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SURVEY REPORT
ON EXPLORING EU GOOD PRACTICES
IN DEVELOPING VOLUNTARY QUALIFICATION SCHEMES
-FINAL-
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1. Introduction

The project “TowaRd market-based skills for sustAlNable Energy Efficient construction” is EU funded project under HORIZON 2020 programme, topic: Construction skills, Type of action: CSA Coordination and support action.

Overall objective is to increase the number of skilled building professionals according to recommendations from National qualification roadmap (http://buildupskills.mk/images/Publikacii/Roadmap/EN_Roadmap_BUS-MK.pdf) concerning two priorities, training of 4,500 building professionals and blue collar workers and overcoming barriers for implementation of EE measures in operation and maintenance.

Three specific objectives are set up as:

(1) Upgrading two qualification schemes for technicians, building managers and engineers and development of large scale of training schemes for 5 blue collar qualifications and two RES occupations (designers and installers) by establishing the Knowledge Centre for support in development of sustainable EE market-based construction skills with annual capacity to replicate it to 10 training providers and 600 qualified construction workers (200 through training and 400 through recognition of previous learning);

(2) Increasing awareness of building professionals for use of Building Information Modelling (BIM) tools, in order to achieve the desired multidisciplinary approach in construction that should result with reduction in the gap between designed and actual energy performance through improved quality of construction in specific projects and to achieve measurable energy savings and improved quality of indoor environment;

(3) Improved market recognition of skills in the building sector and enhancing collaboration across different professional groups and introducing methodology for mutual recognition of skills with three EU countries (Greece, Slovenia and Croatia).

The TRAINEE consortium consists of 6 partners, 5 from Macedonia: ECM-Economic Chamber of Macedonia; ZBK Kreacija-Association of business and consultancy; UKIM Ss Cyril and Methodius University, with the Faculty of Electrical Engineering and Information Technologies; EIM-Engineering institution of Macedonia; AEC-Adult Education Centre; and 1 partner from Spain: BIM Academy-WITS Institute from Barcelona.

The project will produce five categories of deliverables (products): (a) Publications (study, survey, report); (b) RPL Methodology; (c) Training programs and materials; (d) BIM software; (e) Assessment procedures.
This document is Deliverable # 2.1 and it presents the findings of the desk research regarding current EU practices in organizing voluntary qualification schemes, especially in construction sector.

1.1 Purpose

This Report includes the findings from desk research on explored EU experience on good practice in voluntary qualification schemes especially concerning qualification levels for blue collar workers and building professionals. It is a result from the task aiming investigation of experience of EU countries in establishing qualification schemes in the frame of vocational education and training (VET) system providing learning outcomes on qualification level Vb, IV and III. These findings from the overview of EU experience, as well as recommendations from professional organizations like OECD, CEDEFOP and ETF that forecast the future skills need and development of labor market, will be used in development of Macedonian voluntary qualification schemes for construction skills, further in TRAINEE project. TRAINEE project aims at developing two training schemes for RES occupations, upgrading the basic pool of already developed training schemes for EE construction in the precursor project www.beet.mk.

A special challenge is to identify the best and most suitable practice for obtaining qualification for level VI and the type of certification that can be awarded through validation of informally and non-formally acquired knowledge. Good practices concerning methodology for RPL (recognition of prior learning) of higher levels of qualification are explored too. Here a special attention is paid to the recommendation of the EU and European training foundation ETF, as a leading institution in this field. Good practices from across EU countries that have a well-established and developed system for validation of prior learning will be taken into account when designing the mechanism for quality assurance of the methodology for extended RPL, as the precursor project www.beet.mk have already resulted in creation of methodology for RPL, becoming a pioneer in introduction of the issue of validation of prior learning in the country.

This Report also include an insight into existing Macedonian practice in implementing measures toward sustainable construction in three particular areas: level of implementation of energy efficiency legislation and benefits of the trainers, workers and construction companies from obtained certificates for EE skills. The data is obtained through direct interviews with target groups and market actors based on the structured questionnaires. The respondents’ sample encompasses of 58 trainers, 40 workers and 98 companies. The questionnaire was prepared and sent electronically to selected sample of respondents during July and August 2018, but also direct contacts by telephone or during arranged meetings were organized. The results from the analysis of the responses on the questionnaires are presented in narrative and tabular way.

ECM explored the experience of professional and trade associations and non-formal educational institutions in introduction and recognition of voluntary qualification
schemes. COV checked the register of verified training programs related to building sector and those concerned to EE skills. Those three types of survey enable project team to identified opinions of market actors on relevant EE issues and to check the existing practices in the field of training schemes.

The integrated report with recommendations will be presented and discussed on the next Consortium meeting as a direction for preparation of upgraded qualification and training schemes and communication and dissemination plan with target groups.

1.2 Methodology of the research

The definition of clear boundaries and limits of the subject of research is especially important to mark out the area of the analysis, particularly because of the potential scope that the topic of this research may have.

For literature review two types of materials have been used in order to ensure the reliability and validity of the data sources employed to gather the necessary information to carry out the research and compose the literature review. The first one consists of official papers by the responsible institutions as EU official documents, CEDEFOP reports and suggestion, OECD and ETF, as the most relevant international organization in the field of vocational training and VET, and the second source used were research papers published in recognized and high quality academic journals.

The desk research has been carried out using keywords in databases such as Google Scholar, Scopus and Science Direct. The keywords used to look for the required information were related to vocational training, training schemes, non-formal education, recognition of prior learning, certification systems of skills, construction skills, training opportunities and training systems, sustainability and sustainable construction.

For the insight of currently available training schemes regarding sustainable and EE construction in Macedonia, the reports from Adult Education Centre in Macedonia, as well as reports and publications of professional associations and chambers working in construction industry were involved. Therefore, this report is a compilation of data gathered by desk research and real data extracted from analysis of the answers on structured questionnaires subjected for responses to the most relevant target groups.

The process followed to carry out the research is described in Figure 1.

Figure 1. Workflow of literature review
This search has made it clear that there is a variety of available articles that deal with the concerns previously exposed in the research questions.

A number of articles are related to examples regarding organization of Certification Systems of skills. However, there is a wide gap with regard to the development and organization of these systems, the methodology that should be applied and the way to keep up to date to the latest construction trends and technologies.

The literature review of this research is focused on understanding the current situation of the construction sector with regard to sustainability and energy efficiency issues, as well as the use and benefits of using innovative approach like IT systems and BIM tools in modern construction industry. Several articles address issues related to sustainable construction and the importance and benefits derived from the use of BIM methodologies but not directly related to its implementation into the construction processes.

2. Current status of construction sector

2.1. Sustainability of construction sector

The construction sector is strategically important for Europe, providing building and infrastructure on which all sectors of the economy depend. The construction sector is one of the European Union’s key industries in terms of output and employment, with more than 16.4 million persons employed. Moreover, there is a significant and complex relationship between construction activities and the built environment on one hand, and sustainable development on the other. Construction uses more raw materials than any other sector, and the creation and operation of the built environment accounts for an important consumption of natural resources. There is also a pressing need to address the regeneration of many urban areas in Europe, in particular in the newly acceded countries, and the realisation of major trans-European infrastructure work.

40% of the EU energy consumption stems from the construction sector and the existing building stock. Furthermore, 25% of transported material is linked to sector activities.

Construction sector is thus highly influential regarding environmental developments in the EU.

A sustainable and competitive European construction industry brings many benefits to society and the EU economy. The sector is affected by several other policies, such as environmental protection, energy efficiency, work safety, taxation, and public procurement. The objective of the European Commission is to promote a favourable framework to boost competitiveness and support sustainable growth in the sector.

Innovations and adaptations toward more competitive construction industry aimed at:
producing buildings and infrastructure adapted to changing social and economic needs
meeting global challenges such as energy security and climate change
providing an attractive sector to work in, complete with excellent opportunities for career development, good pay, and improved health and safety.

In 2012, the Commission published a Communication Strategy for the sustainable competitiveness of the construction sector and its enterprises. This document is a part of the Europe 2020 initiative. It focuses on the promotion of favourable market conditions for sustainable growth in the construction sector. Five areas are addressed:

1. **Financing and digitalisation**: especially for energy efficient investments in the renovation of buildings and for research and innovation in a smart, sustainable, and inclusive environment

2. **Skills and qualifications**: workforce and management training for job creation through up-skilling and apprenticeships to meet demands for new competencies

3. **Resource efficiency**: focusing on low emission construction, recycling and valorisation of construction, and demolition waste

4. **Regulatory framework**: emphasis on reducing the administrative burden for enterprises, and particularly SMEs

5. **International competition**: encouraging the uptake of Eurocodes and promoting the spread of new financial tools and contractual arrangements in non-EU countries.

The study focuses on core construction activities covering conceptual development, design, plans and drawings, project management, operation management and construction, finishing trades, and technical equipment, whereas producers of building materials are not included in the analysis. 95% of enterprises in the sector are micro enterprises with less than 20 employees. Therefore, the study in particular addresses skills demands from an SME perspective.

### 2.2. Statistical overview of the labor force of the construction sector

The statistical data on the labor force in construction sector reported here are extracted from on-line open sources of CEDEFOP reports through Skills panorama [http://skillspanorama.cedefop.europa.eu](http://skillspanorama.cedefop.europa.eu).

**Construction sector** includes both general construction and specialised activities related to buildings and civil engineering works. It includes new work, repair, additions and alterations, the erection of prefabricated buildings or structures, and
also construction of a temporary nature. General construction is the construction of entire dwellings, office buildings, stores and other public and utility buildings, farm buildings etc., or the construction of civil engineering works such as motorways, streets, bridges, tunnels, railways, airfields, harbours and other water projects, irrigation systems, sewerage systems, industrial facilities, pipelines and electric lines, sports facilities etc. Also included is the repair of buildings and engineering works.

In 2016, the share of construction in total EU employment was 6.68%. The occupations with the largest number of people employed in construction in 2016 in EU were:

- Construction workers 6,533,805
- Science & engineering technicians 1,278,880
- Electrical engineering workers 1,177,152
- Technical labourers 1,032,457
- Drivers & vehicle operators 749,701

Fig. 2 presents the distribution of employment share in EU-28 countries.
Countries with highest employment share of **construction** in 2016 were:

- Slovakia 9.21%
- Estonia 8.98%
- Austria 8.30%
- Cyprus 8.27%
- Romania 8.03%

Another relevant insight into the distribution of labor force in EU construction is given at fig. 3 and fig. 4.

**Figure 3** Employment in construction sector in EU in 2016 by level of education, according to CEDEFOP

**Figure 4** Employment in construction sector in EU in 2016 by age, according to CEDEFOP

During the period **2011-2016**, the employment level of **construction** in **EU** has considerably dropped by **5.22%**. However, the projection for change in employment for **construction** in **EU** for the period **2016-2030**, is estimated to change by **3.35%**.
2.3. Future skills needs in the construction sector

Cedefop’s 2016 skills forecast suggests that employment in construction will grow during 2015-2025 and Member States will need to replace an ageing workforce. Around 1 million new workers will be needed by 2025.

The declining trends in employment over the period 2011 – 2016 is predicted to moderate for most of the broad sectors of economic activity and become positive for the construction sector (fig. 5). Especially, the latter will face a slight rise after 2020.

The economic crisis had a profound impact on employment and an exodus of millions of workers from the sector in recent years is dampening recovery. Entrepreneurs report skills shortages and mismatches across the EU. In addition, the sector has an image problem. Improving skills will be essential in supporting blue-collar and white-collar employees to meet new challenges facing construction industries.

Skills requirements are likely to change to meet the demand for EE in buildings and green construction. According to an evaluation of the Build Up Skills (BUS) initiative, 3-4 million workers will require training on energy efficiency alone. Plus, a digital transformation will be essential in delivering more efficient buildings and construction processes.

Figure 6 shows the shares of total job openings for qualifications needs. Most jobs, forecasted to be created over the period up to 2030, will require medium level of education, while about 43% of jobs will require high. The importance of investment of
education and upgrading skills of medium level qualifications (IV, V and VI level of EQF) is essential.

In this study, future skills needs in construction sector are identified, analysed and assessed. The assessment of future skills needs is based on future scenarios, an analysis of the existing education and training systems’ ability to address future skills needs, and an analysis of innovative measures to address skills needs.

If the construction sector by 2020 is to meet the targets set and to meet the objectives of the Lisbon Strategy, it needs to improve its innovation capacity and its ability to engage in and exploit R&D for commercial purposes. This could lead to improved quality, productivity, and sustainability. Investment in education and training is a precondition to improve the sector’s knowledge base and to improve the image of the sector.

Future development of the construction sector is situated in a complex duality between the sector’s own internal dynamics and the sector’s external framework conditions, which vary considerably among Member States. By mapping the drivers of high importance and high uncertainty, two dimensions were identified, each of which could have a high impact on the future development of the European construction sector:

- The *regulation dimension* expresses to what extent the EU and Member States will have succeeded in implementing coherent framework conditions for the construction sector in the future.

- The *market dimension* expresses two highly different outcomes concerning market preferences. Will markets put a premium on quality and innovation in the sector? Or will they mainly be price sensitive?
The long-term development of the construction sector will modify the configuration of future skills needs and the sector’s prerequisites for skills development and innovation. In her study, Aresti identifies the key future skills which are regarded as being of increasing importance:

- Planning and management skills
- Sustainable construction processes
- Adoption of new technologies.

2.3.1 Planning and management skills

Construction projects will require more advanced planning and management skills at management level and at site level among workers. At 'site level', work organisation in the construction sector will increasingly be characterised by self-governing teams that plan construction activities with greater autonomy in the implementation of tasks.

At management level, the following will be key future planning and management skills:

- Preconstruction contingency planning
- Advanced business skills to handle increasingly flexible procurement forms
- Supply chain management abilities
- Reduction of variability and uncertainty due to order changes
- Non-technical and social skills to manage relationships in construction projects
- Negotiation skills - concerning changes to scope, cost, and schedule objectives, as well as contract terms and conditions
- Customer and context awareness

The skills mentioned in the previous paragraph mainly comprise future managerial skills needs. For skilled workers (e.g. bricklayers, carpenters, electricians, and roofers), the study indicates a general shift from strictly demarcated trades towards a more generalist, multi-skilled occupational profile. Skilled workers in the construction sector will increasingly need a broader set of skills to cooperate efficiently across occupations. This includes functional literacy, numeracy, and communication skills as well as ICT skills in order to improve productivity by an efficient deployment of ICT through the whole construction process. Another driver for changing skills is a growing demand for sustainable technological solutions. For example, plumbers may be required to have more insight into technologies such as solar-thermal energy, rainwater harvesting, air source heat pumps, micro fuel cells, and wood heating (biomass).
2.3.2 Sustainable construction processes

The political and societal demands for sustainable solutions in the construction sector will most likely impact the future skills requirements at all stages of the construction process:

- **Pre-design phase** – The integration of assessment and factors related to sustainability will be a key competence that requires the ability to use analytical and planning tools to assess and balance the environmental, economical factors and to understand the legal requirements specific to a construction project.

- **Design phase** - Designers will need to consider energy, recycling of materials, and waste management embedded in the proposed design. It will be increasingly important to steer the design process towards sustainable specifications, including sustainability in the context of future climate changes.

- **Tendering/contracting phase** - Contractors must be able to specify and document how they intend to fulfill specifications to secure environmentally friendly products and services at competitive prices.

- ‘**On-site production phase**’ - The management must be able to execute training at the construction site so that workers can adopt sustainable practices for on-site operations. Furthermore, the on-site manager must be able to organise the logistics of the construction process to minimise the environmental impact. This implies that all site managers and trades involved in the actual construction will need basic knowledge about sustainable practices.

- **The maintenance/refurbishment phase** - Some of the key future skills will be the ability to communicate with clients on sustainable refurbishment, installation of energy-saving building automation systems, performance of service functions subsequent to installation, and the ability to cooperate with other trades involved in maintenance.

- **The deconstruction/demolition phase** - Planning and managing reuse of materials from demolition require know-how to ensure that materials are not contaminated. It also requires knowledge about available markets for purchasing the demolition materials. Specialists’ knowledge on reuse of composite material and the ability to instruct on-site workers on environmentally safe demolition processes will also be important.
2.3.3 Adoption of new technologies

Productivity of construction sector in EU has been considerably lower than that of the manufacturing sector in general over the last 10 years. Moreover, R&D investments in the European construction sector are low.

As the future attraction of skilled workers to the sector is challenged, the adoption of new technology and new practices is essential for the development of the sector’s competitiveness and productivity. There is great potential for use of ICT in the construction processes of the construction sector. This applies not only to offering new ways of communication but also to embedding ICT in construction products and processes to improve efficiency and effectiveness, virtual prototyping for design, manufacture, operation and monitoring of materials. Ideally, technological development drives change in the construction sector as research and development lead to innovation and new technologies. However, the pace at which these developments are integrated and implemented in the sector, particularly in small companies, is very slow. In SMEs, in particular, some of the main barriers to adopting new technologies are insufficient competencies and incentives among construction companies.

As future recruitment of workforce to the sector becomes harder, adoption of new technology and new practices will be essential for the development of the sector’s competitiveness and productivity. There are new technological opportunities; use of ICT in the construction process is a key field of technological development that holds great potential for the construction sector, offering new ways of interaction and communication in trade, construction processes, and monitoring of materials.

The list below provides examples of main actions required to increase the adoption of new technologies.

- **Improve the basic level of construction site-workers’ professional and sector-relevant ICT-skills.** Workers should be able to use mobile and stationary ICT applications for on-site coordination, registration of materials, planning, viewing changes to drawings, calculations, 3D illustrations, and managing logistics and the supply chain communication.

- **Strengthening construction workers’ equipment-handling skills.** The sector is likely to experience increased automation and off-site construction (for certain types of building projects). This involves the use of advanced machinery to handle increasingly larger building components.

- **Develop innovation skills in the sector.** The ability to engage in innovation regarding process, product, and client demands is crucial to improving quality, productivity, and functionality in design. This will be required at all levels in order to continuously improve the quality of construction products and services.
2.3.4 Roadmap for future skills need for achievement of EE in construction in Macedonia

The need for direct construction workers was analyzed in Status Quo Analysis [http://buildupskills.mk](http://buildupskills.mk) from the aspect of both quantity and quality. The quantitative analysis refers to the required number of workers for implementation of EE and RES measures, while the quality analysis covers the skills necessary for realization of the national indicative objectives that will contribute to the EU Strategy 20/20/20. The quality analysis states that there is a need of two types of skills: basic knowledge of EE and RES in order to increase the awareness of the need for upgrading the skills with a specialized know-how for implementation of the EE; and RES measures regarding the reconstruction of the existing housing stock and the new buildings.

The measures (work carried out by direct employees in construction) that are to be implemented in reconstruction refer to three areas:

- **Building envelope**: roof; facade; and windows and external doors; for reduction of the energy loss
- **Energy supply**: interior walls and floors; electricity; heating; air-conditioning and ventilation; replacement of the equipment in order to decrease energy consumption and introduction of EE systems
- **Energy sources**: geothermal systems; biomass; solar heating; photovoltaic systems; wind turbines; combined heat and power facilities (introduction of new renewable sources).

Development of qualifications in Macedonia is according to the Law of national Qualification framework that is fully referenced to European Qualification framework. Each qualification is developed based in the occupation standards. From the 341 occupation standards currently existing in Macedonia, 26 refer to construction (plasterer fitter, dry construction fitter, wall decorator, technician designer for interior architecture, façade worker etc.).

### Table 1. Priority occupations for meeting EE and RES national targets

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<th>Occupation</th>
<th>Annual need for workers</th>
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<tr>
<td>7111 - Construction operatives- semi-qualified workers</td>
<td>200</td>
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<tr>
<td>7112 - Bricklayers and related construction occupations</td>
<td>1200</td>
</tr>
<tr>
<td>9313 - Blue collars in building construction</td>
<td>300</td>
</tr>
<tr>
<td>7115 - Carpenters and joiners</td>
<td>550</td>
</tr>
<tr>
<td>7121 - Roofers</td>
<td>1.100</td>
</tr>
<tr>
<td>7123 - Plasterers- façade workers</td>
<td>500</td>
</tr>
<tr>
<td>7124 - Insulation workers</td>
<td>400</td>
</tr>
<tr>
<td>7125 - Glaziers</td>
<td>500</td>
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</table>
Priority occupations for EE and RES according to defined skills need in the National qualification roadmap (http://buildupsills.mk/images/Publikacii/Roadmap/EN_Roadmap_BUS-MK.pdf) are:

- **Energy Efficiency**: bricklayer, plasterer, carpenters, roofers, thermal insulation workers, installers, electricians, electrical fitters
- **Renewable energy sources**: solar thermal installers, installers of biomass boilers and stoves, solar photovoltaic and thermal systems, shallow geothermal systems and heat pumps.

The need for qualified workers is a minimum of 9,600 and maximum of 16,200 qualified workers.

**Energy efficiency:**

- Bricklayers – construction work – use of new materials with a small heat transfer coefficient – minimum of 2,200 and a maximum of 3,500 workers
- Plasterers (Façade workers) – External wall insulation – a minimum of 1,200 and a maximum of 1,500 workers
- Carpenters (roofers) – roof insulation – a minimum of 600 and a maximum of 1,000 workers
- Joiners – replacement of the existing windows with the same or new ones, a minimum of 1,200 and a maximum of 2,000 workers
- Thermal insulation workers – insulation of walls, floors and perimeter, a minimum of 800 and a maximum of 1,600 workers

### Table: Occupations and Needed Workers

<table>
<thead>
<tr>
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<th>Needed Workers</th>
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<tr>
<td>7124.1 - Thermal insulation workers</td>
<td>1,100</td>
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<tr>
<td>3113.1 - Electrical trades for installation and equipment</td>
<td>1,000</td>
</tr>
<tr>
<td>7133 - Heating and air-conditioning installers</td>
<td>900</td>
</tr>
<tr>
<td>7412 - Electric mechanics and fitters</td>
<td>300</td>
</tr>
<tr>
<td>7412.4 - Electrical fitter of power machines and devices</td>
<td>200</td>
</tr>
<tr>
<td>7412.8 - Electrical mechanic for electrical energy, specialized</td>
<td>300</td>
</tr>
<tr>
<td>7412.9 - Electrical fitter</td>
<td>500</td>
</tr>
<tr>
<td>7412.9 - Electrical mechanic</td>
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</tr>
<tr>
<td>7412.10 - O&amp;M (Operation &amp; Maintenance) of electrical appliances and equipment</td>
<td>150</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>9,600</strong></td>
</tr>
</tbody>
</table>
Installers, electricians, electrical fitters, installation of energy management systems, reconstruction of the heating system - a minimum of 3,600 and a maximum of 7,000 workers

Renewable energy sources:

- Solar thermal installers, installers of biomass boilers and stoves, solar photovoltaic and thermal systems, shallow geothermal systems and heat pumps – a minimum of 2,000 and a maximum of 3,000 workers

Introduction of voluntary qualification schemes which will upgrade energy efficiency skills to 5 workers’ occupations in the building sector (building envelope, glassing, roofing, energy infrastructure and HVAC systems) was achieved in the frame of the project www.beet.mk. Study for introduction of voluntary qualification schemes, following EU practices and national legislation resulted in two voluntary qualification training schemes for upgrading workers EE skills. One was 10 days training and second was recognition of previous learning (RPL). Following the Study’s methodology for development of training schemes, 5 occupational standards were deployed as a base in preparation of training forms and programs.

Furthermore, building capacity for VQS though training of trainers and assessors, which was organized through 20 seminars, resulted in 195 certified trainers who passed the exam. Activity provided trainers for each occupation (EEEI 33, facades 42, roofers 41, carpenters 46, HVAC 33). Finally, large scale training schemes for 1,050 workers were implemented. Through the public call 1128 applications were received. In total, 55 sessions were organized and 967 workers were certified. In addition 60 application were submitted for 10 days training. Five pilot trainings were organized and 50 workers after exams were certified.

Overall, the project outcome was satisfactory as the BUILD UP SKILLS-BEET became a synonym in the country for Energy efficiency in buildings among institutions and companies. Government institutions showed great acceptance and Ministry of Social affairs included all 5 EE modules as part of the Operational plan for trainings that will be realized by the government. Upgraded occupational standards with EE skills according to existing legislation were accepted by national VET Centre as good practice that will be used for other occupation.

Still, there is plenty of work to be done, in order to reach the goals of EU 2020 strategy, regarding the share of construction sector. The importance of investment of education and upgrading skills of medium level qualifications (IV, V and VI level of EQF) is now prioritized. As in EU, in Macedonian construction sector the need for upgrading skills, by following the new trends in construction, technological achievements, needs for digitalization of construction industry and introducing innovations is even more emphasized. These priorities will be roadmap of activities in the TRAINEE project. A special attention will be given to development of training schemes for medium level professionals and in the subject of design and installation of solar energy systems in buildings in order to enable use of RES.
3. Good practices in EU in education and training in construction

3.1. The provision of education and training for the construction sector

The analysis focuses on the ability of existing education and training systems and institutions to address the construction sector’s future skills and skills needs, and in the context of the revised Lisbon strategy to assess critical parameters if the education and training systems are to future-proof their capacity to provide a qualified workforce to the European construction sector.

Education and training systems across Europe are diverse as to the degree of centralisation/decentralisation; the structure of training provision; the role of social partners; the financial structure; and the mechanisms for quality assurance.

Identification and analysis of good and innovative practices within the construction sector and in other sectors are enabling elements to the formulation of a strategy for future development and upgrading of skills for the construction sector. Desk research has resulted in identification of a number of cases of good and innovative practices in order to illustrate the variety of education and training practices in the construction sector.

Given the strategic importance of the European construction sector the ability of existing education and training systems and institutions to adapt to and address the sector’s future skills needs is essential. Adaptability to the construction sectors’ skills needs is a challenge to all systems. Dynamic training systems are often key elements in sector innovation. Developments in technology, building materials, sustainability requirements, and new ways of organising supply chains and building projects in the construction sector put the training systems under pressure to reform to changing skills needs.

3.2. Vocational education and training

Furthermore, selected conclusions related to different cases are presented.

In Germany, the VET-system is decentralist and corporatist, as the construction sector is the joint responsibility of the federal government, the Länder (the federal states), the social partners, and enterprises. The main advantage of this dual system is the built-in linkage between theory and practice, as a substantial part of the practical training takes place in companies. As it is based on tripartite cooperation between government, employers, and trade unions, it enables updated curricula in line with labor market needs. The disadvantage of the current system is that there are too many and too narrow specialisations within the construction sector. The many specialisations make it more difficult for both enterprises and potential
apprentices to navigate the system and to adapt to future job profiles and skill needs which often transcend specific occupational profiles.

In Italy, vocational training in the construction industry is carried out by a national vocational training system jointly managed by employers and employees’ federations and based on the national collective agreement for construction firms signed by ANCE (National Association of Construction Sector Workers) and the workers’ unions. The ANCE agreement is interpreted and implemented by the regional organisations and training institutions and has so far led to significant differences in training and skills in the northern and southern regions of Italy. Therefore, a main challenge to the adaptability of the Italian VET system is to define and ensure comparable competence outcomes and quality levels across regions. Though regional/local adaptation to employers’ needs is desirable, a challenge to the Italian VET system is to define and ensure comparable competencies and quality levels across regions. As the vocational training system is not related to a national qualification framework, two workers may have the same vocational training qualifications but with quite different content and this is a shortage of the system.

England can be defined as having an employer-led on-site learning system where students mainly acquire competencies through company training. The VET-system is primarily regulated through voluntary agreements rather than national legislation. In the employer-led system, the employer contributes to the apprentices’ wages, while school training is funded by the state. There is no official delineation between vocational education and training, and it can take place in various settings managed by different bodies. A challenge in this system is the continued lack of suitable and sufficient places for apprentices, even though there is a levy/grant system for employers that take in apprentices.

The Bulgarian VET-system is centralised and characterised by school-based training and practice. Vocational education and training in Bulgaria generally lasts between 2-3 years, but can last up to 6 years depending on the starting level. The vocational construction education and training includes 4 years of general school training followed by the option of an additional year of specialisation. At the national level, VET is the responsibility of the relevant ministries. The Bulgarian Ministry of Education and Science develops the curricula for schools, which refer directly to the Bulgarian Ministry of Education and Science. The main components of the curriculum are identical for all schools. A challenge of centralised systems like the Bulgarian is the rigidity in changing curricula. VET schools have to contact the Bulgarian Ministry of Education and Science if they want to make changes, and it may take 2-3 years before changes are implemented.

The most common route to a career in the construction industry in Sweden goes through upper secondary school and on through university and university college for those who want to become engineers. After a secondary education with a focus on any professional craft, those who want to become a skilled worker apprentice search for employment at construction companies. There is also a possibility to work as a so called “traditional apprentice” with no requirements of previous education.
It is particularly the construction programme in upper secondary school that is related to the construction industry professions. The technical program and other programmes can authorize to engineering education at university and university college. The vocationally oriented upper secondary school programs lathe theoretical and practical parts. It includes 15 weeks of workplace training. Many of the professional orientations have an apprenticeship of 1-3 years after completion of upper secondary school. In addition to the municipal upper secondary school programs there are a number of training providers approved by *The Swedish Construction Industry Training Board (BYN)*.

The technical program has no nationally-set specialisations. Each school decides which specialisations to offer. The program prepares for further studies at universities and university colleges. By reading the optional subjects, the pupils can prequalify for engineering education at university level.

Since the courses offered at higher vocational education (YH) are determined by demand in the labour market the availability of different courses varies. Advanced Vocational Education (KY) is being phased out by 2013 when it will be replaced by higher vocational education (YH). The difference between these educational systems is that they are governed by different regulations. Educationally they are quite similar.

The National Authority for Higher Vocational Education is responsible to establish Europass supplement to the educations. They issue an “Appendix to Diploma” which is not one of the six components of Europass. The “Appendix to Diploma” is very similar to a Certificate Supplement. Examples of “Appendix to Diploma” issued for occupations in the construction field are:

Halmstad University – School of Business and Engineering December 01, 2010

- Supervisor – civil engineering
- Energy Efficiency Specialist
- Real Estate Technician
- Installation Engineer
- Production Manager Building construction
- Piping Engineer for Water Supply and Sewage Management
- Water Supply and Sewage Management Planner.

The *Austrian* VET system is a dual system that has many commendable features, with well-structured apprenticeships that integrate learning in schools and workplace training. Youth unemployment rates are low and the transition from education to first employment is smooth by international standards. Social partner involvement at all levels, in VET policy design and delivery, is strong, with effective co-operation between different stakeholders. The VET system caters for a broad range of needs, providing safety nets for those with weak school results or from disadvantaged backgrounds, but also offering five year VET college programmes providing high
level technical training. The VET system offers different progress routes at various levels, avoiding dead-ends and linking VET to general tertiary education through the *Berufsreifeprüfung* (professional baccalaureate).

There is a good range of vocational options at different levels in *Belgium* (Flanders). Initial secondary education offers full-time and part-time programmes, while continuing VET provides further learning and second chance opportunities in centres for adult education, and training centres of the Flemish Employment and Vocational Training Agency (VDAB) and the Flemish Agency for Entrepreneurial Training (*Syntra Vlaanderen*). However, the weaknesses are found in tracking students at a young age (14, with institutional transition at age 12) and there are limited opportunities for upward progression between secondary tracks. So, the share of unqualified school leavers is high. Also, some parts of the VET system make limited use of workplace training, and the effectiveness of quality assurance mechanisms for workplace training also varies.

The *Czech* VET system has a number of strengths: the majority of students complete their upper secondary studies; the dropout rate from this level of education is below the OECD average; the Czech Republic has a very impressive data base on education and labour market outcomes of education, one of the best the OECD team has seen. Many reforms have been launched recently, including: the setting up of a new qualification system; the introduction of a national standardised exam in apprenticeship programmes, the launch of a major new adult education initiative, and new tools to improve career guidance. The government is actively fostering stronger participation of social partners in VET. Sector Councils provide a good example of the co-operation between social partners and policy makers.

Since 1989, *Hungary* has made significant efforts to restructure its VET system to face the challenges of the market economy. It has implemented major reforms to improve the ability of VET to meet labour market needs. The training levy provides a significant and reliable source of funds for VET and played a crucial role during the transition years. The Hungarian VET system can rely on a strong national qualifications framework. The number of 15-to-19-year-olds is set to decline sharply; this presents both an opportunity and a challenge for the Hungarian VET system. The current VET system is strongly school-based with relatively few links to the labour market. VET has relatively low status and many students are oriented to VET because of poor academic performance.

*Norway* has a well-developed upper secondary VET system linked to apprenticeship, which enjoys a high degree of confidence among stakeholders. In particular: there is strong tripartite co-operation at national, county and sectoral levels; the VET system is supported by a high level of trust among stakeholders; in the current exceptionally tight labour market employers are keen to attract apprentices. But, student choice may limit the responsiveness of VET to the labour market.
3.3. Higher education

Compared to VET, the higher education systems have more similarities across the four countries, especially regarding funding structures. In most countries, the higher education institutions are financed or supported by their respective national governments and with various levels of financial contributions from the students. The four countries face different challenges as to the provision of education to the construction sector.

In Germany, the tertiary education systems (in particular the Fachhochshulen) are generally considered to have good links between the industry and the educational institutions. Higher education programmes for the construction sector often include practice-oriented education and work placements. Furthermore, there is a general practice of using external trainers from the industry. The challenge is to attract students who have the capacity and motivation to study construction engineering, as the sector is affected by a continuous lack of engineers.

In England, the higher education system is mainly private (self-owned institutions). Consequently, all universities have their own degree-awarding powers and determine their own degrees, other qualifications, and the conditions that apply to achieving them. One challenge is to make the system more demand-driven based on better career guidance. The UK Commission for Employment and Skills (UKCES) suggests that the way the colleges are funded should be changed. In the current system, the colleges are assessed on the number of students that pass the courses. It is argued that the English system leads to many students who only attend courses that they are certain to pass. It is also suggested that young people entering the construction sector should have access to better information about the different programmes and career opportunities.

In Bulgaria, the system of higher education is in the process of becoming more compatible with other European systems. The system faces basic challenges concerning funding and recruitment and retention of students and teachers. A challenge is that it is becoming more difficult to attract students as the number of high school students is decreasing due to demographics. In addition, the universities have problems with high dropout rates and students leaving to study abroad.

In Italy, a challenge is to establish a better link between the higher education institutions and the realities of working life in the construction sector, as there is limited tradition for cooperation. Employers argue that employees increasingly need a combination of technical skills and management skills and that graduates do not acquire such skills at university.

Construction and civil engineering at Bachelor or Masters level, Architect and Surveying educations in Sweden are examples of higher education related to the construction industry. Bachelor Degree in construction (Högskoleingenjör) lasts at least three years, i.e. at least 180 credits according to the Bologna model. Different qualification requirements apply to different university colleges and courses. In comparison to the Master degree programme the Bachelor programme is more
practically oriented and does not have as much maths and physics. Master of Science programmes in Construction Sciences comprises 300 university credits which correspond to 5 years education. The Master educations in construction are given at the major Universities. The focus is directed to construction of various buildings, civil engineering and projects such as roads, railways, bridges, ports. The various universities choose their profile.

Architects are educated at four universities in Sweden. The education takes 5 years, corresponding to 300 university credits. Admission to the education is via scores from upper secondary school, through a “national test”, or via a special architectural test, with a third of the seats each.

3.4. Continuing education and training – Voluntary qualification schemes

According to OECD, the key policy challenges in organizing voluntary qualification schemes are:

- **Provide the right mix of skills for the labour market.** For vocational programmes beyond secondary level, share the costs between government, employers and individual students according to the benefits obtained must be defined. It should provide a mix of VET training places that reflects both student preferences and employer needs and to achieve this through provision of workplace training and through planning and incentive mechanisms. Engagement of employers and unions in curriculum development and ensure that the skills taught correspond to those needed in the modern workplace is essential. Through VET systems, young people are provided with generic, transferable skills to support occupational mobility and lifelong learning, and with occupationally-specific skills that meet employers' immediate needs. VQS must ensure all students in vocational programmes have adequate numeracy and literacy skills to support lifelong learning and career development.

- **Reform career guidance to deliver effective advice for all.** Coherent career guidance profession must be developed, independent from psychological counseling and well-informed by labour market information. Adequate resources for career guidance and its pro-active delivery should be provided along with good sources of information about careers and courses and an independent base to support objective career guidance ensured.

- **Ensure teachers and trainers are well-prepared with industry experience.** Recruitment of sufficient number of teachers and trainers for VET institutions is prerequisite, and also ensuring this workforce is well-acquainted with the needs of modern industry. To this end:
  - Encourage trainers in VET institutions to spend some of their time working in industry.
− Promote flexible pathways of recruitment and make it easier for those with industry skills to become part of the workforce of VET institutions through effective preparation.

Appropriate pedagogical and other preparation for trainers (including supervisors) of interns, trainees and apprentices in workplaces, adapting the level of preparation to the nature of the workplace learning must be provided. Interchange and partnership between VET institutions and industry, so that vocational teachers and trainers spend time in industry, which will update their knowledge, and vocational trainers in firms spend some time in VET institutions, which will enhance their pedagogical skills.

- **Make full use of workplace learning.** The condition to be fulfilled in order to have successful VQS is to make substantial use of workplace training in initial VET and to ensure that the framework for workplace training encourages both employers and students to participate. Ensuring workplace training will rise the quality, through an effective quality assurance system and a clear contractual framework for apprenticeships.

- **Develop tools to engage stakeholders and promote transparency.** Engage employers and unions in VET policy and provision through effective mechanisms to develop and implement qualification frameworks, supported by strengthened quality assurance and adoption of standardised national assessment frameworks, which will underpin quality and consistency in training provision. Strengthening data on labor market outcomes of VET will provide institutional capacity to analyze and disseminate that data.

### 3.5 Developing RES training schemes

Unavailability of human resource with required knowledge and skills is often identified as one of the key reasons for poor dissemination of renewable energy technologies. For a balanced and accelerated diffusion of various renewable energy technologies adequate number of competent and well trained professionals is needed (for resource assessment, technology development, system design, installation, operation, repair and maintenance, performance monitoring, information processing, planning, etc.). Workforce development is one of the critical factors to success in implementing any strategy towards renewable energy technology development and dissemination. It is necessary to periodically seek inputs from the industry about (a) any gap(s) between existing and desired levels of renewable energy education and training (b) important courses for professionals already employed in the field of renewable energy and (c) required skills and knowledge with the new entrants to renewable energy industry. This necessitates that sincere efforts are to be made in the area of renewable energy education and training to provide the required technical manpower at all levels.
Renewable energy education is a relatively recent initiative. The academic programmes currently being offered on renewable energy vary considerably in the types of renewable energy resources included in the curricula, as well as in the extent of their coverage. Moreover, the relative share of laboratory component, field visits, etc. also varies amongst various academic programmes. Being an interdisciplinary and end-user driven field (except large-scale grid connected power generation), a variety of issues must be properly addressed to make the educational efforts efficient and effective. Besides acquisition of knowledge and skills, a renewable energy professional should be creative and imaginative to be able to develop appropriate solutions for specific situations. As a new and emerging area, the associated professionals should also be aware of their responsibility and should be able to communicate and organize green solutions wherever feasible.

Concepts and courses dealing with renewable energy sources and technologies must be introduced from primary classes through all formal and informal stages of education.

Renewable energy education programmes must offer a mix of academic, as well as hands-on-skills training to the students. The latter can be accomplished by conducting laboratory experiments, practical demonstration of operational systems, field visits and field installation of actual working systems. Wherever applicable, the students may be encouraged to undertake hardware oriented projects during the course of the teaching/training programmes.

The employment aspects of renewable energy education programmes which are offered beyond the secondary/high school level must be realistically analysed before starting the programme. The university level teaching/training programmes should be designed to provide ample job opportunities and/or should be capable of providing self-employment.

4. Validation of prior learning

4.1. EU practice in validation of prior learning

4.1.1 Introduction: non-formal and informal learning

Despite the unfavourable economic and social circumstances many EU countries are currently facing, in which even formal education does not guarantee finding a job, the European Economic and Social Committee - EESC believes that the EU cannot fail to validate the hidden wealth that lies in the experience and skills that people have acquired through non-formal or informal means. This validation could provide opportunities in particular to certain disadvantaged groups (such as women, migrants, young people, older workers). However, it should not create false hopes that they would quickly find a place in the labour market. This requires economic and social policy aimed more at investment, creating quality jobs, and reducing poverty.
and the risk of social exclusion. These policies must also guide and support the strengthening of education, vocational training and retraining systems.

Based on the above, the EESC has drawn on an important document, the Council Recommendation on the validation of non-formal and informal learning of 20 December 2012. It highlights the fact that the validation of learning outcomes (knowledge, skills and competences) acquired through non-formal and informal learning can play an important role in enhancing employability and mobility, as well as increasing motivation for lifelong learning, particularly in the case of the socioeconomically disadvantaged or the low-qualified. The validation of relevant knowledge, skills and competences has a valuable contribution to make in improving the functioning of the labor market, in promoting mobility and in enhancing competitiveness and economic growth.

The key stakeholders with an important role to play in facilitating opportunities for non-formal and informal learning and any subsequent validation processes according to the Council are: employer organisations, individual employers, trade unions, chambers of industry, commerce and skilled crafts, national entities involved in the process of recognising professional qualifications and in assessing and certifying learning outcomes, employment services, youth organisations, youth workers, education and training providers, and civil society organisations.

As set out in the Council Recommendation of 2012, by 2018 Member States must have in place, in accordance with national circumstances and specificities, arrangements for the validation of non-formal and informal learning which enable individuals to:

- have knowledge, skills and competences validated which have been acquired through non-formal and informal learning, including — where applicable — via open educational resources;
- obtain a full qualification, or, where applicable, partial qualification, on the basis of validated non-formal and informal learning experiences (...).

According to the Council Recommendation, and based on the official guidelines set by European Training Foundation – ETF, the arrangements for the validation of non-formal and informal learning should include the following elements, as appropriate, whilst allowing each individual to take advantage of any of these, either separately or in combination, in accordance with his/her needs:

- IDENTIFICATION of an individual’s learning outcomes acquired through non-formal and informal learning;
- DOCUMENTATION of an individual’s learning outcomes acquired through non-formal and informal learning;
- ASSESSMENT of an individual’s learning outcomes acquired through non-formal and informal learning;
CERTIFICATION of the results of the assessment of an individual’s learning outcomes acquired through non-formal and informal learning in the form of a qualification, as credits leading to a qualification, or as otherwise deemed appropriate.

European guidelines for validating non-formal and informal learning from 2009 (and the recently updated version from 2015) have been written for individuals and organisations that are responsible for establishing, developing, implementing and running validation. Those involved operate at various levels (European, national, sectoral and local) and in various contexts (public, private and voluntary sectors, education and training, and labour market services). The aim of the guidelines is to clarify the conditions for carrying out validations and to make stakeholders aware of their options at different stages of the process.

4.1.2 Skills and competences acquired through non-formal and informal learning

The decline in specialised production based on skilled trades, technological changes and the rise of the service sector mean that 21st century employers now put greater emphasis on ‘personality’, or ‘transversal’ and ‘transferable’ skills. The importance of lifelong learning and validation of knowledge and skills acquired outside of schools is on the increase.

A shift in emphasis towards the outcomes of such learning is important if validation of the non-formal and informal learning (VNFIL) is to be successful. Indeed, since 2004 this has been expressly encouraged in the EU policy agenda for education, training and employment. The recent study by Cedefop (based on research conducted between 2013 and 2015) shows that the shift to learning outcomes is currently gaining ground across Europe — for example, in the creation of national qualifications frameworks, in defining and describing professional skills, in the use of learning outcomes in curricula and assessments and as reference points for validation. This is expected to increase the transparency, relevance and quality of education and its openness to non-formal and informal learning. CEDEFOP have published large number of publications and documents to guide the process. The summary of proposed routes toward qualification through the process of VNFIL is presented in fig. 7.

It therefore follows that emphasis should be placed on evaluating and documenting the outcomes of non-formal learning in a manner that is comprehensible to all parties involved, particularly employers and educational institutions. As people are interested and the required conditions have been put in place for them, these could then be recognised as standard professional qualifications on an equal footing with formal education programmes.

At the same time the public must be given relevant information on the benefits of having skills recognised and the options and mechanisms for doing so. The EESC recommends that Member States broaden the range of institutions providing this
kind of guidance and counselling and, in particular, enlist employment services, youth information centres, educational institutions, employers, trade unions, career advice centres, youth organisations, women’s organisations, organisations providing support to migrants and people with disabilities, and public institutions.

General prerequisite for ensuring the equal value of certificates achieved through formal and non-formal or informal study is a good national legislative framework. This places significant demands on the quality of validation processes. The EU has many examples of good practice in this field and these should be promoted.

Figure 7 Routes from learning to certification, CEDEFOP
The EESC is convinced that collective bargaining and social dialogue between unions and employers could play a key role in the process of validating non-formal education and lifelong learning and it should be used as an instrument to work on validating non-formal learning as an important contribution to the debate on employability and instruments to support it. Promoting the visibility — and raising awareness of the importance and value — of non-formal and informal education in voluntary organisations, as well as strengthening mutual trust can act as driving force for initiating this process. Development and use of self-evaluation tools can help people identify and describe their learning outcomes. The experience of civil society organisations should be harnessed here. The initiative for creation of a European skills passport and, subsequently, the Europass Experience can serve as positive input also.

## 4.2. Certification systems in construction

The skills’ certification is the public, formal and temporary acknowledgement of the working capabilities demonstrated by a worker. It is carried out by means of evaluation of the skills with regard to a standard and it does not need to be necessarily linked to the end of an educational process. Nowadays, certification systems of skills have gained importance due to a concern about improving the quality and productivity of the companies, the continuous evolution of construction techniques and technologies, the use of new materials and the commitment to ensure a sustainable development.

At present, factors such as the changes in the labour market as well as the globalization, which is increasingly affecting the economic and socio-occupational changes and the necessity of new professional profiles driven by the appearance of new technologies have led to the need of continuous and flexible training and thus skill’s certifications.

Certifications are driven by the need to recognize competencies of workers in an objective and formal way, independently on how and where they were acquired. This recognition should facilitate labor mobility and guarantee equal opportunities to the access and maintenance of employment regardless the place or country where the work is carried out. It requires a previous identification of competencies, their standardization, and the evaluation of the candidate who is going to be certified.

In order to be valuable, a skills’ certification needs to have some features such as meaning, validity, transparency and updating. The certificate has a high meaning for its labour implementation. It indicates the working capacities included in a standard and is recognised by workers and employers. It is an expression of the knowledge a person has acquired throughout his life and that enables him to perform an activity. It has to be issued by a legitimate and recognised institution responsible for ensuring the quality and transparency of the certification process.

This process is to be open and clear to all stakeholders so as to be credible to both employers and employees. Moreover, a certification has to be regularly updated as it
should reflect the real skills of the workers. Besides, it has to ensure the adaptation to the constant transformations in the work contexts due to technological innovations or changes in the organization of works that lead to skills' modifications. Specifically, in the construction industry construction methodologies and technologies are continuously evolving so it is of the utmost importance to be privy to the latest trends.

Focusing on the construction industry, particularly the building sector has demonstrated to be essential in boosting a change in society towards sustainable development. Therefore, when talking about sustainable construction development, the way a leader manages a project (Tabassi, et al., 2012), along with the blue collar workers, can modify the project, driving it towards sustainability and leading to better productivity. Conventional construction methods and technologies should be replaced by those new ones which help to reduce the environmental impact in order to achieve sustainable construction and activate the application of sustainable development concepts. Certification systems are a good starting point regarding this issue, even though they should be complemented with other actions such as training programs.

4.3. EU experience in organizing certification system

The fundamental principles underpinning validation:

- Validation must be voluntary.
- The privacy of individuals should be respected.
- Equal access and fair treatment should be guaranteed.
- Stakeholders should be involved in establishing systems for validation.
- Systems should contain mechanisms for guidance and counselling of individuals.
- Systems should be underpinned by quality assurance.
- The process, procedures and criteria for validation must be fair, transparent and underpinned by quality assurance.
- Systems should respect the legitimate interests of stakeholders and seek balanced participation.
- The process of validation must be impartial and avoid conflicts of interest.
- The professional competences of those who carry out assessments must be assured.

4.3.1 Swedish example

The purpose of validation is to aid those without Proof of education, diplomas or professional degrees to be able to have their skills acknowledged and documented in accordance with the requirements of the industry set for different occupations and salary levels. For individuals, a validation represents for example, to be able to get a
This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 785005

job in the construction industry and to be acknowledged at a salary level equivalent to their competence.

The work of the construction industry with validation focuses firstly on acknowledging of documented training and experience - and, secondly, through practical and theoretical tests. Several of those validated in Sweden have a foreign background. Some are content with a superficial assessment of competence as it is often sufficient to obtain a job.

A validation may involve:

- checking, for example, a documented foreign education and other documents concerning professional experience and evaluate it in comparison to the Swedish conditions and educational levels,
- testing people without education, but with a long background in construction or with an older training and documenting relevant qualifications,
- ensuring that skilled workers who work temporarily in Sweden have expertise in the safety criteria that apply to work at a Swedish site.

Validations can lead to different results such as:

- **A Swedish Proof of education** - for construction workers with years of experience in the Swedish construction industry. To get a Swedish Proof of education it is required to pass the Swedish vocational test (YTP). The test is in Swedish.
- **Letter of acknowledgement** - the applicants’ training records and/or documented work in construction - such as for foreign construction workers.
- **Validation Certificate** - for everyone who has done a validation and need to provide further documentation or training, but at the time, is not employed when the validation is done.
- **Apprentice log for additional training** - for those who are employed in Sweden and if the validation shows that there are gaps in the skills that can be compensated for in the continued apprenticeship period.
- **Temporary apprentice log** - for skilled workers from other countries with temporary employment in a Swedish construction project. The temporary apprentice log is valid for 6 months or until the validation has been completed.

The overall responsibility for validation issues lies at the Swedish National Agency for Higher Education. The Swedish National Agency for Higher Vocational Education is a relatively new agency that is responsible for matters relating to vocational education, further education and apprenticeships for adults to certain skilled trades. They are also responsible for coordinating and supporting a national structure for validation, and to be the national focal point for the European Qualifications Framework for lifelong learning, the EQF.

BYN is responsible for the validation of the construction workers. It is often municipalities and employment centres that order validation, but also individuals can
order a validation of their professional qualifications. The Swedish Construction Industry Training Board (BYN) is a joint organization made up of employers' organizations, the Swedish Construction Federation, the Swedish Earth Moving Contractors and the trade unions: Swedish Building Workers' Union and the Union for Service and Communications Trades (SEKO). BYN owns the task of ensuring that there are skilled professional workers in the Swedish construction industry. BYN's overall responsibility is to work with schools that have construction programmes and enterprises in construction work for the Swedish upper secondary education and apprenticeship, which takes place in construction and to see that the requirements for this industry are met. BYN is centrally coordinating and controlling the validation process, approves the validators, and develops an assessment portal for recognition of foreign training and documented work experience.

Approved validators for construction trades can be searched via http://www.valideringsinfo.se. These are usually the same companies that also have authorized trainers. A validation of a construction worker can cost between 100 and 300 Euro per day - depending on who is doing the validation. Anyone who wants to validate his/her professional skills can contact the employment agency or go through municipality or employer. It is also possible for the one who wants to be validated to bear the cost of validation and go directly to approved validators. Approved validators always do assessment of competence for certificate or diploma.

The Employment Service has national guidelines for validation and validates, if necessary, the people who are unemployed and living in Sweden. According to the procedures of the employment service, a validation should be done when the unemployed has an ambiguous profile, has experience that is difficult to evaluate or have extensive experience in an occupation, but have no documentation, no documentation from the relevant education or have a foreign education that is difficult to evaluate on the Swedish labour market.

The official validation model for the construction industry is divided into four stages which are based on the validateds' background and the purpose of the validation:

1. **General mapping of skills** - often a self-assessment. Those who have documented training or experience or are already established in the construction industry will immediately begin with step 2.

2. **In-depth skills mapping** - is done with an in-depth skills survey. Tools: Validation Test on safety and technology, in several languages and BYN assessment portal. The result of step 2: is a letter of acknowledgement of foreign professional qualifications and/or Swedish professional certificates of competence tests that must be passed in Swedish.

3. **Assessment of competence for Letter of acknowledgement** - is done both practically and theoretically for those who do not have sufficient documentation to prove their skills as of step 2. The result of step 3: letter of acknowledgement of documented foreign professional certificates or equivalent, as well as the compensatory measures necessary to obtain a Swedish Proof of education. The
This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 785005

person who is employed at the time of the validation obtains an apprentice log in this case.

4. **Assessment of competence for certificate** - practical and exploratory tasks. The results and documentation of completing step 4 is a *validation certificate* for those who are unemployed and *letter of acknowledgement* and apprentice log or a Swedish Proof of education (after written test).

4.4. **MK status and experience in validation of prior learning**

Republic of Macedonia is stepping the road toward European education system. The introduction of the Bologna process and the establishment of the credit transfer system in higher education were followed by harmonization of the National Qualification Framework with the EQF, ratified at the beginning of 2016. The next step is to establish a system for validation of prior non-formal and informal learning. This process is governed by the Adult education centre as the responsible institution for lifelong learning - LLL. The programme for introduction of the process of VNFIL on national level by 2022 is developed.

In order to establish large scale training schemes, the Project BUILD UP Skills BEET has made pioneer steps toward introduction of the process for validation of previous non-formal and informal learning in Macedonia, becoming an example of a success story in the country, but also in the region. The developed Methodology for implementation of the process of recognition of prior learning (RPL) is a comprehensive, detailed and concise document (fig. 8) describing the whole procedure of evaluation of informally obtained skills of building workers.

![Figure 8 Cover page of the Methodology for implementation of the process of recognition of prior learning (RPL) developed in BUILD UP Skills BEET](image-url)
The process of recognition of prior learning as very new and unknown in the country was promoted by announcing the benefits for candidates — Reasons to choose Recognition of Prior Learning:

- A much shorter process than a conventional training, resulting in the same qualification;
- Validated qualifications increase employability;
- It means valorization of previous knowledge, skills and experience;
- Qualification can be acquired without formal training;
- The certificate is identical to the one obtained through formal training;
- Lack in certain competences can be remedied through partial or modular training.

The designed process for Recognition of Prior Learning within BUILD UP Skills BEET is a six-phase process, and is fully compatible with the recommendations for necessary phases of VNFIL issued by the European Training Foundation –ETF (fig. 9).

![Diagram of the Recognition of Prior Learning process]

**Figure 9 designed process for Recognition of Prior Learning within BUILD UP Skills BEET**

A certification body (fig. 10) was established within the project that was in charge of issuing certificates, in accordance with the standard EN ISO/IEC 17024:2012, ‘General requirements for bodies certifying persons.’ It acted as an authorised body for certifying persons in the framework of the project, for certification of trainers and certification of workers during the RPL process.
This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 785005.

A closer look at the evaluation routes during the RPL process is given in fig. 11. The possible ways for obtaining the certificate are shown. It is essential to have a person-oriented, transparent evaluation process, in order to ensure a high-quality and trustworthy procedure.

The process of recognizing building workers’ previous skills was endorsed by most of the construction companies in Macedonia. It was received with a considerable acceptance rate, although it was a rather new and unfamiliar process in the country. The construction companies’ and workers’ interest in the possibilities for certification rose continually, especially as the promotional campaign was repeated. In addition, many applications for RPL were received after the project ended.

An overall result was 967 certified workers, which was a huge success.
5. Macedonian practice in implementing measures toward sustainable construction

5.1. Analysis of the questionnaire based survey

In order to assess existing Macedonian practice in three areas: level of implementation of energy efficiency legislation and benefits of the trainers, workers and construction companies from obtained certificates for EE skills during previous project BUILD UP Skills BEET Direct questionnaire based survey of target groups and market actors is carried out.

The sample encompasses 58 trainers, 40 workers and 98 companies. The focus was given to the opinion of trainers’ and companies' as those two segments have big influence in public opinions related to implementation of EE measures in private sector. As the project is focused more on private investors and market recognition it was additional reason to concentrate on two market segments. The questionnaire was prepared and structured in two groups of questions: first, the assessment of market changes stem from legislation and the market actors behavior and second, the benefits for the interviewees from new market trends and from certified skills on personal, organizational and market level. The distribution and collection of the responses were organized on-line, by using available IT technologies. Some interviews were also conducted by telephone and direct contacts.

The questionnaires are presented as an Appendix 1 of this report. The analysis was done according to the areas that concern to the EE skills and the report is organized on findings and conclusions.

(a) MAIN FINDINGS

MARKET

(1) All three categories of interviews considered that the changes in the legislation have influenced the demand for EE measures:

<table>
<thead>
<tr>
<th>KEY ANSWERS</th>
<th>% of answers of interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Companies</td>
</tr>
<tr>
<td>The increased importance of EE buildings</td>
<td>62.3 %</td>
</tr>
<tr>
<td>Note: the neutral answer “nothing was changed” is second</td>
<td></td>
</tr>
<tr>
<td>The responsible bodies enforced the legislation for EE measures</td>
<td>98.9 %</td>
</tr>
<tr>
<td>The demand for EE buildings is increased -YES</td>
<td>87.5 %</td>
</tr>
</tbody>
</table>

(2) The influence of demand on investors’ behavior and market prices is considered as big from all categories of interviewees:

<table>
<thead>
<tr>
<th>KEY ANSWERS</th>
<th>% of answers of interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Companies</td>
</tr>
<tr>
<td>The private investors dominated in increasing demand for EE buildings. Note: small number of answers from public institutions</td>
<td>93.9 %</td>
</tr>
<tr>
<td>The prices for EE have increased in last 2 years</td>
<td>68.4 %</td>
</tr>
</tbody>
</table>
(3) It is enumerated that there are many proposals for upgrading legislation as the EE building demand will be increased.

- The by-laws have to be aligned with legislation and have to follow the whole value chain in building sector;
- The responsible bodies have to be more rigorous with punishment and in organization of their job; The lack of skills for EE of state official have to be overcome
- The financial incentives for investors of EE building to be introduced on the level of Government and municipalities;
- Introduction of mechanism for monitoring and controlling building process in all phases: architectures, construction, crafts, maintenance.

**BENEFITS FROM EE SKILLS**

(4) The certification of EE skills have influence on market positioning of the interviewees:

<table>
<thead>
<tr>
<th>KEY ANSWERS</th>
<th>% of answers of interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Companies</td>
</tr>
<tr>
<td>The contribution of the Certification for EE is followed and measured. <em>Note: some trainers' answers are “How to do this?”</em></td>
<td>94.9 %</td>
</tr>
<tr>
<td>If the Certificate contribute for visibility and recognition of your EE skills / qualified workers on the market. <em>Key answer “not much”</em></td>
<td>81.6%</td>
</tr>
<tr>
<td>Delivery of training after completion of BEET training *</td>
<td>46%</td>
</tr>
<tr>
<td>The companies with EE skills are visible on the market and looked for investors</td>
<td>85.7</td>
</tr>
<tr>
<td>The certificate obtained through Recognition of previous learning is valued the same as other obtained by non-formal training</td>
<td>94.9%</td>
</tr>
</tbody>
</table>

* Many answers concern that there is demand, but they can’t organize it as individuals

**NEEDS FOR TRAINING AND EE CERTIFICATION**

(5) The interest for training is more accented for high educated professionals in building sector:

<table>
<thead>
<tr>
<th>KEY ANSWERS</th>
<th>% of answers of interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Companies</td>
</tr>
<tr>
<td>The implementation of EE measures for buildings depend mostly from architects and engineers</td>
<td>87.5 %</td>
</tr>
<tr>
<td>Interest for participation in project TRAINEE</td>
<td>90 %</td>
</tr>
</tbody>
</table>

(6) There are no big differences in given answers among three groups of interviewees. The similarity in opinions is more emphasized in the answers of companies and workers. The differences in opinions are showed from trainers, meaning that they have no direct contacts with the market or that changes in this sector are more required in construction of the buildings and less on the meso and macro level (supporting services in the value chain).
(b) CONCLUSIONS

1) The opinions of the interviewees shows that there are remarkable changes on the market for EE buildings, influencing demand and behavior of the investors. The main suggestions emphasize the needs for more organized approach from public institutions and responsible bodies in alignment of legislations and their enforcement.

2) It is identified that there is a need for establishing mechanism to monitor and measure the contribution of EE skills offer for companies, professionals and workers along the whole construction process and in each phase of the main value chain of buildings. This is good pre-condition for planned project objective for introducing BIM on Macedonian market.

3) The BEET certification had remarkable influence in visibility of EE skills. However, if it will end on individual level it cannot be expected to have large market recognition. There is a need for continuing organization of certification in medium level companies and by certified trainers (building sector and educational sector) and synergy of their effort in this field. Planed TRAINEE activities can raise awareness for more organized approach in recognition of EE skills through professional associations.

4) The needs for involvement of high educated professionals are pointed by all interviewees and TRAINEE activities in those areas have to be promoted extensively. Having in mind the high responses for willingness to participate in TRAINEE it can be said that drown conclusions can be deployed in project implementation period.

5.2. Review of existing training schemes in Macedonian voluntary qualification system

ECM explored the experience of professional and trade associations and non-formal educational institutions in introduction and recognition of voluntary qualification schemes in the last two years. Starting point was the lists of involved non-formal training providers and private companies that implemented training for their needs.

The main finding is that existing professional associations have not introduced any certification schemes related to EE buildings. There are some initiatives within Chamber for architects and engineers to introduce them in their process of giving licenses for individual architects and engineers training for EE, which is required from EE directives that will be enforced for Republic of Macedonia after 2020.
The opinion of the professional associations, especially those dealing with EE and RES issues, is that the topic of qualification schemes has to be left only to State official institutions.

Therefore, AEC, as official institution for adult education, carried out the analyses of verified programs for adult education in order to assess the existing practices in deployment voluntary qualification schemes. All verified programs in the last four years were listed and analyzed and the verified programs for construction occupations were identified. (the lists are in annex)

The main finding is that there is trend of not re-verifying the programs after three years (when the verification expires). AEC reports 42 % of total number of verified programs are not re-verified (134 programs out of 318 did not submit request for re-verification).

Currently, there are 19 out of 184 existing verified programs for construction occupations where EE skills are included (15 for EE skills and 4 for RES skills), which are provided by accredited training providers from Skopje, Kumanovo, Gostivar, Tetovo, Strumica and Bitola.

However, there are training programs related to building sector that are not verified: 23 programs out of 134 concerning the building sector include EE skills (22 for EE skills and 1 for RES skills).

The reasons for these trends are linked to the expectations of training providers that their trainings will be co-financed by national budget (programs implemented by National Employment Agency).

CONCLUSIONS – EXISTING TRAINING SCHEMES

1) The market demand is still low and expectations are that training schemes should be financed by national budget, so the supply side of training is more oriented towards state institutors for co-financing, rather than towards the needs of relevant market actors.

2) The professional associations are not willing to be involved in and manage voluntary qualifications schemes and it is supposed that only public institutions have to take care about the new needs for EE buildings.

3) TRAINEE has large space for dealing with those issues, as well as for introducing new approach in upskilling the professionals and workers and the mechanism for monitoring and measuring contributions of EE skills that will increase market demand for EE and RES skills along the whole value chain in building sector.

Both carried out research show that TRAINEE is planned on the relevant market issues that are confirmed by opinions and practices of relevant market actors, professional associations and public institutions.

The drown conclusions are solid to direct the operationalization of the planned tasks and to concentrate communication with stakeholders on the TRAINEE activities that meet their opinions about the needs for EE buildings.
References


[34] Persson M. 2010. Validation of Construction workers. European Lifelong Learning Policy – Case Study Sweden. LLL-RADAR EC project under the Key activity 1


[37] SmartMarket Report, 2014. The business value of BIM for construction in major global market: How contractors around the world are driving innovation with Building Information Modelling, s.l.: McGraw Hill Construction.


Appendix 1

Questionnaires

on the practice of implementing measures toward sustainable construction

ПРАШАЊА
За Анкета на ФИРМИ

Почитувани

Проектот ТРАИНЕЕ (Пазарно ориентиране вештини за енергетски ефикасна градба) е продолжување на активностите за сертификација на вештините на вработените за ЕЕ градба. Како учесници во претходниот проект БЕЕТ (Обука на градежни работници за ЕЕ) и корисници на сертификатот за енергетски ефикасна градба сакаме да го консултираме вашето мислење за придонесот на добиените сертификати за вашата поголема препознатливост на пазарот за ЕЕ градба, како и оценка на користа за вас како компанија и за сертифицираните работници.

Вашето искуство и учество во анкетата ќе даде вреден придонес за реализација на проектот и идентификување на потребите за понатамошна поддршка и соработка.

А Регулативи
1) Вашето мислење за промените во постојната регулатива за ЕЕ градба е дека:
   o Ја зголеми препознатливоста на ЕЕ згради
   o Ја намали препознатливоста на ЕЕ згради
   o Не се промени ништо
   o Друго
2) Дали регулативата за ЕЕ градба е следена од надлежните органи?
   o ДА, бараат да се почитува
   o НЕ
   o Друго
3) Дали постојната регулатива влијае и ја поттикнува побарувачката за ЕЕ градба?
   ДА
   НЕ
   Не знам
4) Кои инвеститори ја зголемија побарувачката за ЕЕ градба?
   ПРИВАТНИТЕ
   ЈАВНИТЕ ИНСТИТУЦИИ
   Ниту едните, ниту другите
5) Дали вашите цени на становите со повисоки ЕЕ перформанси и цените за примената на мерки за ЕЕ градба се зголемија во последните 2 години?
   ДА
   НЕ
6) Што треба да се промени во регулативата за зголемување на примената на ЕЕ градба?

..........................................................................................................................................................
..........................................................................................................................................................
..........................................................................................................................................................

Б. Корист од Сертификацијата на вработените
7) Дали го следите и мерите придонесот на работниците со подобри вештини за ЕЕ градба?

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<th>Да</th>
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<th>Друго</th>
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8) Дали фирмите со квалификуваните работници за ЕЕ градба се видливи на пазарот и препознавани (барани) од инвеститорите?

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<th>Не</th>
<th>Друго</th>
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9) Колку Сертификатот на Проектот БЕЕТ придонесе за видливост и препознавање на вашите квалификувани работници?

<table>
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<tr>
<th>Многу</th>
<th>Незначително</th>
<th>Остана иста</th>
<th>Се намали</th>
<th>Друго</th>
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1) Дали во вашата компанија различно се вреднуваат Сертификатите (1) кои се стекнати преку обука за ЕЕ или Сертификатите (2) стекнати преку процесот на препознавање на претходното знаење кој се реализираше во Проектот БЕЕТ?

<table>
<thead>
<tr>
<th>Исто се вреднуваат</th>
<th>Сертификатот (1) повеќе се вреднува</th>
<th>Сертификатот (2) воопшто не се вреднува</th>
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</table>

B. Потреба од обука и ЕЕ сертификација
10) Од кој профил на стручен кадар најмногу зависи имплементацијата на мерки за ЕЕ градба?

- Архитекти и инженери
- Техничари
- Директни градежни работници

11) Дали сте заинтересирани за користење на обука и Сертификацијата за ЕЕ вештини на проектот ТРАЙНЕЕ?

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<tr>
<th>Да</th>
<th>Не</th>
<th>Друго</th>
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</table>
ПРАШАЊА
За Анкета на ТРЕНЕРИ

Почитувани

Проектот ТРАИНЕЕ (Пазарно ориентирани вештини за енергетски ефикасна градба) е продолжување на активностите за сертификација на вештините на вработените за ЕЕ градба. Како учесник во претходниот проект БЕЕТ (Обука на градежни работници за ЕЕ) и корисници на сертификатот за енергетски ефикасна градба сакаме да го консултираме вашето мислење за придонесот на добиените сертификати за вашата позолота препознатливост на пазарот за ЕЕ градба, како и оценка на користа за вас од сертификатот за тренер и евалуатор за ЕЕ вештини.

Вашето искуство и учество во анкетата ќе даде вреден придонес за реализација на проектот и идентификување на потребите за понатамошна поддршка и соработка.

А Регулатива
1) Вашето мислење за промените во постојната регулатива за ЕЕ градба в дека:
   o Ја зголемија препознатливоста на ЕЕ згради
   o Ја намалија препознатливоста на ЕЕ згради
   o Не се промени ништо
   o Друго ..............................................................

2) Дали регулативата за ЕЕ градба е следена од надлежните органи?
   o ДА, бараат да се почитува
   o НЕ
   o Друго ..............................................................

3) Дали постојната регулатива влијае и ја поттикнува побарувачката за ЕЕ градба?
   ДА ........................................................................
   НЕ ........................................................................
   Не знам

4) Кои инвеститори ја зголемија побарувачката за ЕЕ градба?
   ПРИВАТНИТЕ .........................................................
   ЈАВНИТЕ ИНСТИТУЦИИ ............................................
   Ниту едните, ниту другите

5) Дали вашиите цени за примена на мерки за ЕЕ градба се зголемија во последните 2 години?
   ДА ........................................................................
   НЕ ........................................................................
   Друго .................................................................

6) Што треба да се промени во регулативата за зголемување на примената на ЕЕ градба?
   ...........................................................................................................................
   ...........................................................................................................................
   ...........................................................................................................................
   ...........................................................................................................................
   ...........................................................................................................................

Б. Корист од Сертификацијата на вработените
7) Дали го следите и мерите придонесот на Сертификатот за зголемувањен обем на вашиот ангажман за ЕЕ градба?

ДА \n
НЕ

Друго.............................

8) Дали испорачавте тренинг за градежни работници по завршување на проектот БЕЕТ?

ДА \n
НЕ

Друго.............................

9) Колку Сертификатот на Проектот БЕЕТ придонесе за видливост и препознавање на вашите вештини на пазарот?

МНОГУ \n
НЕЗНАЧИТЕЛНО \n
ОСТАНА ИСТА \n
СЕ НАМАЛИ

Друго............

2) Дали сметате дека различно се вреднуваат Сертификатите (1) кои се стекнати преку обука за ЕЕ и Сертификатите (2) стекнати преку процесот на препознавање на претходното знаење кој се реализираше во Проектот БЕЕТ?

ИСТО СЕ ВРЕДНУВАА \n
Сертификатот (1) повеќе се вреднува \n
Сертификатот (2) воопшто не се вреднува

В. Потреба од обука и ЕЕ сертификација

10) Од кој профил на стручен кадар најмногу зависи имплементацијата на мерки за ЕЕ градба?

АРХИТЕКТИ И НЖЕНЕРИ, ТЕХНИЧАРИ, ДИРЕКТНИ ГРАДЕЖНИ РАБОТНИЦИ

11) Дали сте заинтересирани за вклучување во организација на обуките и Сертификацијата за ЕЕ вештини на проектот ТРАИНЕЕ?

ДА \n
НЕ

Друго.............................
ПРАШАЊА
За Анкета на РАБОТНИЦИ

Почитувани
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Вашето искуство и учество во анкетата ќе даде вреден придонес за реализација на проектот и идентификување на потребите за понатамошна поддршка и соработка.

А Резултати
1) Вашето мислење за промените во барањата за ЕЕ градба е дека:
   - Се зголеми важноста на ЕЕ згради
   - Се намали важноста на ЕЕ згради
   - Не се промени ништо
   - Друго

2) Дали правилата за ЕЕ градбe следени од надлежните органи?
   - ДА, бараат да се почитуваат
   - НЕ
   - Друго

3) Дали се зголеми побарувачката за ЕЕ градба?
   - ДА
   - НЕ
   - Не знам

4) Кои инвеститори ја зголемија побарувачката за ЕЕ градба?
   - ПРИВАТНИТЕ
   - ЈАВНИ ИНСТИТУЦИИ
   - Ниту едните, ниту другите

5) Дали вашиите цени за примена на мерки за ЕЕ градба се зголеми во последните 2 години?
   - ДА
   - НЕ
   - Друго

6) Што треба да се промени за да се зголеми примената на ЕЕ градба?
   - ........................................................................................................................................
   - ........................................................................................................................................
   - ........................................................................................................................................
   - ........................................................................................................................................

Б. Корист од Сертификацијата на вработените
7) Дали го следите и мерите придонесот на Сертификатот за зголемување на вашиот ангажман за ЕЕ градба?
8) Колку Сертификатот на Проектот БЕЕТ придонесе за видливост и препознавање на вашите вештини на пазарот?

МНОГУ НЕЗНАЧИТЕЛНО ОСТАНА ИСТА СЕ НАМАЛИ

9) Дали во вашата компанија различно се вреднуваат Сертификатите (1) кои се стекнати преку обука за ЕЕ или Сертификатите (2) стекнати преку процесот на препознавање на претходното знаење кој се реализираше во Проектот БЕЕТ?

ИСТО СЕ ВРЕДНУВАА Сертификатот (1) повеќе се вреднува Сертификатот (2) воопшто не се вреднува

В. Потреба од обука и ЕЕ сертификација

10) Од кој профил на стручен Hàng зависит реализацијата на мерки за ЕЕ градба?

АРХИТЕКТИНЖЕНЕРИ, ТЕХНИЧАРИ, ДИРЕКТНИ ГРАДЕЖНИ РАБОТНИЦИ

11) Дали сте заинтересирани за вклучување во обуките и Сертификацијата за ЕЕ вештини на проектот ТРАИНЕЕ?

ДА НЕ Друго.............................
Appendix 2

Detailed analysis of questionnaire-based survey
1. Денеска в момента се променя ли официалната цена на тютюн? (снимка за въпроси)

2. Думата промени ли официалната цена на тютюн в посочения период? (снимка за въпроси)

3. Думата дегерменирана ли е на официален ниво на вътрешността със съдържание на никотин? (снимка за въпроси)

4. Една или две думи за поддържането на зелен цвет при престарени тютюни? (снимка за въпроси)

5. Думите са също така не въвеждали на мерни на нивото на пушене скопски, за съдържание на никотин в зелени? (снимка за въпроси)

6. Една или две думи за промените на регулаторен, за използване на тютюн в зелени? (снимка за въпроси)

7. Думата е в момента на черния тютюн, за използване на тютюн на мерни на вътрешността? (снимка за въпроси)

8. Една или две думи за черния тютюн? (снимка за въпроси)

9. Думата е в момента на черния тютюн, за използване на тютюн на мерни на вътрешността? (снимка за въпроси)

10. Една или две думи за черния тютюн? (снимка за въпроси)