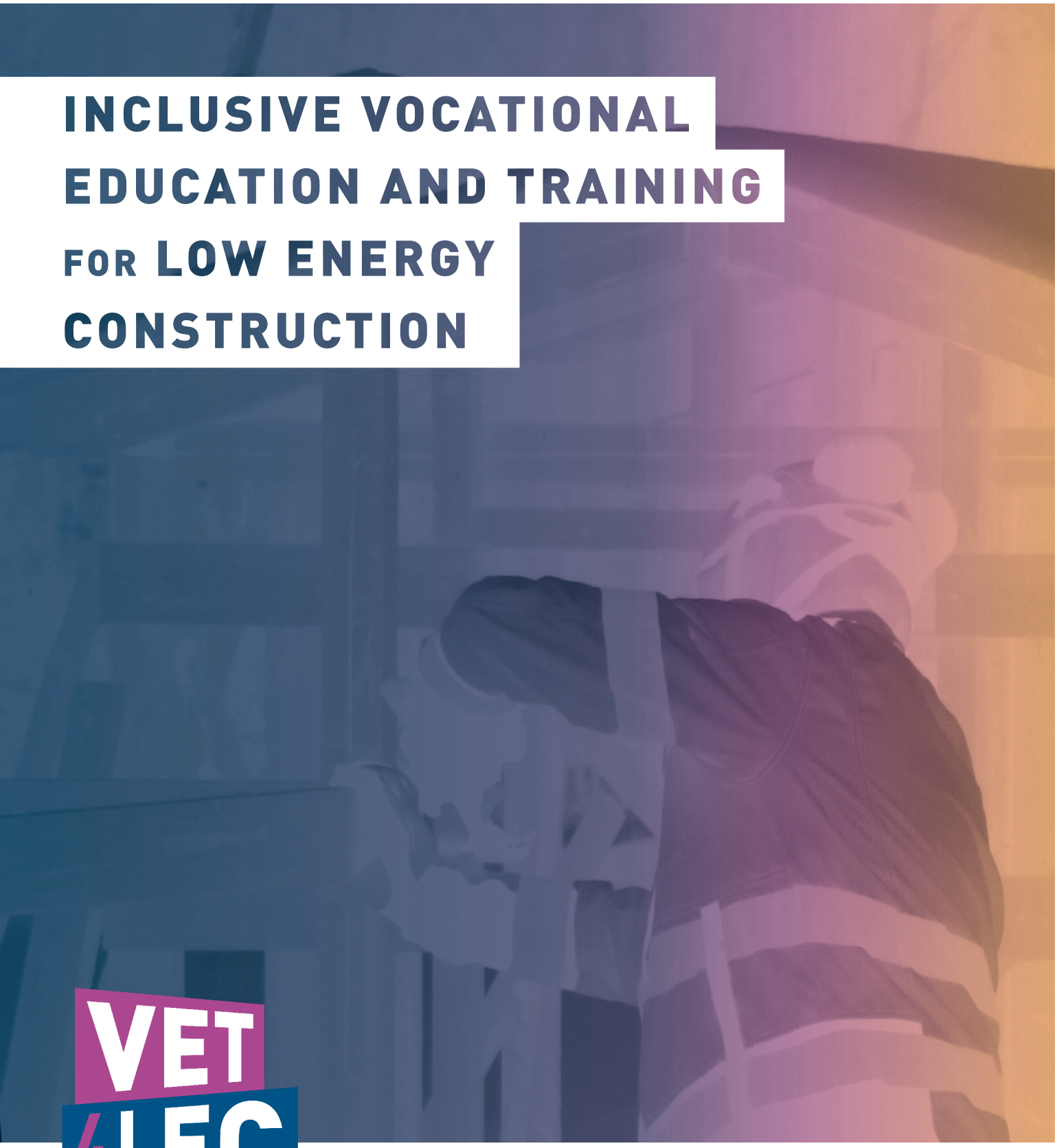

INCLUSIVE VOCATIONAL EDUCATION AND TRAINING FOR LOW ENERGY CONSTRUCTION

VET 4LEC

COUNTRY SUMMARY BULGARIA
FEBRUARY 2019

European Federation
of Building
and Woodworkers

EFBWW

FIEC

THIS SUMMARY was prepared by the research team,
based on the Bulgarian national report produced by BCC and Podkrepa.

RESEARCH TEAM

ProBE, UNIVERSITY OF WESTMINSTER
Linda Clarke
Colin Gleeson
Melahat Sahin-Dikmen
Christopher Winch (Kings College London)
Fernando Duran-Palma

A SOCIAL DIALOGUE PROJECT (REF.: VS2016/0404) UNDERTAKEN BY

FIEC European Construction Industry Federation AISBL (Domenico Campogrande)
EFBWW European Federation of Building and Woodworkers (Chiara Lorenzini/Rolf Gehring)

DESIGN: Beryl Natalie Janssen
COVER PHOTO: Carpentry trainee at Vantaa Vocational College/Finland

Project carried out with the financial support of the European Commission.

This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

BULGARIA

Construction Industry

The construction industry contributes about 5% to the GDP (2015). Its output was 3 million EUR in 2016, a drop from 4.5 million in 2015. A similar decrease was observed in engineering construction. Following the recession of 2008, output had started increasing again in 2013, but this drop suggests that the economy has still not stabilised. Overall unemployment has also dropped from over 10% in 2014 to under 7% in 2016. The size of the *black economy* is estimated to be around 7-10%. The construction sector[1] (2017) is dominated by small firms. In total, there are 4,862 firms, and 87% employ under 50 workers, 11% has up to 250 employees and a tiny percentage (72 in total) are large firms with over 250 employees. At 5%, self-employment is very low.

Construction workforce[2]

There are 216,400 (2016) construction workers in Bulgaria. The construction workforce makes up 7% of the entire labour force. There is a growing shortage of qualified workers and Bulgarian workers tend to emigrate. Generally, pay is low and, as construction is not seen as an attractive career, it is difficult to attract young people. Women make up about 7% of the construction workforce, decreasing from 10% in 2014. This contrasts sharply with the representation of women in the entire labour force (46%).

Vocational Education and Training (VET) system

Bulgaria operates a centralised, school-based IVET system, although legislation passed in 2014 allows for the setting up of Dual System routes. The Minister of Education, Youth and Science coordinates national policy on VET. Sports and Culture Ministries are in charge of VET schools in their respective fields. The Framework Programmes provide the regulatory framework, determining age and entry level, content and duration of training, and setting out the State Educational Standards (SERs) for each training programme. SERs specify the entry requirements, learning objectives and outcomes, theoretical and practical training content, and required competences for qualifications including the activities, responsibilities and personal qualities of the profession. The curriculum includes a schedule of training, distribution of subjects, classes for general education and for compulsory vocational training. Vocational Training Colleges develop curricula, evaluated by the National Agency for VET (NAVET) and approved annually by the Ministry of Education, Youth and Science.

Since 2015, the responsibilities of local and regional authorities have increased. Social partners have a role in VET at several levels, participating in the economic and social council, as well as other national councils to help shape VET policy. Employers are actively involved in designing and updating SERs, a process coordinated by NAVET. Representatives from employer organisations and trade unions are members of examination boards set up by VET providers (CEDEFOP, 2018). With the 2016 amendments to the VET Act, employer organisations are becoming more actively involved in implementing VET and can propose changes to the list of VET qualifications.

IVET is mainly school based and the main IVET providers are VET secondary schools, art schools, sports schools, VET colleges and other licensed private and public continuing vocational training centres. The majority of VET providers are state owned, funded by the municipalities and the relevant state agencies. Vocational colleges and training centres, regulated by NAVET, need a licence to operate. The law specifies six types of initial and continuing VET, differentiated

1 Company information for specific NACE activity areas is not available.

2 No data available on migrant workers, the age profile or the qualification levels of the workforce. BUS SQA estimated that about one third had no qualifications and majority operate without any formal training. The 2015 Annual Report of the Bulgarian Construction Federation notes an ageing workforce, lack of interest in construction from young people.

by age and level of entry and duration. Young people can enrol from age 13. Vocational secondary schools provide training at EQF levels 2 and 3. VET programmes for school-age learners result in both a general education certificate and a VET qualification (EQF Level 3). VET programmes by training centres and colleges do not include a general education part. By law, practical learning comprises a substantial part of vocational studies (50-70 %), conducted for the most part in workshops rather than through work placements. However, the introduction of dual VET since 2014 has the aim of increasing periods of learning based in the workplace. IVET refers only to programmes leading to a first qualification at EQF Level 2; EQF Level 3 and higher are described as continuing VET. Since 2016/17, it is also possible to enter VET at the second stage of secondary education, aged 16. With the implementation of the Bulgarian qualifications framework, this system of validation will become operational. In accordance with the European credit system for VET (ECVET), all VET qualifications at Levels 2-5 are learning outcomes based, though the credit system has not been fully developed.

CVET: The main providers of further training are vocational schools, vocational colleges and vocational training centres. CVET programmes are available to those completing their secondary education. In addition, ministries, municipalities, employer and employee organisations and individual employers provide training for their employees. CVET provision can therefore be more informal. Other training by ministries and municipalities may target the unemployed and be part of a labour market programme. Since 2015, procedures and quality assurance criteria have been in place to facilitate the validation of informal learning in VET.

Bulgarian Build Up Skills – LEC training needs

The Build Up Skills (BUS) status quo analysis estimated that only around one third of construction workers have qualifications and large numbers work without much formal training, a significant barrier to further training in low energy construction. It also highlighted that young people are not attracted to construction as a career and the number of trainees is decreasing. Despite recent improvements in the availability of training opportunities particularly by manufacturers of EE and RES related products, the number of workers trained in LEC related specialisms is low. Shortage of LEC trained workers is coupled with a severe shortage of trainers who do not have access to training themselves. The existing vocational training schools lack sufficient funding, facilities and equipment. There is a general lack of awareness and interest in LEC. The Roadmap recommended that: the VET system and curricula are completely overhauled, upgraded and better resourced to develop the training capacity needed; the training of teachers is prioritised with opportunities for requalification; a dual system of VET with a more substantial practical element is developed; and systems for monitoring and certifying training needs, worker qualifications and quality standards in low energy construction are established.

VET for LEC development

The introduction of LEC training into national IVET was triggered by the Build Up Skills investigation. As part of the BUS Pillar II project EnerPro, a review of SERs for the professions relevant to the implementation of measures for energy efficiency and use of renewable energy in buildings was conducted. On the basis of the findings, the National Agency for VET (NAVET), also a partner in BUS EnerPro, developed recommendations to change the learning content of SERs for seven training programmes to introduce EE and RES. These recommendations are expected to be approved and formalised in 2017-18, once qualifications are updated and published by the Minister of Education, Youth and Science. The updating of training content and qualification requirements is taking longer than usual as the new VET Act of 2016 requires that all qualifications are re-written in terms of units of learning outcomes. NAVET also informed all Vocational Training Centres (licensed by the Ministry) to update and improve their training plans and programmes to include the newly developed modules in EE and RES in the two relevant professional directions:

- Electrical Engineering and Energy Sector (Electrician, Power Installer, Installer of energy equipment and systems)
- Construction (Builder Technician including civil engineering, architecture, hydro engineering, Builder, Building Assembler)

VET schools, which provide training in 'Architecture/ Construction' and 'Electrical/ Engineering Studies' professional pathways, teach these courses as part of IVET. The training programmes take 4-5 years to complete, lead to EQF 3 or 4 and are offered nation-wide in 22 Bulgarian districts (out of 27). The new programmes are expected to include about nine hours of training related to energy efficiency over the course term. The coverage of LEC knowledge and competences is specific to the specialisation in question. For example, Building Assembler training specialises in door and window frames and glazing and covers insulation of different types of joinery and glazing including PVC windows and doors.

CVET programmes for LEC are dependent on market demand, and shortages have been identified in, for example, heating and air-con systems. According to

the national report, three EQF Level 3 LEC related courses are offered by three VET centres in the two largest cities, Sofia and Varna, at the time of writing: 'Insulations in construction', 'External coating and plastering' and 'Joinery and glazing'. Other further training courses have been developed as part of EnerPro, for trainers and other building professionals. Initially designed as a comprehensive course, due to lack of demand the structure of the course changed to provide short modules that can be taken individually.

As outlined above, Bulgaria's participation in Train-to-NZEB and Fit-to-NZEB, both EU projects, will contribute to building training capacity in low energy construction both in new build and renovations.

Initiatives related to VET for LEC

Bulgaria has taken part in several European projects since 2011, starting with *Build Up Skills* Pillar I (BUS), which culminated in the production of a Status Quo Analysis and the Roadmap (2011-2013), all co-ordinated by EnEffect, the Centre for Energy Efficiency based in Sofia.

- *EnerPro* (2014-16) was developed as part of BUS Pillar II and included: a 5-day 'train the future trainer of trainers' course in Dublin, conducted by MosArt/ Passive House Academy; two training programmes and an online training module for trainers, developed by the Passive House Institute, Germany; 10 new curricula; short forms of training (40-60 hours), together with all necessary supporting materials; and 29 courses delivered by the project co-ordinator, Centre for Energy Efficiency EnEffect, in different schools and locations. The project developed regional trainer capacity and trained more than 300 construction specialists[3].
- *Train-to-NZEB* (2015-2018) was funded under Horizon 2020 and created a network of training centres (Building Knowledge Hubs – BKHs) in four countries including one in Bulgaria, extending the target group of trainees to non-specialists such as journalists, decision makers, real estate agents. BKHs, in addition to providing training, will be used to demonstrate and exhibit innovative NZEB technologies and materials and promote the advantages of LEC. Partner countries include Bulgaria, Czech Republic, Germany, Ireland, Romania, Turkey and Ukraine. The advisers are Passive House Institute, Darmstadt and Passive House Academy, Dublin[4].
- *Fit-to-NZEB* (2017-2020), funded under Horizon 2020, aims to build on Train-to-NZEB and to introduce educational content on deep energy

3 https://ec.europa.eu/energy/intelligent/projects/en/projects/build-skills-enerpro

4 http://www.train-to-nzeb.com

BULGARIA – NZEB definition

OFFICIAL STATUS	To be approved
RESIDENTIAL/ NON-RESIDENTIAL	✔
SINGLE FAMILY HOUSES	✔
APARTMENT BLOCKS	✔
OFFICES	✔
EDUCATIONAL BUILDINGS	✔
HOSPITALS	✔
HOTELS/RESTAURANTS	✔
SPORT FACILITIES	✔
WHOLESALE AND RETAIL	✔
BUILDING TYPOLOGY	New/retrofit
BUILDING CLASS	Private/public
BALANCE	-
PHYSICAL BOUNDARY	Building unit
HEATING DHW	✔
VENT, COOL, A/C	✔
AUXILIARY ENERGY	✔
LIGHTING	✔
PLUGS, IT, APPLIANCES	✔
CENTRAL SERVICES	✔
ELECTRIC VEHICLES	✖
EMBODIED ENERGY	✖
ON-SITE RES	✔
OFF-SITE RES	✔
EXTERNAL GENERATION	✔
CREDITING	✖
PRIMARY ENERGY INDICATOR (kWh/m²/y)	✔

Source: based on European Commission (2016a) *Synthesis Report on the National Plans for Nearly Zero Energy Buildings*, JRC Science for Policy Report

BULGARIA – Energy performance expressed as primary energy (kWh/m²/y)

RESIDENTIAL BUILDINGS (kWh/m²/y)		NON-RESIDENTIAL BUILDINGS (kWh/m²/y)		
NEW	EXISTING	NEW	EXISTING	NOTES
~30-50	~40-60	~30-50	~40-60	Buildings need to comply with class A. The definitive definition still to be approved.

BULGARIA – Intermediate targets

ALL NEW BUILDINGS			ALL NEW BUILDINGS OCCUPIED AND OWNED BY PUBLIC AUTHORITIES		
QUALITATIVE 2015 TARGET	QUANTITATIVE 2015 TARGET	NOTES	QUALITATIVE 2015 TARGET	QUANTITATIVE 2015 TARGET	NOTES
ZEVI set a 2015 target of at least 15% of the total amount of heat and cooling energy needed must be produced from renewable sources. The National NZEB Plan will be actualized to set NZEB intermediate targets.	n/a	It is foreseen to revise the national legislation, including building codes, in order to define NZEB requirements (BG161PO001/5-01/2008/076 "Analyses, studies and actualization of legal acts" project).	As other new buildings	2015 estimated NZEB target: 1÷1.5% share of the total floor area of new buildings occupied by central and local government	As other new buildings

renovation of buildings in the curricula at all levels of the system of VET in South Eastern Europe, including in universities, professional high schools, vocational colleges and training centres. Partner countries are Bulgaria, the Czech Republic, Romania, Italy, Croatia, Ireland, Austria and Greece[5].

In addition, the construction sector trade union FCIW PODKREPA has developed a training programme for the unemployed, delivered through its Vocational Training Centres, which have been running for 2 years. In the *'Training in Park Construction and Landscaping'* course, 750 people have taken part over the last two years, of whom 60 per cent were women and 15 per cent under 35 years old. Forty per cent of successful candidates are guaranteed a job with a real employer for a minimum of 3 months. In the *'Construction Assistant – Basic and Finishing Works'* course, 264 people participated over two years, of whom 30 per cent were women and 15 per cent were under 35 years old.

National NZEB definition

According to the European Commission's Joint Research Centre for Policy Report (EC 2016a), Bulgaria's NZEB definition is yet to be approved.

In its applied definition, Bulgaria defines NZEB for both residential and non-residential buildings and includes eight specific subcategories: single family houses, apartment blocks, offices, educational buildings, hospitals, hotels and restaurants, sport facilities, and wholesale and retail (ibid: 16: Table 4). In terms of building typology, classification, balance type, and physical boundary, Bulgaria refers to new buildings and renovations, private and public buildings, (does not specify), and building unit respectively (ibid: 17-18: Figure 3). Bulgaria's definition includes six types of energy use: heating DHW; ventilation, cooling and A/C; auxiliary energy; lighting; plug loads, appliances, and IT; and central services (ibid: 18-19: Table 5). With regard to the specification of generation boundaries in the definition, Bulgaria's definition considers on-site, off-site, and external generation. Crediting has not been considered (ibid: 20-21: Table 6).

The numeric indicators of energy performance above, expressed as primary energy (kWh/m²/y) have been specified in Bulgaria's definition (EC, 2016a: 23-26, Table 7).

Intermediate targets

Bulgaria has set the intermediate targets above for all new buildings, and all new buildings occupied and owned by public authorities.

5 http://www.fit-to-nzeb.com

Case studies

The case studies refer to two retrofits: Military social housing 'MAY' in Sofia and Multifamily residential building in Silistra. The following observations complement, and should be read in conjunction with, the information contained in the National Report.

The two retrofits 'meet all the requirements for energy saving and heat preservation in accordance with the requirements of Ordinance No. 7 of 2004' (Partner Report, page 10). Little technical information is provided regarding MAY, where no information is available for pre or post fabric changes (insulation and windows) apart from the boiler replacement new dual-fuel De Dietrich boiler with a potential efficiency increase of from 50-60 to 80-90%.

Case study 2 was retrofitted following the introduction of the National Programme for Energy Efficiency of Multi-Family Residential Buildings. The retrofitted envelope has new insulation ranging from 50 to 120mm at a 'k' or 'λ' value (thermal conductivity) ranging from 0.044 to 0.036 W/mK, thus a significant reduction in fabric heat loss. Since the pre and post retrofitted overall 'U values' (thermal transmittance coefficient) for structural elements are not given, energy savings cannot be calculated. However if, for example, we assume 1986 solid concrete wall panels of 150mm (15 cm) with 50mm (5 cm) insulation, the retrofitted addition of 120mm of insulation provides a U value percentage reduction of about 46%. No information is given for window replacement, or for any new heating systems although feedback from occupants reports that: "the living comfort is much higher and the heating costs have been reduced by at least 50%".

It is not possible to determine the extent to which Ordinance 7 or the National Programme for Energy Efficiency reflects the Bulgarian NZEB standard for cost optimal retrofit, partly because the Partner Report does not provide primary energy classification as defined in 'Implementation of the EPBD in Bulgaria December 2015' (https://www.epbd-ca.eu/outcomes/2011-2015/CA3-2016-National-BULGARIA-web.pdf).

CASE STUDY 1: Military social housing 'MAY' (Sofia) – Before and after renovation

CASE STUDY 2: Multifamily residential building (Silistra) – Before and after renovation

VET for LEC visit to Bulgaria: Summary Report

The visit to Bulgaria took place on 13-14 December 2017 and involved interviews with:

- Podkrepa, the Confederation of Labour, representing 62 unions including the Construction, Industry and Water Supply Federation
- Bulgarian Construction Chamber
- EnEffect Training Centre at the University of Sofia
- The contractor and owners of a retrofitting project in Mazdra

VET for LEC

VET for LEC in Bulgaria is at an early stage of development. A CVET type training programme in LEC was developed as part of the Build Up skills (BUS) project, and delivered by EnEffect, an NGO actively engaged with the EU energy efficiency agenda and representing Bulgaria in a number of EU funded projects. The BUS training programme was open to blue collar workers but mainly targeted construction professionals and trainers/teachers. EnEffect also collaborates with the Passive House Institute and facilitates its training course for designers. Prior to the BUS investigation, energy efficiency was not included in any IVET programme and there was very limited CVET type training, usually provided by manufacturers of relevant products. There are many private providers and some offer short courses in RES installations. The BUS investigation had an impact, albeit limited, on the national VET system: the IVET curriculum for the Construction and Architecture High School Diploma has been revised to include 9-11 hours of teaching in energy efficiency topics, though the precise details of this addition have not yet been developed.

Barriers to delivering effective LEC training include: the theoretical nature of existing initial VET; lack of work placements; lack of funding to set up training facilities, particularly in RES installations; and difficulties in engaging a workforce with low levels of general education in further training. A dual system is being introduced but the process is slow. Interest in VET for LEC is low, including among construction professionals, as evident from enrolment on the BUS training project despite the course offered being very affordable; the long course developed was as a result redesigned as standalone modules to attract more trainees.

NZEB implementation

Interviews with the Bulgarian Construction Chamber (BCC) and the trade union Podkrepa similarly highlighted the generally low levels of LEC awareness among policy makers and the general public. Whilst some energy efficiency measures, such as external insulation, have become more widespread and a recently completed project funded by the EU supported more extensive retrofitting of apartment blocks, market demand for LEC remains low. Although the NZEB legislation has been transposed with some policy instruments in place to stimulate activity, implementation remains limited. The union representative interviewed emphasised the role of building materials in improving energy efficiency and the contribution of renewable energy sources to meeting emission reduction targets. He suggested that the dependence on coal-generated energy created a dilemma for the government and for the union in fully embracing the transition to renewable energy because of the job losses entailed. A green transition in energy production would have to be accompanied by training and alternative employment programmes; though a major retrofitting programme would create jobs, this would need sustained government investment.

The union is involved in the NZEB implementation process at the policy level and in an advisory capacity. Since 2013, it has sole responsibility for the Centre for Traditional Training set up in 2004 initially in collaboration with the Employers Chamber, though there are no plans at present to integrate low energy topics into its programmes. Only 20% of the workforce is unionised and the union faces challenges in recruiting from a mobile workforce, in a sector characterised by small firms and unregistered employment.

Labour market challenges

The BCC noted the lack of skilled workers, the poor standards of work in the construction sector and the large grey economy. Migration of Bulgarian workers, attracted by higher wages in other European countries, was mentioned as a major issue by the trade union Podkrepa. Labour shortages are at such high levels that Bulgaria is considering importing construction workers from other countries, such as Moldova, Ukraine and Vietnam, though this presents its own challenges as these workers would need to be issued with a white card allowing them to work anywhere in Europe. Podkrepa suggested that, without a revision to European wage policies, migratory flows from Eastern Europe would be difficult to control.

Low energy building example

The building scheme visited, a block of six apartments refurbished as part of the EU funded 2-year scheme administered by the municipal government, was one of several in the same town. The scheme began with an energy audit to establish the gains to be made post-refurbishment and to make specific recommendations and was managed by a consortium, including an architectural firm, an engineering firm, and a building contractor. The application for the subsidy was described as complicated and bureaucratic and off putting to many homeowners. The energy efficiency measures implemented included external rendering, replacement of single glaze windows with double-glazing, and repairs and insulation to the roof; the source of energy remained gas. The energy efficiency standard of the building improved from E to C and it was expected that energy bills would be reduced by around 40%. The project manager had received training in external insulation ten years earlier in Sofia and his company had completed other similar renovations. Other workers were also said to have had experience of working on similar projects and acquired skills on the job.

Retrofitting project in Mazdra

Conclusions

The development of VET for LEC in Bulgaria has received an impetus from participation in EU initiatives such as Build Up Skills and a subsequent Horizon 2020 project, prompting a revision of the existing IVET, including a review of curriculum, the gradual introduction of a dual system of VET, and the introduction of a national qualifications framework modelled after EQF. However, the VET for LEC development process remains dependent on a dedicated but small specialist organisation and on EU initiatives. This is underscored by the fact that NZEB implementation is not high on the political agenda and national funds are very limited. A construction labour market with high external migration, unregistered employment and large numbers of workers with no formal training adds to the challenges of equipping the workforce with the necessary LEC knowledge, skills and competences.