course in a centre for part-time education (*CDO* in Dutch). This centre must be recognised by the Joint Apprenticeship Committee. The training centre will be evaluated against criteria such as: qualified staff, availability of requisite materials and equipment, safety, etc.

- Apprenticeship programme: the apprenticeship programme is tailored to the apprentice. It is based on the vocational profile for the vocation being acquired.
- During the apprenticeship contract the young person will be evaluated based on tests. The final test is a practical test in which the young person is assessed by a panel consisting of a representative from the centre for part-time education, a company representative, a fvb-ffc Constructiv representative and local management and workers.
- The training centre is inspected by the ministry of education. In-company training is assessed by fvb-ffc Constructiv staff.

- *Leertijd* [Apprenticeships] *(Syntra, IFAPME, EFPME, IAWM)*: a system that prepares students for self-employment. The largest difference between this system and the Industrial Apprenticeships scheme is that here basic knowledge of business management is also provided. This is a condition for being able to engage in self-employment. In-company training is roughly the same as in the Apprenticeships scheme. During the training period students spend as much as 80% of their time in the company. In the Apprenticeships scheme it is no more than 60%. Many young people do not go into self-employment immediately after completing their studies, but start off as employed workers first.

6.1.1.4 Ratio between the various routes

If we look at the number of apprentices in the various training systems, we can see that the ratio between the various routes is as follows:

- Special needs education 20%
- Vocational and Technical education: 40%
- Industrial Apprenticeships: 20%
- Apprenticeships: 20%

(source: Syntra, IFAPME, fvb-ffc Constructiv statistics)

Accordingly, vocational and technical education constitute the greatest potential intake channel, the others can account for proportionally equal intakes.

6.1.2 CVET

6.1.2.1 Fvb-ffc Constructiv

The Fund for Vocational Training in The Construction Industry (fvb-ffc Constructiv) was set up in 1965 as a Fund for Social Security, tasked to promote and support training of present and future workers in construction and to safeguard the quality and results of their training.

The importance the sector attaches to training was already made clear from the start by the unique financial arrangements for this fund. Fvb-ffc Constructiv was and is in actual fact financed by a percentage that all construction companies pay on payroll payments. In this way the cost of training is fully consolidated.

The history of fvb-ffc Constructiv is characterised by a number of fundamental changes.

- Initially fvb-ffc Constructiv operated in the structural construction sector only. The finishing sector was also added to this in 1987.

- In the early years of fvb-ffc Constructiv the main emphasis was directed at campaigns involving young people. Since the nineties its operation has been based on 3 pillars: collaboration with education, retraining jobseekers and in-service training for construction sector workers.

- Furthermore, fvb-ffc Constructiv is also working on upgrading the image of construction vocations and on raising awareness of safety aspects in the construction industry. Massive efforts were put into both areas, not only for, but also by the companies and workers in the construction sector.

The Joint Committee for Construction is the ultimate client for fvb-ffc Constructiv. Thus, among others, it appoints members of the fvb-ffc Constructiv Board of Management, in which employer and employee organisations are represented.

The fvb-ffc Constructiv structure of permanent employees moreover can count on input from both regional and sectoral advisory groups that include representatives from the sector and training partners.

6.1.2.2 Vormelek

Vormelek is the training centre for all employers and employees in the 149.01 joint committee. This is the joint committee for electricians. Accordingly, this sector also takes on employees who operate in renewable energy and energy efficiency. Solar panel installers are but one example that comes to mind. The organisation was set up in 1991 in response to on-going training needs. In other words training is crucial in order to remain successful. This understanding led management and workers to set up an occupational training centre.

Like fvb-ffc Constructiv, Vormelek is funded through a collective labour agreement. In the collective labour agreement employers and unions have laid down that 0.75% of each worker's gross salary will be paid in to support training for workers and to activate risk groups.

In order to keep knowledge levels in our sector up to scratch, Vormelek is working on various fronts simultaneously. First and foremost are the efforts in terms of training and competency management. Furthermore Vormelek is also engaged in sectoral research and analysis. In

addition, Vormelek is conducting all manner of campaigns to promote the intake of employees.

6.1.2.3 OCH

The Training Centre for Wood [OCH in Dutch] is the training centre for the Soft Furnishings and Woodworking sector. This sectoral training centre was set up in 1988. In order to develop and support training and competency policy in the sector, OCH is operating in various fields and for various target groups:

- Training courses and competency policy for companies and employees. Guidance and training recommendations, monitoring the training market, etc.
- Monitoring the labour market in line with problem area vacancies. Induction of new employees (jobseekers' training).
- Assistance for outflow through sectoral outplacement, etc.
- Link between education and the labour market including through suitable wood education. Refresher courses and company visits for teaching staff, follow up on "Learning and Working", promoting work placements, etc.
- Sector promotion and image

6.2 Training partners within the construction sector

6.2.1 Public training centres:

6.2.1.1 VDAB / Le Forem / Bruxelles Formation / Arbeitsamt

Each region in Belgium has an organisation at its disposal to organise vocational training for 3 target groups:

- Jobseekers
- Those in work
- Companies

For Flanders it is *VDAB*, for the French Community it is *Le Forem*, for Brussels it is *Bruxelles Formation*, for the German-speaking Community it is *Arbeitsamt*.

6.2.1.2 Syntra Vlaanderen / IFAPME / EFPME / IAWM

In addition to the aforementioned public training centres there are those aimed at the self-employed:

- *Syntra*: for the Flemish Community. Apprenticeship training courses come under the learning and working decree, as does part-time education, and therefore are certainly not directed at the self-employed only. *SYNTRA Vlaanderen* offers companies entrepreneurship courses but many of these have an acknowledged outflow of SME employees.
- *IFAPME*: for the French Community
- *Espace Formation PME*: Brussels French-speaking Community
- *IAWM*: for the German-speaking Community

6.2.1.3 Sectoral training centres: Edutec / Construtec / BRC

There are also specific sectoral training centres in existence within the construction sector to enable a faster response to be offered and to develop specific and innovative training courses. For Flanders it is *Edutec*, for the Walloon Region it is *Construtec* and for Brussels it is the Vocational Reference Centre for Construction (*BRC* in Dutch). *BRC* also receives additional funding from regional governments.

6.2.1.4 Commercial training centres

In addition to the public and sectoral training centres there are also commercial training centres that offer training. The relevant training centres for training courses on renewable energy and energy efficiency can be found in the listing for the existing training supply below. These can be specific training centres, as well as manufacturers of systems or materials for instance who arrange training on the systems or materials they produce.

6.2.2 EE and RES training supply

6.2.2.1 Education

In the tables below you will find those training courses under the various training operators that are relevant to EE and RES. This information originates in every case from data available to fvb-ffc Constructiv (data on education, information on training in their own database, etc.)

6.2.2.1.1 Full-time Education

In Dutch	***In French***
Special needs secondary education	**Special**
Central heating and plumbing systems	CGO
Roofer, metal roofing	Joinery
Weatherproofing roofer	Zinc cladding - Plumbing - Pipework
Electrical systems	
Electromechanical systems	
Electrical engineering	
Woodworking	
Bricklayer	
VOCATIONAL SECONDARY EDUCATION	**Skilled worker**
Special joinery structures	Roofer
Central heating and plumbing systems	Joiner
Roofing	Plumbing and heating fitter
Sustainable living	Qualified structural building worker
Woodworking	
Refrigeration systems	
Refrigeration engineering systems	
Building renovation	
Structural	
Structural finishing	
Heating systems	
TECHNICAL SECONDARY EDUCATION	**Technical**
Construction structural and scheduling technologies	Construction draughtsman/woman
Building and timber skills	Timber industry technician
Construction technologies	Construction and public works technician

Timber structure and scheduling technologies	Heating equipment technician
Timber technologies	
Industrial refrigeration technologies	
Refrigeration and heating technologies	

Table 6.48 – Training facilities in Full-time Education

6.2.2.1.2 Industrial Apprenticeships

Training for the occupation of:
Borer
Bricklayer
Metal façade cladding element fitter
Refrigeration fitter
Residential electrical engineering installer
Prefab fitter
Rendering worker
Metal structure fitter
Plasterer
Roofer
Weatherproofing roofer
Metal cladding roofer
Carpenter
Joiner - carpenter
Exterior joinery worker
Interior joinery worker
Glazier
Industrial insulation worker
Central heating fitter
Plumbing installer
Gas appliance installer
Painter-decorator
Duct and channel installer
Shell finishing worker

Table 6.49 – Training facilities in Part-time Education

6.2.2.1.3 Training for the self-employed

6.2.2.1.3.1 Syntra (Flemish Community)

Training for the occupation of:
Interior joinery worker
Exterior aluminium joinery worker
Exterior timber joinery worker
Exterior plastic joinery worker
Weatherproofing roofer
Roofer, slates and tiles
Roofer, metal roofs
Roofing carpenter
Central heating installer
Installer for gas heating with individual appliances
Glazier
Bricklayer
Interior joinery installer
Exterior joinery installer

Table 6.50 – Training facilities in Apprenticeships

6.2.2.1.3.2 EFPME (Brussels French-speaking Community)

Training for the occupation of:
Electrician installer
Central heating installer
Plumbing and pipework installer
Joiner - carpenter
Bricklayer - concrete worker

Table 6.51 – Training facilities in Apprenticeships in the Brussels French-speaking Community

6.2.2.1.3.3 IFAPME (French Community)

Occupations in "apprenticeships"	Occupations in "Corporate Management Training"
Joiner - carpenter	Joinery - carpentry contractor
Glazier	Glazing contractor
Patio door and awning installer	
Suspended ceiling, removable partition and weatherboarding fitter	
PVC/aluminium frame and door manufacturer and installer	PVC/aluminium frame and door manufacturer
Bricklayer - concrete worker	Bricklaying and concrete contractor
Roofer	Building metal and non-metallic roofing contractor
	Carpentry contractor
Ceiling specialist	Ceiling work/rendering contractor
Tiler	Tiler
	Period building renovation and restoration contractor
	General contractor
	Surveyor - estimator, EPB oriented
	Swimming pool - pond specialist
Installer for gas heating with individual appliances	
Installer for gas heating with hot air and air treatment	
Central heating installer	Central heating installer
Plumbing and pipework installer	Plumbing and pipework installer
Air conditioning fitter-repairer	Air conditioning fitter-repairer
Refrigeration specialist	Refrigeration specialist
Lagging-insulation fitter	
Electrician installer	Electrician installer
	Home automation and control systems technician

Table 6.52 – Training facilities in Apprenticeships in the French Community

6.2.2.1.3.4 ZAWM (German-speaking Community)

Training for the occupation of:
Carpenter
Plumbing installer
Heating installer
Electrical installer
Bricklayer
Roofer and building lead worker

Table 6.53 – Training facilities in Apprenticeships in the French Community

6.2.2.2 Advanced training courses

The tables below provide a listing of all available training courses that can be attended by construction workers in the Belgian construction sector. The training supply of advance training is shown by Region. A distinction is then drawn between private training centres, public training centres for the self-employed, public training centres for those in work and jobseekers and sectoral training centres. Finally an listing of the various specific training centres, the training modules they offer and the occupation to which this training module relates. In this way you will arrive at as exhaustive as possible a listing of advanced training courses in the field of EE and RES. This list has been compiled on the basis of information contained in the fvb-ffc Constructiv database.

6.2.2.2.1 Flanders

Type of training centre	Training centre	Occupation	Training course
Private training centres	ALBINTRA NV	Industrial insulation fitter	Thermische isolatie plaatsen
	ARISTON THERMO BENELUX	Central heating fitter	Wandketel Chaffoteaux Vloerketel Chaffoteaux Zonneboiler Ariston (ook dakdekker)
		Plumbing installer	Wandketel Chaffoteaux / Zonneboiler Ariston
		Roofer	Zonneboiler Ariston
	BCQS asbl	Roofer	Nieuwe technieken dakbedekking & isolatie
	BOUWUNIE	Weatherproofing roofer	Isolatie & luchtdichtheid woningen
		Industrial insulation worker	Gecombineerde opleiding touwtechnieken in masten & structuren
		Central heating fitter	De CV-installatie van de toekomst G1 - Gasvormige brandstof - atmosferische ketels Warmteverliesberekening
		Construction shift leader	Energiebewuste aannemer - 1 Alg. energiekader gebouwen

Type of training centre	Training centre	Occupation	Training course
			Energiebewuste aannemer - 2 Gebouwschil - principes Energiebewuste aannemer - 3 Technische installaties Energiebewuste aannemer - 4 Duurzaam bouwen in de praktijk
	BOUWUNIE LIMBURG	Construction shift leader	Energiebewuste aannemer - 1 Alg. energiekader gebouwen Energiebewuste aannemer - 2 Gebouwschil - principes Energiebewuste aannemer - 3 Technische installaties Energiebewuste aannemer - 4 Duurzaam bouwen in de praktijk
	CAPAROL BELGIUM BVBA	Plasterer	Moderne isolaties bouwmaterialen en pleisterrenovatie
	CNO CENTRUM VOOR NASCHOLING	Bricklayer	Energiezuinig en duurzaam bouwen
		Environmental management	Workshop klimaat en energie
		Central heating fitter	G1 - Gasvormige brandstof - atmosferische ketels G2 - Verkorte opleiding technicus gasvormige brandstof gasunits
		Plumbing installer	Condensatieketels op stookolie
	CONFEDERATIE BOUW - TECNOBOUW VZW	Central heating fitter	Basisopleiding attest mazoutbranders Hernieuwing attest mazoutbranders Warmteverliesberekening Woningventilatie
	CONFEDERATIE BOUW ANTWERPEN	Roofer	Isolerende dakelementen
		Industrial insulation worker	Schadelijke stoffen
		Quality assurance	Omgaan met energie- & afvalbeheer binnen een bouwonderneming
		Bricklayer	Energiezuinig en duurzaam bouwen
		Central heating fitter	G1 - Gasvormige brandstof - atmosferische ketels G2 - Gasunits gastoestellen type C WDO Ventilatie van woningen

Type of training centre	Training centre	Occupation	Training course
		Industrial insulation fitter	Duurzaam bouwen - koude bruggen & infraroodtest
		Plumbing installer	G2 - Gasunits en gastoestellen type C (avond-zat)
		HGV driver	Bouwchauffeurs - Module 2 - Ecodriving
	CONFEDERATIE BOUW KEMPEN	Roofer	Combi plaatsen dakraam & toebehoren conform EPB + EHBO
		HGV driver	Bouwchauffeurs - Module 1 - Defensief rijden
	CONFEDERATIE BOUW LIMBURG	Construction shift leader	Energiezuinige renovatie - Isolatie & luchtdichtheid
			Nieuwe regeling EPB : Bouwknopen & Koudebruggen
		Carpenter	Houtskeletbouw
			Houtskeletbouw - Bouwfysica
			Houtskeletbouw - Luchtdichtheid voor installateurs
			Houtskeletbouw - Materialenkennis
			Houtskeletbouw - Metingen & controles
			Houtskeletbouw - Ontwerp
			Houtskeletbouw - Opbouw
			Houtskeletbouw - Werfleiding in de praktijk
			Houtskeletbouw Basis
			Houtskeletbouw in de praktijk
			Opbouw van een houtskeletbouw Woning
	CONFEDERATIE BOUW OOST-VLAANDEREN	Roofer	EPB-normen hellende daken
			EPB-normen schrijnwerk
		Weatherproofing roofer	Isolatie en luchtdichtheid van houten constructies
		Bricklayer	Energiezuinig en duurzaam bouwen
		Construction shift leader	Nieuwe regeling EPB : Bouwknopen & Koudebruggen
		Stonemason - Marble worker	Vakkundig plaatsen van thermische isolatie

Type of training centre	Training centre	Occupation	Training course
		Carpenter	Houtskeletbouw
	CONFEDERATIE BOUW VLAAMS BRABANT	Industrial insulation worker	Schadelijke stoffen
		Central heating fitter	G1 - Verkorte opleiding atmosferische gastoestellen WDO G1.2 Leidingen en toestellen (avond-zat) G2 - Verkorte opleiding gasunits gastoestellen type C WDO Technicus vloeibare brandstoffen (avond)
		Plumbing installer	G1 - Verkorte opleiding atmosferische gastoestellen (avond-zat) G1.1 Habilitatie van de aardgasinstallateur (avond-zat) G2 - Gasunits en gastoestellen type C (avond-zat)
		HGV driver	Bouwchauffeurs - Module 2 - Ecodriving
	CONFEDERATIE BOUW WAASLAND	HGV driver	Ecodriving
	CONFEDERATIE BOUW WEST-VLAANDEREN	Basic engineering - refrigeration technologies	Energieprestatie en binnenklimaatregeling
		Roofer	Isoleren & bouwknopen voor het dak
		Bricklayer	Energiezuinig en duurzaam bouwen Isoleren & bouwknopen voor de ruwbouw
		Construction shift leader	Nieuwe regeling EPB : Bouwknopen & Koudebruggen
		Stonemason - Marble worker	Vakkundig plaatsen van thermische isolatie
		Carpenter	Houtskeletbouw
	VCB Vlaamse Confederatie Bouw	Bricklayer Central heating fitter	Energiezuinig en duurzaam bouwen Woningventilatie
	CVO DE NOBEL	Central heating fitter	Installatie individuele gastoestellen (gasbrandertechnicus)
	CVO HEUSDEN-ZOLDER	Bricklayer	Technische werkzaamheden Isolatie
	CVO HIK GEEL	Central heating fitter	Certificaat gekwalificeerd brandertechnicus
	CVO LEERSTAD	Central heating fitter	CV-Verbrandingscontrole

Type of training centre	Training centre	Occupation	Training course
	CVO OVERPELT	Roofer	Bouwafwerking - Dak
	CVO ROESELARE	Central heating fitter	G1 - Gasvormige brandstof - atmosferische ketels Gasbrandertechnicus en habilitatie Oliebrander praktijk Oliebrander technologie
		Plumbing installer	G2 - Gasunits en gastoestellen type C (avond-zat)
	CVO SINT-JOZEF GERAARDSBERGEN	Central heating fitter	Stookolieketels en stookoliebranders
	DE CONINCK MANAGEMENT & ORG.	Central heating fitter	EPB algemeen kader Plaatsen van zonnepanelen
		HGV driver	Defensief rijden
	DE ORANJERIE CVO GO (DIEST)	Central heating fitter	Technicus vloeibare brandstoffen (avond)
	DRIVOLUTION	HGV driver	Bouwchauffeurs - Module 1 - Defensief rijden Preventief en zuinig rijden
	ECR	Interior joinery worker	Luchtdichtheid & schrijnwerkerij
		Industrial insulation worker	Passief huis & energiebesparing
		Environmental management	Isoleren van bouwdelen
		Central heating fitter	Gedetailleerd ontwerpen : thermische isolatie & koude bruggen Ventilatie van woningen
		Plumbing installer	Energiezuinige maatregelen & Hernieuwbare energie
	EURO-INDER	Central heating fitter	Meettechnieken
		Plumbing installer	Meettechnieken
	HENDRICKX TRANSPORTOPLEIDINGEN BVBA	HGV driver	Ecodriving
	HITS	Industrial insulation worker	Gecombineerde opleiding touwtechnieken in masten & structuren

Type of training centre	Training centre	Occupation	Training course
	KATHO - VHTI Z-W-VLAANDEREN	Central heating fitter	Certificaat gekwalificeerd brandertechnicus Erkend technicus verwarmingsaudit WDO Hernieuwen attest brandertechnicus Hernieuwen attest controle en onderhoud stookolietanks Hernieuwen attest onderhoud en controle stookolietanks
		Plumbing installer	G1 - Verkorte opleiding atmosferische gastoestellen (avond-zat) G1.1 Habilitatie van de aardgasinstallateur (avond-zat) G2 - Gasunits en gastoestellen type C (avond-zat) G3 - Ventilator gasbranders (avond-zat) G3 - Verkorte opleiding Gasbrandertechnicus (avond-zat)
	KCST CENTRUM VOOR VOLWASSENENONDERWIJS	Central heating fitter	Certificaat gekwalificeerd brandertechnicus
	KEY DRIVING COMPETENCES	HGV driver	Bouwchauffeurs - Module 2 - Ecodriving
	KLIMACONNECT BELGIUM BVBA	Central heating fitter	Gebruik airco + voordeel warmtepompwerking
	KVBG/ARGB	Plumbing installer	Bijscholing Cerga professionnele gasinstallateur
	MOSA-IC	Central heating fitter	Hernieuwen attest controle en onderhoud stookolietanks
	OPLEIDING & TECHNIEK VZW	Central heating fitter	G1 - Gasvormige brandstof - atmosferische ketels G2 - Gasunits gastoestellen type C WDO
	PCVO Meetjesland EEKLO	Central heating fitter	Installatie individuele gastoestellen (gasbrandertechnicus)
	PCVO WAAS & DURME	Electricity for construction workers Central heating fitter	Domotica Gasbranders
	ROOF TRAININGCENTER	Roofer	Plaatsen van fotovoltaïsche zonnepanelen Pose d'ardoises photovoltaïques Pose de sous-toiture - étanchéité au vent Zonnepanelen

Type of training centre	Training centre	Occupation	Training course
			Zonnepanelen Thermisch in dakvlakramen Zonnepanelen Thermische systemen algemeen
		Weatherproofing roofer	Draagstukken & isolatie Plaatsen van een thermische en PV-installatie
		Central heating fitter Industrial insulation fitter	Plaatsen van zonnepanelen Eniergiezuinige gevelopbouwen met montageschroeven
	STROOMOP - Ökofen Belgium	Central heating fitter	Installatie van balansventilatiesystemen Kachels : pellet & houtkachels
		Plumbing installer	Thermische zonne-energie voor santiair en verwarming
	VAB RIJSCHOOL	HGV driver	Bouwchauffeurs - Module 1 - Defensief rijden
	VASCO NV	Central heating fitter	Vloerverwarming
	VION	Central heating fitter	C.V. regeltechnieken
	VTI WAREGEM Volwassenonderwijs	Central heating fitter	Attest onderhoud en controle van stookolietanks
	ZEHNDER GROUP BELGIUM NV	Central heating fitter	Installatie van balansventilatiesystemen
	ACV BELGIUM	Central heating fitter	Brûleurs Chaudières murales Wandketels Zonneboilers (ook dakdekker) Vloerketels Warmtepompen
		Plumbing installer	Wandketels Zonneboilers
	ATAG VERWARMING BV	Central heating fitter	Wandketel Vloerketel Zonneboilers

Type of training centre	Training centre	Occupation	Training course
		Plumbing installer	Vloerketel Zonneboiler
	AXO INDUSTRIES BVBA	Roofer Rendering worker	Zonneboiler Na-isoleren van gebouwen met een thermisch gevelisolatiesysteem
	BELGIUM INVEST	Central heating fitter	Plaatsen van Super-Isol Panelen
	BOOMER BVBA	Weatherproofing roofer	Isolatie & luchtdichtheid woningen
	BUDERUS	Roofer	Zonneboiler
		Central heating fitter	Wandketel Vloerketel Brander Warmtekrachtkoppeling Warmtepompen Pelletketels
		Plumbing installer	Wandketel
	COMAP BENELUX	Central heating fitter	Vloerverwarming
	DANFOSS	Central heating fitter	Brandercomponenten (CV) Radiator- en kamerthermostaten, zonneregeling
	DESCO	Central heating fitter	Optimaal rendement vd verwarmingsinstallatie
	EANDIS VLAANDEREN	Mains specialist	Aansluiten budgetmeter aardgas
	ELCO Belgium NV	Central heating fitter	Wandketel Vloerketel Warmtepomp Brûleur/Brander Pompes à chaleur
		Plumbing installer	Wandketel
	EGADA	Central heating fitter	Ventilatiesystemen
	ENERTECH	Central heating fitter	Warmtepomp
			Zonneboiler

Type of training centre	Training centre	Occupation	Training course
		Roofer	Zonneboiler
	EURABO CVBA	Industrial insulation worker	Pro Clima
	GEOTHERMA	Central heating fitter	Warmtepomp
	GROHE	Central heating fitter	Thermostats
	HAROL CONSYST NV	Exterior joinery worker	Protection solaire Technisch-commerciële opleiding Zonwering Zonnewering
	HENCO INDUSTRIES	Central heating fitter	Vloerverwarming
	ILE-DE-CHAUX	Plasterer	Bouwen & isoleren met kalk & hennep
	IMPERBEL (DERBIGUM)	Weatherproofing roofer	Bitumineuze membranen & isolatie Membrane bitumineuse et isolation
	INTERNATIONAL ROOF SYSTEMS - BTECH	Weatherproofing roofer	Plaatsen van Solar
	ISOPROC CVBA	Weatherproofing roofer Industrial insulation worker	Isolatie & lucht- + waterdichtheid Isoler étanche au vent & à l'air
	ITHO DAALDEROP	Central heating fitter	Wandketel
			Zonneboilers
		Roofer	Zonneboilers
	IZEN	Central heating fitter	Warmtepomp
			Zonneboilers
		Plumbing installer	Zonneboilers
		Roofer	Zonneboilers
	JAGA	Central heating fitter	Lage watertemperateur radiatoren (Low-h20)
	JUNKERS SERVICO	Roofer	Zonneboilers
		Central heating fitter	Wandketel Vloerketel Warmtepompen

Type of training centre	Training centre	Occupation	Training course
		Plumbing installer	Wandketels + Zonneboilers
	Mitsubishi Electric Air Conditioners - Belklima	Basic engineering - refrigeration technologies	Airco Type RAC en MR Slim R410A units en INVERTERS Airconditioning Type Multi R410A
	MODDE BOUWMATERIALEN	Roofer	Iso-finish buitengevelisolatie
	NATHAN	Central heating fitter	Warmtepomp
	OMNI-TERM BVBA	Central heating fitter	Condenserende gasketels
	PROFIALIS	Joinery - carpentry	Lucht- & waterdichtheid van ramen
	RECTICEL INSULATION	Interior joinery worker Exterior joinery worker	Eurowall spouwisolatie Powerwall buitengevelisolatie & Isofinish concept
	REMEHA MAMPAEY NV/SA	Plumbing installer	Wandketel REMEHA & OERTLI Zonneboiler OERTLI
		Central heating fitter	Wandketel REMEHA & OERTLI Vloerketel REMEHA & OERTLI Brander
		Roofer	Zonneboiler OERTLI
	RENSON NV	Basic engineering - refrigeration technologies Exterior joinery worker	Energieprestatie en binnenklimaatregeling Plaatsen van eclips-, icarus-zonwering en lamellenwandsysteem
	RIELLO NV	Central heating fitter	Wandketels Vloerketel Warmtepompen
		Plumbing installer	Wandketel
	SANUTAL BELGIE	Central heating fitter	Pelletketels Zonneboiler
		Plumbing installer	Zonneboiler
	SIEMENS NV	Central heating fitter	Automatische regelingen in de centrale verwarming
	SMA SOLAR TECHNOLOGY	Roofer	Sunny family (Sunny Boy, Mini Central, Sunny Design)

Type of training centre	Training centre	Occupation	Training course
	SOMFY nv	Exterior joinery worker	Bekabelde oplossingen voor rolluiken en buitenzonwering Motorisatie van rolluiken & zonwering met RTS Motoren - Basis Motorisatie van rolluiken & zonwering met RTS motoren-gevorderde
	STIEBEL ELTRON	Central heating fitter	Warmtepompen
	STO	Rendering worker	Plaatsen van gevelisolatie en isolatiewerken
		Industrial insulation worker	Ecolage de base
	TDN MATERIALS BVBA	Plasterer	Buitengevelisolatie met bepleistering Buitengevelisolatysteem Baumit
	TYCO	Plumbing installer	Heattracing installatiecursus
	TESTO	Plumbing installer	Meettechnieken
		Central heating fitter	Meettechnieken
	UBBINK	Central heating fitter	Ventilatiesystemen
	VAILLANT	Central heating fitter	Chaudières murales / Wandketels Vloerketels Warmtepompen Zonneboilers Brander
		Plumbing installer	Wandketel Zonneboiler
		Roofer	Zonneboiler
	VAN MARCKE COLLEGE	Roofer	Zonneboiler
		Central heating fitter	Wandketel Vloerketel Zonneboiler Warmtepomp
		Plumbing installer	Wandketel Zonneboiler

Type of training centre	Training centre	Occupation	Training course
	VAN OIRSCHOT	Central heating fitter	Woonhuisventilatie (Ventiline)
	VENTILAIR	Central heating fitter	Inleiding tot residentiële ventilatie
	VERBEKE H. DIEPSONDERINGEN EN FUNDERINGSADVIES BVBA	Borer	Boormeester geothermie & pressiothermie
	VICTOIR NV	Interior joinery worker	Plaatsen van isolatie
		Plasterer	Buitengevelisolatie & Rendering - Machinaal werken Buitengevelisolatie & Rendering - Praktijk Buitengevelisolatie & Rendering - Theorie PUR-schuim
	VIESSMANN-BELGIUM	Roofer	Zonneboiler
		Central heating fitter	Wandketel Brander Vloerketel Pelletketel Warmtepomp Zonneboiler Warmtekrachtkoppeling Zonneboiler
		Plumbing installer	Wandketel
	WATTS-ON	Central heating fitter	Micro WKK Whispergen
	WIENERBERGER NV	Roofer	KoraSun
		Rendering worker	Na-isoleren van gevels met façatile of kleipannen
	ZEHNDER ACADEMY	Central heating fitter	Introductie ventilatiesystemen C & D (+Comfokits) Ventilatie Systeem C Ventilatie Systeem D
	ZEN RENEWABLE	Central heating fitter	Zonneboiler

Type of training centre	Training centre	Occupation	Training course
		Plumbing installer	Zonneboiler
		Roofer	Zonneboiler
Public training centre for the self-employed	Syntra	General	Isoleerder luchtdicht bouwen Plaatser van thermische isolatie Energiedeskundige type C Energiedeskundige type A Energiedeskundige type B Erkend technicus verwarmingsaudit > 100kW
		Roofer	Plaatsen van fotovoltaïsche zonnepanelen
		Weatherproofing roofer	Isolatie & luchtdichtheid woningen Isolatiedeskundige Isolatiedeskundige - de uitvoerders
		Central heating fitter	Aannemer installateur van centrale verwarming CERGA Professioneel gasinstallateur Aannemer installateur sanitaire installaties CERGA professionele propaangasinstallateur Pomptechniek voor installateurs Residentieel ventilatietechnicus Technicus thermische zonne-energie Fotovoltaïsche cellen Afstellen van gasbranders Afstellen van stookoliebranders Attest onderhoud en controle van stookolietanks Brander- en kacheltechnicus C.V. regeltechnieken Centrale verwarmingstechnieken voor energiedeskundigen Certificaat gekwalificeerd brandertechnicus Energiedeskundige Type A

Type of training centre	Training centre	Occupation	Training course
			Energiedeskundige Type A verkort Energiedeskundige type B (EAP) EPB algemeen kader Erkend technicus verwarmingsaudit WDO G1 - Gasvormige brandstof - atmosferische ketels G1 - Verkorte opleiding atmosferische gastoestellen WDO G1.1 Habilitatie van de aardgasinstallateur WDO G1.2 Leidingen en toestellen (avond-zat) G1.2 Leidingen en toestellen WDO G2 - Gasunits gastoestellen type C WDO G2 - Verkorte opleiding gasunits gastoestellen type C WDO G3 - Gasbrandertechnicus WDO G3 - Verkorte opleiding Gasbrandertechnicus WDO Gedwongen afvoer en condensatieketels Habilitatie van de gasinstallateur Heating, ventilation, airconditioning HVAC Hernieuwen attest controle en onderhoud stookolietanks Hernieuwen attest onderhoud en controle stookolietanks Hernieuwing attest brandertechnicus - zonder opl G1-G2 Hernieuwing T-nummer - afstellen van oliebranders Hydraulisch inregelen van CV-installaties Inleiding tot residentiële ventilatie Instal. verwarming, onderhoud van mazouttanks, instal. gasverw. Installatie individuele gastoestellen (gasbrandertechnicus) Kachels : pellet & houtkachels Klas. en condens. wand en vloer gasketels in open en gesl. uitv. Onderhoud en herstellen van cv-installaties Ontwerp & berekening ventilatie

Type of training centre	Training centre	Occupation	Training course
			Technicus vloeibare brandstoffen (avond) Ventilatie passieve woningbouw Warmtepompen Warmteverliesberekening Werking en gebruik van een warmtepomp Woningventilatie
		Industrial insulation fitter	Thermische isolatie plaatsen
		Construction shift leader	Brandpreventie en energieprestatieregelgeving
		Plumbing installer	Duurzaam energie- en watergebruik via zonne-energie G1 - Verkorte opleiding atmosferische gastoestellen (avond-zat) G1.1 Habilitatie van de aardgasinstallateur (avond-zat) G2 - Gasunits en gastoestellen type C (avond-zat) G3 - Ventilator gasbranders (avond-zat) G3 - Verkorte opleiding Gasbrandertechnicus (avond-zat) Zonne-energieprojecten
		Carpenter	Houtskeletbouw
		HGV driver	Preventief en zuinig rijden Schadepreventie & eco-driving
	Syntra WEST	Miscellaneous	Blower Door Bouwconducteur - werfleider Centrale verwarming en sanitair warm water voor architecten en energiedeskundigen Droge afbouw Energiedeskundige A/B (vooropleiding) Energiedeskundige type A - groep a Energiedeskundige type B Energiedeskundige type C

Type of training centre	Training centre	Occupation	Training course
			Club Energiedeskundigen bijscholing energiedeskundige: FAQ EPB Algemeen wetgevend kader Begeleiding van de EPB verslaggever EPB BOUWKNOPEN module theorie EPB BOUWKNOPEN module toepassingen EPB Software gevorderden EPB Transmissieverliesberekeningen EPB Ventilatievoorzieningen EPB--software (basis) Houtskeletbouw: algemene kennismaking Isolatiedeskundige Legionellawetgeving Micro WKK warmtekrachtkoppeling voor residentieel gebruik en kmo Passief bouwen Plaatser van thermische isolatie Planlezen voor interieur en de bouw Tadelakt: Marokkaanse sierpleister Technicus Thermische Zonne-energie Thermografie voor architect en energiedeskundige Warmte uit water, lucht, bodem..het kan! Waterpompen voor de installateur Zichtbeton Blower Door Bouwconducteur - werfleider Centrale verwarming en sanitair warm water voor architecten en energiedeskundigen

Type of training centre	Training centre	Occupation	Training course
			Droge afbouw Energiedeskundige A/B (vooropleiding) Energiedeskundige type A - groep a Energiedeskundige type B Energiedeskundige type C Club Energiedeskundigen bijscholing energiedeskundige: FAQ EPB Algemeen wetgevend kader Begeleiding van de EPB verslaggever EPB BOUWKNOPEN module theorie EPB BOUWKNOPEN module toepassingen EPB Software gevorderden EPB Transmissieverliesberekeningen EPB Ventilatievoorzieningen EPB--software (basis) Houtskeletbouw: algemene kennismaking Isolatiedeskundige
	Syntra AB	Miscellaneous	Centrale verwarming voor Energiedeskundigen Luchtdicht bouwen Luchtdichtheidsmetingen volgens NBN EN 13829 One-Day-Topic: Thermografie One-Day-Topic: Ventilatie Thermografie: het zichtbaar maken van warmteverlies Vooropleiding energiedeskundige type A/B Zonneboiler
Public training centre	VDAB	Roofer	Dakopbouw in functie van de energieprestatieregelgeving

Type of training centre	Training centre	Occupation	Training course
			Plaatsen & installeren van zonne- en fotovoltaïsche panelen
			Plaatsen van dakisolatie
		Rendering worker	Gevelisolatie
		Industrial insulation worker	Armaflex
			Basistechnieken industrieel isoleerder
			Industriële isolateur JLW/ABO
			Isolatiemonteur
			Isolatievakman
			Opmeter
			Plaatwerker
		Central heating fitter	Aansluiten van verwarmingsketels (CV)
			Attest oliebranders
			Attest onderhoud en controle van stookolietanks
			Condenserende gasketels
			G1 - Gasvormige brandstof - atmosferische ketels
			G1 - Verkorte opleiding atmosferische gastoestellen WDO
			G2 - Gasvormige brandstof - gasunits
			G2 - Verkorte opleiding technicus gasvormige brandstof gasunits
			G3 - Gasbrandertechnicus WDO
			G3 - Verkorte opleiding Gasbrandertechnicus WDO
			Gasbranders VDAB
			Hernieuwen attest brandertechnicus
			Hernieuwen attest brandertechniqus + audit
			Hernieuwen attest onderhoud en controle stookolietanks
			Meet- en regeltechniek automatisatie
			Regeling en sturing voor brandertechnicus
		Plasterer	Isoleren met droogbouw afwerking

Type of training centre	Training centre	Occupation	Training course
Sectoral training centre	EDUTEC	Exterior joinery worker	Plaatsen van ramen
		Roofer	Duurzame energie : fotovoltaïsche energie Duurzame energie : zonthermische energie
		Weatherproofing roofer	Isolatie en luchtdichtheid van houten constructies
		Small electric hand tools	EPB en gevolgen op de werf
		Refrigeration fitter	Ventilatiesystemen en energiebesparing
		Bricklayer	Energiezuinig en duurzaam bouwen Isolatietechnieken (vervolmaking)
		Environmental management	Duurzaam bouwen en thermografie Duurzame energie : thermische zonne-energie Energiebewust bouwen met leerlingen Milieubewust werken
		Central heating fitter	Duurzame energie: condensatieketels Duurzame energie: warmtepompen Ventilatie van woningen
		Plumbing installer	Duurzame energie : kennismaking Duurzame energie: zonne-energie Lage energie-woning/ passief huis
		Plasterer	Sierbepleistering en buitenisolatie
		HGV driver	Bouwchauffeurs - Module 1 - Defensief rijden Bouwchauffeurs - Module 2 - Ecodriving Preventief en zuinig rijden

Table 6.54 - Supply of advanced training courses in the Flemish Region

6.2.2.2.2 Wallonia

Type of training centre	Training centre	Occupation	Training course
Private training centres	AIR MOVEMENT COMPANY	Refrigeration fitter	Recuperatie ventilatiegroepen
	CEFORTEC	Basic engineering - refrigeration technologies	Montage, mise en service et dépannage des climatiseurs
		Electricity for construction workers	Prescription d'avis énergétique PAE Production d'électricité verte par modules photovoltaïques
		Central heating fitter	Chauffagiste: Chaudières à condensation Chauffagiste: Contrôle de la combusti.& entretien instal. Mazout Chauffagiste: Habilitation gaz Chauffagiste: Réglages combustion & entretiens installations gaz Concept de la maison passive Formation technicien agréé combustible liquide Formation technicien agréé combustible liquide BXL G1 - Formation technicien agréé combustible gazeux (cycle court) G1 - Gasvormige brandstof - atmosferische ketels G2 - Gasvormige brandstof - gasunits Hernieuwing attest mazoutbranders Hydraulique et régulation appliquées aux installations solaires Prolongation de l'agrément Soltherm Recyclage habilitation gaz VMC - Ventilation mécanique contrôlée
		Plumbing installer	Chaudières murales au gaz Général constr.: Utilisation rationnelle de l'énergie Instal.sanit.: La production d'eau chaude à l'énergie solaire Installations solaires thermiques combinées

Type of training centre	Training centre	Occupation	Training course
			Pompes à chaleur
	EDDY DEVOS CONSTRUCTIONS SA	**Plasterer**	**Plaatsingtechnieken van crepi's en pleisters op isolatie**
	EMEC	**Roofer**	**Installations panneaux photovoltaïques**
	FORMATTOIT	**Exterior joinery worker** **Roofer**	**Menuisier: Velux** **Couvreur: Isolation de toiture**
	GIACOMINI BENELUX NV	**Central heating fitter**	**Vloerverwarming**
	IDEDD - INSTITUT DE CONSEIL & D'ETUDES EN DEVELOPPEMENT DURABLE	**Electricity for construction workers**	**Prescription d'avis énergétique PAE**
	INSTITUT D'ENSEIGNEMENT - P. S.	**Roofer**	**Panneaux solaires thermiques / panneaux solaires photovoltaïques**
	LA MAISON ECOLOGIQUE	Bricklayer	Systèmes d'isolation en fibres de bois Unger Diffutherm
	ORES (AYE)	Mains specialist	Compteur à budget
	ORES (STREPY)	Mains specialist	Compteur à budget
	PROMOTION SOCIALE Les Aumôniers du Tr.	Central heating fitter	Certificat d'aptitude de technicien qualifié
	TECHNIFUTUR	Weatherproofing roofer	Thermographie infrarouge orientée bâtiment
	ATLANTIC BELGIUM SA	Central heating fitter	Chaudières murales Chaudières sol Pompes à chaleur
		Plumbing installer	Chaudières murales
	CPB/ISOCELL	Industrial insulation worker	Technique d'isolation cellulosique par insuflation
	BAXI Belgium	Plumbing installer	Chaudières murales BROTJE / CHAPPEE Chauffe-eau solaire
		Central heating fitter	Chaudières murales BROTJE / CHAPPEE Chaudières sol BROTJE / CHAPPEE Pompes à chaleur Chauffe-eau solaire

Type of training centre	Training centre	Occupation	Training course
			Brûleur
		Roofer	Chauffe-eau solaire
	DAIKIN AIRCONDITIONING Training Center	Basic engineering - refrigeration technologies	Airconditionné de base MULT & SPLIT service VRV III Heat Pump
	DEPASSE BELGIUM SA	Central heating fitter	Installation, mise en route & entretien de la chaudière Burneco
	ECOBATI SCRL	Industrial insulation worker	Isolatietechnieken met cellulosevlokken Soufflage Thermofloc
	ESE	Central heating fitter	Chauffe-eau solaire
		Plumbing installer	Chauffe-eau solaire
		Roofer	Chauffe-eau solaire
	ETS A. MARCHAL SPRL	Central heating fitter	Système de régulation de chauffage EBV
	FLACHDACH TECHNOLOGIE	Weatherproofing roofer	Couvreur-zingueur: membrane bitmunineuse et isolation
	GIRRETZ PIERRE	Central heating fitter	Houtpelletkachel - Edilkamin niveau 1 Houtpelletkachel - Edilkamin niveau 2
	KNAUF	Joinery - carpentry	L'isolation & son parachèvement
		Plasterer	Buitenpleisters op isolatie
	LUC DELHEZ ISOLATION	Weatherproofing roofer	Application de la mousse isolante ICYNENE
	PITTSBURGH CORNING EUROPE NV	Weatherproofing roofer	Plaatsen van isolatie met foamglas
	PROMINENT BELGIUM NV	Central heating fitter	Plaatsen, afregelen & herstel automatisatietoestellen
	THEMA SA	Central heating fitter	Chauffe-eau Solaires SONNENKRAFT Chaudières pellets WINDHAGER Chaudières murales REMEHA Chaudières sol REMEHA Chaudières pellets
		Plumbing installer	Chaudières murales REMEHA + Chauffe-eau solaires

Type of training centre	Training centre	Occupation	Training course
			SONNENKRAFT
		Roofer	Chauffe-eau solaires SONNENKRAFT
	Saint Roch Couvin	Central heating fitter	Chaudières Pellets Chaudières Murales Chaudières sol Chauffe-eau solaires Brûleur
		Plumbing installer	Chaudières murales Chauffe-eau solaires
		Roofer	Chauffe-eau solaires
Public training centre for the self-employed	IFAPME	Green technology	Géothermie Le petit éolien
		Energy and sustainable development	Eco-construction Utilisation rationnelle de l'énergie-URE Le concept de maison passive Gestion énergétique d'un bâtiment ou d'un parc de bâtiment L'enveloppe du bâtiment Logiciel PHPP1 Logiciel PHPP2 Conseiller en environnement Responsable énergie pour le secteur tertiaire privé
		EAP	Thermographie Prescription d'avis énergétique Modules d'hydraulique et régulation appliqué à la PAE Le Blower-Door Test

Type of training centre	Training centre	Occupation	Training course
			Formation à la certification énergétique des logements existants en RW pour auditeurs PAE Formation à la certification énergétique des logements existants en RW pour non-auditeurs PAE Responsable PEB (appropriation de la méthode et du logiciel PEB) Nœuds constructifs dans la PEB
		Structural (joinery, bricklayer, roof)	Les ponts thermiques dans les constructions Les ponts thermiques (méthode de calcul sur logiciel) La PEB et ses conséquences pour les maçons Les nœuds de la construction (ponts thermiques)-Raccordement des isolants Isolation des murs Les maçonneries performantes Isolation des planchers L'étanchéité à l'air d'un bâtiment La construction en ballots de paille
		Roofer / weatherproofing roofer	Techniques d'isolation des toitures Condensation dans les toitures Désamiantage des toitures Toiture verte Bardage en tuiles et isolation Isolation et ponts thermiques PEB-Couvertures des bâtiments Panneaux solaires thermiques / panneaux solaires photovoltaïques : technique de pose
		Joiner	Maisons à ossature bois Pose des menuiseries extérieures

Type of training centre	Training centre	Occupation	Training course
		Plasterer	Enduits à l'argile
			Cimentage extérieur sur isolant
		Electricity	Régulation électrique
			Production d'électricité verte par modules photovoltaïques: Etude technique et énergétique
			Maintenance et dépannage des installations solaires photovoltaïques
			Domotique-immotique
			Eclairagisme appliqué aux bâtiments
			Micro-production décentralisée d'électricité à partir d'énergies renouvelables
		Plumbing installer	Traitement des eaux usées
			Traitement des eaux de distribution et de pluie
			Production d'eau chaude par capteurs solaires (SOLTHERM)
			Hydraulique et régulation appliquée aux installations solaires
			Optimalisation du rendement global de la production de chaleur et d'eau chaude sanitaire
		Refrigeration and climate control technologies	La ventilation dans l'habitat: principes de base
			La ventilation des bâtiments résidentiels et non résidentiels
			Certification des techniciens frigoristes cat1 (certification environnementale)
			Certification des techniciens frigoristes cat2 (certification environnementale)
			VMC pour le bâtiment avec récupération de chaleur
		CH fitter	Chauffage à pellets: études techniques et énergétiques
			Chauffage thermodynamique par pompe à chaleur : conception de l'installation
			Panneaux solaires thermiques : systèmes combinés pour la

Type of training centre	Training centre	Occupation	Training course
			production d'eau chaude, le chauffage des locaux et/ou des piscines Régulation domestique en chauffage central Les brûleurs mazout à flamme bleue Chaudière mazout à condensation Technicien agréé combustible liquide de type L Renouvellement de type L –agrément Région Wallonne et Bxl Capitale) Technicien agréé combustible gazeux type G1/GI : formation à destination des candidats déjà actifs en gaz naturel Technicien agréé combustible gazeux type G1/GI : formation longue à destination des candidats avec peu de prérequis Technicien agréé combustible gazeux type G2/GII Formation de technicien qualifié au contrôle de combustion et à l'entretien des installations alimentées en combustible liquide (formation courte) Formation de technicien qualifié au contrôle de combustion et à l'entretien des installations alimentées en combustible liquide (formation longue) Recyclage et renouvellement du certificat d'aptitude pour brûleurs à combustible liquide en Région Wallonne Formation de base « Installateur gaz professionnel Cerga » Logiciel maxitherm
	IAWM	Industrial insulation worker	Grundlagen der Bauphysik -+ Wärme & Feuchte
		Small electric hand tools	Thermographie von Gebäuden
		Central heating fitter	Schulung zur Verlängerung des Solthermzerifikats Solare Heizungsunterstützung
		Plumbing installer	Maison basse énergie
Public training	FOREM	Roofer	Couvreur: Isolation de toiture

Type of training centre	Training centre	Occupation	Training course
centre employees and jobseekers			Couvreur: Pose de panneaux solaires Plaatsen van fotovoltaïsche zonnepanelen
		Industrial insulation worker	Isolateur indust.: Croquis isometriques calorifugeur Isolateur indust.: Mesure real. montage,synthese et evaluation Isolateur indust.: Metreur Isolateur indust.: Monteur Isolateur indust.: Pose de PVC Isolateur indust.: Pose manchons mousse en isolat° industrielle Isolateur indust.: Specialiste Isolateur indust.: Start-connais.materiaux,decoupe cisaille main Isolateur indust.: Technologie assemblage par moulures Isolateur indust.: Tolier traceur Isolateur indust.: Tracé & fabrication de penetration & de cones Isolateur indust.: Tracé elementaire de l'onglet(realisation) Isolateur indust.: Tracé et fabrication de coudes a section Isolateur industriel RAJ/RAC
		Bricklayer	Maçon: Maconnerie mixte et isolation
		Central heating fitter	Chauffagiste: rénovation Chauffage Pompes à chaleur Air/Eau, type Split system
		Plumbing installer	Energie solaire photovoltaique Instal. Sanit.: Energies renouvelables
	ARBEITSAMT	Industrial insulation worker	Isolation thermique, acoustique, étanchéité
		Bricklayer	Maçonnerie extérieure - briques, blocs, isolation
Sectoral Training Centre	CONSTRUTEC WALLONIE	Industrial insulation worker	PEB - Etanchéité à l'air PEB - Noeuds de la construction

Type of training centre	Training centre	Occupation	Training course
		Bricklayer	Maçon: Maconnerie mixte et isolation PEB - Conséquences pour les maçons PEB - Isolation des murs PEB - Isolation des planchers PEB - Maçonneries performantes
		Central heating fitter	Chauffagiste: Brûleurs flamme bleue Chauffagiste: Certificat d'entretien&réglage inst. chauf. mazout Chauffagiste: Habilitation gaz
		Construction shift leader	Isolation thermique des parois à ossature Isolation thermique des parois en maçonnerie
		Plumbing installer	Chauffage thermodynamique par pompe à chaleur : installation Chauffage thermodynamique par pompe à chaleur : pratique Instal. Sanit : Soltherm - recyclage Instal. Sanit.: Soltherm Techniques solaires (Brusoltherm)

Table 6.55 - Supply of advanced training courses in the Walloon Region

6.2.2.2.3 Brussels

Type of training centre	Training centre	Occupation	Training course
Private training centres	CEDICOL	Central heating fitter	Basisopleiding attest mazoutbranders Certificaat gekwalificeerd brandertechnicus Energiedeskundige type B (EAP) Erkend technicus verwarmingsaudit WDO G1 - Gasvormige brandstof - atmosferische ketels Hernieuwen van attest brandertechicus met audit Hernieuwing attest brandertechnicus - zonder opl G1-G2 Initiatie verwarmingstechniek Renouvellement technicien brûleur - Module pr Wallonie & Bxl Technicien brûleur - Module pour la région flamande Technicien brûleur - Module pour la région wallonne et brux. Technicien brûleurs certifiés
	CEVORA - CEFORA	Central heating fitter	Duurzaam bouwen - Ventilatie Energiezuinige renovatie - Algemene Inleiding Energiezuinige Renovatie - Koelte & Verwarming Warmtepompen
	CONFEDERATIE BOUW BRUSSEL-HOOFDSTAD CBB-H	Weatherproofing roofer	Isolatie & lucht- + waterdichtheid
	MERCEDES-BENZ BELUX	HGV driver	Ecodriving
	R.A.C.B. Safety Academy	HGV driver	Defensief rijden
	ROAD SAFETY CONSULTING	HGV driver	Bouwchauffeurs - Module 2 - Ecodriving Formation de conduite Ecodrive sur simulateur

Type of training centre	Training centre	Occupation	Training course
	VCB Vlaamse Confederatie Bouw	Bricklayer	Energiezuinig en duurzaam bouwen
		Central heating fitter	Woningventilatie
	WTCB-CSTC	Roofer	Nieuwe technieken dakbedekking & isolatie
		Industrial insulation worker	Na-isolatie van spouwmuren
		Central heating fitter	Chauffagiste: Chaudières à condensation
	BULEX	Central heating fitter	Wandketel Vloerketel Zonneboiler Warmtepomp Ventilatiesysteem
		Plumbing installer	Wandketel Zonneboiler
		Roofer	Zonneboiler
	HONEYWELL	Central heating fitter	Regeling Evohome
	RENOVA BULEX	Plumbing installer	Gaswandketels Chaffoteaux
	WEISHAUPT	Central heating fitter	Wandketel Vloerketel Brander Warmtepomp Zonneboiler
		Plumbing installer	Warmtepomp Zonneboiler
Public training centre for the self-employed	ESPACE FORMATION PME	Weatherproofing roofer	Isolatie & lucht- + waterdichtheid
		Central heating fitter	Chauffagiste agréé < 100 kw Chauffagiste: Certificat d'entretien&réglage inst. chauf. mazout Chauffagiste: Chaudières à condensation Chauffagiste: Electricité appliquée au chauffage

Type of training centre	Training centre	Occupation	Training course
			Chauffagiste: Habilitation gaz Chauffagiste: Régulation électrique G1 - Formation technicien agréé combustible gazeux (cycle court) G1 - Gasvormige brandstof - atmosferische ketels G2 - Gasvormige brandstof - gasunits Montage d'une chaudière à condensation et atmosphérique Montage et dépannage d'une chaudière murale mixte Montage et dépannage d'une installation de chauffage
		Plumbing installer	Combustibles liquides : formation de base et recyclage Energie solaire photovoltaique Installations solaires thermiques combinées Solaire thermique - entretien Techniques solaires (Brusoltherm) Thermische zonne-energie voor santiair en verwarming
	SYNTRA BRUSSEL	Central heating fitter	G1.2 Leidingen en toestellen (avond-zat)
		Plumbing installer	G1 - Verkorte opleiding atmosferische gastoestellen (avond-zat) G1.1 Habilitatie van de aardgasinstallateur (avond-zat) G2 - Gasunits en gastoestellen type C (avond-zat) G2 - Verkorte opleiding gesloten wandtoestellen (avond-zat)
		Miscellaneous	EPB-adviseur (+ bijscholing) Vooropleiding Energiedeskundige type A Vlaanderen Energiedeskundige Brussel
Public training centre for employees and jobseekers	BRUXELLES FORMATION	Roofer Weatherproofing roofer Central heating fitter	Plaatsen van fotovoltaïsche zonnepanelen Isolatie & lucht- + waterdichtheid Chauffage: la régulation

Type of training centre	Training centre	Occupation	Training course
	VDAB ANDERLECHT	Central heating fitter	Aansluiten van verwarmingsketels (CV)

Table 6.56 - Supply of advanced training courses in the Brussels Capital Region

6.2.3 Training courses completed

The tables below provide an outline of the courses attended by construction workers within the construction sector in Belgium. In order to provide a full picture, as well as the relative significance of the training courses in terms of EE and RES, they are broken down in each case between 'ordinary' training courses, courses relating to EE and courses relating to RES.

6.2.3.1 Number of training hours per occupation broken down between EE and RES

Occupation	2009				2010				2011			
	Others	EE	RES	Total	Others	EE	RES	Total	Others	EE	RES	Total
General	194,805	318	44	195,167	202,304		240	202,544	152,538	1,195	52	153,785
Other mechanized occupations	19,889			19,889	15,789			15,789	20,609			20,609
Other training courses	12,517			12,517	10,704			10,704	16,615			16,615
Asbestos remover	12,864			12,864	13,595			13,595	12,297			12,297
Asphalt layer	1,222			1,222	230			230	1,144			1,144
Dredging worker	47,878			47,878	42,724			42,724	51,872			51,872
Formworker	11,430			11,430	11,378			11,378	31,216			31,216
Mobile crane and telescopic handler operator	5,832			5,832	5,014			5,014	4,152			4,152
Concrete repairer	1,280			1,280	952			952	2,168			2,168
Interior joinery worker	840	6		846	3,136			3,136	6,621			6,621
Borer / Wellpoint drainer	2,164			2,164	1,964			1,964	1,820			1,820
Site plant operator	25,178			25,178	25,598			25,598	33,890			33,890
Exterior joinery worker	2,246	160		2,406	2,138	240		2,378	4,917	213		5,130
Driver	28,313	236		28,549	23,451	208		23,659	27,373	672		28,045
Weatherproofing roofer	4,328	820	84	5,232	6,505	1,258		7,763	7,731	1,380		9,111
Roofer	31,327	243	1,242	32,812	31,201	72	386	31,659	36,229	930	392	37,551
Roofing carpenter	2,248			2,248	2,408			2,408	3,752	52		3,804

Occupation	2009				2010				2011			
	Others	EE	RES	Total	Others	EE	RES	Total	Others	EE	RES	Total
Floor covering layer					248			248	48			48
Glazier	392			392	422			422	1,512			1,512
Lift truck operator	9,911			9,911	9,616			9,616	9,815			9,815
Steel fixer	488			488	312			312	3,124			3,124
Industrial insulation worker		4,376		4,376		7,062		7,062		5,968		5,968
Industrial painter	1,592			1,592	1,584			1,584	1,800			1,800
Interior fitter	1,529			1,529	1,920			1,920	1,020			1,020
Storeman	60			60	380			380	823			823
Bricklayer	38,123	570		38,693	42,137	1,756		43,893	49,865	5,287		55,152
Central heating fitter	11,900	20,767	1,305	33,972	13,079	22,078	584	35,741	13,548	21,169	583	35,300
Metal façade cladding and roofing element fitter	304			304	328			328	1,128			1,128
Utility mains installer	11,189	76		11,265	15,367	72		15,439	13,972	296		14,268
Drain layer	520			520	2,412			2,412	1,621			1,621
Plumbing installer	9,874	1,612	1,472	12,958	11,654	2,367	852	14,873	10,323	1,995	400	12,718
Painter - decorator	10,404			10,404	13,368			13,368	14,191			14,191
Joiner - Carpenter	2,464			2,464	5,940			5,940	18,384	624		19,008
Railway worker	7,932			7,932	6,792			6,792	4,204			4,204
Stonemason / Marble worker	3,772			3,772	2,715			2,715	8,756			8,756
Scaffolding erector	11,923			11,923	23,120			23,120	18,072			18,072
Paver	2,564			2,564	2,536			2,536	7,526			7,526
Plasterer	9,253			9,253	8,088	296		8,384	5,524	424		5,948
Tiler	8,157			8,157	6,399			6,399	6,085			6,085
Tower crane operator	16,214			16,214	17,671			17,671	20,629			20,629
Road builder	9,362			9,362	12,117			12,117	27,164			27,164
Total	**572,288**	**29,184**	**4,147**	**605,619**	**597,296**	**35,409**	**2,062**	**634,767**	**654,078**	**40,205**	**1,427**	**695,822**

Table 6.57 - Number of training hours per occupation broken down between EE and RES

6.2.3.2 Percentage of the number of training hours per occupation broken down between EE and RES

Occupation	2009				2010				2011			
	Others	EE	RES	Total	Others	EE	RES	Total	Others	EE	RES	Total
General	99.8%	0.2%	0.0%	100.0%	99.9%	0.0%	0.1%	100.0%	99.2%	0.8%	0.0%	100.0%
Other mechanized occupations	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Other training courses	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Asbestos remover	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Asphalt layer	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Dredging worker	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Formworker	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Mobile crane and telescopic handler operator	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Concrete repairer	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Interior joinery worker	99.3%	0.7%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Borer / Wellpoint drainer	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Site plant operator	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Exterior joinery worker	93.3%	6.7%	0.0%	100.0%	89.9%	10.1%	0.0%	100.0%	95.8%	4.2%	0.0%	100.0%
Driver	99.2%	0.8%	0.0%	100.0%	99.1%	0.9%	0.0%	100.0%	97.6%	2.4%	0.0%	100.0%
Weatherproofing roofer	82.7%	15.7%	1.6%	100.0%	83.8%	16.2%	0.0%	100.0%	84.9%	15.1%	0.0%	100.0%
Roofer	95.5%	0.7%	3.8%	100.0%	98.6%	0.2%	1.2%	100.0%	96.5%	2.5%	1.0%	100.0%
Roofing carpenter	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	98.6%	1.4%	0.0%	100.0%
Floor covering layer				100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Glazier	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Lift truck operator	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Steel fixer	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Industrial insulation worker	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
Industrial painter	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%

Occupation	2009				2010				2011			
	Others	EE	RES	Total	Others	EE	RES	Total	Others	EE	RES	Total
Interior fitter	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Storeman	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Bricklayer	98.5%	1.5%	0.0%	100.0%	96.0%	4.0%	0.0%	100.0%	90.4%	9.6%	0.0%	100.0%
Central heating fitter	35.0%	61.1%	3.8%	100.0%	36.6%	61.8%	1.6%	100.0%	38.4%	60.0%	1.7%	100.0%
Metal façade cladding and roofing element fitter	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Utility mains installer	99.3%	0.7%	0.0%	100.0%	99.5%	0.5%	0.0%	100.0%	97.9%	2.1%	0.0%	100.0%
Drain layer	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Plumbing installer	76.2%	12.4%	11.4%	100.0%	78.4%	15.9%	5.7%	100.0%	81.2%	15.7%	3.1%	100.0%
Painter - decorator	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Joiner - Carpenter	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	96.7%	3.3%	0.0%	100.0%
Railway worker	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Stonemason / Marble worker	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Scaffolding erector	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Paver	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Plasterer	100.0%	0.0%	0.0%	100.0%	96.5%	3.5%	0.0%	100.0%	92.9%	7.1%	0.0%	100.0%
Tiler	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Tower crane operator	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Road builder	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Total	94.5%	4.8%	0.7%	100.0%	94.1%	5.6%	0.3%	100.0%	94.0%	5.8%	0.2%	100.0%

Table 6.58 - Percentage of training hours per occupation broken down between EE and RES

6.2.3.3 Number of trained construction workers per occupation broken down between EE and RES

Occupation	2009				2010				2011			
	Others	EE	RES	Total	Others	EE	RES	Total	Others	EE	RES	Total
General	16,585	13	3	16,601	16,930		10	16,940	15,522	82	2	15,606
Other mechanized occupations	1,552			1,552	1,439			1,439	1,885			1,885
Other training courses	772			772	634			634	826			826
Asbestos remover	1,428			1,428	1,531			1,531	1,410			1,410
Asphalt layer	147			147	24			24	41			41
Dredging worker	1,297			1,297	1,570			1,570	1,731			1,731
Formworker	380			380	287			287	536			536
Mobile crane and telescopic handler operator	147			147	242			242	162			162
Concrete repairer	104			104	127			127	98			98
Interior joinery worker	52	2		54	169			169	187			187
Borer / Wellpoint drainer	108			108	102			102	95			95
Site plant operator	779			779	1,036			1,036	1,294			1,294
Exterior joinery worker	141	20		161	146	29		175	269	25		294
Driver	2,205	37		2,242	2,320	26		2,346	2,637	101		2,738
Weatherproofing roofer	446	72	17	535	617	103		720	563	120		683
Roofer	3,520	46	169	3,735	3,318	5	55	3,378	3,315	50	27	3,392
Roofing carpenter	80			80	73			73	61	8		69
Floor covering layer					16			16	6			6
Glazier	14			14	34			34	71			71
Lift truck operator	722			722	793			793	914			914
Steel fixer	15			15	7			7	36			36
Industrial insulation worker		95		95		188		188		167		167
Industrial painter	82			82	92			92	158			158

Occupation	2009				2010				2011			
	Others	EE	RES	Total	Others	EE	RES	Total	Others	EE	RES	Total
Interior fitter	73			73	94			94	38			38
Storeman	1			1	20			20	12			12
Bricklayer	771	19		790	866	144		1,010	1,101	167		1,268
Central heating fitter	694	1,240	122	2,056	642	1,034	72	1,748	887	1,042	56	1,985
Metal façade cladding and roofing element fitter	22			22	20			20	31			31
Utility mains installer	1,001	12		1,013	1,354	13		1,367	1,177	46		1,223
Drain layer	62			62	169			169	142			142
Plumbing installer	488	144	83	715	668	150	45	863	564	98	13	675
Painter - decorator	380			380	597			597	574			574
Joiner - Carpenter	193			193	277			277	389	15		404
Railway worker	264			264	280			280	197			197
Stonemason / Marble worker	75			75	59			59	601			601
Scaffolding erector	570			570	1,045			1,045	729			729
Paver	87			87	100			100	85			85
Plasterer	344			344	255	25		280	179	34		213
Tiler	208			208	216			216	131			131
Tower crane operator	600			600	657			657	908			908
Road builder	814			814	1,321			1,321	1,345			1,345
Total	**37,223**	**1,700**	**394**	**39,317**	**40,147**	**1,717**	**182**	**42,046**	**40,907**	**1,955**	**98**	**42,961**

Table 6.59 - Number of trained construction workers per occupation broken down between EE and RES

6.2.3.4 Percentage of trained construction workers per occupation broken down between EE and RES

Occupation	2009				2010				2011			
	Others	EE	RES	Total	Others	EE	RES	Total	Others	EE	RES	Total
General	99.9%	0.1%	0.0%	100.0%	99.9%	0.0%	0.1%	100.0%	99.5%	0.5%	0.0%	100.0%
Other mechanized occupations	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Other training courses	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Asbestos remover	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Asphalt layer	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Dredging worker	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Formworker	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Mobile crane and telescopic handler operator	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Concrete repairer	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Interior joinery worker	96.3%	3.7%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Borer / Wellpoint drainer	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Site plant operator	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Exterior joinery worker	87.6%	12.4%	0.0%	100.0%	83.4%	16.6%	0.0%	100.0%	91.5%	8.5%	0.0%	100.0%
Driver	98.3%	1.7%	0.0%	100.0%	98.9%	1.1%	0.0%	100.0%	96.3%	3.7%	0.0%	100.0%
Weatherproofing roofer	83.4%	13.5%	3.2%	100.0%	85.7%	14.3%	0.0%	100.0%	82.4%	17.6%	0.0%	100.0%
Roofer	94.2%	1.2%	4.5%	100.0%	98.2%	0.1%	1.6%	100.0%	97.7%	1.5%	0.8%	100.0%
Roofing carpenter	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	88.4%	11.6%	0.0%	100.0%
Floor covering layer				100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Glazier	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Lift truck operator	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Steel fixer	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Industrial insulation worker	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
Industrial painter	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%

Occupation	2009				2010				2011			
	Others	EE	RES	Total	Others	EE	RES	Total	Others	EE	RES	Total
Interior fitter	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Storeman	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Bricklayer	97.6%	2.4%	0.0%	100.0%	85.7%	14.3%	0.0%	100.0%	86.8%	13.2%	0.0%	100.0%
Central heating fitter	33.8%	60.3%	5.9%	100.0%	36.7%	59.2%	4.1%	100.0%	44.7%	52.5%	2.8%	100.0%
Metal façade cladding and roofing element fitter	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Utility mains installer	98.8%	1.2%	0.0%	100.0%	99.0%	1.0%	0.0%	100.0%	96.2%	3.8%	0.0%	100.0%
Drain layer	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Plumbing installer	68.3%	20.1%	11.6%	100.0%	77.4%	17.4%	5.2%	100.0%	83.6%	14.5%	1.9%	100.0%
Painter - decorator	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Joiner - Carpenter	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	96.3%	3.7%	0.0%	100.0%
Railway worker	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Stonemason / Marble worker	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Scaffolding erector	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Paver	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Plasterer	100.0%	0.0%	0.0%	100.0%	91.1%	8.9%	0.0%	100.0%	84.0%	16.0%	0.0%	100.0%
Tiler	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Tower crane operator	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Road builder	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	100.0%
Total	94.7%	4.3%	1.0%	100.0%	95.5%	4.1%	0.4%	100.0%	95.2%	4.6%	0.2%	100.0%

Table 6.60 – Percentage of trained construction workers per occupation broken down between EE and RES

6.2.4 Structures to monitor developments in technology, competencies and training

6.2.4.1 BBRI technical committees

The BBRI has 16 Technical Committees. Eleven of these are devoted to a specific construction discipline and are chaired by a contractor, while an engineer-coordinator appointed by the BBRI is charged with the proper conduct of their meetings. Furthermore delegates from the construction trades concerned and various other experts also sit on these occupation-related Committees. Four other Technical Committees, which are also chaired by a contractor, are tasked with directing the more horizontal themes cutting across the occupations (including hygrothermy, acoustics and business management). The latest Technical Committee is made up of delegates from the world of architecture and is responsible for consultations with designers.

The various Technical Committees that conduct research campaigns – this involves the eleven occupation-related Committees and the horizontal Committees in particular – are required systematically to prepare a three-part work programme (information transfer, information gathering and other action). As far as information transfer is concerned, the Technical Committees develop Technical Information and reports. In order to be able to disseminate information, one needs first and foremost to gather the requisite information. This involves research activities that usually run for several years and which can be innovative as well as pre-normative in nature. In addition to this, participation in these activities on standardisation and technical approval constitutes an important source of information (48).

Their task is to direct research into their specific field from a practical point of view (bottom-up approach) and to ensure that the research results are transferred to the shop floor in a usable manner.

6.2.4.2 Fvb-ffc Constructiv (FVB)

The 3 pillars of the FVB are:

- collaboration with construction vocational education;
- support for jobseekers' training;
- stimulating in-service training for construction sector workers.

The FVB is the point of contact in this regard for all the target audience concerned. The FVB is and remains a federal sectoral Fund. It is therefore the Board of Governors that that bears ultimate responsibility. Given that "education" and "training jobseekers" are regionalised matters, sectoral terms of reference are utilised in which implementation is carried out by the regional guidance groups:

- the sectoral terms of reference lay down uniform sectoral objectives such as:
- increasing intake into construction training courses;

- increasing training quality;
- increasing flow to construction employment;
- reducing the number of dropouts.

Taking account of these sectoral terms of reference, subsequent elaboration will be assigned to the 3 regional guidance groups. Every effort will be made here to achieve optimum coordination with the regional governments on these matters. There are 3 fully-fledged guidance groups: Flanders, Brussels and Wallonia. In general terms they will consult mutually where necessary. Directing and managing employee training courses remains a federal matter. The FVB has recommendations passed on to it from two channels: FVB-regions and FVB-sections.

The FVB-region is a joint action and consultation body of the FVB at provincial level. In carrying out its assignments it can also put sub-provincial sensitivities on the agenda. It is made up of local management and workers from the construction sector and is supported by the competent FVB regional manager.

The duties of the FVB-regions comprise:

- collaboration with daytime education with a full syllabus;
- collaboration in the context of organising and dealing with young people's apprenticeships (*JLW* in Dutch), construction apprenticeships (*ABO* in Dutch [construction sandwich courses]);
- collaboration in the context of training schedule implementation;
- collaboration to develop sectoral initiatives for the benefit of the "construction risk groups";
- compiling all relevant information on the provincial sectoral labour market and temporary construction labour, as well as regularly drawing up a demand list for construction competencies that could not be met from the labour market. The geographical competence of the FVB-region extends the territory of the province.

The FVB-region is run by day-to-day management, that is made up jointly of regional representatives of the FVB member organisations, including employer and employee organisations. The day-to-day management is assisted in an advisory capacity by one representative of the National Action Committee for Health and Safety in the Construction Business (*NAVB* in Dutch) and the regional manager of the FVB or a training advisor appointed by him. The regional manager's role comprises the overall coordination of the FVB-region's activities. The regional manager or an FVB training advisor appointed by him acts as secretary of the FVB-region.

The FVB-sections ensure that the training content is optimally matched to the specificities of the various distinct occupations. They issue advice to the FVB Board of Governors. Each section is led by a core group made up of experts from FVB member organisations and employees in the training department.

7 Gap between the current situation and the needs for 2020 in terms of skills

7.1 Evolution of the workforce

7.1.1 Personnel turnover

7.1.1.1 Introduction

This research is based on a comparison of the active construction sector workforce as at 30 June 2009, with the construction sector workers who were active on 30 June 2010. As a result of this we can draw a distinction between various categories:

- the same employer in construction, workers who have not changed employers (*SEC*)
- a different employer in construction, workers who have changed employers, but who are still active in the construction sector (*DEC*)
- outflow, these are workers who are no longer present as workers in the construction sector. There can be various reasons for this. Accordingly, a worker might be active in a different sector on 30 June 2010 or not able to be found on account of death, (early) retirement, unemployment, etc. (outflow)
- intake, workers might not be active in the construction sector on 30 June 2009, but are such on 30 June 2010, these people in other words have started work in the construction sector (intake).

The source of this research is the database which fvb-ffc Constructiv has at its disposal. This database is fed with information from the Crossroads Bank for Social Security. It contains all the information about employment of workers in the construction sector.

The turnover in the workers' population from June 2009 over a one-year period is shown in the chart below (note: the difference in number of employees compared with the table in the preceding passage (Table 5.29 Evolution in workers by age) is due to a different measuring point: in this study employment was measured 30 June 2009, in the preceding table regarding employment the measurement was taken in December 2009).

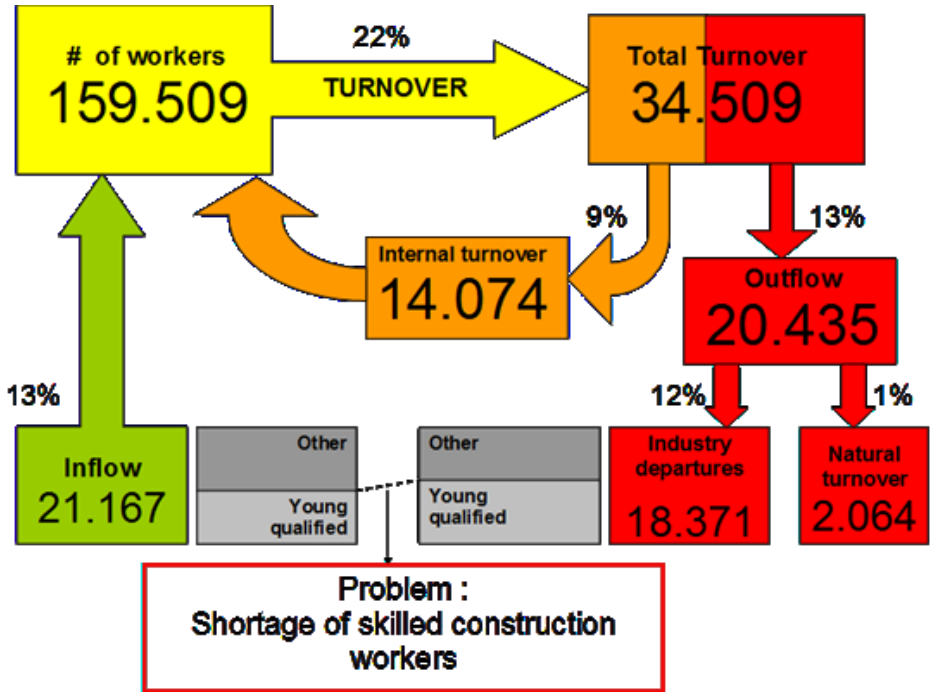


Figure 7.13 - schematic outline of turnover in the construction sector (figures for 2010)

Of the estimated 159,500 workers employed in 2009, around 34,500 have changed employer (22%). Of these 34,500 around 14,000 have changed employer within the sector. Around 20,500 workers (13%) have left the sector. This includes some 2,000 people under natural wastage: they are on (early) retirement, long-term unfit for work, deceased, etc. The remaining 18,000 workers have transferred to another sector, are unemployed of have changed status (clerical or self-employed).

7.1.1.2 Turnover by region

If we look at personnel turnover by region, we can observe the following:

Total turnover in percentage terms is highest in the Walloon Region. 24.2% of building workers who were active in the construction sector on 30 June 2009, were no longer working for the same employer the year after (13,644 workers). Of these, 7,071 individuals left the sector.

The lowest turnover can be found in the Flemish Region. Accordingly, the lowest outflow can be found here: 11.4% of building workers who were active in the construction sector on 30 June 2009 (11,592 workers) left the construction sector.

Brussels is somewhere between these two: 77.7% stayed with the same employer; 6.9% changer employer, but remained active in the sector as construction workers; 15.4% left the sector.

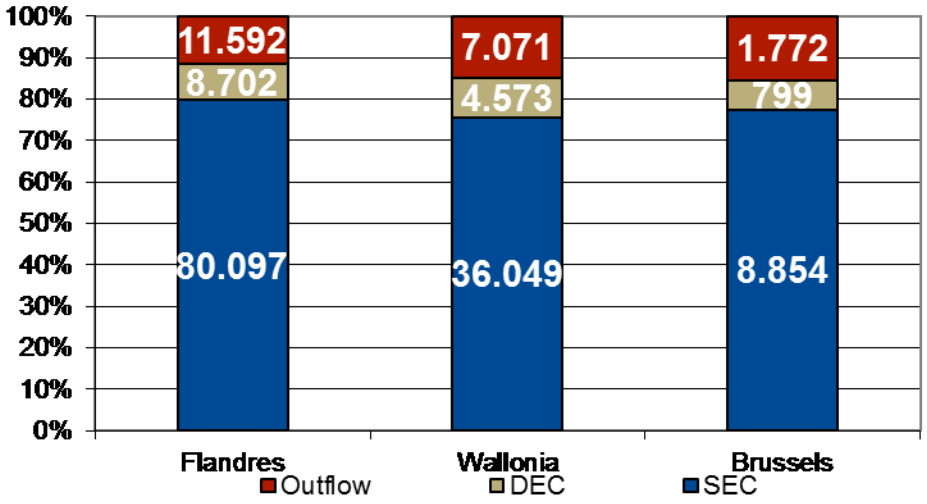


Figure 7.14: situation of the 2009 construction worker population after one year, broken down by region (figures for 2010)

7.1.1.3 Turnover by sub-sector

Figure 7.15 shows turnover in the construction sector by sub-sector. The sub-sectors for road construction, trade/hire, joinery and the dredging sector showed the largest proportion of construction workers that had the same employer on 30 June 2010 as the year before.

If we look at the actual outflow from the sector, we see that road construction has the lowest outflow. The sub-sector for other finishing has the highest outflow, namely 15%. Structural, other finishing, structural finishing and others have the highest turnover (23%).

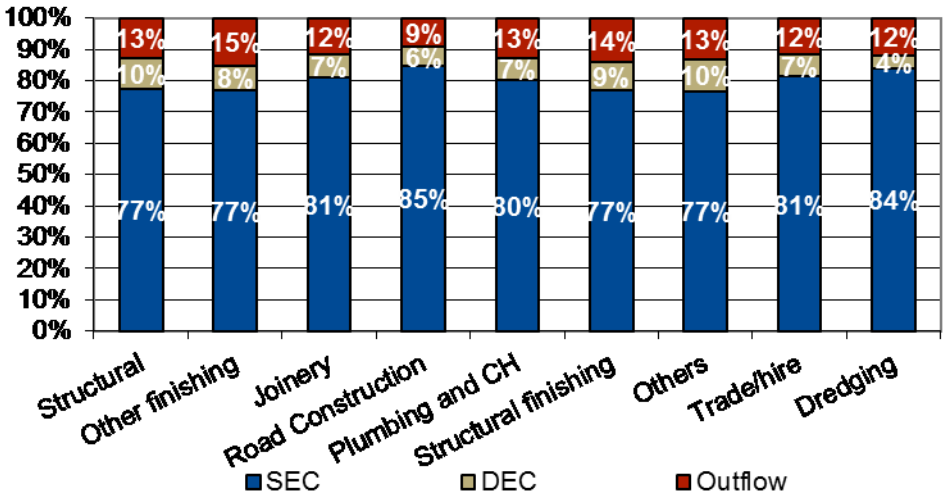


Figure 7.15: situation of the 2009 construction worker population after one year, broken down by sector (figures for 2010)

7.1.1.4 Turnover by age

Figure 7.16: - age distribution of turnover in the construction sector, relative numbers (figures for 2010) shows the relative age distribution for the various subpopulations and for the total population. The age distribution for the "same construction employer" approximates the age distribution for the total population. The "outflow" and "different construction employer" subpopulations have a relatively young population. For outflow there are naturally many older construction workers, who take (early) retirement or die. Intake naturally has a very high proportion of young people, but this is partially negated by young people who leave.

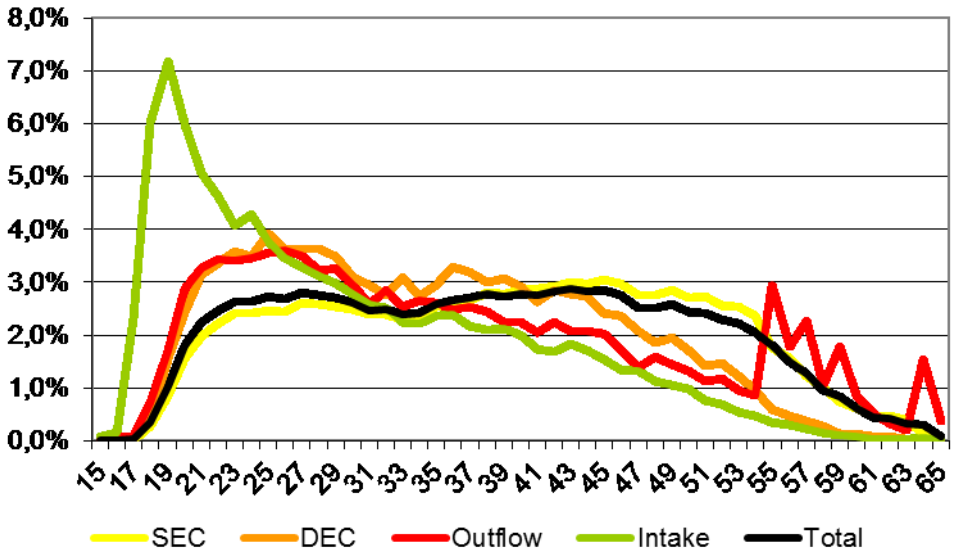


Figure 7.16: - age distribution of turnover in the construction sector, relative numbers (figures for 2010)

7.1.1.5 Evolution in turnover

Year	Same construction	Different construction	Outflow	Intake
1994	73.3%	11.5%	15.2%	11.6%
1998	76.4%	10.6%	13.0%	12.5%
2004	78.1%	10.9%	11.0%	13.2%
2006	74.9%	10.6%	14.5%	16.0%
2008	77.5%	8.8%	13.7%	11.9%
2009	78.6%	8.8%	12.8%	13.3%

Table 7.61 – evolution of personnel turnover in the construction sector between 1994 and 2009

Personnel turnover in the construction sector has experienced major fluctuations since 1994. Whereas the total turnover in 1994 was still 27%, in 2005 it dropped to 22%. In 2007 however, turnover rose again to 25%. In 2010 it was down again to 22%. Fluctuations in turnover can nearly always be boiled down to a change in outflow: from 15% in 1994, to 11% in 2005, to 15% in 2007 and 13% in 2010. Internal turnover has remained constant over a

long period. Here there has also been a downward in recent years. Here internal turnover is down to 9%. This is stagnation compared with the previous year. Intake has remained stable in absolute numbers through time.

7.1.1.6 Origin of intake

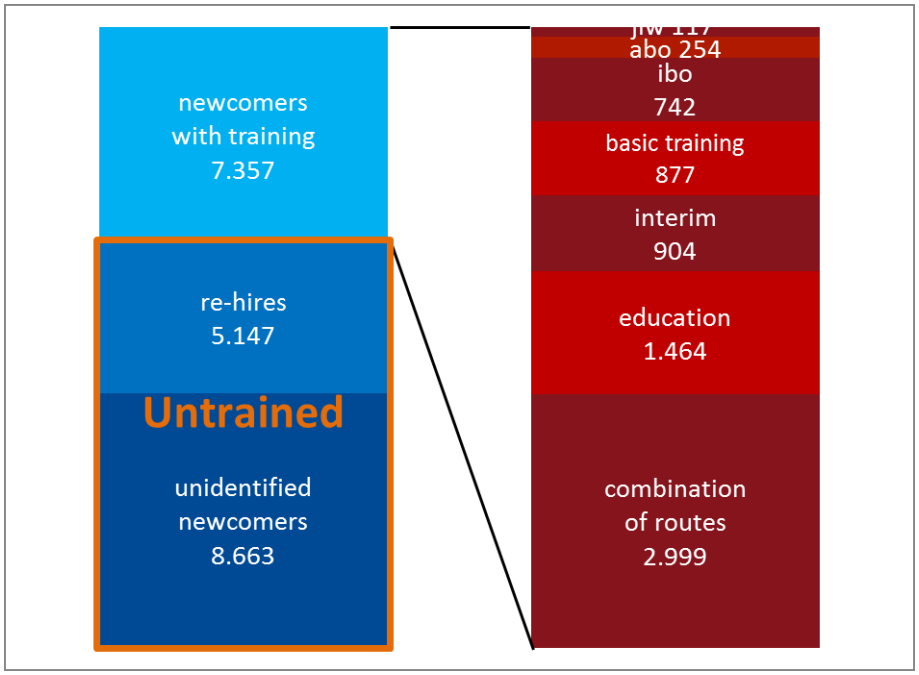


Figure 7.17: origin of intake in the Belgian Construction sector

The above chart shows the origin of the intake. It will be noted that out of the total intake of 21,167 construction workers in 2010, 7,357 (35%) originated from a training system (or through temporary work).

- 14% came from a sandwich course system (JLW, ABO, IBO)
- 12% came from basic training for jobseekers
- 12% came through a temporary contract in the sector
- 20% came from construction education
- 42% came from a combination of the above systems (e.g. a temporary contract after construction education)

5,147 (24%) are re-entrants, i.e. workers who have come back to work in the construction sector again. The remaining intake (8,663; 41%) consists of newcomers who cannot be traced. In concrete terms this undefined intake consists of individuals who cannot be tracked down in construction training courses. Accordingly, these are possibly young people who have attended a training course outside construction education (catering, engineering, etc.). They could also be older employees who have come in from another sector. What is indeed

clear is that these people have no experience within the construction sector and/or did not have the benefit of basic training that prepares for work in the construction sector. This group therefore lacks any construction-related qualifications.

7.1.2 Projections for 2020

The table below shows numbers of construction sector workers per occupation (group):

Occupation (group)	2009	2010	2011	Estimated EE and RES training need for 2020
Construction machinery	21,788	21,944	23,044	2,300
Road worker	14,461	14,093	15,794	1,500
Bricklayer	27,078	26,714	25,393	6,400
Formworker/steel fixer	13,258	13,059	12,541	1,200
Rendering/Pointing worker	2,549	2,551	2,359	600
Floor covering layer/Tiler/Plasterer	11,667	11,682	10,712	2,500
Roofer	10,442	10,663	11,335	2,800
Joinery	24,281	24,633	25,457	6,400
Glazier	1,090	1,089	1,094	2,500
Insulation worker	2,646	2,662	3,652	900
CH fitter	6,076	6,257	6,736	2,250
Plumbing installer	5,537	5,684	6,092	2,050
Others	20,970	20,937	20,534	2,000
Total	163,852	163,978	166,754	33,400

Table 7.62 – Construction sector workers per occupation (group) and projected training need

This table also presents a rough estimate of the numbers of vocational practitioners to be trained. This is based on an estimate of annual turnover and the unqualified intake determined from it. This is estimated at 14% per annum. Accordingly this means around 100% of the total of vocational practitioners over a 7-year period. A quarter of the intake leaves the construction sector immediately, thus leaving 75%. Of these groups it is estimated that one in three will need training in the period leading up to 2020, or 25% of the total number of vocational practitioners in 2011. This percentage is estimated at 33% for CH fitters and Plumbing installers, for construction machinery, road workers and the ‘others’ category, this percentage is estimated at 10%. The results of this exercise are shown in the above table.

7.2 New skills

An update is currently underway of existing vocational profiles in the construction sector by occupation. The current vocational profiles were developed in the late nineties and were therefore due to be updated to the current status quo. As part of this process the vocational competencies relating to renewable energy and energy efficiency were also updated. Reworked vocational profiles have been validated at this time for the following occupations:

- Roofer
- Weatherproofing roofer
- Plumbing installer
- CH fitter
- Ventilation systems installer

Other occupations will be updated at a subsequent stage. Work is currently in progress on the following occupations:

- Roofing carpenter
- Timber frame construction
- Exterior joinery worker
- Interior joinery worker
- Interior fitter

Attached you will find the additional competency requirements that are relevant to Energy Efficiency and Renewable Energy for the occupations that have already been updated, notably Roofer, Weatherproofing roofer and CH fitter, Plumber and Ventilation systems installer.

8 Barriers

8.1 Introduction

As part of carrying out the National Analysis of the Status Quo, an inventory of potential barriers was prepared. Potential barriers were listed in the first instance during a workgroup meeting. These barriers were then submitted to various respondents through an online survey. This survey enabled the relative perceived significance of these barriers to be ascertained. The survey was answered by a total of 127 respondents. The results of this exercise are set out in the text that follows. The various barriers were listed in the first instance. After that the three most quoted problem areas were highlighted in bold, the ranking and the percentage of respondents who pointed to this problem area are in brackets. Possible solutions were also asked for. Some solutions put forward are listed (indicated by a ○), but it is emphasised that these are only by way of illustration.

8.2 Problem areas

8.2.1 Problem areas connected with training courses

- Training courses are not technically correct
- **Training courses only focus on how something must be done rather than why it must be done (3; 25%)**
    - Better basic training, training should provide an overall picture and theory should be better aligned with practice
- There is no code of best practice
- The right competencies are not covered during the training courses on offer
- The quality of course material in training courses is inadequate
- **Training courses do not keep up with technological developments fast enough (2; 33%)**
    - More contact between course attendees, trainers and business
- Training courses are not sufficiently modular in their structure
- Training courses are too product-related
- **Existing training courses are too theoretical (1; 40%)**
    - More training on the shop floor or in a practical setting

8.2.2 Problem areas connected with training supply

- There is no training that meets the needs of my organisation
- **There are training courses available, but the distance to the training centre is too great (2; 30%)**
    - In-company training, better spread of training centres
- There are no instructors/trainers able to provide the desired training
- Available instructors/trainers are not to a high enough technical standard
- Available instructors/trainers are not to a high enough teaching standard
- The material/technical facilities used during training courses are not of high enough quality
- **Technical progress is not being followed up on soon enough (1; 35%)**
    - More intense collaboration with manufacturers
- **I prefer training courses organises in my organisation (3; 26%)**
    - Request additional support
- The level of training is insufficiently geared to an audience of workers
- Training premises are inadequately equipped for practical training courses

8.2.3 Problem areas connected with access to training courses

- **The way in which work is organised does not allow workers to be sent for training (1; 30%)**
    - More training outside working hours
- My workers' language knowledge is insufficient to send them for training
- Bureaucracy is a barrier to sending workers for training
- **The cost of training is too high to send workers for training (1; 30%)**
    - Financial incentives

- Whenever workers are sent for training this increases the likelihood that they will choose another employer
- Attending training does not result in a certificate or testimonial
- The supply of training courses is not geared to the seasonal nature of the sector (e.g. greater supply during the winter)
- **The training supply is insufficiently well known (3)**
    - Carry out more promotion

8.2.4 Problem areas connected with attaching value to high quality execution of works

- **High-quality execution of contracts does not offer any economic added value (1; 41%)**
    - Quality of works must also be taken into account
- **There are no results or performance commitments included in the scope of contract execution (3; 30%)**
    - Ensure that factors other than financial cost influence choice
- **My current manpower allocation does not offer any opportunity to enter into any results or performance commitments (2; 36%)**

8.2.5 Problem areas connected with the worker population

- **I am experiencing a shortage of trained workers (2; 46%)**
    - Make use of intake channels other than education
- **I am experiencing a shortage of qualified workers (irrespective of training) (1; 67%)**
- **There are insufficient training opportunities for workers without prior training (3; 19%)**
    - IBO for people who are ‘not’ unemployed.

9 Conclusions

9.1 Short term

In terms of the existing building stock the focus needs to be on (total) renovation of outdated buildings in order to achieve the targets for 2020.

This involves among other things not only insulating roofs and replacing glazing and joinery, but also embarking on more efficient energy generation. This will bring about an increase in construction workers employed in the areas of CH, roofing and insulation work and exterior joinery.

Accordingly, it is in these areas that new in-service training initiatives need to be set up.

9.2 Long term

Changes in the construction process which are necessary to produce nearly energy-neutral homes will also have knock-on effects on work content. Examples of this are in heating and ventilation. In passive buildings there is very little if any work for a heating installer, whereas in a traditional building installing heating plays a part which is not to be underestimated. However supplying ventilation, which is optional in a traditionally built house, is of the utmost importance in a passive home. The heating-ventilation job content in new build will therefore, as part of the greening of the construction sector, shift from heating to ventilation. This is likewise the case for developments expected in insulation works where the supplementary business of airtightness will gain in importance. In general all jobs that interfere with airtightness (joinery, plumbing and HVAC, electrical, etc.) will change in content.

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12 Glossary

GDP	Gross Domestic Product
boe	Barrel of oil equivalent is a unit of energy. 1 boe is equivalent to 1628.2 kWh.
CDO	[Dutch] Centre for Part-time Education
CVET	Continuous Vocational Education and Training
EC	European Commission
EE	Energy Efficiency
Single family dwelling	A building that provides accommodation for just one family
EPB	[Dutch] Energy Performance Decree
EQF	European Qualifications Framework
FKR	[Dutch] French-speaking Qualification Framework
Low-energy dwelling	For the purposes of the federal tax credit is taken to mean a dwelling for which the total energy demand for space heating and cooling is less than or equal to 30 kWh/m² of climate-controlled floor space.
LLL	Lifelong Learning
Multi-family dwelling	A building that provides accommodation for more than one family
NSQ	National Status Quo
Zero energy dwelling	For the purposes of the federal tax credit is taken to mean a dwelling that meets the conditions for a passive dwelling and in which the residual energy demand for space heating and cooling is fully compensated by renewable energy generated on site.
Passive dwelling	For the purposes of the federal tax credit is taken to mean a dwelling for which the total energy demand for space heating and cooling is less than or equal to 15 kWh/m² of climate-controlled floor space. In an airtightness test (in accordance with standard NBN EN 13829) with a pressure differential between interior and exterior atmospheres of 50 Pascals, air leakage does not exceed 60% of the volume of the dwelling per hour (n50 not exceeding 0.6/hour). Restrictions are also imposed on overheating and building component performance.
PC 124	Construction industry Joint Committee
RES	Renewable Energy Sources
toe	Tonne of oil equivalent is a unit of energy. 1 toe is approximately equal to 11,630 kWh.
VET	Vocational Education and Training
VKR	[Dutch] Flemish Qualification Framework

BUILD UP Skills

The EU Sustainable Building Workforce Initiative in the field of energy efficiency and renewable energy

BUILD UP Skills is a strategic initiative under the Intelligent Energy Europe (IEE) programme to boost continuing or further education and training of craftsmen and other on-site construction workers and systems installers in the building sector. The final aim is to increase the number of qualified workers across Europe to deliver renovations offering a high energy performance as well as new, nearly zero-energy buildings. The initiative addresses skills in relation to energy efficiency and renewable energy in all types of buildings.

BUILD UP Skills has two phases:

I. First, the objective is to set up national qualification platforms and roadmaps to successfully train the building workforce in order to meet the targets for 2020 and beyond.

II. Based on these roadmaps, the second step is to facilitate the introduction of new and/or the upgrading of existing qualification and training schemes.

Throughout the whole duration of the initiative, regular exchange activities are organised at EU level to underline the European dimension of this important initiative and to foster the learning among countries.

The BUILD UP Skills Initiative contributes to the objectives of two flagship initiatives of the Commission's 'Europe 2020' strategy — 'Resource-efficient Europe' and 'An Agenda for new skills and jobs'. It is part of the Commission's Energy Efficiency Action Plan 2011. It will also enhance interactions with the existing structures and funding instruments like the European Social Fund (ESF) and the Lifelong Learning Programme and will be based on the European Qualification Framework (EQF) and its learning outcome approach.