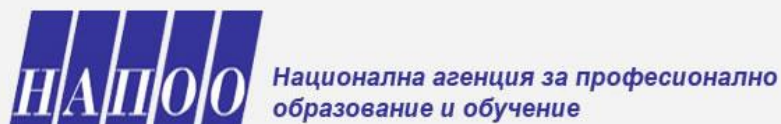




BUILD UP Skills BULGARIA

Roadmap for Trainings to Develop Skills and Knowledge on Intelligent Energy Solutions in Buildings for Bulgaria until 2020



March 2013

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Further information

More details on BUILD UP Skills can be found at www.buildupskills.eu

More details on the IEE programme can be found at <http://ec.europa.eu/intelligentenergy>

More details on BUILD UP Skills Bulgaria Project can be found at www.buildupskillsbg.com

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Introduction

Since November 2011, the project "Roadmap for Trainings to Develop Skills and Knowledge on Intelligent Energy Solutions in Buildings for Bulgaria until 2020" (BUILD UP Skills Bulgaria), prepared by a consortium consisting of EnEffect (coordinator), National Agency for Vocational Education and Training and Bulgarian Construction Chamber, entered its implementation phase. The project was approved for funding in open competition within the "National qualification platforms and roadmaps to 2020" priority of the new initiative "BUILD UP Skills" under the "Intelligent Energy Europe" programme.

BUILD UP Skills Bulgaria engages to unite the efforts of all stakeholders involved in the construction sector and the national education system in order to dramatically increase the knowledge and skills of specialists and workers involved in the construction of nearly-zero energy buildings.

The National platform for dialogue, which was initiated in the project, builds the basis of a comprehensive process of consultation and cooperation of all stakeholders in the construction sector and related vocational training establishments (professional associations, chambers of commerce, associations of producers in the industry, vocational training centers, public authorities, etc.). Within the project, a detailed study of the current situation was conducted, including:

- 1) Analysis and evaluation of the situation in the construction sector, including the latest statistical data;
- 2) an analysis and evaluation of national policies to achieve the objectives of the Energy Strategy of the Republic of Bulgaria until 2020 (including the expected contribution of the construction sector), the national development plan for renewable energy and the plans to implement the Directive on the energy performance of buildings; as well as the national plan for support of "green" jobs (National Reform Programme (2011-2015) in implementing the strategy "Europe 2020");
- 3) an analysis and evaluation of the national system for continuing education in the construction sector and the extent to which it meets the needs of additional skills for the implementation of energy efficiency measures and installations for renewable energy sources (RES) in buildings;
- 4) identification of the existing barriers and gaps, as well as of the needs for training of trainers involved in vocational training in the construction sector; measurable data for the needs of skilled workforce by 2020.

Based on this study, a National roadmap and Action plan for trainings to develop skills and knowledge on intelligent energy solutions in buildings for Bulgaria until 2020 has been prepared, and is already submitted for approval by the responsible authorities and stakeholders, with the commitment to implement and enforce the set of concrete measures and targets. The ultimate goal of the project is that the Roadmap should establish itself as a valuable tool for achieving the national targets for energy efficiency, renewable energy and climate change, as well as the ambitious EU targets laid down in Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast), Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of renewable energy and Directive 2012/27/ES of the European Parliament and of the Council of 25 October 2012 on energy efficiency.

Leading objectives of the National Roadmap:

The National roadmap and Action plan for implementation of trainings on intelligent solutions for EE and RES in buildings until 2020 for trainings to develop skills and knowledge on intelligent energy solutions in buildings for Bulgaria until 2020 has three major objectives:

- Identification of measures to overcome the barriers and gaps in training for various professions in order to meet the indicative targets for 2020 in the construction sector;
- Implementation of trainings on intelligent energy efficient solutions through changes in the basic vocational training curriculum and practice;
- Implementation of the necessary measures to ensure recognition of the fact that a higher skilled workforce leads to increased added value and use of skilled workers should be encouraged through incentives or required by legislative norms.

Characterisation of the construction sector and the building stock in Bulgaria

Characterization of the construction sector¹

The building sector is of strategic importance for the European Union and for Bulgaria in particular since it generates a significant portion of the Gross Domestic Product (GDP) and employment. The major characteristics of the sector in terms of investments comprise relatively high investment costs, substantial professional requirements with respect to the involved engineering, economic and legal experts and the required qualification and skills of the workforce employed on a given building site. The construction industry represents an economic sphere in which the interests of a number of economic entities intersect: the investor, the design engineer and the contractors – companies featuring their own personnel, subcontractors, manufacturers of building products and raw materials, supervisor companies, the state administration and the end-user/s – all of them following their own rules, regulations etc., for the purposes of achieving specific business objectives.

According to data of the National Statistical Institute (NSI) construction occupies an important place in the economy of Bulgaria and prior to the setting in of the financial and economic crisis it used to generate nearly 9% of the GDP and provide jobs for 7% of all the employed persons in the country. In this sense the sector stands out also as the biggest industrial employer on a national level. The trend of increase of the share of construction in the national economy persisted until 2009 at levels above 9%, followed by a drop to 7.5% in 2010. In 2010 the sector was represented by 22 078 enterprises (according to NSI data), which in terms of categories of personnel (according to the Small and Medium-size Enterprises Act) may be split as follows: 18 508 micro-, 2 890 small, 621 medium-size and 59 big companies. Referring again to the NSI data, in 2012 the sector has generated hardly 5.1% of the GDP and 5.9% of the Gross Value Added with 17 300 construction companies operating on the market.

Although by the end of 2012 certain sporadic optimistic trends for construction have emerged, the sector is still very far from the levels achieved before the crisis. The overall activity of the construction sector demonstrates negative growth and has recorded a drop by 7.9% as compared to the 2011 level. The forecast of the Bulgarian Construction Chamber for 2013 is that it will reach the 2007 levels – below BGN 10 billion. There is some negligible growth in residential building by 2.5% as compared to 2011, but the production output of the subsector for 2012 as compared to that of the peak year 2008 shows a drop by 54.5%. It is anticipated that within a short-term horizon the activities will be concentrated above all in renovation and rehabilitation because of the oversaturation of the market for housing of new construction. The negative growth, which has lasted for more than 4 years now, has brought about negative consequences and gravely curtailed the possibility for any shift of the trend in the direction of revival.

The initial estimate based on preliminary data about 2012 is that the construction branch manifests negative growth and operates at low intensity. The focus of hope is oriented towards public procurement procedures awarded by the state and local authorities and financed with European funding. As already noted, when comparing the first three quarters of 2011 with the same period in 2012 a slight growth in building construction is noted, but all in all there is a drop by approximately 7% for the entire sector. As regards the issued building permits for the period January-September 2012, a certain reduction is noted as compared to the same period of 2011:

¹ Данните и анализите в тази секция са преимуществено осигурени от КСБ, като са актуализирани през март 2013 г. За повече информация: Бъчварова, Таня (2013) Строителната индустрия през 2012 г. Вестник Строител, брой 12 от 2013 г.

- There is a drop by 8% in the number of issued building permits for buildings in general and with respect to the floor area - by 12.2%;
- There is a drop by 10% in the number of issued building permits for residential buildings and with respect to the floor area – by 12.4%;
- In the case of the number of issued building permits for administrative/office buildings there is a drop by 26% and with respect to the floor area – by 28%.

According to NSI data the volume of unfinished construction in 2011 amounted to BGN 19 billion. The forecast for 2012 is that it will exceed BGN 20 billion. There is evidence for grave inter-company debts, leading to financial losses and risk of bankruptcy. The dumping policy in the sector is aggravating and setting firmly in. The practice of employing small unregistered construction companies, which do not have adequately skilled workforce, still persists on the construction market. This situation is extremely negative from the point of view of the aspired upsurge of the sector.

According to the Bulgarian Construction Chamber the major problems in the building sector are as follows:

- Delayed payments on the part of the assignors;
- Aggravation of the inter-company debts, which has struck record rates;
- Unfair competition;
- Lack of sufficient private funding for investments in building construction;
- Increase of unemployment in the sector;
- Shortage of skilled workforce;
- Need of higher transparency in public procurement assignments in order to ensure access of small and medium-size enterprises as well;
- Complicated interactions with the monopolistic utilities: power distribution companies and water and sewerage operators.

Construction companies

Registered in the Central Professional Registry of Builders with the Bulgarian Construction Chamber are the companies, which account for about 92% of the construction works and 85% of the employees of the sector total. The majority of the registered companies are small and medium-size enterprises. Members of the Bulgarian Construction Chamber are the companies which pay due attention to quality, training of their personnel, healthy and safe work conditions, accountability and obligations to the state. By 28.02.2013 a total of 4 286 construction companies are registered in the Central Professional Registry of Builders, including 4 215 Bulgarian legal entities and 71 foreign ones. So far 596 companies have been removed from the registry. According to the criterion “Personnel (Number of employees)” 83.4% of the companies are classified as small, 14.7% as medium-size and 1.9% as big. According to the criterion “Net revenue from sales (NRfS)” for 2011 the small companies are 4040, forming 55% of the NRfS total or BGN 5 861 million. The medium-size companies are 72, forming 29% of the turnover or BGN 3 064 million. The big companies are 8 with NRfS 16% of the turnover, which amounts to BGN 1 729 million. The data from the building registry indicate that during the past two years 2 600 companies have ceased to operate.

An “Energy infrastructure” Section has been set up with the Bulgarian Construction Chamber. It represents the interests of the segment of construction organizations active in the field of energy, RES and energy efficiency. The total number of companies registered as active in this field is 535, while members of the section are only 230. Approximately 30% of these are capable of implementing RES installation works. According to calculations of the Bulgarian Construction Chamber the personnel of these companies is as follows: in the energy efficiency field – companies, employing approximately 8000 people; and in the RES field – companies with 2500 employees. This figure comprises all the employees of these entities, i.e. it may be concluded that the actual installation

personnel is less. As an example, the majority of the workers have not undergone a specific training on RES or application of insulations, respectively do not possess the required certificates for graduated training, evidencing that they possess the respective qualification. **The workers have, to a considerable extent, acquired their knowledge and skills in the course of their practical work on the construction site (on-the-job training). Conducting of training courses and/or possibly validation of the acquired knowledge and skills is indispensable for all those workers, who are directly involved in these specific activities.** The activities related to replacement of door and window frames and in-house space heating systems are most frequently implemented by installation companies/window-frame manufacturers or district heating companies, whereat the training of their craftsmen is also subject to certification and validation.

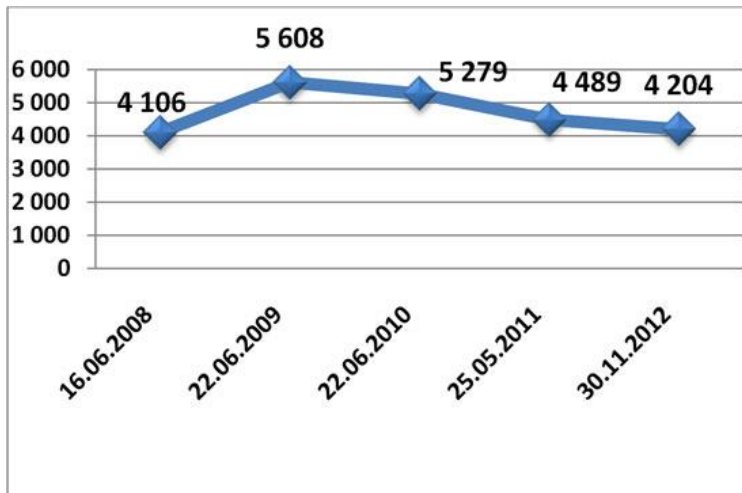


Fig. 1. Companies working in the construction sector as of December 2012 z. Source: Central Professional Registry of Builders

For 2012 the employees in the construction sector account for 5.3% of the total number of those employed in the national economy. As compared to 2011 the number of those employed under labour contracts has diminished by 16.9%. As compared to the pre-crisis period there is a drop by 41.7%. Another important aspect is the ageing of the workforce in the construction sector. Alienation and ebbing of the young generation from the profession “builder” has been noted. In this connection, the elaboration of an adequate strategy for development and promotion of that profession by the state is indispensable.

The unemployed in the construction sector account for 13% of the national total. According to NSI data the number of unregistered unemployed for 2012 is 51 000 people or there is a reduction by 3.6% as compared to 2011. This change is due mainly to seasonal factors. According to the analyses of the Bulgarian Construction Chamber the unemployed in the sector are more than 120 000 people. This trend unfortunately forms a persistent pattern of long-term unemployment.

Characterization of the building stock

According to NSI data, the total floor area of the buildings in Bulgaria in 2010 was about 262 M m², spread as follows: 212 M m² in the residential sector and 50 M m² - in the non-residential building sector. There are approximately 1.773 M detached single family houses (SFH), as around 66% of them are located in rural areas. About 96% of the 70 000 multi-family buildings (MFH, block of flats) are located in urban areas. Detached single family houses and multi-family blocks of flats represent almost 90% of the residential building stock in Bulgaria and around 97% of the net floor area in the residential sector.

The housing stock in Bulgaria is comprised of about 3.7 M dwellings, where the average dwelling size is around 60 m². In the residential sector, the most common building type is the urban multi-family building with 41%, followed by the rural single family house with 32%. On the other hand, the most common building type in the non-residential sector is the office building (37%), followed by educational establishments (22%) and retail buildings (19%).

The construction rates of new buildings for the period of growth in the sector are calculated based on the available statistics for the years 2009 and 2010. These construction rates are generally higher in the non-residential than in the residential sector. In the residential sector, the average new construction rate is of about 0.9%. In the non-residential sector, the average new construction rate is 2.8%, as restaurants and hotels boast the highest new construction rate with 10%, followed by retail buildings (6.9%) and office buildings (0.8%). Due to the significant demographic decline in Bulgaria (since 1985, the Bulgarian population has decreased by 1.5 M), the number of the new educational and health facilities built is negligible.

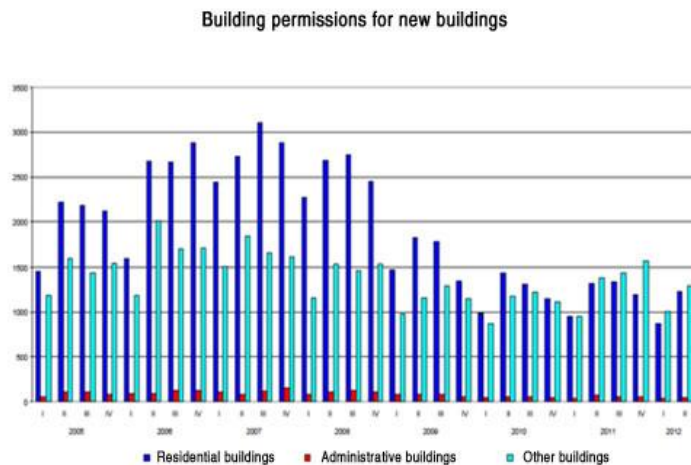


Fig. 2. Building permissions for new buildings. Source: NSI (http://www.nsi.bg/EPDOCS/RazrStr2012q4_4WOI07L.pdf)

A large part of the dwellings in Bulgaria (around 68%) were built after World War II and during the communist regime, when energy prices were very low and priority was given to minimization of the initial investments, which in turn lead to a low quality architecture and practically no insulation in buildings. Around 22% of the residential buildings were constructed using external walls from prefabricated elements with a very poor thermal insulation. In the last two decades, the ownership many public residential buildings were split among the inhabitants and the share of private residential buildings reached 97%. However the means for maintenance of these buildings were not guaranteed, and there is no state commitment or any specific subsidy or incentive for this part of the refurbishment market.

One of the problems for correct forecasting of the contribution of the building sector in Bulgaria to the 20-20-20 goals is that there are no systematic data about consumed energy and carbon emissions by households. Several estimations have shown that the average consumption in the relatively old building stock (without any energy efficiency measures applied) is about 150-200 kWh/m² and even more. Compared to low-energy building standards and even to the regular standards, requiring consumption of less than 50 kWh/m², these estimations show the vast improvement potential of the existing buildings in terms of energy saving measures. It is evident that

in 2020 the population will continue to inhabit these same buildings (including the 70 000 multifamily blocks of flats) built in the 80ies and before that and offering minimal thermal and air comfort and efficiency. It can be conferred that the energy consumption per heated area is higher in Bulgaria compared to the average EU level mostly due to the very low quality insulation, which leads to widespread energy poverty and inability of many households to pay for heating of their homes to normal comfort levels. Moreover, the majority of the owners in the multifamily apartment blocks do not possess the capital to invest in sufficient energy efficiency measures and usually are not accepted for crediting by the financing institutions due to their low income. As an illustration of this reasoning, it should be noted that between 1996 and 2004 the energy efficiency levels in the Bulgarian households improved with mere 4% compared to the baseline year of 1990.

The numbers and evidence cited above represent the main indicators for the selection of the right direction of the measures for restricting energy consumption: in order to achieve the European 20-20-20 goals and to conform to the requirements of the EU directives related to the efficient use of energy, immediate actions are needed in the existing housing stock, followed in parallel by more ambitious energy efficiency standards for the new buildings. The measures for improvement of the energy efficiency in the existing buildings should be undertaken carefully and with purpose – in a step-by step manner, with clear definition of activities with specific responsibilities assigned.

Table 1: Number of buildings in Bulgaria and new construction rates. Source: Buildings Performance Institute Europe (2012) Implementing Nearly Zero-Energy Buildings (NZEB) in Bulgaria. Towards a Definition and Roadmap. Available at:

http://www.bpie.eu/documents/BPIE/publications/Bulgaria_nZEB/BG/BG_full_report.pdf

Building type		Region	Number of buildings (1000)	Floor area (M m ²)	New construction rate (%)
Residential buildings	Detached single family houses	urban	600	48	1.1
		rural	1,173	68	1.1
	Multi-family buildings	urban	67	88	0.8
		rural	2.7	1.3	0
	Other buildings that cannot be assigned to above categories	urban	94	4.1	0.9
		rural	117	2.9	0.9
	Total		2,053	212	0.9
Non-residential buildings	Commercial and public office		No data	20.4	0.8
	Retail		No data	10.2	6.9
	Hotels & restaurants		3.2	5.5	10
	Health facilities		2.3	2.1	0
	Educational facilities		7.7	12.1	0
	Industrial facilities		No data	2.07	0
	Other facilities		3.3	3.2*	0
	Total		16.5	50	2.8

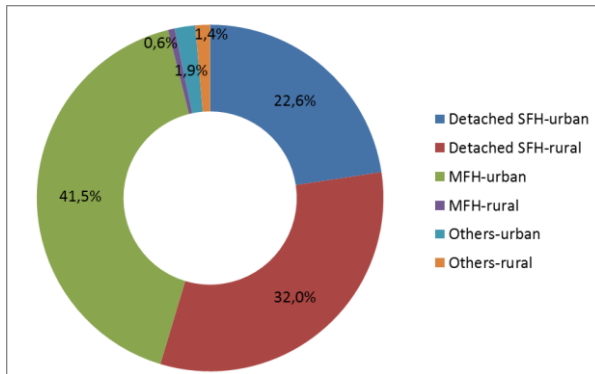


Fig.3. Distribution of residential floor area by building type

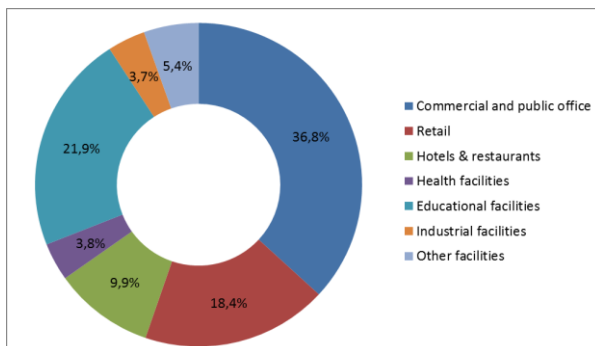


Fig. 4. Distribution of non-residential floor area by building type

Renewable energy share in buildings

There are currently no specific building obligations requiring the use of renewable energy for heating, cooling and DHW. As requested by the EPBD, the Bulgarian Energy Efficiency Act for Buildings stipulates that use of renewable energy generation should be considered for every project for new construction of buildings or reconstruction of old buildings over 1000 m². Moreover, the current Renewable Energy Sources Act in Bulgaria (last updated on 17.07.2012) foresees simplification of the procedures in implementation of small wind turbines and small PVs in private properties. A new Renewable Energy Sources Act is currently under elaboration, but it is not certain whether it will enforce additional requirements for renewable energy integration in buildings.

Renewable technologies and systems are frequently used in office buildings. The most popular technology is the air to air heat pump. The most common RES installations for new detached and semi-detached houses are solar panels for DHW and biomass boilers for heating.

According to Energy Act, Energy Distribution Companies are obliged to buy the electricity produced by RES. The price of electricity produced by RES is approved annually by the State Energy and Water Regulation Commission and is calculated so that investments in these technologies are profitable.

Strategic goals and acting building codes

Energy Strategy of the Republic of Bulgaria: impacts on the energy efficiency practices and the construction sector

The Energy Strategy of the Republic of Bulgaria until 2020 is a fundamental act of the national energy policy, which is approved by the Council of Ministers and is passed by the National Assembly of the Republic of Bulgaria.

The present national energy strategy reflects the political vision of the Government concerning the European development of Bulgaria in alignment with the current European framework of the energy policy and the global trends in the development of the energy technologies.

The energy strategy is oriented towards overcoming of the main challenges for the Bulgarian energy sector at the present moment, namely:

- 1) The high energy intensity of GDP. Despite the positive trend of improvement, the energy intensity of the national GDP is by 89% higher than the EU average (with due account taken of the purchasing capacity parity).
- 2) The high dependence on import of energy resources: Bulgaria provides 70% of its gross consumption through import. The dependence on imported natural gas, crude oil and nuclear fuel is practically overall and there is a traditionally one-sided orientation to the Russian Federation.
- 3) The need of environmentally-friendly development.

The major **priorities** of the Energy Strategy of the Republic of Bulgaria in the context of the European energy policy have been reflected in five directions:

- To guarantee the security of energy supply;
- To achieve the targets for renewable energy;
- To improve energy efficiency;
- To develop of a competitive energy market and policy aimed at meeting the energy needs;
- To protect consumers' interests.

On the basis of the above mentioned priorities is formulated also the vision of the Government for development of the energy sector during the coming years, oriented as follow:

- To maintain a secure, stable and reliable energy system;
- The energy sector remains a leading branch of the Bulgarian economy with a clear cut export orientation;
- Emphasis on clear and low-emission energy – nuclear and from RES;
- Balance in terms of quantity, quality and prices of electricity produced from RES, nuclear energy, coal and natural gas;
- Transparent, effective and highly professional management of energy companies.

The construction sector is not observed as a separate sector in the national statistics of Bulgaria. It deals, as also indicated by Directive 2006/32, with the sectors industry, transport, households, services and agriculture. The impact of the energy consumption of buildings is mainly in households and services sectors. In several countries, national action plans for energy savings in the building sector have been developed, as the methodology proposed there is based on average data for the share of the buildings in the five sectors. Due to the negligible number of buildings in the transport, industry and agriculture sectors, the national target is formed by households and services sectors. It is assumed that the final energy consumption in households amounts to 100% in total for the sector “Buildings” and in the final consumption in the “Services” sector the consumption of buildings is in the range of 70%-90%. For calculation purposes we assume a share of 80% and that all the sectors participate proportionally in the achievement of the 9% target.

Under these assumptions and bearing in mind the above mentioned objectives of the National Action Plan on Energy Efficiency, the national target for the building sector is 2938.8 GWh (252 854 ktoe). Taking in account the anticipated savings, presented in the Second National Action Plan on Energy Efficiency by sectors, the implementation for the building sector would be 2806.2 GWh (241 445

ktoe). The reason for this is the lower implementation in the household sector as compared to the figures laid down as a target for the sector. Due to the high energy intensity of the economy, it is believed that these targets will be achieved; however, strict control on the application of existing and future legislative measures is deemed to be crucial for the execution of the national goals.

More information about the policy framework and descriptions of the specific activities undertaken at national level can be found in the analysis “Current state, practices and trends in the building sector in Bulgaria” produced in the framework of the BUILD UP Skills initiative, as well as on the website of the Sustainable Energy Development Agency at www.seea.government.bg.

Energy efficiency in the actual building codes²

The first and overarching condition for implementing nZEB is the reinforcement of current building codes by a gradual increase of the energy performance requirements, accompanied by systematic enforcement and compliance control.

Currently, in the Bulgarian building codes there are requirements for U-values of specific building components. The energy performance for each new building is calculated with the referent U-value prescribed by law. The technical documentation for the design of new buildings includes a compulsory estimation of the energy performance of buildings at the design stage and a report done by an independent expert for checking the compliance of the design with the existing energy performance and prescriptive requirements. In case of non-compliance, the permission for constructing the building is not given. Moreover, it is necessary to obtain a technical certificate for the building, issued after construction but before commissioning. If the buildings’ energy performance is worse than the energy performance calculated on the basis of the U-values for building components (as indicated by the current legislation), then the building will not be commissioned.

The upcoming legislation transposing the EPBD at national level will ensure that energy performance requirements are part of the building codes. It is also required by the EPBD to relate energy performance requirements to primary energy consumption, in order to have a more accurate picture of the energy quality and related CO₂ emissions. This means that the first measure to be implemented will reduce as much as possible the energy demand/need of buildings.

In addition, EPBD requires supplying the remaining energy demand/need of the building by onsite and/or nearby generated renewable energy. This is in line with actual practices in implementing very low-energy buildings such as the Passive House standard which imposes a limit of 15kWh/m²/yr for the energy demand for heating, mainly because this is the energy need that can be covered by most small scale RES installations.

Low energy and nearly-zero energy buildings cannot be evaluated and implemented as a sum of their building components and equipment. Very low-energy buildings should be designed based on a holistic approach in order to minimise the gap between estimated and real energy performance and the overall investments and operation costs of the building. It is recommended to introduce a renewable energy share requirement in the building codes. This is in line with Article 13 of the RES Directive. Implementing nZEBs will contribute positively to the implementation of building sector and renewable energy policies and thereby help to achieve the EU’s climate and energy targets.

Due to their energy consumption, buildings are responsible for a major share of CO₂ emissions. In its policies for reducing carbon emissions the EU introduced a 20% binding target by 2020 and the ambitious goal of reducing them by 80-90% by 2050. While the carbon emissions of buildings and

² This subsection, in combination with Attachment 1 of the National Roadmap, is developed on the base of the research “Implementing Nearly Zero-Energy Buildings (NZEB) in Bulgaria.Towards a Definition and Roadmap”, conducted by EnEffect under assignment by Building Performance Institute Europe (BPIE, www.bpie.eu): Buildings Performance Institute Europe (2012) Implementing Nearly Zero-Energy Buildings (NZEB) in Bulgaria.Towards a Definition and Roadmap. Available at: http://www.bpie.eu/documents/BPIE/publications/Bulgaria_nZEB/BG/BG_full_report.pdf

their respective energy demand will be reduced and the renewable energy use increased, it is recommended to introduce an additional requirement in building codes (even if only indicative at the beginning) concerning related CO₂ emissions. According to the EPBD, energy performance certificates have to indicate both the energy demand and CO₂ emissions of a building. Therefore, introducing a threshold for CO₂ emissions of buildings will ensure not only coherence and integration of climate, energy and buildings requirements, but will also contribute to the sustainable development of the building sector.

The following table shows the current regulation for new buildings in Bulgaria and the foreseen adaptations towards nearly-zero energy building regulations.

Status quo	<ul style="list-style-type: none"> ▪ Requirements for U-values for specific building components. The energy performance for each new building is calculated with the referent U-value prescribed by law. ▪ Prescriptive requirements and calculated energy performance are compulsory for issuing the construction and commissioning certificates for a building. • No requirements for compulsory use of renewable energy in new buildings. However, in the Energy Efficiency Law it is mentioned that the renewable energy use should be considered as a possible option during the design phase of the buildings.
Gaps in the implementation of nZEB	<ul style="list-style-type: none"> • Building codes do not foresee minimum energy performance requirements for primary energy demand and by building type. The energy performance should be calculated case by case and based on prescriptive U-value for components. • There is no obligation to meet certain CO₂ emissions • There are no specific requirements for using renewable energy in buildings.
What can be improved to achieve the implementation of nZEBs?	<ul style="list-style-type: none"> • To secure the transition to nZEB in the future, the regulation should be improved. The changes should affect the structure of the regulation and its ambition level. • The structure should be adapted, including clearly defined obligations by building type regarding the primary energy use / CO₂ emissions and the use of renewable energy. • The ambition level of the obligations should be tightened over the time.
Intermediate steps	<ul style="list-style-type: none"> • Start to gradually tighten the energy related requirements for buildings: • Tighten requirements for building envelope (e.g. Energy class A become obligatory for new buildings) • Tighten max. primary energy use • Change structure of regulation: <ul style="list-style-type: none"> ➢ limit primary energy use and CO₂ emissions ➢ introduce obligation for renewable energy share

Table 2: Further steps for improving building codes in Bulgaria. Source: Buildings Performance Institute Europe (2012) *Implementing Nearly Zero-Energy Buildings (NZEB) in Bulgaria. Towards a Definition and Roadmap*. Available at: http://www.bpie.eu/documents/BPIE/publications/Bulgaria_nZEB/BG/BG_full_report.pdf

Actual state, tendencies and support measures on the nZEB market at the end of 2012³

Actual state and tendencies on the nZEB market

³ This section is developed on the base of the research “*Implementing Nearly Zero-Energy Buildings (NZEB) in Bulgaria. Towards a Definition and Roadmap*”, conducted by EnEffect under assignment by Building Performance Institute Europe (BPIE, www.bpie.eu): Buildings Performance Institute Europe (2012) *Implementing Nearly Zero-Energy Buildings (NZEB) in Bulgaria. Towards a Definition and Roadmap*. Available at: http://www.bpie.eu/documents/BPIE/publications/Bulgaria_nZEB/BG/BG_full_report.pdf

During the last seven years, the number of newly built multi-family houses is over 60% of the total number, and the total floor area is about 50% of the new-built area. The migration of the Bulgarian population from rural areas to cities (with a peak in 2008 due to a high economic growth) required more and more multi-family houses to satisfy the market. The grown population of the big towns in Bulgaria lead to the need for new commercial and working places. Therefore, over the last years, new retail and office buildings were constructed in city areas at a higher rate than other non-residential buildings. However, as the market is already flooded by free flats and offices, these sectors evidence a reduction in their growth rates, which is expected to continue in the near future. The experts' forecasts for the short- and mid-term period indicate increased build rates for detached houses, semi-detached houses and luxury residential buildings, mostly located in the suburbs of the big Bulgarian cities. The future development of the construction sector in Bulgaria will also be strongly influenced by the overall economic situation in the EU.

The main investors in the most dynamic sector – the multi-family houses - are the end-users (future private owners), about 92% of them being citizens of Bulgaria. The size of the purchased apartments depends mostly on the monthly income of the family. The highest rate of newly bought properties is for two-room apartments, predominantly with floor area of about 55 - 60 m². Over the last 3 to 4 years, the investors' prefer to buy new homes using their savings or low-scale crediting from banks, due to higher interest rates in Bulgaria compared to the average in the EU.

The additional investments for an energy optimized building are estimated as reasonable and will be sufficiently covered by the potential energy costs savings for the whole life cycle of the building, but only if every building is examined separately and specific energy efficiency measures are suggested. Subsidies and tax reduction for execution of such projects would additionally improve the financial parameters of investment. This will also stimulate the market uptake of various types of energy efficiency and RES measures.

An important condition to achieve a fully liberalised energy market and gradual uptake of energy efficiency and renewable energy systems and technologies is to gradually decrease harmful subsidies for end energy prices. At the same time, it is important to implement support policies in order to alleviate the social burden, possibly by using the funds saved from subsidies on energy prices.

Another important condition for a successful transition to low energy and nearly-zero energy buildings is to support the deployment of new technologies in order to manage the anticipated increase of demand in an efficient way. An insufficiently developed market which is not able to keep pace with the demand for new energy efficient and renewable technologies represents indeed one of the biggest barriers, which is also related to the quality training of the building workforce.

As considering the specific technological solutions, it can be stated that the most commonly used renewable energy installations for single family houses in Bulgaria are solar panels and small biomass boilers, as well as air-to-air thermal pumps. According to the conducted studies and expert estimations, implementation of nZEB in Bulgaria would require using thicker or improved insulation materials, triple-glazed windows in every building, installing mechanical ventilation with heat recovery in about 90% of the buildings, heat pumps in about 50% of the buildings, pellet boilers in about 50% of the buildings, solar thermal systems in about 15% of the buildings and PV systems in more than 75% of all new buildings. The exact shares correlate strongly with the distribution of variants that are built.

Insulation material	Ventilation systems	Triple glazed	Heat pumps	Pellet boilers	Solar thermal	PV
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	with heat recovery systems				windows		
Actual market ⁴	Existing	Very small	Small	Small	Small	Existing	Very small
Demand of new nZEBs	100%	90%	100%	~50%	~50%	~15%	>75 %
Required growth of market	High	Very high	Very high	High	High	Normal	Very high

Table 3: Comparison of current market and demand for new technologies. Source: Buildings Performance Institute Europe (2012) *Implementing Nearly Zero-Energy Buildings (NZEB) in Bulgaria. Towards a Definition and Roadmap*. Available at:

http://www.bpie.eu/documents/BPIE/publications/Bulgaria_nZEB/BG/BG_full_report.pdf

Active support schemes for energy efficiency in buildings

Currently there are several support schemes and programmes addressing energy efficiency and renewable energy heating in buildings in Bulgaria, such as the following:

- Operational program “Regional development”;
- Sub-Program “Introduction of Energy Saving Technologies and Renewable Energy Sources” ;
- SEDA Grants program;
- International fund “Kozloduy”;
- The first and the (announced) second EBRD credit lines.

However, all support schemes are targeted only to existing buildings. There is no scheme to specifically support energy efficiency and renewable energy in new buildings. There is a programme for the development of rural areas which supports the construction of new family hotels and guest houses, but this incentive is given without a specific condition for implementing energy efficiency or renewable energy measures.

The credit line of the EBRD (‘BEERECL’) runs quite successfully in supporting RES-Heating (as well as RES Electricity and energy efficiency) projects, on a large, industrial scale and for households/SMEs (energy efficiency, only RES-H&C).

In Bulgaria there are several support schemes, mainly financed by EU Structural Funds and from the International fund ‘Kozloduy’, such as in the following:

- The Priority Line “Sustainable and Integral Urban Development” of the Operational program “Regional development” offers 100% grant support to public authorities for reconstruction of buildings including energy efficiency measures in buildings of the following sectors: education, health care, social services and culture.
- The Priority Line “Sustainable and Integral Urban Development” of the Operative program “Regional development” offers 50% grant support to public authorities and to building owners associations for reconstruction including energy efficiency measures in multi-family buildings.
- The “Kozloduy” International fund offers 100% grants for energy efficiency projects in municipal and state owned buildings.

⁴Expert estimation.

- The Sub-Programme “Introduction of Energy Saving Technologies and Renewable Energy Sources” of Priority Line “Increasing efficiency of enterprises and promoting supportive business environment” of the Operative program “Competitiveness” offers between 35% and 50% grants to SMEs for implementation of energy efficiency projects, including energy efficiency in buildings.

In addition to previous support schemes addressing directly energy efficiency and renewable energy in buildings, there are other financing programmes that can potentially cover buildings activities such as in the following:

- The Bulgarian Energy Efficiency and Renewable Energy Credit Line - 15% grant for projects including: Investments in new hydro power or run-of-the-river with installed capacity less than 10 MW (investments in second hand hydro power or rehabilitation of existing sites are not eligible); Investment in new and second hand wind turbines with installed capacity of less than 5 MW; Biomass investments with installed capacity of less than 5 MW electric output (for biomass heat only boilers with a thermal input higher than 10MWth, the EBRD will confirm eligibility based on an outline of the investment prepared and submitted by us outlining the origin of fuel supply and establishing if an Environmental Impact Assessment is needed for the project); Solar thermal; Geothermal; Biogas.
- Measures 311 and 312 of the Program for Development of the Rural Regions offers grants up to 80%, but not more than 200 000 EUR for renewable energy project in rural regions.
- The Sub-Programme “Introduction of Energy Saving Technologies and Renewable Energy Sources” of Priority Line “Increasing efficiency of enterprises and promoting supportive business environment” of the Operative program “Competitiveness” offers between 35% and 50% grants to SMEs for implementation of renewable energy projects.
- The Sub-Programme “Introduction of Energy Saving Technologies and Renewable Energy Sources” of Priority Line “Increasing efficiency of enterprises and promoting supportive business environment” of the Operative program “Competitiveness” offers 50% grants to large enterprises for implementation of renewable energy projects.
- The SEDA Grants program offers from 60 to 85% grants for implementation of renewable energy projects in SMEs.

Moreover, there is potentially € 40 M available from the regional development funds (2007-2013) which can be used for enhancing the energy performance of buildings. Unfortunately, in practice these incentives are not translated into an increase in refurbishment projects, since pilots still dominate the market; moreover, the amount of the grants is not related to the energy characteristics of the renovation project, if it meets the minimum requirements.

State of art	<ul style="list-style-type: none"> • All support schemes for the implementation of energy efficiency and RES measures in buildings are exclusively targeted to existing buildings
Gaps in the implementation of nZEBs	<ul style="list-style-type: none"> • No holistic policy package in place at the moment. • There is no support scheme for the implementation of energy efficiency and renewable energy in new buildings, e.g. to stimulate the construction of only A class energy buildings or only with a certain energy performance (e.g. a better interest or a premium for buildings with primary energy consumption lower than 50kWh/ m²/yr).
What can be improved for implementing nZEBs	<ul style="list-style-type: none"> • Create financial/ fiscal instruments for energy efficiency and renewable energy in new buildings that are embedded in a holistic policy package and which should include regulatory and communication elements.

	<ul style="list-style-type: none"> • Where possible, extend and adapt existing support schemes also for new buildings. • Make energy efficiency measures affordable (remove barriers) by introducing support mechanisms such as soft loans and grants. • Facilitate the use of renewable technology (remove barriers): • Support local technology (financial support, knowledge transfer) or/and where necessary, facilitate the import of only very efficient materials and renewable technology from other (EU)countries
Intermediate steps	<p>Create an in-depth gap analysis to find out:</p> <ul style="list-style-type: none"> • which EE measures and RE technologies to support • which barriers exist on the market • which type of instruments effectively help to overcome identified barriers, • what level of support is needed • which auxiliary instruments are needed to make the financing work • how to overcome budget limitations for support programmes • what is the investors opinion (how do people understand EE and RES)

Table. 4: Further steps for improving financial support schemes in Bulgaria. Source: Buildings Performance Institute Europe (2012) *Implementing Nearly Zero-Energy Buildings (NZEB) in Bulgaria. Towards a Definition and Roadmap*. Available at: http://www.bpie.eu/documents/BPIE/publications/Bulgaria_nZEB/BG/BG_full_report.pdf

Vocational education and training in Bulgaria: qualification needs and identified barriers

Current state and tendencies

The transition towards low energy and nearly-zero energy buildings will be extremely hard and expensive without taking the necessary measures for improving of the qualification of those working in the construction sector. It is expected that the stricter standards for energy certification of buildings and the qualification of the experts engaged in this process will lead to even more problems related to the skills of blue-collar workers. It is evident that the training schemes and programmes for initial vocational training and for continuing training should be updated and adapted in order to meet the needs of both construction workers, on one hand, and experts involved in building planning, design and quality assurance, on the other. Another point of importance is the introduction of life-long learning schemes and trainings on the workplace so that all employed in the sector could keep up with the developments expected in terms of new technologies, products and processes.

The number of employed workers possessing second level of professional qualification in construction in 2010 was 63 886, including 42 840 craftsmen and 21 046 installers, whereas the total number of those employed in the building sector for the same year was 156 327.

In compliance with the expectations on the workforce dynamics, to date no clearly manifested shortage of workers in the traditional professional activities has been noted (concrete-worker, reinforcement worker, mason, carpenter, plumber, electrician, roofer, installer of window frames, thermal insulation installer, water-proofing installer, shuttering-worker, etc.). In perspective towards

2020 dropping off of a certain portion of the workers is presumed, leading to the assumption for pending need of training of 20% new workers, preferentially young people from socially vulnerable strata of the population. However, due to the stable penetration of low-energy solutions in the mainstream construction practice, it is supposed that nearly all workers would be engaged (although at different levels) in continuing vocational training activities dedicated to main energy efficiency principles, either on-site or through specialized training programs (specific targets available below).

On the other side, supply of specialists for installation and maintenance of main RE systems in buildings and the level of qualification of the workforce is quite limited. There is a clearly manifested shortage of installers in each of the studied systems (small biomass-fired boilers, photovoltaic and solar thermal systems, geothermal systems and heat pumps, mini wind turbines). New specialized training schemes should be developed and introduced in the training system, with growth rate similar or even exceeding the expected rate of introduction of the specified systems.

It is also worth noticing that the general approach to the practical trainings in the system of secondary vocational training and education is much different compared to the traditions and practices in most other EU member-states. One of the key recommendations is to foster practical trainings during this stage of education, both through enhanced cooperation with producers and suppliers of materials and technologies and through inclusion of intensive practical trainings on actual construction sites in the training programmes.

With respect to the teachers/trainers it can be stated that in a few years there will be acute shortage of well-trained trainers in civil engineering professions and practical classes. The reasons are that the teaching profession is unattractive for young graduates and that a significant number of the present teachers will retire in the next years. The number of teacher trainings until 2020 period should be at least 1000 trainers educated in practice and theory for all classic construction works, energy efficiency, and installers. Training of trainers has to be realized before that with the support of all stakeholders and with respect to already achieved results in the advanced countries in the area of energy savings and RES, using all opportunities for intensive knowledge and experience transfer.

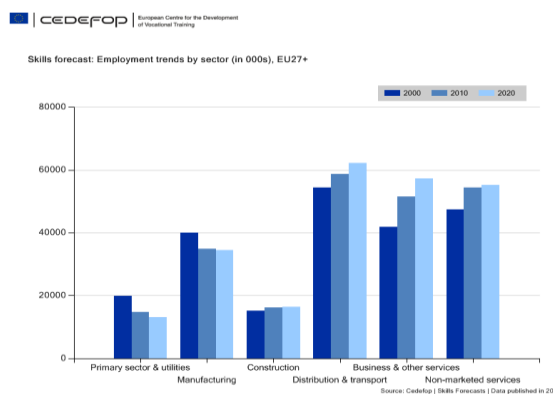
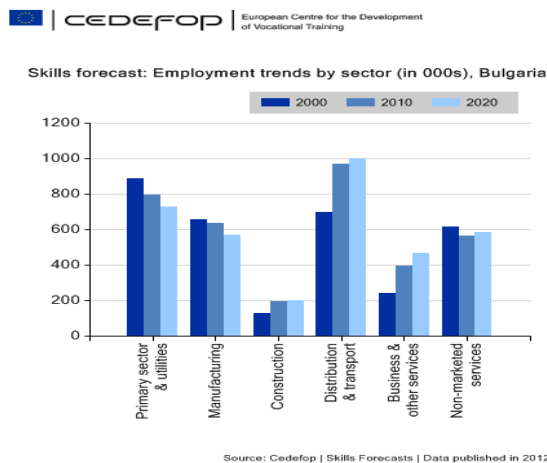


Fig. 5. Employment trends by sectors (in 000s). Bulgaria

Fig. 6. Employment trends by sectors (in 000s). EU27+.

Source: CEDEFOP

The trend in the number of employees in the building sector both as an independent value and as compared to the total number of employed persons in the national economy during the period 2000-2010 is significantly declining. The migration of the Bulgarian population from villages to towns (caused by the economic growth until 2008), was the main reason for the rapid growth of multi-family houses, office and retail buildings. The flooded market nowadays will lead to reduction of build rates in these sectors. The growth of the construction sector in Bulgaria depends mostly on the

economic situation in the EU. The expectations are for increased build rates only for detached houses, semi-detached houses and luxury residential buildings, mainly built around the big Bulgarian cities. Construction of new retail buildings will either stay on the same level or will slightly grow, which is directly related to the expected dynamics of the building workforce until 2020.



Fig.7. Employed persons – total for the national economy and in the building sector, 2000-2010, in thousand people (according to NSI data).

The average monthly number of employees on payroll for the nine months of 2011 is 131 000 people, which represents a reduction by 11.5% as compared to the same period of 2010.

According to analyses of the Bulgarian Construction Chamber the number of the unemployed in the building sector is more than 100 000 people. According to the NSI the number of the unemployed for the first half of the year is 59 000. Unemployment in the building sector bears the marks and seasonal nature typical for the sector. The economic crisis has to a certain extent screened the positive and negative characteristics of the sector. Again, according to BCC, the relative share of construction companies operating in the non-formal economy has reached the level of 15-20% for a 10-year period.

Distribution of the employed persons by labour contract and position arrangements in the building sector as per the classes of occupied positions according to the National Classification of Professions and Positions and subsectors according to Classification of Economic Activities 2008 for 2010

Legend: Qualification structure of persons employed under labour contract and position arrangement as per the classes of occupied positions:

- 1 – President, legislators, senior civil servants and managers
- 2 – Experts in analytical studies
- 3 – Technicians and experts in other applied sciences
- 4 – Administrative staff
- 5 – Personnel employed in provision of services to the population, trade and security
- 6 – Skilled workers in agriculture, forestry, fishery and hunting sectors
- 7 – Skilled industrial workers and craftsmen in similar trades

8 – Operators of machines and equipment and installers

9 – Professions not requiring specific qualification

Subsectors of CEA 2008 / National Classification of Professions and Positions classes	Number of employed persons by classes of the National Classification of Professions and Positions									
	1	2	3	4	5	6	7	8	9	TOTAL
2010 National total	122 393	305 600	238 227	216 970	380 014	15 625	240 444	297 968	299 031	2 116 272
F Construction	9 547	8 471	11 724	11 335	5 395	482	42 840	21 046	45 487	156 327
41. Construction of buildings	3 948	3 543	5 000	5 161	2 668	207	20 432	5 672	23 349	69 980
41.1 Activities for implementation of investment projects for buildings	161	143	135	167	166	5	128	51	203	1 159
41.2 Construction of residential and non-residential buildings	3 787	3 400	4 865	4 994	2 502	202	20 304	5 621	23 146	68 821
42. Construction of facilities	2 979	2 517	3 598	2 616	1 038	92	11 213	10 112	10 069	44 234
42.1 Construction of roads, incl. railroads	1 365	1 049	1 643	1 168	440	50	3 279	6 613	5 436	21 043
42.2 Construction of transmission and distribution lines and networks	768	689	866	718	267	19	3 380	1 681	2 442	10 830
42.9 Construction of other facilities	846	779	1 089	730	331	23	4 554	1 818	2 191	12 361
43. Specialized building activities	2 620	2 411	3 126	3 558	1 689	183	11 195	5 262	12 069	42 113
43.1 Clearing and preparation of construction site	213	205	192	268	136	15	367	1 161	560	3 117
43.2 Construction of installations	1 091	1 079	1 481	1 459	572	50	5 391	1 489	3 400	16 012
43.3 Finishing construction activities	574	392	708	951	634	49	2 458	817	4 882	11 465
43.9 Miscellaneous specialized construction activities	742	735	745	880	347	69	2 979	1 795	3 227	11 519

Table 5. Distribution of the employed persons by labour contract and position in the building sector by classes of the National Classification of Professions and Positions for 2010

Training in the framework of national education system

The number of pupils, who have acquired professional qualification 2nd Level in professions from the construction sector in 2010 is 906 (total for all professions 14 834). As compared to 2000 a total of 1278 individuals have acquired Professional Qualification Certificate in professions 2nd Level in the field of construction (according to NSI data). The difference is due to a large extent to the changes in the educational requirements and in a medium-term horizon it is expected that the 2010 figures will be retained.

Narrow fields of education	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Secondary school graduates	18198	15595	4121	13355	13738	12826	10792	9841	7981	7677	7498
Persons, who have acquired professional qualification – total	18198	15595	4121	29781	23119	21639	20031	18819	15532	16816	14834
Architecture and civil engineering	1278	1079	431	1845	1247	1171	1011	944	815	1060	906

Table 6. Number of pupils acquired 2nd professional qualification level

The number of pupils, who have acquired professional qualification 3rd Level in professions from the construction sector in 2010 is 641 (total for all professions 9366), which is less than the number of graduates in the year 2000, when 1680 individuals had acquired Professional Qualification Certificate in professions 3rd Level in the field of construction (according to NSI data). The difference is again due to a large extent to the same reason and no significant change of the 2010 figures is expected by 2020.

Narrow fields of education	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Secondary school graduates	28439	27871	29533	30956	28511	29793	29506	29659	25525	25772	23064
Persons, who have acquired professional qualification – total	28439	27871	29533	1637	11134	10628	10514	10409	8410	8332	9366
Architecture and civil engineering	1680	1227	1322	20	870	804	888	868	788	479	641

Table 7. Number of pupils acquired 3rd professional qualification level

A trend of diminishing of the number of persons taking training or graduating in professions from the building sector (especially professions of low-level professional qualification – 1st and 2nd) has been observed.

In 2010, the following numbers of workers have completed courses in the vocational training centers in the professions, which are the object of this analysis:

Number of trainees in the vocational training centres

Professional direction “Electrical engineering and energy sector”

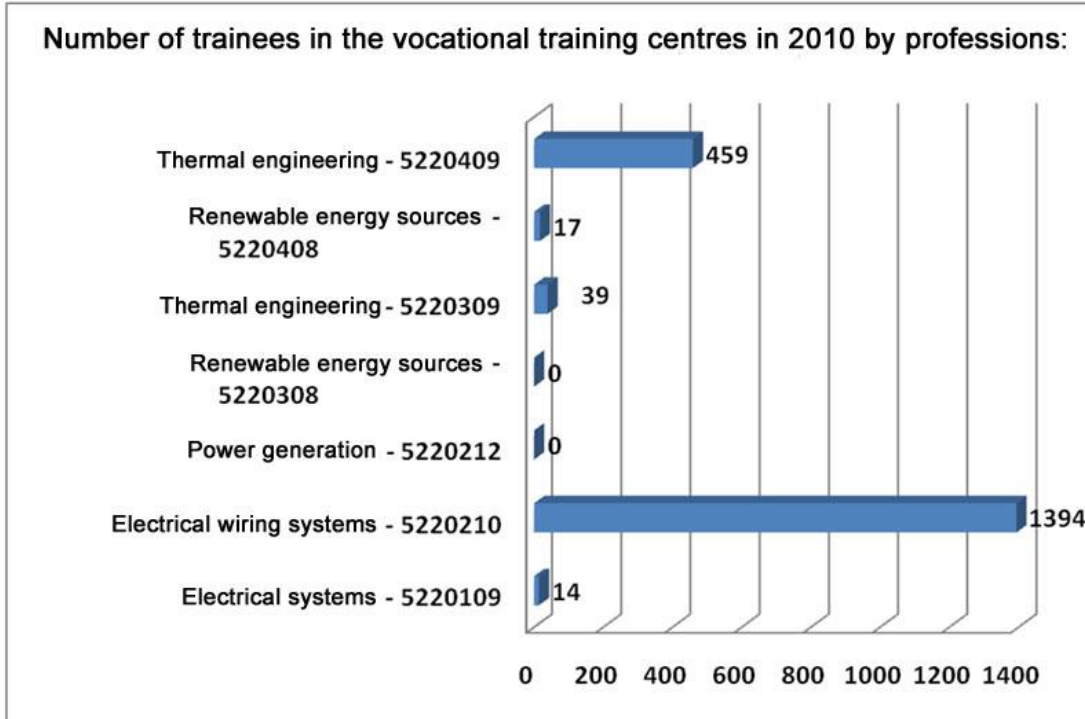


Fig. 8. Number of trainees in the vocational training centres in 2010, professional direction “Electrical engineering and energy sector”.

Professional direction “Construction”

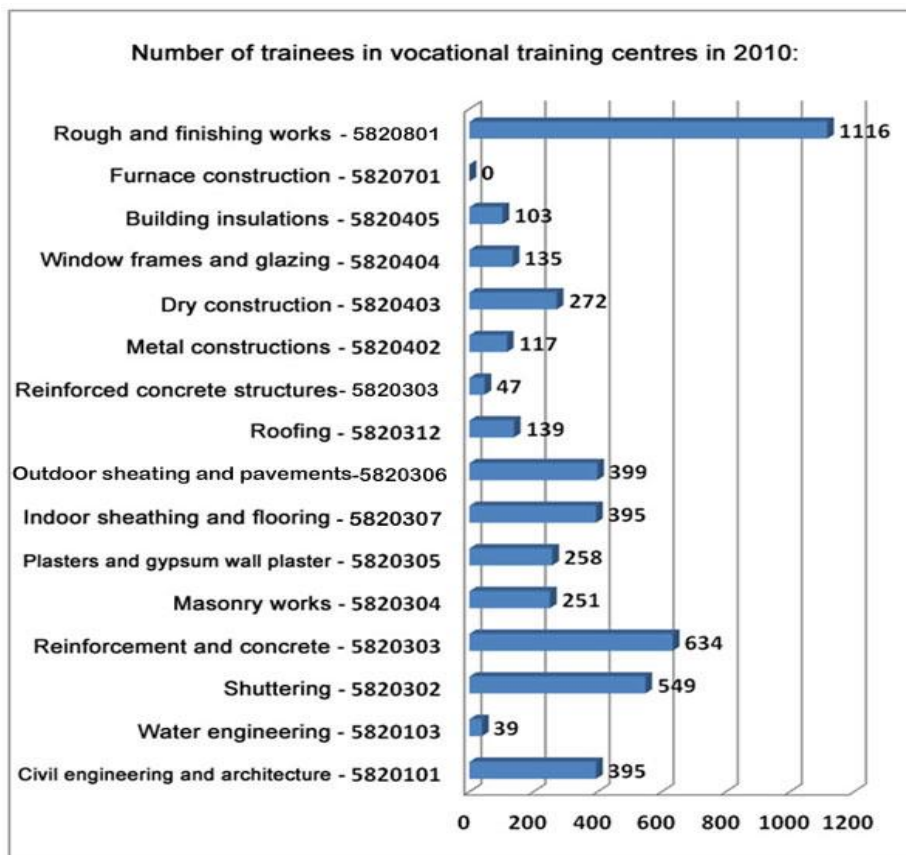


Fig. 9. Number of trainees in the vocational training centres in 2010, professional direction “Construction”.

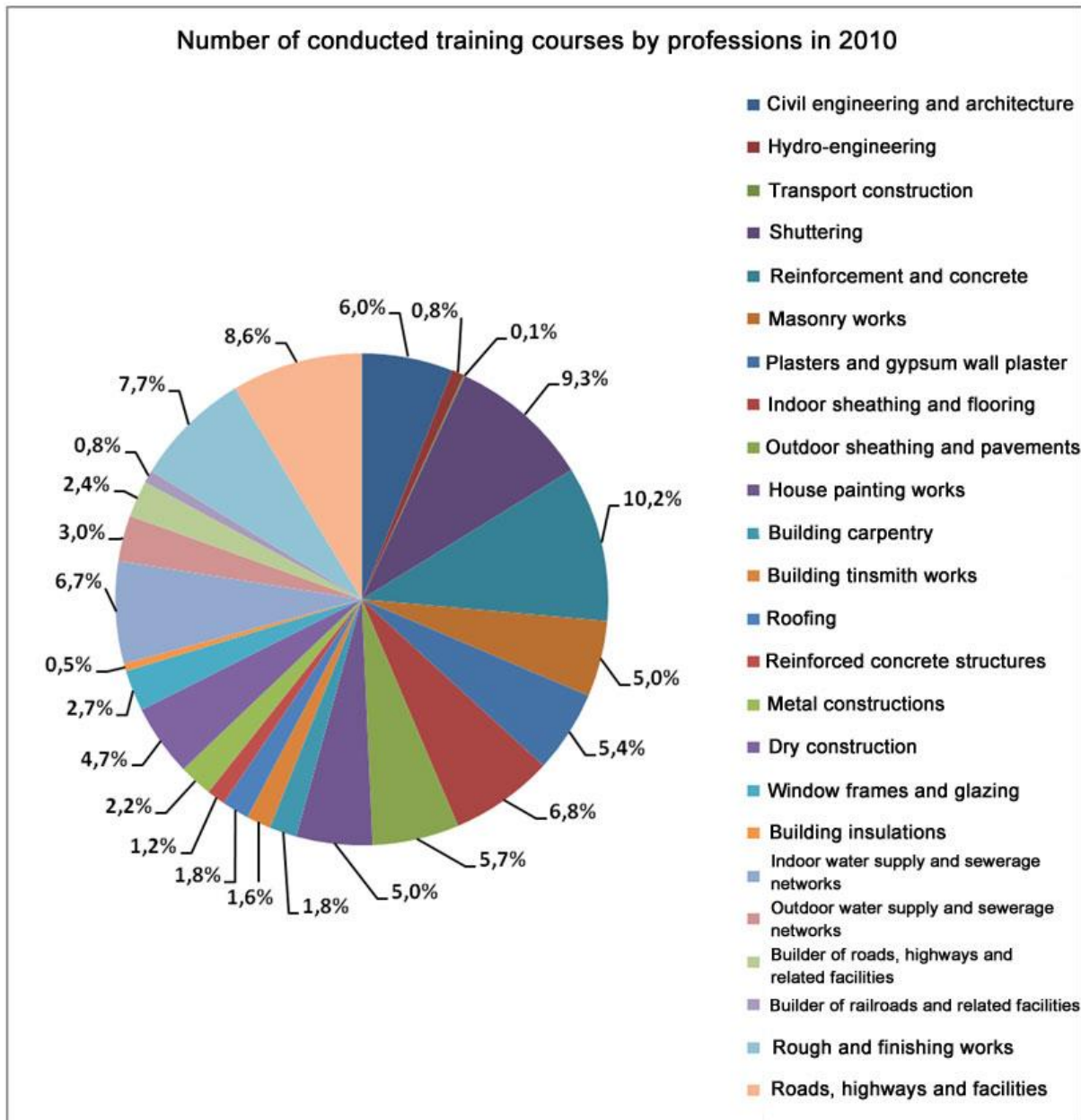


Fig. 10. Number of conducted training courses by crafts in 2010. Source: NAVET

From the information above, it is evident that in 2010 in the training programmes were not included crafts directly related to servicing of energy efficiency and/or retrofitting. There are very few trainings for specialists on RE systems conducted which turns out to represent a major gap between the existing skills of the workforce and the needs for 2020 (see below).

Newly emerging skills and needs for new/additional qualification

The newly emerging skills, connected with the improvement and upgrading of the qualification of the building workforce, may hardly be forecasted in a medium-term horizon, since they are directly dependent of the technology developments and market trends. Even if no dramatic new changes of building technology are expected, the low level of introduction of existing ones - especially in the area of RE systems, together with the under-developed market make all predictions highly uncertain.

It can be however stated with a certain degree of reliability that the knowledge related to application of innovative energy efficient solutions, as well as the decisions related to integration of RES in buildings, are not adequately addressed in the national educational system. On the contrary, the small number of exceptions, which are often result of individual initiatives of certain institutions in the vocational training and education system, have proven through their success the existence of emerging and already assessed market demand.

On the basis of the performed analyses of existing studies and surveys the following newly emerging solutions, requiring additional qualification of craftsmen working in the different subject fields and/or upgrading of their skills have been identified:

- General knowledge and skills for construction of low-energy and passive buildings (technological core);
- High insulation standard ($< 0,18 \text{ W/m}^2\text{K}$);
- Balanced ventilation with heat recovery ($>80 \%$);
- Triple glazing;
- PV (rooftop and facade);
- Biomass CHP or trigeneration;
- Solar cooling systems;
- Water/water heat pumps;
- Brine/water heat pumps;
- Automatic lighting controls;
- Automatic controlled external shading.
- Work with inventory shuttering and built-in thermal insulations;
- Water-based floor heating;
- Methods of fastening of thermal insulation package and steam insulation;
- Installation of window frames: connection window-thermal insulation; fitting of indoor and outdoor window sills.

In addition, the results from the performed empirical studies and surveys indicate that to date there is demand for additional craftsmen for implementation of the following solutions, which cannot be assumed as newly emerging, but are of decisive significance for the application of measures in the field of energy efficiency and renewable energy sources:

- Air/water heat pumps
- Pellet boiler
- LED Lighting
- Gas-fired boiler
- Oil-fired boiler
- Solid-fuel-fired furnace

Regarding the skills level, problems have been identified in the following fields and possible building solutions:

- Gas-fired boiler
- Oil-fired boiler
- Solid-fuel-fired furnace
- Floor heating systems
- Cooling/Air-conditioning systems

As already mentioned above, learning of new skills, necessary for implementation of energy efficiency measures in the construction and operation of buildings, is projected at several levels:

- Existence of specific professions, related to the implementation of measures for energy efficiency improvement and the use of renewable energy in buildings, in the List of professions for VET;
- Incorporation of new knowledge, skills and competences, related to the energy efficiency measures, in the State Educational Requirements by professions;
- Changes in the training plans and programmes – for schools with permit from the Ministry of Education, Youth and Science; for the vocational training centres - at the initiative of the centres proprietor;
- Addition of new themes, which are not clearly mentioned in the training programmes, in the framework of the process of planning of the trainings on the respective subject in the annual distribution of classes, or in the respective course in the vocational training centres.

To date, no proposals for changes in the State Educational Requirements or the training plans and programmes have been submitted.

It is not reckoned necessary to introduce new specific professions related to implementation of measures for energy efficiency improvement and the use of renewable energy in buildings. On the other hand, it can be sustained with a high degree of confidence that changes are necessary in the other three levels – incorporation of new knowledge in the State Educational Requirements by professions, changes in the training plans and programmes and adding of new themes in the educational process. There is a clearly manifested need of new craftsmen in the professions “Technician in energy equipment and systems – RES” (5220308 – 3rd Level of professional qualification) and “Installer of energy equipment and systems – RES” (5220408 - 2nd Level of professional qualification), but it should be noted that the high-quality implementation of renewable energy in buildings is the responsibility of specialists from other directions as well, who should also acquire elementary knowledge in that field. It can be assumed with a certain degree of conventionality, that the need for additional qualification in that field, forecasted for the specialists from the two professions quoted above, is valid also for the other related professions (marked in the analysis below). Since increase of the number of craftsmen in neither of these professions has been reported, the emphasis is laid on the need of changes in the training plans and programmes and the addition of new themes in the process of education.

According to the conducted study introduction of new training programmes and/or upgrading of the currently used ones is necessary as a matter of priority in the following directions:

- General knowledge and skills for construction of low-energy and passive buildings (technological core);
- High insulation standard ($< 0,18 \text{ W/m}^2\text{K}$);
- Balanced ventilation with heat recovery ($>80 \%$);
- Triple glazing;
- Biomass CHP or trigeneration;
- Automatic lighting controls;
- Automatic controlled external shading;
- Solar thermal for DHW, Solar cooling systems Brine/water heat pumps, Water/water heat pumps, Air/water heat pumps
- Pellet boiler;
- Balanced ventilation with heat recovery ($>80 \%$);
- LED Lighting; Automatic lighting controls;
- Gas boiler, oil boiler;
- Air handling units and filters;
- Cooling/air conditioning systems;

- Radiators;
- Air handling units and filters;
- Underfloor heating system;
- Window installers.

At this point it should be noted that the need of permanent optimization of the training and educational programmes is valid for all the investigated professional groups. In this specific case the emphasis is laid on clearly manifested dependencies identified in the course of the analysis of the available documents, the results from the conducted survey and the qualitative research methods.

As already stated above, the knowledge in implementation of innovative solutions for energy efficiency improvement and integration of renewable energy in buildings is not adequately covered in the vocational training and education system. One cannot fail to note the absence of proposals for changes in the State Educational Requirements or the training plans and programmes, especially in comparison with the identified need of additional qualification and re-training of the specialists, above all in the field of application of RES in buildings. The outcomes of the conducted quality studies based on semi-structured interviews show that making changes to the training plans and programmes and adding new themes in the practice is actually a “bottom-up” process, quite often the result of individual initiatives or specific projects, funded mainly through programmes of the European Commission.

In this sense, it is often stated that training plans and programmes are a conservative matter, since they are prepared according to a planning period of not less than 5 years and seldom meet the actual trends. The paths for updating of the teaching content are presumed to be bound to the initiative of teachers/trainers, who are entitled to introduce new content in the framework of the programme (including in the course of classes for freely chosen study subjects), specialized seminars and workshops with the participation of external experts (companies and branch associations) and in project-based initiatives. These practices are assessed as being very successful, taking due account of the significant interest on the part of the pupils in the vocational high schools and the workers in continuing education courses; and the real improvement of the quality of education through practical classes is evident.

Going back to the issue of the acute need of additionally trained workforce in the area of RE installations, which has been constantly reported, it has to be taken into account that, until recently, there were practically no qualified specialists in this area. It is virtually impossible to give accurate estimation of the number of specialists actually involved with installations of RES equipment and systems as this activity has been overtaken by other specialists in practice - mainly electricians and thermal engineering technicians. However, the need for further training has been recognized for all related specialties and duly reported. The positive sign is that with the recent changes in the Law on RES, all companies offering such products and/or services are obliged to hire a certified expert (in compliance with the enforced registration regime with the State Agency for Metrological and Technical supervision of the companies active in installation, servicing and maintenance of RES systems). This legally created market niche has visibly enhanced training activities in the area, including training of trainers; however, precise data about the employment rate of such specialists is still not available.

With a view to the forecast norm for penetration of systems for integration of renewable energy in buildings in the optimistic scenario and the identified shortage of certified specialists, the need of increase of the number of workers is estimated as follows: ~40% in the direction photovoltaic and solar thermal systems; 10-15% in the direction geothermal systems and heat pumps; 15-20% in the direction small biomass-fired boilers. Despite the identified need of specialists for installation of mini wind turbines it is not possible to forecast the need of new workers, since the extent of penetration of that technology in the country is negligible and there are no reliable forecasts concerning the expected growth in the building practice.

The quantification of the identified needs for building of new or upgrading of existing capacities according to the actual qualification framework is presented in the Action plan for implementation of trainings on intelligent solutions for EE and RES in buildings until 2020 and the “Current state, practices and trends in the building sector in Bulgaria” analysis elaborated in the framework of the BUILD UP Skills project.

Qualification of trainers

The opinion that there are not enough adequately qualified teachers/trainers is clearly gaining ground. Emergence of practices of self-training, which do not comply with the requirements for didactics and methodology in the educational system, has been observed. There are many approaches for training of trainers in the framework of projects with external financing, and a shared opinion that this is the one of the very few working methods. The post-graduate qualification in the higher educational institutions is defined as a suitable modality, but the observation is that such practices are not common. The existing practices of company-based training limit the qualification to a specific product or equipment, which is justified but not applicable to the training of trainers.

The identified shortage of teachers/trainers is viewed as a grave problem, especially with a view to the high age structure (a significant number of the trainers is above 55 years of age) for the majority of those currently employed. It is recognized that there are no mechanisms and reference points, which might help assess the quantitative needs of trainers. In the practice, it is usually relied on the personal initiative and the opportunities for career development and adaptation of the capacities to the current needs. Of course, the major problem related to staffing - the low remuneration level - is also pointed out on all occasions. The crisis in the building sector is, to a certain extent, regulating this gap, and in the recent two years penetration of young teachers has been observed. They are estimated to be the bearers of innovations in the teaching content, but nevertheless the general trend remains negative.

In this connection, it is worth noting the fact that the further qualification of the trainers in professional capacity building is not well regulated and there is no institution responsible for it (as different from the system of general education) and therefore building of an additional institutional capacity is necessary. The manner in which the institutions in the system of professional education manage to handle the problem is again through seminars and workshops sponsored by companies, which regard themselves as carriers of innovations, as well as through trainings under the PHARE Programme and other EU programs. No resources have been envisaged except for the funding provided from the delegated budgets of the schools. The interaction among the educational institutions and the enhanced possibilities for co-operation are also viewed as a major instrument for optimization of the training practices.

The need of implementing a national policy and providing institutional support, including by the centres for post-graduate training (above all in the higher educational institutions) is recognized. Proposals have emerged to incorporate opportunities for re-training of engineers under the OP “Human Resources Development”. The estimate is that these are namely the people, who are able to introduce innovations and practical knowledge. It is relied upon penetration of leading technologies and the respective training practices with support from the EC programmes despite the existing barrier of inadequate training facilities.

According to the conducted research, there is no clearly identified need of additional educational establishments. According to the qualitative study, the number of the professional high schools and the vocational training centers is determined on market principle and the demand for specific professions is based on the social development and actual trends. However, the opinion that regulated regional distribution of professional high schools is necessary is also well documented on several occasions. It is a common understanding that partnerships between professional high schools and VTCs should be sought after, as there are already good examples in this respect.

Monitoring needs

The establishment of a specialized structure aimed at assessing the dynamics of demand in the building sector and steering of the efforts of the educational and training institutions in the necessary direction is regarded as an important step for maintaining the quality of professional qualification. The possible actions have been reviewed in two main directions, whereat the leadership in this field is associated on one hand with the branch organizations and associations and, on the other hand, with the bodies of the executive authorities. Although the opinions that it is the business communities and its organizations that should bear the responsibility for ensuring feedback to the educational institutions, there has not been a single case in which the possibility for creating a specialized structure in the framework of the Ministry of Education, Youth and Science of NAVET has been denounced. Some respondents even insist on actions of that type. Once again, successful practices of co-financing and public-private partnerships, which can support the efforts in this direction, come to the fore.

It is presumed that the expected changes in the Law on Education and the Law on VET will ensure a base for setting in place of such a structure, which would systematize and unite the efforts of the bodies of the executive authorities, the educational and training institutions and the branch organizations and representatives of business in the planning of the number of the necessary specialists, as well as in the elaboration, adaptation and optimization of the training plans and programmes. The timeframe indicated to date is not more than two years for updating of the teaching content, which, of course, is predetermined by the high pace of development of new technologies. In all the conducted interviews the major role of the EC programmes and of cooperation with leading European institutions for improvement of the quality of the training programmes for vocational training and their topicality has been emphasized.

Unfortunately, to date there is no fundamental strategic document at the national level, committed specifically to the policies in the field of vocational education and further professional training (like the National strategy for further professional training for the period 2005-2010). The concrete activities, which are expected to be realized in the system for VET, are laid down in the Objectives of the Administration of the Ministry of Education, Youth and Science for 2012 and the Action Plan for 2012-2013 in implementation of the National Strategy for Lifelong Education (2008-2013). A detailed review of the quoted documents will reveal that the first steps of monitoring of the inadequacy between the demand for qualified specialists and the supply in the national system have already been made (or are pending to be made in a short-term horizon).

In connection with the last tasks above it can be added that the currently enforced criteria for evaluation of the quality of vocational education unfortunately do not include updating of the training plans and programmes and involvement in activities for improvement of the qualification of teachers, but on the other hand it should be acknowledged that collaboration with the social partners and the branch organizations and the acquiring of practical experience on real work places is envisaged, which to a high extent has a positive influence on the process of synchronization of market demand and supply of qualified workforce.

Barriers⁵

A significant numbers of barriers related to the qualification of the building workers which obstruct the expected development and may hinder the achievements of the 2020 targets in the building sector in Bulgaria have been identified. It is hardly possible to assign those barriers to a specific market or policy area and to propose a coherent framework; many of the issues are overlapping and

⁵ Detailed description of the identified barriers is available in the analysis „Current state, practices and tendencies in the construction sector in Bulgaria”, elaborated in the framework of the BUILD UP Skills Bulgaria project.

concern – albeit to a different extent – construction companies and professionals, vocational education practitioners, producers and suppliers of building products and technologies, policy makers, etc... However, for the sake of better organization of the results of the analysis, a general distinction will be explored. The barriers are structured in four major categories:

- Barriers in the construction sector;
- Market barriers;
- Policy barriers;
- Barriers in the system of vocational education and training.

Barriers in the construction sector

- Impact of the financial crisis
- Lack of coherent HR policies
- Lack of loyalty
- Fragmentation of the labour market; regional discrepancies
- Motivation of the workforce
- Low educational level of the workforce; language and literacy barrier
- Low prestige of the profession
- Age structure of the workforce
- Lack of experience
- Lack of practice for nearly-zero energy renovations
- Low level of penetration of RES technologies in buildings
- Grey economy

Market barriers

- Lack of investment interest to NZEB
- High cost of low-energy renovations
- Lack of market for new technologies and products

Policy barriers

- Unstable legislation base and institutional structure
- Lack of incentives for high-end low-energy new building and renovation projects
- Urban planning
- Quality assurance and assessment
- Lack of pilot and demonstration projects
- Lack of coordination between crafts and professions

Barriers in the system of vocational education and training

- Insufficient facilities and equipment, lack of financing
- Low number and unfavourable age structure of qualified trainers
- Access to training of trainers
- Monitoring and anticipation of training needs
- New training programmes
- Cooperation with business actors
- Lack of a national system for forecasting new skills
- Lack of financial and human resources for updating State Vocational Standards and their further development in terms of units of learning outcomes
- Unattractiveness of the professions, lack of adequate professional orientation

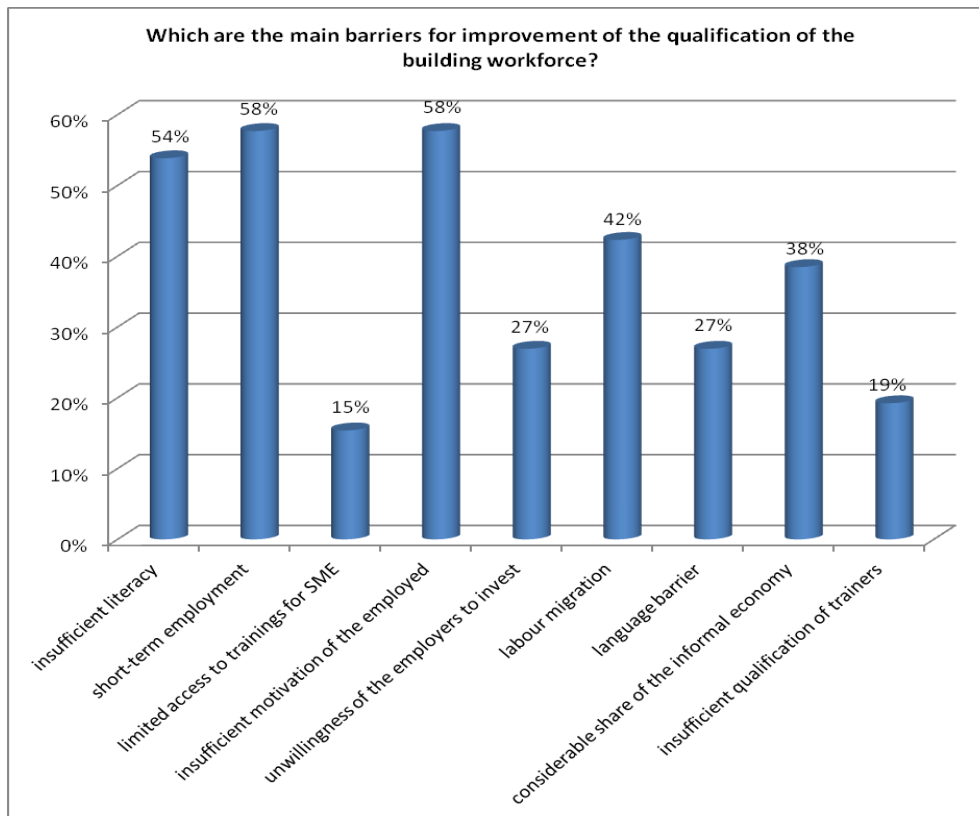


Fig. 11. Main barriers for qualifications upgrade in the construction sector

Priority areas

Priority 1. Measures for upgrading of the professional skills

Despite the results from the analysis “Current state, practices and trends in the building sector in Bulgaria”, proving diminishing of the number of persons employed in the construction sector after 2008 and the number of graduates from the national education system (vocational high schools and vocational schools) and the system for adult training (vocational training centres), no direct need of increase of the number of trainees in the existing professions and crafts in construction has been identified. Nevertheless, and irrespective of the fact that there are no statistical data for direct comparison of the number of employees in construction and the number of persons possessing professional skills in the field of construction, it is obvious that redistribution and re-orientation towards subject fields, in which there is higher demand on the part of employers is needed, especially with respect to professions, in which skills in installation and maintenance of the major in-house systems for renewable energy in buildings are acquired. According to expert estimations provided by NAVET, the average training cost for short trainings for one employee amounts to approximately EUR 406.

As a consequence of the analysis of the identified gaps between the supply of skilled craftsmen on the labour market and the demand on the part of the employers in the quoted study, it may be declared that an adequate number of specific professions, related to implementation of energy efficiency measures and the use of renewable energy in buildings exist in the “List of professions for vocational education and training”. This means that the efforts should be oriented mainly towards changes in the contents of education/training with a view to acquiring of competences, which the persons currently on the labour market and the persons, who have just graduated, do not possess, but are required for introduction of innovative energy efficient solutions.

Measure 1

Review of the State Educational Requirements concerning acquisition of skills by professions and supplementing of knowledge, skills and competences related to the introduction of innovative energy efficient solutions

The professions and crafts, in which a need of acquiring new competences according to the study “Current state, practices and trends in the building sector in Bulgaria” has been detected, are as follows:

- Electrician (Electrical in-house systems);
- Power installer (Electrical in-house systems, Power engineering);
- Technician - energy equipment and systems installer (Thermal energy engineering, renewable energy sources);
- Installer of energy equipment and systems (RES, thermal engineering);
- Building technician (Civil engineering and architecture, hydro-engineering);
- Builder (Internal sheathing and flooring, Outdoor sheathing and pavements, Roofing);
- Building assembler (Door and window frames and glazing, Insulations in construction).

It is necessary to make an assessment of the State Educational Requirements for acquiring qualification in these professions and - together with the business community - to work out proposals for addendum to the following structural elements of the State Educational Requirements: “Description of the profession”; “Objectives of training”, “Outputs from training” and “Requirements concerning the training facilities” in connection with the need of mastering of skills related to the application of newly emerging solutions by the trainees:

- General knowledge and skills for construction of low-energy and passive buildings (technological core);
- High insulation standard ($< 0.18 \text{ W/m}^2\text{K}$);
- Balanced ventilation with heat recovery ($>80 \%$);
- Installation of triple glazing package;
- Photovoltaics (roof- and façade-mounted);
- Cogeneration and/or three-generation using biomass;
- Solar cooling systems;
- Geothermal systems, heat pumps;
- Automated lighting control;
- Automated external shading control;
- Operation with inventory formwork and built-in thermal insulation;
- Water-based floor heating;
- Methods of fixing of a thermal insulation package and steam barrier;
- Installation of door and window frames; window-thermal insulation joints; shaping of indoor and outdoor window sills;

as well as with competences required for installation, operation and maintenance of:

- Air-water heat pumps;
- LED lighting;
- Pellets-fired boilers;
- Gas-fired boilers;
- Naphtha-fired boilers;
- Coal-fired boilers;
- Floor-heating systems;
- Cooling/air-conditioning systems

It is necessary to set up minimum three working groups (representatives of enterprises and training institutions in the field of construction, the energy sector and energy engineering), which will formulate specific proposals for updating and addendum of the existing State Educational Requirements concerning acquiring of qualification in the listed professions on the basis of the conclusions of the study “Current state, practices and trends in the building sector in Bulgaria” and with due consideration of new solutions, which have emerged during the past year.

The financial resources – in the event that no additional studies and interviews will be required – comply with the traditional expenditures of NAVET within the framework of the procedure for updating of the State Educational Requirements; NAVET works out the State Educational Requirements by professions using funds from its own revenue or from the state budget. It is possible that the proposals for updating of the State Educational Requirements by professions, supplementing of the existing training programmes with new themes/modules, might be financed as part of the activities under a project designated for updating of the educational content by professions specified in the Roadmap.

Measure 2

Incorporation of new modules in the curricula or new themes in the training programmes of the training institutions from the system of national education on all the professions from the professional directions “Civil engineering” and “Electrical engineering and energy sector”

Incorporation of new modules in the curricula or new themes in the training programmes of the training institutions from the system of national education has been planned with a view to mastering of competences oriented towards the newly introduced energy efficiency solutions or for acquiring the missing competences for introduction, operation and maintenance of new and existing equipment.

The changes in the curricula and training programmes are made on the basis of the already formulated proposals for updating of the State Educational Requirements for acquiring of qualification by professions in the framework of assignment by the Ministry of Education, Youth and Science and with funding from the state budget. The curricula and training programmes are coordinated with the employer associations (and through them with representatives of concrete enterprises from the respective subsector).

The timeframe for implementation of that change is up to one year after the date of promulgation in the State Gazette of the ordinances, which endorse the State Educational Requirements for acquiring qualification by professions.

In view of the length of education in the vocational high schools it may be anticipated that persons possessing the required competences will graduate at the earliest 2 or 3 years after the endorsement of the changes made in the curricula and training programmes (the expected term is not 4 years as is the normal length of vocational education at school, because it is possible that the object of changes might be subjects, which are studied in the 11th and 12th grade and that these changes might be reflected in the educational contents for pupils admitted to the vocational high schools the preceding year/years).

In so far that the proposals for incorporation of new themes and new results from the learning process in the educational programmes do not require new furnishing and equipment for the training facilities of the schools, there are no specific expenditure for their introduction. The new equipment and the need of purchase by the schools of materials and products for implementation of the learning process are reviewed under Priority 3.

The incorporated new themes will make it necessary to make changes also to the manner of admission and certification of the trainees in the institutions of the system of national education.

Measure 3

Incorporation of new modules in the curricula or new themes in the training programmes of the vocational training centres for all professions from the professional directions “Civil engineering” and “Electrical engineering and energy sector”

Incorporation of new modules in the curricula or new themes in the training programmes of the vocational training centres for all professions from the professional directions “Civil engineering” and “Electrical engineering and energy sector” has been planned with a view to mastering of competences oriented towards the newly introduced energy efficiency solutions or for acquiring the missing competences for introduction, operation and maintenance of new and existing equipment.

Since the issue is related to new curricula and training programmes for vocational training centres, which apply for licensing by the state, the compliance of the documentation with the State Educational Requirements by professions is evaluated in the framework of the licensing procedure. This means that the deadline for starting to apply this requirement to the candidates for licensing is immediately after the promulgation on the State Gazette of the ordinances concerning the State Educational Requirements by professions. The expenditures are for the account of the candidates for licensing.

Changes in the curricula and training programmes of already licensed vocational training centres need to be made and that is the responsibility of the individual vocational training centres and in the interest of retention of their competitiveness. For acceleration of the process for the purposes of faster response to the demands of the business, it is possible that on the basis of the already made amendments in the State Educational Requirements, NAVET should strengthen the control on the changes in the curricula and training programmes of the vocational training centers. The decision to make the changes, however, rests with the individual vocational training centre and as per the provisions of the Vocational Education and Training Act the NAVET does not possess the authority to oblige all the licensed vocational training centres to make adjustments.

Since the training provided by the vocational training centres is more flexible and shorter, it is possible that within a year (or even less in the event that the training courses are shorter) after the changes in the State Educational Requirements for acquiring qualification by professions there might be a larger number of trained persons, who possess the required skills and qualification for implementation of innovative solutions in the field of energy efficiency and the use of RES.

The incorporated new themes will not require changes in the manner of admittance to the institutions of the system of national education and respectively certification.

Measure 4

Introduction of changes in the national examination programmes related to the professional directions “Civil engineering” and “Electricity engineering and energy sector”

The changes in the national examination programmes are made on the basis of the endorsed State Educational Requirements for acquiring qualification by professions at the assignment by the Ministry of Education, Youth and Science with funding from the state budget.

The timeframe, in which this change should be implemented, is one year after promulgation in the State Gazette of the ordinances, by virtue of which the State Educational Requirements for acquiring qualification by professions have been approved.

The amendments to the national examination programmes will not impose changes in the manner of admission to the institutions of the system of national education and respectively certification.

Measure 5

Organization of short-term training courses (for part of a given profession) for acquiring of the required competences for introduction, maintenance and operation of energy efficient solutions

The training courses may be conducted by the institutions of the system of vocational education and training – vocational high schools, vocational colleges and vocational training centres. The training should comply with the updated State Educational Requirements by professions.

A matter of exclusive importance is conducting of the practical part of the training – its length (at least 50% of the classes) should be guaranteed by the Vocational Education and Training Act. The conditions for conducting of this part of the trainings are also very important – at real workplaces (for which serious support by the enterprises is expected), or practical trainings within the training institution (provided that modern equipment is available on site).

The training efforts should be oriented towards persons employed by companies (specified by both the employers and at the initiative of the employees), as well as towards unemployed persons, trained for acquiring new qualification or upgrading of the existing one.

The training of unemployed persons may be realized by the instruments of the measures for promotion of employment.

There are several opportunities for financing of the trainings of employed persons – by means of vouchers (in so far as the schemes “I can” and “I can more” will have a follow-up during the next programming period) or through schemes, under which the beneficiaries will be the employers.

The training efforts under Measure 5 might be organized also with funding laid down in the National Action Plan on Employment, which is worked out and approved by the social partners for every calendar year. One of the priorities in the National Action Plan on Employment is namely raising the quality of the workforce through acquiring of new qualification, upgrading of the qualification and skills of the employed and the unemployed for the purposes of ensuring the necessary human capacity for restructuring and technological innovation of the economy, higher labour productivity and better compliance with the requirements of the labour market. This priority aims at improvement of the capacity of the employed persons to adapt to the requirements related to suitability, adaptability and skills of the workers.

In all the cases the length of training stands out as a problem – currently the length of training under the existing measures, financed under the Operational Programme “Human Resources Development” or from the state budget, is legally regulated (minimum 960 classes for professions of Level 3, 600 classes for part of the professions of Level 3, minimum 660 classes for professions of Level 2, 300 classes for part of the professions of Level 2 of the Classification of Professions). It is necessary to submit a proposal to the Employment Agency and the Ministry of Labour and Social Policy for making legal provisions for the citizen’s right to participate also in qualification courses of shorter duration, financed with funds from the state budget or the European funds.

In order to submit such a proposal, an exhaustive argumentation of its feasibility will be necessary, as well as support by all the stakeholders – representatives of both workers’ and employers’ organizations.

The conditions for participation in such courses will be aligned to the requirements stated in the Vocational Education and Training Act, whereat in the event of existence of a scheme oriented towards qualification specifically aimed at acquiring skills related to energy efficient solutions additional conditions (sphere, in which the enterprise is operating) might be specified: e.g. “installation, operation and maintenance of energy efficient solutions”, region (number of companies engaged in such type of activity, number of employees and availability in the region of already installed equipment/facilities of this type), etc.

Measure 6

Information campaign among employers

The information campaign is planned with the aim to motivate employers to orient their personnel towards measures for maintaining and improvement of the qualification level with a view to improvement of labour productivity and attainment of higher quality of their product.

It is necessary to ensure adequate financial opportunities (from European funds or from the state budget) for involvement of a larger number of employed persons in specific training schemes. For the purposes of fostering employers' activeness it is necessary to facilitate the process of administration and reporting of projects for qualification of the employees in a given enterprise and to make amendments to the regulatory framework with a view to providing better protection of the employer's rights (in the event when the employers have the will to retain longer the employees, in whose qualification they have invested), as well as of the employed persons (who possess higher qualification and have ambitions for better career development outside the respective company and are more apt to quit).

Measure 7

Legislative regulation of the modality „on-the-job training”

The modality „on-the-job training” should be legislatively provided for as an opportunity for mastering skills required in the everyday practice for the shortest possible time at optimal cost.

The conducted study has revealed that even under the high-quality vocational education performed in schools, the well-educated specialists will join the labour market after 4-5 years at the earliest. This timeframe cannot be satisfactory for companies, which introduce energy efficient solutions and need skilled workforce right away.

It is necessary for the enterprises to recognize the need of or to be additionally motivated to implement such modalities of training of their employees (initial training or skills upgrading).

For successful implementation of activities for on-the-job training several amendments in the regulatory framework are necessary:

- regulation of the obligations of the tutors, including mandatory incorporation of this activity in their work contracts;
- qualification (initial and follow-up training) of the tutors, who will perform training of this kind, through elaboration of appropriate programmes and guidelines;
- creation of a set of instruments for on-the-job training for identification of the inadequate/missing skills, elaboration of individual training schemes, motivation, evaluation of competences, certification;
- validation of the knowledge, skills and competences acquired on the job.

Additionally, an EU recommendation concerning guaranteeing the quality of “on-the-job training” is in the process of elaboration.

Since the quality of on-the-job training is an issue related to the interests of both employers' and workers' organizations, the structures of state authorities, in whose functions might be incorporated the responsibility to support and control this activity, are NAVET and the Employment Agency. Also, they have been found to be among those cooperating the best with the social partners. However, at this moment they have neither the preparedness nor the resources to take up that task. In the event that it is decided at the national level to make legislative provisions for on-the-job training and a need for regulation of that process is found, it will be necessary to evaluate (on the basis of an analysis of the preparedness of the enterprises and of their demand) what exactly will be the role of the state, as well as what instruments shall have to be developed. The preparatory work (legislative provisions, capacity building) for setting up of a governmental institution, which will be assigned that function, may be planned for a timeframe of about three years.

Measure 8

Linking of the scheduled admission rates to the vocational high schools on the territory of every district with the demand of the business entities

Detailed linking of the scheduled admission rates to the vocational high schools on the territory of every district in the Republic of Bulgaria with the demand of the business entities – in this specific case with the needs of the enterprises employing workers with a subject profile “Renewable energy sources” – is indispensable with a view to the growing concentration of qualified workforce in the bigger cities and resorts. In view of this situation it is necessary to envisage as a matter of priority financing for training of unemployed as well as employed persons in this subject field in the framework of programmes and measures of the National Action Programme on Employment or with funding from the European funds (Operational Programme “Human Resources Development”).

In both cases with a view to the role played by the vocational high schools in this training (in terms of available teaching staff and training facilities) support is required on the part of both the Regional Inspectorate on Education with the Ministry of Education, Youth and Science and the regional structures of the employers’ organizations for the purposes of acquiring of the necessary knowledge and skills by the teachers on one hand and of equipment of the training facilities on the other (or support for signing of agreements between training institutions and enterprises for use of the training facilities in the enterprises).

Why at the regional level? Because the enterprises in the region are well known and their demand for workforce possessing specific qualification may easily be identified; while, at the same time, conducting of such a study at national level would be difficult and inefficient, as the toolbox for study of the market demands by profession is still in the process of elaboration.

Priority 2. Training of trainers: new or upgraded systems for qualification and requalification

According to NSI data the majority of the teachers on professional training in the vocational high schools and vocational colleges are university graduates. A characteristic feature of the higher education in Bulgaria is its strong theoretical bias and the shortage of adequate updating and practical orientation of its contents. In this sense the acquired baseline knowledge and capacity of the vocational training teachers in the higher educational establishment very soon becomes obsolete and outdated. On the other hand, the incessant introduction of new production technologies puts to a test the professional competence of the active teachers. The majority of them familiarize themselves with the new technologies, the respective equipment and the innovative materials used, only through specialized literary sources, although the training costs (based on expert estimation by NAVET) is relatively lower – about EUR 300. Moreover, an indisputable trend is that the predominant part of the trainers is in pre-retirement and retirement age. These conclusions highlight two major requirements with respect to the improvement of the quality of professional qualification of teachers on vocational training, described below.

Measure 1

Raising the quality of baseline knowledge and capacity of trainers on professional training

Irrespective of the number of steps undertaken in recent years for improvement of the quality of the provided higher education, there is still need of:

- *Changes in the curricula of the higher schools in the direction of enhancement of the practical orientation of education.*

The provision of professional training in real work environment to the students will assist the facilitation of their transition from the higher school to the labour market. The curricula for M. Sc. degree, which ensures the baseline training of the future teachers and trainers in the vocational high schools and vocational training centres, usually comprise hardly two weeks of practical training.

Responsible for restructuring and updating of the curricula are the higher schools, in which training connected with the implementation of intelligent energy efficiency solutions in the building sector is provided. It is particularly important that the updating of the curricula shall be performed with the active involvement of specialists from the practice.

The implementation of this task may be realized without investment of additional financial means. Till 2014, this might be achieved also in the framework of the project “Practical studies for pupils and students” of the Ministry of Education, Youth and Science under Operational Programme “Human Resources Development”, in which funding for such activity is envisaged. The only requirement is that the university should have a partnership agreement signed with an employer.

Another available opportunity is participation in a project under the scheme “Updating of curricula and training programmes in the higher education in compliance with the requirements of the labour market” of the National Action Plan on Employment for 2013 (provided this scheme is laid down again).

The possible timeframe for updating through restructuring of the respective curricula is two years. The changes will not affect the manner of admission to the higher school.

- *Building of long-term strategic partnerships between the higher schools, science and the business community*

An important precondition for ensuring high quality of the higher education is its partnership with science and the business community. Partnership is a way to integrate education, research and innovations. Education provides services to business and should comprise the most appropriate knowledge and skills, which will help the young graduates to feel competent as early as at the start of their carrier. A matter of significant importance is that the established forms of strategic partnership between the business and the universities should be based on recognition of the mutual benefit. Thus, real practical sessions and on-the-job training by prominent professionals will be ensured for the students. Through the participation of students coming from the respective subject field in the operations of partner companies, an opportunity is provided for conducting research, innovative, production and design activities.

In the majority of cases the initiative for establishment of cooperation is launched by the higher education establishment. The range of actions, from selection of partners, the initial negotiations for establishment of mutual confidence and will for joint work, to the founding of joint ventures for participation in contests for implementation of projects are steps, is usually time-consuming and cannot be expected to happen overnight.

The implementation of this task requires motivation of the management bodies of the higher education establishments, to which the Board of Rectors might contribute, and motivation of the leading companies in the field of implementation of intelligent energy efficiency solutions in the building sector, for which the Bulgarian Construction Chamber might assist.

This is a long-term task, but it is very urgent that its implementation should start within a year.

Measure 2

Updating of the qualification of the trainers on professional training

It is necessary to set up a permanent system for updating of the qualification of trainers on professional training through forms of continuing professional training. The forthcoming tasks in this sphere are as follows:

- *Creation of opportunities for upgrading/updating of the qualification of the teachers in their subject field from their higher education and in connection with the training content, which they teach*

In the recent 20 years the opportunities provided to the teachers of vocational training are mainly related to their pedagogical skills, ICTs and foreign languages. Training, which is aligned to the specifics of the profession and subject field acquired by the teacher by virtue of the graduated higher education, updating of his/her baseline capacity and knowledge about emerging new technologies, new equipment and new materials, is almost not offered at all. Upgrading/updating of the qualification of teachers in connection with the implementation of intelligent energy efficiency solutions in the building sector might be realized through a project, initiated by the respective higher schools with support by the Ministry of Education, Youth and Science and in partnership with the Bulgarian Construction Chamber under the new Operational Programme “Competitiveness and innovations” for the period 2014-2020, whose objectives are in the sphere of development of the knowledge and skills of the employed persons. In this way the required financial means will be ensured.

Another possibility for improvement of the qualification of trainers is application for support under the “Leonardo da Vinci” Programme – design activity, *mobility* of professionals in the sphere of vocational education and training (VETPRO) for vocational high schools, in which there is training on implementation of intelligent energy efficiency solutions in the building sector. Through the project activities the trainers will exchange experience with their colleagues from other countries for the purposes of learning from each other. The larger portion of the required funds will be ensured through the implementation of the project.

- *Creation of opportunities for motivation of employers, who have introduced new production technologies, new equipment and/or new materials, to support the training of trainers in its practical aspect*

The possibilities for identification and acquiring by the teachers in the vocational educational and training system of theoretical knowledge for implementation of intelligent energy efficiency solutions in the building sector are much broader than just acquiring of practical skills. The best option in this respect is provision of opportunities for practical training of trainers in the companies, which have introduced new technologies in this sphere.

A decisive role is assigned to the Bulgarian Construction Chamber, which through its forums and website provides information, clarification and promotion aimed at motivation of the managers of these companies. The persistent activity for raising the awareness about the benefits from the support for the practical training of trainers in the respective fields, as well as its broader popularization will assist the process of opening of the companies towards the needs of up-to-date practical training of teachers and trainers.

One possible step is proposal by the Bulgarian Construction Chamber for incorporation in the National Action Plan on Employment for 2013 and the years after of a scheme on the subject “Upgrading of the qualification of vocational training teachers in vocational high schools and trainers in the vocational training centres in connection with the implementation of intelligent energy efficiency solutions in the building sector”.

Priority 3: Improvement of the training facilities

There are grave problems with the material-and-technical stock of the vocational high schools and vocational colleges. In the majority of cases the training facilities is obsolete and heavily depreciated. They are not renovated and upgraded to the necessary extent and do not correspond to the modern technologies. The possibilities for conducting practical training under real production conditions are limited – a large number of the companies demonstrate no will at all for hosting of pupils. There is lack of correspondence between the equipment in the vocational high schools and vocational colleges and the new equipment for modern technologies, which are applied by the companies and production lines and the innovative materials used.

The requirements with respect to the material-and-technical stock for conducting vocational training are quoted in every State Educational Requirement for acquiring qualification in a specific profession.

A large number of vocational high schools make efforts to upgrade their training facilities and equipment through participation in different international projects and from equity revenue, mainly from conducting of courses for continuing vocational training, but the results are not particularly optimistic.

Measure 1

Participation in different programmes and projects related to improvement of the training facilities and equipment of the institutions from the vocational education system

For several years now, a National Programme “Modernization of the vocational education system” is being implemented. The volume of funding available for the current year is BGN 2 million, which is far from adequate for the meeting the increased needs of renovation of the material-and-technical stock of the vocational high schools and colleges. A serious difficulty facing the schools is the requirement to apply for funding in partnership with an economic entity, whose sphere of activity corresponds to the professions, with which the respective schools is applying. This company should co-finance the activities under the programme and/or lend machine tools and equipment to the amount of not less than 10% of the total value of the project and not less than BGN 10 000; it should also ensure practical training for pupils from that school for the period of implementation of the programme activities.

The participation in this and other national and international programmes and projects might be facilitated through creation of modules with the website of the Bulgarian Construction Chamber and other branch organizations, through which information shall be made available to the providers of vocational education and training (higher schools, high schools and vocational training centres), connected with the implementation of intelligent energy efficiency solutions in the building sector and the economic entities active in the same sphere. The information should cover the location, addresses (mailing address of the central office and e-mail), wherever available also website address and contact persons. In this way the communications between the training institutions and businesses will be facilitated and the search for partner/s for future joint participation in different programmes and projects (national and international) will be assisted.

Measure 2

Building of educational parks

Building of structures of a new type is necessary (“educational parks”, “aquariums”): one or at the most two such sites on the territory of the country, set up with the joint efforts of the state, the specific municipality, employers from the building sector and the energy sector (in demand or intending to hire people possessing the required qualification in the field of energy efficiency solutions) and training institutions on the basis of public-private partnerships.

The roles in such a partnership might be distributed in the following manner: the municipality lends a building or premises, the employers work out curricula jointly with the training institution, provide trainers on theory and practice and orient the persons seeking for training.

The state (the Ministry of Labour and Social Policy as a management body of the Operational Programme “Human Resources Development”, the Employment Agency, NAVET and the Ministry of Education, Youth and Science) is expected to assist the process of linkage of this type of education with the existing system for acquiring of qualification or for acceleration of the process of approval of amendments to the regulatory framework in order to make provisions for this form of education and also to create prerequisites for an appropriate measure, in the framework of which building of educational parks might be funded (not only in the sphere of qualification connected with energy

efficient solutions, but in other spheres as well, in which serious shortage of workforce with a specific qualification is observed).

In the educational parks, people from different settlements and regions might be trained - both employees of the partner companies, which have taken part in the setting in place of the respective structure, and persons, who are in the process of acquiring elementary vocational training (from the system of national education or unemployed persons at the request of the State Labour Bureau and the municipalities). The financing of the equipment and furnishing of an accommodation stock for the trainees (who will be from different parts of the country) is expected to be provided with money from the Structural Funds (and within reasonable limits from the state budget and instalments by the employers).

Priority 4. Structural measures for monitoring of the processes

In the analysis “Current Status, Practices and Trends in the Building Sector in Bulgaria” has been highlighted the need of assessment of the needs as a result of monitoring of the gaps and inconsistencies between the demand of qualified professionals in the building sector and the supply by the national system for vocational education and training. The creation of a specialized structure or assignment of additional functions to an existing one for the purposes of assessment of the dynamics of the demand in the building sector and orientation of the efforts of the educational and training institutions in the appropriate direction represent an important step for sustaining the quality level of professional qualification.

For the purposes of conducting systematic activities in the field of monitoring of the processes related to the requirements to the skills in the building sector (e.g. through elaboration of fundamental analyses and studies of the current state and trends on the labour market, the workforce, the skills, qualification level and competences of the employee by branches and regions) and evaluation of the competences of the workforce, the following measures might be undertaken:

Measure 1:

Forecast of the demand of workforce possessing specific characteristics in connection with the introduction of energy efficiency solutions

This measure might be realized through the project “Building a system for forecasting of the demand of workforce possessing specific characteristics” financed under Operational Programme “Human resources development”, co-financed by the European Social Fund of the European Union.

The main objective of the project is preparation and updating of reliable and comprehensive forecasts for the development of the labour market, necessary for implementing of effective and targeted policies in the sphere of education, training, social inclusion and active policy on the labour market through establishing of a “System for forecasting of the demand of workforce possessing specific characteristics”.

The specific objectives of the project are:

- To support the establishing of an active system, which should assist the better correspondence between the demand and supply of skills on the labour market in Bulgaria;
- To reduce the disparities on the labour market and promote economic growth through overcoming of the shortage of skilled workforce in specific economic activities and categories of professions;
- To improve the process of planning in the sphere of the educational system and the system for providing training for acquiring of qualification in a long-term and medium-term horizon;
- To improve the opportunities for professional orientation and carrier development through effective support of unemployed and employed persons in connection with the selection of profession, orientation for qualification, additional qualification and requalification;

- To build the capacity of the institutions related to the labour market in terms of formulation and implementation of policies based on long-term and short-term forecasts for the development of the labour market in Bulgaria.

The major activities and outputs from the implementation of the project are:

- Setting in place of a “National unit for forecasting of the development of the labour market in Bulgaria”;
- Conducting of studies for identification of employers’ needs in a short-term and medium-term aspect of workforce possessing specific characteristics;
- Preparation and testing of macro-econometric model for forecasting of the development of the labour market in a medium-term and long-term aspect.

Measure 2:

Preparation of “Annual analyses of the activities of the licensed vocational training centres”, which offer training in professions and subject fields in the professional directions “Civil engineering” and “Electrical engineering and energy sector”

In implementation of the provisions of the Vocational Education and Training Act, by 31 January of every year NAVET collects, systematizes and analyses statistical data and information about the vocational training courses provided by the licensed vocational training centres. The object of the annual information are the training courses for acquiring of a degree of professional qualification, conducted by the vocational training centres, as well as training courses on part of a profession. Short-term training courses, which might be performed at the request of employers or on the basis of the individual aspirations of the employees, are also included. In this way it is possible to trace annually what courses are preferred by the employers in connection with the energy efficiency solutions in buildings and, above all, which skills are covered by the training content of these courses.

On the basis of the conclusions made and the trends identified in the annual analyses different proposals might be worked out and measures might be undertaken at the sectorial level for improvement of the qualification of the employed and the unemployed.

Measure 3:

Project “Development and introduction of an information system for assessment of competences”, financed under Operational Programme “Human resources development” and implemented by the Bulgarian Industrial Association

In the framework of the project, 10 regional centres for assessment of the competences and 20 sectorial consultancy boards are set up. One of the consultancy boards is for the building sector. In 2014, it is expected that competence models for the sector will be developed, comprising key posts with description of specific competences.

The information system for assessment of competences is expected to start officially in 2013. The results from the assessment and self-assessment, which is envisaged to be provided by that system, will ensure reliable feedback not only about the level of implementation, but also about forecasting of the needs of new skills in a given sector, including the building sector. In practical terms the information system will act as a bridge between the demand of the business community and the need of updating of the curricula and training programmes. An aspect of particular significance is also the possibility for certification of the knowledge and skills acquired under non-formal training modalities, which is an important measure in the building sector since in it the number of workers, who do not possess formal qualification, is quite high.

A draft idea for follow-up on this project for the period 2014-2020 is in the process of elaboration by the Bulgarian Industrial Association, which in practical terms will cover the entire period of the Roadmap.

Priority 5. Interactions among the stakeholders

The state and municipal institutions, employers and employers' associations and the training institutions should conduct a coordinated policy with respect to:

- identification of the needs on the labour market;
- justified planning of training formats for acquiring and maintaining of professional qualification for pupils, employed and unemployed people;
- initiation of measures for acceleration/facilitation of the process of vocational training on the basis of identified good practices in Bulgaria and in other countries;
- evaluation of the effect from the undertaken measures.

There are various options for financing such measures, including the "Intelligent Energy - Europe" programme, "Lifelong Learning" programme and the operational program which will succeed OP "Human Resources Development".

Measure 1. Building a network with the participation of the training institutions and the business community

It is necessary that a functioning mechanism for cooperation between vocational high schools, vocational training centres, companies offering internal training or training related to specific products offered by the company, enterprises and branch organizations, related to the activities and professions dealt with in the analysis, NGOs, governmental bodies is developed. This network of institutions in Bulgaria offering training or employing persons with specific qualifications required for the introduction of energy efficiency solutions should be linked with other similar structures in other countries or at the EU level.

Measure 2. Development of a specialized electronic

Following the goal to facilitate interactions and activities by the main stakeholders, a web-based electronic platform should be developed, providing possibilities for:

- provision of information concerning existing energy efficient solutions (by the business community and the manufacturers),
- newly developed training programmes, teaching aids, manuals (by the training institutions and NGOs),
- existing regulatory documents, curricula and programmes (by the governmental institutions),
- information about identified needs of workforce possessing qualification related to the energy efficient solutions (by municipalities, the State Labour Office and enterprises).

Measure 3. Legislative provisions concerning the right to practice professions related to installation, maintenance and repair of RES systems

The right to practice professions related to installation, maintenance and repair of RES systems is expected to be regulated by virtue of an ordinance worked out in partnership between the state and the business community (i.e. incorporation of this/these profession/s in the list of regulated professions). The implementation of this measure would guarantee to a high extent that those practicing these professions would possess the required competences for implementation of the respective activity, and at the same time will allow to legally provide for up-keeping of the acquired qualification *vis-à-vis* the fast penetration of innovative solutions and the need of regular updating of the competences of those employed in this sphere. In the process of elaboration of the ordinance it will be necessary to make use of the good practices on a global scale, as well of the existing regulations concerning practicing of professions subject to regulation in Bulgaria. In the process of introduction of such regulatory amendment it will be necessary to analyse also the potential risks in

order to avoid complications of the procedures for acquiring of qualification and limitation of the access to training on the professions related to the use of RES.

Measure 4. Building of training structures of a new type

It is expected that modern training structures (e.g. “educational parks”) – one or at the most two on the territory of the country – will be built with the joint efforts of the state, a concrete municipality, employers from the building sector and the energy sector, and training institutions on the basis of public-private partnerships (Refer to Priority 3 above). The state (the Ministry of Labour and Social Policy in its capacity of management body of the Operational Programme “Human resources development”, the Employment Agency, NAVET, the Ministry of Education, Youth and Science) is expected to assist the process of linking of this type of training with the existing system for acquiring of qualification or to accelerate the process of approval of amendments in the regulatory framework, to ensure legislative provisions for that form of training and also to create preconditions for an adequate measure, in the framework of which building of educational parks might be financed (not only in the sphere of qualification related to energy efficient solutions, but in other spheres as well, in which a grave shortage of workforce possessing specific qualification has been observed).

Opportunities for financing:

“Intelligent Energy – Europe” Programme

“Life-long learning” Programme

The Operational Programme, which will succeed the Operational Programme “Human resources development”

Equity funding

Responsible institutions:

Branch organizations: the Bulgarian Construction Chamber, the National Installers Union, etc. Since no clearly manifested interest in participation in qualification activities on the part of the business community has been observed, and the citizens themselves do not manifest wish to participate in training activities and to date there are no signs of any changes in this trend, probably the best solution might be that the state should come forward as initiator of such activities.

Priority 6. Raising the citizens’ awareness about the opportunities for energy efficient solutions

It is evident from the analysis that the absence of interest in energy efficient solutions in construction is to a high extent due to the shortage of:

- citizens’ culture with respect to energy saving in everyday life;
- information about the extent, to which the use of specific new materials, systems, technologies and solutions related to improvement of the state-of-repair of already existing buildings and equipment might contribute to energy saving during their operation;
- information about comprehensive solutions (for instance buildings with nearly zero energy consumption) during new construction, especially in the event of construction of luxury estates and single-family buildings, in which, according to the conducted study, a minimal increase of the interest is anticipated.

Measures:

1. Incorporation of themes related to energy efficiency in the fundamental stage of education with a view to acquiring skills for energy saving in everyday life.

2. Identification of subjects and incorporation of themes, oriented towards acquiring of skills for possible approaches to and potential benefits from the use of energy efficient solutions in existing and new buildings, in the high school education:

- identification of adequate subjects for the individual grades of the elementary education and formulation of themes;
- working out of training content and adequate teaching methods;
- this measure might be realized within a period of about 5 years (from the point of submission of the proposal for incorporation of a new theme to the incorporation of the learning content in the respective manual/teaching aid);
- the necessary funds for introduction of this change in the learning content are designated mainly for the two participating teams: the one, which will prepare the proposal for submission to the Ministry of Education, Youth and Science (it might be also with the Bulgarian Construction Chamber) and the second one, which will identify adequate subjects, work on the integration of the themes in these subjects, the elaboration of the learning content, the training methods etc.

3. Media campaign, oriented towards raising the citizens' awareness about the energy efficiency measures, which may be applied in everyday life and the measures for improvement of the energy efficiency of the existing building stock or new buildings and facilities with minimum energy consumption, including bonuses (use of additional financial sources, taxation preferences, etc.).

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List of abbreviations

BCC –Bulgarian Construction Chamber

BPIE – Buildings Performance Institute Europe

CEDEFOP – European Centre for the Development of Vocational Training

DHW – Domestic Heated Water

EBRD – European Bank for Reconstruction and Development

ESF – European Social Fund

GDP –Gross Domestic Product

ICT – Information and Communication Technologies

IEE – Intelligent Energy Europe

LED – Light-emitting diode

NAVET – National Agency for Vocational Education and Training

nZEB – Nearly Zero Energy Building

NSI –National Statistical Institute

OP – Operational Programme

RES – Renewable Energy Sources

SEDA – Sustainable Energy Development Agency

SME – Small and Medium Enterprises

VTC – Vocational Training Centre

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Information sources:

In English:

Buildings Performance Institute Europe (BPIE) (2011) Europe's Buildings Under The Microscope – a country-by-country review of the energy performance of buildings. Available at:

http://www.bpie.eu/eu_buildings_under_microscope.html

CEDEFOP – European Centre for the Development of Vocational Training, International Labour Organisation (2010) Skills for Green Jobs – European Synthesis Report. Luxembourg: Publications Office of the European Union

CEDEFOP – European Centre for the Development of Vocational Training (2012) Skills Forecast.

Employment trends by sector. Available at: <http://www.cedefop.europa.eu/EN/about-cedefop/projects/forecasting-skill-demand-and-supply/skills-forecasts/main-results.aspx?CountryID=31&case=ETBS>

European Construction Industry Federation (2011) Annual Report. Available at:

http://www.fiec.org/docshare/docs/2/NNNPENACFCDBPAECHNHMDBLFCFG5T44VCPDWY9LI35DWE/ECIF/docs/DLS/FIEC_AR_2011-EN-v01jlow-20110622-000003-EN-v1.pdf

European Construction Industry Federation (2012) Annual Report. Available at:

http://www.fiec.org/docshare/docs/3/NNNPENACFCDBPAECHNHMDBLFCFG5T44VCPDWY93V3PDWY/ECIF/docs/DLS/FIEC_AR_2012-FR-20120628-000001-EN-v1.pdf

International Labour Organization (2011) Comparative Analysis of Methods of Identification of Skill Needs on the Labour Market in Transition to the Low Carbon Economy. Geneva: European Commission.

International Labour Organization (2011) Skills and Occupational Needs in Green Building. Geneva: European Commission.

In Bulgarian:

Агенция за устойчиво енергийно развитие. Годишни цели и отчети. Достъпен на

http://www.seea.government.bg/index.php?option=com_content&view=article&id=170&Itemid=127&lang=bg

Агенция за устойчиво енергийно развитие. Национална дългосрочна програма по енергийна ефективност до 2015 г. Достъпен на:

<http://www.strategy.bg/StrategicDocuments/View.aspx?lang=bg-BG&Id=377>

Агенция по заетостта (2012) Статистика и анализи. Обобщени данни за пазара на труда.

Достъпен на: <http://www.az.government.bg/internal.asp?CatID=25/01&WA=Summaries.asp>

Агенция по заетостта. Статистика и анализи. Годишни прегледи. Достъпен на:

<http://www.az.government.bg/internal.asp?CatID=25/05&WA=AnaProSurv.asp>

Българска народна банка (2011-2012) Икономически преглед. Достъпен на:

<http://bnb.bg/ResearchAndPublications/PubPeriodical/PubEconomicReview/index.htm>

Директива 2012/27/ЕС на Европейския парламент и на Съвета 25 октомври 2012 г. относно енергийната ефективност, за изменение на директиви 2009/125/ЕО и 2010/30/ЕС и за отмяна на директиви 2004/8/ЕО и 2006/32/ЕО. (Официален вестник на ЕС, L 315/1, 14.11.2012)

Директива 2010/31/ЕС на Европейския парламент и на Съвета от 19 май 2010 година относно енергийните характеристики на сградите (преработена версия) (Официален вестник н° L 153 , 18/06/2010 стр. 0013 – 0035)

Директива 2009/28/ЕО на Европейския парламент и на Съвета от 23 април 2009 г. за насърчаване използването на енергия от възобновяеми източници и за изменение и впоследствие за отмяна на директиви 2001/77/ЕО и 2003/30/ЕО. (Обн. Официален вестник на ЕС, L 140 от 05.06.2009 г. – бълг.)

Директива 89/106/ЕИО на Съвета от 21 декември 1988 г. относно сближаването на законите, подзаконовите и административните разпоредби на държавите членки по отношение на строителните продукти. (Официален вестник на ЕО, L 40/12 от 11.02.1989 г.)

Енергийна стратегия на Република България до 2020 г. Обнародвана в Държавен вестник, бр. 43 от 7 юни 2011. Достъпен на: <http://www.mi.government.bg/bg/themes/energiina-strategiya-na-republika-balgariya-do-2020-g-147-295.html>

Евростат. Статистическа база данни. Достъпен на:

http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

Институт за пазарна икономика (2010-2013) Преглед на стопанската политика (седмичен бюлетин). Достъпен на: <http://ime.bg/en/>

Институт по енергийните характеристики на сградите Европа (2012) Изграждане на сгради с почти нулево потребление на енергия в България (nZEB). Към дефиниция и пътна карта. Достъпен на:

http://www.bpie.eu/documents/BPIE/publications/Bulgaria_nZEB/BG/BG_full_report.pdf

Закон за енергетиката. Обн. ДВ, бр. 107 от 9 декември 2003 г., изм. многократно, посл. изм. ДВ, бр. 82 от 26 октомври 2012 г.

Закон за енергийната ефективност. Обн. ДВ, бр. 98 от 14 ноември 2008 г., изм. ДВ, бр. 6, 19, 42 и 82 от 2009 г., бр. 15, 52 и 97 от 2010 г., бр. 35 от 3 май 2011 г. и бр. 38 от 18 май 2012 г.

Закон за енергията от възобновяеми източници. Обн. ДВ, бр. 35 от 3 май 2011 г., изм. и доп. ДВ, бр. 29 и 54 от 2012 г.

Закон за занаятите. Обн. ДВ, бр.42 от 27 Април 2001 г., изм. многократно, посл. изм. ДВ, бр.28 от 5 Април 2011 г.

Закон за Камарата на строителите. Обн. ДВ, бр.108 от 29 Декември 2006 г., изм. многократно, посл. изм. и доп. ДВ, бр.82 от 26 Октомври 2012 г.

Закон за народната просвета. Обн. ДВ, бр.86 от 18 Октомври 1991 г., изм. многократно, посл. изм. и доп. ДВ, бр.102 от 21 Декември 2012 г.

Закон за обществените поръчки. Обн. ДВ, бр.28 от 6 Април 200г., изм. многократно, посл. доп. ДВ, бр.15 от 15 Февруари 2013 г.

Закон за професионалното образование и обучение. Обн. ДВ, бр.68 от 30 Юли 1999 г., изм. многократно, посл. изм. ДВ, бр.97 от 10 Декември 2010 г.

Закон за техническите изисквания към продуктите. Обн. ДВ, бр. 86 от 1 октомври 1999 г., изм. многократно, посл. доп. ДВ, бр. 84 от 2 ноември 2012 г.

Закон за устройство на територията. Обн. ДВ, бр.1 от 2 януари 2001 г., изм. многократно, посл. изм. ДВ, бр. 82 от 26 октомври 2012 г..

Камара на строителите в България. Проекти. Достъпен на:

http://www.ksb.bg/en/index.php?option=com_content&task=view&id=114&Itemid=124

Милков, Пенчо (2010) Договорна система между участниците в строителния процес. Научни трудове на Русенския университет - 2010, том 49, серия 7.

Министерство на икономиката, енергетиката и туризма. Бюлетин за състоянието и развитието на енергетиката на Република България (2011 г.). Достъпен на:
<http://www.mi.government.bg/bg/themes/byuletin-za-sastoyaniето-i-razvitiето-na-energetikata-na-republika-balgariya-2011-g-658-296.html>

Министерство на икономиката, енергетиката и туризма. Бюлетин за състоянието и развитието на енергетиката на Република България (2012 г.). Достъпен на:
<http://www.mi.government.bg/en/themes/byuletin-za-sastoyaniето-i-razvitiето-na-energetikata-na-republika-balgariya-2012-g-892-296.html>

Министерство на икономиката, енергетиката и туризма. Втори национален план за действие по енергийна ефективност 2011 – 2013 г., приет с Протокол № 36.14 на Министерския съвет от 28 септември 2011 г. Достъпен на: <http://www.mi.government.bg/bg/pages/energiyna-efektivnost-52.html>

Министерство на икономиката, енергетиката и туризма (2012) Национален план за действие за енергията от възобновяеми източници (Проект) по Модела за националните планове за действие в областта на енергията от възобновяеми източници съгласно посоченото в Директива 2009/28/ЕО на Европейския парламент и на Съвета.

Министерство на образованието, младежта и науката. Европейска квалификационна рамка за учене през целия живот. Достъпен на:
http://www.minedu.government.bg/opencms/export/sites/mon/left_menu/strategies/documents/p_reporaka_eu_kvalifikatsionna_ramka-BG.pdf

Министерство на образованието, младежта и науката (2012) Цели на администрацията на Министерство на образованието, младежта и науката. Достъпен на:
http://www.minedu.government.bg/left_menu/strategies/

Министерство на образованието, младежта и науката (2013) Списък на професиите за професионално образование и обучение. Достъпен на:
http://www.minedu.government.bg/opencms/export/sites/mon/top_menu/vocational/SPPOO_21-01-2013.pdf

Министерство на образованието, младежта и науката. Национална стратегия за продължаващото професионално обучение за периода 2005-2010 година. Достъпен на:
http://www.minedu.government.bg/left_menu/strategies/

Министерство на образованието, младежта и науката. Национална стратегия за ученето през целия живот 2008-2013. Достъпен на: http://www.minedu.government.bg/left_menu/strategies/

Министерство на образованието, младежта и науката. Национална квалификационна рамка на Република България. Достъпен на:
http://www.minedu.government.bg/opencms/export/sites/mon/left_menu/strategies/documents/NQF_bg.pdf

Министерство на образованието, младежта и науката. Държавни образователни изисквания за придобиване на квалификации по професии. Достъпен на:
http://www.minedu.government.bg/top_menu/vocational/doi/

Министерство на регионалното развитие и благоустройството. Национална жилищна стратегия на Република България. Достъпен на:
<http://www.mrrb.government.bg/index.php?lang=bg&do=law&type=4&id=220>

Министерство на регионалното развитие и благоустройството. Национална програма за обновяване на жилищни сгради в Република България. Достъпен на:

<http://www.mrrb.government.bg/index.php?lang=bg&do=law&type=4&id=225>

Министерство на регионалното развитие и благоустройството. Национална стратегия за регионално развитие 2012-2022 г.. Достъпен на:

<http://www.mrrb.government.bg/index.php?lang=bg&do=law&type=4&id=222>

Министерство на труда и социалната политика. Национален план за действие по заетостта 2012 г. Достъпен на:

<http://www.mlsp.government.bg/bg/docs/indexplan.htm>

Министерство на труда и социалната политика. Национален план за действие по заетостта 2013 г. Достъпен на:

<http://www.mlsp.government.bg/bg/docs/indexplan.htm>

Министерство на труда и социалната политика. Национална класификация на професиите и длъжностите в Република България-2011. Достъпен на:

<http://www.mlsp.government.bg/class1/store/listclass.asp>

Министерство на труда и социалната политика. Актуализирана стратегия по заетостта на Република България 2008 - 2015 година. Достъпен на:

http://www.mlsp.government.bg/bg/docs/Labour_Market_Strategy_2008-2015.pdf

Национална дългосрочна програма за насърчаване използването на възобновяеми енергийни източници 2005-2015 г., МИЕ/АЕЕ, декември 2005 г.

Национален статистически институт. Класификация на икономическите дейности. Достъпен на:

<http://www.nsi.bg/Classifics/KID-2008.pdf>

Национален статистически институт. Сектор Енергетика. Достъпен на:

<http://www.nsi.bg/otrasalen.php?otr=37>

Национален статистически институт. Сектор Жилищен фонд. Достъпен на:

<http://www.nsi.bg/otrasalen.php?otr=45>

Национален статистически институт. Сектор Образование и учене през целия живот. Достъпен на:

<http://www.nsi.bg/otrasalen.php?otr=36>

Национален статистически институт. Сектор Пазар на труда. Достъпен на:

<http://www.nsi.bg/otrasalen.php?otr=51>

Национален статистически институт. Сектор Строителство. Достъпен на:

<http://www.nsi.bg/otrasalen.php?otr=32>

Фондация „Анализ на риска“ (2008) Реалности и проблеми при подготовката на квалифицирани кадри за строителството. Достъпен на:

http://www.ksb.bg/index.php?option=com_content&task=view&id=447&Itemid=34

Централен професионален регистър на Камарата на строителите в България. Нормативни документи. Достъпен на:

<http://register.ksb.bg/>

Център за изследване на демокрацията (2011) Динамика на скритата икономика в България по време на криза. Достъпен на:

<http://www.csd.bg/>

Център за изследване на демокрацията (2012). Център за изследване на демокрацията.

Достъпен на: <http://www.csd.bg/>