European Commission

European Construction Sector Observatory

Policy fact sheet

Bulgaria

BUILD UP Skills EnerPro

Thematic Objective 2

June 2019

In a nutshell

Implementing body	Centre for Energy Efficiency 'Eneffect'
Key features & objectives	The BUILD UP Skills EnerPro project aims to update existing training programmes on energy efficiency and renewable energy in buildings
Implementation date	September 2014 – February 2017
Targeted beneficiaries	Construction companies and workers, VET institutions, trainers
Targeted sub-sectors	All construction sub-sectors (e.g. residential, commercial, industrial, etc.)
Budget (EUR)	446,731
Good practice	★★★★☆
Transferability	★★★★★

Buildings represent 40% of the EU's energy consumption, 36% of its CO_2 emissions and 55% of its electricity consumption. In order to meet the EU wide objectives for 2020, the improvement of the energy performance of buildings and the use of renewable energy remain crucial measures that need to be addressed. In this regard, the European Commission has stipulated that all new buildings must be nearly zero-energy buildings (NZEBs) before 2021 (public buildings before 2019)[1].

Improving the human-capital basis of the construction sector by developing a more qualified workforce is of utmost importance to achieve these targets. However, there is a lack of skilled workforce in the construction sector all across Europe.

Over 3 million construction workers will need to improve their skills in energy efficiency (EE) and renewable energy systems (RES) by 2020[2].

In Bulgaria, around 1,400 buildings are being renovated and retrofitted since 2017 according to the Bulgarian Construction Chamber (BCC) as nearly 70% of the building stock was built before 1979[3]. The successful improvement of building performance and the adoption of renewable energy are especially challenging due to the skills shortage in the Bulgarian construction sector – a sector which accounts for 14.4% of Bulgarian GDP. Indeed, the number of job vacancies in the construction sector increased from 135 positions in 2010 to 404 positions in 2015. In fact, Bulgaria presents one of the highest number of bottlenecks among science and engineering professionals according to the Country Fact Sheet on Bulgaria produced by the European Construction Sector Observatory[4].

Bulgaria is among the lowest in the EU in terms of investment in education, despite having a 53.7% rate of enrolment in the Vocational Education and Training (VET) system, which is 4.8% above the EU average.

Recognising the importance of supporting skills development in the construction sector in the VET system to deliver high quality energy performance renovations, in particular NZEBs, a number of EU-sponsored programmes are designed to enhance skills in the construction sector. One example is the 'BUILD UP Skills EnerPro' (EnerPro) project, which aimed to increase the skill levels related to Energy Efficiency (EE) and Renewable Energy Sources (RES) in buildings.

The successful implementation of EnerPro project has resulted in the creation of more than 40 educational / training programmes that have trained over 400 workers in the construction sector in Bulgaria, improving the Bulgarian VET system and its correlation with requirements of the labour market.

1. General description

The EnerPro project is funded under the Intelligent Energy Europe Programme (IEE), which supports initiatives in areas such as energy efficiency, renewables and better transport and mobility that put the concept of 'intelligent energy' into practice.

The financed projects cover a range of activities, from training schemes or promotional campaigns to the transfer of good practices between EU countries.

The EnerPro project was implemented as part of the BUILD UP Skills initiative (Pillar II), which aims to increase the number of qualified workers across Europe to deliver high-energy performance building renovations, as well as NZEBs. Pillar II of the BUILD UP Skills initiative (second phase) aimed to design and pilot new qualification and training schemes and/or upgrade existing ones based on the national roadmaps developed under Pillar I (first phase).

The main goals of EnerPro were to improve the attractiveness of the VET, especially on EE and RES in buildings, to create new curricula that foster NZEBs and respond to the increasing demand for specialists, and to turn NZEBs-related trainings into a standard practice with a specific focus on young professionals.

More specifically, the EnerPro project had four main objectives:

1. Define, analyse and describe a core of technological competences related to the most common solutions for EE and RES in buildings through a newly established Centre of Excellence;
2. Revise and update the State Educational Requirements (SER);
3. Update and develop new training programmes;
4. Establish capacity for professional training of trainers.

With an overall budget of EUR 446,731 (75% EU funded), the different training programmes developed under the EnerPro project targeted construction workers and specialists that were either active, unemployed or entering the labour market.

More specifically, the development of core technological competences through training programmes targeted the following professions:

- Electrical engineering (Electrical installations);
- Electrician (Electrical installations, Electricity);
- Technician of Energy Facilities and Installations (Heat Technology, RES);
- Installer of energy facilities and installations (RES, Heat engineering);
- Construction technician (Construction and architecture, Water construction);
- Builder (Indoor cladding and pavements, Exterior cladding and flooring, Roofing);
- Building and Installation (Joinery and Window Glass, Insulation).

The project was implemented by a consortium led by the Centre for Energy Efficiency 'Eneffect', which is a non-governmental organisation whose aim is to support Bulgarian public administration at all levels in their effort to promote sustainable development and energy efficiency. The consortium was completed by the Bulgarian Construction Chamber (BCC), the National Agency for Vocational Education and Training (NAVET), the German Passivhaus Institut, and five vocational training institutions (the Professional Vocational School of Construction and Civil Engineering – Pazardzhik; the Vocational School of Civil Engineering, Architecture and Geodesy – Ruse; the Bulgarian-German Vocational Training Centre State Enterprise; the Professional High School of Transport and Energy 'Henry Ford'; and the

Vocational High School of Electronics 'John Atanasoff').

The BUILD UP Skills initiative contributes to the objectives of two flagship initiatives of the European Commission's Europe 2020 strategy ('Resource efficient Europe' and 'An Agenda for new skills and jobs'). More specifically, EnerPro addresses the objectives of the Construction 2020 strategy, mainly the improvement of the human-capital basis of the construction sector and, indirectly, the improvement of resource efficiency, environmental performance and business opportunities.

2. Achieved or expected results

When the EnerPro project started in 2014, the expected results were the following[5]:

- Creation of a National Centre of Excellence for EE and RES in buildings to monitor the implementation of the project;
- Revision and proposal for changes of the SER to improve the institutional framework of the VET system;
- Development and licensing of at least 10 new training programmes for the acquisition of qualification on selected professions, including capacities for cross-craft training;
- Establishment of capacity for professional training and certification of trainers through the Centre of Excellence to reduce the gap in continuing professional training of trainers;
- At least 10 trainers of trainers trained and certified;
- Actual training of at least 50 trainers and 250 workers;
- Comprehensive communication and dissemination campaign targeted to increase the market demand for quality buildings and building services.

In terms of its long-term impacts[6], EnerPro was expected to significantly improve the existing skills of the workforce to meet market demands, and enhance the VET system thanks to a new more sustainable perspective.

Regarding the implementation of the project, a Centre of Excellence on energy efficiency and renewable energy in buildings was created (Objective 1) to supervise the activities and guarantee the sustainability and high quality of the training programmes. This centre is open to participation – voluntary and free of charge – to all interested parties and gathers around 30 stakeholders' organisations. Its main tasks involve[7]:

- Gathering and analysing the required technical competences to be included in the training programmes for implementing intelligent energy solutions in buildings;
- Improving the specific professional skills of the trainees;
- Building partnerships between different stakeholders (e.g. training institutions, SMEs, employers' organisations, trade unions, public authorities, etc.);
- Raising awareness among citizens about the benefits of implementing intelligent energy solutions in buildings;
- Participating in international projects and initiatives as well as in the exchange of experiences with foreign partners.

Based on the newly developed programmes and the experience from the conducted training courses, the NAVET officially approved a plan to update the SER (Objective 2) for acquiring qualification for 13 professions in the fields of Construction and Electrical and Energy. Also, a new programme called 'Energy efficiency in construction' is going to be developed by the project partners in the Bulgarian professional high schools of architecture and civil engineering.

400

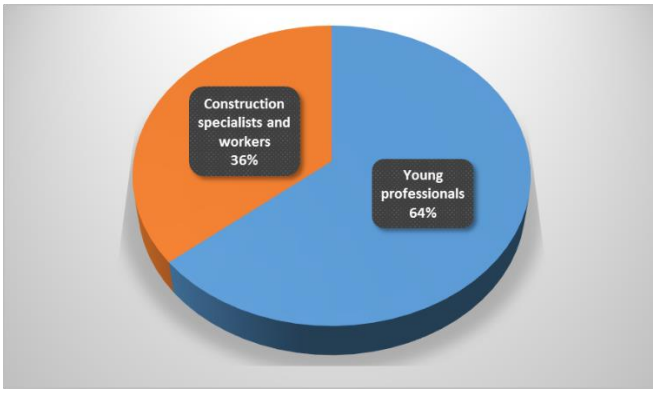
Workers were trained under the 12 new training programmes for Objective 3

Regarding Objective 3, 12 new training programmes were developed for Objective 3 (Photovoltaic installations; Solar thermal; Biomass boilers and installations; Mini-wind equipment and installations; Heat pump systems; Air conditioning, ventilation and heating; Hybrid thermal systems; Building envelope; Building systems; Construction market, products and technologies; and Certified passive house tradesperson) to train over 400 workers.

Other important outputs of the project are six new programmes for vocational schools and vocational training centres, 29 courses conducted by project partners, six active educational centres, and 17 cooperation agreements with external partners. In addition, an active cooperation with other projects under the IEE and the Horizon 2020 Programme (e.g. Train-to-NZEB, BUILD UPON, Fit-to-NZEB) has been maintained[8].

Figure 1 provides an overview of the type of workers that were trained during the implementation of the EnerPro project. Whereas the training of young professionals (with recently acquired 2nd or 3rd professional qualification level or in the last year of their education) created better NZEB capacities and training opportunities, trained construction workers and specialists were able to instantly apply their newly acquired knowledge, skills and competences on EE and RES, including NZEBs in their work place.

Figure 1: Trainees certified for acquiring qualification for profession or part of profession



Source: WP6: Conduction and monitoring of actual trainings report[11]

The EnerPro project has also developed two training programmes and an online training module for trainers (Objective 4) and 10 new curricula short forms of training (40-60 hours).

Table 1 provides an overview of the performance indicators that were used to measure the implementation of the project:

Table 1: Project performance indicators

Common Performance Indicator	Ex ante target	Final result
N° of training courses	24	25 (+4 pilots)
Workers trained	300	433 (without pilots)
Duration of courses (hours)	1,200	1,340 (without pilots)
Estimated specific cost to qualify each trainee	1,177 euro/trainee	1,035[9] euro/trainee
Renewable energy production triggered	3,710 toe/year on average	Planned/2016: 671 toe/year Achieved/2016: 507 toe/year
Primary energy savings compared to projections	13,027 toe/year on average	Planned/2016: 2,270 toe/year Achieved in 2016: 1,722 toe/year
Reduction of greenhouse gas emissions	61,300 tCO_2/year on average	Planned and achieved/2016: 29,940 tCO_2/year

Source: BUILD UP Skills Bulgaria Factsheet[10]

3. Perspectives and lessons learned

Both trainees and construction companies are extremely pleased with the results of the EnerPro project in terms of quality of the courses and the acquired knowledge and skills of the workers[12].

In fact, the workers that participated in the project's training programmes are of the opinion that the training programmes are excellent and have provided important added value to their current occupation[13].

From the training providers' perspective, the different training programmes are aligned with the most current construction trends and their corresponding challenges and solutions, providing the most updated state-of-the art knowledge on energy efficiency and renewable energy in buildings. The Director of VET at ARCI (the Alliance for regional and civil initiatives) is of the opinion that the new skills and competences provide fresh impetus and meet the growing innovation needs of green industries[14].

Similarly, the employers that participated in the project – those that received training themselves or that sent employees to the training sessions – share the opinion that the training programmes were extremely beneficial and useful, not least because they are an important tool to enable them to stay apace with a rapidly changing marketplace. They also agree that they would include their employees in similar training programmes in the future[15].

From a government perspective, the President of the National Agency for Vocational Education and Training says that the EnerPro project will improve existing skills of the construction workforce in response to new market demands, ensuring sustainable employment for Bulgarian citizens at the same time.

The CEO of the Bulgarian Construction Chamber emphasises the positive effect of the EnerPro project on the public image and perception of the construction industry, as well as on the modernisation of the Bulgarian VET system[16].

The positive views of different groups of stakeholders involved in the EnerPro training programmes are related to the success factors identified when the project was completed[17]:

- Involvement of actual and active VET providers and real practitioners as lecturers;
- Onsite training for trainers at the premises of the VET provider designed and performed by experienced partners;
- Active internal and external communication;
- Involvement of external partners and cooperation with other ongoing projects with similar objectives.
- Despite the positive feedback and the project's success factors, a series of lessons learned were also identified[18]:
- Although the pedagogic skills of the trainers are sufficient, their access to innovative technologies, products and materials was limited;
- Cooperation with industry should be fostered to facilitate access to know-how and facilities for practical trainings;
- The use of an online training platform, developed by the Passivhaus Institut, ensures the quality of the theoretical training, saving time and resources at the same time;
- Although there were many vocational training institutions in the consortium, the importance of practical training should not be underestimated;
- Specific demonstrations (e.g. pressurisation tests, thermal imaging, etc.) are very attractive and useful in the courses;
- Best practices and lessons learned in the national context are more valuable and effective than directly imported foreign examples.

The lack of facilities, experience, materials and demand for practical training on NZEB, as well as the lack of specialised construction companies, the slow market acceptance of international energy efficiency and sustainable building standards and the insufficient political will for implementing NZEB standards were the main barriers identified in the implementation of the EnerPro project[19].

Additionally, the imbalance between market needs and specialised labour force persists at regional level according to the Bulgarian Construction Chamber[20].

Last but not least, the key improvements needed to make the measure more successful are listed below[21].

- Promotion of the ongoing training offer from active VET providers;
- Communication campaign on NZEB-related issues, as well as support from private and public stakeholders in the dissemination and promotion of the training programmes;
- Integration of the requirements for specific qualification and/or competences in procurement procedures for energy efficiency projects, especially in the public sector.

4. Conclusions and recommendations

EnerPro has sought to address the skills gap in the Bulgarian construction sector workforce by providing new and updated training schemes that had a positive effect on the renovation of existing buildings and the construction of NZEBs buildings.

The EnerPro training package was well structured and accurately matched the knowledge and competences defined in the initial BUS EnerPro plans and expectations. The format of the training package was designed to enable VET providers to adapt content to the needs of different groups of trainees, and the EnerPro VET providers proved to be proficient in both customising and delivering that content to groups with different educational backgrounds, occupational profiles and skill levels[22].

The EnerPro training content was a good fit for the needs of the Bulgarian trainees and covered all required NZEB topics, from building materials and technologies to NZEB design and construction techniques.

The training approach adopted involved a blend of theoretical and practical training, with the use of graphical content and practical 'real-life' examples[23].

The majority of trainees were proactive and enthusiastic participants and they were satisfied with the training they received. The practical training workshops were particularly well received by the trainees and greater emphasis should be given to this type of training delivery method in future initiatives, as it is particularly beneficial to trainees.

Another recommendation for future initiatives, is to ensure that all training providers are able to offer sufficient or reasonably comparable practical training facilities[24], as well as improving access to those facilities and the provision of materials for training courses[25]. It is also important to ensure that an initiative of this type provides geographical coverage of all regions in as balanced a manner as possible[26].

In terms of marketing and awareness raising, EnerPro's activities were successful. Diverse communication channels were utilised efficiently to reach and attract participants to the programme. The EnerPro partners were also successful in establishing a network of potential end-users from across the construction value chain and engaging them in the project and programme, with a view to ensuring the sustainability of the EnerPro programme in the longer-term[27]. Look forward however, it remains the case that sustainable building design and technologies, and NZEB in particular, continue to be relatively new concepts in Bulgaria.

It is recommended therefore that greater emphasis be placed on awareness raising campaigns, in order to support the continuity, impact and success of EnerPro and similar initiatives in the future.

To maximise their effectiveness, awareness raising campaigns should aim to involve an extensive number of relevant stakeholders, including for example, professional chambers, industry associations, SMEs and public authorities[28].

The success of EnerPro was ultimately dependent on the involvement and role of both proficient VET providers and external partners. One of the key constraints that the project experienced during implementation however, was the lack of political will to support the implementation of NZEB standards. It is hoped that the new reform of the Vocational Education Act will help to improve the quality and effectiveness of VET in Bulgaria[29].

Overall, EnerPro is considered to be a good practice measure.

On a scale of 1 (low) to 5 (high) stars, the programme is rated at 4 stars. This score is based on:

- the involvement of a good range of VET partners and external construction sector stakeholders which helped to guide the development of EnerPro;
- a well-designed training package that met the needs of construction sector;
- the adaptability of the training content which was developed to suit varying skill levels; and
- a blend approach to theoretical and practical training, although greater emphasis should be placed on practical training and support materials.

EnerPro serves as a good example of how to develop a vocational training system and programme to upskill both trainers (VET providers) and trainees (e.g. construction sector professionals) on EE and RES in buildings, and NZEB in particular, in order to improve building performance. EnerPro therefore provides an interesting case-study for other countries that are interested in developing their own training system and programmes.

The EnerPro concept and programme are considered to be highly transferable, with a score of 5 stars, to countries and regions that are facing similar issues to those experienced in Bulgaria.

Those issues include: an ageing building stock and construction sector workforce; the lack of skills in the construction workforce; and the lack of young people wanting to build a career in the domestic sector either because it is not appealing enough or because they prefer to move abroad for work.

EnerPro is structured in clearly defined and inter-related phases that provide a logical workflow, from analytical work to assess existing EE and RES solutions and technological competences, to updating the national educational framework and requirements, developing modular training and certification programmes for trainers and trainees, and the creation of a National Centre of Excellence for EE and RES in buildings. This type of workflow makes the initiative, or parts of it, relatively easy to transfer to other countries and regions.

EnerPro is also part of the broader European BUILD UP Skills (BUS) Initiative which has helped to support the creation of upskilling programmes in a range of EU countries. The sharing of knowledge and learned experiences across countries and between initiatives is a central element of BUS. The EnerPro experience and the lessons learned during implementation are therefore part of a broad portfolio of experiences that other countries can take advantage of when exploring upskilling solutions for their own domestic workforce.

Endnotes

1 European Commission website:
https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings
2 ECSO Analytical report - Improving the human capital basis (2017):
https://ec.europa.eu/docsroom/documents/24261
3 EmBuild, Fact sheet Bulgaria – Renovation strategy (2017):
http://bpie.eu/wp-content/uploads/2017/06/Embuild-BG.pdf
4 European Construction Sector Observatory (ECSO), Country Fact Sheet 2018 – Bulgaria:
https://ec.europa.eu/docsroom/documents/30341/attachments/1/translations/
5 Bulgarian Construction Chamber, BUILD UP Skills EnerPro:
http://ksb.bg/en/build-up-skills-enerpro
6 European Commission, BUILD UP Skills EnerPro:
https://ec.europa.eu/energy/intelligent/projects/en/projects/build-skills-enerpro
7 Centre of Excellence on energy efficiency and renewable energy in buildings:
http://www.busenerpro.com/knowledgehub.html (in Bulgarian)
8 European Commission BUILD UP Skills EnerPro:
https://ec.europa.eu/energy/intelligent/projects/en/projects/build-skills-enerpro
9 Total eligible cost of the project divided by the number of trainees. Therefore, it does not represent the cost per trainee as the costs cover a number of preparatory and accompanying activities
10 BUILD UP Skills Bulgaria Factsheet:
http://www.buildup.eu/sites/default/files/bus_projects/factsheet_bulgaria.pdf
11 BCC, WP 6: Conduction and monitoring of actual trainings report (2017):
http://www.busenerpro.com/uploads/9/8/8/4/9884716/enerpro_-_d6_1_-_conducted_trainings_-_v.1_-_feb_2016.pdf
12 BUILD UP, BUILD UP Skills EnerPro project - 12 new training programmes and other best practice results (2017):
http://www.buildup.eu/en/news/build-skills-enerpro-project-12-new-training-programmes-and-other-best-practice-results
13 BUILD UP Skills EnerPro Final Publishable Report (2017):
http://www.busenerpro.com/uploads/9/8/8/4/9884716/final_publishable_report.pdf
14 Ibid
15 Ibid
16 Ibid
17 BUILD UP Skills Bulgaria Factsheet:
http://www.buildup.eu/sites/default/files/bus_projects/factsheet_bulgaria.pdf
18 European Commission, BUILD UP Skills EnerPro:
https://ec.europa.eu/energy/intelligent/projects/en/projects/build-skills-enerpro
19 BUILD UP Skills Bulgaria Factsheet:
http://www.buildup.eu/sites/default/files/bus_projects/factsheet_bulgaria.pdf
20 Information provided by Martina Krasteva and Violeta Angelieva from the Bulgarian Construction Chamber on 18th September 2018
21 BUILD IP Skills Bulgaria Factsheet:
http://www.buildup.eu/sites/default/files/bus_projects/factsheet_bulgaria.pdf
22 Build Up Skills EnerPro, D6.2 Monitoring Report, Feb 2017:
http://www.busenerpro.com/uploads/9/8/8/4/9884716/enerpro_-_d6_2_-_monitoring_final_report_-_v.4_-_feb_2016.pdf
23 Ibid
24 Ibid
25 BUILD UP Skills Bulgaria Factsheet:,http://www.buildup.eu/sites/default/files/bus_projects/factsheet_bulgaria.pdf
26 Build Up Skills EnerPro, D6.2 Monitoring Report, Feb 2017:
http://www.busenerpro.com/uploads/9/8/8/4/9884716/enerpro_-_d6_2_-_monitoring_final_report_-_v.4_-_feb_2016.pdf
27 Build Up Skills EnerPro, D6.2 Monitoring Report, Feb 2017:
http://www.busenerpro.com/uploads/9/8/8/4/9884716/enerpro_-_d6_2_-_monitoring_final_report_-_v.4_-_feb_2016.pdf
28 BUILD UP Skills Bulgaria Factsheet:
http://www.buildup.eu/sites/default/files/bus_projects/factsheet_bulgaria.pdf
29 Information provided by Martina Krasteva and Violeta Angelieva from the Bulgarian Construction Chamber on 18th September 2018