



Final report on the assessment of the BUILD UP Skills Pillar II

Deliverable D4.4

Of the contract EASME/H2020/EE/2015/008 to 'Support for BUILD UP Skills EU exchanges and analysis on construction skills' for the Executive Agency for Small and Medium-sized Enterprises (EASME)



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Unit B.1 — Energy

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Evaluation of BUILD UP Skills Pillar II

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EXECUTIVE SUMMARY

This report aims at assessing BUILD UP Skills' Pillar II initiative and constitutes the final deliverable of the contract EASME/H2020/EE/2015/008 'Support for BUILD UP Skills EU exchanges and analysis on construction skills' for the Executive Agency for Small and Medium-sized Enterprises (EASME) in the evaluation report form of the.

The overall approach to the assessment of the BUILD UP Skills initiative is based on the standard evaluation methodology for European programmes. The assessment framework consists of evaluation questions against six evaluation criteria: Relevance, EU added value, Efficiency, Effectiveness, Coherence and Sustainability. The methods used to collect and analyse the data include desk review of project Interim and Final reports and Common Performance Indicator reports and stakeholder consultation, mainly through interviews.

Findings and overall conclusions

Relevance

Relevance is 'built in' to the BUILD UP SKILLS Pillar II projects through their links to the Pillar I projects (which mapped the skills and other needs in the construction sector in the majority of Member States). Projects have been also adapted based on ongoing customer feedback relating to the nature of the training courses, delivery style and timing.

The original roadmap actions are largely complete, so in theory the roadmaps need to be updated. Updates could focus on supporting uptake as demand grows, as well as on updating course content to keep it up to date. Elements that could be added are the circular economy implications (lifecycle of buildings), Building Information Models (BIM) and use of IT in construction (and IT literacy generally), Near Zero Energy Buildings (NZEBS), energy efficiency in existing buildings and white collar (professional) sectors. This might need different stakeholders and political commitment at Member State level.

EU added value

The European element of the BUILD UP Skills programme enabled the EU Exchange Meetings which provided the main networking and learning opportunities. In some cases new networks created during the EU Exchange Meetings have resulted in new follow-up projects (e.g. H2020 projects). In addition, some project training schemes have been (or will shortly be) recognised at EU level. Finally, in most countries, national funding would not be available for projects such as those supported by BUILD UP SKILLS. In the very few cases where national funding is available, the projects would have been more fragmented compared to the BUILD UP Skills projects and would not include activities beyond the national level.

Efficiency

The quantitative analysis showed that the BUILD UP Skills initiative was relatively efficient in terms of costs to qualify each trainee compared with other programmes. The majority of the BUILD UP Skills projects met their ex ante target in terms of cost per trainee. The BUILD UP Skills initiative has also been relatively efficient in terms of cost / trainee in comparison to other international programmes or similar national initiatives.

Economic barriers (lack of time for training, cost of training), awareness-related barriers (lack of understanding of the importance of skilled / trained workers), legal barriers (delays in introducing energy efficiency related definitions), market barriers (low demand for energy efficient buildings and thus for the skills required to build them), and knowledge barriers (language, varying levels of competence of the trainees, and lack of facilities for practical training) were the most common issues to

adversely affect the efficiency of the projects. Overall, the administrative burden of the BUILD UP Skills initiative was considered low and not higher than in similar programmes.

Effectiveness

The results show that BUILD UP Skills projects boosted education and training of craftsmen and other on-site construction workers and system installers in the building sector and increased the number of qualified workers across Europe. All projects developed and piloted new qualifications and training schemes and/or upgraded existing ones. The majority of projects have achieved the targets they initially set. Overall, this evaluation considers that the programme has been very successful (this is also perceived at the national level by the stakeholders consulted).

Coherence

Sharing experience between BUILD UP Skills projects has been almost exclusively prompted by the EU Exchange Meetings. For many projects this was the only way to share experience and learn from each other (and adjust approaches), for others, these meetings were the beginning of further collaboration. The relationships initiated here also led to new projects and hence to establishing links between BUILD UP Skills projects and projects from other initiatives, like Horizon 2020. It appears that synergies are enhanced when having a consortium partner in the project who is involved in policymaking.

Sustainability

BUILD UP Skills training courses, methods to establish voluntary qualification schemes, competence frameworks, and methodologies for the recognition of previous learning developed by BUILD UP Skills projects can be replicated in other countries, by other construction occupations, and, in some cases, possibly by other sectors.

Continuation is ensured firstly through the outputs e.g. learning materials, which are largely available through the BUILD UP Skills project websites. The work is already continuing or is planned to be continued at local level (e.g. implementing the training courses), national level (e.g. trying to influence policymaking, legislation) and at EU level (e.g. replicating the project in other countries, taking part in H2020 follow-up projects).

Conclusion and Recommendations for all levels of stakeholders

BUILD UP Skills has been a successful, relevant, unique and timely initiative. In many countries, similar training courses did not previously exist, neither were any efforts made to analyse the need for such skills or to bring together the relevant stakeholders. The projects have helped set the basis for education of construction workers, developed high quality and innovative materials, developed a good network and raised awareness among construction workers and policy makers of the importance of energy efficiency and RES and cross-craft skills for blue collar workers. Below, a set of recommendations addressed to specific stakeholder groups is listed.

Recommendations for the European Commission

The EC should continue to support continuing learning and further upskilling of the workforce and should foster communication and awareness raising, of both construction professionals and the general public, concerning the importance of energy efficiency in buildings and the quality of the construction work to achieve this, by:

- **Setting more ambitious targets** for energy efficiency in buildings.
- **Adapting the legislative framework.** For example, by:
 - Setting a requirement for **mandatory training courses** for blue-collar workers for energy efficiency related construction skills.

- Tackling the issue of **mutual recognition** so that training accredited in one EU country is recognised in another EU country.
- Ensuring that every EU country has a **working definition of nZEB** and that this and other **concepts are harmonised** and promoted across the EU.

Recommendations for EASME

EASME should also continue to support ongoing learning and further upskilling of the workforce and should foster communication and awareness raising, of both construction professionals and the general public, concerning the importance of energy efficiency in buildings and the quality of the construction works to achieve this.

Concrete ways to do this include:

- (Continue to) Fund projects for knowledge and skills development as well as projects with strong awareness-raising component addressed to the general public as well as to blue- and white- collar workers.
- A prerequisite should be that projects pursue national recognition, so that the training courses developed are embedded in the national systems.
- Harmonising Common Performance Indicators. Adopt clearer, single methodologies for calculating project impacts (Common Performance Indicators) and their cost-efficiency.
- Maintaining the BUILD UP Skills network through for instance EU Exchange Meeting-like events in the (near) future.
- If future programmes foresee Technical Working Groups, the topics dealt with by these should be directly connected to the projects, addressing actual challenges that the projects are facing and grouping comparable projects into one Working Group.
- Support the update of national skills Roadmaps, possibly inviting new stakeholders (e.g. building managers, construction ICT experts etc.) to participate.

Recommendations for national authorities

- Offering long-term support in terms of funding (i.e. long-term, stable, continuous funding) and implementation.
- Providing recognition of the skills obtained.
- Green procurement: Demand qualifications / skills in their tendering procedures.
- Support awareness raising campaigns.
- Creating a register of companies that employ skilled workers.
- Setting a requirement for mandatory training courses.
- Requesting / Funding new / updating the national skills Roadmaps regardless of whether the EU does (or does not) request / suggest an update.

Recommendations for project coordinators and other training developers

- Awareness-raising of the importance of skills and training.
- Offer practical, flexible training courses adjusted to the various needs of workers.
- Involve target groups and other stakeholders from the beginning.
- Proactive promotion of training courses and marketing training courses. Consider timing for promotion e.g. marketing courses immediately before periods when there tends to be less work.
- Active participation in the update or development of new national Skills Roadmaps.

1. INTRODUCTION

1.1. Purpose and scope of the evaluation

This evaluation is the final deliverable of the contract EASME/H2020/EE/2015/008 'Support for BUILD UP Skills EU exchanges and analysis on construction skills' for the Executive Agency for Small and Medium-sized Enterprises (EASME).

The objective of the contract was to foster exchanges and cooperation between the different countries implementing the national initiatives of Pillar I BUILD UP Skills. The aim was to do this by means of the following:

- 1) Fostering international exchanges and cooperation;
- 2) Monitoring and reporting on BUS projects and evaluating overall BUS initiative.

Work Package four (WP4) of the contract aimed to assess BUILD UP Skills' Pillar II. This assessment is delivered in the form of this Evaluation Report (D4.4). The call for tender for this assignment described this work package as an assessment. In order to produce outputs which are of maximum utility for EASME, it has been suggested that this work package should effectively be considered as an evaluation. Therefore, in this report the programme has been evaluated according to the contractor's own, tailored evaluation criteria (further explained in the Methodology Chapter).

2. BACKGROUND OF BUILD UP SKILLS

2.1. Description of the BUILD UP Skills initiative and its objectives

The first calls for BUILD UP Skills proposals took place in 2011 and 2012. Against the backdrop of the 2020 energy targets of the EU, projects across 30 EU countries (EU-28, the Former Yugoslav Republic of Macedonia and Norway) were funded to work on national roadmaps for qualifying the building workforce in these countries. These projects developed national qualification platforms and roadmaps that would serve to successfully train the building workforce in order to meet the targets for 2020 and beyond. This phase is known as Pillar I. The report 'BUILD UP Skills – EU overview report Staff working document' published in 2013 -and revised in June 2014- summarises the results of this phase.

As a follow up, new calls for proposals were launched in 2012, 2013 and 2014. A total of 22 projects were then funded to help implement the roadmaps developed in their countries. This second phase, known as Pillar II aimed to design and implement new qualification and training schemes and/or to upgrade existing schemes, based on the roadmaps developed in Pillar I.

The BUILD UP Skills initiative continued via the construction skills strand of the European Horizon 2020 research and innovation programme (H2020 EE4 Construction Skills). Aiming to support and further develop multi-country qualification and training schemes, five (transnational) projects ([BUStoB](#), [ingREeS](#), [MEnS](#), [PROF-TRAC](#) and [Train-to-NZEB](#)) were supported. The coordinators of these projects also participated in the BUILD UP Skills EU Exchange Meetings, which allowed them both to exchange experiences with the BUILD UP Skills project coordinators and to create synergies amongst the five projects.

The H2020 programme has continued to support BUILD UP Skills type projects. The 2016 H2020 call approved five projects which started in 2017. Three of these are

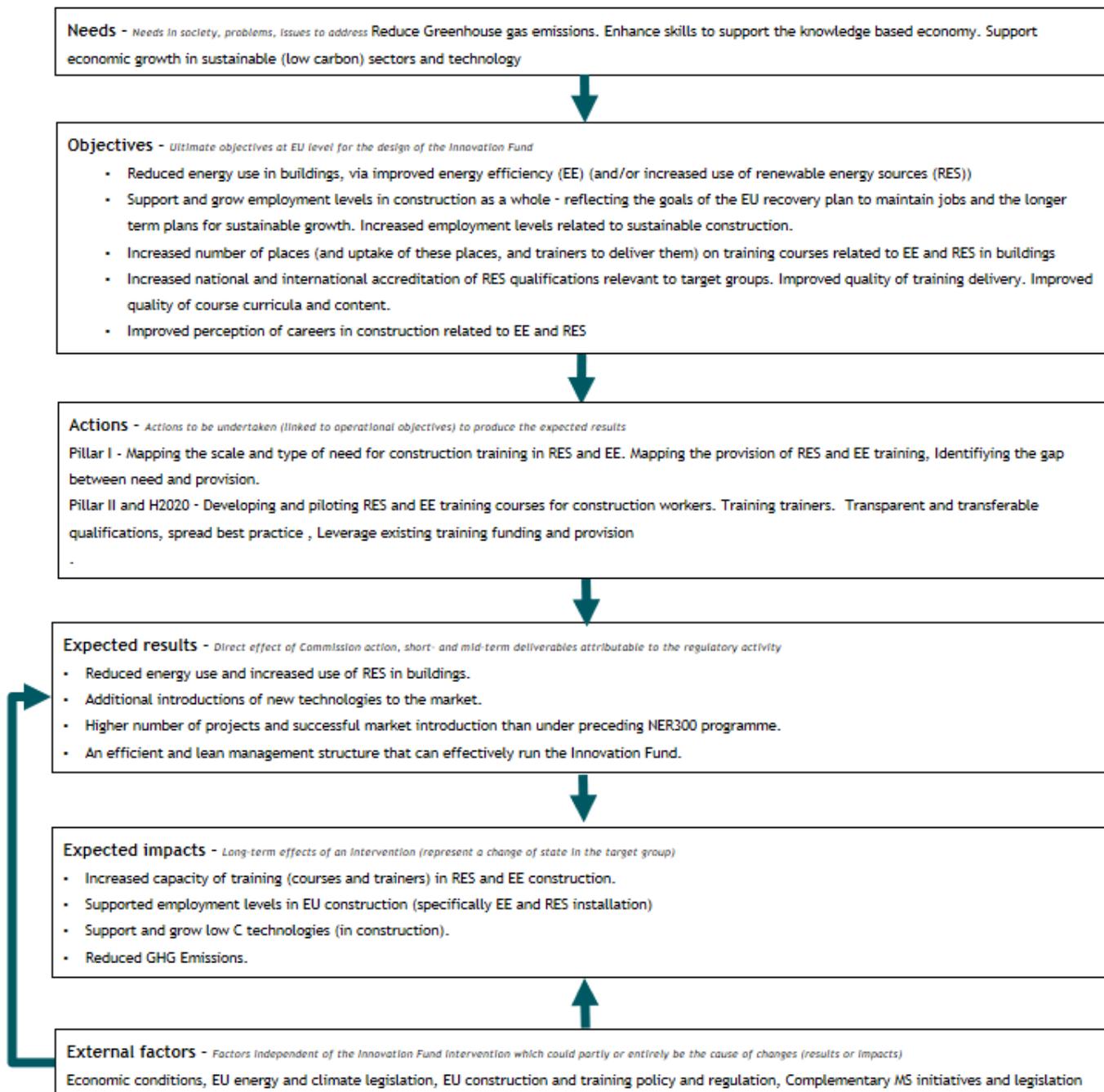
focussed on Building Information Models (BIM). The projects are briefly described below, but they are not included in any analysis in this report¹:

- [Fit-to-nZEB](#) (Coordinated by the Energy Efficiency Center/Eneffect foundation) – Start: 15/6/2017. Subject: Innovative training schemes for retrofitting to nZEB-levels
- [Net-UBIEP](#) (Coordinated by ENEA) – Start: 3/7/2017. Subject: Network for Using BIM to Increase the Energy Performance
- [BIMplement](#) (Coordinated by Alliance Villes Emploi) – Start: 1/9/2017. Subject: Towards a learning building sector by setting up a large-scale and flexible qualification methodology integrating technical, cross-craft and BIM related skills and competences
- [BIMEET](#) (Coordinated by Luxembourg Institute of Science & Technology) – Start: 1/9/2017. Subject: BIM-based EU -wide Standardised Qualification Framework for achieving Energy Efficiency Training
- [NEWCOM](#) (Coordinated by the Austrian Energy Agency) – Start: 1/9/2017. Subject: New competence for building professionals and blue-collar workers – certified qualification schemes to upgrade the qualification for building nZEBs

2.2. Intervention logic

An intervention logic for BUILD UP Skills Pillar II has been developed by the contractor. The intervention logic is important for evaluations as it defines what the desired outputs, impacts and results of the programme (and its constituent projects) should be. These outputs, impacts and results should align with the indicators selected for monitoring under WP4. The table and indicators below are adapted from our original impact assessment and updated given how the programme has transpired.

¹ The scope of this evaluation is limited to the BUILD UP Skills Pillar II projects which have been continuously monitored. The H2020 projects listed are relevant to mention due to the fact that some are continuing the work of various BUILD UP Skills projects. When that is the case, that has been captured in this report.

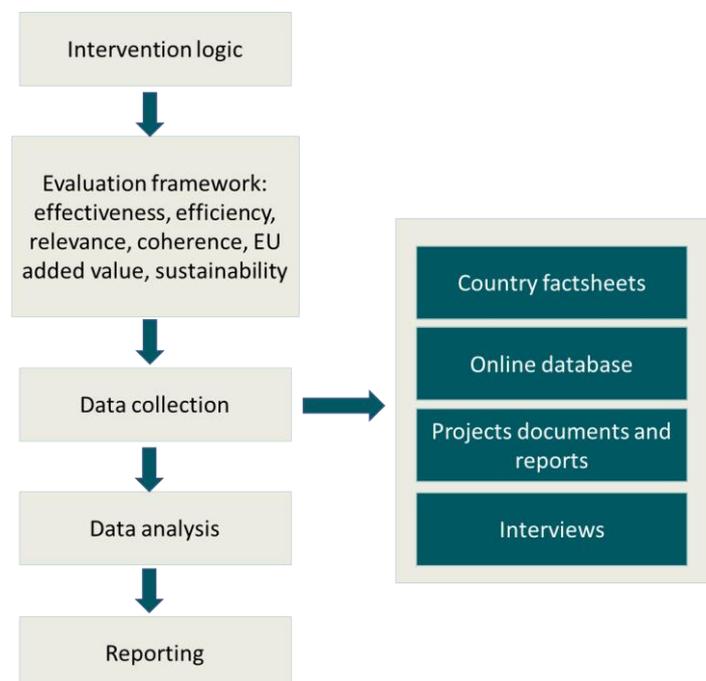


2.3. Baseline

The overall approach to assessment of the BUILD UP Skills initiative is based on a standard evaluation methodology used for evaluations of European programmes. This methodology consists of developing an intervention logic, and an evaluation framework with questions addressing five evaluation criteria: Relevance, EU added value, efficiency, effectiveness and coherence. An additional criterion, sustainability, was added to the evaluation framework as it is an important aspect to evaluate in the framework of this initiative. The assessment was carried out in three phases: data collection (desk research and stakeholder interviews), data analysis (against each of the evaluation criteria), and reporting.

The data collection and analysis partly built upon the project monitoring activities carried out during WP3 and additional stakeholder interviews with relevant stakeholders and project coordinators carried out during WP4. In particular the country factsheets and projects online database developed as part of WP3 were an important part of data collection and analysis.

Figure 2-1 Overview of the approach



The approach also takes into consideration the evaluation of the impacts of the BUILD UP Skills Pillar I, carried out by COWI. This evaluation included a proposed methodology for assessing the medium to long term impacts that the BUILD UP Skills projects should generate. The report contains the following key points of relevance to our approach:

- The Pillar II projects all include project specific indicators but also common performance indicators.
- For each project the proposal requested targets to be set for achievement during the course of the action (shorter term results and impacts) and by 2020 (Longer term impacts).
- Monitoring arrangements are not usually described in detail in the proposals, and it may therefore be difficult to assess whether budgets allocated are commensurate with the specific workload.
- While the baseline is supposed to be provided by the Status Quo Analysis, situations might have changed drastically before the inception of Pillar II actions and thus, updates of the SQAs would be required – e.g. Spain.
- There is a disconnection between the monitoring needs of projects and those of the Commission. Project specific indicators are fairly straightforward to monitor and are fairly representative of the projects outcomes. However, the Common Performance Indicators, adopted by the Commission, are much further away from the direct outcomes of the projects, and therefore require a number of iterative calculations based on initial assumptions. This makes these indicators difficult to estimate without adequate training.

The report suggests a number of methodological steps to evaluate the impacts of Pillar II projects. The following table lists these steps and shows how our approach (and other activity by EASME) addresses these:

Table 2-1 Alignment of the approach with the evaluation of BUILD UP Skills Pillar I

Methodological Steps (from COWI report)	Comments
1. Agree on the level of impacts to be monitored and the purpose of the reporting.	WP3 (of our project) involves collection and collation of the monitoring data from the Pillar II projects. This includes data on outputs (and impacts where possible).
2. Agree or identify a common set of indicators and their definition both in the short and long term (during project implementation and beyond); (Already partly done with CPIs). As far as possible, this exercise should allow "reusing" indicators already being collected to avoid duplicating efforts;	The projects already report a core set of common indicators. Our evaluation also tries to touch upon project specific indicators where possible.
3. Quantify needs and resources required to collect information and data and verify their reliability;	Each project is obliged to report on project outputs in periodic reports. WP3 includes a data collation task (the D3.5 Project Database where the results on CPIs of projects are inputted). The evaluation work (WP4) has looked into the reliability of the results provided by project coordinators i.e. questioning outliers.
4. Develop a common data reporting and collection method and a common analysis protocol and conduct training to ensure minimum coherence;	CPIs allow us to collect data that are comparable. Our project does not have the power to influence the methodology that determines those figures. At the 8 th EU exchange meeting (Budapest June 2016) there was a plenary session on reporting of indicators in which two projects presented the methods they used to estimate the CO ₂ savings as a result of their project s. This was an indicator that a number of projects reported to have difficulty in estimating.
5. Collect data (including validation). This can include a document review (proposals, final reports and project evaluation papers from EASME); reporting from platform members; surveys; exploitation of existing statistical information; etc.	WP3 is focussed on the collation of this data. Examples of these are the Country Factsheets that compile qualitative and quantitative data.
6. Analysis of available and reliable information (Compare Performance Indicators from initial plan and at project completion, analysis of reasons for deviations, analysis of recommendations, identification of barriers and lessons learnt, etc.)	The data collected in WP3 includes the ex-ante targets (i.e. those included in the project proposal and contract) and final results achieved and reported in the final reports. Where Final Reports were not available, project coordinators were directly requested (via email) to provide

Methodological Steps (from COWI report)	Comments
	their final results.
7. Interviews with the project coordinators of each project with focus on these points: Relevance, impact, effectiveness, sustainability, and coherence/synergies with other programmes; added value.	Interviews with (virtually) all of the project coordinators have been executed. The topic guide was partly developed from the questions in the evaluation matrix.
8. Development of a regular and dynamic "evaluation report" to bring perspective to the figures and analyse trends, with recommendations for future activities.	This project presented preliminary results at the 10 th EU Exchange Meeting in Rotterdam (in May 2017) and at the Stakeholder Workshop (in November 2017) where almost all final results of CPI were known. That has allowed the team to see how results for the whole programme, graphs and hence conclusions (considerably) change depending on the data used. This report takes these aspects into account e.g. mentioning outliers and how those affect results.

3. EVALUATION QUESTIONS

The evaluation questions that are answered in this report are as follows:

Relevance

- Has involvement of the project partners and the stakeholders been taken into account in defining what has been developed during the BUILD UP Skills projects (including what construction workers want and need in their training)?
- Has there been a continued match of project activities with Status Quo Assessment (from Pillar 1)? If not, what has changed since then (in the last 2-3 years)?

EU Added value

- To what extent have the EU Exchange Meetings benefited BUILD UP Skills projects?
- To what extent could BUS projects have been carried out with national funds?
- Could you get national funding to continue the project?

Efficiency

- Are there comparable projects or programmes (in terms of delivering training of a similar nature) upon which the costs of delivering BUS projects or their training elements (i.e. cost/trainee) can be compared?
- What obstacles have been encountered in the BUILD UP Skills projects that affected cost-effectiveness of the projects?

Effectiveness

- Have BUILD UP Skills projects been successful?
- Have the projects developed training courses/curricula that result in any formal (e.g. accredited) qualification? Is this nationally recognised? And internationally (e.g. does it comply with EQF)?
- Have there been any planned and non-planned side effects – positive or negative?

- Have the activities and outputs of BUILD UP Skills projects (especially the developed training courses) been included into national programmes / official curricula for education or national strategies?

Coherence

- How have BUILD UP Skills projects established links with each other throughout the projects and to what extent have these links led to adjusting approaches or ways of doing things?
- Have BUS projects established links with other EU or national programmes?

Sustainability

- How are BUILD UP Skills projects continuing the work / utilising the outputs once the projects are finished? Is this continuation at local, national or EU level?
- Should the BUILD UP Skills initiative be continued and if so how?
- Can the approach and material of BUILD UP Skills projects be translated and transferred to other regions/countries?

4. METHOD/PROCESS FOLLOWED

4.1. Process/Methodology

The methods used to collect and analyse the data are:

Desk review – The **project reports** (final and interim / progress reports) provided by the project coordinators to EASME and the assessments thereof carried out by EASME (or its contractors) have been reviewed. In Annex 1 the full list of reviewed files can be found.

- **Description of Action of projects** - Each project was requested to provide quantitative target estimates for a number of **Common Performance Indicators (CPI)** in their proposals distinguishing between the targets within the action duration and the targets by 2020. Throughout the project duration, the projects were required to report on their progress towards these targets. At the end of the project, the final indicators were reported on. This evaluation included the analysis of the 22 BUILD UP Skills projects.

Besides this, the project team has reviewed and analysed other relevant programmes (for the 'cost per trainee' section in the Chapter on Efficiency).

Country factsheets - An additional source of data is the country factsheets which were developed for all EU countries with a BUILD UP Skills project as well as Horizon 2020 construction skills projects for those countries which had one or more. These factsheets, which are publicly available on the BUILD UP Skills Website², have been completed with additional useful information (such as particular challenges faced, lessons learnt and potential for replicability) and validated by the respective BUILD UP Skills project coordinators.

Interviews - In addition to the monitoring data collected in WP3, interviews with the project co-coordinators and other stakeholders have been conducted in order to collect personal / professional views on the projects' effectiveness (and what has helped or

² <http://www.buildup.eu/en/skills>

hindered it), along with examples of impacts and results (such as individual learner case studies). The interview questions are annexed to this methodology (see Annex 2). The questions therein have been specifically designed to respond to the aspects that need to be answered in an evaluation (effectiveness, efficiency, relevance etc) which are the backbone of this report.

The aim was to develop a robust evidence base, with consensus around key conclusions. This is achieved by bringing together evidence from the different sources. This has been done through a clear and transparent synthesis approach. This highlights where the evidence has been sourced, and as far as possible aims to triangulate the conclusions from multiple sources of evidence. When discrepancies exist, these are clearly identified, and discussed. The next sub-section assesses the strength of the evidence upon which conclusions have been made, including the main uncertainties.

4.2. Description of Common Performance Indicators

There are seven Common Performance Indicators that the projects are required to report, four are training related and three are energy related. Their description can be found in the table below.

Table 4-1 Common Performance Indicators

No	Indicator	Description
Common performance indicators – training related		
1	Number of training courses triggered by the action	The overall number of training courses provided by the projects. The courses can be: pilot courses, training courses for workers, courses for trainers, on-site company courses, etc.
2	Number of people that will be trained.	The total number of people trained – workers, trainers, on-site workers, craftsmen, people qualified, etc. The indicator can be provided by country/ project and trade (if possible).
3	Number of hours taught in the frame of the courses triggered	The total number of hours. The indicator can be provided by country/ project and trade (if possible).
4	Estimated specific cost to qualify each trainee	The cost of training per trainee. Some projects provide assumptions. The indicator can be provided by country/ project and trade (if possible).
Common performance indicators – energy related		
5	Renewable Energy production triggered	These indicators show the contribution towards the energy efficiency targets from the EED, EPBD and RES directives.
6	Primary energy savings compared to projections	
7	Reduction of greenhouse gas emissions	

4.3. Strengths and limitations of the methodology

This report contains a thorough and comprehensive analysis and evaluation of the programme. The strengths of the method stem from the following:

- Quantitative results have been complemented with qualitative assessment;
- Qualitative assessment is robust – conclusions recurring in Final Reports, Country Factsheets, discussion at EU Exchange Meetings, interviews with project coordinators and stakeholders.
- We have interviewed the project coordinators from virtually every project and verified views (next to facts);
- We have developed a good working relationship with virtually all of these people via the workshops and Technical Working Groups, which made these interviews well informed and informal.
- The project coordinators are all very knowledgeable about how the programme is working in practice but are also frontline practitioners in the development and delivery of EE in construction training, which makes their opinions of double value.

The limitations of the methods include:

- Relying on the methodologies for calculation of CPIs developed by the BUILD UP Skills project coordinators (particularly for the three energy indicators, which were more complex);
- BUILD UP Skills projects are too different to compare (e.g. in terms of cost-efficiency) and data on cost-efficiency of other similar programmes is very limited. This has also limited the methodology (e.g. counterfactual or other methods could not be applied to assess effects);
- There has been no roundtable to discuss the results and conclusions.

5. ANSWERS TO THE EVALUATION QUESTIONS

5.1. Relevance

The relevance evaluation criterion is defined as: *To what extent is an intervention relevant in respect to needs, problems and issues identified in target groups?* Questions under this heading tend to focus on the problems and market failures that the policy is intended to address, and ask if these still exist and if the policy is capable of addressing them concretely. The three specific questions which our work in this area has sought to address are:

- *Has involvement of the project partners and the stakeholders been taken into account in defining what has been developed during the BUS projects (including what construction workers want (and need) in their training)?*
- *Has there been a continued match of project activities with Status Quo Assessment (from Pillar I)? If not, what has changed since then (in the last 2-3 years)?*
- *What are the skills targeted?*

Involvement and influence of stakeholders

This analyses to what extent and how the projects reflect what construction workers want (and need) in their training.

Many of the projects have retained the participation of some or all of the Pillar I stakeholders. These organisations and experts have helped to ensure the quality and relevance of the course content developed. They have also helped practically (e.g. provision of example building materials, training spaces, access to accreditation routes) etc. Some projects have added additional stakeholders – from construction (need/ demand side) and training (supply side) – also national and regional representation – which is positive as it provides links to local training providers. Some

projects also linked to policy makers by including project partners that could influence policy. Although this was only the case in a limited number of projects it should be viewed as positive for relevance because it makes a link to those charged with designing and implementing building standards related to energy efficiency.

Many of the projects also reported that they adapted their training offers based on customer feedback on an ongoing basis. This related to the nature of the course and the delivery style and timing. From the reported adjustments it is apparent that what works best in some markets is not the best in others, although the inclusion of a practical / on site part in the training, and short courses appear popular in all markets.

In some Member States the project coordinators reported that the apparent lack of awareness of the training needs associated with NZEBs (among construction workers and companies) suggests that basic awareness raising is still needed.

In order to ensure improved relevance some projects reported that they did additional mapping of demand (for skills), via surveys / meetings at the start of their projects.

Match between the projects and the actual needs

BUILD UP Skills Pillar II projects respond to specific needs identified and the roadmaps that were designed in the Pillar I phase. The developed training courses aim to tackle the skills gaps and needs, and therefore their relevance was built-in.

A special case is that of Italy, where there are two 'follow up' / implementation projects stemming from Pillar I. In this case the projects' partners were well aware of this and there has been good cooperation between the projects to avoid duplication and enable synergies. In some cases, some of the roadmap actions were done by other (nationally funded) projects. This appears to be good added value from the completed Pillar I projects.

Actions from the original roadmaps have largely been completed, so in theory the roadmaps need to be updated. Views on the nature of the update (expressed by Coordinators in interviews) vary. Some feel that the next stage is about supporting uptake and that demand is expected to grow as NZEBs become the norm. However, the courses need to be kept up to date to remain relevant. These updates reflect the fact that technology changes quickly in some areas (especially Renewable Energy Sources) so if the courses are not continuously kept up to date they will be irrelevant within 4-5 years (by when demand should have increased).

Some of the project coordinators feel that some new / additional EU level encouragement / obligation to update the roadmap would be needed in order for it to happen, as without this the relevant (and diverse) groups of stakeholders identified in Pillar I (builders, training providers, building material etc.) will not come together. This coming together was felt to be of key importance to the success of Pillar I and the projects developed as a result.

Some of the project coordinators suggested additional matters that could be added to the roadmap – for example circular economy implications (lifecycle of buildings – ease of material recycling and demolition etc), and/or BIM and use of IT in construction (and IT literacy generally). While most felt this would be useful, it was also pointed out that it might well need different stakeholders (to those engaged in the Pillar I activities) and political commitment at MS level.

Some of the project coordinators pointed out that the construction market has developed since the Pillar I roadmaps were completed. The sector is generally expanding (rapidly in some MSs) after the economic downturn. NZEBs are now clearly on the horizon as a future need and this was not the case when the roadmaps were drafted (for some MSs). There has also been an increase in the profile of the

importance of energy efficiency in existing buildings, for example, the issue has been picked up in NEEAPs (National energy efficiency action plans).

Another suggestion relates to the fact that to date BUILD UP Skills has mainly been focussed on blue-collar workers and it could expand into white collar (professional) sectors.

Analysis of skills targeted

The skills targeted by each project are pertinent to the relevance questions because they illustrate what skills the Pillar I projects (and the roadmaps they produced) think are most in need to improve skills related to energy efficiency and renewable energy sources in buildings.

Each BUILD UP Skills project targeted specific skills. However, country factsheets and project reports provided a very different level of detail on skills and professions the project targeted (e.g. plumber, glazier, or renewable energy systems installers). In addition, some broader targeted skill categories cover more specific categories (e.g. HVAC covers heating, ventilation and air-conditioning). In order to provide an overview of the skills targeted the skills have been grouped into five broad categories (see **Table 5-1** below):

- 1) Building fabric;
- 2) Building services;
- 3) Energy sources;
- 4) Building management;
- 5) Building misc.

This classification allows us to compare the skills targeted in each of the projects, although the projects are very different in terms of the level of detail in their descriptions of the targeted skills. Projects have been analysed against two different sets of criteria:

- Categories of skills and specific skills targeted;
- Scope of the projects in terms of targeted skills (broad focused projects vs narrow focused projects).

Table 5-1 Categories of skills targeted

Skill	Number of projects targeting the respective skill (category)
BUILDING FABRIC:	96
Façade workers/ plasterer (building envelope)	12
Roofers	12
Outdoor/ indoor carpenters	4
Bricklayers	8
House painters	2
Prefabricated construction fitters	1
Insulation installer	19
Tile setter	1
Concrete worker, concrete and steel constructions	2
Crane and construction machinery	1

operator	
construction finisher	2
Tinsmith (plumber)	1
Window installer	9
Aluminum and metal constructions craftsmen	1
Aluminum and PVC carpentry	2
Glazier	5
Flooring	2
Carpentry i.e. Finishing of doors, windows, facades	6
Wood (pre-)fabrication	2
Ceiling and wall installer	2
Windows and doors installation	2
Locksmith	1
Chimney builder	1
BUILDING SERVICES:	62
Electrical installers (energy infrastructure i.e. light, power)	10
Skills in engineering systems	1
Building engineering system installer	1
Duct fitters installation	1
Installers-maintainers of burners	1
Ventilation, air conditioning installation	15
Lighting installation	4
Control systems	3
Heating systems installation	18
Plumbing	6
HVAC installers	2
ENERGY SOURCES:	45
Installation of thermopanes and exterior sunshades	1
Electricity engineering and energy sector	3
Skills in energy efficiency	7
Renewable Energy Systems - RES (wind power, solar thermal, photovoltaics, hydro power)	16
Heat pump installation	10
Boilers (e.g. biomass, gas)	6
Biomass energy installations	2
BUILDING MANAGEMENT:	3
General foreman	1
Foremen	2
MISC.:	9

Immigrant workers	1
Skilled across-the-craft workers	2
Craftsmen (across the crafts)	3
Unskilled workers (across the crafts)	2
Blue collar workers	1

Source: Database developed by the project team, based on the country factsheets and project reports.

Categories of skills and specific skills targeted

Most of the skills targeted by the projects were in the categories of building fabric (96 skills targeted), building services (62 skills targeted), and energy sources (45 skills targeted). The projects targeted a limited number of skills in building management (3 skills targeted) and other skills (9 skills targeted).

20 out of the 22 projects analysed targeted at least the following three categories of skills: building fabric, building services and energy sources. Skills in the building fabric category were targeted by all 22 projects. Building management skills were only targeted in two projects (CrossCraft and QualiBuild targeted skills of foremen).

Four projects targeted skills that were assigned to the miscellaneous category (usually all skilled and/ or unskilled craftsmen). One of the examples of projects targeting skills in this group is QUALITRAIN. This project was based on the idea that understanding a building as an integrated system (i.e. system thinking) is needed among workers. As a result of this project, the cross-trade CVET programme was developed which became part of the regular training of the German Central Agency for Continuing Vocational Education and Training in the Skilled Crafts.

While looking at the specific skills targeted, the following specific skills can be identified as the most popular among analysed projects:

- insulation installers (targeted by 19 projects);
- heating system installers (targeted by 18 projects);
- renewable energy systems installers (targeted by 16 projects);
- ventilation and air conditioning installers (targeted by 15 projects);
- façade workers (targeted by 12 projects);
- plasterers (building envelope) (targeted by 12 projects);
- roofers (targeted by 12 projects);
- electrical installers (targeted by 10 projects);
- heat pump installers (targeted by 10 projects).

Scope of the projects in terms of targeted skills

Table 5-2 outlines the categories of skills targeted by each analysed project. The majority of projects were more broadly focused in terms of targeted skills. One of them (BUS CrossCraft) focused on all five categories, five projects (i.e. TRAINBUD, BEEP, SWEBUILD, QUALITRAIN, QualiBuild) focused on four categories, 14 projects focused on three categories.

The broad focus of the projects is the result of the interconnection between the different skills needed in order to achieve improved energy efficiency of buildings. Skills related to renewable energy systems, insulation and heating, etc. are needed in order to reach higher energy efficiency of buildings. These skills cover three of the five categories.

It should be noted that the broad focus on many skill categories does not necessarily mean that a lot of different skills were targeted. Some projects (e.g. BUS BEEP) focused on six skills (insulation installers, ventilation and air conditioning installers, heating system installers, heat pump installers, skills in RES, and immigrant workers), but covered four skill categories, while others (e.g. N@W) focused on 17 skills, but targeted three categories. Despite the focus on a small number of skills it does not change the fact that such projects are broadly focused.

Table 5-2 Skills categories targeted in the BUILD UP Skills projects

	Building fabric	Building services	Energy sources	Building management	Building other	Total	Total number of skills targeted
Construye2020	X	X	X			3/5	7
N@W	X	X	X			3/5	17
QualiShell	X					1/5	3
BRICKS	X	X	X			3/5	8
I-TOWN	X	X	X			3/5	11
TRAINBUD	X	X	X		X	4/5	9
BEET	X	X	X			3/5	9
CrossCraft	X	X	X	X	X	5/5	13
WE-Qualify	X	X	X			3/5	5
CROSKILLS II	X					1/5	6
STAVEDU	X	X	X			3/5	18
LuxBuild	X	X	X			3/5	9
BEEP	X	X	X		X	4/5	6
FORCE	X	X	X			3/5	7
BUILDEST II	X	X	X			3/5	13
EnerPro	X	X	X			3/5	11
ENERGOTRAIN	X	X	X			3/5	13
SWEBUILD	X	X	X		X	4/5	15
UPSWING	X	X	X			3/5	6
QualiBuild	X	X	X	X		4/5	12
QUALITRAIN	X	X	X		X	4/5	7
FORESEE	X	X	X			3/5	10
Total	22/22	20/22	20/22	2/22	5/22	-	-

Source: Database developed by the project team, based on the country factsheets and project reports.

Box 5-1 below provides examples of narrowly and broadly focused projects.

Box 5-1 Good practice examples

BUS CROSSCRAFT

BUS CrossCraft was the only project targeting all five skill categories. This reflects the project aim of developing a qualification scheme for across-the-crafts training of professionals in the construction industry. The project developed a concept for such a training scheme (together with the training material, requirements and standards) and a strategy for the establishment of the course within the continuing education and training sector. The scheme was then piloted via 21 pilot courses all over Austria. These training courses, especially the short (two day) on-site training courses, were popular with the

market and can be considered as a success story. Education providers will integrate the two days basic CrossCraft training module into their training offers. In addition, the four day CrossCraft compact course is being integrated into the existing training schemes for general foremen and timber constructors.

BUS QUALISHELL

BUS QualiShell is a narrowly focused project. This project focused on the three occupations (building envelope insulation systems installers, window installers and glaziers) in Romania that were identified as having the maximum deficit of workers compared to the workforce need for 2020. QualiShell managed to develop occupational standards and two national qualification schemes for these occupations. The qualification schemes that were developed contain all the documents and tools to support the implementation of high quality training programmes and are fully available for the qualification market. The achievements can be considered as good practice examples to be followed for other occupations/ qualifications. The sustainability of the new qualifications was ensured by:

- Five training suppliers are already engaged in the application of the new qualification schemes and some of them already performed vocational training courses in the addressed qualifications;
- At least 11 local or regional partnership agreements were signed between various training suppliers;
- Several financial mechanisms for the training programmes organisation were proposed.

Source: developed by the project team, based on the project reports.

5.2. EU Added Value

European added value is the value resulting from the European project, which is additional to the value that would have resulted from projects funded at national level. This chapter reports on the EU added value of the BUILD UP Skills projects.

This section is guided by the questions:

- *To what extent have the EU Exchange Meetings benefited BUS projects?*
- *To what extent could BUS projects have been carried out with national funds?*
- *Could you get national funding to continue the project?*

The BUILD UP Skills Initiative allowed a national focus to be kept by each supported project and at the same time encouraged the projects to exchange information and learn from each other. EU added value of the BUILD UP Skills projects may include the following:

- Availability of funding at national level being limited
- Sharing of good practice (the EU Exchange Meetings)
- Training courses that are recognised at the EU level (compliance to the EQF)
- Continuous activities at EU and national level

In addition, there are currently ongoing national projects on skills in the construction sector in different countries. These projects may overlap as they might address the same problems (e.g. development of energy efficiency skills). Repetition needs to be avoided to make the best use of public budgets. The EU dimension minimises these overlaps and enables more synergies.

Availability of funding at national level

The main EU added value of the BUILD UP Skills projects came from the fact that the majority of these projects would not have been implemented without the EU funding. In most cases (according to 13 of 15 interviewed project coordinators) national funding would not be available for projects similar to the BUILD UP Skills projects. The reasons for this include: the lack of funding, the lack of focus on energy efficiency in national programmes and focus on execution of the current training programmes rather than developing new ones. The remaining project coordinators indicated that projects on a national level would have been possible, but would be more fragmented compared to the BUILD UP Skills projects and would not have included activities beyond the national level. Nationally funded projects would also not have had the EU Exchange Meetings. These meetings were considered as a huge success of the BUILD UP SKILLS Initiative (an analysis of the EU Exchange Meetings is presented below).

Sharing of good practice (the EU Exchange Meetings)

The EU Exchange Meetings gathered partners of the BUILD UP Skills projects together to share their best practices, learn and further improve their activities. In total 10 EU Exchange Meetings were organised during the 2011-2017 period. The participants' expectations of the first meeting were not high. They expected to receive information from the Commission rather than share knowledge³. At the following meetings the participants became much more active and found these meetings very beneficial. The project coordinators highlighted the following main benefits of these meetings:

- Participation in the meetings and communication with other project representatives established contact between project coordinators. This resulted in the development of a network of experts. As a result, new Horizon 2020 projects (for example, BIMPLEMENT, NET-UBIEP, Train-to-NZEB, Fit-to-NZEB, NEWCOM, BUStoB) and other projects (for example, BuS.Trainer under the Erasmus+ Sector Skills Alliance call) involving different BUILD UP Skills partners were initiated.
- More meetings were initiated to further share experience. For example, the PROF-TRAC project team had a very good cooperation with the MEnS project representatives and had meetings in addition to the EU Exchange Meetings. BUS QualiShell had a study visit to Spain, where they had a fruitful exchange, did site visits, exchanged good practices. From this exchange they felt inspired to develop a 'special fund for training' in Romania (Spain has a similar fund), but this still remains at the discussion stage with national authorities.
- The projects that started a bit later had the opportunity to learn from the experience of projects that started earlier (for example, the BUS BEEP project learned from the BUS CrossCraft project).
- Project representatives could use other BUS projects as a benchmark to compare whether their project was heading in the right direction and to adjust the project if necessary.
- Knowledge exchange. As many issues in the BUILD UP Skills projects were common across countries, project coordinators could cherry pick the ideas and approaches from others. This helped to:
 - Apply some ideas and insights to the projects. For example, following the discussion about working on marketing offers during the EU Exchange Meetings, representatives of the BUS EnerPro project were able to differentiate their own marketing offer and to reach their target. Representatives of the BUS FORCE project gathered ideas on how to organise meetings and events. Representatives of the PROF-TRAC project used learning material of the BUS QualiBuild project for training

³ COWI „Evaluation of the BUILD UP Skills initiative under the Intelligent Energy Europe Programme“ 2016.

their trainers. For the skills mapping the PROF-TRAC project will also adapt methodologies developed during the BUS projects in the Netherlands and Spain. WE-Qualify took advantage of part of the training materials developed in the frame of the UPSWING project for developing their own training materials. The BUS Construye 2020 project representatives have shortened the length of their training courses after discussion during the EU Exchange Meetings.

- Apply ideas and insights to other topics. The general topics touched upon during the meetings were especially useful (for example, how to convince companies to do training, how to analyse training programmes). In addition, the EU Exchange Meetings taught projects how to boost stakeholder involvement. This information could also be applied to other areas beyond the BUILD UP Skills Initiative.
- Solve the challenges of the project by learning from others. For example, Technical Working Groups facilitated the BUS UPSWING project to overcome their obstacles (e.g. legislative) and propose/design accompanying measures for the operation of large-scale training schemes. Experience gained during the EU Exchange Meetings allowed the BUS ENERGOTRAIN project team to manage the project successfully.

Despite these positive outcomes of the EU Exchange Meetings, there are some areas that could be improved. Project coordinators suggested the following improvements:

- The meetings provided a lot of useful information. There were parallel technical workshops taking place. Hence, the project coordinators had to choose between parallel sessions, which gave a feeling of missing out some important topics/ work. It would be beneficial if more than one person representing the project could participate in such meetings. However, the project covered travel expenses for one person and some projects did not have the resources for another.
- Usually there was a lack of time to go deep into the details of the BUILD UP Skills projects.
- For the representatives who joined the EU Exchange Meetings later than others (for example, representatives of the PROF-TRAC project) it was difficult in the beginning to catch up with all the information.
- Technical Working Groups did not give as much as was hoped, because the context and needs in the different countries were significantly different. These groups could be organised by grouping more similar projects.

Course compliance with EQF?

Training courses delivered in most of the surveyed BUILD UP Skills projects did not result in any formal qualification. Training participants received certificates, but they were not formally recognised. The main reason for the lack of compliance with the EQF was the existence of specific national requirements for the accreditation of courses. For example, a minimum length of more than four-day courses is necessary in Austria to comply with the EQF. In Croatia a formal accreditation requires a course of more than 120 hours. Training centres providing non-formal training cannot provide certificates linked to the NQF -and as the NQF is linked to EQF- neither to EQF. In some countries (for example, Greece) the institutional and/or bureaucratic procedures of the NQF system are too long. Because of that, the project team decided to choose another accreditation body. This, however, did not allow certification to be linked to the EQF.

However, there are some positive exceptions, when completion of the training courses resulted in a formal EQF qualification or the approval is expected soon. This is the case for the BUILD UP Skills projects FORCE, QualiBuild, QualiShell, LuxBuild, and I-Town.

What is the way forward: At local, national or EU level

One of the aspects of EU added value of the BUILD UP Skills projects is that the activities developed during the BUILD UP SKILLS projects are continued using other types of the available funds. In some cases, national funding was available to continue the BUILD UP Skills projects. At the EU level the main funding sources for continuation of the BUILD UP Skills projects so far have been H2020 and the Sector Skills Alliance⁴ programmes. This question is analysed in greater detail in chapter 7.2 on continuity.

Another question is continuation of the BUILD UP Skills initiative itself. The vast majority of interviewed project coordinators were in favour of continuing the BUILD UP Skills initiative. They proposed the following further challenges that the BUILD UP Skills initiative should address:

- Training in nZEB for both blue-collar and white-collar workers in order to increase communication and understanding between them.
- Focus not only on new buildings, but also on the renovation sector. Focus on existing buildings and integrating other new things, for example, circular economy, internet of things, increased flexibility of social housing, etc.
- Mutual recognition of skills / competences at EU level.
- Involving the construction industry more.
- Keeping the current network and knowledge sharing platform. Strategic sessions or other events may be organised for this purpose.
- To push the BUILD UP Skills results forward. For example, motivating trainers to further educate construction workers. They often lack time for this and the BUILD UP Skills initiative could provide resources for that.
- Updating country roadmaps. This would result in a higher involvement of stakeholders in different sectors. Currently there are multiple sectors involved (e.g. builders, training, construction products) and most of these sectors only focus on their own needs and do their own roadmaps. EU level activity helps sectors to work together.
- Replication of the BUILD UP Skills experience in new European or associated countries.

5.3. Efficiency

This section answers the following questions:

- *Are there comparable projects (or programmes) (in terms of delivering training of a similar nature), which the costs of delivering BUS projects or their training elements (i.e. price per trained worker) can be compared with?*
- *What obstacles have been encountered in the BUS projects that affected cost-effectiveness of the projects?*

The aim of this chapter is to assess how economically the resources used have been converted into effects. The assessment involves both qualitative and quantitative approaches. The qualitative approach involves analysis of administrative and other barriers that may reduce cost-effectiveness of the BUILD UP Skills Initiative. This covers analysis of interviews of project coordinators and relevant stakeholders, project reports and factsheets. The quantitative approach involves analysis of approximate costs of qualifying each trainee. In both qualitative and quantitative approaches, the

⁴ Sector Skills Alliance is a sub-programme of Erasmus+.

results are compared to other programmes. It should be noted that the BUILD UP Skills Initiative is unique and it is not possible to find very similar initiatives for comparison. For this reason, initiatives that would be partly similar to BUILD UP Skills (e.g. provided training, developed courses, etc.) have been looked at. The comparisons concentrated on the activities similar to BUILD UP Skills activities. The following initiatives were analysed:

- Erasmus+ (including Sector Skills Alliance)
- ESF 2007-2013
- 7th Framework Programme
- Minnesota Job Skills Partnership

A more general question with regard to efficiency relates to budget. In general, the BUILD UP Skills projects budgets were spent well. There were no cases reported where the projects did not manage to stay within the budget⁵. Some minor budget shifts were recorded in most cases. For example, budget shifts between project partners or project activities (e.g. from travel costs to staff costs, from subcontracting costs to travel costs and vice versa, etc.). There were no cases where significant tasks were not delivered because of running out of budget.

Barriers affecting cost efficiency

Administrative and other barriers of the BUILD UP Skills programme

The administrative burden to apply for a grant from the BUILD UP Skills Initiative and to operate the project was rarely mentioned in project reports, country factsheets and interviews with project coordinators. Overall, the administrative burden was considered low or not higher than in other programmes. The cooperation with EASME was described as smooth, flexible, and rational. However, in some cases the following administrative challenges were highlighted:

- Difficult and time-consuming process of consortium formation during the application process. For example, in the BUS EnerPro project over 30 organisations showed interest in participating in the project. It was hard to prepare the project that would fit everyone's needs. There were at least four rounds of discussions. After these discussions a final concept was developed with eight project partners participating. This was especially relevant for the projects that have not formed large consortiums during Pillar I (and hence had to accumulate interests/ involve more stakeholders in the second stage).
- Coordination of a large consortium during the implementation of the project. For example, in the BUS ENERGOTRAIN project 59 people were working on the project. IT system was needed to coordinate everything properly. Internal communication required a lot of resources.
- Project reporting, especially final reports, required more time than expected and compared to the Pillar I stage. It increased administrative burden for project coordinators. These difficulties arose due to the lack of experience in managing such projects. Once one knows the rules though, the administrative burden is not that high. The annotated grant agreement was praised for having all the necessary information.
- In some cases it was challenging to agree which of the partners should co-fund the project (consortiums had to cover 25% of all project costs). It took time

⁵ Information based on the Final Technical Implementation Reports. Reports for the following projects were unavailable on 15th of December 2017: CROSKILLS II, BRICKS, STAVEDU, SWEBUILD, UPSWING, and TRAINBUD.

and a few rounds of discussion before some partner(s) agreed to bear these costs.

Economic, awareness-related, legal, market and knowledge barriers were more common than the administrative ones. These barriers may also have increased the administrative burden. These cases are explained below. It should be noted that the barriers below are the most commonly occurring ones and so it is likely that individual projects have had to face some additional, project-specific barriers.

Economic barriers

- **Lack of time for training** – The time to be spent for training is a major barrier for both employers and workers. Employers need their workers at the workplace and are therefore generally unwilling to send their workers to training courses during their working time. Workers who are self-employed cannot afford to be off-site as that implies an opportunity cost in terms of the work hours/ income lost. This problem resulted in a lower number of trainees in training courses and thus reduced the cost efficiency of certain projects (lower number of people trained with the same resources). In addition, solving this problem in some projects required additional financial resources and this has further decreased cost efficiency. For example, the BEEP project team tried to organise training events off-season. As the weather is unpredictable it required additional resources trying to find the best possible time. Another challenge concerning the lack of time was that the trained trainers did not always train their colleagues. Solving this problem in the SWEBUILD project required additional resources as they phoned trainers and encouraged them to educate their colleagues.
- **Cost of training** – In some cases the same type of training had to be organised separately. For example, in the BEEP project training for a single company at a time had to be organised due to confidentiality reasons. This approach was not cost-efficient, as more training sessions had to be organised. In addition, in some countries the materials and equipment for training were more expensive than expected. For example, this factor increased project costs in the Construye 2020 project. Also, the cost to hire trainers was higher than expected in Ireland as the higher education institutions had fixed rates for their staff and the trainers were unable to change them. This led to an increase in training costs of the project.

Awareness barriers

- **Lack of understanding of the importance of skilled / trained workers** - Workers do not perceive the value of attending training courses (for acquiring skills on energy efficiency in construction) and do not seem to understand that this is related to the quality of work (usually, the higher the qualification, the better the quality of works). Similarly, people (customers) do not always understand the importance of hiring trained construction workers with adequate skills in energy efficiency and are therefore not willing to pay a higher price for that. This problem resulted in a lower number of trainees and thus reduced the cost efficiency of the project (see explanation above).

Legal barriers

- **Delays in introducing energy efficiency related definitions (for example, definition of nearly zero energy buildings)** –Some countries (e.g. Sweden) do not have a clear definition of energy efficiency related concepts and, as a result, market players are less motivated and have limited awareness about the need for training their employees on these topics. This problem resulted in a lower number of trainees and thus reduced the cost efficiency of the project (see explanation above).

Market barriers

- **Low demand for energy efficiency skills** – Demand for workers that are trained / skilled in energy efficiency and renewable energy sources is low. This is partly linked to the still limited market share of relevant buildings, particularly in some countries, and to the fact that such training courses and skills are not yet perceived as necessary. This problem resulted in a lower number of trainees and thus reduced the cost efficiency of the project (see explanation above). In Austria some courses (e.g. of the Cross-craft project) were even cancelled because of the low demand. In addition, solving this problem in some projects required additional resources and this reduced the cost-efficiency of the project. For example, the PROF-TRAC project spent a significant amount of its resources for marketing efforts in Denmark, but there was not much interest for the training offered.

Knowledge barriers

- **Language** – The construction sector often employs a large number of migrant and refugee workers. They often lack fluency in the local language. This is often a problem hindering the quality of work and the uptake of training courses. Translating courses is one way to solve this problem. For example, the training course material in the BUS BEEP project was issued in Swedish, English, Russian, and Estonian. This required additional resources and decreased the cost-efficiency of the project. However, it made the material accessible to more workers.
- **Different skills of the trainees** – Workers have different levels of competencies, so the training had to be adjusted to that. This required additional resources and thus reduced the cost-efficiency.
- **Lack of facilities for practical training** – In some countries (for example, Bulgaria and Greece) there were not enough places where practical training could be organised. This was especially the case in smaller cities. This raised an additional burden for training organisers to find such facilities.

Administrative and other barriers of other similar programmes – comparison

Findings from evaluations of other similar programmes indicated the following barriers resulting in loss of cost-efficiency:

- In some cases the training for teachers focused on wrong or insufficiently advanced topics. This resulted in inefficient use of resources, resources (time of participants and allocated funding) and usually resulted in the expected learning outcomes of the training not being achieved.⁶
- Difficulties in identifying the needs of workers, especially low-skilled. This resulted in mismatches between the content of training courses and participants' skill level.⁷
- Difficulties in creating a new consortium or including new partners. Cooperation within the FP7 (including PEOPLE programme) is usually determined by pre-existing relationships as searching for new partners requires additional resources. This was especially the case with non-EU Member States as additional barriers exist, for example, the lack of knowledge on the strengths of

⁶ ESF Expert Evaluation Network (2014). Final synthesis report: Main ESF achievements, 2007-2013.

⁷ Ibid.

different countries, the lack of trustworthy connections, and political barriers in some countries.⁸

- The European Commission is introducing simplification measures, but the administrative burden in applying and reporting during the project still remains an issue. This results in using more resources for administrative issues. The ex-post evaluation of the FP7 recommends switching to a trust-based and risk-tolerant approach.⁹

The barriers in Erasmus+ (including Sector Skills Alliance) have not been identified as this programme has not been evaluated yet. The evaluation of Erasmus+ is set to be completed in 2017. Evaluation of Minnesota Job Skills Partnership 2013-2015 was also not available. Only annual reports were available. However, they did not outline any information about relevant barriers or other issues in relation to efficiency of the supported projects.

Cost of qualifying trainees in BUILD UP Skills and comparable programmes

Cost per trainee of the BUILD UP Skills Initiative

The average cost to qualify a trainee (euro/ trainee) varied considerably between the BUILD UP SKILLS projects, ranging from as little as 134 euro/ trainee (BUS UPSWING) to as high as 2914 euro/ trainee (BUS QUALITRAIN). Several projects differentiated between different training programmes, and hence reported on two different costs. The average of these different programmes were used. The median cost for all projects was 638 euro. It must be noted that BUILD UP Skills training courses were usually an upskilling initiative in a new market. The demand for such training courses is still low and this raises the cost per trainee. Looking 3-5 years ahead, more people will enter such training courses, use the infrastructure and in this way reduce the costs per trainee.

The cost per trainee varied in different projects. However, it is impossible to compare projects for the following reasons:

- Costs per trainee are calculated differently in the BUILD UP Skills projects. Some projects calculated it by dividing the total budget by the number of people trained, while others – by dividing only a fraction of the budget directly spent on training courses by the number of people trained or even by calculating the exact expenses of the seminars and dividing them by the number of trainees per seminar.
- Training courses were organised in different construction sub-sectors with varying training costs.
- Different target groups. The costs of training for teachers, workers or foremen usually differ.
- Different training methods. For example, on site training is usually more expensive than classroom training.
- Different context. Costs of training may differ across countries due to different market conditions, wages, etc.

Thus, a comparison between the BUILD UP Skills projects of the cost per trainee has not been carried out. The analysis below reports on whether projects outperformed or underperformed their targets and why.

⁸ Louise O. Fresco et al. (2015). Commitment and Coherence – Ex-Post-Evaluation of the 7th EU Framework Programme (2007-2013).

⁹ Ibid.

The target was considered reached if the actual costs per trainee were lower than the target and not reached if the actual costs per trainee were higher than the target.

The majority of the BUILD UP Skills projects met their ex ante target in terms of cost per trainee (i.e. the actual costs per trainee were lower than the initial target, see table 5-3). The training costs in most cases were lower than anticipated, but for different reasons:

- BUS CrossCraft and BUS QualiShell: in these projects the planned target was based on total costs estimated for relevant work packages or even total budget of the project, while the actual value was based on costs incurred during implementation of the trainings.
- BUS Construye 2020 project: the costs per trainee were calculated based on the official Spanish rate for permanent training, which is from 9 to 13€ per hour (depending on courses). At the beginning of the project experts estimated that a course should be on average 90 hours long. However, during the project different type of courses with different duration was executed and the final indicator was calculated for the 30 hour courses. The number of trainees had no impact on these calculations.
- BUS FORESEE: both target and actual values were calculated by dividing total costs of the course by the number of course participants. The actual costs per trainee (€350) were lower than the target (€400) as the estimated target value was higher to account for any additional, unforeseen training costs. However, no such costs were incurred during the project.
- BUS ENERGOTRAIN, BUS QUALITRAIN, BUS BUILDEST II, BUS BRICKS¹⁰, BUS EnerPro, and BUS BEET: the costs per trainee in these projects were reduced due to the higher number of training participants.
- BUS UPSWING, BUS BEEP, and BUS TRAINBUD: the costs per trainee in these projects were reduced due to possibility of using low/no cost premises for training.
- BUS WE-Qualify: the costs per trainee were a little lower because the budget spent on training was a little lower than expected and the costs per trainee indicator was calculated by dividing the training budget for training by the number of people trained.

There were also five projects which did not reach their targets in terms of cost per trainee (i.e. the actual costs per trainee were higher than the initial target, see table 5-3). The cost per trainee was higher than expected in the following projects, due to the following reasons:

- BUS SWEBUILD: the number of people trained was significantly smaller than was planned (2,350 instead of 18,000) and the cost per trainee (both, initial in the proposal and actual in the project) was calculated by dividing the budget by the number of people trained.
- BUS LuxBuild: the training duration was longer. On average, a training course in this project lasted 17 hours instead of 8 hours as was initially estimated. In the future training courses will be intensified in order to develop a less expensive offer.
- BUS FORCE project: the target was calculated without including costs associated with training material preparation, maintenance and acquisition of study equipment stands, programme marketing. However, while calculating actual value, at least some of these costs were included.

¹⁰ The indicated number of people trained does not include 248 people trained during e-learning course. These trainees were included, however, while calculating costs per trainee.

- BUS QualiBuild project: due to high fixed staff rates, which were not foreseen while calculating the initial target. The initial target was based on similar courses provided by other training institutions.
- BUS CROSSKILLS II: the actual costs per trainee were calculated using the same methodology, but more precisely based on actual values instead of estimations. This resulted in a little higher costs per trainee than estimated during the submission of the project.

Table 5-3 Costs to qualify each trainee, Euro per trainee

Project	Actual	Target	Target reached (%)
CrossCraft	208	1130	545%
QualiShell	969	4257	439%
Construye 2020	390	810	208%
ENERGOTRAIN	435,6	864	198%
BRICKS	900	1600	178%
UPSWING	134	200	149%
QUALITRAIN	2914	4292	147%
TRAINBUD	516	678	131%
BUILDEST II	996	1225	123%
FORESEE	350	400	114%
BEET	980	1070	109%
EnerPro	1035	1117	108%
BEEP	160	170	106%
WE-Qualify	917	950	104%
N@W	525	525	100%
STAVEDU	1300	1300	100%
I-TOWN	280	280	100%
CROSSKILLS II	217	200	92%
QualiBuild	1350	1050	78%
FORCE	800	610	76%
LuxBuild	500	225	45%
SWEBUILD	751	109	15%

* Note: The target was considered reached if the actual costs per trainee were lower than the target and not reached if the actual costs per trainee were higher than the target.

Source: Database developed by the project team, based on the country factsheets and project reports.

Cost effectiveness of other similar programmes

As mentioned earlier, the BUILD UP Skills initiative is unique which makes it hard to compare with other programmes. Projects funded by other programmes also differ. Hence, the comparisons below should be viewed with caution.

The information about cost-efficiency of the BUILD UP Skills and compared programmes is presented in Table 5-4 below.

Table 5-4 Statistics on cost-efficiency of the BUILD UP Skills Initiative and other similar programmes

Programme	Short	Budget	Indicators
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	overview of relation to BUS		
BUILD UP Skills Pillar II		€15.3 million	18,195 people trained (programme costs per person - €840; average specific cost to qualify a trainee was €761.5)
Erasmus+	Among other actions it supports education and training in Europe	€2.2 billion	725,000 people went abroad to study, train, teach, work or volunteer in 2016 (programme costs per person - €3,035)**
	Sector Skills Alliance*** - part of Erasmus+. Identifying sector specific labour market needs and enhancing the responsiveness of VET systems	€28 million for 2018 calls	NA, as the programme is still running. No information is publicly available for the finished projects.
ESF 2007-2013 (data represent time period by the December 2012)	ESF measures involved enhancing human capital. Part of these measures was training teachers and workforce.	€35.96 billion for human capital development	25,869,164 people trained (of which 6,401,338 employed) (programme costs per person - €1,390)**
7th Framework Programme	FP7-PEOPLE programme involved measures enhancing human capital. However, these measures target researchers.	€4.79 billion for FP7-PEOPLE programme (except Researchers Night)	52,695 researchers participated in programme activities (except Researchers Night) (programme costs per person - €90,973)**
Minnesota Job Skills Partnership 2013-2015	Programme provides low income workers training	€2.1 million* for low income worker projects	1,457 trainees. Cost per trainee €1,480.6*

Notes: * The conversion rate from \$ to € was €1 equals \$1.1786 according to Bank of Lithuania 8th December course.

** In cases where cost per trainee information was not available, a very rough calculation was made by dividing project budget by the number of trainees.

*** This Erasmus+ sub-programme is presented separately from all Erasmus+, as it is similar to BUS initiative.

Sources: European Commission (2017). Erasmus+ annual report 2016; ESF Expert Evaluation Network (2014). Final synthesis report: Main ESF achievements, 2007-2013; Minnesota Job Skills Partnership Performance Report: Fiscal Years 2013-2015; Data on FP7 participants extracted from: http://ec.europa.eu/research/mariecurieactions/funded-projects/statistics/index_en.htm

The Erasmus+, ESF, and FP7 programmes did not indicate specific costs to qualify each trainee. However, these programmes and the BUILD UP Skills Initiative support other activities apart from trainings. Therefore, a very general proxy to compare the BUILD UP Skills Initiative against these programmes has been used – a programme budget per person trained. It indicates that, compared to other programmes, the benefits of the BUILD UP Skills Initiative are commensurate with the programme costs. The cost per person trained is significantly higher in Erasmus+ and the FP7-PEOPLE programmes. This is because these programmes funded training abroad. Costs to train one person in the ESF were also higher. ESF mainly supports training at the national level. This may suggest that the BUILD UP Skills initiative was more efficient than the ESF in terms of cost per trainee.

The specific cost to qualify each trainee was indicated in the Minnesota Job Skills Partnership programme. The programme is smaller than the BUILD UP Skills Initiative and it specifically targets low income workers. The cost per trainee of this programme was higher compared to that of the BUILD UP Skills Initiative, but it is hard to draw conclusions as that programme took place in a completely different market.

Project coordinators also identified some national initiatives which are somewhat similar and could be compared to the BUILD UP Skills Initiative. As these are national initiatives, they were compared only in terms of the cost-efficiency of the BUILD UP Skills project in that country. The BUILD UP Skills projects that were not in the table did not identify any national projects, as there were no similar or comparable ones.

Table 5-5 Statistics on cost-efficiency of national initiatives or projects similar to the BUILD UP Skills projects

Project/ programme	Short overview of relation to BUS	Indicators
Estonia (BUS BuildEst II)		€996 per trainee
Tartu Vocational Education Center. Professional standard "Plater level 4"	Competences B: 2.2-B.2.5. 60 hours of practical training.	€395 per trainee
Tallinn Building School. Professional standard "Potter, level 4" of 22 hours	Competence B.2.4 Building a solid fuel heater. 122 academic hours of contact education (4.69 ECP), of which 100 hours of practical training and theoretical instruction.	€610 per trainee
Finland (BUS BEEP)		€160 per trainee
The voluntary certification system for the installers of the renewable energy systems under RES directive	The duration of training is 3-5 days depending on the installation area.	Certificate costs €280
Ireland (BUS QualiBuild)		€1,350 per trainee
Tradesperson course	Week long course	€1,500 for the course per

		person
Passive house	5 day course	€1,500 for the course per person
H+S	3 day course	€340 for the course per person

Source: Project coordinator interviews.

In most countries except for Estonia training courses organised in the BUILD UP Skills projects had more or less the same cost per trainee as other national trainings available. This shows that the BUILD UP Skills initiative managed to deliver the training courses efficiently and without being significantly more expensive than other relevant training programmes available at the national level. In some countries (for example, the Netherlands, Romania, Bulgaria) BUILD UP Skills training courses were still expensive, but their price is expected to decrease in the coming years.

5.4. Effectiveness

This evaluation criterion is defined as: "To what extent do the effects induced by an intervention correspond with its objectives as they are outlined in the intervention strategy?" In other words, "to what extent have the objectives of BUILD UP Skills initiative been met"?

The main objectives of BUILD UP Skills are the following:

General programme objectives

- To boost continuing or further education and training of craftsmen and other on-site construction workers and system installers in the building sector
- Increase the number of qualified workers across Europe.

Pillar II objectives

- Design and pilot new qualification and training schemes and/ or upgrade existing ones, based on the roadmaps developed in Pillar I.

In order to assess the effectiveness of the BUILD UP Skills initiative, the analysis relies primarily on quantitative data supplied by all BUILD UP Skills Pillar II projects on a number of Common Performance Indicators (CPI), complemented by qualitative analysis of interviews with project coordinators and a few external stakeholders.

Concerning quantitative data, it should be noted that the initial targets (ex-ante targets) and achieved results that have been used for calculations are those reported by the project consortia as part of their formal reporting obligations towards the Commission (the contractor evaluating this programme has not calculated or audited those quantitative targets and results but relied on 'reported data' to conduct the analysis in this report). Each project was requested to provide quantitative target estimates for seven CPI in their proposals – a target within the action duration and a 2020 target. These quantitative targets were set by the project consortia based on their own experience and 'guesstimates'¹¹. This resulted in training-related indicators that show great variation in scope and ambition from project to project. In addition, some of the differences might be related to the country differences, particularly to the drivers / needs behind these projects as well as different living standards, which might

¹¹ According to some project coordinators, due to the newness of the training schemes that the project consortia aimed to develop, coming up with targets was not always straightforward.

reflect in cost estimates. Projects were given the chance to revise these targets at given points in time. Projects were then required to report on their progress towards these targets.

Box 5-2 Good practice example of calculating CPI

BUS QUALISHELL (Romania)

BUS Qualishell has been regarded as a good example in terms of the methodology used for the calculation of the CPI. An example of this is the cost/trainee indicator which consists of the costs derived from classroom rental, trainer salary for theoretical and for practical training, fee of the Assessment Commission (examiners), safety equipment for students (helmet, overalls, gloves, boots etc.), toolkits for students, construction materials, learning support materials, catering for students (2-3 times a week) and other costs for issuing diplomas and administration. For each of these cost items the €/hour is stated and multiplied (*) by the numbers of hours or the number of people (in this case 28 people, as this was the ex-ante target of 'number of people to be trained').

In addition, BUS Qualishell provides an idea of the kind of assumptions that one can make in the methodology to calculate energy indicators such as 'energy savings (toe/year)' and 'GHG emission savings (toe/year)'. First, estimates of energy efficiency (toe/year) expected from the energy renovation of buildings as well as from new build construction were written down, and in turn, reductions of GHG that would generate (toe). Sensible estimates were achieved through writing down estimates in both a pessimistic and an ambitious scenario these being: renovation of 50,000 units/year (25% building stock in 2020), 65,000 new units/year in an optimistic scenario and renovation of 25,000 units/year (10% building stock in 2020), 50,000 new units/year in a pessimistic scenario. Assumptions made then include that increasing the windows performances leads to 16% of total reduction; increasing of opaque building envelope performance leads to 64% of the total reduction; and that increase of systems efficiency lead to 20% of the total reduction. Based on these shares as well as on the 'gap' in people to be trained (insulating window system installers and thermal insulation system installer), energy efficiency (toe/year/person) and reductions of GHG (tCO₂e/year/person) were estimated for both the optimistic and pessimistic scenarios, taking the average. All of this also implied the assumption that 'no qualification means no energy savings / GHG reduction'.

At the end of the project, the final indicators were reported on. Table 5-6 shows the overall results of BUILD UP Skills Pillar II projects on the seven common performance indicators in more detail, with figures for the actual as well as targeted performance on each of these.

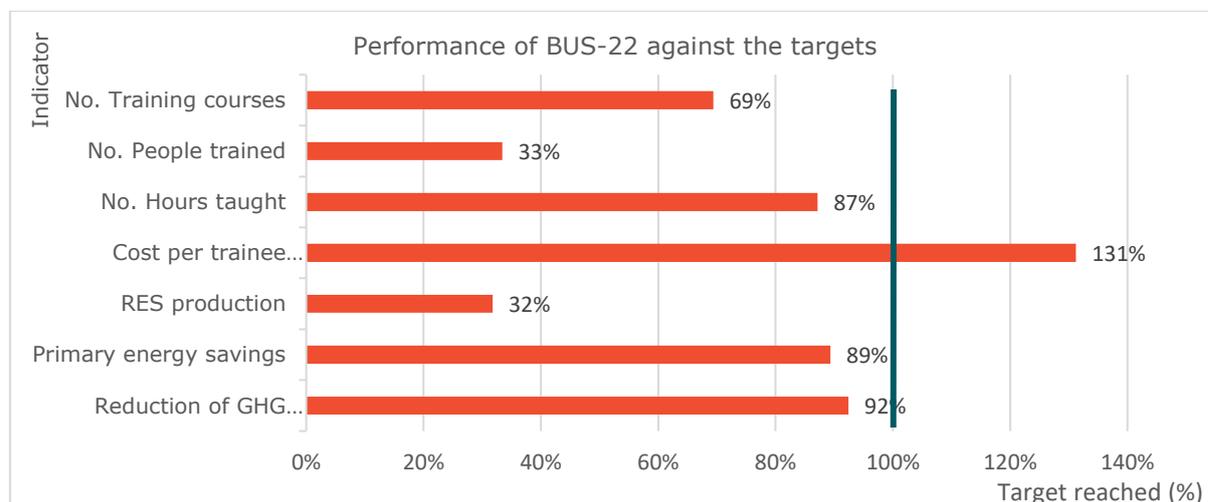
Table 5-6 Overall results on Common Performance Indicators for BUILD UP SKILLS Pillar II projects

Common performance indicator	Actual	Target	Target reached (%)	# projects met target
Number of training courses developed	805	1,160	69%	16/22
Number of people trained	8,570	25,632	33%	12/22
Number of hours taught	27,726	31,811	87%	14/22
Costs to qualify each trainee (median, EUR/trainee)	638	837	131%	17/22

RES production (toe/year)	77,976	245,290	32%	10/18
Primary energy savings (toe/year)	572,766	641,017	89%	14/21
Reduction of GHG emissions (tCO _{2e} /year)	2,070,457	2,239,852	92%	14/21

The table shows that the majority of the projects succeeded in achieving their ex-ante targets. The fact that various indicators when looking at total, absolute numbers (the sum of all projects ex-ante targets compared to the sum of the results achieved by all projects) were not met is the result of a few projects significantly underachieving. This results in the 'cost to qualify each trainee' being the only indicator met when looking at absolute numbers although three other indicators were close to being met namely the 'reduction of GHG emissions' indicator, the 'number of hours taught' indicator, and the 'primary energy savings' indicator. The overall performance of the BUILD UP Skills programme (Pillar II projects) against its ex-ante targets can be seen in **Error! Reference source not found..**

Figure 5-2 Performance of BUS programme against the targets



Source: own calculation

It should be noted that the objective of BUILD UP skills was never to develop as many training courses as possible or to train as many people as possible and therefore these "hard numbers" are less important than other overall impacts such as the fact that high quality training schemes were put into place and piloted, that several awareness raising and dissemination activities were carried out, that key stakeholders such as qualification bodies and public authorities were included in the projects consortia and otherwise (further) engaged throughout the programme.

Below the contractor elaborated on the results for each CPI and analyse why a few projects had difficulties in reaching their targets (see Annex 4 for detailed results per project), it should be noted that projects cannot be compared to each other due to the heterogeneous nature of the projects (different types of courses developed e.g. online vs. offline), the fact that their ex-ante targets differed significantly, and the different methodologies they developed to calculate their quantitative targets.

Training courses developed

The indicator 'number of training courses' shows a large variety among the projects, ranging from as little as two courses offered (BUS FORCE, BUS QUALITRAIN, BUS QualiShell) to more than 200 (BUS LuxBuild) and even more than 500 (BUS

SWEBUILD). The primary explanation for this variation is that there are wide differences between the nature of the courses offered. The projects develop a variety of different training course modules, ranging from a 3-4-hour on-site course, to 10-day courses, pilot courses and fully-fledged on-site/ off-site courses, courses for workers vs. courses for trainers, all of which influence the number of training courses. This implies that the hours taught is also an important indicator to take into account.

Table 5-7 shows the differences in the targeted numbers of training courses to be developed, where the majority of projects (9 projects) aimed to develop less than 10 training courses. There is no obvious relation to the size of the budget, as some projects with higher budgets developed less training courses, and vice-versa.

Table 5-7 Differences in the target number of training courses to be developed

Target amount	Number of projects	BUILD UP Skills projects
<10 training courses	9 projects	BUS FORCE BUS QualiShell BUS QUALITRAIN BUS BEEP BUS WE-Qualify BUS BUILDEST BUS ENERGOTRAIN BUS BRICKS BUS i-TOWN
11-20 training courses	4 projects	BUS QualiBuild BUS Construye 2020 BUS CrossCraft BUS UPSWING
21-30 training courses	5 projects	BUS N@W BUS BEET BUS EnerPro BUS FORESEE BUS TRAINBUD
>200	4 projects	BUS LuxBuild BUS STAVEDU BUS SWEBUILD BUS CROSKILLS

The actual median value shows that a typical BUILD UP Skills project ran around 20 training courses during its life-time, while the median target was only 14 training courses per BUILD UP Skills project. The average value has not been taken into account as there are a few outliers which would skew the average value.

The results show that the BUILD UP Skills initiative has resulted in less training courses developed than targeted. Based on the analysis of final results, the total amount of training courses that BUILD UP Skills Pillar II projects expected to generate was 1,160. In practice, the projects have generated 805 training courses (69% of the target). However, the vast majority (16) projects met their target, while only 6 projects failed to meet their target. A lack of resources was not seen as a reason for the number of training courses being less than predicted.

Number of people trained

The indicator 'number of people trained' is the total number of workers, trainers and people qualified through the training courses developed by the projects. This indicator reflects the number of training courses offered as well as their take up and size (e.g. whether they are only pilot courses or large-scale training schemes). In principle, the more and larger training courses offered, the more people are trained.

According to the final results, 8,570 people have been trained, which is approximately 33% of the initially targeted 25,647. The median value shows that a BUILD UP Skills project typically trained around 266 people compared to a median target of 262. The results show that 12 projects met their target and 10 did not meet their target, although 4 were close to their target.

This apparently low performance could be due to several reasons, from poor performance, to over ambitious target setting by some of the project consortia. Since training schemes are not comparable one-on-one due to their different formats as explained above, it is not possible to evaluate whether some of the targets were too ambitious (but this may have been the case for some).

According to the BUILD UP Skills project coordinators and partners, the reasons given (during a discussion session at an EU Exchange meeting) for why there are less training courses than expected for some of the projects include:

- People trained outside the project duration are not reported - Delays in implementing the pilot training courses led to delays in the delivery of courses. People trained outside the duration of the project have not been reported and therefore have not been considered in the total of people trained;
- Snowball effect has not been considered - Some projects offered 'train the trainer' programmes, through which new people were trained to train others. The snowball effect that this may have had (trainers that in turn trained others) has not been captured in the achieved results (these were also not considered in the ex-ante targets). This means that BUILD UP Skills may possibly have had a much greater impact (in terms of amounts of people trained) than indicated here;
- A lack of demand - For several reasons (barriers) explained in Chapter 5.3) as well as the fact that BUILD UP Skills coordinators and partners lack the appropriate / effective marketing skills to promote the courses. This also resulted in some projects being too late in trying to create demand and some courses that were delivered after project completion, and hence not reported;
- Legislative barriers;
- Courses were not officially recognised and so demand was lower than expected;
- Resistance of relevant stakeholders to work with BUILD UP Skills projects, and preference to do courses in-house;
- Downturn of demand in the construction sector, unrelated to the projects in that it was caused by the economic downturn (which made the predictions of demand completed at project application unrealistic for some of the projects);
- Some potential customers / trainees were hesitant to attend the courses which were perceived as too innovative and therefore less useful.

Number of hours taught

The indicator 'number of hours taught in the frame of the courses triggered' reflects the number of training courses offered but also the length of the courses. If the total hours taught (not the median value) is taken the target has not been met (87% of the target has been reached) with eight projects not meeting their targets (all except one reached more than half of the hours that they set out to teach). The median value is approximately 775 hours taught in total for a typical BUILD UP Skills project compared

to the target of 715. Taking these median values, the indicator has been met (the target has been reached by 108%).

Costs to qualify each trainee

The average cost to qualify a trainee (Euro/trainee) also varies considerably between the projects, ranging from as little as 134 Euro/trainee (BUS SWEBUILD) to as high as 2,914 Euro/trainee (BUS QualiShell) in practice. Several projects differentiate between different training programmes, and hence report on two different costs. The median cost for all projects has been in practice around 638 euro/ trainee compared to the expected 837 euro/ trainee. This indicator was overall reached (131% target reached) and only 5 projects did not meet their ex ante target.

The indicator was reached even though the number of people trained were significantly lower than expected. This happened for the following reasons:

- The accumulated number of people trained only slightly affected the median of costs to qualify each trainee. In other words, large deviations in the number of people trained have only slightly affected the median¹² of costs per trainee. These results are determined by the chosen logic to estimate the value of each indicator.¹³
- Some projects set unrealistic targets. QualiShell and CrossCraft managed to achieve lower costs per trainee than targeted even while teaching smaller number of people than initially planned. The reason for this was the methods used to calculate the target. In QualiShell the planned target was based on the total costs estimated for WP3 and WP4, while achievement is based on the realistic calculation. In CrossCraft the planned target was calculated by dividing the total project costs by the trainees which had to be trained till the end of the project, while factual value was based on the realistic calculation.
- Some projects did not include the number of people trained while calculating the target and actual cost to qualify each trainee. For example, in Construye 2020 the calculations were based on the official Spanish rate for permanent training which is 9/13€ per hour (depending on courses). In I-TOWN the standard hourly cost for VET courses was used to calculate the costs per trainee. Hence, only the length of training had an impact on the costs per trainee.

RES production

Calculating RES production was difficult for several projects. There were five projects that indicated RES production was not applicable to them as there were focusing on energy efficiency. These five BUILD UP Skills projects were: QUALITRAIN, QualiShell, BUILDEST II, BEET and LuxBuild. The other 17 BUILD UP Skills projects set ex ante RES production targets. Nine projects in total reached their target and one project that had not set a target managed to score positively on RES production. The median RES produced per BUILD UP SKILLS project was 401 toe/year while the target set was around 400 toe/year. Some projects calculated their targets and actual values in units

¹² The value separating the higher half of a data sample from the lower half of these values.

¹³ The data for the number of people trained were summed for all the projects (it means that the change between a targeted and an actual number of trainees in every project directly affects the accumulated number for all the projects). The cost to qualify each trainee was calculated on a project level and after that, the median was calculated. It means that only projects, where values of costs to qualify each trainee happen to be in the very middle on the rank of values for all the projects, have a direct effect on the median number estimated for the entire population of projects. Therefore, it might be that in a particular project the targeted costs to qualify each trainee were ten times lower compared to the actual costs. If values of costs in this particular project were higher than the median number in both cases (comparing targeted costs of all the projects to the actual costs), this change will not have any direct effect on the change between the targeted and actual value of the median.

other than toe /year, but in order to enable comparison it has been converted these into toe/year.

Overall, this is the least achieved indicator or target (32% achieved). This shows that projects were quite ambitious in their prediction of how much RES their training courses would enable. On the other hand, projects had to come up with their own methodologies on how to calculate this indicator. It has been reported by BUILD UP Skills project coordinators that this has been a difficult exercise. Table 5-8 provides an overview of targets regarding this indicator.

Table 5-8 Overview of targets for RES production

Target	Number of projects	BUILD UP Skills projects
0 toe/year (no target)	5 projects	BUS BEET BUS Luxbuild BUS QUALITRAIN BUS QualiShell BUS BUILDEST
0 -10 toe/year	3 projects	BUS i-TOWN BUS ENERGOTRAIN BUS FORCE
< 1,000 toe/year	7 projects	BUS WE-Qualify BUS STAVEDU BUS TRAINBUD BUS Construye 2020 BUS CrossCraft BUS EnerPro BUS N@W
1,000 – 10,000 toe/year	5 projects	BUS Qualibuild BUS FORESEE BUS BEEP BUS SWEBUILD BUS CROSSKILLS
Outliers (44,742 and 180,000 toe/year)	2 projects	BUS UPWING BUS BRICKS

Primary energy savings

Two projects indicated they did not set any primary energy savings targets, these are BUS BUILDEST II and BUS LuxBuild. The other 20 projects did set primary energy savings targets. The median primary energy savings per BUS project was 1,955 toe/year compared to a target of 2,270 toe per year. Overall this indicator has been relatively close to being reached (89%), although 7 projects did not meet their targets (although one was very close to meeting its target). Similarly, as for RES production, not all projects calculated their values in the same units. For the sake of comparison, Trinomics has converted all estimates into toe/ year. Table 5-9 shows the overview of primary energy savings targets.

Table 5-9 Overview of targets for primary energy savings

Target	Number of projects	BUILD UP Skills projects
0-1,999	10 projects	BUS Luxbuild

		BUS BUILDEST BUS QUALITRAIN BUS FORCE BUS ENERGOTRAIN BUS i-TOWN BUS QualiShell BUS WE-Qualify BUS STAVEDU BUS N@W
2,000-10,000	5 projects	BUS TRAINBUD BUS EnerPro BUS BEET BUS BEEP BUS QualiBuild
10,000-30,000	3 projects	BUS CrossCraft BUS Construye 2020 BUS SWEBUILD
50,000	2 projects	BUS CROSKILLS BUS UPSWING
Outliers (320,000 and 140,000 toe/year)	2 projects	BUS BRICKS BUS FORESEE

Reduction of GHG emissions

As for primary energy savings, the same two projects (BUS BUILDEST II and LuxBuild) indicated they did not set any reduction of GHG emissions targets. The other 20 projects did set them. Overall, the target has almost been reached (92%), even though 7 projects did not reach their targets. The median GHG emissions reduction per BUS project was 4,357 tCO₂e/year (while the median target was 8,054 tCO₂e/year). This means some projects overachieved, whereas others fell considerably short. As for the other two energy indicators, not all projects calculated their values in the same units. For the sake of comparison, all estimates have been converted into tCO₂e/year.

Table 5-10 Overview of GHG emissions reduction targets

Target	Number of projects	BUILD UP Skills projects
0	2 projects	BUS BUILDEST BUS Luxbuild
0-100	1 projects	BUS FORCE
100-1,000	5 projects	BUS QUALITRAIN BUS ENERGOTRAIN BUS QualiShell BUS N@W BUS SWEBUILD
1,000-10,000	4 projects	BUS WE-Qualify BUS STAVEDU BUS i-TOWN BUS TRAINBUD
10,000-50,000	5 projects	BUS BEEP

		BUS CrossCraft BUS Construye 2020 BUS EnerPro BUS BEET
50,000-1,000,000	4 projects	BUS Qualibuild BUS CROSKILLS BUS BRICKS BUS UPSWING
Outliers Above 1,000,000	1 projects	BUS FORESEE

Other than the quantitative targets, the projects also defined the outputs they were set out to achieve. Outputs refer to the specific products and results (to be) delivered by the projects. Outputs of all projects have been into nine categories:

- 1) Certification and recognition;
- 2) Development of training schemes, modules and qualifications;
- 3) Dissemination of training information;
- 4) Monitoring activities;
- 5) Surveys about training;
- 6) Training delivery;
- 7) Training infrastructure;
- 8) Training materials;
- 9) Training support.

The analysis below is based on the information provided in the final project reports or interim project reports (in the case of two projects¹⁴). Only BUILD UP SKILLS Pillar II projects were analysed.

Table 5-11 Groups of project outputs

Output category	Number of finalised outputs with this output category	Planned outputs that have not been finalised*	Examples of projects addressing the respective output category
1) Certification and recognition:	15	5	BEET, BUILDEST II, Construye2020, QualiShell, QualiBuild, QUALITRAIN, BRICKS, etc.
Work plan for recognition of previous information education	2	0	
Certification for trainers and assessors	10	1	
Mutual recognition	2	5	
Adaption of professional certificates to on-line modality	1	0	
2) Development of training	53	10	N@W,

¹⁴ Two out of 22 projects (CROSSKILLS II and STAVEDU) had not submitted the final project reports by the end of December 2017. In these two cases, the information was extracted from interim project reports.

schemes, modules and qualifications:			QualiShell, UPSWING, FORESEE, EnerPro, BEET, CrossCraft, BEEP, FORCE, BUILDTEST II, QualiShell, Construye2020, QUALITRAIN, QualiBuild, BRICKS, I-TOWN, WE-Qualify, etc.
Development of voluntary/national qualification schemes (VQS)	13	3	
Development of training schemes	16	2	
Development of pilot courses	16	2	
Basic cross craft training module	3	1	
Qualification module for the new service "On Site Quality Coach"	1	0	
Special modules (techniques for renovation of old buildings and installation of renewable energy systems)	1	0	
Establishment of voluntary quality label scheme for companies which employ qualified workers	1	1	
Revision of existing qualifications	1	0	
Development of e-learning module	1	0	
Passive house craftsmen course light	0	1	
3) Dissemination of training information:	68	1	BRICKS, I-TOWN, WE-Qualify, CROSSKILLS II, STAVEDU, LuxBuild, EnerPro, ENERGOTRAIN, SWEBUILD, UPSWING, FORESEE, BEEP, etc.
Communication plan	21	0	
Website	22	0	
Database of trained professionals	3	1	
Database for training programmes	2	0	
Newsletter, leaflets, posters, press releases, etc.	10	0	
Social media profiles	6	0	
Database of contacts related to National Qualification Systems	1	0	
Database of accredited exams	1	0	
App	2	0	
4) Monitoring activities:	6	5	QualiShell, Construye2020, N@W, BEET, ENERGOTRAIN.
Monitoring system for implementation of VQS	4	2	
Centres for evaluation of competences	1	0	
Monitoring plan for the quality of the (deliverables of the) project	1	3	
5) Surveys about training:	8	1	Construye2020, QualiShell, BEEP, I-TOWN,
Survey of competence of trainers	1	0	
(Online) survey of trainers' needs (e.g. to develop training	3	0	

materials for trainers)			TRAINBUD, SWEBUILD.
Surveys to assess satisfaction with training courses	3	0	
Survey to employers on their requirements for developing training	1	1	
6) Training delivery:	40	2	N@W, BEEP, CrossCraft, SWEBUILD, FORESEE, etc.
Seminars and workshops	13	0	
On-site training	4	2	
Training for trainers	19	0	
Implementation of training schemes for workers	4	0	
7) Training infrastructures:	3	0	I-TOWN, EnerPro, LuxBuild.
Establishment/ development of centre of excellence	3	0	
8) Training materials:	25	2	BEET, CrossCraft, BEEP, BUILDEST II, FORCE, etc.
Development of training material	20	2	
Video materials	5	0	
9) Training support:	7	6	QualiShell, CossCraft, Constuye2020, N@W, I-TOWN, EnerPro, etc.
Financial concepts and incentives for new training	2	2	
Sustainability plan	4	4	
Review and changes in the State Educational Requirements	1	0	

Notes: The final reports for CROSSKILLS II and STAVEDU were not available on the 21st of December 2017. In such cases information provided in the interim reports has been used. * - The outputs that were started, but have not been finished in CROSSKILLS II and STAVEDU according to the Interim project reports are considered as not finalised.

Source: Database developed by the project team, based on the country factsheets and project reports.

Most of the projects focused on the **dissemination of training information** (mostly project website, communication plan), **development of training schemes, modules and qualifications** (mostly development of voluntary/ national qualification schemes (VQS), training schemes, and pilot courses), and **training delivery** (seminars and workshops). Project website and communication plans were prepared in almost all (21 out of 22) analysed projects. Training materials were prepared in 20 of 22 projects. Training the trainers was mentioned as a project output in most of the project reports. In addition, all projects also focused on the training of trainers (19 of 22 projects) apart from the training of workers as most projects had training for trainers identified as a project output. Most commonly, planned outputs related to mutual recognition, monitoring plans for the quality of project deliverables, and sustainability plans were not produced even if these issues might have been addressed in the projects in other ways. Outputs that were not initially planned were achieved in 12 projects. These outputs were usually related to dissemination of training information, in other cases it was video material or additional workshops and seminars.

The box below provides some good practise examples in terms of different outputs of the projects.

Box 5-3 Good practice examples

BEET (FYROM)

BUS BEET made a pioneering step towards the introduction and validation of previous non-formal and informal learning in FYROM. During the project, a process for recognition of previous learning was developed. This process consists of identification, documentation, evaluation and certification. The process is completely compatible with the recommendations for necessary phases from the European Training Foundation. This new recognition process was well received. Most of the construction companies in FYROM acknowledged the new recognition process. During the project, 967 workers were certified through the process of recognition of energy efficiency skills. The candidates for skill recognition indicated the following benefits of the recognition of previous learning:

- Much shorter process than the previous training that led to the same qualification;
- Validated qualifications increase employability;
- Valorisation of previous knowledge, skills and experience;
- Qualifications can be acquired without formal training;
- The certificate is identical to the one obtained through more formal training;
- Insufficient competences can be completed by partial or modular training.

BUS BUILDEST II (Estonia)

BUS BUILDEST II can be considered as a good practice example in terms training material. The project provided video learning materials for VET trainers. Video materials covered many different fields, e.g. insulation of the cold-water piping with flexible foam covers, insulation of ventilation flume with strengthened aluminium paper covered flexible mat wool, insulation of heating piping with foil covered wool. These training materials were welcomed very positively by trainers and were largely supported by entrepreneurs.

In addition, BUILDEST II managed to integrate energy efficiency skills into professional standards. The project introduced incentives for more extensive awarding of occupational qualifications in the sector by developing an output-based evaluation of occupational competences. This included the accreditation of prior and experiential learning-based awarding of occupational qualifications in the construction sector. One of the lessons learned during the project is that the most effective method of training the non-qualified workforce is flexible integration of these participants into the existing vocational education system.

BUS N@W (Netherlands)

The project developed and implemented a qualification structure for post-initial training. This bridged the gap between initial and post-initial education in both building and installation sector. In post-initial education, the visualisation of the qualification structure made professional HR-advice for sustaining the built environment possible. In initial education, the developed qualification structure led to the development of several add-ons to the traditional curriculum.

Source: developed by the project team, based on the project reports

Have BUILD UP Skills / EE4 of Horizon 2020 projects been successful?

All interviewed project coordinators were of the opinion that their BUILD UP SKILLS project had been successful. In many countries, similar training courses did not previously exist, neither were any efforts made to analyse the need for such skills (reference was made to the Status Quo Analysis) or to bring the relevant stakeholders together to make something happen (reference was made to the National Qualification Platforms). These projects set the basis for the education of construction workers, developed high quality and innovative materials, developed a good network and raised awareness (e.g. through appointed ambassadors, setting up national qualification platforms, developing new partnerships, dissemination activities) among construction

workers and policy makers on the importance of energy efficiency, RES and cross-craft skills for blue collar workers.

Some of the project coordinators mentioned that the overall success at national level was beyond their expectations. The projects received political interest and influenced education and skills at the national level (e.g. starting to work with the Ministries, getting involved in developing regulations, national qualification standards, etc.).

Some of the project coordinators also mentioned that even though the projects were successful, there is still a long way to go to close the skills gap, as it is not possible to change the market with one single project, and sometimes such topics were not political priorities of the relevant Ministries, and substantial changes require time.

One of the main success criteria was the inclusion and/ or involvement of key stakeholders in the project, as all the outcomes were taken up by them. For some projects, the BUILD UP SKILLS activities and outputs have been included into national programmes and curricula (see section 4.4).

What has been the quality of the courses developed?

The clearest way to assess the quality of the courses is to see how many of them are accredited to national or international standards, the logic being that this accreditation is a reflection of the courses achieving national recognition of quality. Many of the projects have sought to adapt existing national training programmes to better reflect energy efficiency and renewable energy. The fact that these courses have been adopted and accepted is a reflection of quality.

Another test of quality is the course take up – on the basis that a good quality course will be popular. However, this is not always a fair assumption, because the take up is affected by many other factors, such as market acceptance (many builders do not consider that they need training in these issues), the market demand - many building owners (who are the purchasers of building services) are not highly motivated by energy efficiency and/or renewables, so many builders do not see this as a skill they need to develop and offer, and some countries have restrictive national requirements for official recognition, such as the number of hours to be taught, etc.

There are mixed results with respect to BUILD UP Skills courses being accredited at national or international level, as receiving accreditation for a course is not always easy (e.g. legally and politically). As an example, one BUILD UP Skills course was accredited as it was developed based on the National Qualification Scheme, another developed qualifications used in regular education, which is accredited, as this is a formal requirement to receive payments. For another project, only the base course was EQF accredited. A couple of other projects are awaiting (partial) accreditation at national level. What helped to get national accreditation was the inclusion of the accreditation body in the BUILD UP Skills consortium.

Reasons for not receiving accreditation at the national level were:

- Formal accreditation requires a minimum length of courses, whereas BUILD UP Skills courses did not fulfil this requirement as the demand that existed is for shorter courses.
- The skill is not mandatory in a country, hence training of such skills occurs on a voluntary basis, for example, cross-craft understanding.
- Accreditation happens at regional level (e.g. Italy).

Besides formal accreditation, some BUILD UP Skills projects also started to work on mutual recognition issues, where qualifications in one country would be recognised in another.

What have been the overall impacts and spill-over effects of BUILD UP SKILLS activities?

This question assesses if there have been any planned or non-planned side effects of BUILD UP Skills activities and courses. Even though the BUILD UP Skills projects are finalised, their activities and outputs created during the two BUILD UP Skills phases continued in another form, and are planned to continue in the future.

The main impacts and side effects of BUILD UP Skills activities include:

1. **Continuation through one or more Horizon 2020 Construction skills projects** – from the interviews it became apparent that most of the projects have coordinators or partners involved in at least one of the H2020 Construction skills projects. It was mentioned that this was a very positive unplanned result of the work and results of the BUILD UP Skills projects. Some of these new Horizon 2020 projects use/ build upon the training material developed in BUILD UP Skills.
2. **Creation of new partnerships** – many project coordinators mentioned in their interviews that as a result of BUILD UP Skills and Horizon 2020 projects, new partnerships between the education, VET, construction industry and workers were created. An example of these are 'partnerships for education' – a voluntary agreement between builders, training providers and material producers, partnerships with manufacturers, training schools. Another example is working with training institutions to develop free e-learning modules. BUILD UP Skills trainers have become e-learning advisers – partners have been amazed with the possibilities of e-learning. Some of these planned partnerships were more successful than expected. Both the training institutions and the trading companies were interested in continuing the training.
3. **Inclusion of BUILD UP Skills training courses and material into national programmes/ curricula/ strategies** – project coordinators are working on including the courses and material developed during BUILD UP Skills into national programmes and curricula. For some projects, the material is not yet officially recognised, but it is still being used country-wide by training institutions and VET boards. For some other projects, the course is taught in vocational schools, or used in formal education and is fully self-sustaining. For others, it is part of the national catalogue, and as such formally accredited. As a result of another BUILD UP Skills project's work, the competence for energy-efficient construction has been added to the relevant professional standard.
4. **Overall start-up and acceleration of energy efficiency and RES activities** – a couple of project coordinators also mentioned that due to their BUILD UP Skills projects, EE and RES activities in the built environment became more prominent in their country and relevant organisations (usually part of the BUILD UP Skills consortia) started working more on these issues. As a result, the issues became more discussed among policy makers, construction industry, education and VET bodies at national level. As such, the BUILD UP Skills projects created a basis for the national energy efficiency skills in the construction sector.
5. **A change of approach to setting qualification standards** – in some countries, the BUILD UP Skills project affected the way in which qualification standards were set in the country and helped in updating the national framework.
6. **Development of training materials** on issues which did not exist in the country – in some countries, without a BUILD UP Skills project there would be no training material developed on EE and RES issues for construction workers. The developed material is being used by other training facilities and picked up by vocational schools.

- 7. Inclusion of BUILD UP SKILLS as a best practice in the National Energy Efficiency Action Plan** – some of the project coordinators mentioned that their BUILD UP Skills project was indicated as an example to follow for energy efficiency and RES training.

Other planned activities include:

- **The promotion of training materials** – project coordinators also mentioned that they have planned to promote the material they have developed further. In some cases, the training material was so successful that other actors of the building industry (architects, technical controllers, engineers) apart from the targeted type of construction workers were interested in the training and wanted to get the material.
- **Information campaigns** – done for example together with companies
- **Ongoing work with the relevant ministries in the country to roll out the courses further** – for example into vocational schools (if it has not been done yet) and to get official recognition.
- **Continuing/ starting training activities based on the developed courses** – some of the BUILD UP Skills courses are being offered in various training facilities.

5.5. Coherence

Coherence is important for several reasons, from avoiding duplication of efforts to ensuring common ground -in terms of conclusions, recommendations- and avoiding contradiction. 'Coherence' across the BUILD UP Skills programme has been defined as:

- How have BUS projects established links with each other throughout the projects and to what extent have these links (and sharing) led to adjusting approaches or ways of doing things?
- Have BUS projects established links to other EU or national programmes?

Links with other BUILD UP Skills projects

Many links and synergies have been found among BUILD UP Skills projects, for example countries sharing a similar focus (e.g. cross-craft), countries which have to overcome similar challenges (e.g. marketing of courses).

The links with other projects throughout the programme have been established through the EU Exchange Meetings (organised twice a year). This has been the response from all the BUILD UP Skills project coordinators interviewed. These meetings were the means by which project coordinators have come together and shared experiences through face-to-face, informal talking. For example, BUS Construye 2020 was inspired to consider addressing cross-craft understanding after learning about the importance of this from presentations of BUILD UP Skills projects focusing on this. This project also decided to reconsider the length of their training courses after it was clear from an EU Exchange Meeting that shorter trainings tend to do better (are more marketable). Further examples are BUS WE-Qualify in Cyprus, that developed its materials aided by the materials developed by BUS UPWSING, and BUS LuxBuild in Luxembourg, that is considering developing an App like BUS N@W in the Netherlands did.

There are a few projects that planned for close exchanges with another country already in their project proposal: BUS QualiShell from Romania for instance, had budgeted for a study trip to another country with the purpose of exchanging best practices. The selected project was Construye 2020 from Spain. BUS TRAINBUD went on a study visit to Austria where they were experiencing similar challenges.

Links to other national projects and programmes

Many of the BUILD UP Skills consortia have teamed up to continue and expand the work through new projects, some of which happened in parallel to BUILD UP Skills Pillar II (e.g. BUStoB, PROF/TRAC etc). This is very important because each partner brings their experience and also because it allows the work to continue efficiently, as the same people (partner organisations) remain involved.

Other projects were linked to relevant national progress made possible through their partners' involvement. For BUS SWEBUILD in Sweden for instance, the coordinator (The Swedish Energy Agency) had a platform that encompasses all national initiatives (BUS SWEBUILD coordinators were part of the platform). This enhanced cooperation across projects and gathering stakeholders.

Other projects linked well to policy developments. An example of this is BUS BEEP, whose work was in coherence with two of the most important energy legislation instruments: the EPBD and the Directive. The project linked to the EPBD developments and the consortium coordinator was involved in developing the voluntary certification system for the installers of renewable energy systems under the RES directive in Finland.

5.6. Sustainability

This section provides an analysis of the long-term sustainability (beyond project duration) of the BUILD UP Skills projects.

- **Replicability** of projects is guided by the question: *"Can the approach and material of BUS projects be translated and transferred to other regions/countries?"*
- **Continuation** of the projects or their outputs is analysed through the answer to: *"How are BUS projects continuing the work / utilising the outputs once the projects are finished? Is this continuation at local, national or EU level (and why)?"*
- **BUILD UP Skills programme continuity** is defined by exploring: *"(How) should the BUILD UP Skills initiative be continued?"*

Replicability of projects

BUILD UP Skills projects have left a blueprint for others to replicate the outputs and process in various ways. Many of the developed (online) training courses, methods to establish voluntary qualification schemes, the competences frameworks, and the methodologies for the recognition of previous learning developed by BUILD UP Skills projects can be replicated in other countries, by other construction occupations, and in some cases possibly by other sectors.

Replicability may be possible fully or to a large extent for instance, by just having to adjust a unit of the course (e.g. The Foundation in Energy Skills from QualiBuild has been taken up via the Train-to-NZEB H2020 project in countries such as Romania, Czech Republic, Turkey, and for it one unit of six of the course needs to be adjusted to be able to reflect the national situation regarding regulations). Overall, among the factors determining this replicability are the following:

- **The characteristics of the construction market in a country** – the percentage of skilled workers in a country, the characteristics of the building stock, the characteristics of the market, the type of market barriers present in a country, all make the outputs of certain BUILD UP Skills projects more applicable to some countries than others.
- **The legal frameworks for construction skills education / qualifications** – A similar legal framework for education/qualification for trades in the

construction sector and a similarly structured qualification framework / CVET system (e.g. containing a detailed definition of competences for each occupation and providing recognised certification for qualified workers) are also enhancing replicability. A similar legal focus or targets are also pre-requisite for replicating some of the BUILD UP Skills Projects as in the case of BUS LuxBuild, which was driven by a clear target and goal around Passive House (Passivehaus) and nZEB from the beginning.

- **Language** – Language is key as training materials would otherwise need to be translated for different countries with a different main language unless language synergies exist (For instance, French, English or German, are spoken in various countries; also Hungarian is spoken in a small part of Slovakia). Some BUILD UP Skills projects tackled the language aspect by developing materials in various languages (e.g. BUS BEEP (Finland) developed materials in Finnish, Swedish, English, Russian, and Estonian; BUS EnerPro’s materials have been translated to English and are currently being used in a follow up H2020 project). This may also serve blue-collar workers who do not speak the local language in the country where they work (e.g. In Sweden many workers do not speak Swedish). Besides translations, an opportunity exists in training companies from the same country based in other countries e.g. BUS BEEP trained Finish companies in Russia. This need for translation is related to funding, as the translation of materials can be expensive and this hinders replicability.
- **Geographical characteristics** - Study materials and approaches to building energy efficiency may in some cases be applicable to countries with similar climatic conditions. In many cases however, despite these peculiarities of the climate that may make some components not that relevant from project to project, the training courses can be largely transferable (e.g. the training courses developed by BUS Construye 2020 were applied through an Erasmus+ programme to train two groups of window installers from France and Italy). Obviously, the more the similarities between countries, the greater the chances for replication from one country to another. Therefore, knowing the situation of a country/region and its market is necessary, as well as finding the way to adapt the outputs (training, qualification scheme) accordingly (e.g. from a learning module, some competences may need to be compulsory in some countries but not in others).

Box 5-4 Replicability example from BUS QualiBuild (Ireland)

The Train the Trainers and the Foundation in Energy Skills (FES) course are currently being replicated in a number of EU funded projects such as Train-to-nZEB and placed on training platforms such as PROF/TRAC. Both courses are easily adaptable and may be used in a module format or as an entire programme. The FES course can be added to other advanced or specific courses as it covers the main principles of quality low energy building with an emphasis on best practice communication skills.

Continuity of the work beyond the projects’ duration

The outputs generated by the BUILD UP Skills projects are likely to remain useful for some time. Outputs such as learning materials are largely available at no cost through the project websites each BUILD UP Skills consortium created. The key issue for continuation now is to find out how to ensure that the training schemes developed throughout the duration of the project become implemented as widely as possible. The BUILD UP Skills consortia are already -and have intentions to continue doing so- continuing the work beyond the project duration in the following ways:

Continuation via interested parties

Continuation can be ensured by other parties through two routes: **integration in the curricula of relevant educational institutions** and national programmes that some training schemes developed by the BUILD UP Skills consortia managed. The **training materials generated by the BUILD UP Skills consortia can also be handed over to future training providers** e.g. Vocational training centres and institutions, other types of training centres as well as to certification or qualifications bodies, Education and Training Boards (ETBs), building councils together with instructions on how to deliver the training courses. For example, in Spain, the training courses developed by BUS Construye 2020 are now being offered through the State Foundation for Education at Work (FUNDAE). In Latvia, the training programs developed by BUS FORCE have been integrated in five training centres in Latvian regions. In Sweden, two trade organisations, the Swedish Construction Federation and the Employers' Association representing the Swedish plumbing and electrical industry (Installatörsföretagen) will run the training courses developed by BUS SWEBUILD in the years until 2020.

Box 5-5 Example from QualiBuild (Ireland) about the uptake of the training courses by education providers

The proposed general training of BUILD UP Skills QualiBuild is EQF 4 and is the equivalent contact of 3 days or 24 contact hours. This means that the content can be introduced into the school curriculum as part of construction studies or similar. The QualiBuild FES course handbook has already been issued to a couple of schools in Ireland to try out as an addition to the existing construction studies course at Leaving Cert level (final year of secondary school) to 17/18-year olds. The results or evaluation of interest are yet to be determined but understanding the principles of air tightness and insulation and ventilation can easily become part of the curriculum.

An alternative network for the training programmes includes the apprenticeships. Although each apprentice is learning a specific craft trade, it is important to understand the main principles of construction at a holistic level. Understanding communications is equally important. This 3-day course can run alongside the existing apprenticeship preferably in the first year.

Continuation prompted by legislation

To some extent, **the continuation of the BUILD UP Skills legacy also depends of the steps taken by legislators and policymakers.** If incentives for the employment of qualified staff are introduced and/or if appropriate financing tools/incentives and other supporting measures to encourage the participation of workers in the training courses are put in place, this would be likely to boost the demand for qualified workers, which would make a strong case for the training schemes of the BUILD UP Skills consortia. In this regard, BUILD UP Skills consortia can work on influencing progress in legislation in this direction. For instance, the BUS QualiShell consortium is trying to promote better regulation (for skills) in Romania in terms of improving regulation on minimum air tightness requirements for construction. BUS N@W is similarly attempting to influence policymakers for formal accreditation of qualifications.

Continuation by means of additional funding

An obvious means of continuation (for the current project consortia) is to acquire **additional funding** that allows them to continue the activities (i.e. training courses)

and/or to keep up the platforms and training materials developed up to date. Funding, particularly EU funding through H2020 or the Sector Skills Alliance has so far been the main means by which projects are continuing. Projects such as the following have emerged from BUILD UP skills projects and consortia: [Train-to-nZEB](#), [Fit-to-nZEB](#), [NEWCOM](#), BuS.Trainer, [BIMplement](#).

In some cases, national funding or a mix of national and EU funding have also allowed for the continuation of projects. For example, in Estonia, the continuation of BUS BUILDDEST II has been enabled by the Ministry of Education and Research by commissioning 78 training courses in the field of construction for teaching a non-qualified worker in 2016 and 2017. The courses were funded by Estonian state resources in combination with the European Social Fund.

Private (including own) funding is also allowing for the continuation of the projects. For instance, in Hungary, the BUILD UP Skills consortium is using its own resources, together with resources from the local training centres and sponsors from industry (this is partly thanks to the Sustainable Construction Skills Alliance that they set up as part of BUS TRAINBUD). In Spain, BUS Construye 2020 partners are currently working on the [platform](#) (pilot project within BUS Construye 2020) dealing with the business-users interface aiming to promote renovation of housing. The platform allows private individuals to make requests for energy efficiency calculations of their house and links them to organisations that can send quotes for energy efficiency works and products.

BUILD UP Skills programme continuity

Although BUILD UP Skills work and projects have been continued through H2020 to some extent, it is worth analysing if a future BUILD UP Skills programme would be relevant and if so, what this would entail. Based on the work that BUILD UP Skills projects have done so far, and where projects are at, as well as having validated preliminary conclusions with BUILD UP Skills project coordinators (through interviews), it is clear that it is essential for the work of BUILD UP Skills to continue. This has already been done in different ways as explained in Chapter 7.2. A new BUILD UP Skills programme could take the following form:

- **Updating the national roadmaps developed in Pillar I** – This is important as it enables benchmarking between countries and captures progress since the original roadmaps. This could be coordinated by BUILD UP Skills consortia, each in their country.
- **Having a specific function or focus** - A potential future BUILD UP Skills programme should aim to:
 - Act as a *networking and knowledge sharing platform*. The purpose would include: keeping the current BUILD UP Skills network together, to exchange experiences between EU MSs in improving the quality of training courses, to share best cases of experiences with the use of new, innovative, energy efficient materials and technologies etc.
 - Assist consortia with *marketing plans to promote their training courses*. Given that market demand is a big barrier and marketing is an area that virtually all consortia are not very experienced in, this would be key.
- **Focus on new, trending topics** - A potential future BUILD UP Skills programme would not be focused on developing training but could also deal with how to ensure that the training courses already developed comply with:
 - IT approaches and more concretely BIM – IT and particularly BIM is an increasingly important technology in buildings' energy efficiency. Training blue- and white- collar workers on this (albeit in a different way) is essential.
 - Mutual recognition of training, skills and competences – The accreditation or recognition in one country of training courses taught - and skills gained- in another country is key and still a challenge to overcome.

- Cross-craft understanding and communication between different profiles of construction workers and between blue-collar workers and white-collar workers (this was partly covered by some BUILD UP Skills projects).

The topics listed above are partly being dealt with in current Horizon 2020 programmes, therefore partly corroborating the relevance of this programme.

6. CONCLUSIONS

BUILD UP Skills has been a unique, successful, relevant and timely initiative. In many countries, similar training courses did not previously exist, neither were any efforts made to analyse the need for such skills or to bring the relevant stakeholders together. These projects set the basis for education of construction workers, developed high quality and innovative materials, developed a good network and raised awareness (e.g. through appointed ambassadors, setting up national qualification platforms, developing new partnerships, dissemination activities) among construction workers and policy makers on the importance of energy efficiency, RES and cross-craft skills for blue collar workers. In order to bridging the skills gap and solving related macro-level issues such as mutual recognition of training, it is imperative that the legacy and the work of BUILD UP Skills is continued and further advanced.

Relevance

Relevance is 'built in' to the BUILD UP SKILLS Pillar II projects through their links to the needs identified in Pillar I projects. Many projects have retained Pillar I stakeholders (organisations and experts) who have helped to ensure the quality and relevance of the course content developed and helped practically e.g. provision of example building materials, training spaces, access to accreditation routes. Projects have also been adapted based on ongoing customer feedback relating to nature of the course, delivery style and timing.

The original roadmap actions are largely complete, so in theory the roadmaps need to be updated. Updates could focus on supporting uptake as demand grows or on updating course content to keep it up to date. Identified aspects that could be added to the roadmaps are: circular economy implications (lifecycle of buildings), BIM and use of IT in construction (and IT literacy generally), NZEBs, energy efficiency in existing buildings and white collar (professional) sectors. This might need different stakeholders (and political commitment at MS level).

The skills targeted by each project are pertinent to the relevance questions because they illustrate what skills the Pillar I projects (and the roadmaps they produced) think are most in need to improve skills related to energy efficiency and renewable energy sources in buildings. The following skills are the most popular among analysed projects: insulation installers (19 projects); heating system installers (18); renewable energy systems installers (16); ventilation and air conditioning installers (15), façade workers (12); plasterers (building envelope) (12); roofers (12); electrical installers (10); heat pump installers (10).

EU added value

The main European added value of the BUILD UP SKILLS projects came from the fact that the majority of these projects would not have been implemented without the EU funding. Another big success was the EU Exchange Meetings. These meetings provided the following benefits:

- Created network of experts that generated new follow-up projects (e.g., Horizon 2020 projects)
- Opportunities to learn from the experience of projects that started earlier

- Use of other BUILD UP SKILLS projects as a benchmark to compare whether the project was heading the right direction
- Knowledge exchange between project representatives

Finally, the EU added value was demonstrated by some project training courses gaining recognition at EU level.

Efficiency

Qualitative evaluation showed that a high administrative burden of applying for a grant to operate BUILD UP SKILLS project was rarely reported or mentioned by project coordinators. The administrative burden was considered low or no higher than in other programmes. The cooperation with EASME was described as smooth, flexible, and rational. Economic (lack of time for training, cost of training), awareness-related (lack of understanding of the importance of skilled / trained workers, delays in introducing energy efficiency related definitions), market (low demand for energy efficiency skills), and knowledge (language, different skills of the trainees, and lack of facilities for practical training) barriers were more common than administrative barriers.

The quantitative analysis showed that compared with other programmes, the BUILD UP SKILLS initiative was rather efficient in terms of costs to qualify each trainee. Also, with some exceptions, the majority of the BUILD UP SKILLS projects met their ex ante target in terms of cost per trainee.

Effectiveness

The BUILD UP Skills objectives have been achieved. The results show that the BUILD UP Skills projects boosted the education and training of craftsmen and other on-site construction workers and system installers in the building sector and therefore increased the number of qualified workers across Europe. All projects developed / upgraded and piloted new qualifications and training schemes based on the roadmaps developed in Pillar I. The majority of the projects achieved the initial targets they set. The overall programme is considered a success at the national level (by the participating Member States), where some of the developed materials have been integrated in national programmes and vocational education/ training curricula. Overall, the effectiveness of the programme is considered high.

Coherence

Sharing experiences between BUILD UP Skills project has been prompted solely by the EU Exchange Meetings. For many projects this was the only way to share experiences and learn from each other, for others, these meetings were the beginning of further collaboration. The relationships initiated here also led to new projects and hence to establishing links between BUILD UP Skills projects and other new projects. It appears helpful and synergistic to have a consortium partner in the project who is involved in policymaking.

Sustainability

BUILD UP Skills training courses, methods to establish voluntary qualification schemes, competences frameworks, and methodologies for the recognition of previous learning developed by BUILD UP Skills projects can be replicated in other countries, by other construction occupations, and in some cases possibly by other sectors. The factors influencing to what extent this can be done are: the characteristics of the construction market in a country, the legal frameworks for construction skills education / qualifications, language and geographical characteristics.

Continuation is ensured firstly through the outputs e.g. learning materials, which are largely available through the developed BUILD UP Skills project websites. Furthermore, the work is already continuing or planned to continue at local level (e.g. implementing the training courses), national level (e.g. trying to influence

policymaking, legislation) and at EU level (e.g. replicating the project in other countries, taking part in H2020 follow-up projects).

7. RECOMMENDATIONS

From the above sections, it can be concluded that the framework conditions affecting BUILD UP Skills projects are mostly at national, rather than European level, but that European level guidelines and targets certainly have an influence. In other words, the national context is what exerts most influence on BUILD UP Skills projects, as most of the barriers and needs identified can be best tackled at national level (rather than European or local). Below recommendations at various levels are presented. Not surprisingly, most of our recommendations are directed at national level authorities. It should be noted that these measures should be adopted as a mix i.e. not in isolation. For instance, a register of which companies only work with trained workers will not be a useful tool if the general public is not aware of the importance of the quality of construction.

Recommendations for the European Commission

The European Commission can have a role in advancing skills for energy efficiency at the higher level. It should continue to support continuing learning and further upskilling of the workforce and should foster communication and awareness raising, of both construction professionals and the general public, concerning the importance of energy efficiency in buildings and the quality of the construction work to achieve this efficiency:

- Setting more ambitious targets – The European Commission has the ability to speed up the transition towards a more energy efficient construction sector by setting more ambitious (than the current nZEB targets) targets for energy efficient buildings. More ambitious energy targets for buildings would stimulate the market, which in turn will encourage workers to learn about the techniques required. This more ambitious target-setting can go hand in hand with legislation requiring mandatory training / skills / qualifications.
- The Commission could consider the following possibilities and accordingly propose adaptations to improve the legislative framework for skills:
 - Requirements for mandatory training courses for blue-collar workers for energy efficiency works.
 - Tackling the issue of mutual recognition so that training accredited in one EU country is recognised in another EU country.
 - Enforcement and harmonisation of working definitions of nZEB and similar concepts across EU countries.

Recommendations for EASME

EASME can help tackle knowledge related barriers amongst blue-collar workers as well as awareness-related amongst the general public. It should continue to support continuing learning and further upskilling of the workforce and should foster communication and awareness raising, of both construction professionals and the general public, concerning the importance of energy efficiency in buildings and the quality of the construction work to achieve this efficiency. Concrete ways to achieve this include:

- (Continue to) fund projects for knowledge and skills development as well as projects with a strong awareness-raising component aimed at the general public as well as blue- and white- collar workers, as the lack of awareness is an important barrier at all levels. This funding should not be seen as a means to solve economic problems related to the success and continuation of these training courses. Such a long-term financing need cannot be expected from EASME. EASME could however help by funding projects at the business model

development and marketing stage, facilitating the process of these projects becoming self-sufficient.

- If new projects similar to BUILD UP Skills were to be funded, a prerequisite should be that projects pursue national recognition, so that the training courses developed are embedded in the national systems. This would increase effectiveness and possibly efficiency, through a larger uptake of the courses.
- Harmonising Common Performance Indicators. Adopt clearer, single methodologies for calculating impacts of the projects (Common Performance Indicators) and their cost-efficiency. For example, in order to have a single methodology for calculating costs per trainee special attention must be drawn to what expenses are included in the calculation of the training costs (both target and actual). The following expense categories could be included while calculating the costs of training courses: staff costs teachers, costs of training materials (may include preparation of training programme, acquisition and maintenance of related training material, etc.), catering, lease of classrooms/ laboratories, travel, advertising, etc. Not all of these categories are relevant in every case, but these categories could be used as a long list of possible expenses. Finally, to ensure comparability of costs per trainee across projects, only some particular categories of costs can be included (e.g. staff costs and costs of training materials).
- Maintaining the BUILD UP Skills network – Given how useful the EU Exchange Meetings were considered for exchanging experience, some thought needs to be given as to whether it is possible to bring these stakeholders together again to maintain the network developed through BUILD UP skills. Some project coordinators remain in touch due to H2020 projects but EU level meetings to share results across these projects as well as to reconnect with old BUILD UP Skills colleagues in other countries would be positive.
- Revisiting the concept of Technical Working Groups – Although the topics were interesting, BUILD UP Skills coordinators were not as engaged as foreseen in the Technical Working Groups, partly because this was seen as additional work that had not been budgeted in their projects. A suggestion to make this more relevant and connected to the actual projects (if there were ever something similar to BUILD UP Skills) would be to set up Technical Working Groups bringing together projects and their challenges and work, instead of bringing together project partners around a topic of interest.
- Support the update of national Roadmaps – It is five years since the Status Quo analysis of the EU-28 (and Norway and FYROM) which worked on national roadmaps for qualifying their building workforce for the 2020 challenges was conducted. Considering an update of the current situation (quantifying the skills gap, assessing current needs e.g. which trades, which skills) would be useful. New stakeholders (e.g. building managers, construction ICT experts etc.) may have to be involved for this broader scope to work.

Recommendations for national authorities

National authorities have a key role to play in incentivising upskilling of the workforce and the uptake of training courses. Through several hands-on measures, they are key to removing the barriers for the success and continuation of the training courses skills developed by BUILD UP Skills. National authorities have the ability to influence all types of barriers (economic, awareness-related, market, legal & institutional and knowledge-related). They are also key to tackling the most important barriers namely the time / opportunity cost that attending training imposes on the workers and employers and the fact that training and skills are not perceived as an important asset to have. Potential measures include:

- Assuming accountability for the long-term roll out of the training programmes – National authorities or public agencies should assume responsibility for the sustainability of the training programmes. This means offering long-term

support in terms of funding (i.e. long-term, stable, continuous) and implementation.

- Providing recognition of the obtained skills – There are different means by which national authorities could provide recognition for skilled, trained workers, for example, by defining worker categories depending on their skills and knowledge level, by including the training courses in the national catalogue of qualifications (or equivalent) and by recognising that the certification provided by the training complies with the national standards.
- Green procurement: Demand qualifications / skills as part of tendering procedures - The national legal framework should require that tendering procedures in the construction sector incorporate skills and quality requirements for certified qualifications. This is imperative as a “signal” to both employers and employees that they need training to stay in the business. Obviously, such provisions would increase the demand for training courses.
- Support awareness raising campaigns - Public authorities should support or create (via a specialised communications / marketing consultancy) an awareness raising campaign to communicate with citizens on buildings energy efficiency issues and a campaign to promote the upskilling of the construction workforce, stressing that upskilling is possible for all ages and backgrounds. This promotion of training courses should be done as part of a broader energy efficiency awareness raising or NZEB market acceptance campaign and should emphasise existing success stories.
- Creating a register of companies that employ skilled workers – A register of companies with skilled workers could work as an incentive for companies to send their workers on training courses, by rewarding the companies with trained workers by putting their name on such a registry. This should be the register that someone who wants to contract works should consult, in order to make sure that the company or workers he/she is contracting will do the job properly. For this register to be widely used and therefore be appealing for companies to be listed in, the general public awareness needs to be raised, so that they understand the importance of energy efficiency skills and quality works in building.
- Setting a requirement for mandatory training courses– Eventually, if the demand for training courses is still low, and if the quality of the EU workforce continues to not reach the standards required for achieving the energy efficiency targets for the sector, mandatory training courses would need to be put in place. These would help overcome the market and economic barriers to training courses. The ideal would be to have at least some basic / general skillset as mandatory, with add-ons or refresher courses required after some time to ensure skills are kept up to date. This would boost demand and would reduce the time and cost barriers for workers and companies, as it would be mandatory for the future of the company to stay in business.
- Updating the national roadmap – If the EU does (or does not) request / suggest an update for the Pillar I country roadmaps, consider doing one (with the original stakeholders plus others).

Recommendations for project coordinators and other training developers

The advice for project coordinators revolves around what kind of training needs to be offered, when, and how the process should be organised.

- Awareness-raising - In order to be able to increase the demand for training courses, first the lack of understanding of the importance of skilled / trained workers needs to be tackled. The focus of the communication should be on triggers that lead to behavioural change amongst relevant stakeholders.
- Offer training with a major practical component – Foreseeing sufficient (financial, labour) resources and facilities for practical training activities is

important to give the practical component of the training courses the special focus this requires.

- Offer training courses that are as flexible as possible – Training courses offered should be of different length (longer or shorter courses) and delivered at a variety of locations (to make sure there is one relatively close to every worker). In order to ensure maximum flexibility, training schemes could be developed in a short format with a view to acquiring skills on a step-by-step basis, by completing one short training course, then another and so on (e.g. credit system). Such an approach encourages continuous learning and at the same time recognises every step taken by the worker in the learning process.
- Involve target groups and other stakeholders from the beginning of the project – As explained in the 'lessons learnt' chapter, it is very important to make sure that all relevant stakeholders are involved in developing the training courses, as each stakeholder will facilitate one aspect of the long-term sustainability of the training course be it due to acceptance, promotion or by the establishment of a supportive institutional framework. If directly including SMEs in the development process is challenging, stakeholders close to these could be involved instead e.g. consultants (craft sector) or providers of CVETs.
- Proactive promotion of training courses – The amount of marketing or promotion required by training courses should not be underestimated. Direct marketing approaches work best so the acceptance and engagement achieved from stakeholders by involving them early in the process will also be an asset here. Particularly tight links with construction federations and training organisations are key in helping to spread the word about the training courses.
- Market training courses immediately before quiet periods – Considering one of the main barriers preventing the major uptake of training schemes is 'time' (which needs to be spent working and not learning), the best time to promote training programmes may be right before the vacation period of the construction sector (e.g. months preceding summer, or winter in countries where construction is often stopped by bad weather). Obviously, in an ideal situation where the construction sector (and the demand side) understands the importance of training and perceives it as a way to gain a competitive advantage, or in a situation when training is mandatory 'forcing' construction workers to take it up, the time of the year to promote the training would not be so important (as workers would sign up for courses anyway).
- Active participation in new country Roadmaps - Take part in the updating of the skills roadmap, either requested by EC or national authority; if it is not requested, pressurise the relevant authorities to begin the process. The Roadmaps should be detailed and clear including what (concrete actions), when (timeframe, milestones), who (who will carry the actions out, who will pay for that) and how. The interaction between education experts and energy experts is vital for developing good roadmaps.

8. ANNEXES

Annex 1 - Overview of files per project

	Annex I Description of Action	Annex II Budget	Technical Progress Report	Technical Progress Report Assessment	Interim Technical Implementati on Report	Interim Report assessment	Final Technical Implementati on Report	Final Report assessment
BUS N@W	✓	✓					✓	✓
BUS FORCE	✓	✓	✓		✓	✓	✓	✓
BUS QualiBuild	✓	✓			✓	✓	✓	✓
BUS QUALITRAIN	✓	✓			✓	✓	✓	✓
BUS QualiShell	✓	✓					✓	✓
BUS Construye2020	✓	✓			✓	✓	✓	✓
BUS CrossCraft	✓	✓			✓	✓	✓	✓
BUS BEEP	✓	✓			✓	✓	✓	✓
BUS BUILDEST II	✓	✓			✓	✓	✓	✓
BUS WE Qualify	✓	✓			✓	✓	✓	✓
BUS BEET	✓	✓			✓	✓	✓	✓
BUS LuxBuild	✓	✓	✓		✓	✓	✓	
BUS EnerPro	✓	✓	✓		✓	✓	✓	✓
BUS STAVEDU	✓	✓	✓		✓	✓		
BUS ENERGOTRAIN	✓	✓	✓		✓	✓	✓	✓
BUS FORESEE	✓	✓			✓	✓	✓	✓
BUS SWEBUILD	✓	✓	✓		✓	✓	✓	
BUS BRICKS	✓	✓	✓	✓	✓	✓	✓	
BUS UPSWING	✓	✓	✓	✓	✓	✓	✓	
BUS I-TOWN	✓	✓	✓	✓	✓	✓	✓	
BUS CROSKILLS II	✓	✓	✓		✓			
BUS TRAINBUD	✓	✓	✓	✓	✓	✓	✓	

Annex 2 - Questions for Project partners - evaluation of Pillar II projects

Relevance: Are the tasks in your project relevant to the situation in the country?

1. Involvement of the project partners and the stakeholders in defining what has been developed during the project? Background: The question is about whether the projects reflect what construction workers want and need.
2. Continued match of project activities with Status Quo Assessment (from Pillar I)? If not what has changed since then? (in the last 2-3 years)

Effectiveness and impact: Short- and long-term outputs and impacts of the project (local, regional, national, EU level)

3. Do you consider your BUILD UP skills / EE4 of Horizon 2020 project successful?
4. Quality of the courses developed – questions where training courses/ curricula have been developed:
 - Does completing the course result in any formal (e.g. accredited) qualification?
 - If the course does result in an accredited qualification is this nationally recognised? Any international recognition (e.g. does it comply with EQF)?
5. Were there any planned side effects? And non-planned positive or negative side effects?
6. Have any of your project activities (esp. the developed training courses) been included into national programmes / official curriculums for education or national strategies?
7. Can the approach and material of your project be translated and transferred to other regions/ countries?

Efficiency: Do you think the project has been cost-effective (price per trained worker)? In comparison to other training programmes

8. Any suggested comparator projects (or programmes) (in terms of delivering training of a similar nature)? If so do you have any data on their cost of delivery (i.e. price per trained worker)?
9. What obstacles have been encountered in the project that affected cost-effectiveness of your project? For example, high admin burden in applying for the grant or in grant reporting, off-site training difficult to sell, poor attendance, long duration of training, etc.

Sustainability: Will some (or all) of your project activities be carried on without public funding?

10. What are your (or others) plans for continuing the work / utilising the outputs? Will you continue working at local, national or EU level? Why this particular level? If European level was not considered ask why.
11. Do you think the BUS initiative should be continued? If so how?

Coherence/synergy: How coherent have the project and the programme been with other EU funded programmes?

12. Links to other BUS projects – sharing outputs, adapting approaches, etc.?
13. Links to other EU or national programmes that are similar to your project?

EU added value: What is the value resulting from the Initiative that is additional to the value that would have resulted from projects funded at national level? The emphasis (of the ToR) is on the future/ way forward

14. Have the EU Exchange Meetings benefited your project? What was good/ bad about these meetings?
15. Could you have got national funding to carry out the project? (If yes are there any aspects that would not have been possible with the national funding?) Could you get national funding to continue the project?

Annex 3 - Questions for General Stakeholders evaluation of Pillar II projects

Relevance: Do you think there is still a need for EU support in developing construction skills for energy efficiency and RES?

1. Is the need for energy efficiency skills understood? (At sectoral level? In all MSs?)
2. How is the need (and level of demand) evolving? And how will this change in the next 10-15 years?

Effectiveness and impact: Short- and long-term outputs and impacts of the BUILD UP Skills programme (local, regional, national, EU level)

3. Do you think the BUILD UP skills / EE4 of Horizon 2020 projects have been successful?

- Are you aware of any new accredited courses as a result

4. Other benefits?
5. Do you think the outputs / results are transferable? (between MSs, between sectors)

Efficiency: Do you think the programme has been cost-effective (price per trained worker)? In comparison to other training programmes

6. Any opinions of the costs of delivering work of this nature (Would you expect it to be higher than normal? (Given its nature – i.e. a relatively new area where demand is yet to peak)

Sustainability: Do you think some (or all) of the BUILD UP Skills project activities could / will be carried on without public funding?

7. How could the work be carried on? Is there a continued role for EU interventions?
8. Do you think the BUS initiative should be continued? If so how?

Coherence/synergy: How coherent have the BUILD UP Skills projects and the programme been with other EU funded programmes?

9. Any knowledge of good or bad overlaps (sectoral level or MS level)

EU added value: What is the value resulting from the BUILD UP Skills initiative that is additional to the value that would have resulted from projects funded at national level?

10. What benefits are there of EU level support? (e.g. best practice sharing, highlighting issues that otherwise would not get supported)

Annex 4 – Detailed results per project

Figure 0-1 BUS Pillar II – Number of training courses

Project	Actual	Target	Target reached (%)
BUILDEST II	162	9	1800%
Construye 2020	40	14	286%
ENERGOTRAIN	12	8	150%
QualiBuild	19	14	136%
BEEP	5	4	125%
EnerPro	29	24	121%
I-TOWN	11	10	110%
BEET	27	25	108%
CrossCraft	21	20	105%
FORCE	2	2	100%
FORESEE	24	24	100%
QualiShell	2	2	100%
QUALITRAIN	2	2	100%
TRAINBUD	28	28	100%
UPSWING	12	12	100%
BRICKS	6	6	100%
WE-Qualify	7	8	88%
N@W	20	24	83%
LuxBuild	129	216	60%
CROSSKILLS II	53	120	44%
STAVEDU	15	38	39%
SWEBUILD	179	550	33%

Figure 0-2 BUS Pillar II – Number of people trained

Project	Actual	Target	Target reached (%)
Construye 2020	429	150	286%
EnerPro	433	300	144%
BEEP	93	70	133%
I-TOWN	325	260	125%
BUILDEST II	571	464	123%
ENERGOTRAIN	154	126	122%
BEET	291	250	110%
UPSWING	197	180	109%
QUALITRAIN	87	80	109%
STAVEDU	227	209	109%
FORESEE	441	420	105%
TRAINBUD	493	470	105%
N@W	277	285	97%
FORCE	76	85	89%
QualiShell	28	32	88%
QualiBuild	255	300	85%
WE-Qualify	94	131	72%
LuxBuild	1191	2160	55%
BRICKS	33	60	55%
CrossCraft	195	400	49%
CROSSKILLS II	330	1200	28%
SWEBUILD	2350	18000	13%

Figure 0-3 BUS Pillar II – Number of hours taught

Project	Actual	Target	Target reached (%)
TRAINBUD	1364	692	197%
QualiBuild	1544	1040	148%
Construye 2020	1430	980	146%
BEEP	56	42	133%
STAVEDU	341	262	130%
LuxBuild	2216	1728	128%
QualiShell	1110	1440	123%
FORESEE	900	738	122%
EnerPro	1340	1200	112%
BEET	2026	2000	101%
BRICKS	300	300	100%
FORCE	400	400	100%
ENERGOTRAIN	600	600	100%
UPSWING	315	315	100%
N@W	160	192	83%
SWEBUILD	6892	8500	81%
CrossCraft	244	310	79%
BUILDEST II	650	932	70%
QUALITRAIN	129.3	210	62%
I-TOWN	4200	7000	60%
CROSSKILLS II	1325	2400	55%
WE-Qualify	184	530	35%

Figure 0-4 BUS Pillar II RES Production (toe/year)

Project	Actual	Target	Target reached (%)
I-TOWN	40	20	200%
ENERGOTRAIN	13	7,8	167%
BEEP	3000	2400	125%
Construye 2020	536	455	118%
TRAINBUD	357	344	104%
FORCE	2,15	2.10	102%
STAVEDU	284.49	280	102%
BUILDEST II	6,19	0	100%*
FORESEE	2300	2300	100%
QualiBuild	1340	1340	100%
N@W	136,28	140,22	97%
CrossCraft	401	488	82%
EnerPro	507	671	76%
CROSSKILLS II	2866,15	7936,67	36%
BRICKS	56000	180000	31%
UPSWING	9665	44742	22%
SWEBUILD	522	4000	13%
WE-Qualify	0	163	0%
QualiShell	0	0	NA
QUALITRAIN	0	0	NA
BEET	0	0	NA
LuxBuild	0	0	NA

*When there was no initial target (Target = 0) for RES production but such has been achieved, the target has been rated as achieved (Target reached = 100%).

Figure 0-5 BUS Pillar II Primary energy savings (toe/year)

Project	Actual	Target	Target reached (%)
QualiShell	1955	100.5	1945%
QualiBuild	74665	8704	858%
I-TOWN	523	261,13	200%
QUALITRAIN	24,51	12,9	190%
ENERGOTRAIN	66	39	169%
Construye 2020	17670	11876	149%
BEEP	8200	6300	130%
BEET	5140	4332	119%
UPSWING	56527	53165	106%
FORESEE	340000	320000	106%
TRAINBUD	2083	2006	104%
FORCE	14,35	13,88	103%
BUILDEST II	6,6	0	100%*
STAVEDU	405.84	400	101%
N@W	324,61	333,98	97%
EnerPro	1722	2270	76%
WE-Qualify	106	260	41%
BRICKS	44800	140000	32%
CROSSKILLS II	14045,57	50000	28%
SWEBUILD	3917	30000	13%
CrossCraft	571	10943	5%
LuxBuild	0	0	NA

*When there was no initial target (Target = 0) for primary energy savings but such have been achieved, the target has been rated as achieved (Target reached = 100%).

Figure 0-6 BUS Pillar II – Reduction of GHG emissions (tCO2e/year)

Project	Actual	Target	Target reached (%)
QualiShell	4357	225	1936%
QualiBuild	225524	25305	891%
I-TOWN	2396	1196	200%
QUALITRAIN	570	300	190%
ENERGOTRAIN	228	134,4	170%
BEEP	22000	17000	129%
BEET	41004	34592	118%
Construye 2020	28995	26300	110%
FORCE	33,9	32,59	104%
TRAINBUD	8364	8054	104%
BUILDEST II	271	0	100%*
EnerPro	29940	29940	100%
FORESEE	1400000	1400000	100%
STAVEDU	1033.26	1030	100%
N@W	103,88	106,88	97%
UPSWING	198000	292865	68%
WE-Qualify	1074	2644	41%
BRICKS	67200	210000	32%
CROSSKILLS II	38521,2	166666,67	23%
SWEBUILD	46	350	13%
CrossCraft	796	23110	3%
LuxBuild	0	0	NA

*When there was no initial target (Target = 0) for GHG emission reduction but such have been achieved, the target has been rated as achieved (Target reached = 100%).

