BUILD UP Skills Belgium

National Roadmap

June 13

Further information

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

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

Contents

0. Preface

In the field of energy consumption, buildings still present a huge opportunity to reduce greenhouse gas emissions.

Based on that conclusion, the European Commission has included the building industry in its lists of priorities established in order to achieve the goals set in the Europe 2020 strategy [1], these goals being:

- reducing greenhouse gas emissions by 20% in comparison with 1990;
- reducing the energy consumption by 20%;
- increasing the energy from renewables by 20%.

That is also the reason why, on 19 May 2010, it adopted a new directive concerning the energy performance of buildings [2]. That new directive, transposed into national legislation by its member states in 2012, implies among others things that all new buildings will have to be near zero-energy buildings from 2021 on.

As new buildings are not the only buildings on which the achievement of the 2020 goals will depend, we are well aware that the renovation of buildings will also play an important part. The year 2020 being practically here, it is important to ensure that our current construction workers can contribute to this by extending their professional competences with 'green' aspects, such as renewable energy (RE) and energy efficiency (EE).

Build Up Skills Belgium (BUSB) is a cooperation between the Fund for vocational training in the construction industry (fvb-ffc Constructiv), the Scientific and Technical Centre for the Construction Industry (CSTC), the Flemish Energy Agency (VEA) and the Directorate-General for Energy (DG04).

In June 2011, Build Up Skills Belgium introduced a proposition in order to receive funds from the Intelligent Energy Europe (IEE) programme [3]. Once this proposition was approved, the project took a start in November 2011.

Its goal is to prepare a roadmap – based on a national status quo analysis [4] – in which the priority measures that could contribute to the expansion of the current construction workers' skills are defined. After all, the achievement of the goals for the construction industry will depend mainly on the skills of these workers.

The present document contains the Roadmap that has been established for Belgium on the basis of the National Status Quo report and after a consultation with the construction industry via the national platform and nine thematic working groups.

1. Executive summary

The analysis of the National Status Quo (NSQ) shows that an overwhelming majority of the annual intake of construction workers consists of young people without formal qualifications. This means in other words that there is a substantial intake of unqualified personnel. Consequently, raising the competency level of the workforce up to standard will constitute a challenge for the current workers.
Furthermore, different barriers that impede the expansion of the technical collaborators' skills in the working field have been mapped:

- a shortage of qualified workers (irrespective of training);
- a shortage of trained workers;
- a high-quality execution of contracts does not offer any economic added value;
- the 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 the 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.

Obviously, the Belgian construction industry 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 a better follow-up on technical progress in particular.

In order to respond to these challenges, we have opted for an approach using working groups , in which seven technological and two cross-profession themes are addressed. These themes have been fixed on the basis of the results of the NSQ and the priorities brought forward by the different authorities. The themes are:

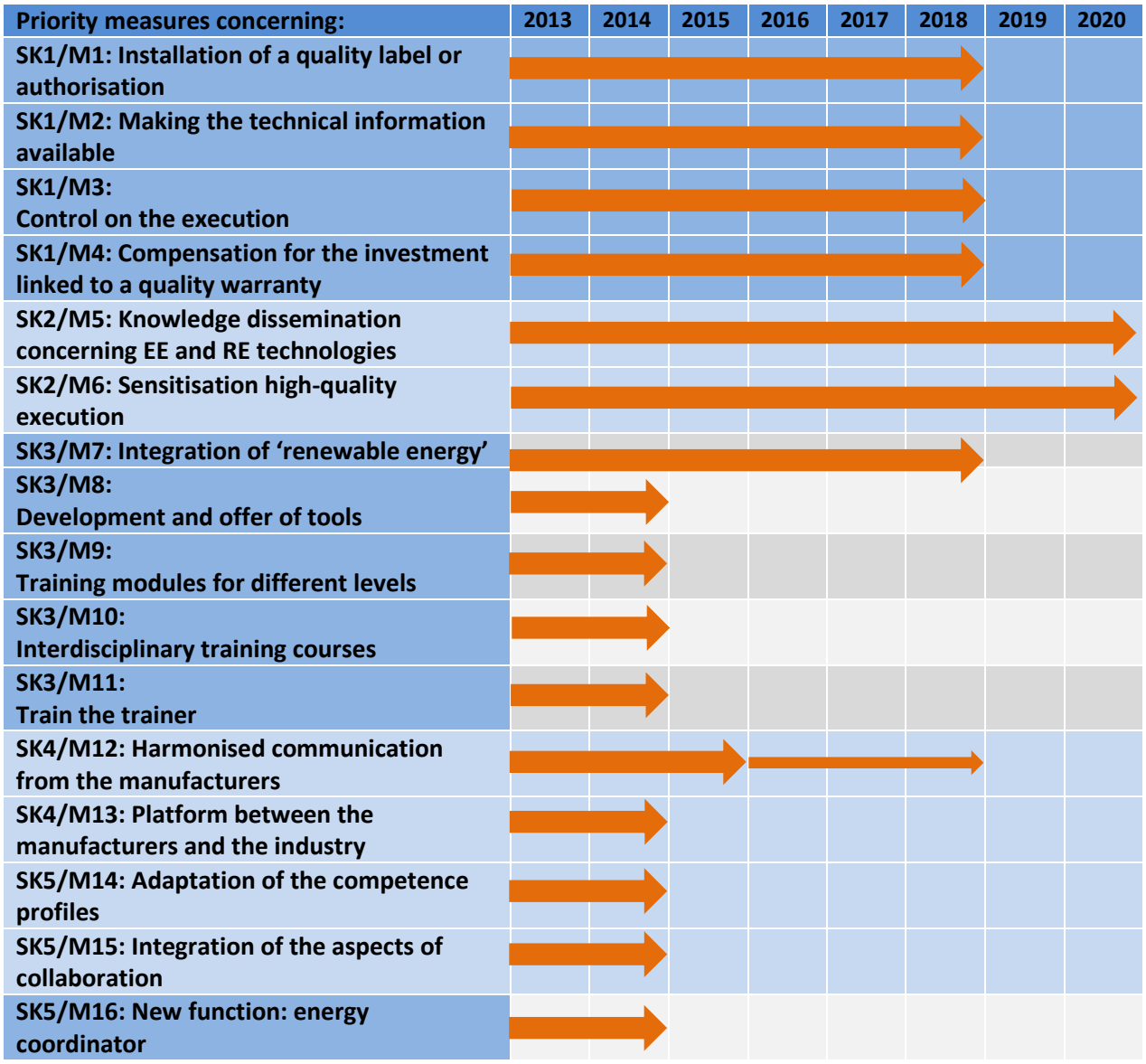
- Post-insulation of walls;
- Ventilation;
- PV and solar thermal installations;
- Solar screening;
- Insulation of roofs;
- Replacement of joinery;
- Heat pumps;
- Air-tightness;
- Interaction between professions.

The results of these working group sessions have first been analysed per theme. Afterwards, they have been bundled in a general roadmap. Of course, the analyses are also available for each theme separately. Eventually, the global working group activities have led to five priorities in the field of Energy Efficiency (EE) and Renewable Energy (RE):

- **Priority 1:** tools for quality control;
- **Priority 2:** knowledge dissemination and sensitisation;
- **Priority 3:** reorientation of the vocational trainings;

- **Priority 4:** the manufacturer's contribution;
- **Priority 5:** redefinition of the professional competence profiles.

For each of those priorities, different measures are proposed:



2. Introduction

2.1. Key findings from the National Status Quo

2.1.1. 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.

	Single family dwellings			Multi-family dwellings	Others	Total	%
Number of buildings constructed	TH	SDH	DH			TH	SDH
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 1 - Age of building stock in Belgium (2011)

2.1.2. 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	
	PE	NER-H	PE	NER-H	PE	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 2 - 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.

2.1.3. Turnover of personnel in the construction industry

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

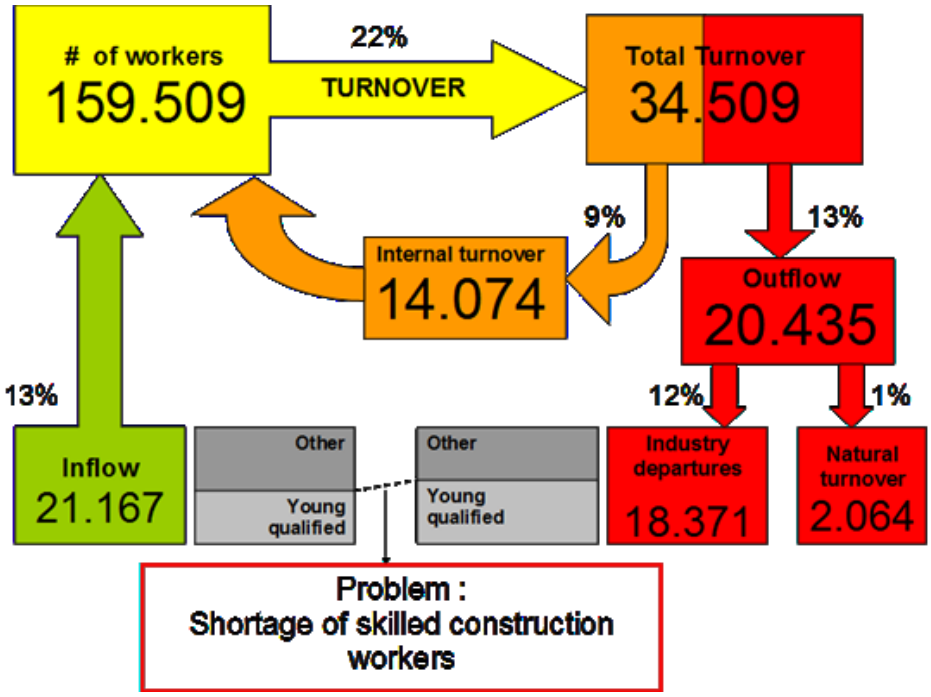


Figure 1 - schematic outline of turnover in the construction sector (figures for 2010)

2.1.4. Barriers

Below you will find the barriers to arriving at a population of construction 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;
- a high-quality execution of contracts does not offer any economic added value;
- the 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 the 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 a better follow-up on technical progress in particular.

2.1.5. Population of construction workers

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

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%.

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 3 - Construction workers per occupation (group) and projected training need

.

2.2. Methodology

2.2.1. Goal

Based on the results of the National Status Quo report, this document aims to:

- provide a list of the priority measures that will have to be taken in order to expand the current construction workers' skills in the fields of EE and RE;
- give indications on the way in which the measures can be applied;
- announce the barriers to the application of those measures;
- mention which party/parties are best placed to apply said measures;
- if possible, make a cost estimate;
- mention the time frame for the application of the measure.

2.2.2. Methodology for the development of the Roadmap

In order to explore the priority themes in depth, we have opted for an approach using working group sessions, in which seven technological and two cross-profession themes are addressed. Those themes have been defined based on the results of a questionnaire about priority technologies with regards to RE and EE that has been addressed to all Belgian stakeholders. The themes are:

- Post-insulation of walls;
- Ventilation;
- PV and solar thermal installations;
- Solar screening;
- Insulation of roofs;
- Replacement of joinery;
- Heat pumps;
- Air-tightness;
- Interaction between professions.

In each working group, the participants have been invited to share different kinds of knowledge and experience with each other. The participants in the sessions are experts who have a focus on their own specific domain. In principle, no one was excluded from participating.

For reasons of completeness, we have to mention that upcoming technologies such as biomass, micro combined heat and power, etc. are not part of this roadmap in first instance. In an ulterior phase, they could however be part of a similar exercise. The reader of this document is thus free to transpose the general conclusions to those technologies, as the authors of this document are of the opinion that the common conclusions are applicable on a larger scale (e.g. sensitisation, quality framework, ...).

2.2.2.1. First working group session

Each participant is invited to think about what needs to be set up/undertaken/developed/etc. in order to achieve a higher competency level for the construction workers. Their ideas are written down on Post-it notes.

Under the guidance of the working group leaders, the Post-it notes are pasted on an basic template and discussed in the working group. The aim is to group the different ideas as much as possible in a number of different topics which they think need to be addressed in the roadmap.

Lastly, every participant can attribute 'points' to their preferred initiatives on the basic template.
A guiding top 7 of priority goals is distilled from there.

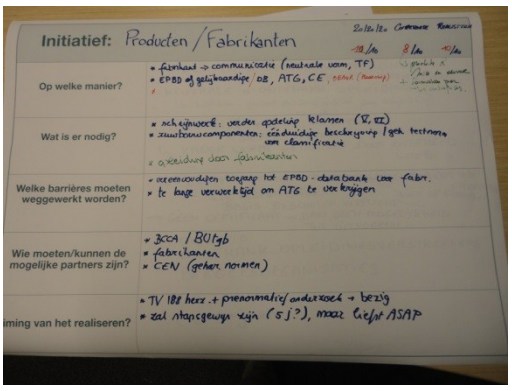
Topic	Date	Present	Social partners	Industry	Public authorities	Training centres	Quality control	Knowledge centers	Manu-facturers	Contractors
Solar boilers and panels 1st session	14/11/2012	20	X	X	X	X	X	X	X	
Post construction wall insulation 1st session	23/11/2012	29	X	X	X	X	X	X	X	X
Roof 1st session	29/11/2012	16	X	X	X	X		X	X	X
Airtightness 1st session	11/12/2012	26	X	X	X	X	X	X	X	X
Interaction between professions 1st session	12/12/2012	9	X	X		X		X	X	
Heat pumps 1st session	13/12/2012	12		X	X	X		X	X	
Replacement of windows 1st session	18/12/2012	9				X	X	X	X	X
Solar screening 1st session	14/01/2013	14	X	X	X	X	X	X	X	
Ventilation 1st session	18/01/2013	14		X		X	X	X	X	X

Table 4- Participants in the first working group session

2.2.2.2. Second working group session

The selected objectives are divided into three heterogeneously compiled subgroups. The working group then investigates each initiative's value from one of the following criterion's point of view:

- To what extent does the initiative contribute to the EU 2020 goals?
- To what extent does the initiative contribute to a higher competency level for the construction workers?
- Is the initiative achievable?



After that, the initiatives are further elaborated in subgroups and finally in a plenary session. The followed questions are answered:

- In which ways can this initiative be elaborated?
- What is needed for that?
- Which barriers have to be removed?
- Who could/should be the potential partners?
- Timing of the realisation (short term/long term)?

Topic	Date	Present	Social partners	Industry	Public authorities	Training centres	Quality control	Knowledge centers	Manu-facturers	Contractors
Solar boilers and panels 2nd session	23/01/2013	21		X	X	X	X	X	X	X
Roof 2nd session	29/01/2013	9	X	X	X	X		X	X	X
Airtightness 2nd session	01/02/2013	23	X	X	X	X	X	X	X	X
Heat pumps 2nd session	04/02/2013	10		X	X	X		X	X	
Post construction wall insulation 2nd session	08/02/2013	18		X		X	X	X	X	X
Interaction between professions 2nd session	19/02/2013	11		X		X		X		
Replacement of windows 2nd session	21/02/2013[1]	3				X		X		
Ventilation 2nd session	26/02/2013	14	X	X	X	X	X	X	X	X
Solar screening 2nd session	01/03/2013	11	X	X	X	X		X	X	

Table 5- Participants in the second working group session

2.2.3. Methodology for the endorsement of the Roadmap

An important outcome of this project is the endorsement of the Roadmap. In order to achieve this goal, Build Up Skills Belgium aims at a double endorsement: an implicit and an explicit endorsement.

The implicit endorsement: during the project, all pertinent concerned parties are gathered and are given the opportunity to actively take part in the drawing up of the Roadmap. In our opinion, the industry's participation thus implies a sort of implicit endorsement. It is an advantage of BUSB that all social partners, professional organisations and public authorities are involved in the project.

The explicit endorsement consists of the physical signature of a support letter.

[1] The working group session took place on the first day of Batibouw (the most important construction trade fair in Belgium). Because of the rather limited number of participants, the moderators decided to discuss the first session's report in CSTS's Technical Committee.

3. Context for the Belgian Roadmap

3.1. Belgian 2020 goals

On 23 January 2008, the European Commission published its climate package meant to put into practice the 20-20-20 goals. For Belgium, this means that by the year 2020 [6] [7]:

- the part of renewable energy in the gross final energy consumption will have to be reduced by 13%;
- the primary energy consumption will have to be reduced by 18%;
- the greenhouse gas emissions will have to be reduced by 15% in comparison with 2005 in the industries that are not covered by the European Emissions Trading System (non EET industries).

The European Directive 2009/28/EC of 23 April 2009 on the promotion of the use of energy from renewable sources imposes a binding goal to each member state concerning the part of renewables in the final energy consumption that will have to be achieved by 2020. Belgium will have to achieve a goal of 13% of renewables by 2020. That is a very ambitious goal, knowing that in 2005, only 2,2% of all energy had a renewable origin.

The aforementioned goals from the national roadmap still have to be translated on the regional and federal levels. In the absence of this, the Regions have already fixed certain unofficial non-binding ambitions for themselves.

The Walloon Government decided to set the European goal of getting 20% of all energy from renewables as a goal for the Walloon Region too [8]. Regarding the greenhouse gas emissions reduction, it aims at a reduction by 30% compared to 1990 [9].

Flanders imposes itself to get 13% of all energy from renewables by 2020, and to reduce the energy consumption by at least 9% by 2016 (based on the average final energy consumption 2001-2005). Flanders also wants to reduce the greenhouse gas emissions. Two central elements in this are the Flemish climate policy plan 2013-2020 and the Flemish adaptation plan [10]. Moreover, a lot of attention is spent on the good implantation of wind turbines. The wind energy industry has set itself the goal to generate 1.500 MW in Flanders and 2.800 MW in the North Sea using wind turbines by the year 2020 [11].

The directive also contains provisions that oblige the member states to fix minimum levels for the use of renewable energy in new buildings. In Flanders, this obligation applies to the offices and schools that belong to public authorities from 1 January 2013 on. For all other new and thoroughly renovated buildings, the obligation will apply from the year 2014 on. The European directive 2010/31/EC on the energy performance of buildings obliges the European member states to ensure that, by the year 2021, all new buildings are near zero-energy buildings (nZEB). For buildings that belong to the public authorities, this obligation will apply from 2019 on.

Moreover, the transformation of existing buildings into nZEB-buildings will have to be stimulated as much as possible, so that a significant number of existing buildings will be transformed into nZEB-buildings by the year 2021.

3.2. Need for qualification and skills / barriers in the construction industry

The development of a socially supported policy framework that premises nZEB-buildings as a realisable exigency is an important social challenge. It will require large investments in the fields of energy efficiency and renewable energy by prime contractors as well as companies/the industry and the public authorities.
It is important that those investments are executed in a correct way because of the following aspects:

- avoiding health troubles;
- good general performance;
- maximum longevity;
- maximum energy efficiency;
- avoiding risks for the installer;
- avoiding risks for the user of the building;
- avoiding building physical problems (cracks, moisture problems, ...);
- realising a market embedment and a stable growth of the innovating techniques.
- Agreement between real (measured) pay-back time and theoretical pay-back time

Hence, guaranteeing a high-quality execution is a necessary condition in the framework of the developments in the fields of energy efficiency and renewable energy that the construction industry will experience by the year 2020.

3.2.1. Need for qualification and skills

The renewal of the existing professional competence profiles started in 2011 in collaboration with the social partners, CSTC, navb-cnac Constructiv and experts in the industry. This process will not be completely finished until the beginning of 2014.

The professional competence profiles contain an overview of all activities and the associated competences for each profession. In order to respond to the challenges brought on by the EU 2020 goals, they all have a solid 'green' foundation. It will be possible to use the profiles as a starting point for the development of adapted training programmes and didactic tools as well as for an appropriate screening of potential construction workers.

The roofer's profile has been completed in 2011. Before, the main question for a roofer was: "How and with which materials can we tile a roof and make sure it is watertight?".

Nowadays, the questions that have to be posed and answered are more complex:

• What are the exigencies in the field of energy efficiency?
• What is needed in terms of insulation?
• With which adjusted materials does the work have to be executed?
• How can we make the roof airtight?
• Does the installation of solar panels have to be foreseen?

These new questions bring along new exigencies in terms of the roofer's professional competences. Mapping the new exigencies and new techniques (insulating
in an airtight way, posing thermal insulation, etc.) will make it possible to adjust the basic and advanced vocational training for roofers to these new needs [12].

In 2012, the profiles for the plumbing installer, the CH fitter and the installer of ventilation systems have also been completed.

The working group sessions organised in the framework of the drawing up of this Roadmap revealed that there is a call for some still to be developed new profiles, such as 'insulation worker' and 'airtight maker'.
Apart from that, a new function of 'energy consultant' / 'energy coordinator' / 'energy coach' has been proposed.

In some branches of the industry, there is an explicit call for a quality framework.

3.2.2. Barriers to the achievement of the 2020 goals

The following barriers have been included in the National Status Quo:

- There is a shortage of qualified workers (irrespective of training).
- There is a shortage of trained workers.
- Usually, a high-quality execution of contracts does not offer any economic added value.
- The existing training courses are too theoretical.
- Technical progress is not being followed up on soon enough in the trainings.
- The way in which the work is organised does not allow workers to be sent for training.
- The cost of training is too high.
- There are no or too few results or performance commitments included in the scope of contract execution.
- Difficulty in assessing/measuring quality in execution.

3.3. Results of the working group sessions

In Annex 1, you will find the tables with the conclusions from the different working groups, as described in chapter 2.2.

4. Strategic clusters

4.1.Conclusions of the workshops

FIVE STRATEGIC CLUSTERS

Although the nine thematic working groups were conceived from a technological approach, each of them with specific context and challenges, priority measures can be derived into five strategic clusters:

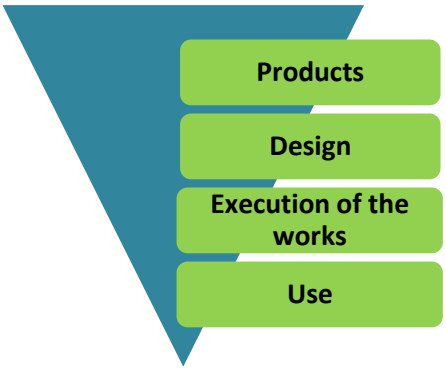
1. Instruments for quality control.
2. Dissemination and awareness.
3. Reorientation vocational training.
4. Contribution of the manufacturers.
5. Redefining professional competences

These strategic clusters, can reinforce each other and are preferably implemented simultaneously to attain a leverage effect.

VARIOUS FOCUS POINTS

Allocate measures regarding the process

For each of these five strategic guidelines, specific measures, often cross-technology, were determined. These measures aim to increase overall quality in the process (see figure) to deliver renovations offering a high energy performance as well as new, nearly zero-energy buildings.



Given the predefined target group, namely the on-site construction workers and system installers in the building sector, the determined measures focus mainly on the phase 'execution of the works'.

However, the previous phases (products and design), have a significant impact on the final quality, and cannot be neglected.

To ensure maximum longevity and efficiency of the installation or the building, the use phase with correct handling, monitoring and maintenance is essential as well.

Extending the target group

It is generally agreed by the stakeholders that a constricted focus on training the building workforce, the initial scope of BUILD UP Skills, will not trigger the required transition. There are several actors with direct or indirect impact on the quality delivered by these on-site workers:

- architects;
- managers;
- manufacturers;
- retail & wholesale traders;

- consumers;
- …

Only taking into account the on-site construction workers and system installers in the building sector, is for a comprehensive project as BUILD UP Skills Belgium too restricted.
Various barriers will only be eliminated if all relevant actors are involved and included as target groups. Moreover, advanced or new cooperation mechanisms between the main actors should be further developed.

IMPORTANCE OF QUALITY SCHEMES

The discussions in several thematic working groups have indicated the importance on qualification schemes as instruments for quality assurance. On the condition that investment in quality assurance is rewarded, it is recognised that control mechanisms and/or labeling schemes have a significant added value as motivator for raising knowledge, keeping this up to date and applying it during execution of the works.
These qualification schemes need to be developed in accordance with or by the relevant actors.

VALIDATION AND VALORISATION OF COMPETENCES

Although awareness raising of the public (the end consumer) is not foreseen in the project, it is considered as a conditio sine qua non to make any progress. The market is demand-driven, and to avoid a business as usual scenario, proprietors need to be informed on the benefits of demanding quality of execution and the way in which to recognize quality.

Dissemination and training for the on-site workers and their supervisors have to be adapted on their level of competences (experience, knowledge, capacities…).

BUILD UP SKILLS BELGIUM SHOULD NOT END IN APRIL 2013

Gathering all relevant stakeholders in a national platform, and organising the thematic working groups, is uncommon for the Belgian construction sector. It is an explicit request by the stakeholders to continue the national platform meetings.
This gives as well the opportunity to set up new thematic working groups on technologies not yet initiated such as residential biomass systems, micro-CHP, small-scale windmills… Further development and fine-tuning of the existing thematic working groups is an option as well.

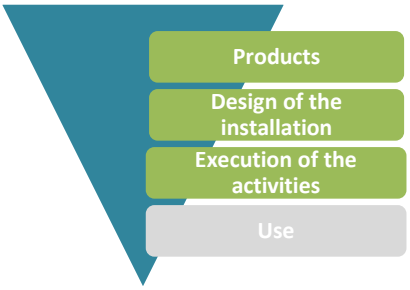
CONTINUING ACTIVE PARTICIPATION BY ALL STAKEHOLDERS

In order to achieve the objective to increase the competences of on-site construction workers and system installers in the building sector, and deliver renovations offering a high energy performance as well as new, nearly zero-energy buildings, all relevant stakeholders should take their responsibility and continue to participate actively in this process.

4.2. The strategic clusters

This chapter contains several measures that are proposed and that are meant to enable a higher-quality execution of techniques and technologies with regards to renewable energy and energy efficiency.
The different obstacles to the realisation of high-quality buildings in 2020 have to be removed as much as possible via the execution of the following measures.

4.2.1. Strategic cluster 1: Tools for quality control

SC1 - MEASURE 1: INSTALLATION OF A QUALITY LABEL OR AUTHORISATION
A quality label (voluntary) or an authorisation (obligatory) are powerful tools that can be used as a levier to stimulate high quality. The installation and/or the quality of the final product is made actionable. This can be done by introducing a labelling of the executor (and/or the employer) or by doing a control on the executed activities and the provided services, or even by the drawing up of an internal training scheme in an organisation. Existing initiatives, such as Quest and the declaration of conformity for the post-insulation of cavity walls, are generally considered as best practices.
TECHNOLOGY
Almost every working group expressed an explicit call for a quality label or authorisation. Quality can be split up at the level of the building. Objective quality evaluations have to be executed for the different partial aspects. Those evaluations can focus on the quality of the result or on the quality of the execution. Specific technologies: • Roof insulation • Air-tightness • Post-insulation of walls • PV/solar thermal • Ventilation • Heat pumps • Solar screening • Replacement of joinery • …
IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?
When introducing a label or authorisation, the main focus is on the following phases: • products • design of the installation • execution of the activities 'Maintenance & monitoring' is also possible to a certain extent, but this is not a matter of course. 
WHO?
The specialised partners in coherence with the competent authorities (e.g. BCCA, WTCB, Construction Quality, Quest Energiebewuste Aannemer and others). Professional federations (manufacturers, architects, engineers, …), training centres and educational institutions have to be involved in the execution of this activity. The competent authorities have to be involved at least in the 'validation', cf. SK1 - Measure 4. The competent authority is often also the indicated party to initiate the process.
TERM FOR THE IMPLEMENTATION
2013-2018

SC1 - MEASURE 2: MAKING THE TECHNICAL INFORMATION AVAILABLE

Clear quality criteria (e.g. technical specifications) and/or codes of good practice (e.g. technical information sheets), vulgarisation tools that form a solid technical base for a high-quality execution on the worksite have to be foreseen.

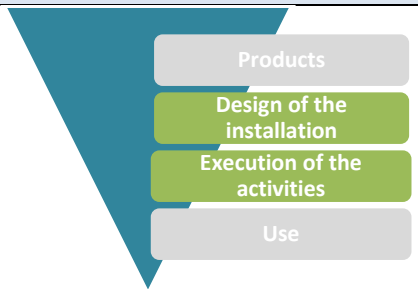
A centrally managed portal site and/or accessible data base should be drawn up, so that basic data and details of good executions, simulation tools, etc. can be consulted. These data have to be offered in a global and centralised way and they have to be in line with ongoing activities or existing initiatives. Fragmentation of the channels is not an option.
The set up and can be done in conjunction with guidance.

The development and set up of these tools can be accompanied with guidance and assistance.

TECHNOLOGY

- Roof insulation
- Air-tightness
- PV and solar thermal
- Ventilation
- Heat pumps
- Solar screening
- Replacement of joinery
- …

IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?



WHO?

The specialised partners in coherence with the competent authorities for the pedagogical transposition of the codes of good practice, best practices, norms, performance criteria in order to facilitate the access to the technical information for the professionals.

To be determined: managing and opening a portal site and/or data base, possibly in consultation with existing government data (e.g. via the different regional platforms that already exist, such as www.energiesparen.be).

Professional federations, training centres and educational institutions have to include the documents in their didactic material and make sure they keep this information up-to-date.

TERM FOR THE IMPLEMENTATION

2013-2018

SC1 - MEASURE 3: CONTROL ON THE EXECUTION

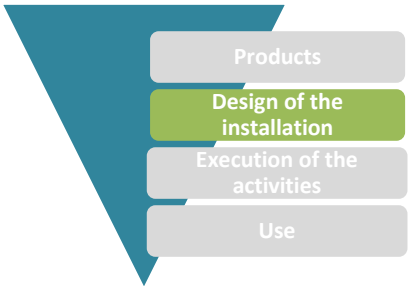
For the quality assurance by means of a control on the execution, a more severe legal or normative framework would be useful. Such controls stimulate an increase of the competency level and can lead to training actions to remediate the situation. The control on the execution needs to support the philosophy of continuous improvement. The results should lead to recommendations and improvement of the level of competency of organisations and their employees by means of training.

For monitoring reasons, there should be a source from which one can deduct which follow-up the actors have already undergone and what the results were.

TECHNOLOGY

- Roof insulation
- Air-tightness
- PV and solar thermal
- Replacement of joinery
- Heat pumps
- Ventilation
- …

IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?



WHO?

For the construction industry, navb-cnac Constructiv is active in the field of safety. The creation of a similar organisation that would be competent in the fields of energy efficiency and renewable energy could be taken into consideration.

The specialised partners in coherence with the competent authorities.

People will have to be trained to assure the follow-up. A standardised training should exist: 'Auditor executed activities', which can be used.

TERM FOR THE IMPLEMENTATION

2013-2018

SC1 - MEASURE 4: COMPENSATION FOR THE INVESTMENT LINKED TO A QUALITY WARRANTY

The additional investment linked to a high-quality execution can partly be compensated for with financial stimulants. It is also important to communicate good information in order to make sure that consumers realise that improvement in quality can result in savings and/or a more extended longevity.
In a second phase, the support measure can be made conditional upon the ways of execution for which all concerned parties can present a 'training plan'. Instead of sporadically following training courses, the concerned companies will have to develop a global long term vision which they link to training their own personnel.

The attribution of public procurements should be revised and shouldn't just take price-oriented criteria into account. It also should hold into account: social and environmental clauses, the possession of a quality label, the demonstrability of 'green' competences, …

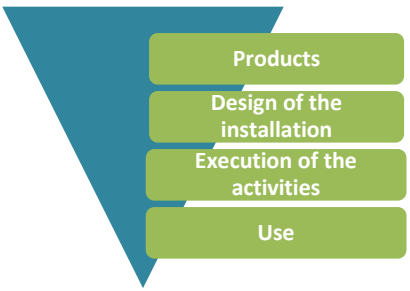
TECHNOLOGY

Identical to the technologies for which a quality framework is being realised:

- Roof insulation
- Air-tightness
- Post-insulation of walls
- PV/solar thermal
- Ventilation
- Heat pumps
- Solar screening
- Replacement of joinery
- …

IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?

The compensation for an investment in quality improvement can have an impact on all of the phases.



WHO?

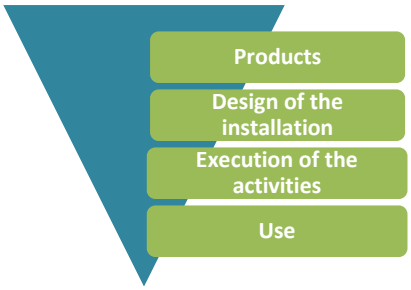
The specialised partners in coherence with the competent authorities.

The competent authority for conditional financial and other support measures (e.g. obligation by means of the epb-declaration) and for the adjustment to the attribution of public procurements.

TERM FOR THE IMPLEMENTATION

2013-2018

4.2.2. Strategic cluster 2: Knowledge dissemination and sensitisation

SC2 - MEASURE 5: KNOWLEDGE DISSEMINATION CONCERNING EE AND RE TECHNOLOGIES
More knowledge of EE and RES technologies has to reach different target groups. A campaign that focuses on the general public and another campaign that focuses on a professional public. The campaign for the general public can make use of TV, radio, the general press and schools, while the campaign for the designers can make use of specialised channels/publications that can reach all concerned parties (architects, engineers, contractors, workers). The development of a basic package that can be offered to secondary schools, colleges, universities can also be considered.
TECHNOLOGY
• Roof insulation • Air-tightness • Post-insulation of walls • Heat pumps • Ventilation • PV/solar thermal • Replacement of joinery • …
IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?

WHO?
The specialised partners in coherence with the competent authorities. Information from the federations, associations of manufacturers. The public authorities for the leading of the campaign. Training, education and information organisations.
TERM FOR THE IMPLEMENTATION
2013-2020

SC2 - MEASURE 6: SENSITISATION HIGH-QUALITY EXECUTION AND DESIGN

In addition to priority 1, there has to be promotion in order to raise the awareness concerning the advantages of a higher-quality execution and higher-quality materials. In the framework of this promotion, the final user has to be informed on how he can recognise a qualified professional and good quality and what he can realistically expect.
Such a campaign is meant to enhance the call for high-quality installations.

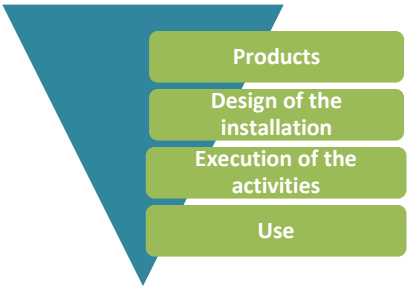
TECHNOLOGY

Sensitising people about a high-quality execution is a cross-technology measure, but it has been put forward as a priority mainly for the following technologies:

- Roof insulation
- Ventilation
- Replacement of joinery
- Solar screening
- PV/solar thermal
- Heatpumps

IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?

Sensitisation can be applicable to all phases in the building process. The phase 'maintenance & monitoring' can certainly be dealt with during the sensitisation process.



WHO?

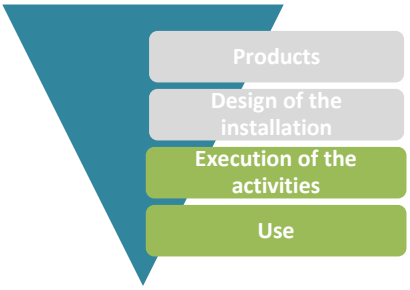
The specialised partners in coherence with the competent authorities.

The competent authority can be the central organisation that leads the sensitisation campaign. However, an essential element in this campaign is the support by the professional organisations, manufacturers, federations and trade fair organisers.
The opinion leaders or main players have to be motivated to give decisive support to a promotion campaign.

TERM FOR THE IMPLEMENTATION

2013-2020
Nowadays, the basic information for a sensitisation campaign is available for most technologies, but it will have to be adapted to the different target audiences.

4.2.3. Strategic cluster 3: Reorientation of trainings

SC3 - MEASURE 7: INTEGRATION OF 'RENEWABLE ENERGY'
Integration of the element 'Renewable Energy' in the existing training courses (e.g. education and training). The content of this training has to be in line with the expectations in the work field. In other words, the training has to be adjusted as much as possible to the reality of the (best) practice. Only then can such a training produce good workers and be a promotion vehicle for the profession. General training material could be developed. Train the trainer sessions: the trainers have to be correctly trained so that they can teach and transfer the content of the training and the training material in a high-quality way. Well-equipped rooms with a correct pedagogic disposition are needed.
TECHNOLOGY
This measure is mainly focused on the technologies regarding renewable energy.
IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?

WHO?
The specialised partners in coherence with the competent authorities. Different actors will have to collaborate for this measure: the competent authority, the different education and training providers and actors, schools, knowledge centres, sectorial training funds, …
TERM FOR THE IMPLEMENTATION
2013-2018

SC3 - MEASURE 8: DEVELOPMENT AND OFFER OF TOOLS

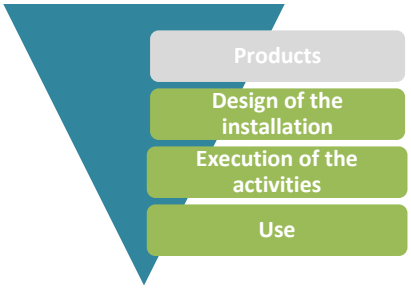
Developing and offering tools. This can be realised by creating a digital knowledge centre (accessible via PC, laptop, tablet, smartphone, ...) for everything that has already been developed, such as interactive videos and 4D-details. Apart from that, new material will also have to be developed, such as demo videos. These can be offered in a passive way, but they can also be used during training courses.
A check-list is a simple and powerful tool to promote the self-control of the quality of an installation or activity.

TECHNOLOGY

Developing and offering tools is especially a priority for the following technologies:

- Solar screening
- Air-tightness
- Replacement of joinery
- Ventilation
- …

IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?



WHO?

The specialised partners in coherence with the competent authorities.

In order to achieve a high-quality development of these tools, different concerned parties will have to collaborate: professional federations, manufacturers, wholesalers, knowledge centres, government, training centres, …

TERM FOR THE IMPLEMENTATION

2013-2014

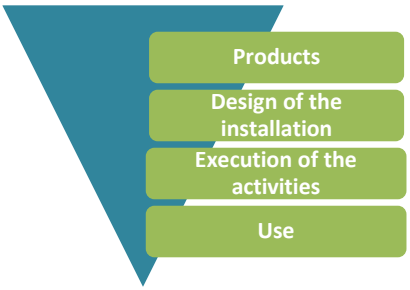
SC3 - MEASURE 9: TRAINING MODULES FOR DIFFERENT LEVELS

It is necessary to develop vocational trainings for different professionals. The executors' training needs not only vary in function of the different backgrounds they have, but also in function of their 'level', as well in accordance with their function on the construction site (executor, team leader, etc.) as in accordance with their experience level. Additional short modules for different target audiences have to be developed in addition to the existing offer.
In order to enable this development, there first has to be a consensus on the content of the activities that will have to be executed.
Development of mixed trainings. Mixed trainings are trainings that are not meant for the traditional (homogeneous) target audiences and that are not theoretic. They are practice-related trainings that are given in the form of workshops for people from different disciplines.
Training courses have to be practice-oriented. The best place to give them is in a training centre in which the different techniques can be demonstrated, e.g. with the support of installations that the industry puts at disposal.
These developments should take into account the different obstacles that were identified (obstacles that prevent the improvement of the competency level of on-site workers, as shown on p. 8 of this document)

TECHNOLOGY

- Roof insulation
- Post-insulation of walls
- PV and solar thermal
- Replacement of joinery
- Ventilation
- …

IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?



WHO?

The specialised partners in coherence with the competent authorities.
For the development of the trainings:

- Sectorial training funds
- Professional federation
- Manufacturers for the delivery of the materials
- Knowledge centres
- Training providers

Training centres for the redaction of a manual that is adjusted to the target audience, for the permanent evaluation and adjustment of the training courses and for the infrastructure dispositions.
For the 'marketing' of the training modules.

- Social partners: to reach a consensus on the content of the profession, but also because they can direct the training policy in the industries.
- Regional and federal authorities: to support the necessary leviers and enhancing initiatives where possible. The federal government also rules the access to the profession.

TERM FOR THE IMPLEMENTATION

2013-2014

SC3 - MEASURE 10: INTERDISCIPLINARY TRAINING COURSES

There is a need for interdisciplinary training courses in which the building professionals acquire knowledge of the other professions. The goal of this is to revalue the knowledge of and the respect for the work of other people (cf. priority 5).

The training are permanently evaluated and updated.

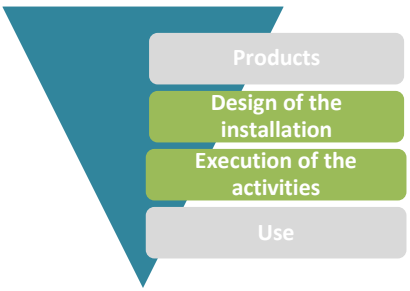
Identify and describe the interactions between professions, e.g.:

- Wall-roof
- Wall-external joinery
- External joinery-solar screening
- Ventilation-airtightness
- …

TECHNOLOGY

- Air-tightness
- Post-insulation of walls
- Replacement of joinery
- Solar screening
- All technologies

IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?



WHO?

The specialised partners in coherence with the competent authorities.
For the development of the trainings:

- Sectorial training funds
- Professional federation
- Manufacturers for the delivery of the materials
- Knowledge centres
- Training providers

Regional and federal authorities: to support the necessary leviers and enhancing initiatives where possible. The federal government also rules the access to the profession.

TERM FOR THE IMPLEMENTATION

2013-2014

SC3 - MEASURE 11: TRAIN THE TRAINER

It is important to find the right trainers and to make sure they are trained well themselves (train the trainer). This training not only has to be technically correct, but the trainers also have to be informed on the importance of the different technologies and the importance of a high-quality execution.

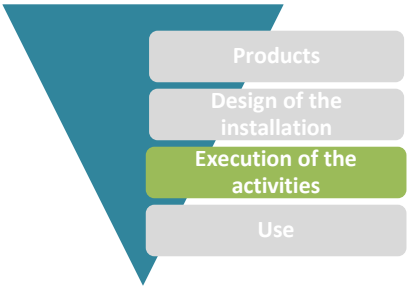
Trainers need to have sufficient pedagogical skills and need to adapt their course to the public (difference in level of participant or goal of the participant).

An inventory of the existing training courses and training centres (as well for general as for sectorial training courses, e.g. for manufacturers) has to be established. Further on, the need for TTT training courses has to be estimated.

TECHNOLOGY

This measure is of the essence for all technologies.

IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?



WHO?

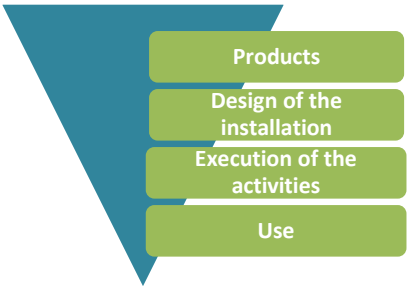
The specialised partners in coherence with the competent authorities.

The training centres are responsible for the recruitment of trainers. The training funds can assist them in this task and also monitor the quality of the training course.

TERM FOR THE IMPLEMENTATION

2013-2014

4.2.4. Strategic cluster 4: The manufacturers' contribution

SC4 - MEASURE 12: HARMONISED COMMUNICATION FROM THE MANUFACTURERS
The manufacturers have to announce their products' performances in the best, reliable and most neutral possible way through their technical sheets, attestations of technical approval/eTAG's, CE attestations, BENOR attestations, etc. Therefore, they have to dispose of harmonised standards or test standards for the classification of components. In-house trainings that have both a neutral and a commercial component can be foreseen. In consultation with the knowledge centres and sectorial funds, the manufacturers determine the content of the neutral part, so that this can be maximally harmonised. A control on the quality and the content of these training courses and their permanent update seem to be absolutely necessary. The product specifications can be taken up in the EPBD database. The access to this base should be made enhanced. We also have to investigate whether the acquisition process for attestations of technical approval can be accelerated.
TECHNOLOGY
This is a cross-technology measure. It has been set forward as a priority in the working groups air-tightness and Solar screening.
IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?

WHO?
Normative institutions for the redaction of the standards. Manufacturers and training providers for the training courses. Knowledge centres and sectorial funds for the redaction of the neutral pedagogic material. The executor is supposed to be able to make the distinction between the neutral and the commercial messages. Don't just train the worker, but also the architect. Develop productspecific trainings for the designer, installer, maintenance, … The sectorial funds for the monitoring of the manufacturers' training courses. The Regions for the EPBD database. BUtgb for the attestations of technical approval.
TERM FOR THE IMPLEMENTATION
Partly currently on-going. During the period 2013-2015, a first big impulse should be given. By the year 2018, the action should be implemented.

SC4 - MEASURE 13: PLATFORM BETWEEN THE MANUFACTURERS AND THE INDUSTRY

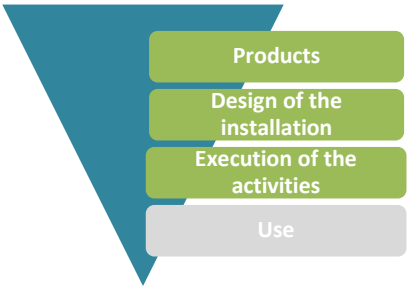
A platform (perhaps based on existing structures) in which an exchange between manufacturers, installers, training institutions, etc. is possible will have to be created. Its goal is to promote the transition of technical evolutions to the training field.

TECHNOLOGY

This is a cross-technology measure. It has been set forward as a priority in the following working groups:

- PV and solar thermal
- Heat pumps
- Solar screening
- Ventilation
- Airtightness
- …

IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?



WHO?

The specialised partners in coherence with the competent authorities.

Consultation and agreements between the manufacturers, contractors and sectorial organisations.

TERM FOR THE IMPLEMENTATION

2013-2014

4.2.5. Strategic cluster 5: Redefinition of the professional competence profiles

SC5 - MEASURE 14: ADAPTATION OF THE COMPETENCE PROFILES

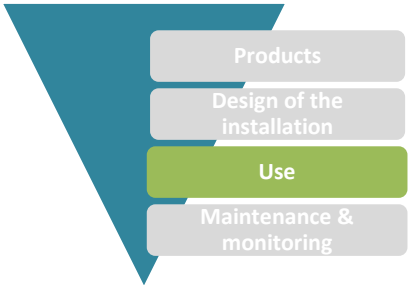
Competence profiles are available for different professions in the construction industry. Ideally, they are adjusted as much as possible to the technical information sheets and the different technical specifications. These two documents are technical and have to be translated correctly into competences for each profession by means of the professional competence profiles. The competence profiles are the reference documents in which the content of the education and vocational training courses are defined.

Ultimately, we have to make sure the professional competence profiles are permanently updated and implemented in training programmes, so that they are adjusted as fast as possible to the reality of the work field.

TECHNOLOGY

- Roof insulation
- Air-tightness
- Post-insulation of walls
- Replacement of joinery
- …

IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?



WHO?

The specialised partners in coherence with the competent authorities.

The competent organisations for the redaction of professional competence profiles:

- social partners who validate the professional competence profiles;
- professional federations and knowledge centres that provide their support by making technological know-how available.
- Training providers, education providers and competent authorities

TERM FOR THE IMPLEMENTATION

2013-2014

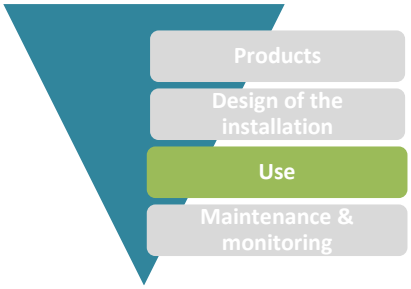
SC5 - MEASURE 15: INTEGRATION OF THE ASPECTS OF COLLABORATION

The competence profiles have to be expanded with the necessary soft skills or attitudes concerning collaboration. The professionals have to be open to the different steps in the construction process and take into account other people's activities. For this purpose, the attention will have to be focused not only on the technical aspects, but also on, among other things, the communicative skills (the professionals have to learn each other's language), conflict management, professional honour, etc.
Interaction between professions on a worksite could be identified (how, stages of work,…). A logical and ideal work method could be determined.

TECHNOLOGY

This is a cross-technology measure.

IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?



WHO?

The specialised partners in coherence with the competent authorities.

The competent organisations for the redaction of professional competence profiles:

- social partners who validate the professional competence profiles;
- professional federations and knowledge centres that provide their support by making technological know-how available.
- Training providers, education providers and competent authorities

TERM FOR THE IMPLEMENTATION

2013-2014

SC5 - MEASURE 16: NEW PROFESSION: ENERGY COORDINATOR

Creation of a new function (linked to existing professions: project leader,…) : a person who can propose the best available techniques (energy - design) on the basis of the specifics and who can coordinate the execution of those techniques.

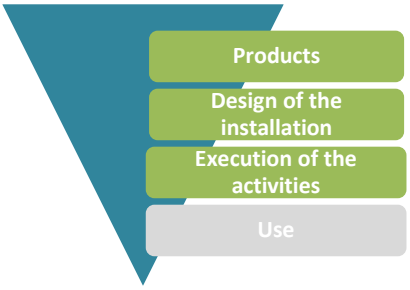
By means of intermediary controls, he can immediately provide the executor with feed-back, so that this person can intervene on time if that is necessary. Lastly, he coordinates the post-project assistance.

The first step will be to verify if this function requires a new profession or whether it concerns architects, site managers, team leaders, EPB controllers and safety coordinators, who will have to acquire extra competencies.

TECHNOLOGY

This is a cross-technology measure by definition, because the energy coordinator will have to take into account all possible aspects of EE and RE. This measure has been mentioned as a priority in the working groups post-insulation of walls and Solar screening.

IMPACT ON WHICH PHASE IN THE BUILDING PROCESS?



WHO?

Training centres/providers, knowledge centres and professional organisations can develop this in a first phase.

TERM FOR THE IMPLEMENTATION

2013-2014

5. Endorsement

5.1. Implicit endorsement

Organisation	Name(s)	Expertise
3E	HUBERLANT Bernard	Consulting office, participant in thematic sessions, expertise in sustainable/renewable energy
ABVV	VERTENEUIL Robert	Social partner, trade union
ACLVB	BÖRNER Peter	Social partner, trade union
ACV	VANTHOURENHOUT Stefaan BORLOO Deef	Social partner, trade union
Agoria	SOETE Paul CALLEWAERT Philippe PAUWELS Jacques ALGABA Diego	Stakeholder, expertise in technologic industries, expertise in construction materials
Agoria NAVENTA	LAMBERT Yves	Stakeholder, expertise in innovation
Alu Centrum	CLAUWAERT Cyriel	Stakeholder, expertise in aluminium building materials
ARIB	WACHTELAER Philémon	Stakeholder, expertise in architecture
ATTB	VANDENBOSCH Emile	Stakeholder, participant in thematic sessions, expertise in thermal techniques
BELPV	NEYENS Jo	Stakeholder, expertise in sustainable energy
Bostoen	VAN DEN BERGHE William	Contractor, participant in thematic sessions, expertise in sustainable building
Bouwunie	MASSCHELEIN Hilde RAMAEKERS Geert DEDEYNE Luc VAN DE WYNCKEL Dirk	Social partner, participant in thematic sessions, expertise in the different technologies
BRC Bouw /CDR Construction	SALLE Sophie VANGINDERDEUREN Philippe	Formation Centre, participant in thematic sessions, expertise in formation and policy
Bruxelles-Formation	PFEFFER Michel	Formation Centre, expertise in formation
Bureau Advisers	BRODBECK Christian	Architect Office, participant in thematic sessions, expertise in airtightness
Bureau voor expertise & architectuur	BEKE Joost	Architect Office, participant in thematic sessions, expertise in architecture
BUtgb	COUMANS Jan WINNEPENNINCKX Eric	Stakeholder, expertise in approval of building materials
Castelein Sealants	CASTELEIN Christophe	Manufacturer, participant in thematic sessions, expertise in airtightness
Caviso	MICHIELSEN Koen	Contractor, participant in thematic sessions, expertise in insulation
CIR Isolatieraad	TIMMERMANS Georges	Stakeholder, participant in thematic sessions, expertise in insulation
Codumé	SIBILLE Pierre RIBBENS Kris	Manufacturer, participant in thematic sessions, expertise in ventilation
Confederatie Bouw (NCB, VCB, CCBC-CBBH, CCW)	VANKERCKHOVE Dirk MATTHYS Geert LESSIRE Emilie CARNOY Francis DE BRABANDER Christophe DILLEN Marc DELPORTE Gabriel	Social partner, participant in thematic sessions, expertise in the different technologies

	DE SCHRYVER Céline BOYER Charline SPIES Nicolas	
Construction Quality	DEMESTER Jacques KLEPFISH Georges	Stakeholder, expertise in quality and certification
Construtec	DUJACQUIER Eric	Formation Centre, expertise in sectorial formation
Dakwerken Derde	DERDE Geert	Contractor, participant in thematic sessions, expertise in roofs
Dakwerken Wattel	WATTEL Didier	Contractor, participant in thematic sessions, expertise in roofs
DT Fix	DE TROCH Bruno	Manufacturer, participant in thematic sessions, expertise in insulation
EDORA	GERARD Frank	Stakeholder, expertise in renewable energy
EDUTEC	DEFRIJN Luc	Formation Centre, expertise in innovating formation in the construction industry
Eltherm	COOSE John	Manufacturer, participant in thematic sessions, expertise in insulation
Espace Formation PME	DUBOIS Georges	Formation Centre, expertise in formation
Eternit	VANDERSTAPPEN Werner	Manufacturer, participant in thematic sessions, expertise in post-insulation of walls
FAB	PROCES Michel	Architect federation, participant in thematic sessions, expertise in architecture
Federplast	VEN Petri HERMANS Dirk	Stakeholder, participant in thematic sessions, expertise in plastic building materials
Fedustira	DIETVORST Jan	Stakeholder, expertise in building materials
FEEBEL	DE COOREBYTER Yves	Stakeholder, expertise in electro
FEMA-FEPROMA	VAN HOE Marnix	Social partner, expertise in building materials
Foamglas	PEETERBROECK Gunther	Manufacturer, participant in thematic sessions, expertise in insulation
FOREM	DEBROUX Guibert GOVERS Jean-Claude POTVIN Xavier BURLIN Natale	Formation Centre, participant in thematic sessions, expertise in formation
Harol	DRAELANTS Joris	Manufacturer, participant in thematic sessions, expertise in solar screens
IBGE-BIM	SOBOTKA Isabelle AULOTTE Etienne	Authority Brussels Capital Region, participant in thematic sessions, expertise in different technologies
IFAPME	BOUNAMEAUX Jacques YERLES Pierre-Paul POURBAIX Philippe CRAPIZ Mauro	Formation Centre, participant in thematic sessions, expertise in formation
Isoproc	EYKENS Jonas	Manufacturer, participant in thematic sessions
Kloeber Benelux	VAN EERSEL Francis	Manufacturer, participant in thematic sessions, expertise in windows/doors and airtightness
Knauf Insulation	ALLAEYS Ignace GROBET Jan TULKENS Peter	Manufacturer, participant in thematic sessions, expertise in insulation
Lemmens	MOREAU Olivier	Manufacturer, participant in thematic sessions, expertise in ventilation
Maison Passive	QUEVRIN Benoit	Stakeholder, expertise in passive building
Meuleman JP sa	MEULEMAN Jean-Paul MICHOT Hugues	Contractor, participant in thematic sessions, expertise in roofs

NAV	VERSTRAETE Bart VERSPEURT Angelique	Stakeholder, participant in thematic sessions, expertise in architecture
NAVB	DEPUE Christian	Stakeholder, expertise in health and wellbeing of blue collar workers
NELECTRA	RUTTEN Dirk	Stakeholder, expertise in electro
Noten	JENNEN Eddy	Contractor, participant in thematic sessions, expertise in insulation
OCH	DELOUW André DOOM Jeroen	Stakeholder, expertise in wood construction and formation
ODE (Arcadis)	VAN GIJZEGHEM Francies LHOËST Jan	Stakeholder, expertise in sustainable energy
ORI	DE BIE Anya DE MEESTER BRAM	Stakeholder, expertise in engineering
PHP (Passiefhuis-Platform)	MARRECAU Christophe HILDERSON Wouter VANDERWEGEN Bert VAN LOON Stefaan	Stakeholder, expertise in sustainable building, passive building, RES and EE
Pluimers Isolatie	SCHOONJANS Luc TER HAMSEL Henk OTTEN Henk	Manufacturer, participant in thematic sessions, expertise in insulation
PMC-BMP	BEUNE Christine VAN DER BIEST Johan	Stakeholder, expertise in building materials
Profine	PAREYN Michel	Manufacturer, participant in thematic sessions, expertise in windows/doors
Quest	LATTEUR Hugues	Stakeholder, expertise in solar thermal, heat pumps and PV
Recticel	ISEBAERT Thomas	Manufacturer, participant in thematic sessions, expertise in insulation
Renson	LAMBERT Yves	Manufacturer, participant in thematic sessions, expertise in solar screens, ventilation
SECO/BCCA	DE BLAERE Benny DE CORT Robert DE STRYCKER Maarten DE BOLSTER Ellen	Stakeholder, participant in thematic sessions, expertise in technical control and certification
SLTS	BEAUJEAN Pol	Contractor, participant in thematic sessions, expertise in insulation
Soudal NV	VAN MIEGHEM Filip	Manufacturer, participant in thematic sessions, expertise in airtightness
SPW-DGO4	PSIULA Carole LOODTS Nicolas	Authority Walloon Region, CA-RES, participant in thematic sessions
STO NV	REYNDERS Dirk	Manufacturer, participant in thematic sessions, expertise in insulation
Syntra	VANDENBUSSCHE Jutta KERKHOFS Elly DE SAEDELEIR Inge DEMURIE Kürt GEUENS Marnix	Formation Centre, participant in thematic sessions, expertise in formation
Tremco Illbruck	DECOMMERE Christ	Manufacturer, participant in thematic sessions, expertise in airtightness
Unilin	VAN ACKER Pol	Manufacturer, participant in thematic sessions, expertise in post-insulation of walls
Van Marcke	DELTOUR Bart KÜPPER Daniel	Manufacturer, participant in thematic sessions, expertise in PV and solar thermal, heat pumps
VDAB	VAN DAMME Nico DE COLVENAERE Patrick DEBLOUDTS Sophie VANDEWALLE Eric VAN CALLENBERGHE Annick VONCK Magda	Formation Centre, participant in thematic sessions, expertise in formation
VEA	DEGROOTE Maarten STEVENS Lore LAMEIRE Wim	Authority Flanders Region, CA-RES, participant in thematic sessions

VEI/Tecnolec	VAN DINGENEN Kris TORFS Emiel DE BELEYR Tom STINISSEN William	Stakeholder, participant in thematic sessions, expertise in electro
Ventibel	DAEM Hendrik	Stakeholder, expertise in ventilation
VEROZO	VAN EYCKEN Ann	Stakeholder, participant in thematic sessions, expertise in solar screens
VGI	DEVENTS George	Knowledge Centre, participant in thematic sessions, expertise in glass and solar screens
Viessmann	DE BRUCKER Pieter	Manufacturer, participant in thematic sessions, expertise in heat pumps
VITO	VANHOLM Marlies SPIRINCKX Carolin	Stakeholder, expertise in technologic research
VMSW	BENAERTS Hannes	Social Housing, participant in thematic sessions, expertise in social housing
VORMELEK-FORMELEC	DE WANDELER Hilde DE RIDDER Ann	Stakeholder, participant in thematic sessions, expertise in electro
Wienerberger	THIERENS Ann MEULEMAN Rebecca TERRYN Sylvain	Manufacturer, participant in thematic sessions, expertise in post-insulation of walls
WTCB	VAN DEN BOSSCHE Paul LANGENDRIES Dominique VAN DE SANDE Wim VANDOOREN Olivier CALUWAERTS Floris MICHAUX Benoît FLAMANT Gilles WOUTERS Peter VERCAUTEREN Steven VRIJDERS Jeroen LONCOUR Xavier WIJNANTS Jörg MEES Clarisse CAILLOU Samuel	
Wycor	DECAESSTECKER Chris	Contractor, participant in thematic sessions
Zehnder	CUYPERS Paul	Manufacturer, participant in thematic sessions, expertise in ventilation

6. Authors/Contributors

6.1. Authors

VAN ROY Kristof, *fvb-ffc constructiv, coordinator consortium;*

VERCAUTEREN Steven, *WTCB-CSTC-BBRI, consortium partner.*

6.2. Contributors

DE GROOTE Maarten, *VEA, consortium partner;*

PISULA Carole, *DGO4, consortium partner;*

WOUTERS Peter, *WTCB-CSTC-BBRI, consortium partner;*

Facilitators of the workshops:
CAILLOU Samuel; CALUWAERTS Floris; DAEM Hendrik; DEDEYNE Luc; FLAMANT Gilles; FRÈRE Marc; LANGENDRIES Dominique; LATTEUR Hugues; LHOËST Jan; LONCOUR Xavier; MEES Clarisse; MICHAUX Benoit; SELS Tom; VAN DE SANDE Wim; VAN DEN BOSSCHE Paul; VAN EYCKEN Ann; VAN KERCKHOVE Dirk; VRIJDERS Jeroen; WIJNANTS Jörg.

Participants of workshops and/or the national platform:
ALGABA Diego; ALLAEYS Ignace; AULOTTE Etienne; BEAUJEAN Pol; BEKE Joost; BENAERTS Hannes; BEUNE Christine; BORLOO Deef; BÖRNER Peter; BOUNAMEAUX Jacques; BOYER Charline; BRODBECK Christian; BURLIN Natale; CALLEWAERT Philippe; CARNOY Francis; CASTELEIN Christophe; CLAUWAERT Cyriel; COOSE John; COUMANS Jan; COVELIERS Filip; CUYPERS Paul; CRAPIZ Mauro; DE BAETS Katrien; DE BELEYR Tom; DE BIE Anya; DE BIE Michael; DE BLAERE Benny; DE BOLSTER Ellen; DE BRABANDER Christophe; DE BRUYCKER Johan; DE COLVENAERE Patrick; DE COOREBYTER Yves; DE CORT Robert; DE MEESTER Bram; DE RIDDER Ann; DE SAEDELEIR Inge; DE SCHRYVER Céline; DE STRYCKER Maarten; DE TROCH Bruno; DE WANDELER Hilde; DE WANDELER Sonja; DEBLOUDTS Sophie; DEBROUX Guibert; DECAESSTECKER Chris; DECOMMERE Christ; DEFRIJN Luc; DELOUW André; DELPORTE Gabriel; DELTOUR Bart; DEMESTER Jacques; DEMURIE Kürt; DEPUE Christian; DERDE Geert; DEVENTS George; DIETVORST Jan; DILLEN Marc; DOOM Jeroen; DRAELANTS Joris; DUBOIS Georges; DUJACQUIER Eric; EYKENS Jonas; GERARD Frank; GEUENS Marnix; GOVERS Jean-Claude; GROBET Jan; GUILLEMEAU Jean-Marc; HEEREN Emmanuel ‘s; HERMANS Dirk; HILDERSON Wouter; HUBERLANT Bernard; ISEBAERT Thomas; JENNEN Eddy; KERKHOFS Elly; KLEPFISCH Georges; KÜPPER Daniel; LAMBERT Yves; LAMEIRE Wim; LESSIRE Emilie; LOODTS Nicolas; MARRECAU Christophe; MASSCHELEIN Hilde; MATTHYS Geert; MEULEMAN Jean-Paul; MEULEMAN Rebecca; MICHIELSEN Koen; MICHOT

Hugues; MOREAU Olivier; NEYENS Jo; NYSSENS Françoise; OTTEN Henk; PAREYN Michel; PAUWELS Jacques; PEETERBROECK Gunther; PFEFFER Michel; POTVIN Xavier; POURBAIX Philippe; PROCES Michel; QUEVRIN Benoit; RAMAEKERS Geert; REYNDERS Dirk; RIBBENS Kris; RUTTEN Dirk; SALLE Sophie; SCHOONJANS Luc; SIBILLE Pierre; SOETE Paul; SPIES Nicolas; SPIRINCKX Carolin; STEVENS Lore; STINISSEN William; TER HAMSEL Henk; TERRYN Sylvain; THIERENS Ann; TIMMERMANS Georges; TORFS Emiel; TULKENS Peter; UTEN Patrick; VAN ACKER Pol; VAN CALLENBERGHE Annick; VAN CAUWENBERGE Laetitia;VAN DAMME Nico; VAN DE WATER Johan; VAN DE WYNCKEL Dirk; VAN DEN BERGHE William; VAN DER BIEST Johan; VAN DINGENEN Kris; VAN EERSEL Francis; VAN GIJZEGHEM Francies; VAN HOE Marnix; VAN LOON Stefaan; VAN MIEGHEM Filip; VANDENBOSCH Emile; VANDENBUSSCHE Jutta; VANDENWIJNGAERT Bruno; VANDERSTAPPEN Werner; VANDERWEGEN Bert; VANDEWALLE Eric; VANGINDERDEUREN Philippe; VANHOLM Marlies; VANTHOURENHOUT Stefaan; VELGHE Katrien; VEN Petri; VERSPEURT Angelique; VERSTRAETE Bart; VERTENEUIL Robert; VONCK Magda; WACHTELAER Philémon; WATTEL Didier; WINNEPENNINCKX Eric; YERLES Pierre-Paul.

7. References

[1] EU, „EU 2020," [Online]. Available: http://ec.europa.eu/europe2020/targets/eu-targets/index_en.htm.

[2] EU, „Directive 2010/31/EU of the European Parliament and of the Council," 19 05 2010. [Online]. Available: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:153:0013:0035:EN:PDF.

[3] IEE, „Intelligent Energy Europe," [Online]. Available: http://ec.europa.eu/energy/intelligent/.

[4] K. Van Roy en S. Vercauteren, „Build Up Skills Belgium," 08 2012. [Online]. Available: http://belgium.buildupskills.eu/sites/default/files/BUSBelgiumNSQ.pdf.

[5] McKinsey & Company, "Pathways to World-Class Energy Efficiency in Belgium," 2009.

[6] „De vijf doelstellingen in het kader van de Europa 2020 strategie - Beleidsvoorbereidende studie," 04 2011. [Online]. Available: http://www.be2020.eu/uploaded/uploaded/201107261107370.NEWTEMP_NL_rapport_EUR2020_2.pdf. [Geopend 18 03 2013].

[7] EU, „National Reform Programme Belgium," 2012. [Online]. Available: http://ec.europa.eu/europe2020/pdf/nd/nrp2012_belgium_en.pdf. [Geopend 18 03 2013].

[8] L. Gaudier, „FGTB Wallonne," 08 2011. [Online]. Available: http://www.fgtb-wallonne.be/sites/default/files/notes/certificats_verts_-_24.769s.pdf. [Geopend 18 03 2013].

[9] „Feuille de route Energie 2020," Institut de Conseil et d'Etudes en Developpement Durable, 07 01 2013. [Online]. Available: http://www.icedd.be/I7/index.php?option=com_k2&view=item&id=1294:feuille-de-route-energie-2020&Itemid=592&lang=fr. [Geopend 18 03 2013].

[10] Vlaamse Overheid, „Persmededeling van de Vlaamse Regering 'Vlaamse Regering keurt ambitieus EU2020-programma goed'," 01 04 2011. [Online]. Available: http://www.vlaanderen.be/servlet/Satellite?pagename=nieuwsberichten/NB_Nieuwsbericht/Nieuwsbericht&cid=1301377231031.

[11] ODE, „Windenergie," [Online]. Available: http://www.ode.be/windenergie. [Geopend 18 03 2013].

[12] fvb-ffc constructiv, „Jaarverslag 2011," fvb-ffc constructiv, Brussels, 2012.

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.