



**BUILD UP Skills – Netherlands –  
National Roadmap & Results of WP3  
Final Report**



**May 2013**



### **Further information**

More details on BUILD UP Skills 'Netherlands' can be found on [www.buildupskills.nl](http://www.buildupskills.nl)

More details on BUILD UP Skills can be found on [www.buildupskills.eu](http://www.buildupskills.eu)

For the IEE programme, see <http://ec.europa.eu/intelligentenergy>

## Our vision

### NEW ENERGY CHALLENGES REQUIRE SUSTAINABILITY SKILLS

*Business and education jointly responsible for skilled workers in order to realise the EU '20-20-20' objectives.*

#### INTRODUCTION

Europe is developing an active policy in the area of energy conservation and zero-energy construction. In the Netherlands we see the direct corollary of this; in 2020 to 16% renewable energy and 20% lower CO<sub>2</sub> emissions. This presents a strong challenge both for the sector itself and for the supply industry. Seizing these opportunities means being prepared for the market demands and so having sufficiently knowledgeable and skilled workers. Aligning professional training with practice in the installation and construction sectors is one of these challenges. It is up to business and education to optimise and flesh out this alignment.

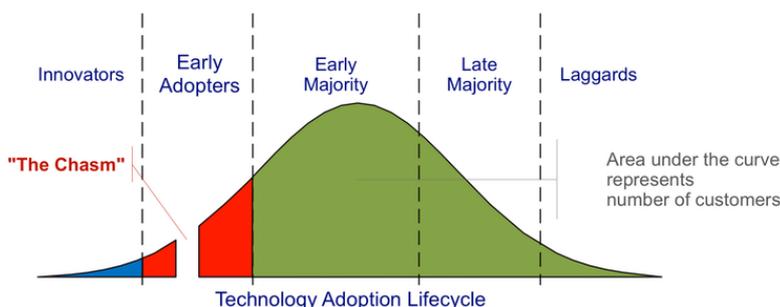
With the Build Up Skills initiative, Intelligent Energy Europe focuses on a joining of forces in order to increase the number of skilled workers in the construction sector (additional training upskilling of approx. 150,000 to 200,000 people).

Build Up Skills endeavours to establish additional education and training of skilled workers, like builders and fitters, so that in any case the objectives for the built environment in 2020 can be realised.

In order to realise the 2020 objectives successfully, also in terms of quality, upskilling is needed for at least 150,000-200,000 skilled workers in the construction and installation sectors. In addition, it is desirable that new influx of qualified school leavers from initial education is skilled in sustainability-critical competences. The same applies to lateral entrants and workers from abroad. The present structure of the education system in the Netherlands is not flexible enough for this.

#### SUMMARY & ANALYSIS OF THE SITUATION

Many of the changes in the construction and installation practice are driven by product innovations. In order to visualise the consequences of this for education, in this summary the various states of education are linked to the implementation phases of innovations, as distinguished in the 'technology adoption lifecycle' (Everett Rogers).



In order to realise the EU 20-20-20 objectives for 2020, it will be necessary to bridge the knowledge and experience gap between the innovators and the early majority.

At the same time, changes are taking place at the crossroads of disciplines.

For sustainable energy and energy conservation, companies need people who both understand the details and can take a comprehensive approach. It is important to keep a close eye on these developments.

## **Initial and post-initial education**

In the current education system for the construction and installation sector, there is in practice an unnatural distinction between initial and post-initial education. Going forward, a better match between initial and post-initial training would be desirable.

### *Initial education*

Initial education is based on the qualification files and corresponding professional competency profiles. The qualification files are drawn up nationally by the knowledge centres of the various professional sectors. The knowledge centre for the construction and technical installation are Fundeon (construction), Kenteq (installation), Savantis (finishing) and SH&M (Hout en Meubel). In these knowledge centres representatives of business and education meet to:

- ensure an up-to-date and effective qualification structure. This is set up based on up-to-date professional competency profiles, which describe the competences these professionals are expected to have;
- ensure a sufficient number and quality of learning companies;
- support learning companies in their training tasks;
- collect, analyse and publish labour market data.  
(This is not a formal task description laid down in law, but is being performed by them.)

Organising this on a national level creates unambiguity and quality control of the professional education in the Netherlands. Employers can trust that a diploma gained in Groningen represents the same quality level as one gained in Maastricht.

Furthermore, students gain experience in daily practice as an employee (BBL) or intern (BOL) during 20%-80% of the education time of developments in the workplace and therefore also of the innovations. In fact, the learning companies are important partners for the RTCs in the development of up-to-date training in professional field committees and/or advisory bodies.

### *Post-initial education*

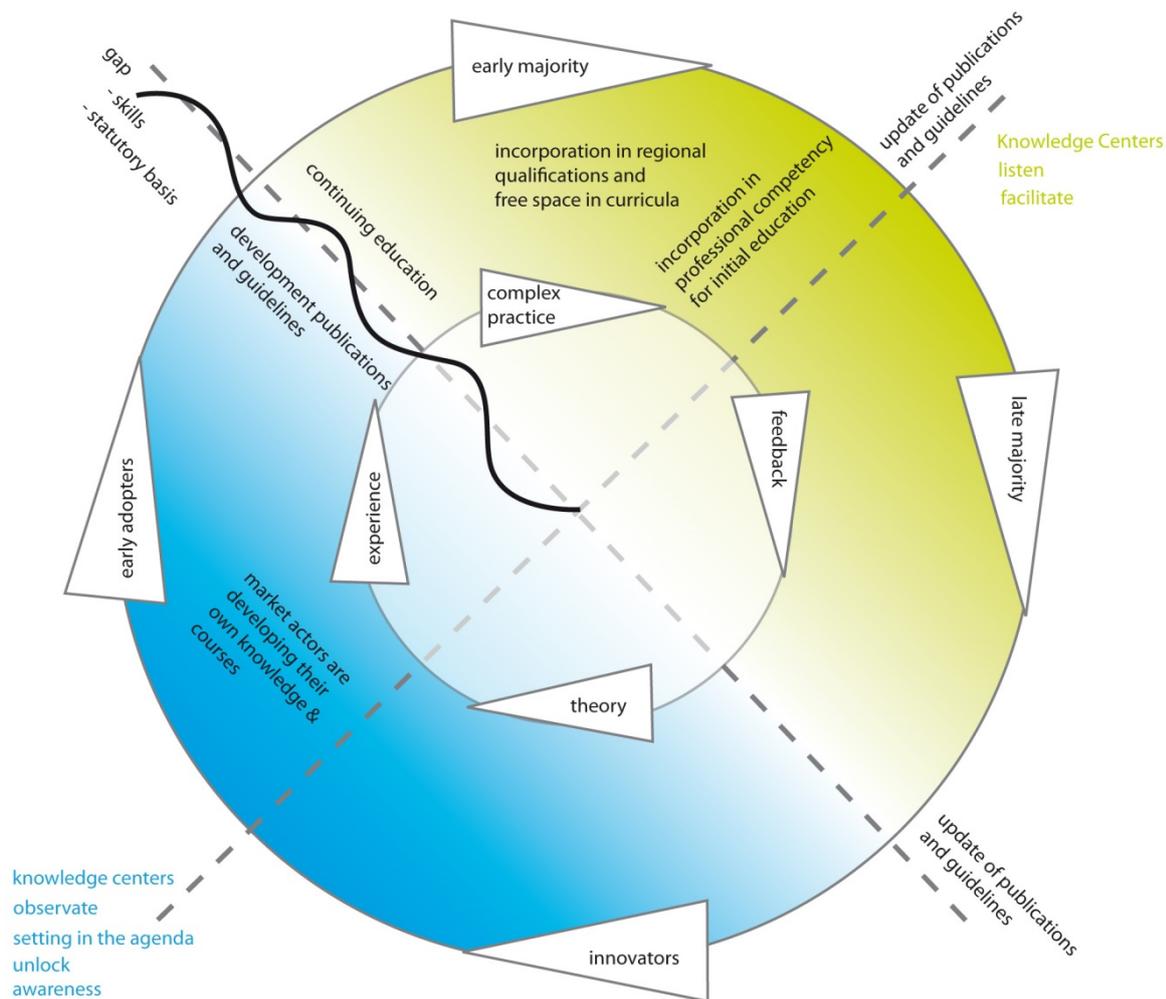
The professional post-initial training is based on demand from market parties for retraining. This demand often results from the first large-scale application of new technologies. Successful embedding in the design, construction and maintenance practice often requires retraining (internal/external). The resulting education demands are a translation of the demand from the 'early majority' after the innovation gap ('the Chasm').

Not until these innovations are sufficiently fundamental or substantial are they systematically embedded in BCPs and curricula. During the update cycle (currently 6 years) this content is recorded in the formal qualification file. In the meantime, individual teachers often include innovations in their teaching programmes, either in the discretionary part of the curriculum or otherwise. At the same time, industry leaders in the construction and installation sectors often train their own people internally. They set up experiments in which they can experiment with the use of new technologies, working methods and concepts. These internal training issues are a translation of the issues and solutions that the innovators and early adopters (before the innovation gap) encounter. This presents opportunities, whereby initial and post-initial training can strengthen each other by exchanging expertise, manpower and resources.

The present structure for the development and maintenance of the qualification structure under supervision and responsibility of the Foundation for the Cooperation on Vocational Education, Training and the Labour Market (Stichting Beroepsonderwijs Bedrijfsleven, or SBB) fully supports this development.

This may create a new dynamic in terms of the development and implementation of innovations (sustainability) that both can benefit from.

The chart below summarises this dynamic with its interactions and connections. The chart combines the basic ingredients for a learning individual/organisation/sector/society with the 'technology adoption lifecycle'. This combination makes it possible to perform various analyses aimed at system optimisation.



Three major success factors can be distinguished in this cycle. The first success factor concerns the degree to which the knowledge obtained from the various experimental set-ups can be made available. The second success factor is the degree to which potential users are aware of the pros and cons of an innovation so that they can decide whether to adopt it. The third success factor relates to the degree to which actors are focused on actively searching for new knowledge. Actions to accelerate the implementation of innovations should be aimed at this.

### **SOLUTION DIRECTION 'Focus on future-oriented craftsmanship'**

Achieving the objectives for 2020 will require applying a range of technologies that are currently innovative. Innovators and early adopters have meanwhile gained ample practical experience of these technologies. And knowledge institutions like SBR and ISSO have translated a great deal of this knowledge into draft guidelines and in some cases into course material and exams. BuildUpSkillsNL believes that over the next three years we will find ourselves right in the middle of the 'Knowledge Gap' (or Chasm). Focusing all efforts on raising consciousness and competence for the next three years will be needed to bridge this gap to a sufficient degree. Only then will the 'early mass' on the demand side of the market gain enough confidence to order a move towards sustainability at a manageable risk or no risk.

BuildUpSkillsNL proposes as the key intervention to complement the professional competency profiles in 2013 and 2013 with competencies which the innovators and early adopters have determined are essential for the desired quality level of sustainable buildings & installations. Adjustments of BCPs are made based on the maintenance cycle, in conjunction with analysis of signals received from the chain. Matching these with the available retraining supply bears out which type of training is lacking. Also, the new and existing training supply can be improved and fine-tuned based on the profiles, especially in terms of certification and accreditation. (objective institute-independent testing and recognised certification of training institutes and diplomas). In addition to reducing qualifications, this also speeds up the BCP update cycle.

Through this 'focus on future-oriented skills' the stakeholders take their responsibility; they focus more on early identification of innovative knowledge, on making this knowledge transparent and available and encouraging that the most up-to-date knowledge is actually used and transmitted. With an active attitude from the government impeding laws and legislation can be identified promptly, so that solutions can be worked on from an early stage. This means a promotion of the sector and a strengthening of the contribution to the Dutch economy: in this way our companies in this sector will increase their competitive position and their innovative power. The skilled workers will work in a sector with a positive and innovative image that they can be proud of. They will be the most persuasive ambassadors.

## Summary

Before you is the report of the National Roadmap BuildUpSkills, containing the findings of the Dutch consortium that is working on the project. In the report you will find the context of the BuildUpSkills project, formulated actions based on the status quo analysis, the results of WP3 (including deliverables) and a proposed Roadmap.

This Roadmap outlines the formulated actions in order to work to improve skills levels between 2013 and 2020 so that the European 20-20-20 objectives can be realised from that perspective.

### Purpose

The purpose of this Roadmap is threefold.

1. Presenting the status quo as of April 2013, based on the draft report Roadmap Actions (of 1 March 2013), supplemented with comments received from market parties.  
Based on discussions with market parties in order to broaden support (endorsement) these actions have been clustered and linked to the parties involved, resulting in an effective and efficient action plan.
2. This document served as conference document for the working conference on 18 April 2013.
3. For the realisation of a number of high-priority clusters the consortium will submit a subsequent application to IEE Europe before 1 May. This application will be drawn up in parallel with the endorsement process.

### Reading guide

For the summary, we have described our vision, which also fleshes out an analytic framework. Using this analytic framework, the actions for the Roadmap have been prioritised. In addition, the developed analytic model serves as a guideline for endorsement discussions with market parties.

After a brief introduction of the BuildUpSkills project, in two chapters more background information is given about:

- The National Energy Objectives 2020 (Chapter 2)
- Demand for skilled personnel in the construction sector and the desired relationship between initial and post-initial training (Chapter 3).

Chapter 4 describes the barriers identified in the status quo analysis. In an appendix, solution-oriented actions, measures and prioritisation are given for these.

### Clustering of actions

The parts discussed separately in Chapter 4 are developed in Chapter 5 into a Roadmap towards 2020. In this Roadmap, the actions are visually grouped so that their location in time, priority and stakeholders are clear at a glance.

Based on the endorsement discussions and comments from market parties the individual actions have been clustered and linked to the parties involved.

In the detailing of the clustering, interdependence between 'separate' actions has been charted. For example, formulated actions on accreditation will be more effective and win more support after actions in the context of 'BCP+' have been completed.

### BUS-NL Platform

Since the Roadmap has a 2013-2020 time frame, a 'virtual' platform has been set up where:

- information is exchanged;
- parties jointly look for opportunities to actually carry out the formulated actions;
- the Roadmap is frequently updated based on monitoring;
- successes are shared with stakeholders.

This platform will be open to organisations who feel engaged by the sketched developments and wish to play an active role in shaping skills between 2013 and 2020.



## List of abbreviations and definitions

Abbreviation	Meaning
BBL	Professional coaching path (on-the-job training makes up at least 60% of total curriculum)
BCP	Professional competency profile
BOL	Professional training path (on-the-job training makes up between 20 and 60% of total curriculum).
BPV	On-the-job training
BUS-NL	BuildUpSkills Netherlands
CREBO	Central Professional Education Registry
EPBD	Energy Performance of Buildings Directive
EVC	Previously gained competencies
HSB	Timber frame construction
HTK	High Temperature Cooling
KBB	Knowledge Centre for Professional Training and Business. Within the scope BUS-NL these include Fundeon, Kenteq, Savantis and Hout en Meubel
KD	Qualification file
LTV	Low Temperature Heating
OCW	Ministry of Education, Culture and Science
PAC	Joint Committee
PI	Post-initial
RES	Renewable Energy Sources
ROC	Regional Training Centre

Term	Meaning
BCP+	Within the scope of BUS-NL; upgrading existing professional competency profiles for use in post-initial training in order to be able to develop retraining.
BCP (Professional competency profile)	Professional competency profiles provide descriptions of experienced professional workers and are used to draw up qualification files.
Crebo code	A unique code for every qualification in a qualification file for administrative purposes in education.
Zero-energy building	The energy consumption of the building and its installations is equal to or less than the sustainably generated energy. <i>Note: In BUS-NL this definition has been adopted. At this time there is not yet a generally accepted definition of a zero-energy building. Discussions are ongoing.</i>
Initial training	Training people receive before entering the labour market; within the scope of BUS-NL this refers to the connecting further education courses in intermediate vocational education
Qualification	A qualification is <u>one</u> profession in a qualification file.
Qualification file	A qualification file describes what a participant in education should know and master at the end of a (intermediate vocational training) course. A qualification file describes the level of starting professional workers (school leavers).
Qualification structure	List of all the qualification files of the relevant KBB.
Joint committee	Organisation that consults to determine the content of intermediate vocational training. For every KBB the joint committee is the designated meeting platform between organised business and vocational education institutions. The objective of a joint committee is to find consensus on the contents of the qualification files.
Prefab	Abbreviation of 'prefabricated'. In the context of zero-energy construction, this refers to constructing building elements that are later taken to the building site and fitted there.
Post-initial training	Training received after leaving initial training.



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Appendix IV	: Barriers, measures and priorities
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# 1 Introduction

The Netherlands pursues an active energy policy. Its three main objectives are: energy supply must be (1) reliable, (2) affordable and (3) sustainable. On a national level, we are working towards achieving 16% sustainable energy and a 20% CO<sub>2</sub>-reduction by 2020.

## *National energy policy and strategy*

- Covenants
- Innovation Agenda Energy for the Built Environment
- Municipal Climate Agreement
- Top sector Energy
- Second National Energy Efficiency Action Plan
- Vision Document on Housing [“Woonvisie”]

Meeting these targets is a challenge for the construction and installation sector, as for the related supply industry.

All the more so, if we consider current economic circumstances.

One of the preconditions for meeting the said targets is the availability of sufficient trained staff on the construction site in the lead-up to

2020. In particular, there is a need for people who are able to deliver as a team in compliance with very strict requirements.

*BuildUpSkills Netherlands* (abbreviated as BUS-NL) is a joint initiative by all relevant partners in the Netherlands to cooperate in fulfilling this condition as quickly as possible.<sup>1</sup>

## **BUS-NL focuses on *additional, post-initial* education and training of skilled labour and other site staff, such as construction workers and installers.**

The chief focus is on the following professions:

- Renovation and upgrading of thermal shells in existing buildings (including restoration), and application of thermal shell technology in new buildings.
- Selection, maintenance, fine-tuning and replacement of both energy efficient and power generating installations (RES) in existing and new buildings.
- Construction site supervisors who are capable of giving effective instructions, checking and validating work on thermal shells and energy systems.
- At (middle) management level: advisors, calculators, constructors, etc.

In order to establish adequately what is needed to achieve the desired situation from where we stand now, the first step in this project was to research the status quo in the Netherlands. Subsequently, we looked at the workforce required.

The next few paragraphs in this introductory chapter provide a summary of the status quo analysis, both in quantitative and qualitative terms. The full analysis may be found in the BUS-NL status quo report: <http://netherlands.buildupskills.eu/sites/default/files/Build up skills - Rapport Status Quo.pdf>

## 1.1 Status quo

### 1.1.1 The market

Taking a look at the Dutch construction sector, we see that a large number of companies in the sector are SME's. There are only a few large companies. Many companies form temporary partnerships in order to tackle larger and complex assignments. Almost one third of the work is subcontracted. Most companies are regionally active, and only a small number operate in the whole of the Netherlands.

Euroconstruct and TNO, i.a., expect major growth from the sustainability work required on the existing building stock. Several factors contribute: stimulation subsidies granted by the Dutch government and the rapidly growing array of energy saving installations and building materials, further enhanced by what the international market has to offer.

Demand is also changing. The Energy Label for New Buildings empowers clients to monitor the energy performance of buildings. This provides valuable opportunities for innovative construction and installation businesses which specialize in sustainable renovation. The same applies for new buildings, even of this market is slack. Businesses which fail to keep up with developments and the more traditional construction companies will drop out.

<sup>1</sup> A Dutch consortium which includes OTIB, ISSO, SBR, Fundeon, Kenteq, Hibin and MBO vocational training services, modelled after European BUILD UP Skills - an initiative undertaken by the IEE (intelligent Energy Europe).

When we look at the concepts for zero-energy buildings developed over the past few years, it becomes clear that the core of the work will be twofold: on-site locating, fitting, and assembly of prefab construction elements, and focus on insulation technology (insulation and airtightness) modifications and installation technology concepts for zero-energy buildings. Existing buildings offer the best opportunities for sustainability gains in absolute terms, being cost savings for households/users, as investment potential for the sector and possibly for reductions of CO<sub>2</sub>-emissions:

*Table 1.1 Average energy consumption (gas and electricity) of homes in the Netherlands:*

	2005	2006	2007	2008
Average household gas consumption [m <sup>3</sup> ]	1,664	1,643	1,560	1,625
Average household electricity consumption [kWh]	3,397	3,402	3,521	3,558

However, implementation of sustainability in existing buildings is far more challenging in technical and equipment terms than in new construction. Generally, regulations for new construction are stricter than for existing buildings (Buildings Decree 2012). Owners of existing buildings gauge investments in sustainability usually against returns (higher income, lower ownership costs), while sitting tenants check the charging on of these investments against the returns (lower energy costs and increased comfort).

For an extensive statistics on the construction and energy sectors, please refer to Chapters 3 and 5 of the BUS-NL status quo report, see <http://netherlands.buildupskills.eu/en/national-project>

### 1.1.1 Education

Looking at initial training, the basis of intermediate vocational education (MBO) and adult education is formed by professional qualifications and descriptions. The development cycle of qualification files, curricula, training materials and exams that follows the description of the professional content has a 3-year turnaround time. Programmes and exams in initial MBO education may still lag behind somewhat on the latest needs and developments in the market. The slow pace at which new developments are absorbed into MBO education is to some extent unavoidable and even wise. But lagging too far behind the rapid developments in sustainable construction would jeopardise the basis that intermediate vocational education offers young people for executive and supervisory professions in the construction trade.

Some recent developments in vocational education respond to a wish to include recent developments in sustainable construction in the qualification files. For example, it is advisable for all parties involved to anticipate on the action plan of the Ministry of OCW to substantially reduce the number of qualifications at MBO level and place them in a domain structure.

This domain structure creates the possibility of an integrated approach of construction and installation techniques. The action plan also makes it possible to include professional profile tasks in the files for industry-specific professions and specialisations. The plan furthermore leaves room for making choices as possible enhancement of the curriculum based on individual training plans that education institutes and participants define together.

## 1.2 Obstacles

### 1.2.1 In construction

The main short-term obstacle to achieving the 2020 sustainability objectives is the current economic crisis. When we focus on the construction sector, we find that sustainability aspects are not included as a matter of course in renovation plans for existing buildings. It is often unclear who should take the lead. The responsibility for implementing energy saving measures is often left to the client and the government.

Also, the economic potential of sustainability (in long-term operations) is not generally appreciated, and quality has often fallen short of the client's demands. The latter has affected the reputation of both the construction and the installation sector.

There is also a continuing failure to cooperate across disciplines, in spite of considerable progress over the past few years. Building zero-energy buildings requires adjusted work processes; BUS-NL sees a central role for quality, in relation to standards and measuring methods.

### 1.2.2 In education

The training courses in the installation and construction sectors are ill matched to the demands and wishes that practice with throw up over the next few years, even though many demands and wishes have already been included in post-initial training. This was shown by national research conducted in the context of a European-wide programme. See <http://netherlands.buildupskills.eu/en/national-project> In order to be able to build zero-energy buildings in 2020, the vocational training courses must modernise the content of their education significantly. An obstacle with the post-initial training courses is that they are often not well-known among the target group.

Educators also need retraining. The MBO institutes are also faced with a shortage of teachers in Construction, Installation, Finishing and (property) maintenance due to ageing. Together with the falling numbers of students, this is one of the main worries.

## 1.3 Required workforce in 2020

### 1.3.1 Skills gap

(Initial) construction and installation training currently places too much emphasis on the individual construction and installation work and not enough on the realisation of the final project in the context of the building. There should be more focus on detail, evaluation, collaboration and ambassadorship for sustainable solutions. There is a shortage of education and follow-up training courses that embed specific developments and 'soft skills' and comprehensive preparation and execution in the curriculum.

### 1.3.2 New specialisations

Through a number of steps - including an inventory of the available supply of post-initial education - BUS-NL has created a detailed picture of professional specialisations and new professions that result from the wish to realise zero-energy buildings. The recognised specialisations are then linked to a list (drawn up by BUS-NL) of existing basic professions.

For the construction field, this means for example that the profession 'glazier' will be enriched by specialisations like 'high-grade insulated glass specialist', 'sun blocking window film specialist' and 'switchable glass/smart glass specialist'.

For the profession of 'carpenter' BUS-NL distinguishes eight specialisations, such as 'on-site installer of prefab HSB façade elements' and 'on-site prefab roof specialist' and 'on-site fitter of prefab wooden frame façade parts'. In the insulation technology field emerging specialisations have also been identified. For example, within the profession 'e-installation mechanic' the specialisations 'sustainable light specialist', 'solar energy specialist' and 'domotica specialist' have developed. In the field of cooling technology BUS-NL distinguishes 'ventilation specialist', 'high-temperature cooling (HTK) specialist', and 'solar energy specialist'.

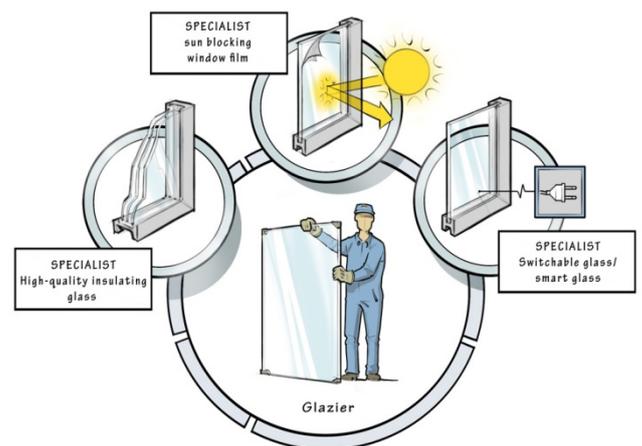


Fig. 1.1 Development of existing basic professions into new professions

A comprehensive overview of the most relevant specialisations for the professional fields is provided in paragraph 3.2.

Due to the developments in the field of sustainable construction, demand for specialisations around insulation and prefab elements has grown to such an extent that BUS-NL wonders if the following three professions may be missing from the range of professions in construction: 'Construction insulation technician' and 'fitter and installer of prefab elements in construction'.

Remarks There is a BCP for 'installer of wooden prefab elements (KBB Stichting Hout en Meubel).

### 1.3.3 Upskilling starts in 2013

If we intend to achieve the required minimum levels for the use of renewable energy in the built environment before 2015, it appears that we have to give extra momentum to upskilling of construction workers as early as the second half of 2013. Initially, this concerns training some 50,000 - 70,000 people. If both the construction and installation sector going forward to 2015 make all possible efforts to ensure realising the objectives, this will encourage businesses and consumers to invest in sustainability of buildings and using renewable energy. Good reason then for parties to do their bit in the realisation of the objectives BUS-NL has set for the next 7 years.

### 1.3.4 Market research

At the end of 2012 the BUS-NL consortium commissioned a market research to be able to determine how the market is moving towards the 2020 objectives. Initially, qualitative research was started among a group of companies that are considered industry leaders in terms of their contributions to realising the 2020 objectives. These companies, 'the market', comprised clients, manufacturers and suppliers and executing parties.

Based on in-depth interviews a quantitative study was then launched among 900 companies (again comprised of clients, manufacturers and suppliers and executing parties). The interviewees were mainly educated to MBO level.

The study conducted can be sketched as follows:

Desk research	Qualitative research	Quantitative research	Analysis, reporting and advice
<i>Activities:</i>	<i>Activities:</i>	<i>Activities:</i>	<i>Activities:</i>
Study existing research reports, like 'analysis of the national status quo' and 'innovatiemotor'	20 in-depth telephone interviews with all market parties on their expectations for 2020 and actions planned/taken	Programming the survey and then conduct it by telephone among 900 companies	Data analysis in SPSS and processing data into information in PowerPoint report
<i>Output:</i>	<i>Output:</i>	<i>Output:</i>	<i>Output:</i>
Initial qualitative insight into status quo of market and technologies	Deeper insight into market situation in terms of 2020 objectives in order to develop effective questionnaire	Reliable data on public awareness of objectives and (perceived) obstacles and benefits	Insight into position on adoption curve and advice on the best policy to inform and engage the sector

Fig. 1.2 Market research in outline

After the study, the research findings were discussed with industry leaders not interviewed before, about the objectives for 2020 in order to check the findings with their views.

The findings of the market research study are included in (the appendices of) this report. All the results of the study can be downloaded from [www.buildupskills.nl](http://www.buildupskills.nl) (only in Dutch)

## 1.4 Purpose and methodology of preparation of Roadmap

### 1.4.1 Objective and scope

The objective of the BuildUpSkills (Pillar I) project is to identify and quantify the demand for workers who are skilled in realising zero-energy buildings. These are relevant professions and competency levels in the construction, installation, finishing and maintenance sectors. Based on this, changes that must be made to the present system are discussed, including concrete measures to meet these needs.

This report is the result of the following activities of the BUS-NL project:

- Workpackage (WP3), Set up of the Roadmap
- Workpackage (WP4), Endorsement

With these reports, the objective mentioned above is pursued in the Netherlands by developing a National Roadmap 2020 (Ch 5).

In the preparation of the National Roadmap a method has been developed to keep the information on the status quo (WP2) up to date. See also the appendix on Monitoring.

#### 1.4.2 Methodology in preparation of Roadmap

The composition of the project team (OTIB, ISSO, SBR, Fundeon, Kenteq, Hibin and MBO-Diensten) has directly affected the choice of methodology. All partners are knowledgeable of the developments in their construction 'patch', all have a direct relationship with the relevant market factors, possess a great deal of know-how and also have extensive networks.

Before BuildUpSkills, most partners had rarely collaborated with each other in projects. This is because the Dutch construction industry is divided into a number of clearly distinct sectors: construction (subdivided into B&U 'Civil and utility construction' and GWW 'groundwork, road and hydraulic engineering'), the installation sector, initial education and retraining courses.

The fact that the partners were well-versed in the issues generated effective cross-fertilisation, provided the right partners were collaborating. This approach also improved relations between the partners, which in itself can be considered a success. It also provides a solid basis for future platform activities initiated by BUS-NL.

After (October 2012) the definitive Dutch status quo report was presented, the consortium immediately started developing and endorsing a National Roadmap. In outline the following activities have been performed in this context:

##### Workshop WP3.1 en WP3.2 ('brown paper session')

- Identify required and lacking professions and skills
- Determine required adjustments of professional profiles
- Measures to boost demand for labour
- Opportunities to stimulate demand for training
- Record aspects that form obstacles to demand for education

##### Workshop WP3.3

- Take stock of existing methods and processes for testing and examination
- Investigate possibilities of quality assurance in evaluations
- Think about structures/systems that promote innovation in education and testing

##### Market research (follow-up on initial results from workshop WP3.2)

- Determine how the market moves towards 2020 objectives (paragraph 1.3.4).

Extensive reports on the workshops have been produced, which sketch the contours of the follow-up:

##### Reports

Based on the partial results from the workshops and the market research, in early 2013 a start was made on the WP-3 report based on the European template.

The following reports were prepared in this context:

January 2013 : Draft report (v1) evaluating and processing of registration of partners

February 2013 : Draft report (v2) for IEE Europe

March 2013 : Draft report (v3) March for endorsement purposes

April 2013 : Report finalised, basis for Working Conference (18 April 2013)

##### WP4 Endorsement

In the first quarter of 2013 one-on-one discussions were held by almost all market parties. To broaden and strengthen support (endorsement) the Roadmap actions thus developed were clustered and linked to the parties involved, generating an effective and efficient action plan.

##### Pillar II

The definitive report also forms the basis for the next phase of the BuildUpSkills project, pillar II. This concerns the execution of actions laid down in the National Roadmap, focusing on the introduction of new and/or upgrading of existing qualification schemes, education and/or training for the benefit of post-initial education.

The member states must submit their application for the first tender, pillar II no later than 30 April 2013. The application is being prepared by the Dutch consortium.



## 2 National energy objectives 2020

A major contribution is expected of the construction sector in Europe in the realisation of the following European objectives for 2020 (based on 1990):

- 20% reduction of energy consumption;
- 20% reduction of CO<sub>2</sub>-emissions;
- 20% share of renewable energy in meeting energy needs.

The Dutch energy policy is matched to the European objectives. In this area, the Netherlands pursues an active policy with three objectives in terms of the energy supply. It must be as (1) reliable, (2) affordable and (3) sustainable as possible.

The energy objectives of the Dutch policy for 2020 were laid down in 2007 in the Clean & Energy Efficient [Schoon & Zuinig] government programme: 20% sustainable energy, 30% CO<sub>2</sub>-reduction compared to 1990 and 2% energy savings per year.

In the government coalition agreement 'Bruggen Slaan' (2012), the targets for energy savings were adjusted. Instead of Clean & Energy Efficient programme, targets were set at 16% sustainable energy and 20% CO<sub>2</sub>-reduction by 2020. For 2050 the objective is for energy supply to be fully energy neutral, and power generation to be 100% sustainable.

A more detailed description of the Dutch energy policy is set out in Chapter 4 of the status quo report on <http://netherlands.buildupskills.eu/en/national-project>

### 2.1 Energy policy NL - Energy savings buildings

National regulations on energy saving are related to the EU Energy Performance of Buildings Directive, EPBD, revised in 2010 (2010/31/EU).

The EPBD originally follows on from the 2002/92/EG directive that was transformed via the Decision to implement the directive on the energy performance of buildings (BEG) and the Regulation on Energy Performance of Buildings (REG).

The implementation is conducted through the 'Energy & the Built Environment' programme of Agency NL, contracted by the ministries of VROM/WWI and the National Energy Efficient Action Plans (NEEAPs).

*Table 2.1 - Overview of implementation of EU Directives in Dutch policy*

EU Directive	Implementation by the Netherlands
Directive 2002/92/EC(2002);	Decision to implement the Directive on Energy Performance of Buildings (2006)
	Regulation on Energy Performance of Buildings (REG) (2006)
	Decision on Energy Performance of Buildings (BEG) (2006)
	National Energy Efficiency Action Plan
	NEEAP-1 (2007)
	Work programme Clean & Energy Efficient [Schoon & Zuinig] (2007)
	Lente-akkoord (2008-2015)
2010/31/EU revised EPBD (2010)	Implementation through the Energy & Built Environment programme of NL Agency
	Second National Energy Efficiency Action Plan NEEAP-2 (2011)
	Energy Label (2008)
	Building Decree, EPC requirement

The EPBD requires all EU member states to take the following measures:

- Energy performance shall be calculated in accordance with methodology for the calculation of integral energy performance of buildings (as laid down in EPG: NEN 7120);
- Minimum requirements for energy performance of new buildings and of existing large buildings which are undergoing major renovation (laid down in the EPC index: Building Decree 2012)
- Energy certification of buildings (laid down in EI index: Energy Label)
- Regular checks of hot water boilers and air conditioning systems in buildings and once-only full review of heating installations with boilers older than 15 years (yet to be approved).

## **2.2 Energy policy NL - Renewable energy sources**

National regulations on the application of renewable energy are related to the EU Directive for the Promotion of the Use of Energy from Renewable Sources, or the RES Directive (2009/28/EC) in short.

The implementation is currently being done through Agency NL. The accreditation system for curricula and exams in the field of small-scale sustainable energy applications was drawn up by KBI commissioned by Agency NL. This refers to installation of (small-scale) applications for solar energy (electricity and heat), heat pumps and shallow geothermal systems, biomass burning boilers and heaters. As of 1 January 2013 the national registry of accredited courses and exams can be inspected on [www.qbisnl.nl](http://www.qbisnl.nl).

## **2.3 Contribution from construction**

The built environment (utility and residential) generates 34% of total CO<sub>2</sub>-emissions. Together, industry, utility buildings and residential houses represent a huge potential for CO<sub>2</sub>-reduction and energy savings. The ambition for the total built environment is a CO<sub>2</sub>-emissions reduction of between 6 and 11 Mt /year in 2020.

### 3 Demand for skilled personnel in the construction sector

(Initial) construction and installation training currently places too much emphasis on the individual construction and installation tasks and not enough on the realisation of the final project in the context of the building. There should be more focus on detail, evaluation, collaboration and ambassadorship for sustainable solutions. There is a shortage of education and follow-up training courses that embed specific developments and 'soft skills', and comprehensive preparation and execution in the teaching programme.

In determining the missing, yet to be developed skills of the professions within the scope of BUS-NL, the key question is:

*which existing professions are impacted most by more sustainability in the built environment?*

#### 3.1 Existing professions

In the status quo analysis the professions in the construction and installation sectors were identified that touch on the objectives of BUS-NL. The Dutch BuildUpSkills website (<http://www.buildupskills.nl>) presents this overview of professions in the construction and installation sectors that are connected to zero-energy building.

Of the professions at the various MBO levels listed in this overview, the following are most relevant in the context of BUS-NL:

##### Installation

- E-installations and service mechanic E-installations (solar energy, sustainable light, control technology/domotica, Power Quality and monitoring).
- Engineering installation mechanic and Engineering service mechanic (heat pump, energy generation, low temperature systems, ventilation systems, monitoring and solar energy, thermal).
- Cooling mechanic and cooling service mechanic (ventilation systems, monitoring, high temperature cooling systems and solar energy, cooling).
- Roof mechanic (solar energy, wind energy).
- Draftsman (all installations)
- Work planner (all installations)

##### Construction

- Carpenter (foundations, floor, façade, roof, window fittings, windows and doors, fitting, joints).
- Bricklayer (insulation, protecting insulation and construction from damp, wall/roof joints, roof openings, and anchoring to foundation beam).
- Roofer (roof insulation, protecting insulation and construction, fitting and insulating roof extensions).
- Works planner (preparation of construction parts and joints).
- Executor (supervision of construction parts and joints).

##### Finishing and (property) maintenance

- Glazier (fitting glass to windows, doors and window fittings).
- Plasterer (insulation of outside façade wall and inner leaf).
- Ceiling and wall mechanic (inner leaf insulation)
- Painter.
- Floor fitter.

*Notes on the origin of the profession selection:*

An inventory was made of professions that are found in the construction and installation sectors in the Netherlands. A list was made of the profession titles that feature in the professional competency profiles (BCP) and qualification files (KD). In addition to the primary profession titles in competency profiles, alternative names are also included as mentioned in the professional competency profiles. In terms of the qualification files, names of professions have been used as they figure in the titles of those files as well as names of professions used to describe job options after completion of education (education differentiation).

As there are many synonyms and, in addition, a number of homonyms to denote certain professions, this inventory initially takes into account only those professions which appear in the titles of the qualification files and the professional competency profiles.

Furthermore, for practical purposes, professions have been clustered by area of expertise and by level. For BUS-NL, this has resulted in practical overview, whereby all occupations found in a single matrix cell are backed by a database containing names of professions.

The complete overview shows only construction and installation professions or groups of professions which are directly related to meeting the target of realising zero-energy buildings. For many professions this relationship is obvious (like carpenters and roofers). For other professions, an explanation is needed: a scaffold builder, for instance, when fixing his scaffolding, must be aware of the building's thermal shell and careful to leave it intact or repair it if necessary. The areas of expertise which have been coloured black have the closest links to BUS-NL. These are the areas requiring most effort in order to achieve the desired level for the workers in these professions.

The overview presents professions which cover a number of occupations in a separate table. These are professions which embrace more than one area of expertise. See also

<http://netherlands.buildupskills.eu/sites/default/files/Occupations%20in%20Construction-%20and%20Installationsector.xls>

### **3.2 Specialisations and new professions**

To get an idea of existing professional specialisations and new professions emerging as a result of the ambition to realise zero-energy buildings, the following three steps were taken:

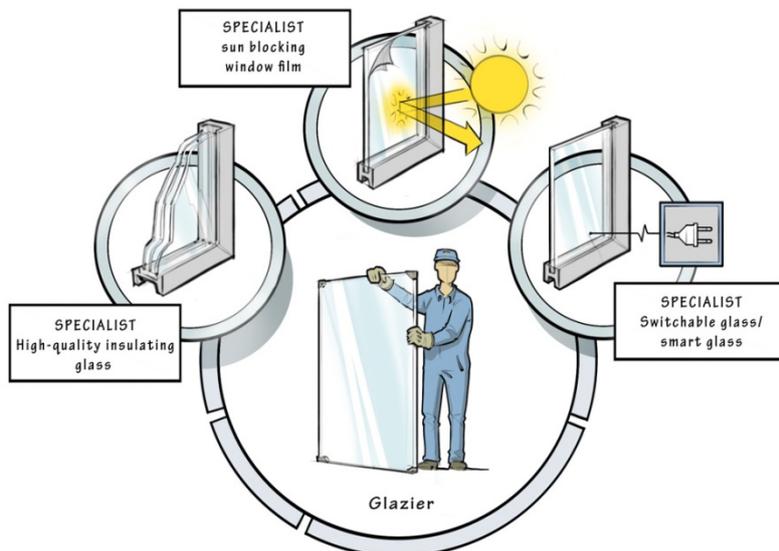
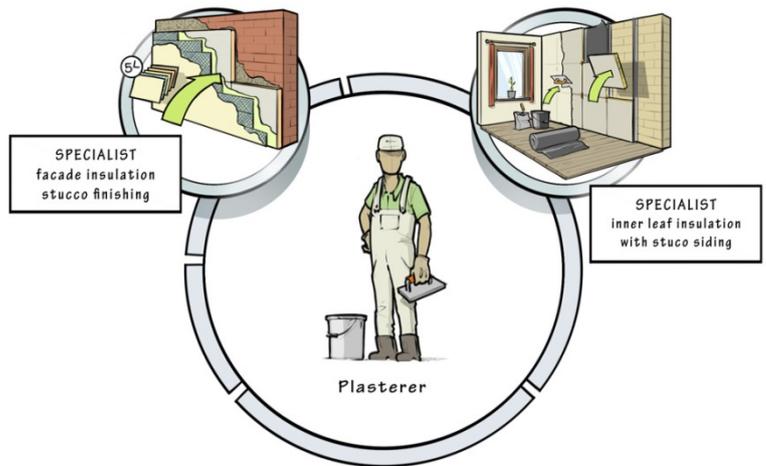
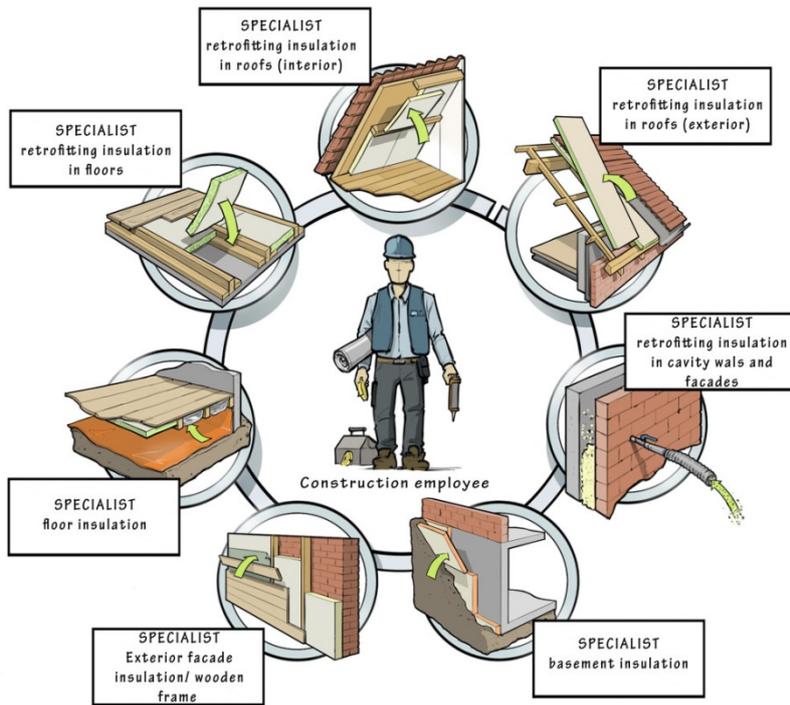
1. An inventory was made of available post-initial training and education which is directly related to the zero-energy buildings target. To understand the gap, relevant courses which prepare for specialised, new occupations (but which have not yet been assimilated in initial education) have been clustered into 'specialisations'.
2. Based on construction and technical installation concepts for zero-energy buildings, we identified specialisations which are necessary for the successful implementation of these concepts, following specific and detailed procedures, and for the correct use of materials, systems and working methods.
3. We looked at outreach of specialisations in practice, and how they are portrayed in commercials along highways and on the Internet.

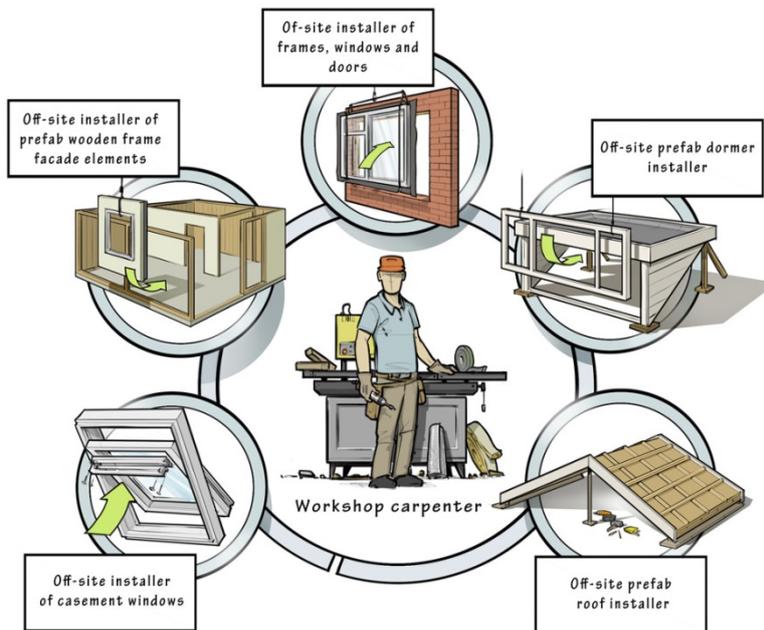
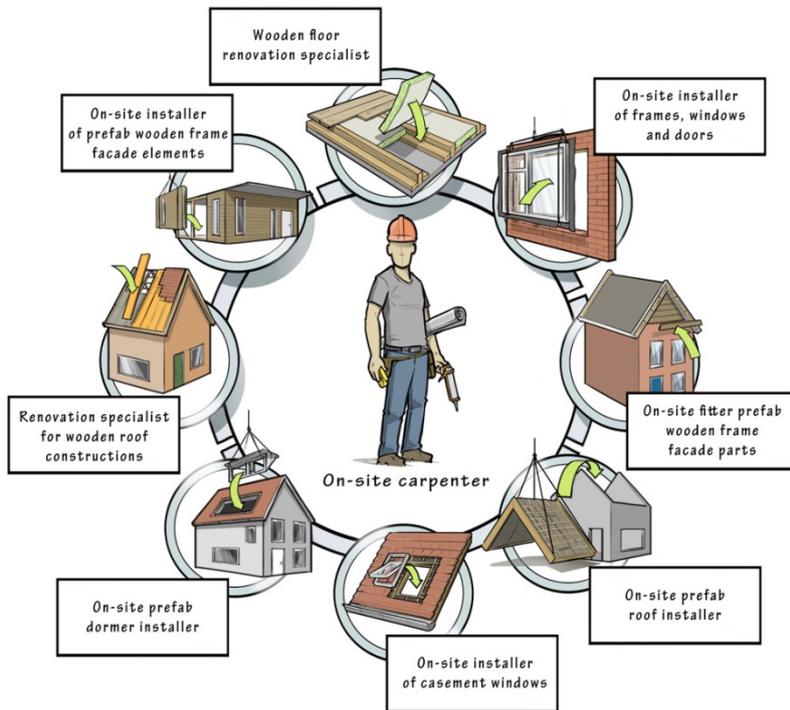
The identified specialisations were then linked to basic professions in the professional qualification structure (MBO level 2-3). This was done because over 40% of workers entering the construction sector are qualified school leavers. Also, the target group description for post-initial training refers to the basic professions.

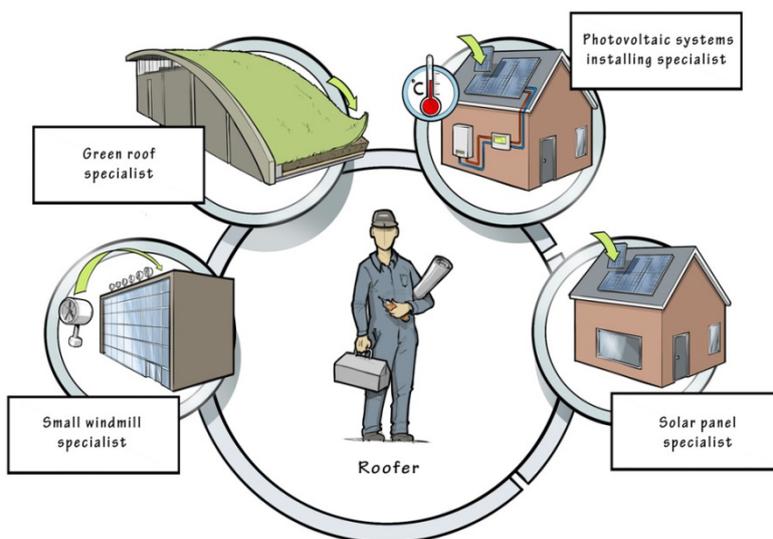
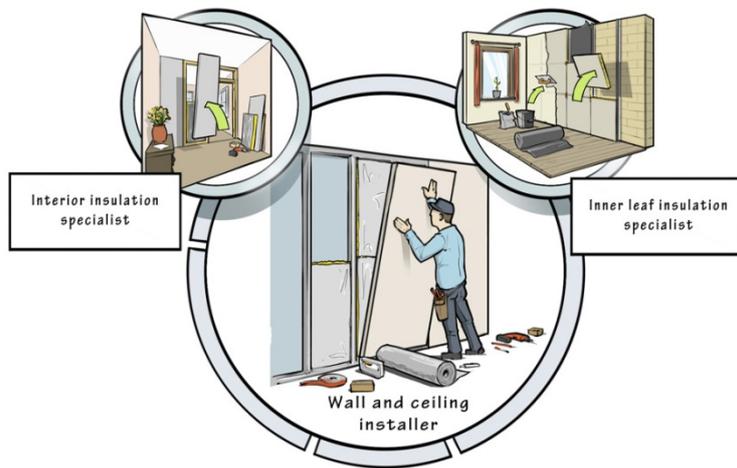
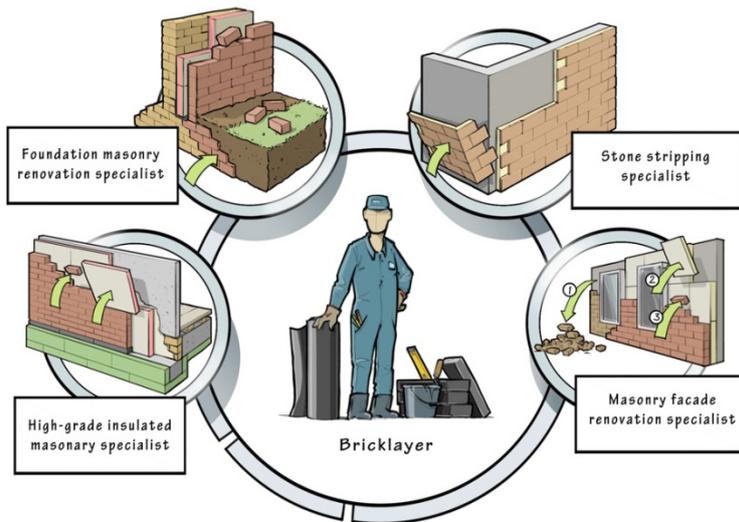
The most relevant specialisations for operating in the fields of construction and technical installation are shown in the figures below.

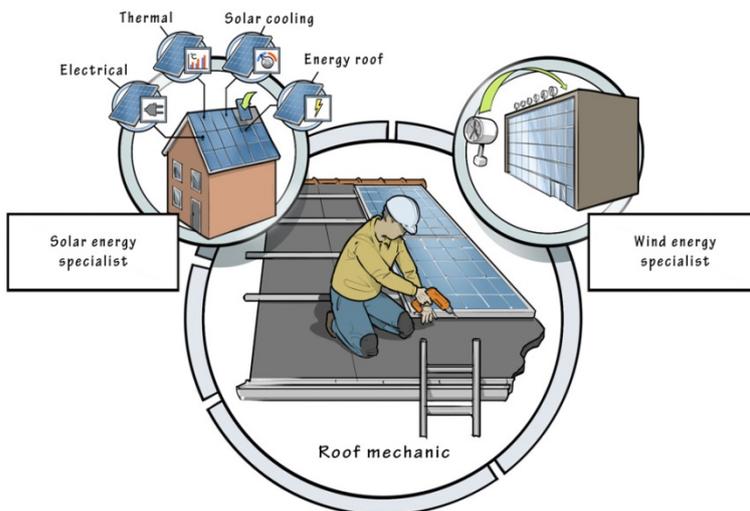
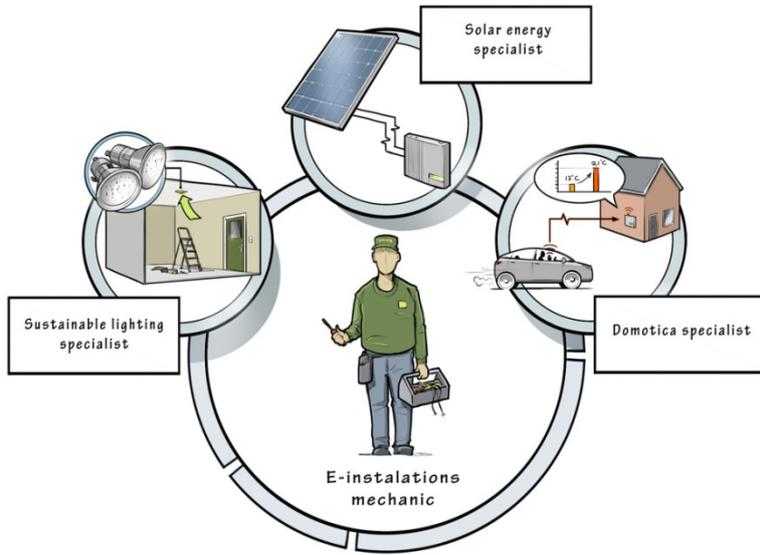
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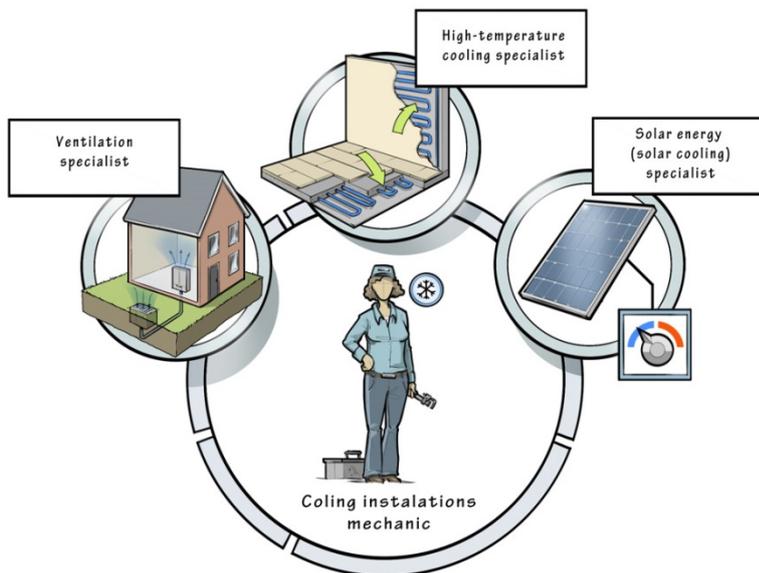
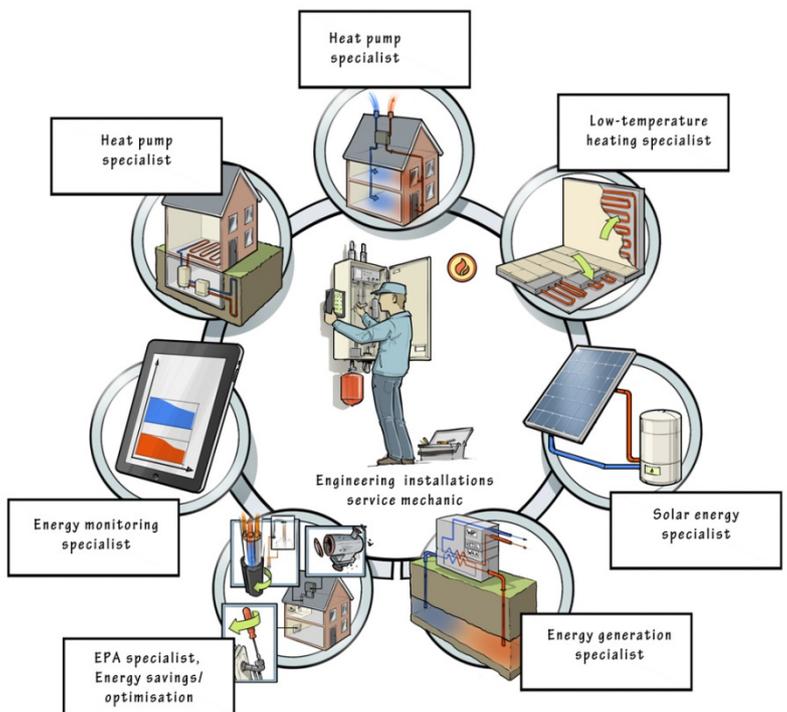
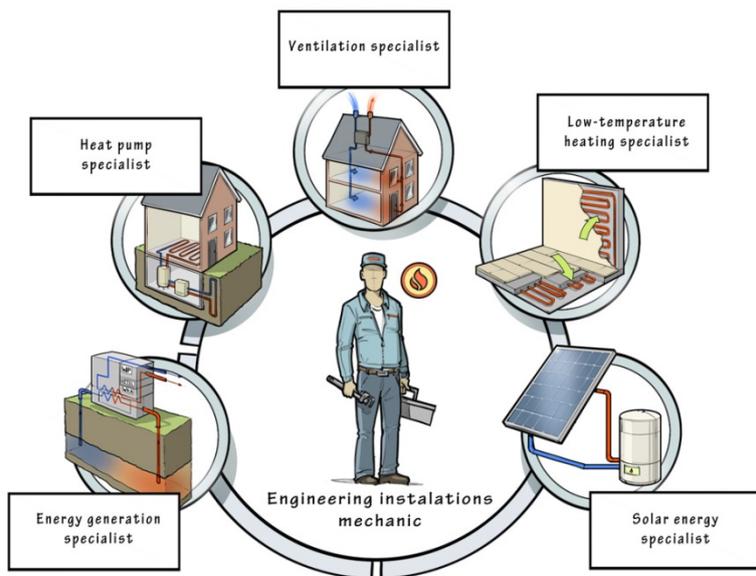
*For this reason, for cross-profession professions (which by and of themselves comprise more than one craft) such as supervisor, executor, and work planner we have not drawn up specialisations.*

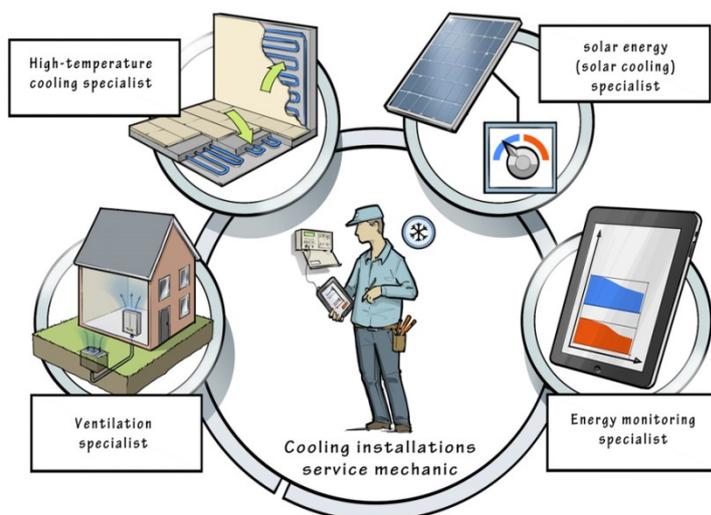












### 3.2.1 Potentially missing professions

A number of specialisations are not easily linked to an existing professional competency profile. This is true in particular of specialisations in the fields of insulation and prefab elements.

#### Insulation specialist

In the list of construction professions derived from professional competency profiles, the profession of insulation specialist or retrofitter of insulation (airtight construction) does not feature. Specialisations in this field are numerous, however. In Belgium, by way of contrast, a professional competency profile was recently developed for insulation specialist for basic foundations, walls and roofs. This profile focuses on retrofitting insulation in dwellings or buildings and corresponds to tasks performed by insulation retrofitters working for Dutch companies which are members of VENIN.

Mistakes are often made in installing insulation in both new housing and renovated buildings. The proneness to mistakes in this area justifies recognition of the profession of insulation specialist, in particular with a view to meeting the 2020 targets. Currently in practice, it is not always clear who is responsible for the correct fitting of insulation material.

Because insulation performance is becoming increasingly important, fully trained professionals responsible for the correct installation/application of insulation and sealing materials should be present on every construction site. This assumes that such professionals have been fully trained.

#### Fitter and installer of prefab parts in construction

The list of professions derived from professional competency profiles does not include the profession of fitter and installer of prefab parts. Because manufacture of (components for) roofs, floors and façades is shifting to factories and a lot can go wrong in the surrounding construction, it seems advisable to train professionals specifically for such tasks. They would then bear responsibility for the correct fitting and installing of prefab parts in new buildings and renovation projects. Training could include specialisations for stone-like and wooden prefab elements.

### 3.2.2 Post-initial training and professions

The summarising tables 3.1 and 3.2 show which basic professions currently exist and which specialisations will be necessary to achieve the 2020 objectives.

The 'initial' column lists the relevant qualification files and qualifications from initial training.

The specialised professions require post-initial training. The tables show the availability of these trainings as well as whether this availability will be sufficient in the future. For example, there will be training courses for the solar energy specialisation for E-installations service mechanics, but not enough. This is because the technology for harnessing electricity from solar cells is developing rapidly (new development: transparent window fittings containing solar cells). The final column shows these estimated shortages of training courses.

A '+' means a surplus, '-' a shortage and '=' means: good balance.

Table 3.1 Basic professions and specialisations in construction

Basic profession	Post-initial		Initial		Retraining	
Construction sector (B)	Professional profile (BCP)	Specialisations and skills	Qual. file (crebo)	Qualifications (crebo)	Availability	Estimated shortage
On-site carpenter	Finishing carpenter / allround carpenter / new building carpenter / workshop carpenter	On-site installer of casement windows	22010	94920 / 94931 / 94932 / 94933	Available	=
		On-site installer of prefab wooden frame façade elements			Available	=
		Wooden floor renovation specialist			Available	+/=
		Renovation specialist for wooden roof constructions			Available	=
		On-site prefab dormer installer			Available	=
		On-site prefab roof installer			Available	-
		On-site fitter of prefab wooden frame façade parts			Available	=
		On-site installer of frames, windows and doors			Available	-
Bricklayer	Allround bricklayer / new construction bricklayer	Masonry foundation renovation specialist	22009	93901 / 93902 / 94821 / 94822 / 94823	Available	=
		Stone stripping specialist			Available	=
		Masonry facade renovation specialist			Available	=
		High quality insulation masonry specialist			Available	=
Roofer	Allround roofer / roofer / roof mechanic	PV systems installation specialist	22004	93841 / 93846 / 93845	Available	-
		Photovoltaic systems installing specialist			Available	-
		Green roof specialist			Not available	-
Glazier	Glazier	High-grade insulating glass specialist	22036	94480 / 94490	Available	-
		Specialist sun blocking window film			Not available	-
Plasterer	Plasterer	Exterior façade insulation specialist (stucco)	22032	93600 / 91501 / 91502	Available	-
		Specialist inner leaf insulation with stucco siding			-	
Workshop carpenter	workshop carpenter	On-site installer of casement windows	22010	94920 / 94931	Available	-
		On-site installer of prefab wooden frame façade elements			Available	-
		On-site prefab dormer installer			Available	-
		On-site prefab roof installer			Available	-
		On-site installer of frames, windows and doors			Available	-
Ceiling and wall installer	Allround installer modular walls and ceilings	Specialist insulation inner leaf	22028	95170	-	-
		Specialist insulation façades inner leaf			-	-
Construction worker	covers multiple profession designations	Specialist retrofitting insulation in floors	covers multiple crebos	94920	Available	-
		Specialist retrofitting insulation in roofs			Available	-
		Crawl space retrofitting insulation specialist			Available	-
		Specialist in retrofitting insulation in cavity walls and façades			Available	-
		Exterior façade insulation specialist			Available	-
		Basement insulation specialist			Available	-
Floor fitter	Cast floor specialist	Floor insulation and finishing specialist	22029	95150	Available	-

Table 3.2 Basic professions and specialisations in installation

Basic profession	Post-initial		Initial		Retraining	
	Installation sector (I)	Professional profile (BCP)	Specialisations and skills	Qual. file (crebo)	Qualifications (crebo)	Availability
I10 - E-installations mechanic	Installation mechanic / electro-technical installation mechanic	Sustainable lighting specialist	22048	94271 / 94281	Not available	-
		Solar energy specialist			Available	-
		Domotica specialist			Not available	-
I11 - E-installations service mechanic	Service engineer / electro-technical installation mechanic	Sustainable lighting specialist	22049	94321	Not available	-
		Solar energy specialist			Available	-
		Domotica specialist			Not available	-
		Power quality specialist			Not available	-
		Energy monitoring specialist			Not available	-
I12 - Engineering installation mechanic	Installation mechanic residential construction	Heat pumps specialist	22048	94272 / 94282	Available	=
		Ventilation specialist			Available	=
		LTV specialist			Available	=
		Solar energy specialist			Available	=
		Energy generation specialist			Not available	-
I13 - Engineering installation service mechanic	Installation service mechanic / maintenance mechanic	Heat pumps specialist	22049	94323 / 95472	Available	=
		Ventilation specialist			Available	=
		High temperature cooling specialist			Available	=
		Solar energy specialist			Available	=
		Energy generation specialist			Not available	-
		Energy monitoring specialist			Not available	-
Cooling installations mechanic	(first) cooling installations mechanic / inspection mechanic cooling installations	Ventilation specialist	22048	94274 / 94284	Available	=
		High-temperature cooling (HTK) specialist			Not available	-
		Solar energy specialist			Available	=
I17 - Cooling installations service mechanic	(first) cooling installations mechanic / inspection mechanic cooling installations	Ventilation specialist	22049	94322	Available	=
		High-temperature cooling (HTK) specialist			Not available	-
		Solar energy specialist			Available	=
		Energy monitoring specialist			Not available	-
I18 - Roof mechanic	Roof mechanic	Solar energy specialist	22048	93843 / 94283	Available	=
		Wind energy specialist			Not available	-

Table 3.1 and 3.2 have been detailed in appendix I, which lists and explains per profession:

- which technology and phase of the innovation system is applicable;
- whether retraining is available;  
(Note: due to the volume, the details on the available retraining is set out in a separate table in appendix I)
- whether some form of retraining quality assurance has been organised;
- the priorities in terms of adjustments of professional profiles, qualifications and courses.

### 3.2.3 Relationship of BCPs with initial training for the professions

In the preparation of the overview of professions explained above, professional competency profiles (BCP) have been used, which form the basis of the initial MBO training (construction and installation).

These BCPs are on average eight to twelve years old. As such, they lag behind recent developments in the professional field. In view of these developments it is desirable that MBO education makes knowledge and skills relevant for the realisation of low-energy and sustainable buildings a key plank of its curriculum.

Although concepts like sustainable building, heat loss, energy (consumption), CO<sub>2</sub>-reduction, insulation and other concepts related to sustainable building are still scarce in professional practice, they must still be related to the BCPs. The BCPs in the installation sector will be updated in 2013.

A key issue here is that a BCP is not a theoretical document. It establishes the activities of experienced professionals. It does not describe future activities, but present-day activities. If activities do not (yet) figure or scarcely figure in practice, they will also not figure in the BCP. Since the BCP describes the fully skilled professional, this is also a good benchmark for post-initial education and measuring and evaluating informal learning (EVC).

Figure 3.1 clarifies the development of professions and the need to innovate (new knowledge in) BCPs on an ongoing basis. Three knowledge levels are distinguished:

- existing knowledge, visible in activities aimed at maintaining the curriculum;
- new knowledge, visible in the innovation of the curriculum;
- future knowledge, visible in activities aimed at discovering which new knowledge will be needed in the future.

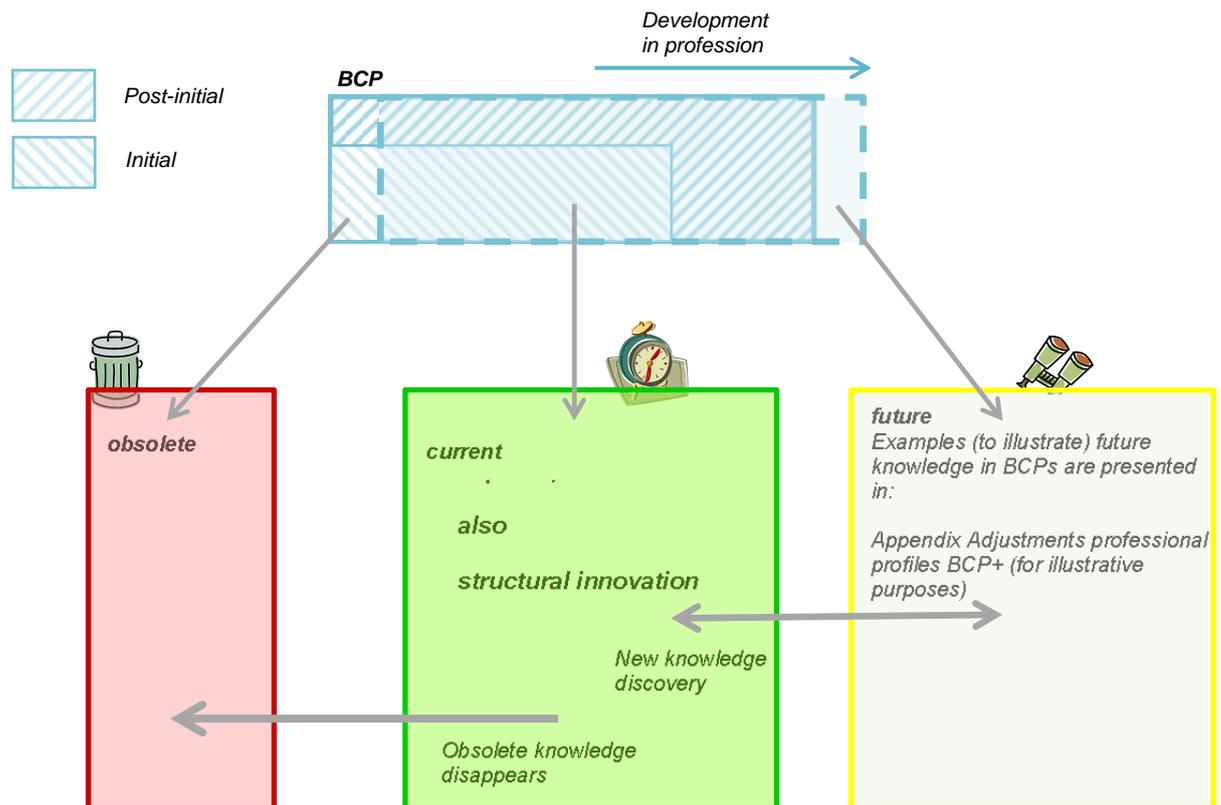


Fig. 3.1 Process of knowledge development in professional profiles

Here, we group under 'post-initial' learning both targeted retraining by means of training and courses and informal learning from colleagues in the workplace (on-the-job training). Learning takes place partly in a focused way, but to a considerable extent also unfocused and permanently. Informal learning has been found to be a significant component in 'life long learning'.

In order to bring out the potential cross-fertilisation between post-initial and initial education, for illustrative purposes adjusted professional competency profiles (BCP+) have been drawn up for the future professions aimed at realising (near) zero-energy buildings. For details by profession, see Appendix III.

Obviously, preparing BCP+ profiles also has consequences for MBO teachers. Due to ageing, MBO institutes already struggle to recruit new construction and technical installation teachers. Indeed, ageing is one of the main concerns in professional construction training.

Teachers in intermediate vocational training are indispensable in introducing the latest developments in initial vocational training.

Their task is to educate students to a level of knowledge and skill that allows them to be deployed in realising zero-energy buildings.

In short: an up-to-date teacher corps that educates future students for the construction and installation sectors is a major precondition for realising the EU '20-20-20' objectives.

One solution may be to take measures to specifically work towards anchoring new knowledge. This may be achieved by fostering closer connections at the regional level between schools and businesses aimed at exchanging up-to-date and new knowledge. Based on these connections, teachers will experience the practice in business more frequently. For this measure to be successful, it must however be included in the job description of the teachers.

## 4 Barriers, measures and priorities

This chapter summarises the identified barriers to BUS-NL's desired objectives. For each barrier, measures are proposed or advice given to overcome the barrier. Appendix IV provides all details per barrier and advised measure.

Based on endorsement discussions with market parties these actions have been clustered, resulting in an effective and efficient action plan. In Chapter 5, the parts discussed in this chapter are developed into a Roadmap towards 2020. In this Roadmap, the actions are visually grouped so that their location in time, priority and stakeholders are clear at a glance.

### 4.1 Methodology used

For every barrier-measure combination the following aspects are detailed in appendix IV:

#### Categories

For an initial clustering, the following categories were used.

<i>Category:</i>	<i>Action concerns:</i>
A = Initial education	Initial 2020
B = Post-initial education	Post-initial BuildUpSkills
C = Teachers/workplace trainer	Initial 2020, post-initial BuildUpSkills
D = Education participants/students	Initial 2020, post-initial BuildUpSkills
F = Labour market mobility/certification	Initial 2020, post-initial BuildUpSkills
G = Monitoring	Platform BuildUpSkills
H = Interdisciplinarity/soft skills	BuildUpSkills
I = Workforce (also self-employed)	BuildUpSkills
J = Funding	Platform BuildUpSkills
N = Continuity	Platform BuildUpSkills
Q = Teaching material development	Initial 2020, post-initial BuildUpSkills

For clarity, for every category is stated which actions:

- are of primary importance for *BuildUpSkills*
- have been recognised as important for the realisation of the 2020 objectives. Barrier-measure combinations in this category often benefit from the results of the BuildUpSkills actions. For this reason, they have been included as a recommendation.
- are of primary importance for *BuildUpSkills Platform*

#### Actors

All the relevant actors to be involved in the execution of the proposed measure.

#### Action level

Per barrier/measure the following levels are distinguished:

- Macro: action refers to the level of statutory requirements or the education system
- Meso: action refers to the level of school, MBO technical college, practice, etc.
- Micro: action refers to the level of team, teachers, supervisors, etc.

#### Type of action

Distinction between actions that result in changes to the (education) system and actions that result in changes to education(al content).

#### SWOT analysis

A SWOT analysis has been made of all barrier/measures, addressing the following issues:

- Strengths of the measure (Strengths)
- Weaknesses van de measure (Weaknesses)
- Probability\* of successfully achieving the BUS-NL objectives with the measure (Opportunities)
- Threats\* to the realisation of the BUS-NL objectives (Threats)

\*Opportunities and threats are considered macro level measures, so they are developments in society that respond to the possibilities (opportunities) or impediments (threats) to realising BUS-NL's objectives.

## 4.2 Recommendations and measures per category

In the summarising overview 4.1 all barriers and proposed measures and recommendations are presented per category.

Table 4.1 Barriers and measures per category

<b>Category</b>	<b>Name of measure</b>
A1.1 - Initial education	Develop shorter cycle for embedding innovations
<b>Barrier</b>	<b>Recommendation/measure</b>
The development cycle of qualification files, curricula, training materials and exams that follows the description of the professional content runs approximately 6 years. Integration of new developments like technological innovations in qualification files requires special attention.	In addition to the formal development and maintenance cycle of the qualification structure, a shorter cycle should be developed for each of the phases in the formal main cycle so that innovations and relevant feedback reach education sooner, both initial and post-initial (see also measure B4.2).
A2.1 - Initial education	Development of teaching/exam products
<b>Barrier</b>	<b>Recommendation/measure</b>
Programmes and exams in the initial MBO education lag behind the latest needs and developments in the market. The curriculum may contain more content than the exams, for example through optional modules that are not tested/do not need testing. This is possible in consultation with the joint committee (PAC)	Updating of current education by using the space / flexibility provided in files and execution (= optional part). In case of sufficient support, joint development of Dutch training materials and exam products instead of earch for himself
A2.2 - Initial education	Further training/retraining arrangements
<b>Barrier</b>	<b>Recommendation/measure</b>
Programmes and exams in initial MBO education lag behind the latest needs and developments in the market	Develop short arrangements ('fast tracks') for students who can/want to move up to higher levels (HBO).
A2.3 - Initial education	Development of career paths
<b>Barrier</b>	<b>Recommendation/measure</b>
Programmes and exams in the initial MBO education lag behind on the latest needs and developments in the market	Develop logical career paths in order to a) fill the gap between what education delivers and the skills businesses need,  b) get a worker to the desired and required level
A3.1 - Initial education	Using PI education for new BCPs
<b>Barrier</b>	<b>Recommendation/measure</b>
Education in the construction, installation finishing and maintenance sectors is ill matched to the demands and wishes that practice with throw up over the next few years,  Constructing zero-energy buildings initially requires adjusted work processes. (transferred from E.9.1)  The quality of the work often does not meet the client's demands/wishes.	Many demands and wishes have already been included in (the exit qualifications of the) post-initial education. These use initial education to develop BCPs raise sense of urgency of improving the quality of construction and installation among executors in construction and installation (transferred from E.9.1)
A10.1 - Initial education	Development of new BCPs/qualifications
<b>Barrier</b>	<b>Recommendation/measure</b>
Insufficient insight in the specific activities and competencies needed to realise the 20-20-20 objectives. E.g., the set of construction professions omits: 'insulation specialist' and 'fitter and installer of prefab elements in construction'.	Investigate further which activities and competencies are needed and whether they should be classified under new or existing professions and qualification files.

Table 4.1 cont'd. Barriers and measures per category

<b>Category</b> B4.1 - Post-initial education	<b>Name of measure</b> Better marketing in course catalogues
<b>Barrier</b>	<b>Recommendation/measure</b>
Target group still largely unaware of post-initial training courses (esp. installation sector?).	Better marketing in course catalogues (and clearer links BCPs and accreditation). E.g. as in the Scholingsfonds Bouw catalogue.  Raise awareness among employers and employees, work towards improving learning culture. Include courses in Lifelong Learning initiatives and programmes
<b>Category</b> B4.2 - Post-initial education	<b>Name of measure</b> Develop craftsmanship qualification structure
<b>Barrier</b>	<b>Recommendation/measure</b>
The development cycle of industry qualification documents, curricula, training materials and exams that follows the description of the professional content is too long.	Develop an industry qualification structure for craftsmanship (post-initial education) including developments in the EE/RES field, taking the already employed fully skilled professional as a benchmark. In addition to the formal development and maintenance cycle, develop a second cycle to introduce innovations into education earlier

<b>Category</b> C5.1 - Teachers/workplace trainers	<b>Name of measure</b> Train the trainer programmes
<b>Barrier</b>	<b>Recommendation/measure</b>
Educators also need retraining. Teachers are often unfamiliar with developments in construction practice  The MBO institutes are faced with a shortage of teachers in Construction, Installation, Finishing & Maintenance due to ageing.	Organise train-the-trainer sessions to increase the capacities of qualified suppliers (relation with action 19) and guarantee sufficient regional availability. In partnership with business, teachers should periodically spend time in the construction/installation practice.
Regional availability not guaranteed	Set up (regional) flex pools with experts from business. Measures apply to both initial and post-initial
<b>Category</b> D7.1 - Education participants/students	<b>Name of measure</b> Promotion campaigns for careers in construction/installation sector
<b>Barrier</b>	<b>Recommendation/measure</b>
Influx decline	
<b>Actors</b>	<b>Action level</b>
Overview of involved actors Requires joint action by sector and education.	Macro (education system/statutory) Meso (RTC/School/College)

<b>Category</b> F11.1 - Labour market mobility/certification	<b>Name of measure</b> Organise mobility of craftsmen in the EU
<b>Barrier</b>	<b>Recommendation/measure</b>
Too few possibilities for influx into the sectors from outside NL  NL craftsmen are not mobile	Focus on mobility of employees in construction and installation sectors and finishing/maintenance sectors in EU (also in relation to actions for upgrading BCPs and accreditation/certification)
<b>Category</b> F12.1 - Labour market mobility/certification	<b>Name of measure</b> Possibilities for personal certification
<b>Barrier</b>	<b>Recommendation/measure</b>
Learning should not be limited to initial education, but must be a continuous activity (Life long learning). Quality in post-initial education is insufficiently guaranteed.	Research into and taking stock of forms of personal and sector certification. Align with IDW / EQF
<b>Category</b> F19.1 - Labour market mobility/certification	<b>Name of measure</b> Possibilities for personal certification
<b>Barrier</b>	<b>Recommendation/measure</b>
The quality of the (post-initial) education supply is highly diverse and there is no standardised accreditation. These circumstances hinder obtaining sustainability competencies.	Develop quality guarantees for post-initial education (see also relationship with category B)

Table 4.1 cont'd. Barriers and measures per category

<b>Category</b>	<b>Name of measure</b>
G13.1 - Monitoring	Develop monitoring tool
<b>Barrier</b>	<b>Recommendation/measure</b>
Tools are not in place to provide quick insight into developments and the consequences of developments	Develop tool(s) to monitor: craftsmanship development result of actions keeping status quo report up-to-date technical developments (Innovatiemotor). identification of and monitoring innovations.
<b>Category</b>	<b>Name of measure</b>
H15.1 - Interdisciplinarity	Development of interdisciplinary education
<b>Barrier</b>	<b>Recommendation/measure</b>
In construction there is a high degree of specialisation, and professions are still strongly pigeon-holed, whereby cross-discipline activities or education are not encouraged or indeed actively discouraged.	Far more attention for the required soft skills and more integrated education in the construction and installation sectors Relates to actions concerning the professional competency profiles, see Cat. A
<b>Category</b>	<b>Name of measure</b>
I.16.1 - Workforce	(Innovative) workforce retraining
<b>Barrier</b>	<b>Recommendation/measure</b>
Workforce & lack of retraining	On-the-job learning paths (greater role for informal learning), possibly linked to personal and industry certification (item 12) Promotion of participation & development of innovative forms of schooling
<b>Category</b>	<b>Name of measure</b>
J20.1 - Funding	ESF en O&O funding
<b>Barrier</b>	<b>Recommendation/measure</b>
Insufficient financial compensation for additional education efforts	Use possibilities: ESF-funding O&O funds Business (in cash or in kind)
J26.1 - Funding	Link funding to craftsmanship
<b>Barrier</b>	<b>Recommendation/measure</b>
No benefits for participant	Relate funding to performance and craftsmanship: Premium/bonus for skilled worker Upskilling as part of assignment! (if possible paid by client) If possible, link to monitoring effect BUS-NL
<b>Category</b>	<b>Name of measure</b>
N25.1 - Continuity	Guarantee continuity BUS-NL Platform
<b>Barrier</b>	<b>Recommendation/measure</b>
Too many initiatives and fragmentation to bring about energy transition	Spread message of BUS-NL in various bodies. Get them to join BUS-NL platform as market party Guarantee continuity of BuildUpSkills Platform
<b>Category</b>	<b>Name of measure</b>
Q31.1 - Developing training material	Development of teaching/exam products
<b>Barrier</b>	<b>Recommendation/measure</b>
Keep existing course material up to date  Lack of teaching and course material on sustainable development/maintenance of property	Keep course materials up to date based on analysis of availability and up-to-dateness, or develop if lacking. (closely connected to A1.1, but short cycle in area of teaching materials) Secure this in a modern publishing formula. Bring together in knowledge base, to be easily available to both initial and post-initial education



## 5.1 Methodology used

In figure 5.1 the main actions (vertical red arrows) within the scope of BUS-NL are located in time (horizontal green arrows) in the direction of the year 2020.

Based on priority, distinctions are made between short-term (2013-2014), medium term (2015-2017) and long-term actions (2018-2020).

The scheme also shows which relevant market parties are involved. Parties that have a major responsibility for or can wield strong influence in the realisation of the objectives of BUS-NL are marked V. Other parties involved are marked X.

### Connections between vocational training and practice

In the Dutch vocational education system there are very strong links between vocational training and the actual business practice in the labour market. These connections are anchored at all levels, from the development of the qualification structure and corresponding qualification files up to the execution of the education by learning companies accredited by knowledge centres. This is best illustrated by the Professional coaching path (BBL): the BBL participant has an employment contract, is an employer in the full meaning of the word and thus earns a wage right from the beginning. Within the construction education, the professional coaching path is most prevalent. Indeed, the industry believes that workmanship can best be learnt in professional practice, and encourages BBL by means of compensation paid to the employers of these students. This group of students and the educational segment related to them (teacher teams, management, account managers) in fact forms a physical connecting link between initial vocational education and practice.

This connection is also apparent in figure 5.1. Many actions not only come back to a common framework (professional competency profiles, qualification structure), but are also developed jointly by partners and eventually find equal application in both the post-initial (green shaded) and the initial (blue shaded) segment of the education market, or differ only in the eventual interpretation for the target group (student/mature).

In the Dutch context, there are especially opportunities to link initial and post-initial education and thus strengthen exchange of expertise, manpower and resources.

This is not the only reason why joint development leads to an efficient process. Helping to update initial vocational training following on from the actions for the post-initial segment leads to a guaranteed structural outflow of competent (sustainability) professional workers to the labour market.

## 5.2 Clustered actions

Based on endorsement discussions, reactions from market parties (February/March 2013) and also for the follow-up of the Roadmap (i.a. Pillar II), in figure 5.1 the separate actions are clustered and linked to the parties involved. This concerns the following action clusters (red arrow: high priority)

**BCP+:** All actions aimed at upgrading the professional profiles (BCPs) for use in post-initial education (actions, green shading) and their use in developing professional profiles and qualifications in initial educations (actions, blue shaded).

*Actions: B.4.2 and G13.1 (post-initial), A.1.1, A3.1, A.10.1 and F.11 (initial)*

**Accreditation:** All actions on the shaping of certification of persons and companies and ensuring quality assurance of education.

*Actions: F12.1 and F.19.1 (post-initial)s*

**Education:** All actions concerning developing education, education itself and the teaching materials. This refers both to what is available and to what will be newly developed.

*Actions: G13.1, H15.1, B.4.1, I.16.1 and Q.31.1 (post-initial), A.2.1, A.2.2, A.2.3, C5.1 and D.7.1 (initial)*

**Platform:** All activities of the BUS-NL Platform, formation during the April 18 Working Conference.

*Actions: N25.1 (post-initial) and A.2.1 (initial)*

**Funding:** All actions aimed at guaranteeing funding for educational activities and the (financial) promotion of performance-oriented craftsmanship.

*Actions: J20.1 and J.26.1 (post-initial)*

## 6 Conclusions

### *From 'consciously incompetent'...*

The status quo analysis (WP2) and the detailing of BUS-NL's Roadmap (WP3) show that the Dutch workforce in the built environment is insufficiently skilled to realise zero-energy buildings. Indeed, a large part of the working population is as yet entirely ignorant of this. Many construction errors are due to such ignorance<sup>1</sup>.

### *to 'consciously competent'...*

In Chapter 5 of this report, in a Roadmap the measures are outlined that must be taken between 2013 and 2020 to move from consciously incompetent to consciously competent.

One of the main drivers for this is the conclusion that in order to realise the 2020 objectives successfully and at high quality, upskilling will be needed for at least 150,000-200,000 craftsmen in the construction and installation sectors.

Key measures in the Roadmap concerning the education in the construction sector (construction, installation, finishing and maintenance) are:

- developing a sector qualification structure for craftsmanship based on the upgraded professional competency profiles (BCP+), to be used to further develop post-initial retraining;
- developing multidisciplinary courses and education;
- guaranteeing the quality of post-initial education and persons/companies;
- updating of existing and development of new attractive teaching materials and forms of training.

Due to the strong links between initial and post-initial education in the Dutch situation, it would be wise and therefore desirable to carry out a number of the above-mentioned measures in parallel with actions for initial intermediate vocational education.

For example, the findings of the BCP+ profiles may be used to further develop BCPs for initial education. The same applies to embedding innovations in BCPs. Updating and keeping up to date teaching materials for initial education plays an important role in this.

Finally, we concluded that the execution of the Roadmap actions will be viable provided the following preconditions are met:

- there is a national and broadly supported platform from which actions are planned, coordinated and monitored;
- there is sufficient funding for the execution of the measures.

Based on the above, there can be no doubt about the importance of starting BUS-NL Pillar II as early as possible.

*Performance of actions laid down in the National Roadmap, focusing on the introduction of new and/or upgrading of existing qualification schemes, education and/or training for the benefit of post-initial education.*

---

<sup>1</sup> Status quo measurement construction and installation sector in relation to the European 2020 objectives for BuildUpSkillsNL, USP 2013



## Authors

The Roadmap report is composed of contributions from:

- Fundeon
- Hibin
- ISSO
- Kenteq
- MBO services
- OTIB
- Savantis
- SBRcurnet
- SH&M



## References

- Agency NL papers
- Building Decree 2012
- European Commission Climate Policy.
- EPBD Recast 2010/031/EU
- RES directive 2009/028/EC
- Status quo report, BUS-NL, 2012
- Government Coalition Agreement 'Bruggen Slaan', 2012
- Rijksoverheid.nl
- Status quo measurement construction and installation sector in relation to the European 2020 objectives for BuildUpSkillsNL, USP 2013



## Testimonials

There are several ways of endorsement for Pillar I:

1. As a member of the email-list; during the project our email-list grows from 100 to 320 persons
2. By attending the final conference; more than 60 key-stakeholders attended the final conference
3. By signing a combined Letter of support for Pillar I and the proposal for Pillar II.
4. By addition to government or national initiatives
  - a. BuildUpSkills is added by BZK in the NZEB strategy
  - b. BuildUpSkills is added to the National Energy Accord (SER)
  - c. BuildUpSkills is when applicable integrated in the HCA Topsector Energy
  - d. Coordinated synergy between CA-RES, CA-EPBD and BuildUpSkills
5. By formation of a steering committee for the period between PI and PII
6. By items in the media; during the last 3 months at least 6 articles are written in the media.

Name of organisation	Person(s) to be involved (where known already)	Type of organisation	Role in the process	Letter of Support attached (Yes/no)
<b>UNETO-VNI</b>	Paul Ewalds Fred Vos R. van der Meer	Union of employers representing businesses in the installation branch	Endorsement Steering committee	Yes
<b>Bouwend Nederland</b>	J.L. van Tuinen	Union representing employers in the building industry (contractors)	Endorsement Steering committee	Yes
<b>O&amp;O-bouw</b>	Marcel Borg	Training and development fund building sector	Endorsement	Yes
<b>Ministerie BZK</b>	Gerben Roest	Ministry for Build Environment	Endorsement	Yes
<b>Agentschap NL</b>	Karin Keijzer Felix Lacroix	National authority	Alignment with the Dutch implementation of the RES-directive and the EPBD-recast Endorsement	Yes
<b>Koninklijke Hiben</b>	Gert Smit	The national trade organization for building materials representing about 80% of the turnover	Mobilising the members (trade organisations, industry, importers) Endorsement	Yes
<b>KBI</b>	Wil van Ophem	Foundation quality assurance installation sector	Endorsement Appointed accreditation organization by Dutch government	Yes
<b>Aannemers Federatie Nederland</b>	René de Kwaadsteniet	Federation of unions representing specialized contractors (e.g. bricklayers, roofers)	Endorsement Mobilising the members	Yes
<b>Dutch Green Building Council</b>	Stefan van Uffelen	a market initiative with the aim to make Sustainability in the building industry Member of the World Green Building Council (WorldGBC)	Endorsement Dissemination of the results to EU building councils	Yes
<b>Nederlandse Vereniging Toelevering Bouw</b>	D.A. van Valkenburg	Organisation representing businesses in the building materials industry	Endorsement Mobilising the members	Will follow
<b>Meer met Minder</b>	Chris Bruijnes	National programme focusing on energy efficiency in the existing housing stock	Endorsement	Yes
<b>VENIN</b>	R. van Boxtel	Association of Certified Post-Insulation Companies in The Netherlands	Endorsement Mobilising the members	Will follow

<b>Bouwradius</b>	Eddy Gruppen	Training Center building sector	Endorsement	Yes
<b>BOB</b>	Kees Warmerdam	Training Center building sector	Endorsement	Yes
<b>DE-Koepel</b>	Monique Eijkelenburg	Branche organisation representing associations on RES technologies	Endorsement Mobilising the members	Yes
<b>VLOK</b>	R. Schenk	National organization representing small contractors and handymen (self-employed /franchise)	Endorsement	Will follow
<b>Duurzaam MBO</b>	Rob de Vrindt	Network of MBO's implementing sustainability	Endorsement	Yes
<b>VEBI dak</b>	Ir. C. Woortman	National Organization of roofers (Flat) representing 70% of the turnover in the Netherlands	Endorsement Mobilising the members	Will follow
<b>NVKL</b>	Vincent Slappendel	Branche organisation representing businesses op het gebied van de Koudetechniek en Luchtbehandeling HVAC	Endorsement Mobilising the members	Yes
<b>FNV</b>	H. de Boer	Trade Union	Endorsement	Yes
<b>Verac</b>	D. Theunissen	Installation	Mobilising the members Endorsement	Wil follow
<b>ROVC</b>	R. Greutink	Training Center installation sector	Endorsement	Wil follow
<b>Installatiewerk Nederland</b>	Reinier Westermann	Training Center	Endorsement	Yes
<b>Marktmonitor</b>	Willem Hooijkaas	Marketresearch	Analysis of technological developments and business concepts	Yes
<b>SkillKompas</b>	Maarten Sprengers	Marketresearch	Analysis of required competences	Yes
<b>Bouwkennis / USP</b>	Jan Paul Schop Henri Busker	Marketresearch	Endorsement	Yes
<b>4-Skills Netherlands</b>	J. de Goeij	Promotes the importance of craftsmanship and vocational education in the Netherlands	Endorsement	Yes
<b>Stek</b>	D. Theunissen	Foundation with the mission to prevent emission of non-sustainable substances by refrigeration. It certifies companies	Mobilising the members (trade organisations, industry, importers) Endorsement	Wil follow
<b>TVVL</b>	W.M.F. de Vries	Association and Training Centre installation sector	Endorsement	Yes
<b>Human Capital Agenda Topsector Energy</b>	Marscha Wagner	National initiative	Endorsement	By email
<b>STYBENEX</b>	BUJM van Roosmalen	Organisation representing businesses in the isolation industry	Endorsement Mobilising the members	Yes
<b>KIEN</b>	Adrie van Duijne	Organisation representing innovative E-installers	Endorsement Mobilising the members	Yes
<b>Consortium MBO</b>	Luc Fine	Develops education materials and curricula for initial education	Endorsement Mobilising the members	Yes

European Commission

The Executive Agency for Competitiveness & Innovation - EACI

April 17, 2013

Dear Mr/Mrs

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

Since we are very pleased with the results of the Build Up Skills Netherlands consortium in Pillar I we are happy to inform you that we are willing to endorse the continuation of the action in Pillar II.

BUS-NL P2 is focused on continuing training of existing workforce in the construction and installation sector, consisting of craftsmen, other on-site construction workers and system installers. We believe the integrated approach of the proposed action of BUS-NL P2 is essential for The Netherlands achieving the EU 2020 targets.

We confirm our intention for endorsement of the BUS-NL P2 project. We will support the consortium both on the approach and the content of the project.

Your valued support of the actions needed to realise the objectives of BUS-NL will help realising the ambitious goals.

Sincerely,



E. van Engelen  
Managing Director  
Units - UNE

European Commission  
The Executive Agency for Competitiveness &  
Innovation - EACI

Via e-mail

Zilverstraat 69  
Postbus 340  
2700 AH Zoetermeer  
t +31 (0)79 3 252 252  
f +31 (0)79 3 252 290  
e [info@bouwendnederland.nl](mailto:info@bouwendnederland.nl)  
i [www.bouwendnederland.nl](http://www.bouwendnederland.nl)

Dat: 26 april 2013  
Our Reference: 1304-38632/JSe  
Your Reference:

Behandeld door: mevr. M. van der Post  
Telefoon: +31 (0)79 3 252 133  
E-mail: [m.vanderpost@bouwendnederland.nl](mailto:m.vanderpost@bouwendnederland.nl)

Concerns: letter of support

Dear Sir or Madam,

I am pleased to offer my sincere support to the *IEE-Build Up Skills* project of OTIB and its partner Build Up Skills Netherlands Pillar II (BUS-NL P2).

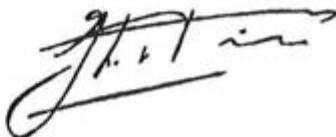
Since we are very pleased with the results of the Build Up Skills Netherlands consortium in Pillar I, we are happy to inform you that we are willing to endorse the continuation of the action in Pillar II.

BUS-NL P2 focusses on continuing the training of existing workforce in the construction and installation sector, consisting of craftsmen, other on-site construction workers and system installers. We believe the integrated approach of the proposed action of BUS-NL P2 is essential for The Netherlands in order to achieve the EU 2020 targets.

We confirm our intention to endorse the BUS-NL P2 project. We will support the consortium both on the approach and the content of the project.

Your valued support for the actions needed to realise the objectives of BUS-NL will help to realize the ambitious goals.

Sincerely,  
Bouwend Nederland,



Mr. J.L. van Tuinen  
Director General



European Commission  
The Executive Agency for  
Competitiveness & Innovation - EACI

Harderwijk, April 17, 2013

our ref.: 344/13/MB/ro  
subject: IEE-Build Up Skills project

Dear Mr/Mrs,

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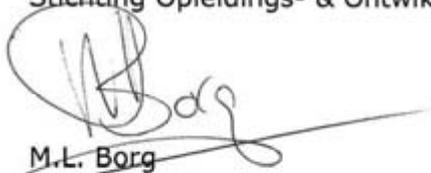
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BUS-NL P2 is focused on continuing training of existing workforce in the construction and installation sector, consisting of craftsmen, other on-site construction workers and system installers. We believe the integrated approach of the proposed action of BUS-NL P2 is essential for The Netherlands achieving the EU 2020 targets.

We confirm our intention for endorsement of the BUS-NL P2 project. We will support the consortium both on the approach and the content of the project. Your valued support of the actions needed to realise the objectives of BUS-NL will help realising the ambitious goals.

Sincerely,

Stichting Opleidings- & Ontwikkelingsfonds

  
M.L. Borg  
Foundation secretary





Ministry of the Interior and  
Kingdom Relations

> Return address

European Commission  
The Executive Agency for Competitiveness & Innovation -  
EACI

Reference

Your reference

Date 18 April 2013  
Subject Letter of Support project BuildUpSkills

Dear Mr/Mrs

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Your valued support of the actions needed to realise the objectives of BUS-NL will help realising the ambitious goals.

Sincerely,

Ministry of the Interior and Kingdom Relations

Represented by: drs. D.G.C. Roest



NL Agency  
Ministry of the Interior and  
Kingdom Relations

> P.O. Box 17, 6130 AA Sittard, The Netherlands

European Commission  
The Executive Agency for Competitiveness & Innovation - EACI

**NL Energy and Climate Change**

Swentiboldstraat 21  
6137 AE Sittard  
P.O. Box 17  
6130 AA Sittard  
The Netherlands  
www.agentschapnl.nl

**Contact person**

H.B. van Eck  
T +31 88 602 26 80

Our reference  
1132555/232/FLAC/AJA/1032

Date 18 April 2013  
Subject IEE-Build Up Skills

**Enclosure(s)**

Dear Mr/Mrs,

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

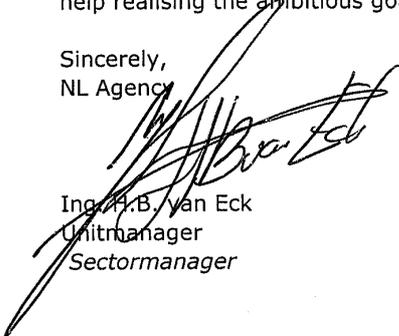
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Sincerely,  
NL Agency



Ing. H.B. van Eck  
Unitmanager  
Sectormanager

>> *Als het gaat om duurzaamheid,  
innovatie en internationaal*

European Commission  
The Executive Agency for Competitiveness & Innovation - EACI  
B-1049 Brussel  
Belgium

Almere, 3 May 2013

Ref.: GH/GS/AOI/brf018  
Subject: support *IEE-Build Up Skills* project

Dear Sirs,

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

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Sincerely,  
Koninklijke Hibin



Mr. Gert Smit  
Chairman



Kwaliteitsborging  
Installatiesector

Kruisplein 25  
3014 DB Rotterdam  
Postbus 857  
3000 AW Rotterdam  
T 010 206 65 50  
F 010 213 03 84  
info@kbi.nl  
www.kbi.nl

European Commission

The Executive Agency for Competitiveness & Innovation - EACI

Date: 25 April 2013

Dear Mr/Mrs,

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

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Sincerely,

Stichting Kwaliteitsborging Installatiesector (KBI)

Drs.ing. W.S.P. van Ophem

Director KBI

KBI IS HET INFORMATIELOKET VOOR  
CERTIFICERING IN DE INSTALLATIESECTOR



European Commission

The Executive Agency for Competitiveness & Innovation - EACI

Date: 26-04-2013

Dear Mr/Mrs

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

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Sincerely,

Aannemersfederatie Nederland Bouw & Infra

Represented by:

W: van der Maas  
Directeur

European Commission

The Executive Agency for Competitiveness & Innovation - EACI

Date: 25 april 2013

Dear Mr/Mrs

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Your valued support of the actions needed to realise the objectives of BUS-NL will help realising the ambitious goals.

Sincerely,

Dutch Green Building Council



Represented by: E.J. van Uffelen, director

.....  
*datum*                      *ons kenmerk*                      *pagina*                      *onderwerp*  
15 april 2013                                           1 / 1                      Letter of support

European Commission  
The Executive Agency for Competitiveness & Innovation - EACI



Dear Mr/Mrs

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

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Sincerely,

A handwritten signature in black ink, appearing to be 'C. Bruijnes', written over a horizontal line.

Meer Met Minder  
Represented by: C. Bruijnes,  
Director

t 079 325 23 91  
c.bruijnes@meermetminder.nl

.....  
*bezoekadres*  
Bouwhuis, Zilverstraat 69  
2718 RP Zoetermeer

*postadres*  
Postbus 340  
2700 AH Zoetermeer

*contact*  
t 079 325 23 90  
f 079 325 23 80  
info@meermetminder.nl

*internet*  
www.meermetminder.nl

Rabobank  
1017.89.939

KvK Haaglanden  
27.319.587

BTW nummer  
NL 8194.62.561.B.01  
.....

European Commission

The Executive Agency for Competitiveness & Innovation – EACI

Zoetermeer, 15 April 2013

Dear Mr/Mrs,

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

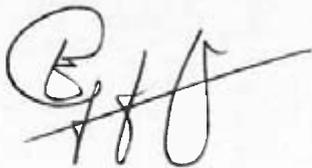
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Sincerely,



Bouwradius Training & Advies B.V.  
Represented by: Eddy Gruppen, director

Baron de Coubertinlaan 33  
2719 EN Zoetermeer  
Nederland  
Tel + 31 79-3685835  
M + 31 6-10909318  
Fax + 31 79-3685890



Opleiding, Training en Advies

European Commission

The Executive Agency for Competitiveness & Innovation - EACI

Date: 26 april 2013

Dear Mr/Mrs

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

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Your valued support of the actions needed to realise the objectives of BUS-NL will help realising the ambitious goals.

Sincerely,

BOB bv  
Represented by:

C.L.M. Warmerdam  
Director

BOB bv  
Postbus 715  
2700 AS Zoetermeer  
Zilverstraat 69  
2718 RP Zoetermeer

T 079 325 24 50  
F 079 325 24 60  
E [bouwkennis@bob.nl](mailto:bouwkennis@bob.nl)  
[www.bob.nl](http://www.bob.nl)

KvK 29039987  
BTW 8030 575 44B01  
ING 66.71.10.216

**To European Commission**

**The Executive Agency for**

**Competitiveness & Innovation - EACI**

April 29<sup>th</sup>, 2013

Dear Mr/Mrs,

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

Since we are very pleased with the results of the Build Up Skills Netherlands consortium in Pillar I we are happy to inform you that we are willing to endorse the continuation of the action in Pillar II.

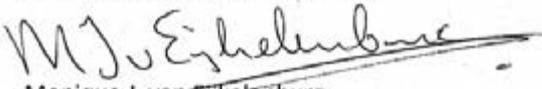
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Sincerely,

Dutch Renewable Energy Council



Monique J. van Eijkelenburg

Director Strategy

[mjvaneijkelenburg@dekoepel.org](mailto:mjvaneijkelenburg@dekoepel.org)

+31622850416

The Dutch Renewable Energy Council (Duurzame Energie Koepel) represents over 500 companies in the Netherlands active in production of solar, bio- and windenergy, energy from water and all sorts of geothermal energy.



## DMBO Duurzaam Middelbaar Beroepsonderwijs

European Commission

The Executive Agency for Competitiveness & Innovation - EACI

Date: 15-4-2013

Dear Mr/Mrs

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

Since we are very pleased with the results of the Build Up Skills Netherlands consortium in Pillar I we are happy to inform you that we are willing to endorse the continuation of the action in Pillar II.

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Your valued support of the actions needed to realise the objectives of BUS-NL will help realising the ambitious goals.

Sincerely,

Sustainable Vocational Education and Training Netherlands (DMBO)

Drs. R.A.M. de Vrind

Chairman

European Commission

Zoetermeer, 15 April 2013

Our ref. : 2013-036-WOV  
Subject : The Executive Agency for Competitiveness & Innovation - EACI

Dear Mr/Mrs,

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

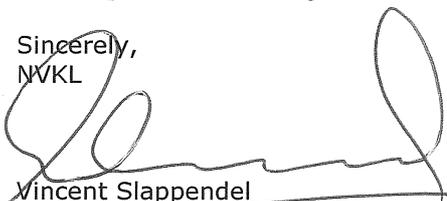
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Sincerely,  
NVKL



Vincent Slappendel  
Chairman



European Commission  
The Executive Agency for Competitiveness & Innovation -  
EACI

**Datum**

25 april 2013

**Ons kenmerk**

Staf-BB\RAH\kie\119

**Betreft | Onderwerp**

Build Up Skills

**Uw kenmerk**

**Doorkiesnummer**

088 575 7124

**E-mail**

Charley.Ramdas@fnvbouw.nl

Dear Mr/Mrs,

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

Since we are very pleased with the results of the Build Up Skills Netherlands consortium in Pillar I we are happy to inform you that we are willing to endorse the continuation of the action in Pillar II. BUS-NL P2 is focused on continuing training of existing workforce in the construction and installation sector, consisting of craftsmen, other on-site construction workers and system installers. We believe the integrated approach of the proposed action of BUS-NL P2 is essential for The Netherlands achieving the EU 2020 targets.

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Sincerely,

C. Ramdas,  
Vice-president.

**Hoofdkantoor**

Postbus 520, 3440 AM Woerden  
Houttuinlaan 3, Woerden

**Telefoon** +31 (0)88 57 57 000  
**Fax** +31 (0)88 57 57 003

**Website** [www.fnvbouw.nl](http://www.fnvbouw.nl)  
**IBAN** 11.72.46.212

European Commission

The Executive Agency for Competitiveness & Innovation - EACI

Date: 15<sup>th</sup> of April 2013

Dear Mr/Mrs

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

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Sincerely,  
InstallatieWerk Nederland



R. Westermann  
directeur

European Commission  
The Executive Agency for Competitiveness &  
Innovation - EACI

MarktMonitor BV  
J. van Oldenbarneveltlaan 11  
Postbus 377  
3440 AJ Woerden  
tel. (0348) 437 700  
fax (0348) 433 111  
www.marktmonitor.com  
KvK 50054155  
Bankrek. 44.25.37.417

**Onderwerp:**  
Letter of support (BUS-NL P2)

**Ons kenmerk:**  
MM1306/WFH/Ata

**Datum:**  
29 april 2013

**Voor informatie:**  
Willem F.G. Hooijkaas

**Doorkiesnummer:**  
0031-348 437 701

**@mail:**  
w.hooijkaas@marktmonitor.com

Dear Mr./Mrs.,

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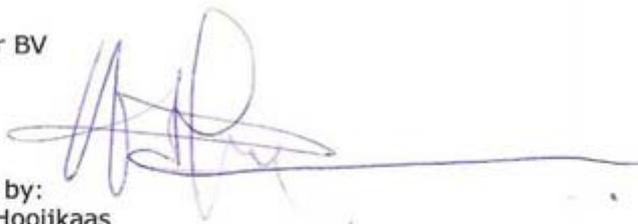
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Sincerely,  
MarktMonitor BV



Represented by:  
Willem F.G. Hooijkaas  
director

European Commission  
The Executive Agency for Competitiveness &  
Innovation - EACI

**Onderwerp:**  
Letter of support BUS-NL P2

**Ons kenmerk:**  
SK 1307/Ata

**Datum:**  
29 april 2013

**Voor informatie:**  
Willem Hooijkaas

**Doorkiesnummer:**  
0031-348 437 703

**@mail:**  
w.hooijkaas@skillskompas.nl

Dear Mr./Mrs.,

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

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Sincerely,  
SkillsKompas BV



Represented by:  
Willem Hooijkaas  
Director

European Commission  
The Executive Agency for Competitiveness & Innovation - EACI

Date: 16 April 2013

Dear Mr/Mrs

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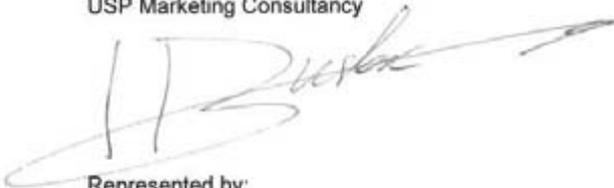
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Sincerely,  
USP Marketing Consultancy



Represented by:  
Henri Busker  
Business Unit Manager Construction & Installation



European Commission

The Executive Agency for Competitiveness & Innovation - EACI

Ref. JG 0026/13

Date: 17 April 2013

Dear Sir / Madam,

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

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Sincerely,

Jos de Goey  
Managing Director Skills Netherlands

European Commission  
The Executive Agency for  
Competitiveness & Innovation - EACI

De Mulderij 12 | 3831 NV Leusden  
Postbus 311 | 3830 AJ Leusden  
T 033 434 57 50 | F 033 432 15 81  
Cursustelefoon 033 434 57 60  
info@tvvl.nl | www.tvvl.nl  
ABN AMRO bank 45 65 50 917

Our ref.: JBij/13.0302  
Subject: **Letter of support**

Leusden, 16 April 2013

Dear Mr/Mrs,

I am pleased to offer my sincere support of the IEE-Build Up Skills project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

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Sincerely,  
TVVL



Represented by:  
Ing. W.M.F. de Vries

## Jan Cromwijk

---

**Van:** Jan Cromwijk <jcromwijk@gmail.com>  
**Verzonden:** woensdag 10 april 2013 14:00  
**Aan:** Jan Cromwijk  
**Onderwerp:** Fwd: buildupskills

**Opvolgingsmarkering:** Opvolgen  
**Markeringsstatus:** Voltooid

----- Doorgestuurd bericht -----

**Van:** **Wagner Marsha** <[Marsha.Wagner@topsectorenergie.nl](mailto:Marsha.Wagner@topsectorenergie.nl)>  
**Datum:** 10 april 2013 10:03  
**Onderwerp:** buildupskills  
**Aan:** Jan Cromwijk <jcromwijk@gmail.com>  
**Cc:** Lianda Sjerps-Koomen <[lianda.sjerps-koomen@tki-energo.nl](mailto:lianda.sjerps-koomen@tki-energo.nl)>, "Schoof ir A.F." <[A.F.Schoof@minez.nl](mailto:A.F.Schoof@minez.nl)>

Beste Jan,

Omdat het mij niet gelukt is jou telefonisch te bereiken, stuur ik jou hierbij de reactie namens de Topsector Energie en de TKI Energo in het bijzonder op de conceptversie van het eindrapport over BuildUpSkills. Ik realiseer mij dat wij zeer laat zijn met onze reactie wat overigens niets afdoet aan ons enthousiasme over het initiatief.

Als Topsector zien wij dat wij er belang bij hebben dat de innovaties en duurzame technieken goed worden toegepast door goed opgeleide mensen, zowel initieel als post initieel. Ook is er voor de sector een belang dat er überhaupt jonge mensen zich goed opleiden in met name de technische disciplines. Hoewel er op dit moment in de bouw juist veel werklozen zijn, is er in de installatietechniek en energietechniek zelfs nu al moeite goede mensen te krijgen. Daar komt ivm de ontgroening en vergrijzing een probleem aan. Opleidingen worden mogelijk aantrekkelijker als ze met de nieuwste technieken werken.

Wij zouden graag het initiatief in zijn vervolg willen ondersteunen door er geregeld over te berichten binnen ons netwerk en good practices te laten zien om anderen te inspireren. BUS wil immers mensen, jongeren/werkenden/werkzoekenden/zzp'ers, opleiden op de nieuwste energieinnovaties en kan daarmee worden gezien als een van de 'enablers' voor de innovatiedoelstellingen van de Topsector in het algemeen en Energo in het bijzonder. Voorts zouden wij willen meedenken over hoe wij vanuit de Topsector die initiatief kunnen faciliteren bij bijv. de opzet van centra voor Innovatief Vakmanschap, Centres of Expertise (wij werken reeds nauw samen met HS Zuyd), praktijkgericht onderzoek gekoppeld aan de Thematische Impuls/koppeling onderzoekswereld met het beroepsonderwijs, et cetera.

Wij wensen jullie veel succes met de verdere afronding van de Roadmap BUS.

Hartelijke groet,  
Marsha Wagner

Programmamanager Human Capital Agenda  
Topsector Energie  
M (06) 46 711 355  
E [marsha.wagner@topsectorenergie.nl](mailto:marsha.wagner@topsectorenergie.nl)



European Commission  
The Executive Agency for Competitiveness &  
Innovation - EACI

Datum: 29 april 2013

Onderwerp: support Build Up skills

Referentie: mail 26-4-2013

Dear Mr/Mrs

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Your valued support of the actions needed to realise the objectives of BUS-NL will help realising the ambitious goals.

Sincerely,

Stybenex  
BUJM van Roosmalen  
directeur

European Commission

The Executive Agency for Competitiveness & Innovation - EACI

Date: 2013 April, 29th

Dear Mr/Mrs,

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

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Sincerely,

Stichting Kien

A handwritten signature in black ink, appearing to read 'Adrie van Duijne', written over a horizontal line.

Represented by: Adrie van Duijne (directeur)

European Commission

The Executive Agency for Competitiveness & Innovation - EACI



Date: Monday, 15 April, 2013

Dear Mr L.H. Fine

I am pleased to offer my sincere support of the *IEE-Build Up Skills* project of OTIB and its partners: Build Up Skills Netherlands Pillar II (BUS-NL P2).

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Sincerely,

Stichting Consortium Beroepsonderwijs

Represented by:

Luc Fine

Manager Techniek en ICT

M 06 24803866

Consortium Beroepsonderwijs

Postbus 2644

3800 GD Amersfoort

A handwritten signature in black ink, consisting of a large, stylized 'L' and 'F' intertwined.

Bezoekadres: Disketteweg 11

3821 AR Amersfoort

T 033 2460447

Website [www.consortiumbo.nl](http://www.consortiumbo.nl)

## Appendix I Basic professions, specialisations, retraining and priorities

*Explanation of the columns from the tables on the following pages:*

### **Basic profession**

The name of the profession used within the scope of BUS-NL. A cut is made at professions in the construction sector versus the installation sector.

### **Professional profile (BCP)**

The BCP(s) used with the relevant basic profession.

### **Specialisms and skills (BCP+)**

The specialisms and skills which are expected around the basic profession when realizing energy-neutral buildings.

### **Qualification file (crebo)**

The relevant crebo code pertaining to the qualification file.

### **Qualification (crebo)**

The relevant crebo code pertaining to the qualifications from the qualification file.

### **Technology**

Specific technologies within the profession. See also par. 6.2.4 from the Rapportage Status quo (WP2) on <http://www.buildupskills.nl>

### **Phase innovation system**

Exploration : high degree of technological variety.  
Take-off : emergence of a dominant design  
Acceleration : technologically stable, minor adaptations -- well embedded into society  
Stabilisation : technologically fully developed – maximum attainable market share realized

### **Retraining**

In the column “Availability”, the availability of the retraining is stated. This is based upon the extensive and detailed stock-taking as stated on the website <http://www.buildupskills.nl>

The column “Form of quality guarantee” states whether in any way any kind of quality control about the courses on offer is performed.

This does not, incidentally, mean the national acknowledgement of trainings, in which quality of the retraining on offer is reviewed and assured according to a stringent and previously established protocol.

The column “Estimated shortage” states whether the available retraining on offer will remain available to a sufficient degree in the future. For example, there will be training courses in solar energy specialisation for the E-installations service mechanics in the future, but not enough. This is because the technology for harnessing electricity from solar cells is developing rapidly (new development: transparent window fittings containing solar cells).

A ‘+’ means a surplus, a ‘-’ means a shortage, and a ‘=’ means good balance.

Basic profession	Post-initial		Initial		Technology and innovation		Retraining*			Updating BCP+, extra training and qualifications from:							
	Professional profile (BCP)	Specialisations and skills	Qual. file. (crebo)	Qualifications (crebo)	Technology	Phase innovation system	Availability	Form of quality guarantee	Estimated shortage	2013	2014	2015	2016	2017	2018	2019	2020
On-site Carpenter	Finishing carpenter / allround carpenter / new building carpenter / workshop carpenter	On-site installer of casement windows	22010	94920 / 94931 / 94932 / 94933	Insulation, Crack stopping, Building materials	Take off	Available	Yes	=			BCP+ and extra training	Qualifications				
		On-site installer of prefab wooden frame façade elements			Passive building, Insulation, Crack stopping, Building materials.	Take off	Available	Yes	=								
		Wooden floor renovation specialist			Renovation, Insulation, Crack stopping	Take off	Available	Yes	+/=								
		Renovation specialist for wooden roof constructions			Renovation, Roofs, Insulation, Crack stopping	Take off	Available	Yes	=								
		On-site prefab dormer installer			Roofs, Insulation, Crack stopping	Take off	Available	Yes	=								
		On-site prefab roof installer			Roofs, Insulation, Crack stopping, Passive building	Take off	Available	Yes	-								
		On-site fitter of prefab wooden frame façade parts			Insulation, Crack stopping, Building materials	Take off	Available	Yes	=								
		On-site installer of frames, windows and doors			Insulation, Crack stopping, Building materials	Take off	Available	Yes	-								
Bricklayer	Allround bricklayer / new construction bricklayer	Masonry foundation renovation specialist	22009	93901 / 93902 / 94821 / 94822 / 94823	Renovation, Insulation	Take off	Available	Yes	=	BCP+ and extra training	Qualifications						
		Stone stripping specialist			Insulation, Crack stopping, Building materials	Take off	Available	Yes	=								
		Masonry facade renovation specialist			Renovation, Insulation	Take off	Available	Yes	=								
		High quality insulation masonry specialist			Insulation, Crack stopping, Passive building	Take off	Available	Yes	=								
Roofer	Allround roofer / roofer / roof mechanic	PV systems installation specialist	22004	93841 / 93846 / 93845	Roofs, PV	Take off / Exploration	Available	No	-	BCP+	Qual.						
		Photovoltaic systems installing specialist			Roofs, PV / ZB (Solar boiler)	Take off / Exploration	Available	No	-								
		Green roof specialist			Green roofs, Insulation, Crack stopping, Building materials	Take off	Not Available	N.a.	-								
Glazier	Glazier	High-grade insulating glass specialist	22036	94480 / 94490	Building materials, Insulation, Crack stopping, Sun-energy	Take off / Exploration	Available	Yes	-	BCP+	Qual.						

Basic profession	Post-initial		Initial		Technology and innovation		Retraining*			Updating BCP+, extra training and qualifications from:							
	Professional profile (BCP)	Specialisations and skills	Qual. file. (crebo)	Qualifications (crebo)	Technology	Phase innovation system	Availability	Form of quality guarantee	Estimated shortage	2013	2014	2015	2016	2017	2018	2019	2020
		Specialist sun blocking window film			Building materials	Take off	Not Available	N.a.	-								
Plasterer	Plasterer	Exterior façade insulation specialist (stucco)	22032	93600 / 91501 / 91502	Insulation, Crack stopping, Building materials	Take off	Available	Yes	-								
		Specialist inner leaf insulation with stucco siding			Insulation, Crack stopping, Building materials	Take off	-	-			BCP+	Qual.					
Workshop Carpenter	Workshop carpenter	On-site installer of casement windows	22010	94920 / 94931	Insulation, Crack stopping, Building materials	Take off	Available	Yes	-								
		On-site installer of prefab wooden frame façade elements			Passive building, Insulation, Crack stopping, Building materials.	Take off	Available	Yes	-								
		On-site prefab dormer installer			Roofs, Insulation, Crack stopping	Take off	Available	Yes	-								
		On-site prefab roof installer			Roofs, Insulation, Crack stopping, Passive building	Take off	Available	Yes	-								
		On-site installer of frames, windows and doors			Insulation, Crack stopping, Building materials	Take off	Available	Yes	-								
Ceiling & wall installer	Allround installer modular walls and ceilings	Specialist insulation inner leaf	22028	95170	Insulation, Crack stopping, Building materials, PCM	Take off	-	-	-								
		Specialist insulation façades inner leaf			Insulation, Crack stopping, Building materials	Take off	-	-	-			BCP+	Qual.				
Construction worker	Covers multiple professional designations	Specialist retrofitting insulation in floors	Concerns multiple crebo's	94920	Insulation, Crack stopping, Building materials	Take off	Available	Yes	-								
		Specialist retrofitting insulation in roofs			Roofs, Insulation, Crack stopping	Take off	Available	Yes	-								
		Crawl space retrofitting insulation specialist			Insulation, Crack stopping, Building materials	Take off	Available	Yes	-								
		Specialist in retrofitting insulation in cavity walls and façades			Insulation, Crack stopping, Building materials	Take off	Available	Yes	-								
		Exterior façade insulation specialist			Insulation, Crack stopping, Building materials	Take off	Available	Yes	-								
		Basement insulation specialist			Insulation, Crack stopping, Building materials	Take off	Available	Yes	-								

Basic profession	Post-initial		Initial		Technology and innovation		Retraining*			Updating BCP+, extra training and qualifications from:							
	Professional profile (BCP)	Specialisations and skills	Qual. file. (crebo)	Qualifications (crebo)	Technology	Phase innovation system	Availability	Form of quality guarantee	Estimated shortage	2013	2014	2015	2016	2017	2018	2019	2020
Floor fitter	Cast floor specialist	Floor insulation and finishing specialist	22029	95150 / 95160	Insulation, Crack stopping, Building materials	Take off	Available	Yes	-			BCP+	Qual.				

Basic profession	Post initial		Initial		Technology and innovation		Retraining*			Updating BCP+, extra training and qualifications from:							
	Installation sector (I)	Professional profile (BCP)	Specialisms and skills	Qual. file (crebo)	Qualifications (crebo)	Technology	Phase innovation system	Availability	Form of quality guarantee	Estimated shortage	2013	2014	2015	2016	2017	2018	2019
E-installations mechanic	Installation mechanic / electro-technical installation mechanic	Sustainable lighting specialist	22048	94271 / 94281	LED/ HR lighting	Take off	Not Available	N.a.	-		BCP+	Qual.					
		Solar energy specialist			PV	Take off	Available	No	-								
		Domotica specialist			Domotica	Take off	Not Available	No	-								
E-installations service mechanic	Service engineer / electro-technical installation mechanic	Sustainable lighting specialist	22049	94321	LED/HR lighting	Take off	Not Available	N.a.	-		BCP+ and extra training	Qualifications					
		Solar energy specialist			PV	Take off	Available	No	-								
		Domotica specialist			Domotica	Take off	Not Available	No	-								
		Power quality specialist			Power management	Take off	Not Available	No	-								
		Energy monitoring specialist			Domotica / GBS / Smart meter	Take off / Acceleration / Exploration	Not Available	No	-								
Engineering installation mechanic	Installation mechanic residential construction	heat pumps specialist	22048	94272 / 94282	heat pump water-water/ air-water / air-air	Acceleration / Take-off / Stabilisation	Available	No	=		BCP+ and extra training	Qualifications					
		Ventilation specialist			wtw /decentralized / demand driven / direct current vent.	Take off / Take off / Take off / Acceleration	Available	No	=								
		High temperature cooling specialist			BKA / floor or wall heating	Take off / Acceleration	Available	No	=								
		Solar energy specialist			PV / ZB (solar boiler)	Take off / Exploration	Available	No	=								
		Energy generation specialist			WKO / mini WKK / Fuel cell / Bio mass / HRE / Residual heat / WP-boiler	Acceleration / Take-off / Exploration / Take-off / Exploration / Acceleration / Acceleration	Not Available	No	-								
Engineering installation service mechanic	Installation service mechanic / maintenance mechanic	Heat pumps specialist	22049	94323 / 95472	heat pump water-water/ air-water / air-air	Acceleration / Take-off / Stabilisation	Available	No	=		BCP+ and extra training	Qualifications					
		Ventilation specialist			wtw /decentralized / demand driven / direct current vent.	Take off / Take off / Take off / Acceleration	Available	No	=								
		High temperature cooling specialist			BKA / floor or wall heating	Take off / Acceleration	Available	No	=								
		Solar energy specialist			PV / ZB (solar boiler)	Take off / Exploration	Available	No	=								

Basic profession	Post initial		Initial		Technology and innovation		Retraining*			Updating BCP+, extra training and qualifications from:									
	Installation sector (I)	Professional profile (BCP)	Specialisms and skills	Qual. file (crebo)	Qualifications (crebo)	Technology	Phase innovation system	Availability	Form of quality guarantee	Estimated shortage	2013	2014	2015	2016	2017	2018	2019	2020	
		Energy generation specialist			WKO / mini-WKK / Fuel cell / Bio mass / HRE / Residual heat / WP boiler	Acceleration / Take-off / Exploration / Take-off / Exploration / Acceleration / Acceleration	Not Available	No	-										
		Energy monitoring specialist			Domotica / GBS / Smart meter	Take off / Acceleration / Exploration	Not Available	No	-										
		EPA specialist, Energy savings/optimisation			Wz. Tuning / PCM / D-WTW / pump circuit / ind. regulation	Acceleration / Exploration / Exploration / Acceleration / Take-off	Available	No	=										
Cooling installations mechanic	(first) cooling installations mechanic / inspection mechanic cooling installations	Ventilation specialist	22048	94274 / 94284	wtw /decentralized / demand driven / direct current vent.	Take off / Take off / Take off / Acceleration	Available	No	=										
		High temp. cooling (HTK) specialist			BKA / floor or wall cooling	Take off / Acceleration	Not Available	No	-										
		Specialist sun energy			PV	Take off	Available	No	=										
Cooling installations service mechanic	(first) cooling installations mechanic / inspection mechanic cooling installations	Specialist ventilation	22049	94322	wtw /decentralized / demand driven / direct current vent.	Take off / Take off / Take off / Acceleration	Available	No	=										
		Specialist high temp. cooling (HTK)			BKA / floor or wall cooling	Take off / Acceleration	Not Available	No	-										
		Solar energy specialist			PV	Take off	Available	No	=										
		Energy monitoring specialist			Domotica / GBS / smart meter	Take off / Acceleration / Exploration	Not Available	No	-										
Roof mechanic	Roof mechanic	Solar energy specialist	22048	93843 / 94283	PV / ZB (solar boiler)	Take off / Exploration	Available	No	=										
		Wind energy specialist			Urban wind turbines	Exploration	Not Available	No	-										

\*Remark:

Based on experience, the costs for the development of a themed course are estimated to be around € 100,000,--. A new course includes final attainment levels, educational tools and test moulds for exams.

## Appendix II

### Methods and working methods for testing and certification

Before any testing or certification can take place, it has to be clear what is the aim of this testing and certifying. It makes sense to know exactly why the testing and certifying takes place. Without pretending to give a comprehensive overview of the justification of testing and certifying, we do provide some considerations.

Testing or certifying can be done for the following reasons:

- ❖ Tests can be used as a basis for the decision to grant (allocation) or to reject (selection), to pass or to fail.
- ❖ Tests can be used to diagnose. For instance, this way an early diagnosis can be made in education to see whether there are certain study problems (dyslexia)
- ❖ Tests can be used to assess a level.
- ❖ A programme can be adjusted on the basis of test data. In that case it serves as an evaluation tool to assess whether sufficient progress is made. In fact, it is a means to compare whether any progress made is in line with the previously determined milestones. Many students use milestones to measure their study progress. At the same time, milestones function as a big stick.
- ❖ A test passed means that a certain level has been reached. Thus, a test serves to determine the level, and users can use it to indicate at which level they function and can derive a certain professional pride from it.
- ❖ Tests are also used in a competitive context and thus serve to indicate the level of excellence in craftsmanship.
- ❖ Within the perspective of a career, tests can mark important moments, as tests indicate here at which moment certain competences are mastered. This way, people use them to obtain a workplace. As soon as other competences are mastered, they leave their first workplace and move on to another place.

People are tested for:

- Knowledge, skills, attitude
- Proficiency in reading and in writing, and verbal skills
- Cognitive skills, metacognitive skills
- Social and management skills, affective skills
- Professional competences

## Test categories

Below is an overview of existing categories of testing.

Test category	Explanation
Open questions	Best suited for testing skills like application, analysis, synthesis, evaluation.
Multiple choice questions	Often used to test reproduction knowledge. Questions dealing with insight and application can also be used in a multiple choice format, but this requires a more careful formulation of the questions.
Case studies	(with questions, or, for example including role-playing with actors). Suitable for testing decision-making abilities and problem-solving abilities.
Papers	Suitable for testing proficiency in writing, analysis, integrating abilities, insight.
Oral tests	Suitable for testing knowledge, skills and attitude.
Portfolio	Contains a collection of products which testify to the development of the student.
Skill tests	As the name implies, these are particularly suited for testing skills and competences (practical).
Group products	Suitable for testing cooperation abilities, functioning in a group, proficiency in writing, presenting.
Proficiency tests	Can or cannot be taken on the job.
Development tests	Indicate the degree to which the student has progressed in the learning process.
Intervision	The degree to which the subject matter is applied.
360 degrees feedback	Includes assessments from the environment in which one functions.
Presentations	To a certain degree, a presentation is a way to give account of what has been learnt.
Viewing screen tests	

These test categories can be used by Build Up Skills. In view of the developments in the field of ICT and new media, like e-learning and see-learning (learning by means of video clips from media like YouTube), we also expect other, more modern categories of testing to evolve in the near future. It is important to observe that the way of testing should also have a connection with the learning method. Especially with relatively new learning methods, like competence-oriented education, a newer way of testing is appropriate, in which students show to a far higher degree that they can actually apply what they have learnt. During the past 20 years, an accent shift has taken place. Previously, information (subject matter) was transferred in a theoretical way. This requires a test to assess whether the subject matter is actually learnt (whether one can reproduce it by heart). Nowadays, emphasis is increasingly put on mastering the knowledge, skills and abilities and on mastering what has been learnt. The test which matches this view, enables students to show that they have embedded the subject matter into their practical working routines. This they can demonstrate.

### Quality assurance

Within initial/regular education, and thus the qualification structure, tests must meet the standards of the schools inspectorate. Thus, a certain level of quality is guaranteed. A comparable quality system is not available with post-initial (cursory) education. The question is whether a quality assurance system for post-initial education is desirable or necessary.

The quality of a test procedure is determined by:

- The way the test is set up
- The quality of the (test) instrument used
- The expertise of those involved with the test procedure.

Quality criterion	Explanation
Representativity	Does the test match the targets specified? Are all targets divided up proportionally, or as indicated in the test mould?
Specificity	Does the test cover the contents of the course?
Selectivity	Does the test separate the good students from the bad ones?
Sensitivity	Is the test sufficiently adjusted to the target group and the level?
Balance/coverage	Is the subject matter proportionally divided among the questions?
Reliability	Are there enough questions/tasks? Are the questions/tasks sufficiently independent from each other?
Validity	Does the test test what it is supposed to test? Does the test test the learning goals and in the proper form?
Consistency	Are all the assessments fair and correct? Especially with multiple assessors it is important to pay attention to this.

### WP 3.3.B

Formally, consultation with the social partners is the basis of the test assessment. Organizationally, this has been realised on a regional level by establishing regional examining boards, on which representatives of employers, employees and educational institutions have a seat. In practice, individual teachers draw up tests and hold them, too, both in practice and in theory. This is done, however, under of responsibility of the examining boards. The examining boards can appoint independent branch-related external examiners to assess the test. This is common practice. The external examiner reports to the examining board after he has assessed the work of the teacher. If necessary, the examining board can correct a teacher if his testing stays below the required level. This will happen in consultation with the direct superior of the teacher concerned. He then will give account to the examining board.

For post-initial education, no formal rules apply. Per branch, however, certificates can be issued. In those cases the branch itself organizes a procedure to assess the standard level. To that end, experts from the branch are taken on. Such tests and certifications which are organized by the branch, have a civil effect for the branch. Besides, such a procedure also represents a commercial value.

## National format examination profile 3.0

2010/2011

### Introduction

In December 2009, the direction group Examination has established Version 2.0 of the national format examination profile. Based on this, the various working groups have developed (through) examination profiles up to and including May 2010. Besides, in the study year 2009-2010 the national process architecture Examination has taken shape. In May 2010, the format and the accompanying explanation, the developed examination profiles and the process architecture have been analysed. A need was identified for simplification and clarification of the format and adjustment to the process architecture. In response to this, some recommendations were done, which were included as an appendix with the report project examination profile second phase 2009-2010. These have led to adjustment of the national format, as has been included after this. It is about an accentuation of the format and not a new format.

In the third phase, the sectoral examination profiles are converted/developed on the basis of format 3.0. In this phase, the relation between the format and the process architecture is further clarified.

The agreements in the examination profile only concern the vocation-related part, including the **vocation-related** requirements for Dutch, modern foreign languages and arithmetic/mathematics. So this does **not** concern the generic requirements for these subjects. Nor does it concern the requirements for Learning, Career and Citizenship. There are separate agreements between OCW and the world of education about this.

Three themes are included in the national format examination profile. These themes are:

1. Involvement of the professional world
2. Contents and coverage
3. Quality development and professionalization

Three levels of aggregation can be discerned within the examination profile:

- National:** In the national format examination profile, the themes are described and explained, based upon which a further elaboration needs to take place on a sectoral and regional level.
- Sectoral:** On a sectoral level, agreements are made about the three themes from the national format. These agreements, which apply for the sector, are made in sectoral working groups, and apply to one or (preferably) multiple qualification files. The sectoral working groups are based on the classification of the branch groups (btg's) of the MBO Raad, or the classification of the AOC Raad.
- Regional:** The agreements which are made on a sectoral level, are further elaborated within the region under responsibility of the educational institution.

### Starting points

- Agreements at each aggregation level are commonly made between the worlds of education and business and are based upon equivalence. Equivalent in this case is not the same as equal. The legal responsibility for examination in the MBO is not divisible or delegatable. However, the degree of acceptance should be equal with all stakeholders.
- The discussion partners for the development of the sectoral examination profile are education, centres of knowledge and an organized work field. These form a good

representation of their rank and file, by means of which the connection on a national, sectoral and regional level is organized and assured.

- Examination profiles do not duplicate what has been agreed elsewhere (for example in laws, inspection standards or qualification files)
- When agreements made elsewhere do not meet the needs any more, or when from the project Examination profile other themes appear which cannot be solved by the project or the working group, they will be discussed at the right board table.
- In sectoral workgroups it is determined, based upon the national format, whether agreements can be made sectorally or whether they must be made in the region by educational institutions. If the latter applies, this will be the agreement which is included in the sectoral examination profile. The sectoral workgroups include representatives from the world of education, the branch organisations and the centre of knowledge.
- There is a hierarchy of agreements which match the aggregation levels. Agreements at a certain level constitute a framework for the underlying level, but do not fill it in in advance.
- When applying examination profiles: Apply or explain when other agreements are made.

### **Qualifications**

The examination profile in hand pertains to all qualifications which fall under SH&M and Fundeon.

Theme	National agreements	Explanation
Theme 1. Involvement of the professional field	<p>1. The education and professional world make agreements about involvement of the professional world with the examining processes:</p> <ul style="list-style-type: none"> <li>- Establishing and determining frameworks</li> <li>- Constructing examinations</li> <li>- Determining examinations</li> <li>- Executing examinations</li> <li>- Assessing examinations</li> <li>- Determining the results</li> <li>- Certifying</li> <li>- Evaluating</li> </ul> <p>The examination processes mentioned are adjusted to the process architecture.</p> <p>In the sectoral examination profiles, it is agreed per sector for one or multiple qualifications if and how the professional field in the region will be involved with the examination processes. For example, the professional field can play an advisory role, be co-responsible or not be involved. For one or more processes it can also be agreed on a sectoral level that this will be determined regionally.</p> <p>Regionally, the interpretation of the roles with the examination processes elaborated to persons or organisations including the accompanying responsibilities.</p>	<p><b>Establishing and determining frameworks</b></p> <ul style="list-style-type: none"> <li>• Organized business plays an <b>advisory role</b> in establishing and determining the frameworks for the examining process (examination vision with examination model, examination rules and the Examining Manual). This role is performed in one of the following ways by one or multiple representatives from the world of business: <ul style="list-style-type: none"> <li>○ Advisory member of the committee which establishes the frameworks.</li> <li>○ Advisory member of the committee which determines the frameworks.</li> </ul> </li> </ul> <p><b>Constructing examinations</b></p> <ul style="list-style-type: none"> <li>• Business plays an <b>advisory role</b> in constructing the examinations. This role is performed in one of the following ways by one or multiple representatives of business: <ul style="list-style-type: none"> <li>○ Advisory member of the committee responsible for the construction of the examinations.</li> <li>○ Member of a committee which gives feedback about the examinations developed.</li> </ul> </li> </ul> <p><b>Determining examinations</b></p> <ul style="list-style-type: none"> <li>• Business is <b>co-responsible</b> for the determination of the examinations, but the institution is ultimately responsible. This role is performed in one of the following ways by one or multiple representatives of business: <ul style="list-style-type: none"> <li>○ Member of the committee responsible for the determination of the examinations (determination committee) (including assessment protocol).</li> </ul> </li> </ul> <p><b>Executing examinations</b></p> <ul style="list-style-type: none"> <li>• Business <b>participates in</b> the execution of the examinations. This role is performed by one or multiple experts (presented by the business involved) in collaboration with the education or examination institution responsible for the execution.</li> </ul> <p><b>Assessing examinations</b></p> <ul style="list-style-type: none"> <li>• Business is <b>co-responsible</b> for the assessment of the examinations. This role is performed in one of the following ways by one or multiple representatives of business: <ul style="list-style-type: none"> <li>○ Co-assessor of the examination results of the participant.</li> </ul> </li> </ul> <p><b>Determining the results</b></p> <ul style="list-style-type: none"> <li>• The examination committee is responsible for the determination. The business world is <b>not</b> actually <b>involved</b> with the determination of the results. Business participates in the annual evaluation of the examination process (see evaluating).</li> </ul> <p><b>Certifying</b></p> <ul style="list-style-type: none"> <li>• The examination committee is responsible for the certification. The business world is <b>not</b> actually <b>involved</b> with the certification of the results. Business participates in the annual evaluation of the examination process (see evaluating).</li> </ul> <p><b>Evaluating</b></p> <ul style="list-style-type: none"> <li>• Organized business <b>participates in</b> the evaluation of the examinations. This role is performed in one of the following ways: <ul style="list-style-type: none"> <li>○ The education or examination institution responsible for holding the examinations inquires with those business representatives involved with the examination processes about their experiences (e.g. by means of panel conversations).</li> <li>○ The education or examination institution responsible for holding the examinations informs the organized business (the branch organisations) about any improvement actions taken as a result of an evaluation.</li> <li>○ The education or examination institution responsible for holding the examinations informs the organized business about the way in which the assessment of examinations, the determination of results and the certification have taken place.</li> </ul> </li> </ul>

Theme	National agreements	Explanation
Theme 2. Contents and coverage	<p>1. The education and professional world enter into agreements about the contents and the coverage of the examination based upon the requirements from the qualification file.</p> <p>Examination covers the core tasks and working processes and with that the competences for a professional starter at the level of the qualification. The vocational knowledge and professional skills required are preferably integrally examined. The assessment criteria are adjusted to the achievement indicators as described in the qualification file.</p>	<p>The education world and organized business have entered into the following agreements about the content and the coverage of the examination:</p> <ul style="list-style-type: none"> <li>• The examinations cover the professional content of the qualification file at the level of core tasks and work processes as described in part C of the qualification file.</li> <li>• All core tasks which are part of a qualification (efflux) are examined.</li> <li>• The examination results are assessed according to assessment criteria which have been derived from the performance indicators as described in part C of the qualification file.</li> <li>• The professional knowledge and skills as mentioned in the qualification file are integrated into the practice examination and/or examined separately.</li> <li>• The profession-oriented language and arithmetic requirements are as far as possible examined at the practice examination. Where this is not possible, these parts are separately tested.</li> </ul>
	<p>2. The education and professional world enter into agreements about the conditions under which examination takes place.</p> <p>If possible, examination takes place in a professional practice situation or in a simulated environment.</p> <p>Sectorally/regionally it is agreed which core tasks and/or working processes will be examined in the professional practice situation or in the simulated environment.</p>	<p>The education world and organized business have entered into the following agreements about the examination conditions.</p> <ul style="list-style-type: none"> <li>• The examination consists of multiple examination parts and forms, including a skills test by independent assessors.</li> <li>• The practice examination takes place in the professional practice or a simulated environment.</li> <li>• An independent assessor is involved with the assessment of the examination.</li> <li>• The environment in which the practice examination takes place, must meet the following requirements: <ul style="list-style-type: none"> <li>○ An examination in the professional practice is done at an accredited learning company or in a simulated environment;</li> <li>○ A proficiency test is taken in an examination location which meets all the requirements for the examination concerned.</li> <li>○ Any machines, materials, tools and aids needed during the examination concerned, have been an essential part of the training.</li> </ul> </li> </ul>

Theme	National agreements	Explanation
Theme 3. Quality development and professionalization	<p>1. The education and professional world enter into agreements about the expertise of those involved with the examination.</p> <p><i>These agreements are valid for all those involved both inside and outside the school. The education institution remains responsible for the examination. The professional field clearly indicates which contribution will be made.</i></p>	<p>The education world and organized business have entered into the following agreements about the expertise of those involved with the examination. The education institution remains responsible for the examination.</p> <ul style="list-style-type: none"> <li>• The assessors at the examination are knowledgeable in the professional field to which the examination pertains.</li> <li>• The assessors at the examination from business have recent working experience with the core tasks and working processes which are examined (being or having been active in the professional practice).</li> <li>• The assessors at the examination from the education world are employed in the education course for the qualification to which the examination pertains.</li> <li>• The assessors at the examination are knowledgeable in the field of assessment. For example:</li> </ul>
	<p>2. The education institution discusses with the professional field how the cyclic quality development, research, evaluation and improvement of the examination is assured.</p>	<p>The education institution has assured the cyclic quality development, the research, the evaluation and the improvement of the examination as follows:</p> <ul style="list-style-type: none"> <li>• There is an Examination Manual in which the following is described: <ul style="list-style-type: none"> <li>○ The way in which the quality control takes place.</li> <li>○ The way in which the examination is evaluated.</li> <li>○ The way in which the improvement in the examination is carried out.</li> </ul> </li> </ul>
	<p>3. The processes of examination of an institution are described univocally and understandably, and are shared with all involved.</p> <p><i>Under the responsibility of the education institution, the examination processes are regionally elaborated in an Examination Manual. The manual is adjusted to the process architecture.</i></p>	<p>The education institution has assured that the processes of examination are described univocally and understandably, and are shared with all involved as follows:</p> <ul style="list-style-type: none"> <li>• There is an Examination Manual in which the examination processes (see Theme 1) are described univocally and understandably.</li> <li>• The examination processes described in the Examination Manual are shared univocally and understandably with all those involved. The way of communication is adjusted to the target group.</li> <li>• The degree to which the examination processes are described univocally and understandably, is evaluated with all those involved. The way of evaluation is adjusted to the target group.</li> </ul>

## Appendix

### Involvement of the professional field with examination

Involvement business	co-responsible	Advisory role	Not involved	Co-executing
Examination processes				
Establishing and determining frameworks		X		
Constructing examinations		X		
Determining examinations	X			
Executing examinations				X
Assessing examinations	X			
Determining results			X	
Certificating			X	
Evaluating		X		X



## Appendix III

### Adaptations professional profiles BCP+ (as an illustration)

**Remark:**

The “BCP+ tables” in this appendix are intended for illustrative purposes.

The tables are available as download (Dutch only) on [www.buildupskills.nl](http://www.buildupskills.nl) under the tab “Roadmap”.

They mean to bring into vision the new skills/professions which can be elaborated in the sequel to the Roadmap (Pillar II).

Both regarding the introduction of new and/or the upgrade of existing qualification schemes and courses and trainings on behalf of the post-initial education.

**Explanation of the tables, available on [www.buildupskills.nl](http://www.buildupskills.nl) :**

The *non-shaded* areas pertain to current skills which are required for the practice of the profession.

For each table, use has been made of one or more professional characterizations as are laid down in the professional competence profiles (BCP) of the basic profession. The accompanying qualification from the initial education is also stated.

Both the BCP and the qualification are indicated *in blue* under each table.

The tables should be read from top to bottom. They are drawn up in the order of the process in the professional practice:

- 1) Preparation of the process and communication before and during the process.
- 2) Execution in required working pace (situational standards).
- 3) Quality of execution according to requirements and standards.
- 4) Activities and communication after delivery, ready signal process step.

The cores of the professions have been elaborated in detail under point 2) and 3):

Under 2) the activities are stated in italics, with all the accompanying relevant aspects per professional action underneath.

Under 3) the requirements per category are stated in italics, with an elaboration underneath.

The areas *shaded in green* concern the new skills needed to act within the professional practice according to the goals of BuildUpSkills.

A possible name for the new BCP which thus has emerged (in this report named BCP+) is given in green under each table.

Apart from its use in post-initial education, the areas of the BCP+ shaded in green can be used for embedding innovations into the initial education via the BCP.



## Appendix IV Barriers, measures and priorities

In the following pages, all barriers and proposed measures and advices are elaborated in overviews per barrier. For the Roadmap, the actions have been considered in mutual dependence of each other in the elaboration (Chapter 5).

*Remark:*

*Once more it should be emphasized that the BuildUpSkills initiative is focused on post-initial education.*

*The proposed measures and actions should therefore be considered in this light.*

*If the actions mentioned also have an effect in the initial education, this is stated separately in the following overviews.*

Category	Name of measure	Priority
A1.1 - Initial education	Development of shortened cycle for embedding innovations	High
Barrier	Recommendation/measure	Other initiatives
The development cycle of qualification files, curricula, training materials and examinations which follows after the description of the job content, has a 6-year lead time. Extra attention should be given to the integration of new developments like technological renewal in the qualification files.	Besides the formal development and maintenance cycle of the qualification structure, to develop a short cycle around each of the phases in the formal main cycle, which enables innovations and relevant feedback to reach education at an earlier stage, both initially and post-initially (see also measure B4.2).	Action plan min. OCW restrict qualifications on an MBO level and include in domain structure, "Focus on professional skill".
Actors	Action level	Type of action
Ministry of OCW SBB/KBB Kenteq/Fundeon/Savantis/SH&M OnderhoudNL NOA Uneto-VNI/OTIB Bouwend-NL Aannemersfederatie Companies MBO Diensten	Macro (education system/legal) Meso (ROC/School/College)	System With respect to content
SWOT analysis		
<p><b>Strengths (internally):</b></p> <p>Transparent branch qualification structure, system applicable in both the construction and installation sector.</p> <p><b>Opportunities (externally):</b></p> <p>Integrated approach building and installation technology.</p> <p>Skilled people are considered important for advice concerning sustainability and to lower failure costs (USP, p. 53, 2013).</p> <p>Evolution existing professions (USP, p. 57, 2013).</p>	<p><b>Weaknesses (internally):</b></p> <p>Action plan OCW requires lessons in the school, which means less space for education-participants for learning in professional practice.</p> <p><b>Threats (externally):</b></p> <p>General trend towards development of shorter, generic qualifications (with more general subjects, like language, arithmetic), compromises attention to specific professional skill.</p> <p>Too strong division between knowledge and competences, where professional skill apparently always has to get the short end of the stick.</p> <p>Various market parties expect great diversity of new professions/specialisations (USP, p. 58, 2013) which will require a large number of qualification structures. It is not certain whether there is sufficient capacity to set up the qualification structures.</p>	

Category	Name of measure	Priority
A2.1 - Initial education	Development education/examination product	Recommendation
Barrier	Recommendation/measure	Other initiatives
Programmes and examinations in the initial MBO education lag behind compared to actual needs and developments in the market. The education programme can have more content than the examination, for example in optional parts which are not (do not need to be) examined. This can be tuned in with the joint committee (paritaire commissie, PAC).	Updating current education by using the space provided / flexibility in files and execution (= optional part). In case of sufficient support common development NL educational material and examination products instead of every man for himself.	
Actors	Type of action	
MBO Diensten Kenteq/Fundeon/Savantis/SH&M PAC ISSO, SBR Centra voor Innovatief Vakmanschap Expertisecentra Duurzaam	Macro (education system/legal)  Meso (ROC/School/College)	Recommendation System With respect to content
SWOT analysis		
<b>Strengths (internally):</b> Uniformity  <b>Opportunities (externally):</b> Support basis market  Overlap disappears  On the average, half of the employees needs extra training or education. (USP, p. 70, 2013).	<b>Weaknesses (internally):</b> Implementation trajectory can take a long time. <b>Threats (externally):</b> Overregulation due to orientation towards uniformity. Costs greatest obstacle for education of personnel (may also constitute a chance) (USP, p. 71, 2013). Available time is major obstacle for education of employees (may also constitute a chance) (USP, p. 71, 2013).	

Category	Name of measure	Priority
A2.2 - Initial education	Arrangements additional schooling	High
Barrier	Recommendation/measure	Other initiatives
Programmes and examinations in the initial MBO education lag behind compared to actual needs and developments in the market.	Develop short arrangements ('fast tracks') for students who are capable and willing to quickly move on to higher levels (HBO).	Increase participation of the business in education (Masterplan Beta-techniek SP1)
Actors	Action level	Type of action
MBO Diensten Kenteq/Fundeon/Savantis/SH&M ISSO, SBR Centra voor Innovatief Vakmanschap Expertisecentra Duurzaam	Meso (ROC/School/College)	Content
SWOT analysis		
<b>Strengths (internally):</b> Quick embedding of new technologies/topics  <b>Opportunities (externally):</b> Increase of courses/participants  Due to present economic depression, people end up with less or even without work, in spite of them having a high degree of professional skill. This can be used in the education.	<b>Weaknesses (internally):</b> Insufficient flexibility in organising post-graduate courses at mesolevel. <b>Threats (externally):</b> Demand fails to materialise.  Competition with existing courses.	

Category	Name of measure	Priority
A2.3 - Initial education	Development career paths	Recommendation
Barrier	Recommendation/measure	Other initiatives
Programmes and examinations in the initial MBO education lag behind compared to actual needs and developments in the market.	Develop logical career paths in order to a) close the gap between what the education system delivers and what the business needs, b) bring an employee up to the desired and required level.	Increase participation of the business in the education (Masterplan Beta-techniek SP1) Skills@school Skills manager
Actors	Action level	Type of action
MBO Diensten Kenteq/Fundeon/Savantis/SH&M OTIB ISSO, SBR Centra voor Innovatief Vakmanschap Expertisecentra Duurzaam	Meso (ROC/School/College)	Recommendation Content
SWOT analysis		
<p><b>Strengths (internally):</b></p> <p><b>Opportunities (externally):</b></p> <p>Courses and trainings mostly used for continuous learning process (USP, p. 58, 2013).</p> <p>On the average, half of the employees need extra training or education. (USP, p. 70, 2013).</p>	<p><b>Weaknesses (internally):</b></p> <p>Skills manager is not yet adopted by the Construction sector.</p> <p><b>Threats (externally):</b></p> <p>Costs greatest obstacle for education of personnel (could also constitute a chance) (USP, p. 71, 2013).</p> <p>Available time is major obstacle for education of employees (could also constitute a chance) (USP, p. 71, 2013).</p> <p>All parties indicate to be ready for the targets for 2020. (USP, p. 61 and 64, 2013). Possibly, the measures required are underestimated.</p>	

A3.1 - Initial education	Utilize PI-education for new BCP's	High
Barrier	Recommendation/measure	Other initiatives
<p>The professional trainings in the building, installation, finalization and maintenance sectors are insufficiently connected to the requirements and demands which the working practice is going to have in the years to come.</p> <p>The construction of zero-energy buildings primarily requires adapted working processes. (moved from E.9.1).</p> <p>The quality of the work delivered frequently does not meet the demands/requirements of the client.</p>	<p>Many requirements and desires have already been included in the (final terms of the) post-initial trainings. Utilize these for development of BCPs initial education.</p> <p>Increase sense of urgency to improve quality of building and installation executives in construction and installation (moved from E9.1).</p>	<p>Roll out concept vocational schools (MB&amp;T, spearhead 1)</p> <p>Techmavo</p> <p>Head-and-tail approach / energy label new constructions</p>
Actors	Action level	Type of action
<p>Post-initial trainers OTIB Kenteq/Fundeon/Savantis/SH&amp;M Loopbaan- en Opleidingsfonds Afbouw en Onderhoud</p>	<p>Meso (ROC/School/College)</p>	<p>With respect to content</p>
SWOT analysis		
<p><b>Strengths (internally):</b> Softskills, rigid thinking and integrated approach make a better appearance on the boards.</p> <p><b>Opportunities (externally):</b> According to all parties, branch organisations and employers play a major role in education and training (USP, p. 67, 2013). Construction branch loses negative image. Skilled people are considered important for advice concerning sustainability and to lower failure costs (USP, p. 53, 2013). Due to present economic depression, people end up with less or even without work, in spite of them being highly skilled professionally. This can be used in the education.</p>	<p><b>Weaknesses (internally):</b></p> <p><b>Threats (externally):</b> Courses and training mostly used for continuous learning process (USP, p. 58, 2013).</p>	

Category	Name of measure	Priority
A10.1 - Initial education	Development of new BCPs/qualifications	Recommendation
Barrier	Recommendation/measure	Other initiatives
<p>Insufficient perspective on the specific activities and competences required to meet the 20-20-20 objectives.</p> <p>E.g. in the professional spectrum for the construction business are lacking: "Insulator in the construction business" and "Adjuster and mechanic of prefab elements in the construction business".</p>	<p>Further investigate which activities and competences are required and whether these should be included into new or existing functions and qualification files.</p>	
Actors	Action level	Type of action
<p>Kenteq/Fundeon/Savantis/SH&amp;M</p> <p>Social partners</p> <p>Business world</p>	<p>Macro (education system/legal)</p>	<p>Recommendation</p> <p>System</p>
SWOT analysis		
<p><b>Strengths (internally):</b></p> <p><b>Opportunities (externally):</b></p> <p>With practical examples the necessity can be underlined, leading to a fast and potentially successful implementation.</p> <p>Skilled people are considered important for advice concerning sustainability and to lower failure costs (USP, p. 53, 2013).</p>	<p><b>Weaknesses (internally):</b></p> <p><b>Threats (externally):</b></p> <p>Social partners do not want to invest in quality research because professions have not yet emerged from exploration of professions.</p>	

Category	Name of measure	Priority
B4.1 - Post-initial education	Better access in course catalogues	High
Barrier	Recommendation/measure	Other initiatives
Post-initial courses (particularly installation sector?) often not yet well-known with the target group.	Better access in course catalogues (and clearer relation with BCPs, accreditation). E.g. like in the catalogue Scholingsfonds Bouw. Increasing awareness with employers and employees, working on improvement of learning culture. Including courses in Lifelong Learning initiatives and programmes.	Skills manager  etalage.otib.nl
Actors	Action level	Type of action
OTIB Kenteq/Fundeon/Savantis/SH&M Scholingsfonds voor de bouw Loopbaan- en Opleidingsfonds Afbouw en Onderhoud Course providers ROCs	Meso (ROC/School/College)	System
SWOT analysis		
<p><b>Strengths (internally):</b> Increasing range.</p> <p><b>Opportunities (externally):</b></p> <p>Enabling of post-initial trainings on a national level?</p> <p>On the average, half of the employees need extra training or education. (USP, p. 70, 2013). According to all parties, branch organisations and employers play a major role in education and training (USP, p. 67, 2013).</p>	<p><b>Weaknesses (internally):</b></p> <p><b>Threats (externally):</b> Within the framework of sustainability: Most respondents cannot spontaneously name targets (USP, p. 19, 2013). The search for trainings/courses by companies will probably not get much attention this way.</p>	

Category	Name of measure	Priority
B4.2 - Post-Initial education	Development qualification structure professional skill	High
Barrier	Recommendation/measure	Other initiatives
The development cycle of branch qualification documents, curricula, educational materials and examinations which follows after the description of the professional content has a lead time which is too long.	<p>Development of a branch qualification structure for professional skill (<u>post-initial education</u>) incl. developments in the field of EE/RES, with the matured, employed skilled worker as a reference.</p> <p>Besides the formal development and maintenance cycle, design a second cycle in order to introduce innovations earlier into education.</p>	
Actors	Action level	Type of action
Ministry of SZW Social partners Kenteq/Fundeon/Savantis/SH&M Branches MBO Diensten	Macro (education system/legal) Meso (ROC/School/College)	System With respect to content
SWOT analysis		
<p><b>Strengths (internally):</b></p> <p>Transparent branch qualification structure, system applicable in both construction and installation sector.</p> <p><b>Opportunities (externally):</b></p> <p>Integrated approach construction and installation technology</p> <p>Skilled people are considered important for advice concerning sustainability and to lower failure costs (USP, p. 53, 2013).</p> <p>Evolution of existing professions (USP, p. 57, 2013).</p>	<p><b>Weaknesses (internally):</b></p> <p>Action plan OCW requires lessons in the school, which means less space for education-participants for learning in professional practice.</p> <p><b>Threats (externally):</b></p> <p>General trend towards development of shorter, generic qualifications (with more general subjects, like language, arithmetic), compromises attention to specific professional skill.</p> <p>Too strong division between knowledge and competences, where professional skill apparently always gets the short end of the stick.</p>	

Category	Name of measure	Priority
C5.1 – Teachers / practical trainers	Train the trainer programmes	Recommendation
Barrier	Recommendation/measure	Other initiatives
Teachers often need refresher courses. Teachers are often ill-informed about the developments in the construction practice.	Organising of train-the-trainer sessions to increase the capacity of qualified providers (relation action 19) and to assure a good regional availability.	Ensure sufficient and good supply of additional schooling for teachers. (Masterplan Beta-techniek SP1)
The MBO institutions are often confronted with a shortage of teachers in Architecture, Installation technology and Finalization & Maintenance, due to the ageing of the population.	In cooperation with the business, teachers structurally spend an amount of time in the construction and installation practice.	
Regional availability is not assured.	Installation of (regional) flex pools with experts from the business. Measures apply for both initial and post-initial education.	Technology talent
Actors	Action level	Type of action
Post-initial trainers OTIB Kenteq/Fundeon/Savantis/SH&M Loopbaan- en Opleidingsfonds Afbouw en Onderhoud OnderhoudNL NOA MBO Diensten BouwendNL Uneto-VNI ISSO, SBR	Macro (education system/legal) + Meso (ROC/School/College)	Recommendation System
SWOT analysis		
<p><b>Strengths (internally):</b> A natural solution for the 'lag' in qualifications update... in other words, a way to preliminarily test adaptations (via teachers directly in education) before they are included in qualifications.</p> <p><b>Opportunities (externally):</b> Improvement of image of teaching profession. Due to the present economic depression, people end up with less or even without work, in spite of them being highly skilled professionally. This can be used in the education.</p>	<p><b>Weaknesses (internally):</b></p> <p><b>Threats (externally):</b> Image of teaching profession</p>	

Category	Name of measure	Priority
D7.1 - Education participants/students	Promotion for career in construction and installation sector	Recommendation
Barrier	Recommendation/measure	Other initiatives
Decline of the influx		Technology talent
Actors	Action level	Type of action
Overview of actors involved Common approach of the branch and education is required.	Macro (education system/legal) Meso (ROC/School/College)	Recommendation System
SWOT analysis		
<b>Strengths (internally):</b>	<b>Weaknesses (internally):</b>	
<b>Opportunities (externally):</b>	<b>Threats (externally):</b> According to all parties, branch organisations and employers play a major role in education and training (USP, p. 67, 2013). Due to the current economical depression, government priorities are with other issues than sustainability. This is a threat to investments in promotion in a career and construction. The stagnation in the market for housing and utility construction also contributes to this.	

F11.1 - Mobility labour market/certification	Organising mobility skilled professionals EU	Low
Barrier	Recommendation/measure	Other initiatives
Too few opportunities for influx in the sectors from outside NL. NL skilled professional not mobile.	Attention for mobility of employees in the construction and installation sector and sector Finalisation and Maintenance within the EU (partly in relation to actions upgrading BCP's and accreditation/certification).	Current initiatives
Actors	Action level	Type of action
Europass ECVET EQARF EVC Skills manager Skills@School The mobility means under Leonardo da Vinci Vetpro for teachers and IVT for students.	Macro (education system/legal)	System
SWOT analysis		
<b>Strengths (internally):</b> Connection with certification of persons.	<b>Weaknesses (internally):</b>	
<b>Opportunities (externally):</b>	<b>Threats (externally):</b> The way the knowledge level of foreign powers is developing as compared to Dutch construction workers is not known. Professional skill disappears to abroad (thatcher, Poland). Government and clients see the market as a booster regarding sustainability (USP, p. 72, 2013). The question remains whether government will take up this role, too.	

Category	Name of measure	Priority
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<b>F12.1 - Mobility labour market/certification</b>	Possibilities personal certification	High
<b>Barrier</b>	<b>Recommendation/measure</b>	<b>Other initiatives</b>
Learning should not be restricted to initial education, but should be a continuous activity (Lifelong learning). Quality in post-initial education is insufficiently assured.	Research into, and stock-taking of kinds of personal and branch certification. Connect with IDW / EQF.	Masterplan Bèta-techniek
<b>Actors</b>	<b>Action level</b>	<b>Type of action</b>
KBI Kenteq/Fundeeon/Savantis/SH&M Annemersfederatie SkillsNL Social partners bouw and installatiebranche CINOP & SBB (IDW)	Macro (education system/legal)	System
<b>SWOT analysis</b>		
<b>Strengths (internally):</b> Life Long Learning is becoming a structural activity. <b>Opportunities (externally):</b>  Could possibly connect to company certification.  Can serve as a source for monitoring development working population.	<b>Weaknesses (internally):</b>  <b>Threats (externally):</b> Government and clients see the market as a booster regarding sustainability (USP, p. 72, 2013). Due to the economical depression of the housing market, government is inclined to be more lenient regarding measures like certification.	

<b>Category</b>	<b>Name of measure</b>	<b>Priority</b>
F19.1 - Mobility labour market/certification	Possibilities personal certification	High
<b>Barrier</b>	<b>Recommendation/measure</b>	<b>Other initiatives</b>
The quality of the (post-initial) training supply is very diverse and there is no standardised accreditation. These circumstances hamper the process of obtaining sustainability competences.	Develop quality assurance of post-initial trainings (see also relation with category B).	RES, EPBD recast and EED
<b>Actors</b>	<b>Action level</b>	<b>Type of action</b>
KBI Branch organisations (possibly KBB's as executive organisation) Ministry of SZW Scholingsfonds voor de bouw Educators	Macro (education system/legal)	System
<b>SWOT analysis</b>		
<b>Strengths (internally):</b> Life Long Learning becomes a structural activity. <b>Opportunities (externally):</b>  Can possibly connect to company certification.  Can serve as a source for monitoring development working population. Courses and trainings mostly used for continuous learning process (USP, p. 58, 2013).	<b>Weaknesses (internally):</b>  <b>Threats (externally):</b> Government and clients see the market as a booster for sustainability (USP, p. 72, 2013). Due to the economical depression of the housing market, government is inclined to be more lenient regarding measures like certification.  Setting up of qualification structures and the corresponding certification.	

<b>Category</b>	<b>Name of measure</b>	<b>Priority</b>
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G13.1 - Monitoring	Instrument developing for monitoring	High
<b>Barrier</b>	<b>Recommendation/measure</b>	<b>Other initiatives</b>
Instruments to get a quick insight into developments and results of developments are lacking.	Developing instrument(s) on behalf of monitoring of: Development of professional skill. Result actions Keep Status Quo-report Developments technical (Innovation motor) up to date. Bring and keep innovations in view.	Implementation developed monitoring model.
<b>Actors</b>	<b>Action level</b>	<b>Type of action</b>
Fundeon/Kenteq/Savantis/SH&M in cooperation with : Research bureaus Consortium partners Energy transition model Branch organisations Knowledge institutions	Macro (education system/legal)  Meso (ROC/School/College)	Platform  System
<b>SWOT analysis</b>		
<b>Strengths (internally):</b> Involvement of all relevant parties, clear positioning and roles. <b>Opportunities (externally):</b> Possibility for a link with respect to content, and with it reinforcement of the relation between education and practice (business).	<b>Weaknesses (internally):</b> Dependence on proactive input of parties involved, no back-up. <b>Threats (externally):</b> Missing relevant developments which fall outside the framework and scope of monitoring, but which (can) have a great influence.	

Category	Name of measure	Priority
H15.1 - Interdisciplinarity	Development interdisciplinary trainings	High
<b>Barrier</b>	<b>Recommendation/measure</b>	<b>Other initiatives</b>
In the construction sector there is a high degree of specialisation, and professions are still very strongly pigeon-holed. Activities or trainings with an interdisciplinary aspect are not stimulated or are even discouraged.	Far more attention to required soft skills and more integrated trainings for the construction and installation sector.  Is linked to actions concerning the professional competence profiles, see cat. A.	The challenges require a combination and integration of knowledge and technology; interdisciplinarity (MBT)
<b>Actors</b>	<b>Action level</b>	<b>Type of action</b>
Overview of actors involved	Macro (education system/legal) Meso (ROC/School/College)	With respect to content
<b>SWOT analysis</b>		
<b>Strengths (internally):</b>  <b>Opportunities (externally):</b>	<b>Weaknesses (internally):</b>  <b>Threats (externally):</b> From the market research the need for soft skills is not really apparent. These are nonetheless required in view of the increase in necessary cooperation in projects. The fact that this is not acknowledged (at least not from the market research), is an indication that this is a possible threat.	

I.16.1 - Workforce	(Innovative) extra training workforce	High
<b>Barrier</b>	<b>Recommendation/measure</b>	<b>Other initiatives</b>

Workforce & lack of extra training.	On-the-job learning trajectories (larger role for informal learning), possibly linked with personal and branch certification (point 12). Stimulation of participation & development of innovative ways of training.	Current initiatives
<b>Actors</b>	<b>Action level</b>	<b>Type of action</b>
BouwendNL Post-initial trainers Uneto-VNI Federation of contractors Self-employed in appearance Real self-employed (reputation)	Meso (ROC/School/College)	System
<b>SWOT analysis</b>		
<b>Strengths (internally):</b>	<b>Weaknesses (internally):</b>	
<b>Opportunities (externally):</b>	<b>Threats (externally):</b>	
On the average, half of the employees need extra training or education. (USP, p. 70, 2013).	Costs are greatest obstacle for education of personnel (may also constitute a chance) (USP, p. 71, 2013). Available time is major obstacle for education of employees (may also constitute a chance) (USP, p. 71, 2013).	

<b>Category</b>	<b>Name of measure</b>	<b>Priority</b>
J20.1 - Financing	ESF and O&O funding	High
<b>Barrier</b>	<b>Recommendation/measure</b>	<b>Other initiatives</b>
Insufficient financial compensation of extra educational efforts.	Use possibilities: ESF-funding O&O funds Business (in cash or in kind)	Policy of organisation with relevant funds
<b>Actors</b>	<b>Action level</b>	<b>Type of action</b>
Ministry of SZW OTIB O&O fonds, Scholingsfonds voor de bouwnijverheid	Macro (education system/legal)  (per sector)	Platform Platform System
<b>SWOT analysis</b>		
<b>Strengths (internally):</b>	<b>Weaknesses (internally):</b>	
<b>Opportunities (externally):</b>	<b>Threats (externally):</b>	
On the average, half of the employees need extra training or education. (USP, p. 70, 2013).	Costs are greatest obstacle for education of personnel (may also constitute a chance) (USP, p. 71, 2013).	

Category	Name of measure	Priority
J26.1 - Financing	Link financing to professional skill	High
Barrier	Recommendation/measure	Other initiatives
No benefits for the participant.	<p>Link financing to performance and professional skill: Premium/bonus for educated employee.</p> <p>Upskilling as part of commission! (if possible paid for by client). If possible, link to monitoring effect BuildUpSkillsNL.</p>	<p>Activity of the platform</p> <p>If possible, link to monitoring effect BuildUpSkillsNL.</p>
Actors	Action level	Type of action
DGBC, NL government Banks NL government	Meso (ROC/School/College)	Platform System
SWOT analysis		
<p><b>Strengths (internally):</b></p> <p>A strong incentive</p> <p><b>Opportunities (externally):</b></p> <p>Boost for energy label new construction.</p>	<p><b>Weaknesses (internally):</b></p> <p>Too many variables (e.g. performance and professional skill can be differently assessed, not a univocal relation).</p> <p><b>Threats (externally):</b></p> <p>Overregulation due to orientation towards uniformity. Costs are greatest obstacle for education of personnel (may also constitute a chance) (USP, p. 71, 2013). Available time is major obstacle for education of employees (may also constitute a chance) (USP, p. 71, 2013).</p>	

Category	Name of measure	Priority
N25.1 - Continuity	Assure continuity Platform BUSNL	High
Barrier	Recommendation/measure	Other initiatives
Too many initiatives and dispersion to get at energy transition.	Spread message BuildUpSkillsNL at various gremia. Connect as a market party to platform BuildUpSkillsNL Assure continuity of Platform BuildUpSkills.	Current initiatives
Actors	Action level	Type of action
Top sectors, Ketenacademie, Vernieuwing bouw, Platform 31, EnergyConsciousness, DGBC, Nationaal Renovatieplatform, Platform Duurzame Huisvesting, Renda, Duurzaam Gebouwd, provincial/regional platforms, municipal platforms, Greendeals, lectorates, Bouwcampus, Bouwteam, Pioneering... Virtual platform BUSNL	Meso (ROC/School/College)	System
SWOT analysis		
<b>Strengths (internally):</b> Increasing involvement of market parties.	<b>Weaknesses (internally):</b>	
<b>Opportunities (externally):</b> Link innovations, link test gardens from among others TKI-programmes and greendeals to education programmes.	<b>Threats (externally):</b> Due to proliferation of initiatives/ platforms and devaluation of the platform concept, not everybody is equally enthusiastic about one more platform. 'Hidden' agendas.	

Category	Name of measure	Priority
Q31.1 - Developing education material	Development education/examination product	High
Barrier	Recommendation/measure	Other initiatives
Keeping current course material up to date.  Lack of education and course material with regard to sustainable development/maintenance real estate.	Keep course material up to date based upon analysis of availability and actuality, or develop it when lacking. (Closely connects to A1.1, but with a short cycle regarding learning materials).  Assure this in a modern distribution formula. Bring together in a knowledge bank, which is readily accessible for post-initial education.	
Actors	Action level	Type of action
OTIB (format sustainable technology) Kenteq/Fundeon/Savantis/SH&M  ISSO, SBR	Meso (ROC/School/College)	Content
SWOT analysis		
<b>Strengths (internally):</b>	<b>Weaknesses (internally):</b>	
<b>Opportunities (externally):</b> Actual/innovative teaching material, also perfectly useful for initial education.  Skilled people are considered important for advice concerning sustainability and to lower failure costs (USP, p. 53, 2013).	<b>Threats (externally):</b>	

## EXPLANATION OF MEASURES INITIAL EDUCATION

**Measure: Developing a qualification structure for professional skill (initial/post-initial education) including developments in the field of EE/RES, with the mature, employed skilled professional as a reference.**

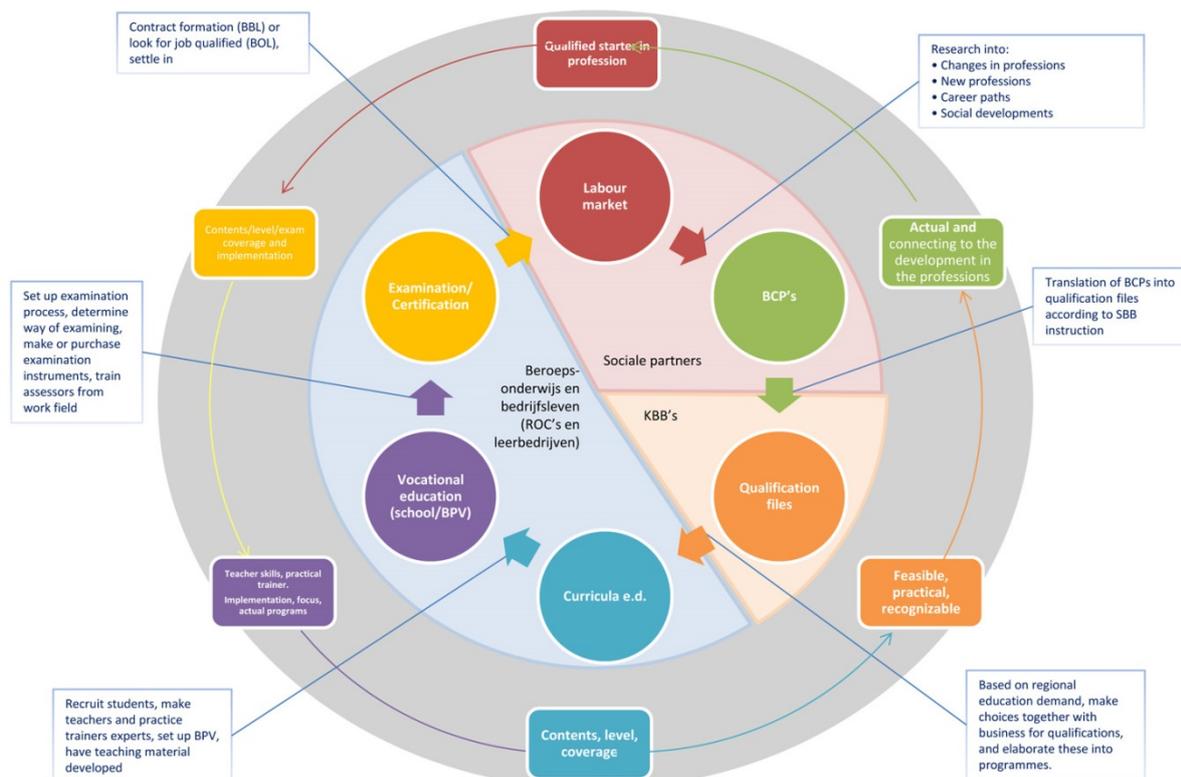
Category : A1.1 - Initial education

Barrier : The development cycle of qualification files, curricula, teaching materials and examinations which follows after the description of the professional contents has a too long lead time.

### Explanation

In order to bring more dynamism into the chain of education, it is important to sketch and understand the entire chain. The chain begins and ends with the labour market: there is a need for sufficiently equipped prospective professionals and professionals who stay up-to-date during their career. The professions which are recognized in the labour market, are translated into so-called professional competence profiles (BCPs). BCPs serve as source document for a qualification file and as such are an important instrument in the process of connecting education to the labour market. For in BCP-research an image is created of a matured, skilled professional, supplemented with new trends and developments, like zero-energy building. Based upon this profile, a qualification file is made and education with examination can be developed.

In the figure below, the inner ring depicts the chain in a schematic way. This scheme is drawn up for the benefit of the initial and post-initial professional education.



A more future-oriented approach is about the faster integration of innovative developments in education, by designing a second 'innovation cycle' next to the existing development and maintenance cycle of BCPs and qualification files:

### BCP:

This can be achieved by explicitly including the innovative developments into BCP-studies, and thus have more input regarding trends and developments. By adding innovation questions to the research, a better understanding emerges about the direction in which a profession develops itself. This is already happening, but will happen in a more explicit way from 2013, among others by including more closed questions and by asking more detailed questions.

#### Qualification files:

The new qualification files (implementation 2014) are formulated on a more abstract level and thus offer enough space to include actual and innovative elements at a training level (see also the next measure). Moreover the new qualification files have a modified, flexible structure, which enables a quick and efficient update of the files: apart from the basic part (50%) and the fixed efflux profiles (35% per profile), the possibility was created to insert optional parts (up to a maximum of 15%) with either a national or a regional action/validity. In the proposed procedure change, the possibility will be included to have these optional parts officially determined by the joint committee. The entire accelerated determination procedure for optional elements amounts to just a few months (!!).

**Measure** : **Update of current education by making use of the space offered / flexibility in files and execution**

**Category** : A1.1 - Initial education

**Barrier** : programmes and examinations in the initial MBO-education lag behind compared to the actual needs and developments in the market.

#### Explanation

At this moment there are also various possibilities to shape innovations in the existing space. The legislator theoretically provides the necessary space, but in practice this space is hardly used. People stick to the existing interpretation of the curricula and working processes. An important condition to make better use of the existing space, is entering into smart, strategic alliances of parties from the field of the entrepreneurs, the government, the education world and the research world. Underneath we give a number of possibilities on a macro, meso and micro level. There is experience already with this kind of possibilities.

#### MACRO level (Education system / legal)

- The existing professional competence profiles (BCPs) provide in the qualification files sufficient space (because they are quite broadly formulated) to shape sustainability competences in the core tasks and working processes:
  - hard skills: technical knowledge elements, skills etc.
  - soft skills: communication elements – customer-orientedness – chain-thinking – collaboration (teamwork)
- The practice of competence-oriented learning and the accompanying education concepts offer ample possibilities and space to include the required elements in curricula and to carry them out. For example, there are possibilities to treat learning material in projects in a superdisciplinary way (construction and installation technology).
- For the interpretation of the curricula, the qualification files give a coverage of 80% of the available education time: 20% is reserved for current regional colouring in collaboration with the business. Both in the BOL and the BBL variant, further elaborations are possible. In practice, this free space is often used to profile the school or for more general aspects of education (e.g. sports).
- In the professional practice education (formerly the stages), the final responsibility for coaching and assessment (skill tests) rests with the learning institutions. The knowledge centres have the responsibility to accredit the learning companies and to train the coaches. Eventually the real interpretation takes place in the (learning) companies, and companies can introduce students to - and get them acquainted with - sustainability aspects as they are handled by the company concerned.
- With the examination, too (for which the learning institution bears the final responsibility) the learning institution may and can use all possible test categories in order to test the learnt competences.
- Under the current legislation, the term and interpretation of the concept of education time is a point of attention, indeed. There is a tendency for the political world to view education time as the time which is spent in an educational building and under supervision of a qualified teacher. The schools inspectorate sees to a strict enforcement of this. Learning institutions should be able to prove how much time is spent under the supervision of teachers. Learning moments

where no teacher (demonstrably) has been present, are NOT deemed education time. In case of insufficiently realised education time, the learning institution can be punished with fines and eventually with a withdrawal of licenses. A redefinition of the concept of education time could eliminate this inhibiting factor. Moreover, learning moments outside the education building and under supervision of capable but not yet qualified teachers ought to be included.

#### MESO level (ROC/School/MBO College)

- The cooperation with the regional business and knowledge institutions could be reinforced by:
  - Adaptation of the role/function of the work practice committees: they could become more involved with the development of frameworks for the education and the definition of curricula;
  - Making better use of the communication between the learning company and the education team during the vocational practice formation, and also detecting current developments on the work floor and feeding them back to the education in school. This could be part of the role of the practice trainers.
  - Enabling teachers to spend more time in the business, partly by teacher internships.
  - Making sure that companies can spend more time in the learning institution, e.g. in the form of guest lessons or demonstrations of certain innovations, etc.
- In collaboration with the business, specifically work on the build-up and transfer of knowledge. The relevant knowledge could be provided in the form of courses, trainings, colleges or other ways of transferring knowledge. To this end, the parties could draw up contracts among themselves. Current expertise and equipment are made accessible for target groups which have a need for them (example: Lean Six Sigma ).
- The organisation of cross-overs between the existing departments of the ROCs, where based upon content the borders between "traditional departments" are taken down, thus creating space for a cross-fertilization between the construction, infrastructure, electricity and installation sectors, but maybe also other departments of an ROC. Maybe there are possibilities to also prepare the service-providing technology for work in the healthcare sector.
- By executing projects via SIM (the educational interpretation of Bouw Informatie Modellen, BIM). If such projects are executed in collaboration with the business world, an active exchange emerges between the business and the learning institution.

#### MICRO level (Team/teachers)

- Reinforce collaboration with regional business, in which teachers are more actively and more purposefully brought into contact with business:
  - Exchange of practical knowledge in business: guest lessons, demonstrations, use of instruction moments, etc.
  - Reformulation of the tasks of the BPV teacher with more attention for the conscious search for innovations within business, and the identification of innovations which can and should be included in the curriculum of the school.
  - Make a proper division of BPV tasks among the different teams.
  - Enable teachers to take part in projects from the business.
- More attention to study career coaching. Teachers and coaches of the study career of students can inform themselves more about developments in the market and thus give better support with career planning for students.
- The professionalization to which teachers are entitled in their annual task, should also be aimed at extrascholar knowledge and skills, and at developments in the business world.
- Provide developing space within the teachers' task (annual task) to reshape education, education concepts and curricula, incl. BPV, within the outlined possibilities and work from the indicated work forms and tuning lines.
- Accelerated introduction of BIM, LEAN, Revit in the training.

General possibilities to include innovations into the current structure:

a. First of all, it should be stated that the current qualification files provide quite a lot of space for adopting innovations already. It should be examined in which way innovations can already be shaped within the existing space.

A more future-oriented approach includes the accelerated integration of innovative

developments in the BCPs and qualification files. This can be done by explicitly including the innovative developments into the BCP-research, and thus have more input with regard to trends and developments. By adding innovation questions to the research, a better insight emerges into which direction a profession is developing.

b. Existing "old" education systems are inclined to "kill" innovation.

The question is whether incremental improvements can offer a solution here. So, do think in an out-of-the-box way about structures which actually stimulate the embrace of innovations.

Ideas which are mentioned in this context, are:

- Use of the post-initial part as a booster: innovative knowledge could be applied within the initial education.
- Look at current and future career paths (evolution via various BCPs?)
- Establish an HBO-lectorate.

c. Role of the teacher as an innovator is essential.

The role of the employee also has an aspect of an innovator. Many employees innovate (from) themselves. This innovative role is performed by many teachers because they have a strong affiliation with the field based upon their involvement with their subject, follow the developments and elaborate them into their own learning material. On the website [www.duurzaammbbo.nl](http://www.duurzaammbbo.nl), a large number of examples can be found.

d. Promotion of training places.

The construction sector is in dire straits because of the depression. Companies in the region fire personnel because of a lack of orders, or go bankrupt. Studies show that construction workers who have had a chance to broadly orientate themselves during their training, like e.g. in restoration/renovation, are best positioned to find a job again, even in this time of crisis. This way, many self-employed individuals and odd-job companies have found their way. Stimulation of training places by the authorities thus offers a clear added value. (e.g. in restoration projects by RIBO, where additional specification conditions are added around sustainability).

In view of the notion that restoration is a good example of sustainable construction, renovation projects in which sustainable use of materials is applied, can also be taken into view, in order to indirectly link students to recycling of sustainable materials.

e. The steppingstone of internationalization as a source of inspiration.

At Euroskills / worldskills too, innovations play an important role, besides the traditional skills. The deliberate placement in another (international) perspective of a professional skill can be the onset of a fertile discussion about vocational training in that region with the branches, with innovations as a special objective.

Thus, this works both ways: on the one hand the branch looks at what happens internationally in the field of professional skill (Euroskills, make team competitions/ test assembly in which the sustainability aspect plays a strong role), and on the other hand collaboration could also create broader professional skills, for which good and appropriate trainings should be organized.

Especially in the border regions, European integration creates an increasingly euregional labour market, in which people are prepared to accept work in the neighbouring country. For example, it is known from the Euregio Rijn Waal (roughly the area between Duisburg and Ede) that before the depression every day about 3000 Dutchmen went to Germany to make a living there. During the worst time of the difficult years in Germany, 15,000 Germans would come to The Netherlands every day to work.

f. Linking masterpieces and proficiency tests to professional games.

By linking the fabrication of masterpieces and proficiency tests as examination assignments to professional games, discussions which are held in The Netherlands about vocational training, will be put into a different perspective. Sustainability is added as a competitive element. The overlaps in the various trainings will be recognized.

After a certain period of time, international assessment systematics should be applied. The Ministry wants to promote professional games for LOB activities and excellent professional skills. Here lies an opportunity for acceleration.

**Measure** : **Organization of train-the-trainer sessions to increase the capacity of qualified providers and to assure a good regional availability.**

**Category** : C5.1 - Teachers/practical trainers

**Barrier** : Trainers must be retrained. Teachers are often ill-informed about developments in the construction practice.

**Explanation**

Possible actions at micro, meso and macro level;

Micro level (Team/Teachers)

- 1 ROBO (Regionaal Overleg Bedrijfs Onderwijs) meetings 6/year; formulate clear goals with regard to innovation and environmental technology.
- 2 'Compulsory' teacher internships in business (innovative companies in environmental matters); 6/year. Include into annual task of teachers.
- 3 Professional literature (related to environment, innovative) in the staff room.
- 4 Attract teachers who are partially employed in the business.
- 5 Use of guest teachers for :  
students (lessons, workshops, graduating) : project-oriented.  
teachers (workshops, case education): process-oriented, insight-oriented.
- 6 Assess graduation projects (with a minimal 'environmental level') in close collaboration with the business, generate projects which stem from practice and which are not older than, say, 2 years.
7. (ROB) develop (learning) material with the various fields of attention and suitable places to derive information from (databases, internet etc). Excursion possibilities, good practices. And coaching with the implementation.
8. Teachers coach students INTO the work field (broadening of domain). This way the teachers stay up to date about the latest developments. Frequent consultation with the business is then assured.

Meso Level (School/ROC)

- 1 'Cross-fertilization' between the various teams (more intensive collaboration, e.g. between Architecture and installation technology); exchange of teachers for teaching certain lessons (integrated construction).
- 2 ROC-wide 'theme weeks' in the field of environment and sustainability; simulation projects In which students and teachers of various directions work together on a project (see 1)
- 3 Create ROC-wide 'innovation team' on which both teachers and students, managers have Seat.
- 4 Assign representatives (teachers) per ROC, who frequently have contact about content with knowledge centres (Fundeon, Consortium, OTIB etc.)
- 5 (More) intensive collaboration with schools of higher learning (and maybe universities) in the field of environment and energy technology (in the form of theme projects?)
6. More intensive collaboration between **all** parties involved in the working process (clients, authorities, designers, operators etc.) and entering into 'Strategic alliances' between the various parties. With various ROCs, there are already organized regional forms of consultation with the business. In Nijmegen, for example, this is called ROBO. In other places we know "the friends of ...". It is the intention that the agenda of these consultations to a large extent consists of topics from the business.

Macro level (Education system/Legal)

- 1 Preliminary to the 'teachers register': have technology teachers 'certified' in the field of environment (in order to fall within a certain function scale, the teacher needs to take an annual refresher course, dealing with various environment and energetic aspects). Some suggestions are EPC, Bouwbesluit, EPA .....

- (Example: Architects should annually prove that they have had some 'schooling' in their field in order to stay included with the register of architects).
- 2 National examinations for technology studies (MBO, HBO, WO) in the field of environment technology, energy saving etc. (see language and arithmetic skills) for both teacher trainings and regular trainings.
  - 3 Inclusion of knowledge level about environment and energy technology into the various qualification files (follows from 2) (adapt curriculum).
  - 4 Adaptation of the qualification files to the requirements of Brussels (Europe 2020) regarding sustainable construction and the environment. (Sustainable construction should become the 'standard', and not an added value).
  - 5 Adjust BCPs, to make them '2020'-proof (see above: measure).
  - 6 Stimulate chain approach and awareness of that.
  - 7 More active pursuit and exchange of knowledge in the various KD's and BCPs.

## V. Appendix V Monitoring plan

### V.1 Status quo analysis as a basis

The analysis in the BuildUpSkills - Rapport Status Quo analysis (<http://www.buildupskills.nl>) shows that major steps are still needed to retrain professionals in the construction sector, in order for them to obtain the skills required in relation to energy efficiency and the use of renewable energy sources. That is a condition for meeting the '2020 objectives' endorsed by the Dutch Government.

Until 2011, the construction sector has fallen short of the intended contribution to energy saving. In spite of a target of 2.4 million houses, a total of 314,000 houses have been made energy-economical at a rate of 20-30% from 2008 to 2010 (research Agentschap NL). If we stick to this 'commuter train scenario' (term Uneto-VNI, a green chance for an empty goal), in which development continues at the same pace as during the past years, then the growth of sustainability and economy in energy will remain too modest to attain the 2020 objectives.

#### V.1.1 Why monitoring?

The reporting of the status-quo analysis gives a catching random indication. Because of this, it is necessary to set up a 'living' and as continuously as possible monitoring procedure, in order to keep the initiated 'upskilling' going. Apart from striving to give a new random indication of the WP2-reporting (to obtain a 'printout' of relevant data at recurrent intervals), the intended monitoring approach is also intended to serve as a catalyst to get the relevant and involved parties in motion and to keep them on course.

Partners in the BUSNL project who have access to relevant information sources, must be well connected to the monitoring process which is to be developed. This way, those parties can keep supplying relevant data without too much extra effort.

Monitoring will be actively boosted and kept up by the Platform BuildUpSkillsNL, which at this point is in formation.

#### V.1.2 What to monitor?

Monitoring is mainly about the evaluation and impact of the Roadmap actions. 'Standard' issues will be taken into account, like statistical data about the built surroundings, about the training and about the labour turnover in the sector. Besides, it is important to follow the involvement and activities of relevant market parties. Including the autonomous actions performed by them, which add value and have an effect upon the actions of Platform BuildUpSkillsNL.

At the same time, monitoring should constitute the basis for following the upcoming Pillar II activities. The main general achievement indicators (KPI's) for these activities are:

- (1) the number of trainings which are started up,
- (2) the number of employees to be trained,
- (3) the number of training hours,
- (4) the specific costs per trainee,
- (5) the realized production of renewable energy,
- (6) the realized primary energy savings,
- (7) and the reduction of greenhouse gas emissions.

The number of students (BOL/BBL) leaving with the right profiling and suitable competences/optional modules from initial education, is a BUSNL-specific education achievement indicator (8).

### V.1.3 Monitoring starting points

It is all about the effect of the learnt matter on the quantity and quality of the realized matter. This has mainly to do with the cycle:

--> (additional) education -> building up experience -> the effect in practice

The focus is on the professional practice and SME, which is fed with trained people from the initial and post-initial education. These starters and matured professionals are presumably not sufficiently equipped to perform the required jobs. This leads to failure costs (as perceived both by clients and by contractors!).

So, in the end it is all about monitoring of the work quality delivered by these professionals, in which the attainment of the 2020 objectives serves as a foundation.

Via monitoring (direct feedback), the Roadmap activities are applied to address the construction practice (in relation to 2020 objectives) via failure costs problems. Thus, monitoring gives an insight into why education-related measures are necessary, and which problem they help to solve.

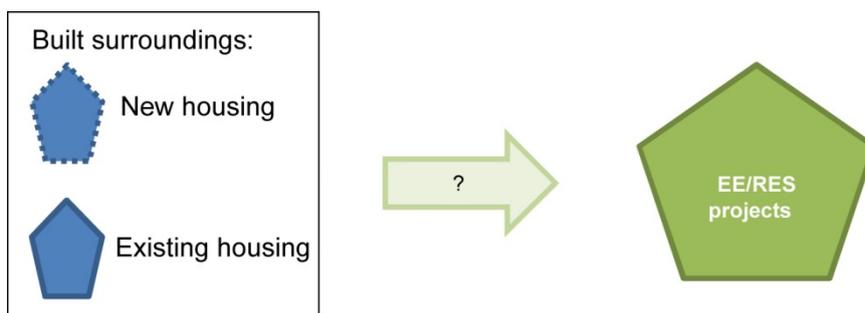
Activities from Platform BuildUpSkillsNL, like facilitating and supporting through-development of the already active parties, offer a possibility via monitoring (indirectly) to relate failure costs to (a lack of) competences and the associated quality aspects. This way, via monitoring something is directly done in return for the front runners, which ultimately also enables the measurement of the effect of the measures taken directly with the target groups. Based upon this, further actions can be applied/adjusted where necessary. This way, monitoring provides input for carry-over of urgency of quality improvement and development at different levels.

### V.1.4 Setup monitoring

Monitoring in the scope of BUS-NL is about the relations between:

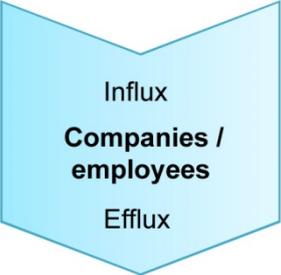
1. Policy/regulation
2. Built surroundings
3. Training/schooling
4. Companies/employees
5. Innovations/(technical) developments
6. Activities Platform BuildUpSkillsNL

A. At first, a number of standard issues must be monitored, like the availability of projects related to 2020 objectives. Will they reach the market anyway, and if so, in which shape? This also includes matters like market conditions, market development, influence of policy and regulation, with a distinction between new housing and renovation:



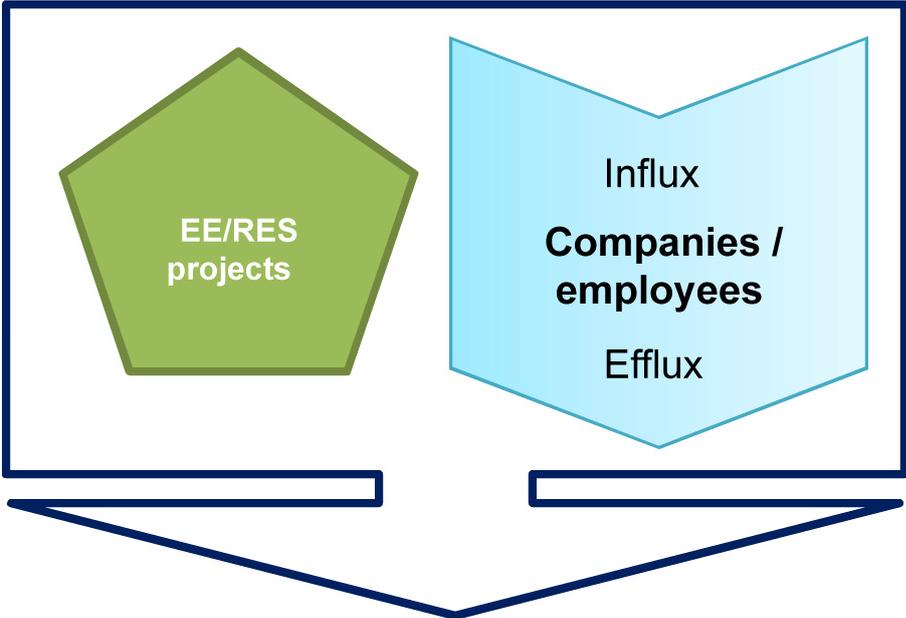
These data mainly stem from EIB, Agentschap NL and CBS sources. It is expected that current periodical research should suffice to keep the data up-to-date.

B. In connection with this, general numbers about availability of relevant employees / disciplines should be monitored. Are there enough people to carry out these projects?



The general numbers about influx and efflux of employees, including ageing of the population and a view on training activities come from EIB, OTIB, Bouwend Nederland and UNETO-VNI sources. The flow of students with the right updated profiles comes from the Annual Suitability Studies ROCs; first generation 2013 is out. As is the case with the data under A., relatively little effort will presumably be needed to obtain these data. It is expected that nearly 100% can be supplied by the parties linked to Platform BUSNL. Thus, they can be considered as 'quick wins' for monitoring. This means that the connection and involvement of the 'supplying parties' must be accentuated in the coordinating activities in Pillar II.

C. However, it is all about the effect:  
With what results are these projects carried out by those people?



*[Evaluation with failure costs and quality as criteria.]*

The operationalization of this should mainly take place via (a panel of) companies at project/project team level. They indicate themselves what the quality of their (team)work is, translated into (estimates of) failure costs. Monitoring can then be purposefully employed as an educational tool.

As indicated in the status quo reporting, seeing yourself as a part of the larger entity of the construction project is one of the most important aspects for improvement. It is mainly about the connection between disciplines: which parts/activities of the other disciplines serve your own good or interest? Energy label new housing is a possible data source, which can even trigger a behaviour change; including the attitude towards learning.

With the evaluations, it is important to check whether failure costs can be attributed to (a lack of, or taught) competences/skills of employees or to other matters (which from a BUSNL professional skill point of view comes under 'the rest'):



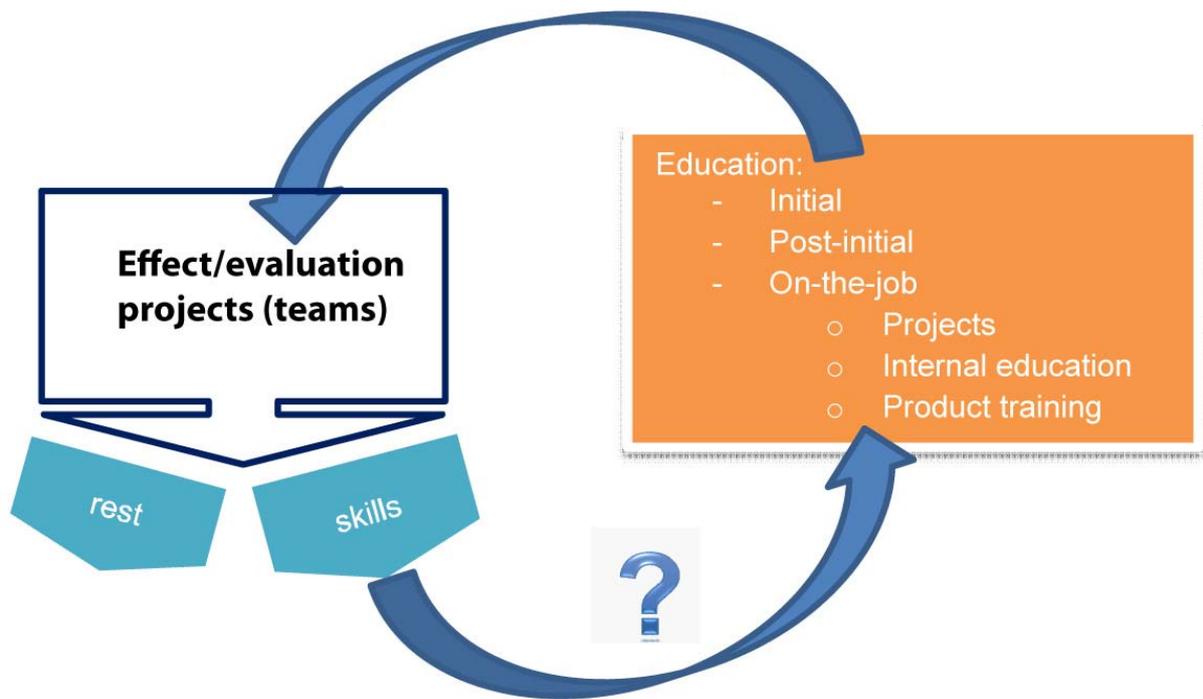
It is important to take into account the fact that on the basis of established quality (in retrospect) alone, no univocal feedback is possible to professional skill! Aspects like coaching, design, intermediate changes, nonsensical rules, deficiencies or wrong materials, destruction of good work by third parties, extreme weather etc. all play their part in the realization of the quality. These issues could maybe unravelled through intermediate measurements and monitoring during the construction process itself. However it is about (relative) improvements, from the perspective of those involved, which eliminates the need for an absolute measurement.

Often, an absolute measurement is also quickly related to 'pointing/blaming', which can make it undesirable.

The existing structures can hardly accommodate this relative aspect of monitoring. Retrieving the level of knowledge and skills of the professional in this way is one of the conditions, however, to arrive at effective monitoring (and to realize Roadmap activities).

In the methodology it is mainly about the continuous measurement and analysis of the data from the monitoring setup above – a 'continuous (dynamic) monitor'. The data can be related to three topics:

1. Initial education effect (quality school-leavers). Especially seen through time; if they become ever better, this has to do with adaptations in the curriculum, etc. Monitoring this 'loop' is particularly important for the educational side, because of its connection with curriculum and policy, and should be anchored via MBO Diensten, Fundeon, Kenteq and OTIB. It has also, among others a direct relation to 'feedback loop' within "Trade monitor" and with the flow of students with the right updated profiles (Annual Suitability Studies ROCs give a decisive answer).
1. Post-initial education effect. The same questions as with initial education effect, extended with: what is (variation in) need for trainings/courses, and are the employees actually sent to there? Monitoring this 'loop' via (a select group of) course and educational institutions (see list in 6.2.3 of status quo report).
2. Learning on-the-job effect; a combination of informal learning in projects, internal trainings and in-company (product-related) courses. Although on-the-job education can partially be considered to be a part (subcategory) of initial and post-initial education, in monitoring the choice is made to treat it as a separate category. This is partly because this way it can also be seen as a major chance for (changes in) current dominating structures within initial and post-initial education.



It is important to also include cross-links as far as possible. How does (the effect of) EE/RES innovations trickle through (e.g. short-cuts to trainings via teachers) and who has a vision to it? Here market research bureaus may have a role to play. It can best be addressed by looking for a connection via Platform BuildUpSkillsNL with the current (permanent) studies and platforms, e.g. by initially extending the presentation of questions in current studies.

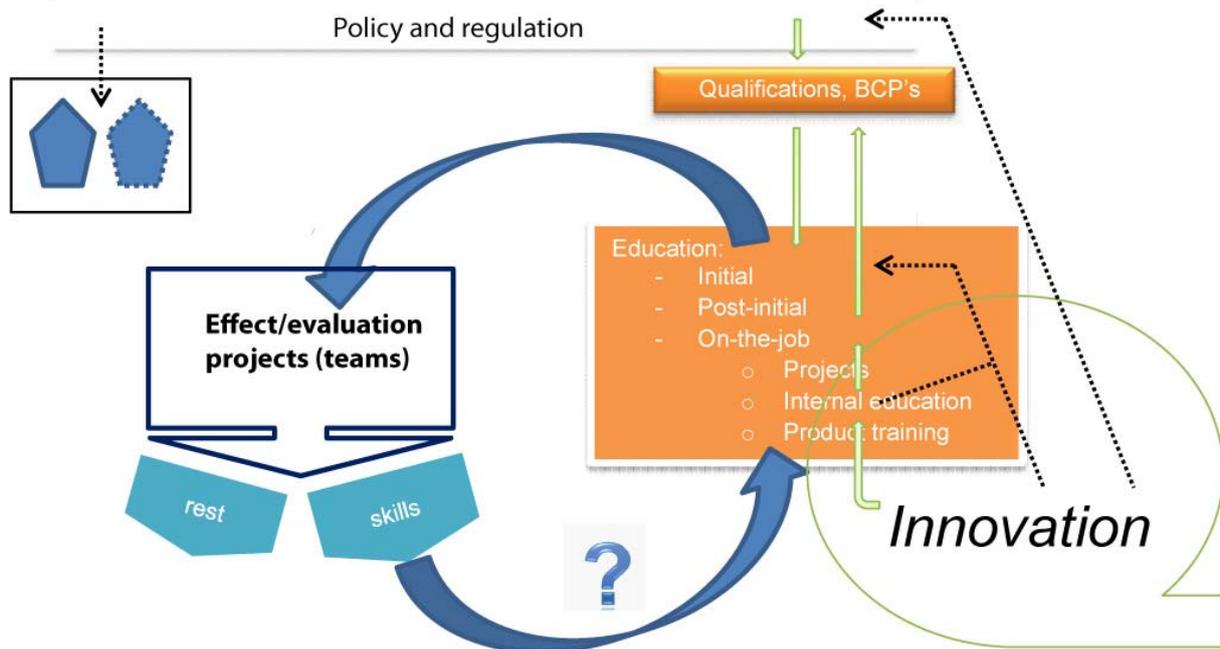
The required competences follow the innovations regarding EE and RES. These innovations mainly come from industry and research, but can also emerge in practice with the companies themselves. Since many competences are obtained on-the-job, especially with innovations which are developed in-house within projects, it is desirable in any case to connect trainings to projects as much as possible. Otherwise it will remain difficult to assess whether the desired impact stems from an (improved) education supply, or from learning-on-the-job.

Companies which qualify for accreditation, should also be monitored. A similar consideration goes for 'official' trainings; a once-only accreditation is not sufficient. Continuous monitoring is necessary. A smaller-scale cycle and the role of monitoring therein, of the development of criteria and final terms for courses, trainings and tests is part of short-term tool development (see chapter 5 overview).

Monitoring quantitative parts via supply of trainings; initial, post-initial, on-the-job in/via projects. How many people have (successfully) followed trainings (information mainly via Fundeon, Kenteq and SBB suitability studies MBO). Sub-parts are: how large is the enthusiasm and willingness to send people to trainings (information mainly via current periodical studies by market research bureaus), how are trainings maintained (initial via MBO Diensten).

Qualitative parts should mainly be related to effects, and should be obtained as directly as possible via companies themselves. Platform BuildUpSkillsNL should take care of this.

### V.1.5 Roles of different parties



With monitoring, a distinction can be made in type of information. The roles of parties can be linked to this.

#### - Basic data:

- Characteristics of built surroundings, in relation to EE and RES
  - Information comes mainly from CBS, EIB and AgentschapNL.
  - Connect to current initiatives, wherever possible to be extended with specific EE and RES focus.
- Labour market, general data about numbers of employees, related to influx, efflux and greying of population per relevant profession.
  - Information comes from EIB, OTIB, UNETO-VNI and Bouwend Nederland
  - Connect to current initiatives, wherever possible to be accentuated at a professional level.
- Policy and regulation in relation to 2020 objectives.
  - Information comes mainly from Agentschap NL (new performance requirements), MBO Diensten (education developments).
  - Connect to current initiatives, wherever possible to be extended with effect measurements.

These basic data serve for the calculation of the three Pillar II KPI's, namely:

- (5) the realized production of renewable energy,
- (6) the realized primary energy savings,
- (7) and the reduction of the emission of greenhouse gases.

The decision about the method of calculating will be part of Platform BUSNL activities and will also partially fall under anticipated Pillar II activities.

The method of calculating for the assessment of these three KPIs must be based on the projects actually made available and executed. The projection will be based of the effect of the results achieved in these projects. This information is directly obtained 'from the field', which will have to be gained via panels of companies and professional clients. Via Platform BUSNL, cooperation of Opmachtgeversforum, Bouwend Nederland, UNETO-VNI and others will have to be found.

The execution of projects depends on different previously described relevant disciplines. For the employees from these disciplines a new (post-initial) education supply is created based upon the BUSNL Pillar I activities. It should lead to the acquisition of new competences and has a direct relationship with the following Pillar II KPIs:

- (1) the number of trainings started,
- (2) the number of employees trained,
- (3) the number of training hours,
- (4) the specific costs per trainee,
- (5) the number of students (BOL/BBL), which graduate with the right profiling and suitable competences/optional modules.

These can be bundled into Roadmap data.

- **Roadmap data:**

- o The number of trainings (per type/target group) started up.
  - New initiative, information comes primarily from/via BUSNL consortium partners (OTIB, Fundeon and Kenteq).
- o The number of employees being trained.
  - New initiative, dependent on suppliers (which is not clear at the moment), information comes primarily from/via BUSNL consortium partners (OTIB, ISSO, SBR, Fundeon)
- o The number of training hours
  - New initiative, dependent of suppliers (which is not clear at the moment), information comes primarily from/via BUSNL consortium partners (OTIB, ISSO, SBR, Fundeon)
- o The specific costs per trainee
  - Dependent on suppliers, will be elaborated in Pillar II.

Looking at the primary focus of BuildUpSkills, i.e. the impact of initiated activities, it must be concluded that 'basic data' and 'Roadmap data' do not suffice to draw any conclusions about the effectivity attained. In order to enable a closer evaluation, it is necessary to take one more step in the monitoring process.

First of all, with EE/RES projects with executing companies, it is necessary to make a distinction between employees who have acquired their skills (a) via initial education, (b) supplemented with post-initial education and/or (c) on-the-job (internal trainings and internal courses).

This can be done prior to the execution of EE/RES-related projects. By doing so, all companies in the sector can be considered to be the target group, enabling an analysis of all companies in the sector, regardless whether they have the direct prospect of an EE/RES project. A similar analysis can provide a direct update of status-quo data. But the prime intention is to perform, with the panels of companies, an evaluation of realized EE/RES projects, which must yield the data about the educational background of employees (a, b, c) and the results attained (in terms of quality and failure costs). These subjective evaluations (which are filled out by the companies themselves) give an indication about the relation between skills and project result, and an insight into which skills are needed for the execution of these projects, and where/how they are obtained.

By doing so, a direct relation with the new supply, resulting from the Roadmap, can be made, i.e. in two ways. Firstly by making visible the concrete match between (new) post-initial supply and the way in which (new) skills are actually acquired. Secondly from the effectivity of new supply in relation to project results; including the relative share as compared to other ways of acquiring skills, with a possible change of the (forms of) supply as a result – the effect of which can subsequently monitored as well. Both ways lead to a specific evaluation, adaptation and verification of roadmap activities.

This can only be initiated from 'panels of companies', or 'communities or practice'. In both cases it is necessary to provide for an active booster role for the setup of panels, the subsequent collection of information, the processing of this information, and the initiation of subsequent actions on the basis of conclusions developed. With this, a mechanism will be created for the specific adaptation of Roadmap activities, but also, if necessary, of starting points and nature and structure of the supply. This necessitates a proactive Platform BUSNL, which will have to put flesh on the already initiated endorsement activities. The BUSNL consortium partners are intent to take on a pulling role at the execution of Platform activities.

Thus, at the implementation path of monitoring, a distinction between three flows must be made:

- I – continuous tapping of basic data, with an insight into absolute changes in time as a result;
- II – monitoring of the running of BUSNL Roadmap programme, with an insight into the (pace of) realization of initiated activities as a result;
- III – evaluations of construction projects, with an insight into relative improvements as a result.

The insights gained under III show the effectivity of the activities initiated under II, and can lead to adaptations where needed. Just monitoring the realization of quantitative targets under II does not say anything about its effectivity and the realization of the intended impact of Build Up Skills.

At the same time, the link between the results gained under III and insights with the measuring data I for the facilitation or determination of calculating methods which can lead to useful statements about (5), (6) and (7) KPIs.

Although the first two monitoring flows are significantly faster and easier to realise, it is important with the implementation path of monitoring to start with the setup of (a basis for) flow III monitoring. This does cost more time and effort indeed, but it is indispensable to arrive at well-founded statements about the potential and impact of BUSNL measures.

## **V.2 Progress and quality measures Roadmap**

Monitoring the progress of the actions in the Roadmap (WP3, chapter 5) pertains to high priority actions, as defined in H4. This concerns 14 actions, 10 of which have a direct relation with the model and activities as described in 6.1. Below follows an explanation about the way they can directly be included / made part of Platform BUSNL activities.

### A1.1 (development shortened cycle embedding innovations)

- Part of initial education, of direct interest and part of current activities of a number of BUSNL partners (Fundeon, Kenteq, MBO Diensten).
- Fits into the feedback loop skills, besides direct relation with monitoring innovations.

### A2.1 (development education/examination product)

- Part of initial education, of direct interest for a number of BUSNL partners (Fundeon, Kenteq, MBO Diensten, ISSO, SBR).
- Fits into the feedback loop skills, where an extra emphasis on reflection of business from Platform BUSNL is needed.

### A2.3 (development career paths)

- Requires special attention from Platform BUSNL, because it can also lead to a change of (interpretation of) roles within existing (education) structures.

### A3.1 (utilizing post-initial education for new BCPs)

- Potentially a very effective measure. Monitoring will be mainly concentrated on the right communication and good exchange of data. It remains partly dependent on the goodwill of the providers of post-initial education.

### A10.1 (developing new BCPs/qualifications)

- Monitoring ensured by direct involvement (and responsibility) of Fundeon.

### B4.2 (development branch qualification structure professional skill)

- Directly linked to A1.1, but from PI focus.

### C5.1 (train the trainer programmes)

- Monitoring, including boosting the action, directly linked to (pool of) companies via project teams. It is part of a feedback loop for adjustment of supply, creating an expectation that it will become one of the prime effects of Platform BuildUpSkillsNL.

### G13.1 (monitoring instruments)

- Roadmaps give a first impulse, elaboration reinforced via endorsement.

### N25.1 (assuring continuity Platform BuildUpSkillsNL)

- Transparency and accessibility. Linked to clear communication.

#### Q31.1 (keeping course material up-to-date)

- The entire setup of monitoring in 6.1 is about the (possibility of) continuous updating. As such the best assured measure; obviously if executed correctly.

The remaining 4 actions will be treated separately.

#### B4.1 (better disclosure of course catalogues post-initial education)

- Monitoring is mainly aimed at continuous measurement of effects of measures. Course catalogues have an informing function. And although they are directly co-responsible for the success or failure (not being able to find trainings also means not being able to yield results), they fall outside the monitoring model. Setting them up in a constructionwide way can be an effective means to also increase the visibility of Platform BuildUpSkillsNL. Therefore it will have to be included in the elaboration of Platform BuildUpSkillsNL;

#### F12.1 (possibilities personal certification)

- An implicit relation with nearly all activities, but not an explicit part of the monitoring model from 6.1. As such also dependent on direct involvement and interest of BUSNL partners). Should an external study a possibility and/or fixed part of Platform BuildUpSkillsNL be set up, it will be included.

#### F19.1 (quality assurance and accreditation of post-initial trainings)

- Comparable to F12.1, in which the role of Platform BuildUpSkillsNL will probably be limited to listing agenda items and observe.

#### H15.1 (development interdisciplinary trainings)

- Necessity decrees that it should actually be part of setup in 6.1. However, it must appear as a logical consequence of first iteration in feedback loop, it is a possible result of evaluation (which is a direct part of monitoring). Otherwise there is a likely chance that it will not be supported.

# BACK COVER

## **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.