



European Construction Sector Observatory

Policy fact sheet

Romania

Build Up Skills QualiShell Project

Thematic Objective 2

November 2019



In a nutshell

Implementing body	Consortium ¹ led by the Institute for Research and Development in Construction, Urban Planning and Sustainable Spatial Development (URBAN-INCERC).
Key features & objectives	Development of National Qualification Schemes for installers of opaque thermal insulation systems for buildings and installers of thermally insulated window systems, to ensure high quality installation of very efficient building envelope components and to achieve high performance building envelopes, moving towards the implementation of nearly zero energy buildings in Romania.
Implementation date	1 October 2013 – 31 July 2015
Targeted beneficiaries	Construction sector companies and employees, training providers, government authorities, building owners.
Targeted sub-sectors	Residential and commercial, VET, government.
Budget (EUR)	511,180 (75% - EU funding)
Good practice	★★★★☆
Transferability	★★★★☆

Buildings are an essential element of EU energy efficiency policy, as they are responsible for approximately 40% of final energy consumption and 36% of greenhouse gas emissions². Major emission reductions can be achieved by making buildings more energy efficient, and ultimately nearly zero energy. This means that buildings are an essential focus of efforts to achieve EU reduction targets³. However, the Nearly Zero Energy Building (NZEB) concept is not yet easily applied in Romania. Although the national legal framework provisions are following the

2010/31/EU Directive, Romania is still in the process of fully accomplishing these obligations. After 31st December 2018, all new buildings occupied and owned by public authorities should be NZEB. This requirement will be applicable to all new buildings as from 2021⁴.

To meet the country's NZEB targets, the Romanian construction workforce need to acquire the appropriate skills to build and retrofit high energy performance buildings. These new skills are needed across the construction value chain including architects, engineers, energy auditors, craftsmen, technicians and installers⁵.

The EU Build Up Skills initiative⁶ and qualification roadmap⁷ were developed to help achieve sustainable energy policy objectives. The roadmap sets the guidelines and priority measures for a national strategy to train and qualify the construction workforce to meet the 2020 targets.

The BUILD UP Skills QualiShell project aimed to develop and pilot two national skills training and qualification schemes – one for installers of external thermal insulating composite systems and one for thermally insulated window systems (carpentry and insulating glazing).

It also aimed to develop skills and competency assessment tools, a procedural framework and a range of support mechanisms. These were intended to ensure that the training and qualification schemes are aligned with market demand, that they are sustainable in the long term, and that they evolve as part of the national qualification system.

QualiShell was successfully implemented and the two qualification schemes were successfully piloted. At least 11 partnership agreements between training providers and construction sector businesses are now in place, with the aim of achieving large scale implementation of the qualification schemes. To guarantee the long-term success of the measure's outputs, skills qualifications will need to become a requirement for all construction work.

1.

General description

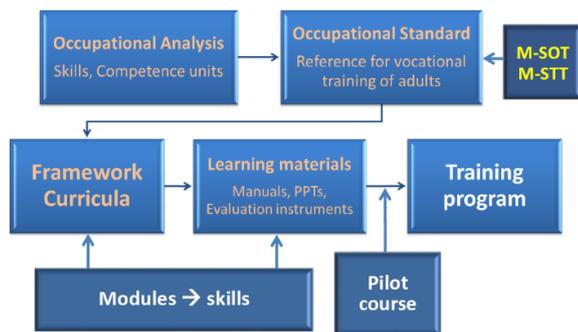
The BUILD UP Skills QualiShell project – ‘National Qualification Scheme for Construction Workers to Ensure High Performance Building Envelopes’ – was implemented between October 2013 and July 2015 under the Intelligent Energy Europe programme funded by the European Commission⁸.

The overall purpose of the project was to increase the supply of qualified construction workers in Romania and thereby improve quality in construction works. To achieve these aims, tools and mechanisms were developed to provide and support skills training and qualification on high performance building envelopes.

The main goal of the project was to develop, validate and promote two national qualification schemes for two key occupations: installers of thermal insulation composite systems; and installers of insulated window systems⁹.

Figure 1 provides an overview of the qualification scheme approach.

Figure 1: Qualification scheme approach



(M-SOT = Installer of opaque thermal insulation systems for buildings; M-STT = Installer of thermally insulated window systems)

Source: QualiCheck fact sheet #52¹⁰

The specific objectives of the project aimed to:

- Activate relevant stakeholders to validate, implement and monitor the proposed qualification schemes;

- Perform a thorough occupational analysis, explore internal and external training resources in the construction sector, and define an adequate procedural framework;
- Develop and validate two national qualification schemes for building insulators and window system fitters, by defining training courses and evaluation tools;
- Raise awareness, ensure an effective communication process between stakeholders and develop effective mechanisms to support the large-scale implementation of the schemes¹¹.

QualiShell was delivered by a consortium that brought together a range of expert organisations from different sectors: construction and buildings; energy efficiency; vocational education, training and life-long learning; research/academia; and government and public sector¹².

To ensure the long-term viability of the qualification schemes, the project also sought to involve a wide range of stakeholders and actors through a process of continuous consultation. Three main channels were utilised to engage with the wider stakeholder community:

- The existing business networks of the project partners;
- The National Consultation Committee (NCC) which includes 17 organisations that represent all of the main actors (other than the project partners) in construction, energy, education, labour, as well as social partners, building owners, public authorities and market/industry decision-makers;

The National Qualification Platform (NQP) with more than 730 active organisations, as an open platform for all interested parties throughout the consultation process¹³.

2.

Achieved or expected results

The QualiShell project targeted both medium- and long-term impacts. The specific results delivered by the project should be viewed as milestones in the broader evolutionary process of the Romanian National Qualification Framework¹⁴, and as a contribution towards NZEB implementation in Romania.

The main outputs¹⁵ of QualiShell were:

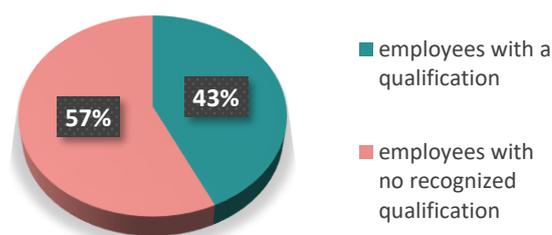
- Continuous consultation of stakeholders in the Romanian National Qualification Platform throughout the project to ensure the correct implementation of key measures defined in the Build Up Skills Romania Roadmap;
- Detailed analysis of occupational skills needs, a modular definition of the required skills and competences for thermal insulators (ETICS installers) and insulated window systems installers, and the development of occupational standards for education and training;
- Two National Qualification Schemes – one for opaque building envelope insulation system installers (ETICS installers), and another for window system fitters (installers of thermally insulated window frames and glazing). The schemes provided tools and documentation to support the implementation of high-quality training programmes and are fully available for the qualification market;
- Mechanisms aiming to ensure the sustainable and large-scale implementation of both qualification schemes:
 - Use of existing networks;
 - Evaluation of competences acquired in formal and informal environments;
 - Proposal of regulatory measures and business models to help establish partnerships between the education system and the construction sector.

Two working groups were set up to carry out the occupational skills analysis work and define occupational standards for education and training. Each working group focused on one of the two qualification schemes. The groups were composed of a range of experts with complementary skills.

The groups utilised several methods to assist their analysis work, including surveys of construction sector employees, structured interviews with professionals in the sector, focus group discussions, regular consultations and round table meetings¹⁶.

Figure 2 provides an example of a key finding from the survey work carried out. This finding demonstrates the need to provide more formal education in the construction sector.

Figure 2: Example of findings from the survey of construction sector employees



Source: QualiShell¹⁷

The analysis revealed a broad span of occupational factors, including specific, transversal and variable activities, the theoretical knowledge and practical skills needed to complete those activities, and the criteria for achievement in those activities. Based on these results, the groups defined the occupational standards for education and training in line with each of the two qualification schemes. They were then developed, validated, approved and published in the National Qualification Framework¹⁸.

Table 1 presents the standards defined for the required education and training level in accordance with the National and European Qualifications Framework (NQF / EQF). It also shows the admission criteria that must be met to access the schemes, as well as the modular course structure (including the required duration of theoretical and practical training per module) and the competencies that the courses will deliver.

Table 1: Qualification scheme competencies

General competencies	
<ul style="list-style-type: none"> • Workplace organisation • Health and safety at work • Environmental protection • Ensuring quality of work • Equipment maintenance • Construction materials (provision, handling) 	
Occupational competencies	
Opaque thermal insulation systems	Thermally insulated window systems
<ul style="list-style-type: none"> • Substrate preparation • Support structure installation • Opaque insulation system installation • Hardening • Finishing 	<ul style="list-style-type: none"> • Preparation and transport • Preparing installation • Fenestration system installation • Application of independent mechanisms • Ensuring functional system control

Source: QualiShell – Occupational analysis report¹⁹

The Classification of Occupations in Romania (COR Nomenclature) and the Romanian Nomenclature for Classification of Qualifications were both updated to include provisions for both new occupations. The new qualifications became operative in August 2014²⁰.

QualiShell developed a set of implementation guidelines on the two new qualification schemes. The guidelines are intended to support training providers, construction companies and trainees.

They cover adult professional training models, conditions of access to professional training, professional training certification, and recognition of the skills acquired in a non-formal or informal context²¹.

QualiShell developed a set of modular training courses for the two target occupations. The modular approach was developed in line with the general and specific competences presented in Table 1. Development work focused on training

content and support materials for both trainers and trainees, as well as an evaluation matrix for trainee examinations (knowledge and practical skills topics and guidelines for trainers/examiners).

Pilot training sessions²² were run to test and validate the new courses.

Table 2 provides an overview of the main course delivery results which are set against the longer-term targets to achieve by 2020. The key targets for course delivery and number of trainees will be achieved with the support of multiple training providers.

Table 2: Course delivery results

Common performance indicators	Ex ante target	Final result	2020 Target
Number of training courses developed	2 (piloted)	2 (piloted)	950 courses
Number of people trained	32	28	26,500
Number of training hours delivered	1,440	1,110	684,000
Estimated cost (EUR) to qualify each trainee	16,100	969	600
Primary energy savings vs projections (toe/year)	100.5	1,955	703.5
Reduction of greenhouse gas emissions (tCO2e/year)	225	4,357	1,575

Source: Build Up Skills Romania Factsheet²³

The course for installers of opaque thermal insulation systems for buildings was piloted between March and May 2015. 16 trainees took part in the pilot qualification programme and they received 130 hours of theoretical training and 260 hours of practical training on a construction site. 12 graduates of the pilot courses received a qualification certificate.

The course for installers of thermally insulated window systems was piloted between December 2014 and June 2015. 16 trainees took part in the pilot qualification programme and they received 240 hours of theoretical training and 480 hours of practical training on a construction site. All 16 graduates of the pilot courses received a qualification certificate.

A number of support tools and mechanisms were developed to help ensure the sustainable and large-scale implementation of the two new qualification schemes:

- Existing networks were involved in consultation panels and workshops throughout the project. QualiShell ran an **intensive consultation process** with the National Qualification Platform, the National Consultation Committee and a wide range of stakeholders;
- Tools and user guides were developed to enable the evaluation of competencies** that are relevant to the qualification schemes, but which have not been acquired through formal training and qualification. The tools and user guides are intended for use by authorised competency evaluation centres. Two QualiShell project partners, the Thermal Insulation Systems Manufacturers (PPTT) and the Thermal Insulation System Quality Group (QETICS), are using these evaluation tools. PPTT is currently an authorised competency evaluation centre and QETICS aims to become one in the near future. The tools are available upon request to the Sector Skills Committee in Construction for any relevant organisation interested in the authorisation as competences evaluation centre for the addressed occupations;
- For the schemes to be sustainable, effective partnerships between the education system and the construction sector are essential. To support that aim, **at least eleven local or regional partnership agreements were signed between various training suppliers and construction sector organisations** with the aim of delivering the training courses, as shown in Table 3²⁴.

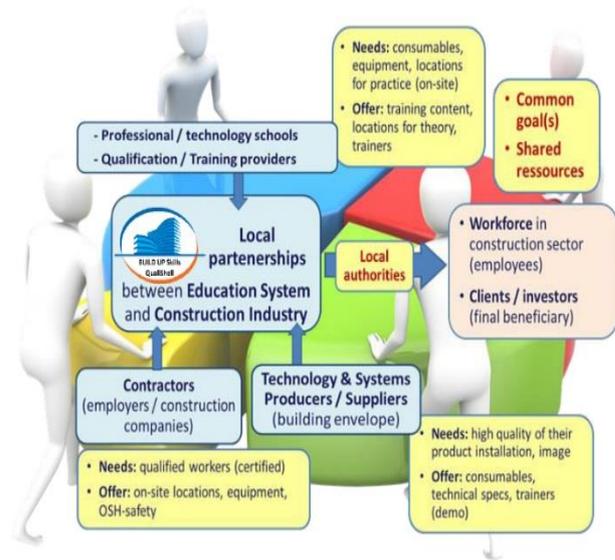
Table 3: Partnership agreements

Total number of signed partnership agreements	11
Training providers (of which, four are VET high schools / colleges)	7
Construction materials / systems producers	4
Construction companies	10

Source: QualiShell Final Report²⁵

Figure 3 conveys the local partnership approach adopted by QualiShell with the support of local authorities. Qualification certificates are not currently obligatory for any public or private construction projects; however, the consultation process has demonstrated strong support for compulsory qualification.

Figure 3: Partnerships for qualification of the construction workforce



Source: QualiCheck fact sheet #52²⁶

Important promotional work was also carried out by the project partners. As shown in Table 4, a significant number of national, regional and local consultation events were organised with relevant stakeholders of the National Qualification Platform.

Table 4: Consultation results

Number of consultation events organised	17
Participating construction companies	84
Participating training providers	15
Number of construction workers and companies targeted by promotional work	400
Individual workers willing to join training	250
Companies that want their staff to join the training	50

Source: QualiShell Final Report²⁷

3.

Perspectives and lessons learned

The Romanian qualification system is undergoing significant change to bring it into line with the requirements of the European qualification framework. With political support, Romania could adopt interesting elements of other EU systems, for example, the use of a special fund for training / qualification managed by a tripartite body, as utilised in the Spanish system. That type of measure may best support the training / qualification market in the construction sector²⁸.

The success and sustainability of Romanian construction sector qualification schemes relies on finding solutions to a number of key challenges that currently affect the sector.

The lack of access to finance is a barrier that does not encourage employers to invest in employee training. Recognition of quality standards in construction is also fairly low in Romania. In fact, there are no mandatory requirements for qualified workers²⁹.

The construction market in Romania lacks awareness of the potential business opportunities these new skills may generate. There is a need to raise awareness and change the general approach, perceptions and practices that exist in the sector. The importance of developing qualified workers and the link between qualifications and quality in construction need to be understood at all levels within construction companies. The sector's direction of travel at European level, with the move towards nearly zero energy buildings, will increasingly require more highly qualified workers with the appropriate skills to master the application of new concepts and technologies. By embracing the qualification approach, Romanian construction companies can actively invest in their own future and success³⁰.

According to the Executive Director of the Board of PPTT and the Marketing Director of the Board of

Construction Companies (PSC)³¹, the award of contracts based on the lowest price rather than the required quality has a negative impact on the implementation of the qualification schemes in the construction sector. One of the ways to address this challenge is to require stricter control of construction sites and the workforce and incentivise the implementation of training and qualification schemes and the application of quality standards.

QualiShell built on the results of the first Romanian Build Up Skills initiative (ROBUST), which established a skills training strategy and roadmap for the domestic construction workforce and a national qualification platform to bring together the key stakeholders. Indeed, QualiShell has applied the three main lessons learned from the previous initiative³². QualiShell specifically adopted an interdisciplinary approach by involving a broad range of different stakeholders/professions in the consultation process. New forms of communication and cooperation were also utilised to make the consultation process more effective (e.g. panel sessions, focus groups, etc.). QualiShell also implemented priority measures defined in the roadmap through cooperative actions.

According to the QualiShell coordinator³³ at INCD URBAN-INCERC, the two stages of Build Up Skills Romania – ROBUST (Pillar I) and QualiShell (Pillar II) – are the first initiatives of their kind in Romania to target long-term skills development in the construction sector.

The National Qualification Framework will need to be regularly reviewed and revised to ensure that it remains aligned with the skills needs of the sector.

The QualiShell coordinator also points out that the training courses for both new occupational schemes were initially developed as long-term

courses. This approach did not prove to be popular with construction companies, who felt that the courses were too long and would be too time-consuming for their staff. To better suit the needs of construction companies, QualiShell switched to a more modular approach, enabling the development of a set of shorter training modules for each occupational scheme. This enabled construction employees to access training more easily with a minimal impact on their work commitments³⁴.

The move towards NZEB implementation emphasises the importance of vocational skills training and qualification across the construction sector.

According to a representative of the QETICS, unskilled work often leads to poor quality of workmanship, which then needs to be corrected at a later stage, resulting in increased waste (e.g. materials), costs and a negative impact on a company's reputation. Conversely, vocational skills training and qualification schemes provide skilled

and qualified workers that are capable of completing work efficient and to the correct standard. This is particularly true in the case of current and emerging NZEB solutions, which pose important technical challenges³⁵.

Looking forward, the partnership agreements that have been established between education and training partners and construction organisations at local/regional level do seem to provide a solid platform for medium to long-term skills development and qualification in the domestic sector. One of the partners at BDG (QualiShell partner) has described local government as being very open to the setup of these types of sustainable partnerships. He highlights the mutual benefits to all parties involved in these agreements. Education and training partners gain valuable knowledge of the market demand for skills and can provide courses to meet that demand. Construction sector companies are then able to benefit from the increased availability of those skills³⁶.

4.

Conclusion and recommendations

QualiShell succeeded in developing two national skills training and qualification schemes with the aim of increasing the domestic supply of skilled and qualified workers to meet the demand for building and window insulation. Together with a set of new occupational standards, training curricula, content, guidelines and tools, these schemes will help the sector to implement high performance building envelopes by 2020³⁷.

Mechanisms were established to support the sustainable and large-scale implementation of the new schemes, utilising existing cooperative networks, competency assessments and partnership agreements between training providers and the construction sector³⁸.

QualiShell succeeded in involving a wide range of stakeholders and professions in a sustained consultation process, which has helped to inform and guide the development and piloting of the new training and qualification schemes³⁹.

QualiShell managed to build on the results of the ROBUST initiative (Build Up Skills Pillar I) and now, in turn, new NZEB initiatives (i.e. H2020 'Train to NZEB' Building Knowledge Hubs) are building on the results of QualiShell⁴⁰.

QualiShell proposals helped to ensure that the construction sector gained recognition as a priority sector in the Romanian Human Capital Operational Programme 2014-2020⁴¹, which was officially launched in April 2015.

The outputs from QualiShell have therefore helped to link the sector's skills gap with Romania's development goals for 2020. It also raises the profile and strategic importance of the training and qualification schemes, which should help to ensure their promotion, adoption, sustainability and further development⁴².

The Human Capital Operational Programme 2014-2020 has incorporated the Build Up Skills objectives on education and professional training on energy efficiency and the use of renewable resources in construction. In addition, priority axes 1, 2 and 3 foresee professional training actions in areas such as energy efficiency, renewable resources, recycling and the use of low carbon technologies.

QualiShell succeeded in setting up at least 11 local partnerships between education providers and construction sector organisations, the purpose of which is to ensure the large-scale implementation of the training and qualification schemes.

QualiShell also helped to ensure that the National Qualification Platform can be used and updated as an open structure for active stakeholder consultation beyond the end of the project and as part of other initiatives. Agreement was also reached for the National Consultation Committee to continue and to be formally established⁴³.

Based on the lessons learned and the achieved results, four recommendations are proposed:

- The legal framework and procedures for the public procurement of construction works (new constructions and renovation work) should be updated, utilising a carrot and stick approach to encourage and require the sector to improve quality and invest in skills training. Quality standards and workforce qualifications should be made a requirement and should be enforced – the stick approach. Support instruments (financial and training support) should serve to encourage businesses to invest in skills training – the carrot approach⁴⁴;
- The training and qualification schemes developed and piloted should be regularly reviewed and revised to maintain their alignment with market needs;

- Future schemes should seek to adopt a modular approach to course delivery in order to maximise its appeal to construction companies and employees. This enables trainees to benefit from skills development without adversely impacting their professional commitments;
- Where possible, there should be a review mechanism to assess the effectiveness of the partnership agreements set up during QualiShell. It would be interesting to understand and learn from different partnerships to see what has worked and what has not worked, and what impact they have had, with a view to improving, extending and replicating those that are successful.

Overall, QualiShell is rated as a '4 star' 'good practice' measure, using a scale of 1 (low) to 5 (high). This scoring is based on several reasons. On the one hand, the programme successfully developed and piloted two new training and qualification schemes to address the skills gap in important occupations for the domestic construction sector. The pilots also significantly

surpassed expectations in terms of the energy savings and the greenhouse gas emission reductions they achieved. The initiative also succeeded in developing a range of support tools (guides, assessment tools, etc). On the other hand, however, the pilots fell slightly short of some of their objectives, in terms of the number of people trained and the number of hours of training delivered.

The initiative also receives a 4-star ranking for transferability. The QualiShell approach is transferable to other countries and other construction sector trades/technologies, providing there is a suitable legal framework in place for training and qualification. The main requirement for the application of the QualiShell approach is the existence of a coherent qualification framework for the relevant trades in the construction sector, which should contain a detailed definition of competencies for each occupation and should provide recognised certification documents for qualified persons⁴⁵.

Endnotes

- 1 Consortium includes: Group for Quality in External Thermal Insulation Composite Systems – ETICS; The Ownership Association of Producers for Thermo-Insulating Carpentry – PPTT; The Ownership Association of Romanian Contractors – PSC; Business Development Group – BDG; National Authority for Qualifications – ANC; National Centre for the Development of Technical and Vocational Education and Training – CNDIPT; Sector Skills Committee in Constructions -CSCon; and the Ministry of Regional Development and Public Administration- MDRAP.
- 2 Plan for increasing the number of nearly zero energy buildings (nZEB) Romania. Background elements, Version I, Ministry of Regional Development and Public Administration, 2013:
https://ec.europa.eu/energy/sites/ener/files/documents/romania_en_version.pdf
- 3 Attia, S., Eleftheriou, P.C., Xeni, F., Ménéz, C., Overview and future challenges of nearly Zero Energy Buildings (nZEB) design in Southern Europe, 2017:
<https://repositorium.sdum.uminho.pt/bitstream/1822/50619/1/Overview%20and%20future%20challenges%20of%20nearly%20zero%20energy%20buildings.pdf>
- 4 Petran, H.A., Niculita, M.C., Petcu, C., Competences development – towards and effective implementation of nZEB in Romania, 2018:
https://www.researchgate.net/publication/319457744_Competerences_Development_-_Towards_an_Effective_Implementation_of_nZEB_in_Romania
- 5 Petran, H.A., Niculita, M.C., Petcu, C., Competences development – towards and effective implementation of nZEB in Romania, 2018:
https://www.researchgate.net/publication/319457744_Competerences_Development_-_Towards_an_Effective_Implementation_of_nZEB_in_Romania
- 6 Digital construction skills: enabling the energy transition in Europe’s building stock:
<https://www.buildup.eu/en/skills>
- 7 BUILD UP Skills – Romania. Roadmap for national qualification of building workforce, 2013:
https://www.buildup.eu/sites/default/files/bus_projects/build-up-skills_roadmap_final_en_0.pdf
- 8 S-a lansat proiectul Build Up Skills QualiShell:
<http://www.comunicate.mediafax.biz/Pages/Public/Comunicate.aspx?comunicatId=6937>
- 9 Ibid
- 10 QualiCheck fact sheet #52, QualiShell, 2017:
<http://qualicheck-platform.eu/wp-content/uploads/2017/02/QUALICHECK-Factsheet-52.pdf>
- 11 National Qualification Scheme for construction workers to ensure high performance building envelopes (BUILD UP Skills QualiShell):
<https://ec.europa.eu/energy/intelligent/projects/en/projects/build-skills-qualishell#results>
- 12 BUILD UP Skills QualiShell National Qualification Scheme for construction workers to ensure high performance building envelopes, Final Report, 2015:
http://www.iee-robust.ro/qualishell/en/downloads/BUILD-UP-Skills_QualiShell_Publishable-Report.pdf
- 13 Ibid
- 14 Interview with Horia Petran, Build Up Skills QualiShell Project Coordinator, on 20th September 2019
- 15 QualiCheck, Fact Sheet #52, QualiShell: Romanian qualification schemes for installers or opaque building elements and/or window systems, 2017:
<http://qualicheck-platform.eu/wp-content/uploads/2017/02/QUALICHECK-Factsheet-52.pdf>
- 16 National Qualification Scheme for Construction workers to ensure high performance building envelopes:
http://www.iee-robust.ro/qualishell/en/downloads/D2-2_QualiShell_Report_resources_EN.pdf
- 17 Build Up Skills QualiShell, Report regarding internal and external resources for training and qualifications in the construction sector, 2014:
http://www.iee-robust.ro/qualishell/en/downloads/D2-2_QualiShell_Report_resources_EN.pdf
- 18 Interview with Horia Petran, Build Up Skills QualiShell Project Coordinator, on 20th September 2019.
- 19 Build Up Skills QualiShell, Report regarding the occupational analysis of the two qualifications, 2014:
http://www.iee-robust.ro/qualishell/en/downloads/D2-1_QualiShell_Raport_AO-SO-calificari_EN.pdf
- 20 BUILD UP Skills QualiShell National Qualification Scheme for construction workers to ensure high performance building envelopes, Final Report, 2015:
http://www.iee-robust.ro/qualishell/en/downloads/BUILD-UP-Skills_QualiShell_Publishable-Report.pdf
- 21 Build Up Skills QualiShell, National Qualification Scheme Implementing Guidelines, 2014:
http://www.iee-robust.ro/qualishell/en/downloads/D2-3_QualiShell_National_QS_Implementing_Guidelines_EN.pdf

- 22 BUILD UP Skills QualiShell National Qualification Scheme for construction workers to ensure high performance building envelopes, Final Report, 2015:
http://www.iee-robust.ro/qualishell/en/downloads/BUILD-UP-Skills_QualiShell_Publishable-Report.pdf
- 23 Build Up Skills Romania Factsheet:
https://www.buildup.eu/sites/default/files/bus_factsheets/factsheet_romania_0.pdf
- 24 Build Up Skills QualiShell, Report regarding internal and external resources for training and qualifications in the construction sector, 2014:
http://www.iee-robust.ro/qualishell/en/downloads/D2-2_QualiShell_Report_resources_EN.pdf
- 25 Ibid
- 26 QualiCheck fact sheet #52, QualiShell, 2017:
<http://qualicheck-platform.eu/wp-content/uploads/2017/02/QUALICheck-Factsheet-52.pdf>
- 27 Ibid
- 28 BUILD UP Skills QualiShell National Qualification Scheme for construction workers to ensure high performance building envelopes, Final Report, 2015:
http://www.iee-robust.ro/qualishell/en/downloads/BUILD-UP-Skills_QualiShell_Publishable-Report.pdf
- 29 Ibid
- 30 Ibid
- 31 Constructorii se pregatesc pentru valul de investitii in reabilitare termica :
<https://www.arenaconstruct.ro/constructorii-se-pregatesc-pentru-valul-de-investitii-in-reabilitare-termica/>
- 32 European Commission, Intelligent Energy Europe, Build Up Skills Romania:
<https://ec.europa.eu/energy/intelligent/projects/en/projects/build-skills-ro>
- 33 Interview with Horia Petran, Build Up Skills QualiShell Project Coordinator, on 20th September 2019
- 34 Ibid
- 35 Constructorii se pregatesc pentru valul de investitii in reabilitare termica :
<https://www.arenaconstruct.ro/constructorii-se-pregatesc-pentru-valul-de-investitii-in-reabilitare-termica/>
- 36 Transylvania Today Premium Edition 2015-2016, Build Up Skills QualiShell, page 33:
https://issuu.com/transylvaniatoday/docs/transylvania_today_premium
- 37 BUILD UP Skills QualiShell National Qualification Scheme for construction workers to ensure high performance building envelopes, Final Report, 2015:
http://www.iee-robust.ro/qualishell/en/downloads/BUILD-UP-Skills_QualiShell_Publishable-Report.pdf
- 38 Ibid
- 39 Ibid
- 40 Ibid
- 41 Romanian Human Capital Operational Programme 2014-2020:
https://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/romania/2014ro05m9op001
- 42 Conferinta finala a proiectului BUILD UP Skills QualiShell: Platforma Nationala pentru Calificare in Constructii:
<http://instalnews.ro/zona-constructiilor/conferinta-finala-proiectului-build-skills-qualishell-platforma-nationala>
- 43 BUILD UP Skills QualiShell National Qualification Scheme for construction workers to ensure high performance building envelopes, Final Report, 2015:
http://www.iee-robust.ro/qualishell/en/downloads/BUILD-UP-Skills_QualiShell_Publishable-Report.pdf
- 44 Ibid
- 45 QualiCheck, Fact Sheet #52, QualiShell: Romanian qualification schemes for installers or opaque building elements and/or window systems, 2017:
<http://qualicheck-platform.eu/wp-content/uploads/2017/02/QUALICheck-Factsheet-52.pdf>